TLAR

Aircraft Performance



PILOT GUIDE 8.4

OWYHEE AVIATION, LLC.

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1. Introduction

Welcome

Welcome to the TLAR pilot community and thank-you for joining the team! The TLAR app is designed to improve general aviation pilot situational awareness regarding aircraft performance. TLAR's performance engine runs a physics and aerodynamic model that predicts aircraft performance in real time. It does this once per second by calculating the three-dimensional position, attitude, and speed of your aircraft as a function of the physical forces (e.g. lift vs weight, thrust vs drag) that affect all aircraft as they move through the air. Why should you care? This enables TLAR to make reasonably accurate predictions of performance between and beyond the conditions explicitly covered by the POH. We have spent a long time testing various user interfaces and hope that you like where we have landed thus far. Making an interface that is both simple and intuitive, yet powerful and accurate for such a complex subject as aircraft performance is a difficult balance indeed. We welcome any suggestions you may have to improve the design or it's accuracy. Rest assured that we will continue to innovate and upgrade the TLAR application for the foreseeable future. This is a journey; we are glad you are on it with us!

This guide explains how to configure the new tile-based interface and how to use it as a disciplined cross-check during planning and flight. It does not replace the aircraft flight manual, placards, certified instruments, published procedures, current weather information, or pilot judgment.

TLAR Background

We created TLAR to fill what we saw was a need in the General Aviation community. Having "grown up" steeped in military aviation, complete with solid performance manuals and information, we were disappointed by the lacking and/or partially complete performance information contained in some General Aviation aircraft pilot operating handbooks (especially experimental category aircraft). Flying back country in the mountains of Idaho, Nevada, Oregon, Utah, Colorado, and others, it became an especially acute need for us to create something that could reasonably estimate aircraft performance. "TLAR" was born of this need. Like many terms used within TLAR, the "TLAR" name itself comes from a military aviation term/acronym. TLAR stands for "That Looks About Right," which in military circles is usually used in a conversation with one's thumb held high acting as a gunsight. It means that what follows is to be considered an estimate, something more-or-less accurate enough to be useful, but not something to be taken as precisely correct, hence, "That Looks About Right" or TLAR.

Aircraft and data model

TLAR currently includes the 40 aircraft models listed below. Don't see your airplane? Expert users can build their own model with Build Custom Planes (see Special Features). Appendix C compares each model's predictions with its POH data.

Code	Aircraft	Category
8KCAB	**American Champion 8KCAB Super Decathlon**	Certificated
A36	**Beechcraft A36 Bonanza**	Certificated
C150M	**Cessna 150M**	Certificated

Code	Aircraft	Category
C152	**Cessna 152**	Certificated
C170B	**Cessna 170B**	Certificated
C172M	**Cessna 172M Skyhawk**	Certificated
C172N	**Cessna 172N Skyhawk**	Certificated
C172S	**Cessna 172S Skyhawk SP**	Certificated
C180K	**Cessna 180K Skywagon**	Certificated
C182P	**Cessna 182P Skylane**	Certificated
C240T	**Cessna TTx (T240)**	Certificated
CA185F	**Cessna A185F Skywagon**	Certificated
DA40	**Diamond DA40 Diamond Star**	Certificated
FX2	**CubCrafters Carbon Cub FX-2**	Experimental
FX3	**CubCrafters Carbon Cub FX-3**	Experimental
GLSP	**Glasair Sportsman**	Experimental
GLST	**Glasair GlaStar**	Experimental
HROC2	**Harmon Rocket II**	Experimental
J3	**Piper J-3 Cub**	Certificated
K7SS	**Kitfox 7 Super Sport**	Experimental
K7STI	**Kitfox 7 STi**	Experimental
L39	**Aero L-39 Albatros**	Experimental
M20F	**Mooney M20F**	Certificated
PA18	**Piper PA-18 Super Cub**	Certificated
PA22	**Piper PA-22 Tri-Pacer**	Certificated
PA24250	**Piper PA-24-250 Comanche**	Certificated
PA24260	**Piper PA-24-260 Comanche**	Certificated
PA28140	**Piper PA-28-140 Cherokee**	Certificated

Code	Aircraft	Category
PA28181	**Piper PA-28-181 Archer**	Certificated
RV10	**Van's RV-10**	Experimental
RV12iS	**Van's RV-12iS**	Experimental
RV14A	**Van's RV-14A**	Experimental
RV4	**Van's RV-4**	Experimental
RV6	**Van's RV-6**	Experimental
RV7	**Van's RV-7**	Experimental
RV8	**Van's RV-8**	Experimental
SR20	**Cirrus SR20**	Certificated
SR22	**Cirrus SR22**	Certificated
SR22T	**Cirrus SR22T**	Certificated
T6G	**North American T-6G Texan**	Certificated

Subscription levels

The new interface exposes three public levels. Each higher level retains the capabilities of the level below it. The exact availability of a tile or control is governed by the shipping application, so this guide names the role of each level rather than promising a feature that may change in a future release.

Level	Dashboard capability
Basic	Core performance functions: Takeoff, Land, Climb, Cruise, HSI, Position, Clock, and the associated core information and control chicklets.
Pro	Adds Moving Map, Global Runway Database, automatic METAR downloads, Aircraft, Runway, Weather, Smart TOLD, Smart Climb/Cruise, Map, V-Speeds, Debrief, expanded weather and landing-zone functions, and LZ/preset sharing.
Expert	Adds HUD, Terrain-aware Emergency Turnback/Glide capability, Emergency Sim, custom-aircraft workflows, Expert emergency controls and values, terrain and tree-canopy awareness from high-resolution data (up to 1 m lidar) with AUTO Fence and obstacle analysis, 3D terrain visualizations in the Vertical Profile and 3D Terrain tiles, Telemetry, X-Plane integration, and OnSpeed AHRS integration.

Hardware/Software Requirements

TLAR needs an iPhone or iPad with an Apple A12 processor or newer. The App Store enforces this and will not install TLAR on older devices. Depending on the selected functions, TLAR can rely on location services, device motion, a network connection, audio routing, the device barometer, and a connected external source.

- iPhone: iPhone XS, XS Max, or XR or newer, including iPhone SE (2nd generation) and later.
- iPad: Wi-Fi + Cellular models only: iPad (8th generation), iPad mini (5th generation), iPad Air (3rd generation), iPad Pro (2018), or newer. Wi-Fi-only iPads have no GPS receiver, and the App Store will not install TLAR on them. TLAR is an iPhone app; on iPad it runs as the iPhone version scaled up to fill the screen.
- iOS: iOS 15 or later. The new tile-based interface needs iOS 17 or later; on iOS 15 or 16, TLAR opens in the legacy interface. Every A12 or newer device can be updated to iOS 17.

Mount the device where it can be read without interfering with aircraft operation and where it can be cross-checked promptly against the aircraft's approved instruments. Before a flight that uses spoken briefings or callouts, confirm headset or panel-audio routing on the ground.

Contact, License, and Release Information

This guide describes TLAR version 8.4. TLAR is developed by Owyhee Aviation, LLC.

Website and full-size manual: https://www.tlarpilot.com

Technical support: support@tlarpilot.com. Suggestions and custom-aircraft submissions (Flight Lead): flightlead@tlarpilot.com.

Credits. With a Pro or Expert subscription, Settings includes Credits, below Legal and Contact. It lists the data and map sources TLAR uses, with their required attributions. Pro shows the airport and runway, NOAA weather, and Apple Maps sources; Expert adds the elevation, tree-canopy, and hillshade sources and Iowa Environmental Mesonet weather observations.

End-user license: TLAR is licensed under Apple's standard Licensed Application End User License Agreement, https://www.apple.com/legal/internet-services/itunes/dev/stdeula/. Use TLAR at your own risk; Owyhee Aviation, LLC assumes no liability for its use.

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Privacy policy

The current privacy policy is at https://www.tlarpilot.com/privacy-policy.html.

2. Overview

The new interface is a dashboard you build yourself. A compact top row gives briefing access, shows the aircraft or current advisory, and reports navigation status. A bottom row opens Presets, LZ, Wx, Aircraft, Info, and Settings. Everything between them is yours to arrange.

Start by choosing a layout, the grid that divides the screen: Mixed, Dual Quad, Eight Pack, Map+Two, or Full Map. Fill each position with a tile, a self-contained display such as Takeoff, Land, HSI, Map, or Weather, sized 1×1, 2×2, or full screen. Most tiles carry chicklets around their edges: small readouts along the top and sides, and buttons along the bottom that change a mode or source. Tap a tile to flip it over and choose its chicklets.

When a dashboard works for you, save it as a preset. A preset stores the whole setup, so one tap switches between complete arrangements: one for planning at the desk, another for taxi and takeoff, and others for cruise or the approach. The rest of this chapter covers each part in turn.



Figure 1. Overview. 1: top row. 2: configurable tile grid. 3: bottom row of primary controls.

Reading the screen at a glance

Region	What it is for
Top row	Briefing access, the active aircraft or current advisory, and a compact navigation/source-health indication.
Tile grid	The pilot-selected collection of performance, navigation, weather, runway, time, and other display modules.

Chicklets	Small values and controls arranged around a tile. Some show data; others change a mode or source.
Bottom row	Direct access to Presets, LZ, Wx, Aircraft, Info, and Settings.

Top Row

Briefing control

Tap the Briefing control once to start the spoken briefing shown on the button. Tap it again to stop the briefing. On the ground, the button can show a takeoff briefing; in flight, it can show a landing briefing; and in the Expert emergency context, it can show the PLATO briefing. Check each briefing on the ground as part of your normal planning.

Aircraft and advisory field

The center field normally identifies the current aircraft. When an advisory is active, it instead presents the highest-priority current advisory. A message is an attention cue, not an automatic action command; assess the aircraft, flight condition, and inputs before responding.

Navigation Status

The NAV indicator at the right of the top row has two status balls. The outer ball reports navigation quality or simulator mode. The inner ball reports the active attitude/motion source or the state of the simulator data stream. Check both balls before relying on navigation-dependent tiles.

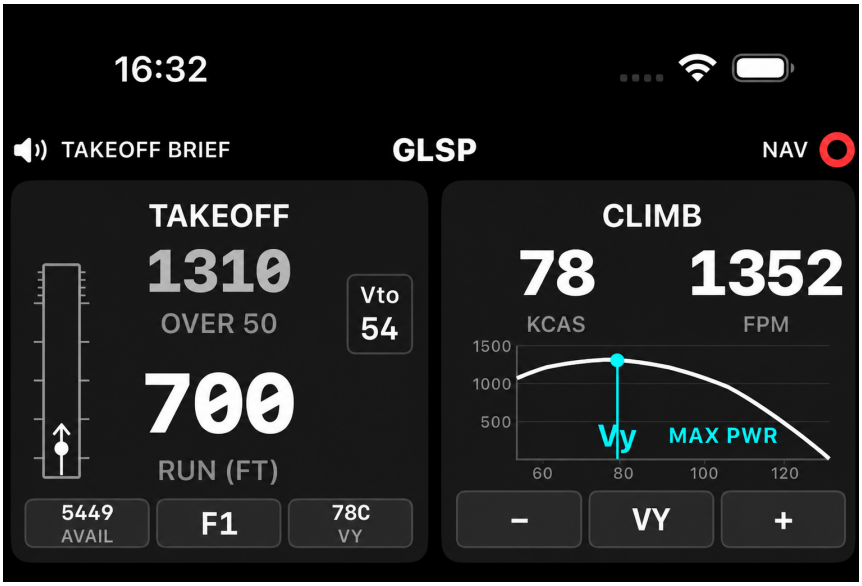


Figure 2. Navigation Status indicator. The outer red ring is the navigation-status ball; the black center is the inner motion-status ball.

What the outer ball means

The outer ball combines horizontal-position, vertical-position, speed, and direction status. Direction follows the source TLAR is displaying: GPS track when available, or heading when track has fallen back to heading. The worst of these four statuses determines the color.

Indicator	Accuracy criteria	Meaning

	All four are green: horizontal accuracy ≤ 15.14 m (about 50 ft), vertical accuracy ≤ 20 ft, speed accuracy ≤ 2 kt, and direction is green. GPS track is green at an accuracy of 4° or better. When heading is used instead, a valid heading report is green.	Normal device navigation.
	No component is red, but horizontal, vertical, or speed accuracy exceeds its green limit, or GPS track accuracy is greater than 4° and no greater than 10°. Heading has no yellow state.	Navigation is available, but accuracy is degraded.
	A required value is invalid, location services are off, or the displayed GPS track has an accuracy worse than 10°. When heading is used instead of track, an invalid heading report makes direction red.	A required navigation component is invalid, unavailable, or outside the track-accuracy limit.
	Not an accuracy rating: simulator GPS mode is selected.	The inner ball reports simulator-stream health.

What the inner ball means

Indicator	Meaning
	Clear / black center: normal device navigation is in use, but device motion is not active.
	Green center: device motion sensors are active.
	Blue center with normal navigation: a valid OnSpeed attitude source is in use.
	Blue center with blue outer ring: simulator GPS updates are being received.
	Yellow center with blue outer ring: simulator mode is selected and the GPS stream is stale; no update has arrived for more than three seconds.
	Red center with blue outer ring: simulator mode is selected but simulated GPS data are not being received.
	White center with blue outer ring: simulator mode is selected but TLAR has not yet received a simulated GPS update.

Representative advisories

When an advisory is active, it replaces the aircraft name in the center of the top row. TLAR shows the highest-priority active advisory; if multiple advisories share that priority, it rotates them. Treat every advisory as a prompt to inspect the related setting or condition—not as a command to continue or discontinue a flight.

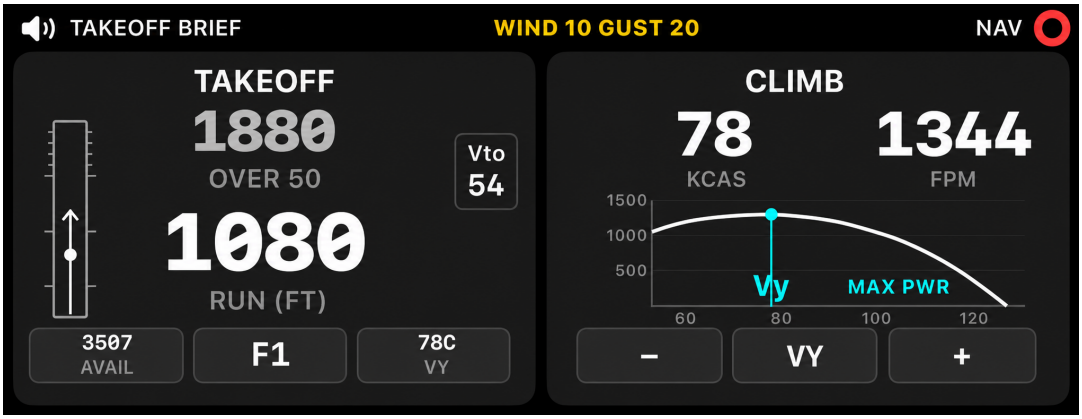


Figure 3. Advisory example. The yellow WIND 10 GUST 20 message replaces the aircraft name and directs attention to the active wind condition.

Example message	TLAR displays it when	Pilot response
WIND 10 GUST 20	A named weather station reports positive sustained wind and gust values, and the gust exceeds the sustained wind.	Review the source and include the gust component in the takeoff or landing decision.
STALE METAR ... MIN	A named-station observation is at least 60 minutes old and no AGE chicklet is visible. The message is suppressed when AGE is already on-screen.	Obtain and compare current weather before using it for performance planning.
CHECK TAKEOFF CLIMB MODE	A Takeoff tile is visible, the over-fence result is caution or danger, and the selected climb mode is neither Vx nor Vy.	Review the Takeoff tile's climb mode and the over-fence assumptions.
SET GLIDE DATA IN SETTINGS	Emergency mode is armed and either the best-glide speed or glide-ratio entry has not been validated.	Do not use emergency guidance until both values are entered and verified.
NEED ACTIVE LZ FOR EMRG	You attempt to arm Emergency mode without an active LZ. TLAR turns Emergency mode back off and shows the message briefly.	Load and verify the intended LZ, then arm Emergency mode again.
NEED PRECISE LZ COORDS FOR EMRG	You attempt to arm Emergency mode with an active LZ whose coordinates are not precise. TLAR turns Emergency mode back off and shows the message briefly.	Load a precise LZ before using Emergency mode.
COORDS IMPRECISE	An LZ is active and its coordinates, runway axis, or TDZE fail TLAR's precision validation. The message remains until LZ mode is off or a precise LZ loads.	Do not use runway-geometry, stabilized-approach, sVAPI, or Emergency-mode functions for that LZ.

CHECK FENCE — SET ..., DTED ...	Expert. AUTO Fence is not active, a takeoff or landing result is yellow or red, and the Fence Height you set is higher than the terrain and tree intrusion TLAR measured from downloaded terrain at that runway end.	Compare the set Fence Height with the measured value and the actual runway environment. Lower it only if the real obstacles allow.
... CLIMB HITS TERRAIN or TREE	Expert. The predicted climb-out for the selected climb mode, including acceleration to climb speed past the departure end, intersects terrain or trees in the departure fan.	Do not rely on the departure as planned. Review climb mode, weight, runway, and departure route.
... CLIMB BELOW PATH	Expert. The aircraft is still accelerating to climb speed past the departure end, so its predicted altitude is below the drawn departure climb line. Terrain is still cleared.	Expect less height early in the departure than the climb line shows. Review the climb mode and takeoff assumptions.

When coordinates are imprecise

"COORDS IMPRECISE" is more than a caution about the displayed location. TLAR uses the approach-end point and runway axis to calculate runway-relative geometry. When those inputs are not precise, TLAR deliberately removes or blocks functions that depend on that geometry.

- Emergency mode cannot be armed. If you tap the Emergency control, TLAR returns it to Off and shows NEED PRECISE LZ COORDS FOR EMRG.
- sVAPI and the associated approach presentation are unavailable. The HSI approach display, CDI, GSI, and PAPI guidance are suppressed.
- Stabilized-approach monitoring is unavailable because TLAR cannot establish the runway-relative stabilization point and approach geometry.
- Runway alignment, lineup, and pattern/turnback calculations tied to the selected LZ are unavailable or suppressed.
- The cross-phase takeoff-versus-landing advisories are suppressed because they depend on a precise runway reference.

REQUIRED CORRECTION Open LZ, select a runway with precise coordinates and a valid axis and TDZE, then verify the runway before relying on any of the restored functions.

APPENDIX The completed manual will include the full advisory catalog in an appendix, with the exact message text, trigger, severity, and recommended pilot cross-check. This chapter uses representative examples so the top-row workflow stays readable.

Bottom Row

Bottom Row Menu Selectors

Presets

Tap Presets to open the preset picker. Tap a saved preset to load its dashboard layout, tiles, and chicklets. To save the dashboard you are currently using, press and hold a preset slot, then follow the save prompt. A

preset saves the screen arrangement; always verify the aircraft, LZ, weather sources, and units after loading one.

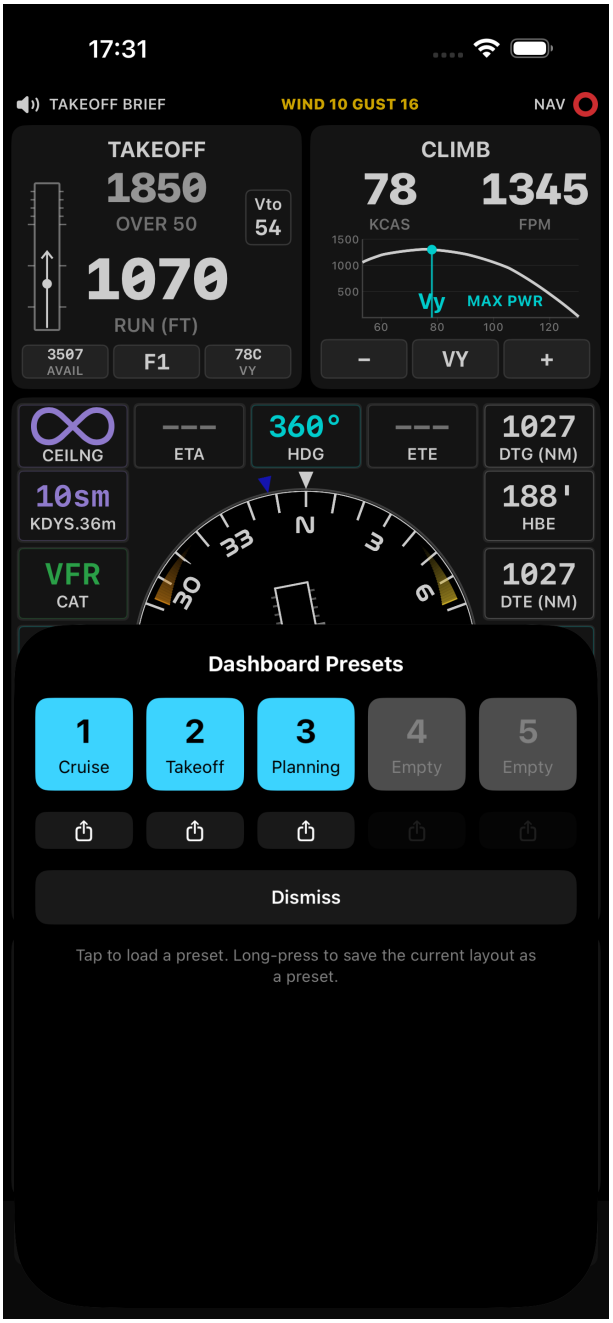


Figure 4. Dashboard Presets. Tap a numbered saved preset to load it. Press and hold a preset slot to save the current dashboard arrangement.

LZ

Tap LZ to open Landing Zone settings. Choose an airport, a saved strip, a new LZ, GPS Survey, or Map Survey; then select the runway you want to use. Before relying on takeoff or landing results, verify the active runway direction, dimensions, elevation, surface, and obstacle assumptions shown in the LZ settings.

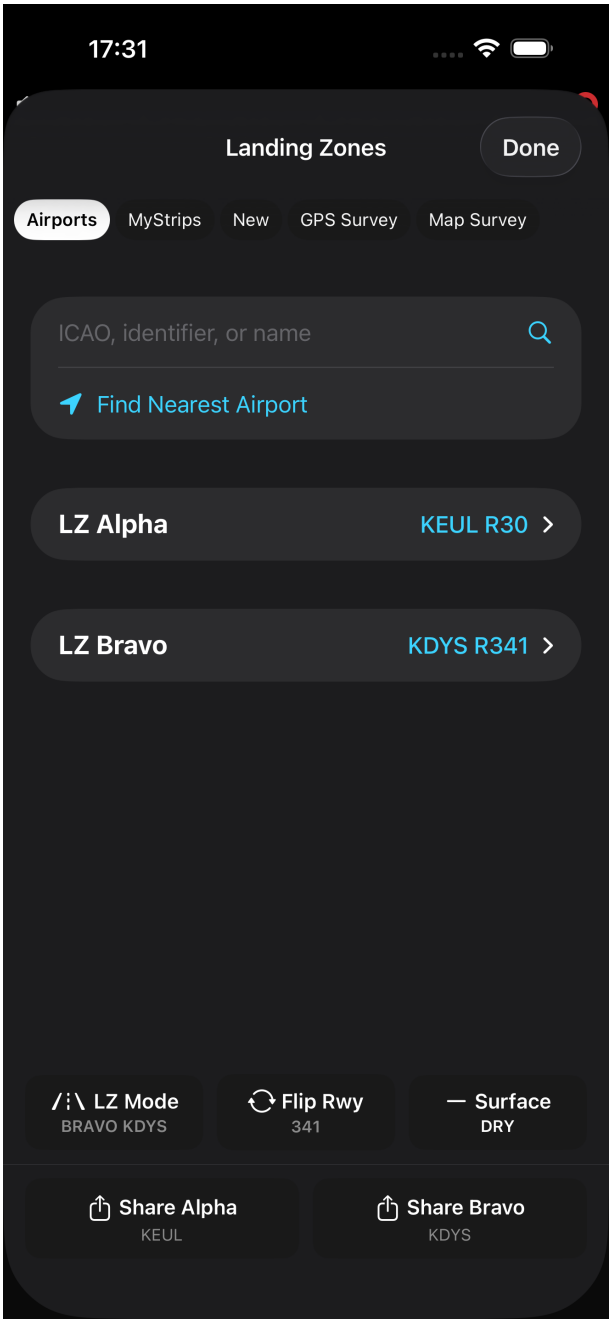


Figure 5. Landing Zones. Select the source at the top, then review the active Alpha or Bravo LZ and runway controls at the bottom.

Wx

Tap Wx to open Weather settings. First choose the performance reference—LZ, Aircraft, or Manual. Then select or enter the temperature, pressure, and wind sources needed for the flight. The source shown beside each value tells you whether TLAR is using a manual entry, a weather station, a device sensor, a simulator, or another selected source.

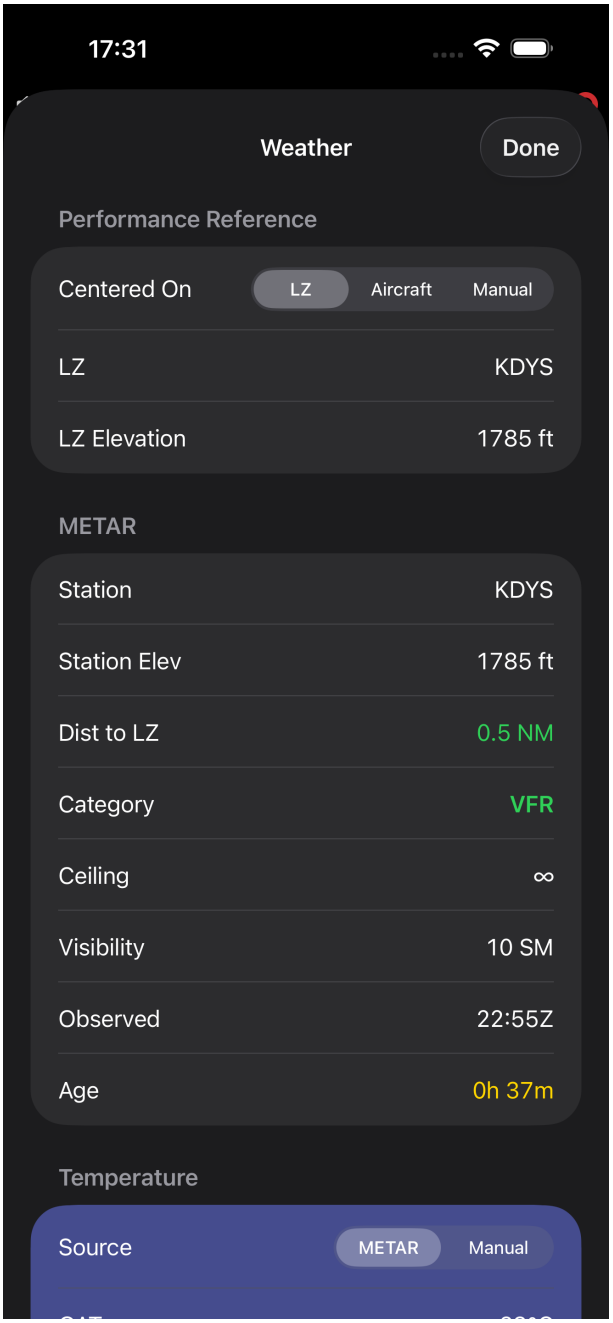


Figure 6. Weather. Select the performance reference, then review the weather station, observation age, and each selected source.

Aircraft

Tap Aircraft to open Aircraft settings. Select the aircraft model, then set or verify its weight, fuel, power, burn, and any available calibration values. The model name at the top of the screen is only the first check; review the values below it before using performance results.

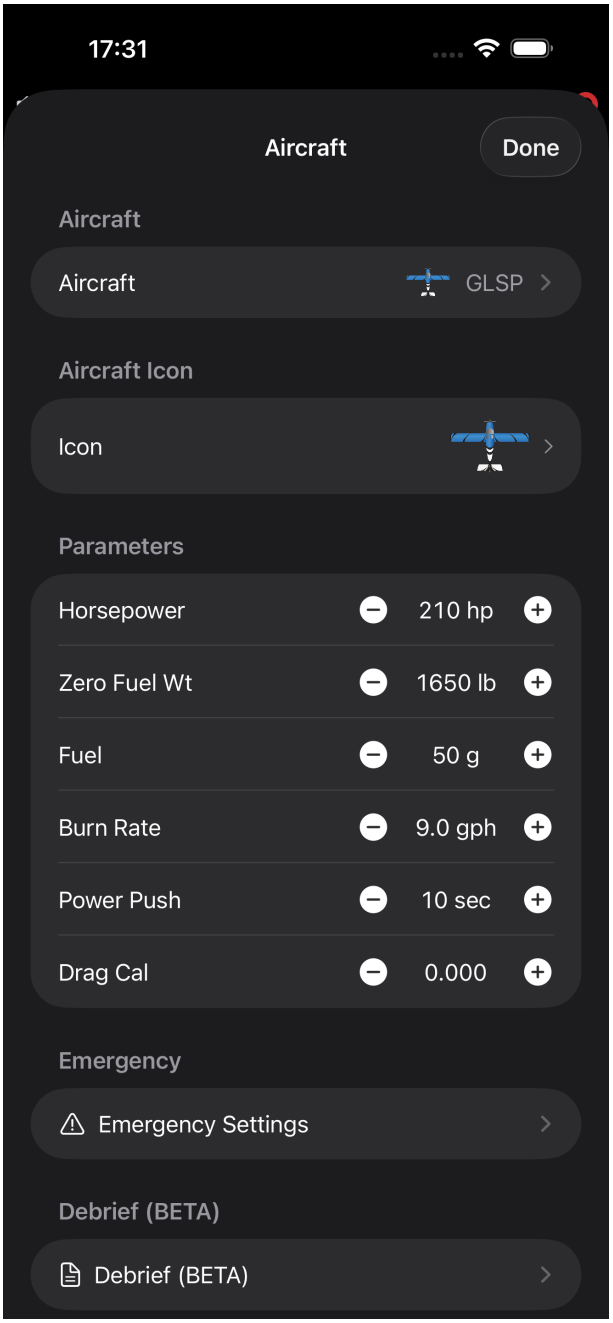


Figure 7. Aircraft. Verify the selected aircraft, then review the displayed weight, fuel, power, burn, and Emergency Settings values.

Info

Tap Info to place a yellow grid overlay on the screen. Then tap the tile you want to learn about. TLAR opens a pop-over with instructions for using that tile and changing its configuration. Tap Info again, or close the pop-over, to leave Info mode.



Figure 8. Info mode. The yellow grid identifies tiles; tap a tile to open its instructional pop-over.

Settings

Tap Settings to open the app-wide settings sheet. Use its sections to change the layout, color palette, units, pilot preferences, voice selection where available, and related options. Make these changes on the ground, then save the finished display as a preset for use in flight.

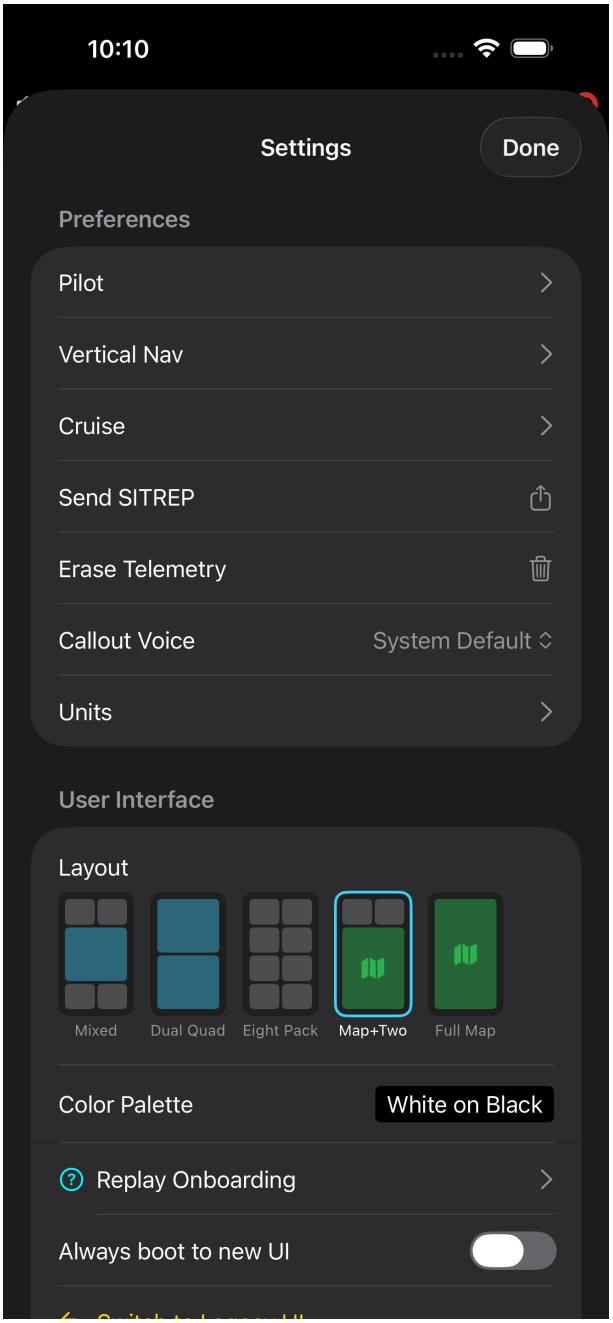


Figure 9. Settings. Change preferences, layout, color palette, and related app-wide options here; save the reviewed dashboard as a preset before flight.

Tile-based Interface

What is a Tile?

TLAR uses tiles: self-contained display modules arranged in the active dashboard layout. Tiles come in four sizes: one-by-one, two-by-two, two-by-three (the tall lower position of the Map+Two layout), and full screen. Map, Emergency Sim, and 3D Terrain can also fill the screen or the tall lower position of the Map+Two layout. A tile's available sizes depend on its design, the selected layout, and the subscription level. Map and Emergency Sim are single-instance tiles.

Tile group	Examples in the current interface
Core	Aircraft, Takeoff, Land, Climb, Cruise, HSI, Position, Clock.
Pro	Runway, Weather, Smart TOLD, Smart Climb/Cruise, Map, V-Speeds, Debrief.
Expert	HUD, Emergency Sim, AOA, Vertical Profile, and 3D Terrain.

Example: HSI tile front and back

The 2×2 HSI is a representative tile. Its front face places the HSI instrument in the center, information chicklets across the top and down both sides, and action chicklets along the bottom. The displayed values are live navigation and flight-information readouts; the bottom chicklets are the controls that act on the selected modes and sources.



Figure 10. 2×2 HSI tile front. The center is the HSI instrument; the top and side rows are information chicklets, and the bottom row contains action chicklets.

Tap a populated tile once to flip it to its back face. Tap Done on the bottom bar to return to the live tile. The HSI back identifies each configurable edge—Top, Left, Right, and Bottom—and shows the five chicklets currently assigned to that edge.

Each edge row lists its five current chicklets. Tap an edge row to open its list of positions. Tap a position to open the picker, then tap the chicklet you want to assign. Top, Left, and Right select information chicklets; Bottom selects action buttons. Press and hold the Reset to Default control to restore this tile's default chicklets. The SOLAR control switches the HSI solar display on or off. The bottom bar on every tile back has three controls: the grid icon opens the tile picker for that slot, the red X removes the tile, and Done returns to the front.

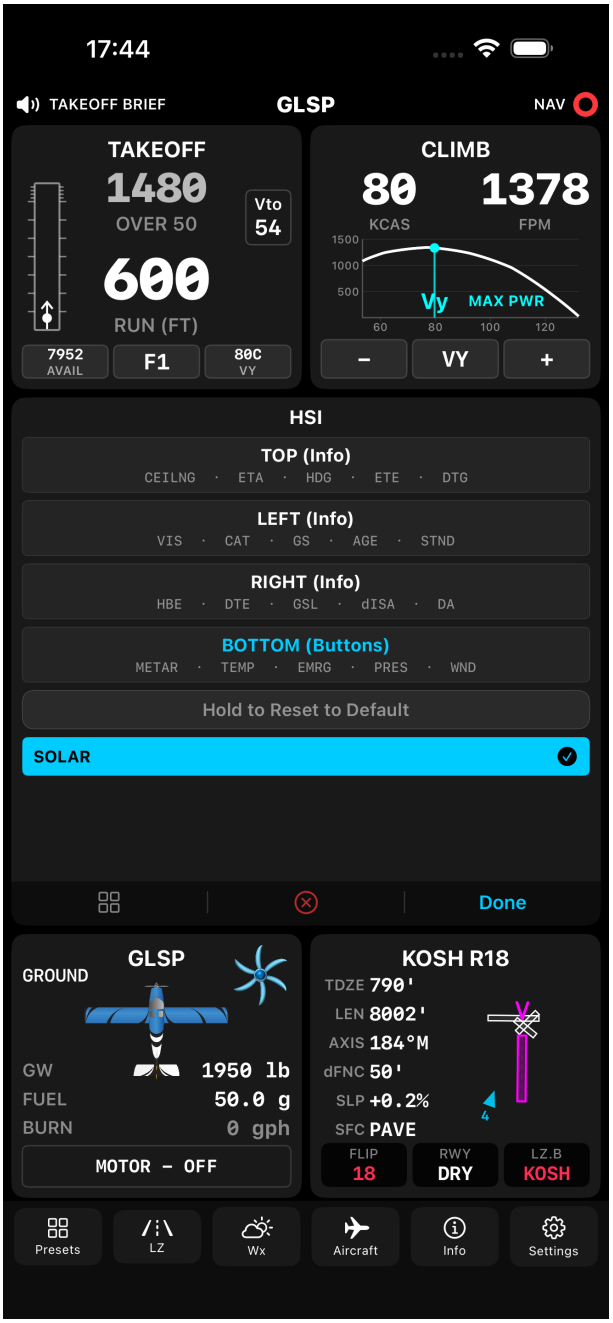


Figure 11. 2×2 HSI tile back. Tap an edge row to configure its chicklets; hold the reset control to restore defaults, use SOLAR to toggle the solar display, and use the bottom bar to replace, remove, or finish editing the tile.

Choosing a tile

Tap an empty dashboard position—or tap the grid icon on a tile back—to open the tile picker. Its title identifies the available position: Select 1×1 Tile or Select 2×2 Tile. Tap a tile to assign it to that position. The white outline marks the current selection. Tap Clear to remove the tile from that position, or Cancel to leave the existing assignment unchanged.

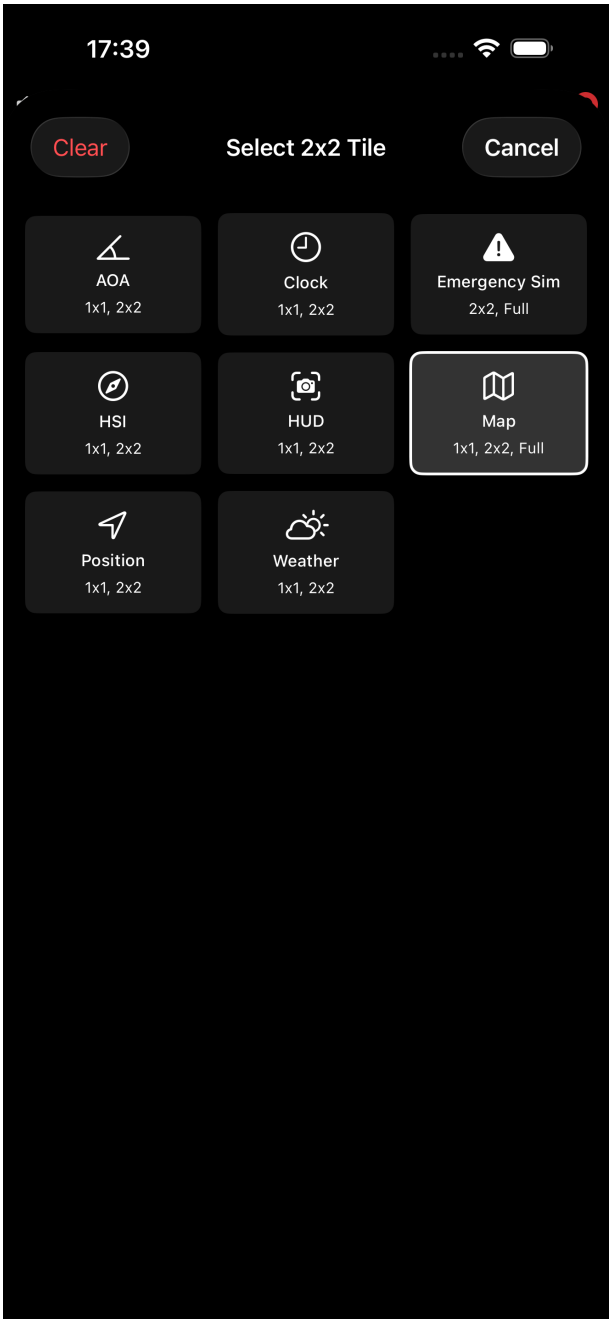


Figure 12. 2×2 tile picker. The title identifies the available position; the white outline marks the assigned tile.

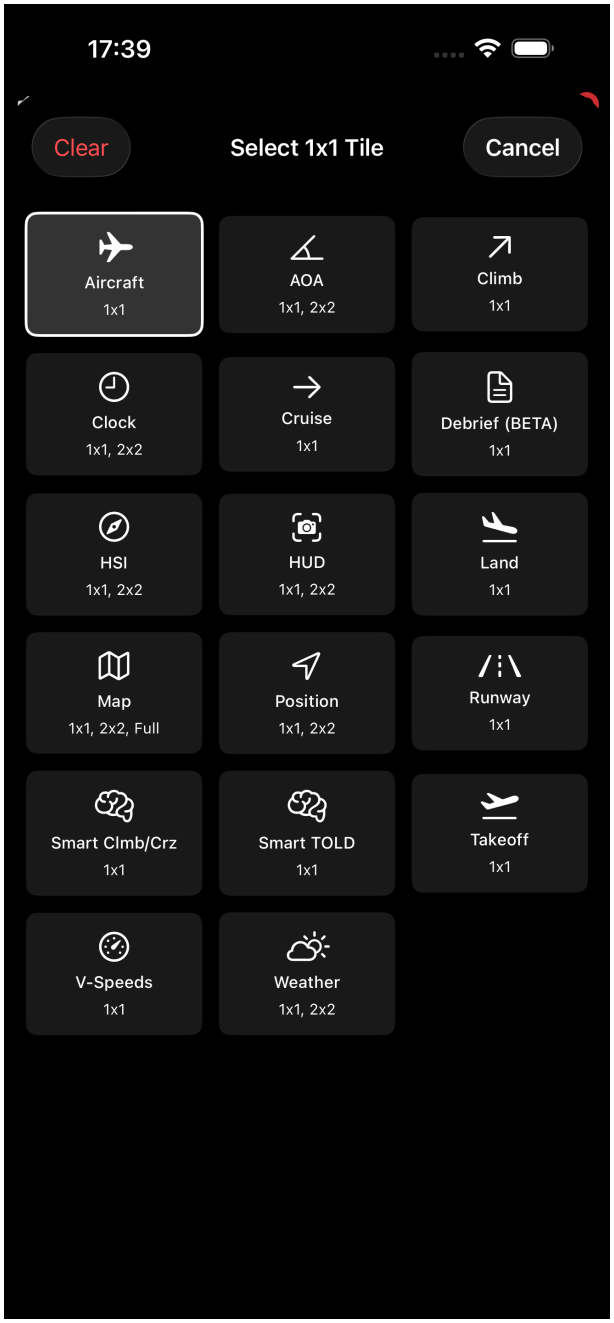


Figure 13. 1×1 tile picker. Tap a tile to assign it; tap Clear to remove the current tile, or Cancel to leave it unchanged.

Layouts

Standard dashboard layouts include Mixed, Dual Quad, Eight Pack, Map+Two, and Full Map arrangements. Map+Two is available with a Pro subscription or higher. Compact devices receive compact variants and do not offer Map+Two. The layout is the grid framework; it is not a flight mode and does not independently change aircraft, weather, or landing-zone data. Choose it for readability and task fit.

MAP-TILE LIMIT TLAR allows only one active Map tile at a time. Limiting the dashboard to one Map tile preserves display responsiveness.



Dual Quad | Eight Pack | Full Screen | Mixed | Map+Two

Figure 14. Dashboard layout choices. Select the arrangement that makes the required information readable for the current phase of flight.

Tile type	Supported presentation
Map	One-by-one, two-by-two, full-screen, or the dedicated Map+Two lower position; Pro or higher; one instance at a time.
HSI and HUD	One-by-one or two-by-two.
Emergency Sim	Two-by-two, full-screen, or the dedicated Map+Two lower position; Expert or higher; one instance at a time.
3D Terrain	Two-by-two, full-screen, or the dedicated Map+Two lower position; Expert.
Vertical Profile	Two-by-two only; Expert.
Clock, Position, Weather, AOA	One-by-one or two-by-two.
Debrief	One-by-one.
Other dashboard tiles	One-by-one.

What is a Chicklet?

Chicklets are the small values and buttons around a tile. To change a configurable chicklet, tap its labeled position on the tile configuration view. TLAR opens a list of available chicklets. Tap an item to assign it; the

blue checkmark marks the current choice. Information chicklets display values such as temperature, barometric setting, track, fuel, density altitude, ground speed, weather, runway data, distance, time, and selected performance values. Button chicklets select or change modes—for example, LZ mode, runway direction, weather source, performance reference, flaps, brakes, or surface condition.

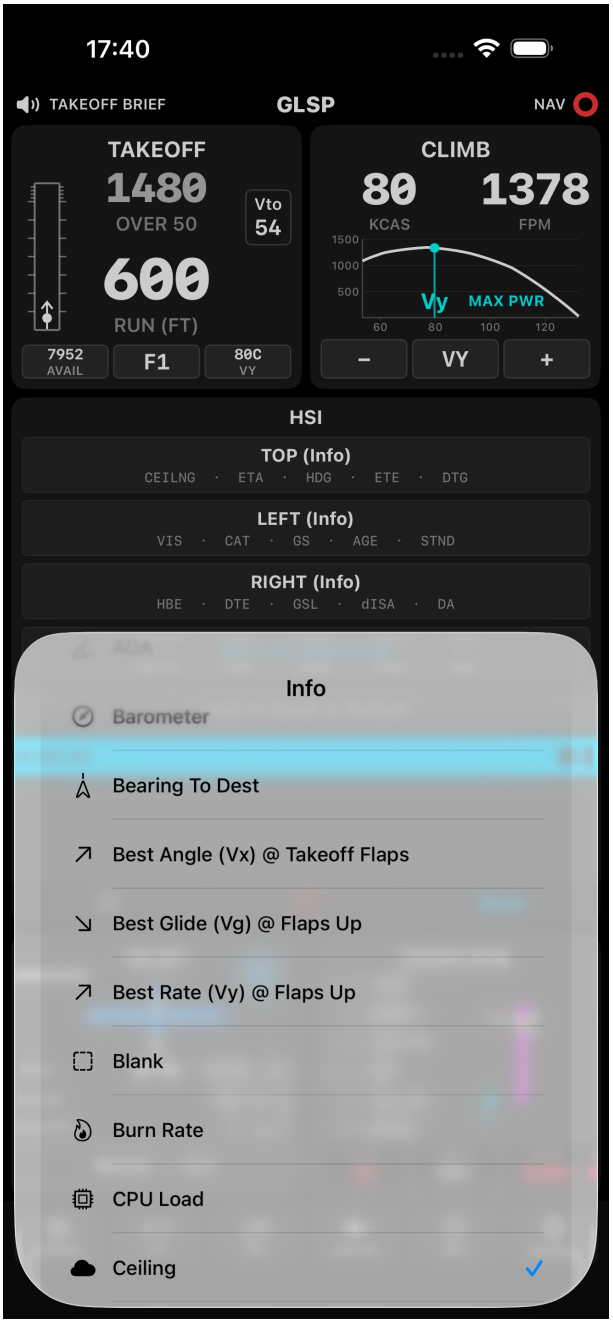


Figure 15. Chicklet picker. Tap an available item to assign it to the selected tile position; the blue checkmark identifies the active choice.

INFO AND BUTTON CHICKLETS Information chicklets display values and appear along the Top, Left, and Right edges of a tile. Button chicklets perform an action—such as changing a mode, selecting a source, or changing a setting—and appear only along the Bottom edge of a tile.

Palette Selections

A palette changes the visual treatment of the dashboard. It does not alter the underlying calculation. TLAR provides White on Black, Green on Black, and Black on White palettes. Select the palette that gives you a readable display for the cockpit lighting conditions; retain the same palette throughout the phase of flight whenever practical.



Black on White **Green on Black**

Figure 16. Palette choices. These examples show Black on White and Green on Black; White on Black is shown throughout the other live interface figures in this guide.

Advisories

Color conventions

TLAR uses color both to show an operational condition and to identify the source of a value. Read color in context: a green operational indication generally means normal or acceptable, while a green weather chicklet has the more specific five-minute-ASOS meaning described below. Color reinforces the label and value; it never replaces the pilot's review of the underlying condition or source.

Color	Meaning in the current interface
Red	Warning, a potentially hazardous condition, or an invalid, unavailable, or unmade input.
Yellow	Caution. Review the condition before relying on the related result.
Green	A normal or acceptable operational indication. For WIND, BARO, and VIS weather chicklets, green specifically means TLAR is using a five-minute ASOS observation that is newer than the latest METAR at that station.
Purple	Weather data from the hourly METAR stream. Temperature, dewpoint, and ceiling remain purple because they use the METAR observation. WIND, BARO, and VIS also remain purple whenever the five-minute ASOS observation is not newer than the METAR.
Blue	A value entered or manually overridden by the pilot.
White	A TLAR-computed performance value, where shown.
Cyan	A live iPhone, iPad, or connected-sensor value, such as GPS, OnSpeed, or iBaro.
Magenta / pink	The active landing zone is the reference for the related value, pointer, or route.
Indigo	Internet or database-derived information, where shown.

FIVE-MINUTE ASOS The green ASOS indication applies only when TLAR has a fresh five-minute observation that is strictly newer than the station's latest METAR. It is an additional source/freshness cue—not a green-light operational recommendation.

3. Phases of Flight, Tactics, Techniques, and Procedures

Set up

Set up a flight by working left to right across the bottom row: LZ, Wx, Aircraft, then Settings. Complete this sequence on the ground. Every later performance, navigation, and approach display depends on the active runway, weather/performance reference, aircraft state, and pilot settings established here.

LZ

LZ is the military abbreviation for Landing Zone. In TLAR, an LZ is the runway reference used to orient runway-relative displays, calculations, and guidance. Tap LZ to open the Landing Zones sheet.

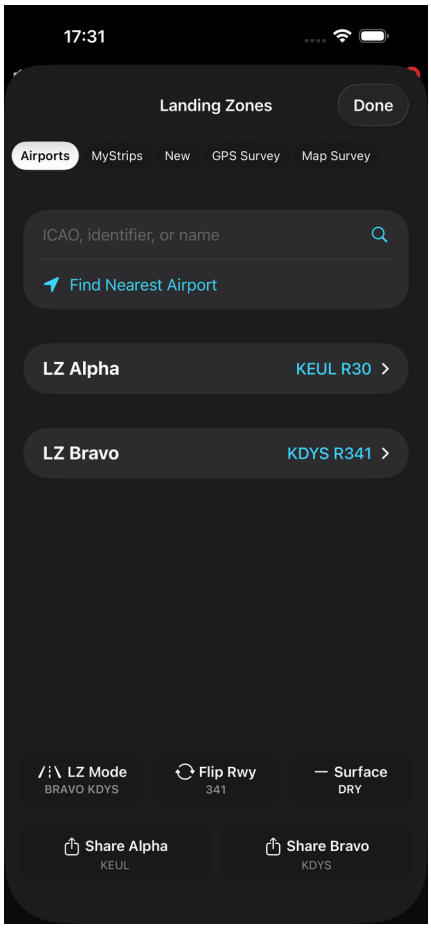


Figure 17. The Landing Zones sheet. The top tabs choose a database or runway-creation method; Alpha and Bravo hold the two loaded LZs.

Two databases and two loaded slots

TLAR has two runway databases. Airports is the global runway database. MyStrips is your personal database of runways you create and save. Regardless of the source, a selected runway is loaded into one of two LZ slots: Alpha or Bravo. This lets you keep two runways ready—for example, the departure runway and an alternate arrival runway.

Mod	What it does
Alpha	Makes the runway stored in the Alpha slot the active LZ.
Bravo	Makes the runway stored in the Bravo slot the active LZ.
AUTO (Expert)	Finds and loads the closest runway from the airport and MyAirstrips databases, and can flip the runway end when needed. Verify the selected runway and direction before using it.
Off	No LZ is active. LZ-relative functions are unavailable.

Make Alpha or Bravo active

Use the LZ Mode control to cycle through Alpha, Bravo, Off, and AUTO. The selected mode determines the active LZ. The active LZ supplies the runway reference for LZ-based weather performance, runway-relative tiles, and approach guidance. The Flip Rwy control changes the active approach end; confirm the resulting runway direction before use.

Load a runway from Airports

1. Tap Airports. 2. Enter an ICAO, FAA identifier, or airport name, or tap Find Nearest Airport. 3. Choose the airport and the desired runway end. 4. Review the displayed runway data. 5. Load it into Alpha or Bravo. Loading an LZ also directs TLAR to refresh weather for the selected field.

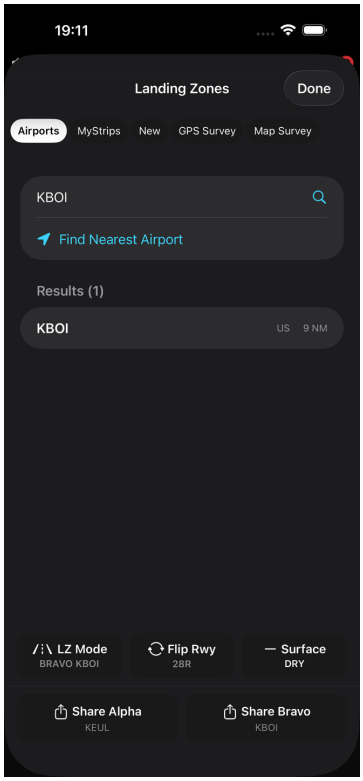


Figure 18. Airport search. Enter an identifier or name; the matching airport appears below the search field.

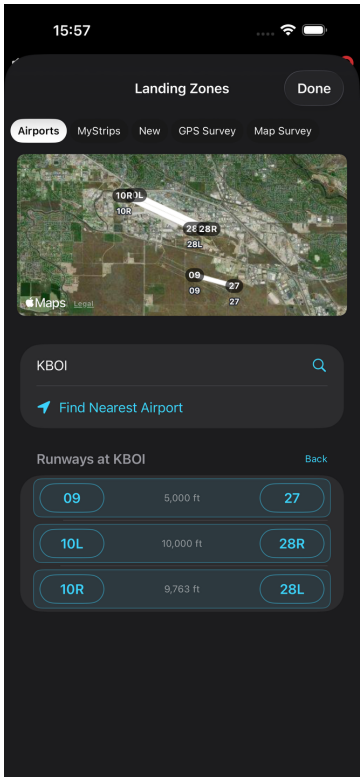


Figure 19. Runway selection. Tap the desired approach end in the runway list.

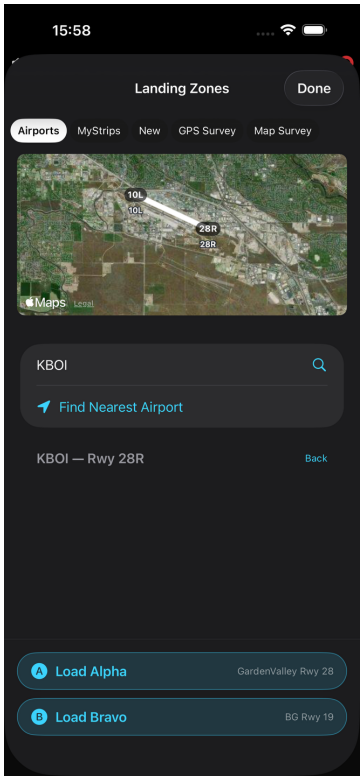


Figure 20. Load the selected runway into Alpha or Bravo. Choose a runway at the airport (left), then tap Load Alpha or Load Bravo (right). LZ Mode, at the bottom of the LZ menu, selects which slot TLAR uses.

Load a saved runway from MyStrips

Tap MyStrips, select the saved landing zone, choose its runway end, review the runway data, then load it into Alpha or Bravo. MyStrips holds only pilot-created LZs that were saved using New, GPS Survey, or Map Survey.

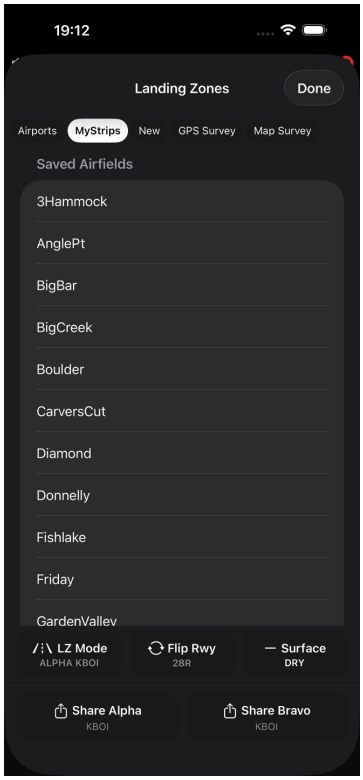


Figure 21. MyStrips. Tap a saved airfield to select and load its runway.

Create and save a MyStrips runway

There are three ways to create a user-defined runway. New is manual entry: enter the LZ name, approach-threshold latitude, longitude, and elevation, then enter the runway's true axis, length, width, and slope. Tap Create to save the completed LZ to MyStrips.

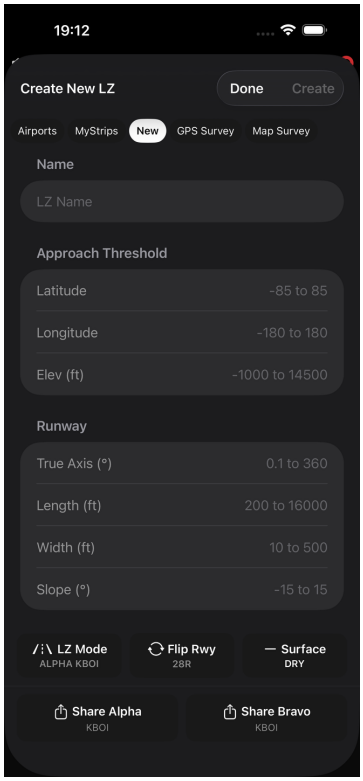


Figure 22. New. Enter the approach-threshold and runway data, then tap Create.

GPS Survey records both runway ends using the device GPS. On the ground, stand at the approach threshold and tap Mark, then move to the departure end and tap Mark. TLAR computes the runway heading, length, elevation, and slope. Enter a name, select the surface, and tap Save & Activate.

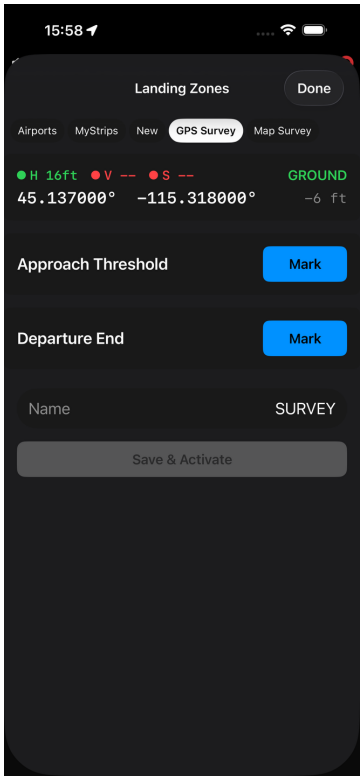


Figure 23. GPS Survey on the ground. Mark the approach threshold and departure end, then name and save the surveyed LZ.

In flight, GPS Survey exposes Survey Height AGL: 50, 100, 150, 200, or Custom feet. Select the height you intend to fly above the runway, then fly that altitude over the approach threshold and tap Mark. Fly along the runway at the selected survey height and tap Mark over the departure end. TLAR subtracts the selected AGL survey height from the GPS altitude at each mark to determine each threshold's elevation before computing the runway axis and slope. The status line above the coordinates reads GROUND or AIRBORNE; Survey Height AGL appears only while it reads AIRBORNE. After you save an airborne survey, TLAR replaces the surveyed elevations and slope with online elevation data for both runway ends: immediately if you are connected, otherwise the next time GPS Survey is open with a network connection.

24Map Survey lets you mark both runway ends on the map. Position the crosshair on the approach end and tap Set Approach End. Then set the departure end, review the computed runway geometry, name the LZ, and save it to MyStrips. When connected, TLAR obtains elevation data from the USGS Elevation Point Query Service for U.S. locations; if that service does not return an elevation, TLAR falls back to the Open-Meteo elevation service.

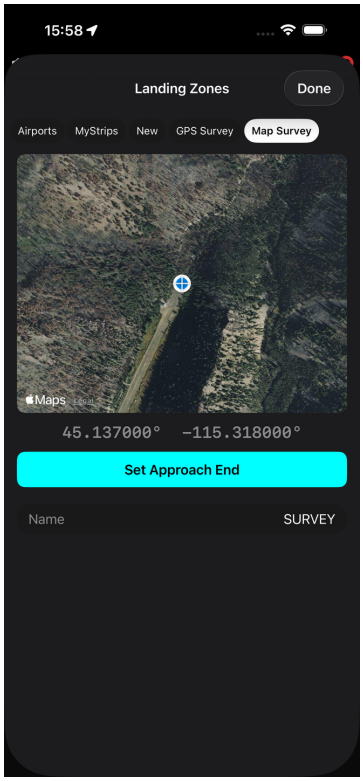


Figure 25. Map Survey. Position the crosshair on the approach threshold and tap Set Approach End; repeat for the departure end.

Coordinate precision

When loading a runway from the global Airports database, TLAR performs an internal data-quality check. A runway is precise only when its endpoint-coordinate source is high quality, its axis is derived from coordinates or survey data, and its touchdown-zone elevation is valid. A public-database runway can therefore load successfully but still be marked imprecise. The most common reason is that the database supplies only the aerodrome center coordinates rather than the coordinates of each runway end.

MYSTRIPS PRECISION ASSUMPTION TLAR treats every runway loaded from MyStrips as precise. That is an application assumption, not an independent verification of pilot-entered, GPS-surveyed, or map-surveyed data. Before relying on runway geometry, stabilized-approach monitoring, or Emergency functions, verify the saved

runway's endpoints, approach end, direction, touchdown-zone elevation, length, surface, and obstacles.

Terrain and tree data

TLAR Expert can download ground-elevation and tree-height data to your device. LZ terrain covers the area around a runway; regional terrain provides wider-area ground-elevation coverage. Download the data you need while connected, then check what is stored before using it offline. A runway loaded into Alpha or Bravo does not, by itself, mean its terrain and tree data have been downloaded.

Open LZ and select the Airports tab. With a runway loaded in Alpha or Bravo, tap the Terrain Data pill directly below the LZ Alpha and LZ Bravo pills. If the runway-selection list is open, finish selecting the runway to show the pill. The pill opens three choices: LZ Terrain, Regional Terrain, and Terrain Management. Terrain-data management requires an Expert subscription.

Terrain status (Expert). After each loaded slot's label, TLAR shows the LZ terrain stored for that runway: (Terrain ✓) when 1 m data is stored, (Partial Terrain) when only 10 m or 30 m data is stored, and (No Terrain) when none is stored. Regional terrain does not change this status.

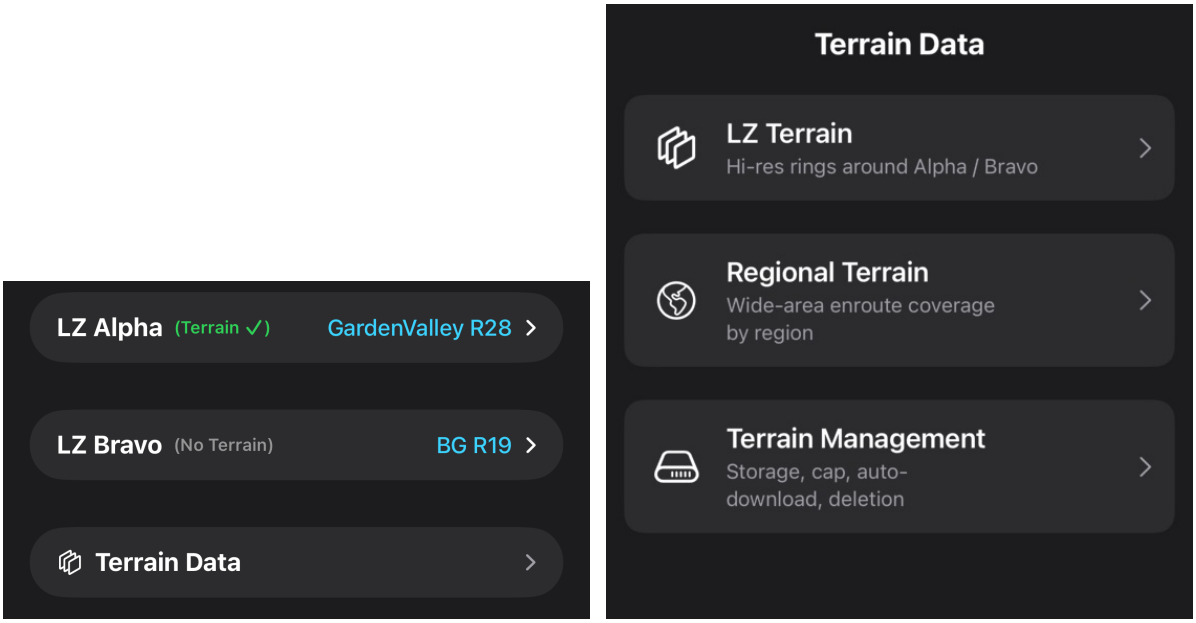


Figure 26. Terrain Data. Tap Terrain Data in the LZ menu (left), then choose LZ Terrain, Regional Terrain, or Terrain Management (right).

Download terrain for an LZ

Tap LZ Terrain, then select Alpha or Bravo at the top. Confirm the LZ name and coordinates. This selector chooses the runway whose data you are managing; it does not change the active LZ mode.

Tap Download LZ Terrain — best available. TLAR requests ground elevations and tree heights for the selected LZ. The bundle includes a nominal 10 m layer extending 5 NM around the airport, or around the runway midpoint for a user-created strip. Close to the runway, TLAR also requests higher-resolution data in an elongated area with rounded ends, extending about 0.53 NM beyond each runway end and to either side of the runway axis.

The close-in ground layer uses U.S. elevation data, nominally 1 m where available, with 5 m data used in Alaska and Hawaii. Coverage and source resolution vary; selecting the best-available download does not

guarantee 1 m ground data at every location. The 10 m layer also uses coarser source data where higher-resolution coverage is unavailable. The resolution describes the spacing of the data, not a guarantee of elevation accuracy.

The progress display shows downloading, processing, and saving to the device. If part of the bundle is already stored, the button reads Download missing data. Its inventory lists 10m, 10m trees, 1m, and 1m trees separately: a check mark means that component is stored; a cross means it is missing. Best available on device appears when all four components are stored. If a download fails or coverage is unavailable, check this inventory rather than assuming the entire bundle is present.

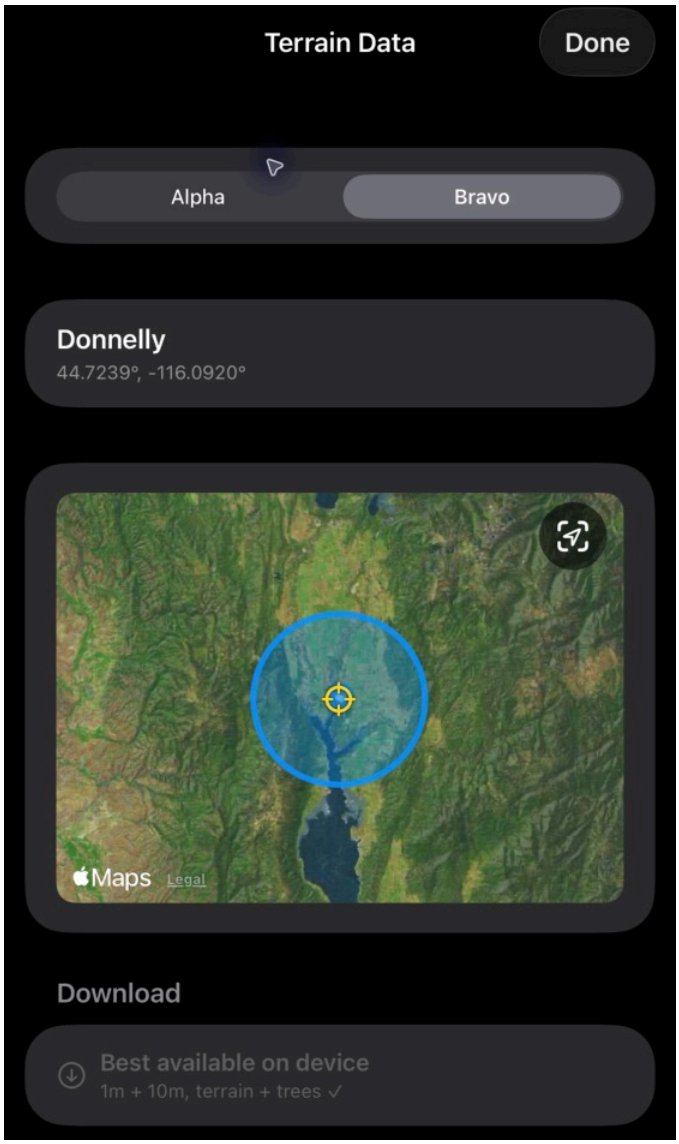


Figure 27. LZ terrain coverage and download status. Select Alpha or Bravo and confirm the runway. This example shows Best available on device for both terrain and trees.

Ground elevation and tree height are separate datasets. Ground coverage does not establish that tree coverage is present. Tree heights come from a canopy-height dataset; they are not a complete inventory of buildings, towers, wires, or other obstacles.

Correct runway elevations

On the LZ Terrain page, scroll to Correct LZ elevations using 1m data. The table compares the loaded Approach, Center, and Departure elevations with the high-resolution terrain samples. Loaded is the runway elevation currently in use; 1m is the terrain sample; Δ is the terrain elevation minus the loaded elevation, in feet. A dash means no sample is available at that point.

Turn on Auto-correct elevations to use the available high-resolution samples for the runway elevations. The setting applies to both loaded slots where suitable data are available, and TLAR saves the setting. This helps put the runway and surrounding terrain on the same elevation reference. The 10 m and regional layers are not used by this correction. If the page says no 1m LiDAR ring is loaded, download the close-in terrain first.

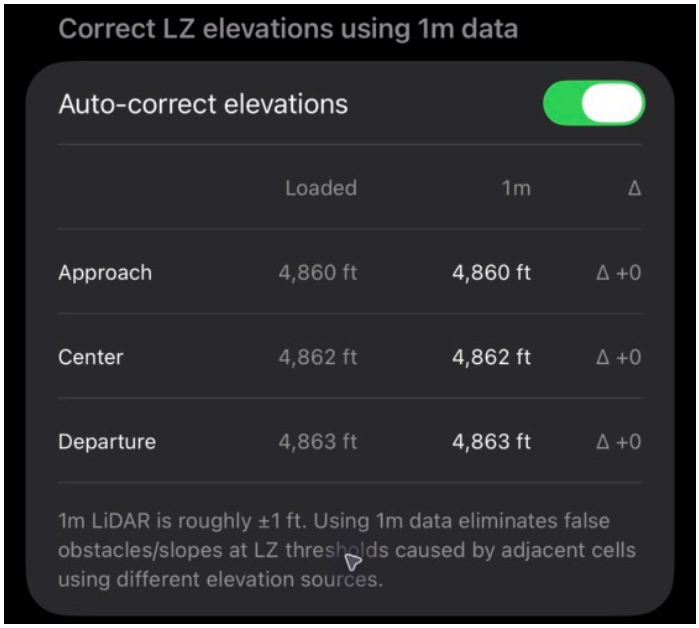


Figure 28. Runway elevation correction. Compare Loaded and 1m elevations at the approach end, center, and departure end. The correction is already enabled in this example.

To have TLAR request this bundle automatically whenever you load a new runway, and to download data for your saved strips or for wider regions, set a storage cap, or delete data, see Managing Terrain Data in Chapter 5.

WX – and performance reference

Tap Wx. First select the performance reference: LZ uses the active runway approach-end elevation and its weather; Aircraft uses the aircraft altitude and aircraft-location weather conditions; Manual uses pilot-entered elevation and weather conditions. Then choose the source for temperature, pressure, and wind. The label beside a value identifies the selected source; review it before relying on a performance calculation.

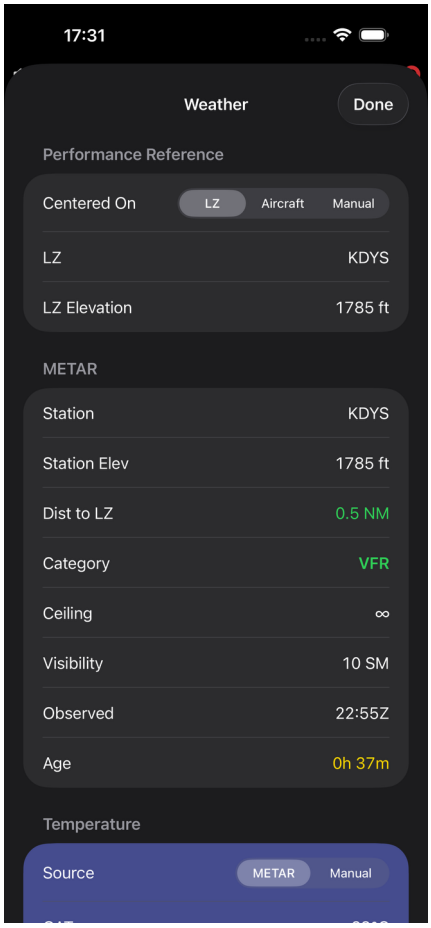


Figure 29. Weather. Select the performance reference first, then review the station, observation age, and each temperature, pressure, and wind source.

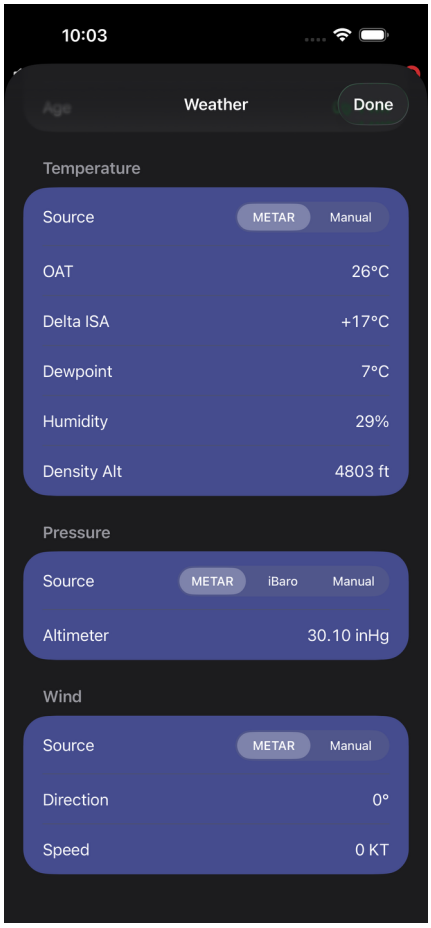


Figure 30. Weather source controls. Temperature and wind can use METAR or manual values; pressure can use METAR, iBaro, or a manual value.

Weather source	Use and limitation
Manual	Enter the value yourself. TLAR marks manually entered or overridden values blue.
METAR	Uses the selected station observation. METAR-sourced values are purple.
Five-minute ASOS (when available)	For WIND, BARO, and VIS, TLAR shows green only when the five-minute ASOS observation is newer than the station METAR. Temperature, dewpoint, and ceiling remain METAR-sourced and purple.
iBaro	Uses the device barometer with GPS-derived elevation to estimate a local setting for performance use. Do not use iBaro to set an aircraft altimeter, especially in a pressurized aircraft.
OnSpeed AHARS temperature	Planned integration. Do not expect this temperature source in the current shipping release until it is specifically released.

Aircraft

Tap Aircraft. Select the aircraft model first. Then review or enter the values that establish the current aircraft state, including weight, fuel, power, fuel burn, and any model-specific calibration or Emergency settings.

Horsepower. TLAR applies a 95% installed-horsepower factor to most aircraft types to account for installation power losses, as opposed to the full motor rating generated on a test stand under ideal conditions. If you have reason to think that the motor as installed in your aircraft can generate its fully rated engine horsepower, you can enter a new, higher horsepower for your engine. We recommend comparing TLAR's predicted performance with your aircraft's actual performance before making such an adjustment.

Zero-Fuel Weight and Fuel. When loaded for the first time, TLAR sets fuel and zero-fuel weight to load the plane to maximum gross weight.

Burn Rate. This is the fuel burn rate TLAR uses when the motor is set to ON. TLAR uses the full value when aircraft groundspeed exceeds 30 knots, and 20% of this value below that threshold. TLAR decreases aircraft gross weight as fuel is burned off. TLAR stops decrementing fuel, and thus weight, if the fuel reaches zero.

L-39C TLAR ignores the cruise burn rate parameter for the L-39C aircraft. Its cruise fuel burn rate is computed from the set percent RPM.

Power Push. You can set the power-push time to replicate the time it takes to push the throttle from idle to maximum power on takeoff. Use zero seconds for a static maximum-power takeoff.

Drag Cal. TLAR is tuned to match manufacturer-stated and/or POH performance. However, a multitude of modifications can change an aircraft's drag, including larger tires, cargo pods, floats, skis, fairings, wheel pants, and other changes. Use the drag adjustment parameter to add or subtract drag in 0.001 increments to match your aircraft's situation. TLAR adds this adjustment to the baseline coefficient of drag. The easiest way to get it right is to adjust drag until TLAR's predicted cruise speed matches your plane's actual cruise speed. Be careful to set the same environmental conditions—elevation, temperature, pressure, and power setting—when matching speeds.

The maximum you can add to the baseline is +0.05, which is a great deal. For reference, most aircraft in TLAR have a drag coefficient of about 0.02 to 0.03. The maximum you can subtract varies by aircraft type, ensuring no aircraft can end up with a negative overall drag coefficient: baseline drag minus the adjustment cannot be less than zero. If you select a new aircraft type, the drag increment is zeroized, and the other parameters return to TLAR defaults for the new aircraft until you adjust them again.

TLAR saves these settings, so they will be the same the next time you start the app.

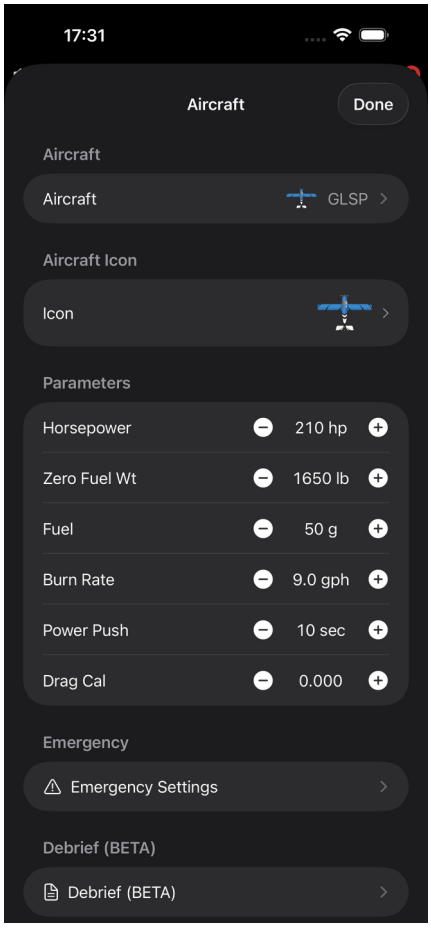


Figure 31. Aircraft. Select the model, then verify its displayed weight, fuel, power, burn, and applicable Emergency settings before using performance results.

LOADING CHECK Before takeoff, compare TLAR's weight and fuel entries against the aircraft's actual loading and the applicable aircraft documentation. Recheck after refueling, loading changes, or a model change.

Emergency settings (Expert)

Tap Emergency Settings to configure the data TLAR uses for engine-out glide and turnback calculations. These settings directly affect Emergency-mode results. Set them deliberately from reliable aircraft data, then compare predictions with aircraft performance before relying on them.

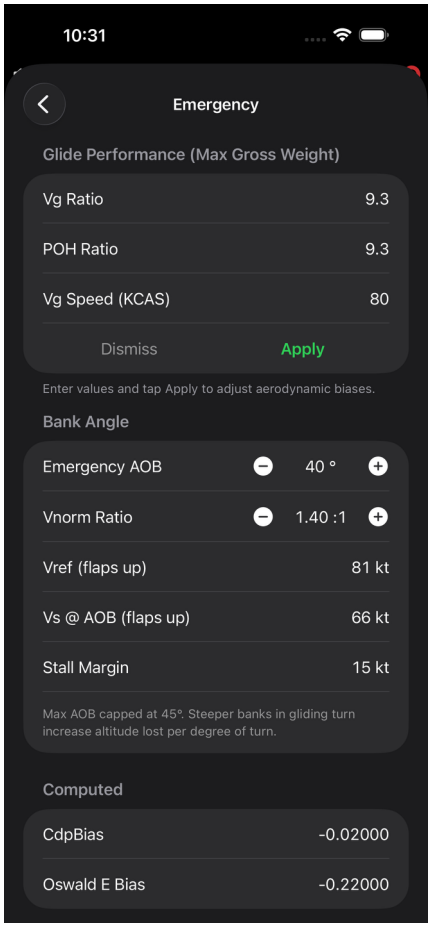


Figure 32. Emergency settings. Enter maximum-gross-weight glide data, tap Apply, then set the intended emergency bank angle and review the computed reference speeds and stall margin.

Vg Ratio. Enter the aircraft's engine-out maximum lift-to-drag glide ratio at maximum gross weight. POH Ratio, when shown, is the reference glide ratio from the selected aircraft's POH.

Vg Speed (KCAS). Enter the best-range glide speed at maximum gross weight. After you enter Vg Ratio and Vg Speed, tap Apply. TLAR uses those values to adjust its aerodynamic model for the selected aircraft; the resulting aerodynamic biases are used only in Emergency mode. Dismiss leaves typed changes unapplied.

Emergency AOB. Set the average bank angle you intend to use for an engine-out gliding return. The mathematical optimum is 45°, but few pilots average that bank in practice; the default is 40°. A lower bank reduces stall risk in the turn but also shrinks the turnback envelope. TLAR limits the selectable bank angle when necessary to retain the configured stall margin, and never permits more than 45°.

Vnorm Ratio. This is the flaps-up normal-approach speed multiplier used to calculate Vref. Vref is the target speed in the turn; a lower ratio increases stall risk but can enlarge the turnback envelope. Set the Vnorm Ratio and Emergency AOB together so the displayed stall margin is appropriate.

Vref (flaps up), Vs @ AOB (flaps up), and Stall Margin are computed values. Vref is the selected target reference speed; Vs @ AOB is the flaps-up stall speed at the selected bank angle; Stall Margin is the difference between them. Treat a small or zero margin as a warning to review the planned bank angle and Vnorm Ratio before using Emergency calculations.

CdpBias and Oswald E Bias are the aerodynamic corrections TLAR derives from the entered Vg Ratio and Vg Speed. They show the model adjustments used to match the selected aircraft's entered glide data.

Settings – Pilot

Tap Settings, then open Pilot, Vertical Nav, and Cruise. These sheets establish the preferences and targets used by the tiles and later phases of flight. Set them deliberately before using their results; they are not a substitute for aircraft limitations or published procedure.

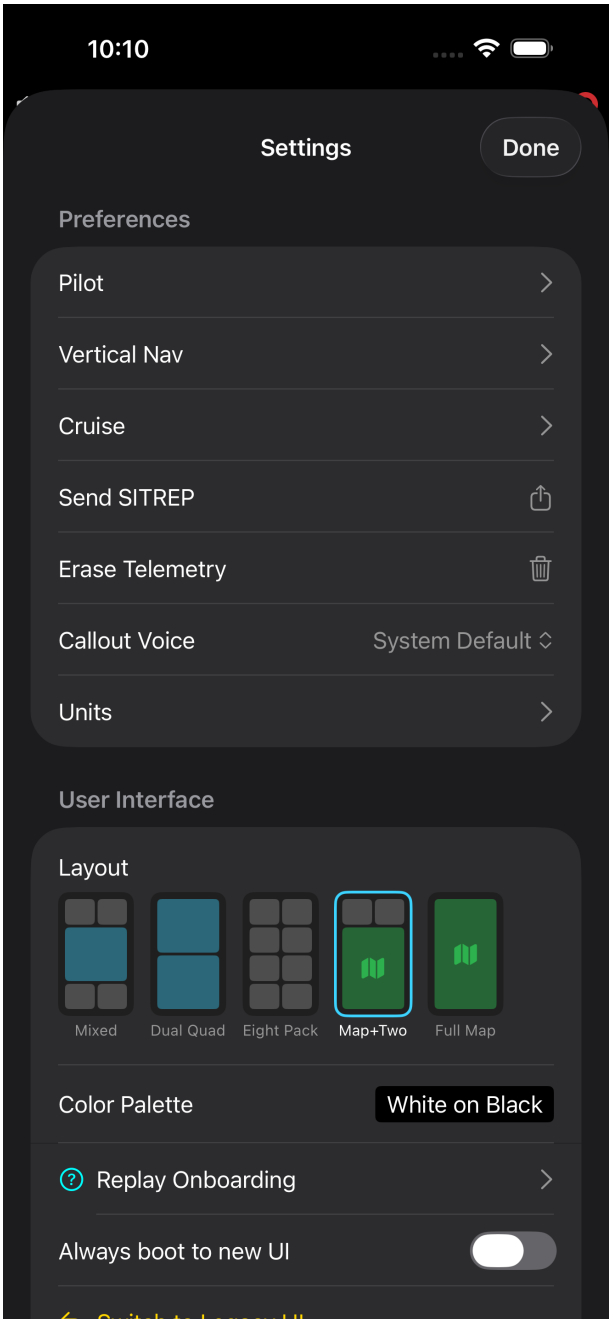


Figure 33. Settings entry sheet. Open Pilot, Vertical Nav, and Cruise to review the settings that shape TLAR's displayed guidance and calculations.

Tap Pilot to set the approach and speed-ratio values TLAR uses in its landing, stabilization, and vertical-navigation calculations. Change a value with its − and + controls, then check that it matches the way you intend to operate the aircraft. TLAR saves your settings so you do not need to re-enter them on subsequent re-boots.

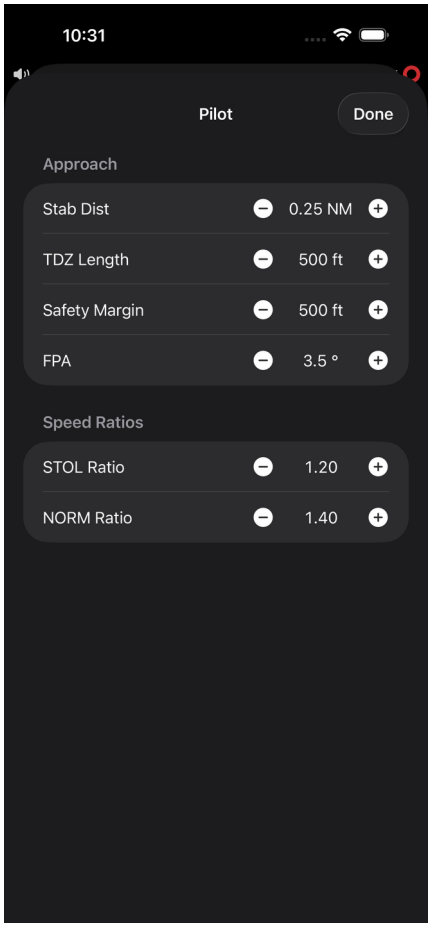


Figure 34. Pilot settings. Set the approach-stabilization and touchdown-zone values first, then review the STOL and normal approach speed ratios.

Stab Dist. Stabilization Distance is the distance on final at which TLAR assesses whether the approach is stable, using the expected groundspeed and flight-path angle. TLAR uses double the stabilization distance as the rollout point in the base-to-final turn.

TDZ Length. Touchdown Zone Length is the distance TLAR reserves for round-out, flare, touchdown, and getting on the brakes during a landing.

Runway Safety Margin. This is the distance from the runway end that TLAR uses to caution you when a predicted takeoff or landing enters the safety zone.

Obstacle Safety Margin (Expert). This is the extra clearance TLAR wants between terrain or trees and the approach or climb line. Set it from 0 to 100 feet in 5-foot steps; the default is 25 feet. The margin starts at zero at the runway end (for an emergency return route, at the touchdown point) and widens along a 2-degree cone until it reaches this value. Terrain inside the margin turns an obstacle-fan lane or an emergency return route yellow instead of green, and BEST uses the margin when it picks a lane. See Terrain obstacle analysis and AUTO Fence under Planning.

FPA. Flight Path Angle is the angle TLAR uses to calculate how far down the runway the touchdown zone begins after the airplane clears the approach-end fence. It is also the reference angle for vertical-navigation displays, including sVAPIs and the FPA marker. In Emergency mode, TLAR temporarily replaces it with the engine-out glide angle.

STOL Ratio and NORM Ratio. These ratios multiply stall speed to produce the STOL and normal approach-speed targets. Lower ratios provide less stall-speed margin, slower touchdown speeds, and shorter braking

distances; higher ratios increase stall margin, increase approach and touchdown speeds, and result in longer braking distances and the potential to float down the runway. The STOL Ratio cannot exceed the NORM Ratio. Set both for the selected aircraft and the operating technique you will use.

POH Ratio. This read-only value, shown below NORM Ratio, is the selected aircraft's published normal approach-speed ratio (approach speed divided by stall speed). Use it as a reference when you set NORM Ratio.

Settings – Vnav

Tap Vertical Nav to set the runway-crossing height and the targets used by TLAR's constant-target climb modes. These values affect displayed guidance and calculated climb performance; confirm that they match the intended procedure before flight. TLAR saves your settings so you do not need to re-enter them on subsequent re-boots.

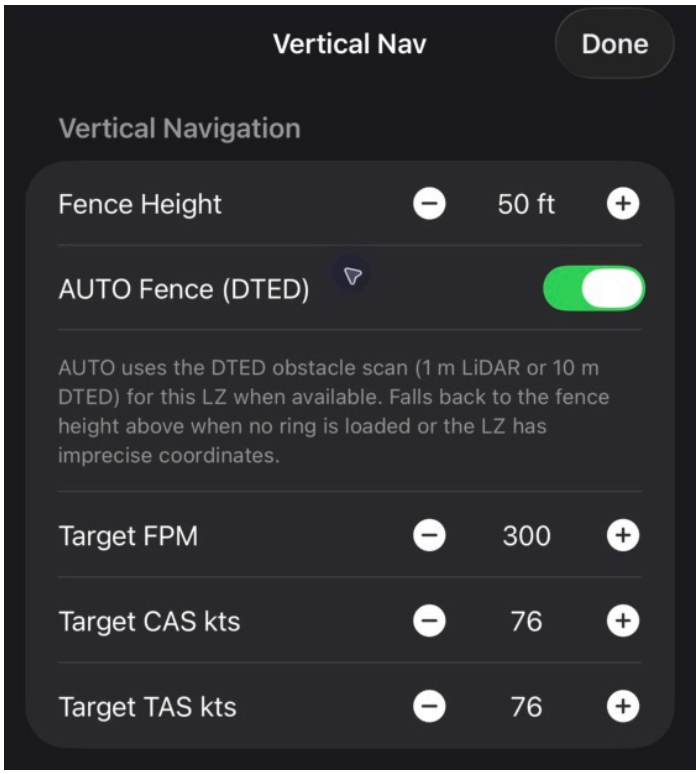


Figure 35. Vertical Nav settings. Set the desired fence height, then set the targets for the FPM, CAS, and TAS climb modes.

Fence Height. Use the − and + buttons to set a manual runway-crossing height from 0 to 100 feet in 5-foot steps. TLAR uses this height at both runway ends when AUTO Fence is off, and as the fallback when AUTO Fence cannot be used.

AUTO Fence (DTED). With an Expert subscription, turn this on to replace the manual Fence Height with terrain-derived fence heights for each runway end. It needs a precise active LZ with downloaded 1 m or 10 m LZ terrain; otherwise TLAR uses the manual Fence Height. The AUTO FENCE switch on the back of the Vertical Profile tile is the same saved setting.

AUTO Fence uses the obstacle case (BEST, CENTER, or WORST) selected on the back of the Map or Vertical Profile tile. Hiding the fans with SHOW FANS on the Map does not change the case or turn AUTO Fence off. See Terrain obstacle analysis and AUTO Fence under Planning for how the lanes, cases, and limits work.

Target FPM. This is the target climb rate, in feet per minute, used when the FPM climb mode is selected. The controls adjust it in 100-FPM steps, with a 200-FPM lower limit and an upper limit based on the computed Vy climb rate.

Target CAS kts. This is the constant calibrated-airspeed target used when the CAS climb mode is selected.

Target TAS kts. This is the constant true-airspeed target used when the TAS climb mode is selected.

Settings – Cruise

Tap Cruise to choose the desired cruise objective, set a selected cruise-power value when applicable, and set the destination altitude for Eco Climb. TLAR computes the displayed cruise power from the selected performance-reference density altitude: aircraft-location weather and altitude when Aircraft is the reference, or LZ elevation and weather when LZ is the reference. TLAR saves your settings so you do not need to re-enter them on subsequent re-boots.

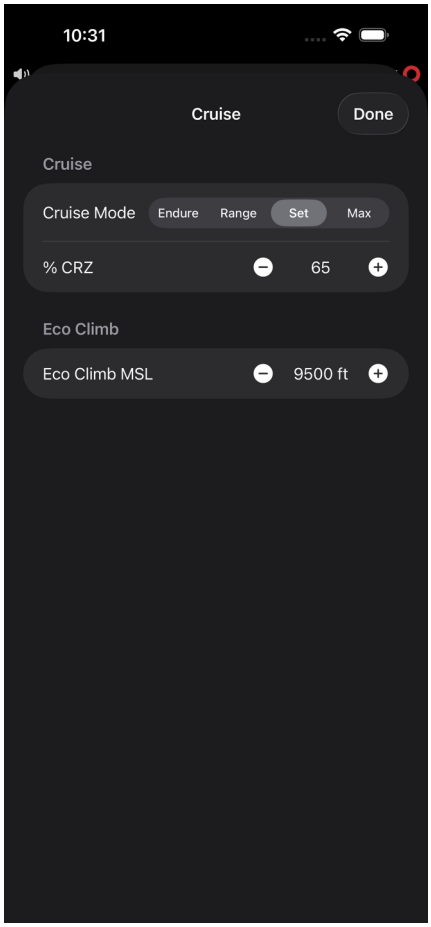


Figure 36. Cruise settings. Select a cruise objective, set percent cruise power when using Set mode, and enter the intended Eco Climb altitude.

Cruise Mode. Select Endure for best endurance—lowest fuel flow—or Range for best range—the greatest still-air nautical miles per gallon. Select Max for maximum speed at full throttle. Select Set to enter a desired cruise power, up to the maximum available for the current pressure altitude and temperature at cruise RPM. TLAR uses cruise RPM for all cruise modes except Max, which uses maximum rated RPM.

% CRZ. This row appears when Set mode is selected. Use the – and + controls to set the desired cruise power. In the other modes, TLAR displays the computed power for that objective; the row label changes to identify the selected mode. For turbojet aircraft, the control is percent RPM rather than percent cruise power.

Eco Climb MSL. Enter the desired cruise altitude above mean sea level. When Eco Climb mode is used, TLAR uses this altitude to calculate the most fuel-efficient climb speed, considering the total fuel used to climb and cruise from LZ Alpha to LZ Bravo.

Planning

Use the planning tiles to review the active runway and predicted takeoff and landing performance before flight. Start with the Runway tile to confirm which runway and direction are loaded. Use Vertical Profile to examine the runway surface, surrounding terrain and trees, and the predicted approach and departure paths. Vertical Profile is a takeoff/landing planning tool, not a primary flight display.

Load the aircraft, weight, weather, and LZ before reviewing these tiles. Download terrain and tree data through the LZ menu as described under Terrain and tree data. Changing the active runway, runway direction, aircraft configuration, weather, or climb mode can change the picture and the predicted results.

Runway tile

The tile title identifies the active LZ and runway direction. The north-up sketch shows the airport runways, with the selected runway in magenta and a wind-direction chevron. Use the sketch and title together to confirm the intended runway before reviewing its performance.

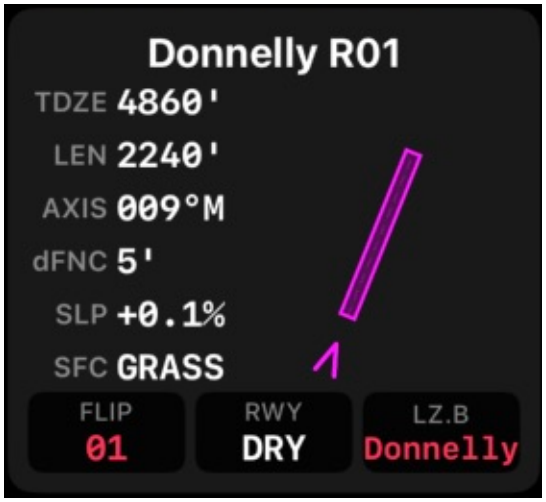


Figure 37. Runway tile. Donnelly R01 is active; dFNC shows the departure-end fence height. The bottom buttons flip the runway, change its condition, and cycle LZ mode.

TDZE is the approach-end elevation in feet MSL. LEN is runway length in your selected distance units. AXIS is the runway bearing in degrees magnetic. SLP is runway slope in percent: positive is uphill in the selected direction, negative is downhill. SFC identifies the surface type used in the performance calculations; it is separate from the DRY/WET/ICY condition button.

dFNC / aFNC. On the ground, dFNC shows the departure-end fence height. In flight, aFNC shows the approach-end fence height. With AUTO Fence off, both use the manual Fence Height from Vertical Nav settings. With AUTO Fence active, terrain-derived approach and departure values can differ.

FLIP. Tap this button to reverse the active runway direction. The approach and departure ends swap. Review the new title, slope, wind relationship, and performance after flipping.

RWY. Tap to cycle DRY, WET, and ICY. This changes runway condition for the performance calculations; it does not change the runway's surface type. The condition is shown on the button.

LZ. Tap to cycle the available LZ modes: Alpha, Bravo, Off, and, with Expert, AUTO. Alpha and Bravo use the runways you loaded into those slots. Confirm the active runway in the tile title after changing modes. When LZ is Off, the tile says LZ not active and lists the saved Alpha and Bravo choices.

Terrain obstacle analysis and AUTO Fence

With downloaded LZ terrain and tree data, TLAR Expert scans the ground beyond each runway end for terrain and trees that rise into the approach or departure path. The Map, Vertical Profile, and 3D Terrain tiles all show this one scan, and AUTO Fence can feed its results into the takeoff and landing calculations.

Lanes. TLAR divides the area beyond each runway end into 31 lanes spaced 2 degrees apart, from 30 degrees left to 30 degrees right of the extended centerline. The scan reaches 0.25 NM beyond the approach end and 0.5 NM beyond the departure end. In each lane, TLAR compares terrain and tree heights with the approach line (the selected FPA) or the climb line (the selected climb profile's gradient).

Obstacle case. The case chooses the lane TLAR uses for the fence calculation and for the Vertical Profile view. CENTER uses the extended runway centerline. BEST uses the lane with the least intrusion, allowing for the wingspan's overlap into neighboring lanes and a small penalty for turning away from the centerline. WORST uses the lane with the greatest intrusion. Set the case with BEST / CENTER / WORST on the back of the Map tile or OBSTACLE CASE on the back of the Vertical Profile tile; both change the same saved setting. When the active LZ has no downloaded LZ terrain, the control on both tile backs is labeled OBSTACLE CASE (need to download terrain).

Obstacle fans on the Map. With SHOW FANS on (on the back of the Map tile), the Map draws fan lines from each runway end. A lane is red when terrain or trees rise above the approach or climb line plus the fence height, yellow when they rise into the Obstacle Safety Margin below that line, and green when they stay below it. The lane chosen by the obstacle case is drawn wider. SHOW FANS changes only the drawing, not the case or the calculation.

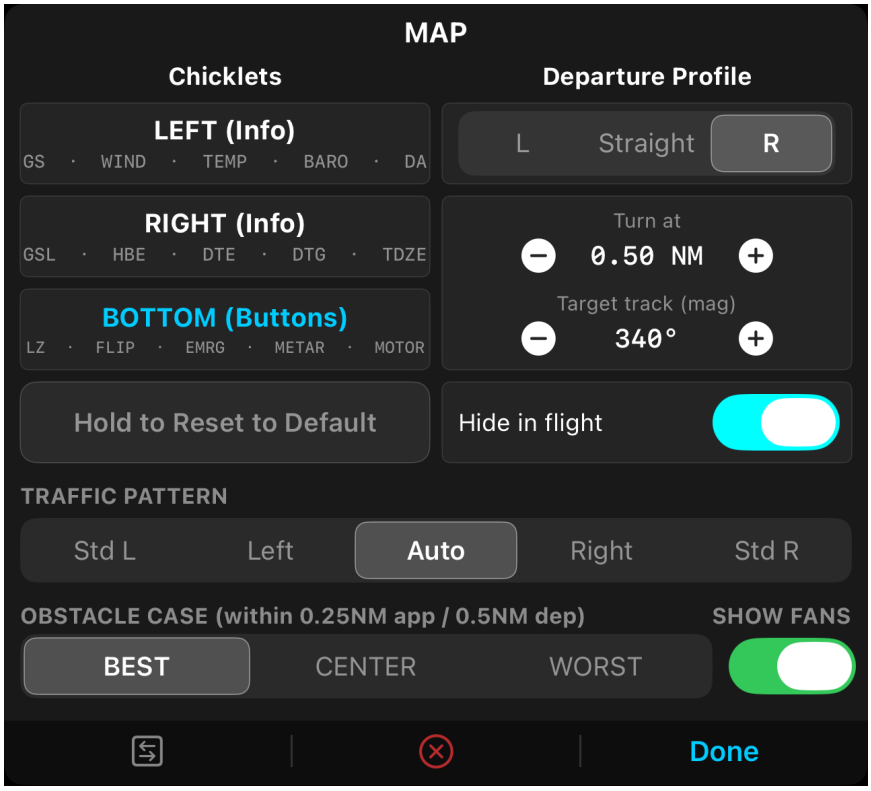


Figure 38. Map tile back at Garden Valley with LZ terrain downloaded. OBSTACLE CASE selects BEST, CENTER, or WORST; SHOW FANS turns the fan drawing on the Map on or off.

AUTO Fence. When AUTO Fence is on, TLAR replaces the manual Fence Height with terrain-derived approach-end and departure-end fence heights from the selected lane, with a 5-foot minimum. The Takeoff and Land tiles then show AUTO after the OVER height. AUTO Fence needs a precise active LZ and local 1 m or 10 m terrain; regional terrain alone, or a 30 m profile, does not qualify, and TLAR falls back to the manual Fence Height. Turn it on or off with AUTO Fence (DTED) in Vertical Nav settings or AUTO FENCE on the back of the Vertical Profile tile; they are the same switch.

The scan covers only the fan area and only the data on the device. Tree heights come from a canopy dataset, and neither dataset includes wires, towers, buildings, or fences. Look at the actual runway environment before relying on a fence value.

Vertical Profile tile

Vertical Profile is an Expert 2×2 tile. Assign it to a 2×2 position using the tile picker. It shows a side view extending 0.25 NM before the approach end, across the runway, and 0.5 NM beyond the departure end. Approach is on the left and departure on the right. The selected obstacle case determines which approach and departure lanes are shown; BEST and WORST need not follow the runway centerline.

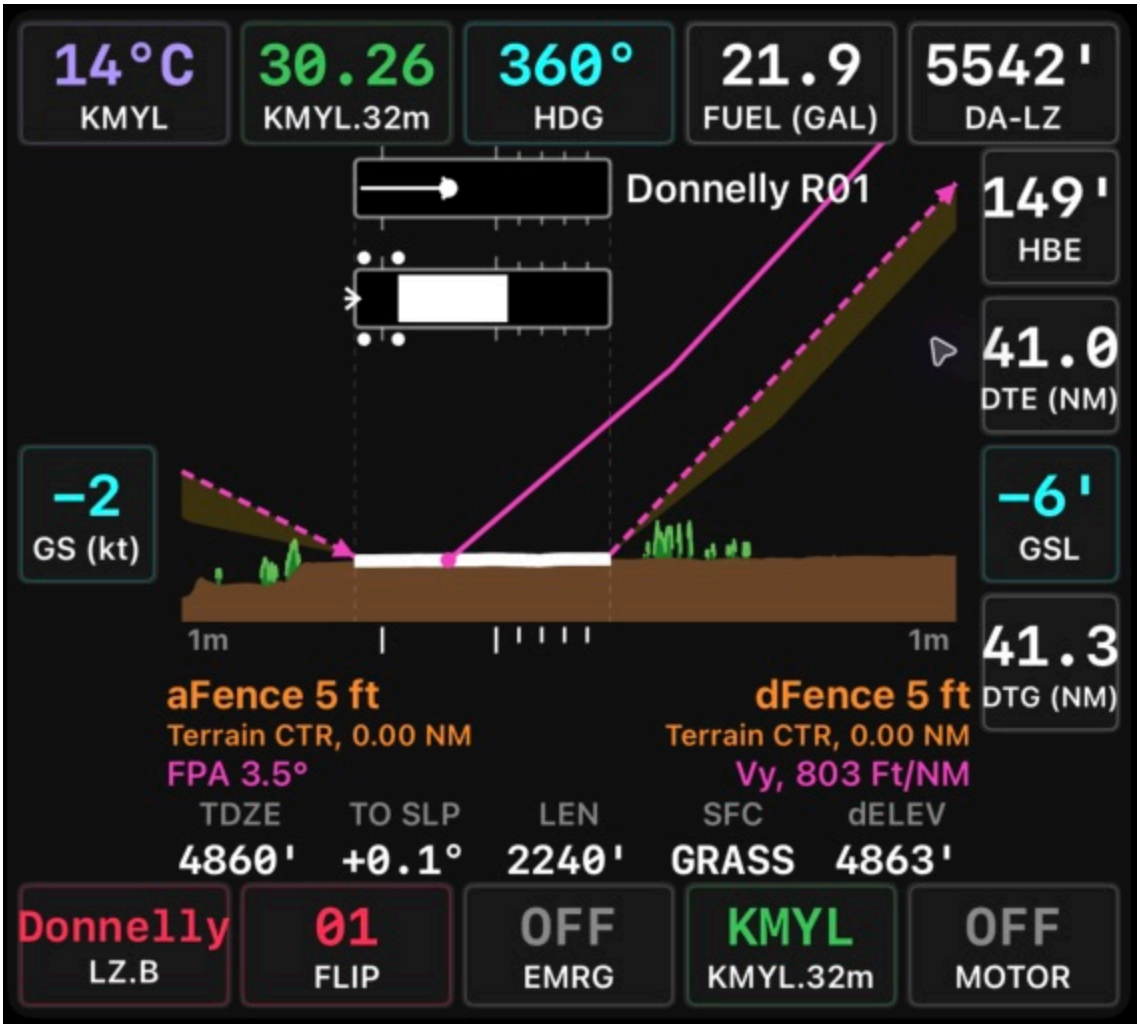


Figure 39. Vertical Profile in ground planning mode. The small runway diagrams summarize takeoff and landing distances; the side view shows the runway, ground, trees, and predicted paths. This example uses CENTER and AUTO Fence.

Read the profile

Runway, terrain, and trees. The runway surface is white on the dark palette and black on the light palette. Brown is bare-earth terrain; green is the tree canopy where tree data are available. Vertical lines locate the runway ends. The two small runway diagrams above the profile show the takeoff and landing distance geometry described in those sections of this guide.

Approach and climb lines. The dashed magenta approach line uses the selected FPA; the dashed departure line uses the selected climb profile's gradient in feet per nautical mile. The shaded wedges below these lines show the modeled obstacle-clearance margin. The solid departure path begins at the predicted liftoff point and depicts the computed climb trajectory. Its liftoff dot is on the runway profile.

Cautions and danger. The takeoff trajectory and landing markings change to yellow or red when their corresponding performance results call for caution or danger. A predicted terrain/tree strike on the departure trajectory is shown with a red dot and a CRASH readout. A fence value alone does not establish that the modeled acceleration-and-climb path clears the terrain.

Fence readouts. aFence applies to the approach end; dFence applies to the departure end. Below them, TLAR shows the selected approach FPA and climb mode/gradient. Obstacle text identifies Terrain or Tree and gives

the controlling obstacle's direction and distance from the runway end; CTR means on the extended centerline. BEST may instead show an Arrive or Depart direction to avoid an intrusion in another lane.

With AUTO Fence off, the readout says set and shows your manual fence height. If the selected lane's terrain/tree intrusion exceeds that value, the readout turns red and shows ABOVE FPA or ABOVE CLIMB. With AUTO Fence active, the readouts use the automatic values for the selected case. These are crossing-height requirements relative to the modeled approach or climb path, not simply the height of the tallest tree.

Runway data strip. TDZE and dELEV are the approach- and departure-end elevations in feet. LEN is runway length and SFC is surface type. TO SLP is the takeoff ground-run slope when available; LD SLP is the landing braking-zone slope when available. AVR SLP means TLAR is using the average runway slope. These profile slope values are in degrees, unlike the Runway tile's percent slope.

Terrain resolution. The corner badges identify the terrain resolution used at each end: 1m, 10m, or 30m, with any applied elevation bias. An elevation bias greater than 10 feet is highlighted amber. A 30m profile can be displayed, but it does not qualify for AUTO Fence. Missing tree coverage must not be read as proof that the area has no trees.

Back-side controls

Tap the tile to flip it over. Tap Done to return to the profile after making changes.

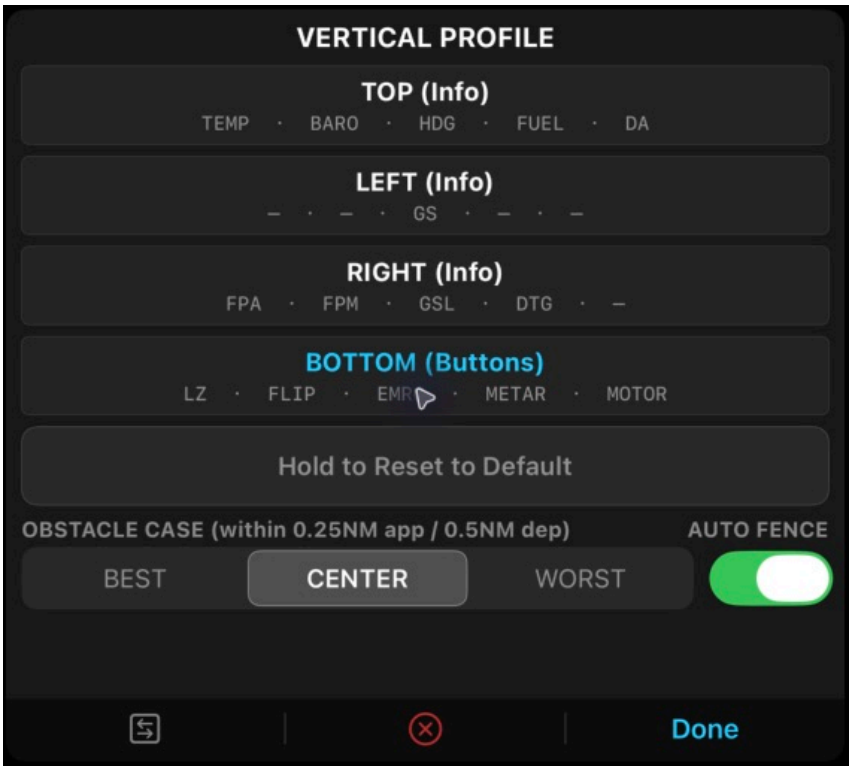


Figure 40. Vertical Profile back side. Edge selectors configure chicklets; OBSTACLE CASE selects BEST, CENTER, or WORST, and AUTO FENCE controls whether terrain-derived fence values feed performance calculations.

TOP, LEFT, and RIGHT. Tap an edge selector to choose its information chicklets. BOTTOM selects button chicklets. Hold to Reset to Default restores the tile's default chicklet arrangement.

OBSTACLE CASE. Select BEST, CENTER, or WORST to choose the lane shown in the profile and used for AUTO Fence. This is the same setting as the obstacle case on the back of the Map tile; see Terrain obstacle analysis and AUTO Fence.

AUTO FENCE. Turn this on to use terrain-derived fence heights in the takeoff and landing calculations. It is the same switch as AUTO Fence (DTED) in Vertical Nav settings. With it off, the profile still draws the terrain, but performance uses the manual Fence Height.

The Vertical Profile back side does not have a SHOW FANS switch. To show or hide the obstacle fans on the Map, use SHOW FANS on the Map tile's back side. That display switch is separate from AUTO FENCE.

If the profile is unavailable

COORDINATES IMPRECISE means the runway location is not precise enough for a runway-relative profile. The other headlines explain what is missing: TERRAIN NEEDS EXPERT, AUTO DOWNLOAD OFF, WAITING FOR NETWORK, DOWNLOADING TERRAIN..., or FETCHING TERRAIN. A message can also report an elevation-data mismatch. Follow the message and check LZ › Terrain Data; a loaded runway does not mean its terrain and trees are on the device.

Use the profile to compare runway directions and the effect of aircraft, weather, climb, and fence settings. The scan is limited to the displayed area and downloaded data; it is not a complete obstacle survey. Weather and V-Speeds provide supporting planning information and are described in their tile sections.

Primary Flight Display Tiles

HSI, Map, and HUD are TLAR's primary flight-display tiles. They use the same active LZ, aircraft position, weather, and performance calculations, but present them in different ways: the Horizontal Situation Indicator (HSI) is a heading-and-runway view, Map is a geographic view, and HUD is an attitude-referenced view. Use them as complementary situational-awareness displays, not as replacements for approved aircraft instruments or procedures.

HSI

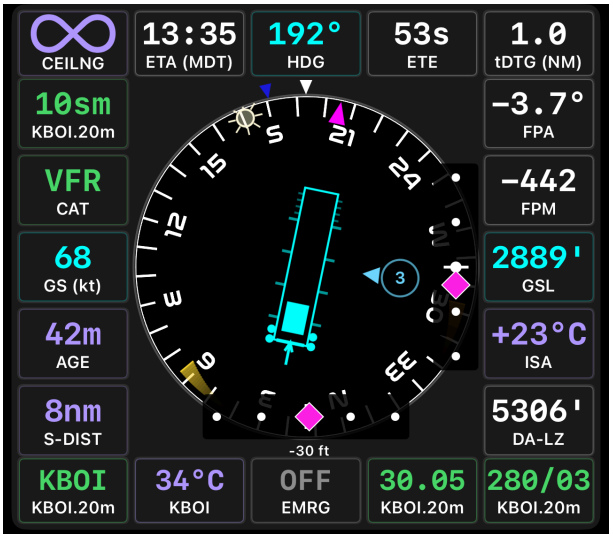


Figure 41. HSI landing display. The cyan dynamic-mode runway geometry, GSI/CDI markers, wind, LZ cues, solar markers, and surrounding chicklets are shown together.

The HSI compass rose is referenced to true north. Above 5 knots, it centers on GPS-derived true track. At lower speeds, TLAR uses iOS true heading when available, with magnetic heading as the fallback. The white lubber triangle at the top is the true reference; the blue triangle is the magnetic-reference marker. The magenta LZ bearing pointer, when enabled, points from the aircraft toward the active LZ approach end.

The white runway is drawn at the active runway's true axis and to its scale within the compass. On the ground, the takeoff arrow runs from brake release to the computed fence-clearance point and the white dot marks liftoff. In flight, the runway changes to landing geometry: touchdown-zone dots, braking-distance rectangle, and the fence-shadow approach arrow. The runway markings use the same conditions and distance logic as the Takeoff and Land tiles.

The cyan wind arrow points toward the true direction the wind is coming from; its circular speed ball gives wind magnitude. With SOLAR enabled on the back of the 2×2 HSI, the sun icon marks current solar azimuth and its elevation; the yellow SR and amber SS rim wedges mark sunrise and sunset azimuths. With an active LZ, these solar cues are calculated for the LZ location; in flight they use the estimated arrival time at the LZ.

When stabilized-approach guidance is available for a precise active LZ and the aircraft is within 10 NM of the approach end, the HSI adds course-deviation and glideslope tracks. The CDI is the horizontal track below the rose and shows cross-track displacement; the GSI is the vertical track at the right and shows displacement from the selected flight-path angle. The diamonds move toward the correction required. The CDI scale is ±1,000 feet and the GSI scale is ±1.0 degree; a yellow outline means the indicated deviation is beyond full scale.

Map

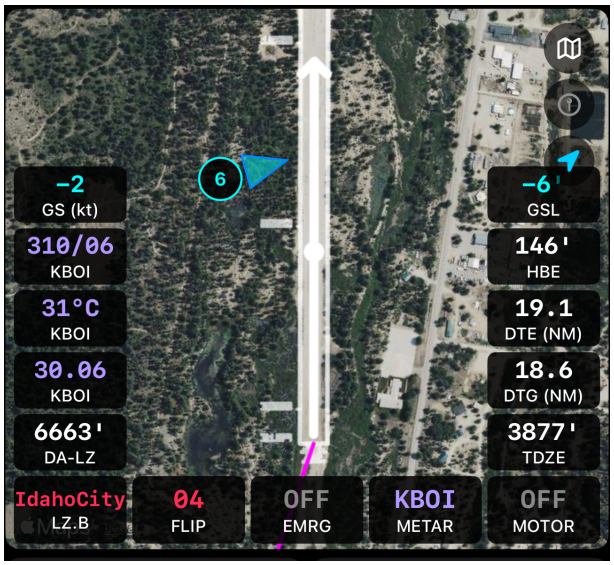


Figure 42. Map reference display. The active runway, takeoff geometry, magenta course line, aircraft position, wind, and map controls remain geographically aligned.

The Map tile draws the active runway on the imagery with runway-end and distance markings. The magenta line is the selected course to the active LZ or the route produced by the selected traffic-pattern mode. The cyan wind arrow at the LZ points toward the true direction the wind is coming from. Nearby METAR stations are marked on the map; at close zoom their observation text is drawn downwind from the station like a flag, so the text remains associated with its source.

At sufficient zoom, TLAR draws detailed runway information at the runway ends: LZ name, latitude and longitude, elevation, true axis, slope, and runway length. The white 10-NM ring is centered on the approach end. The run-in line carries one-NM distance marks, and STAB marks the selected stabilization point. Takeoff and landing performance geometry is projected onto the runway image using the same liftoff, fence, touchdown-zone, and braking calculations shown on the performance tiles.

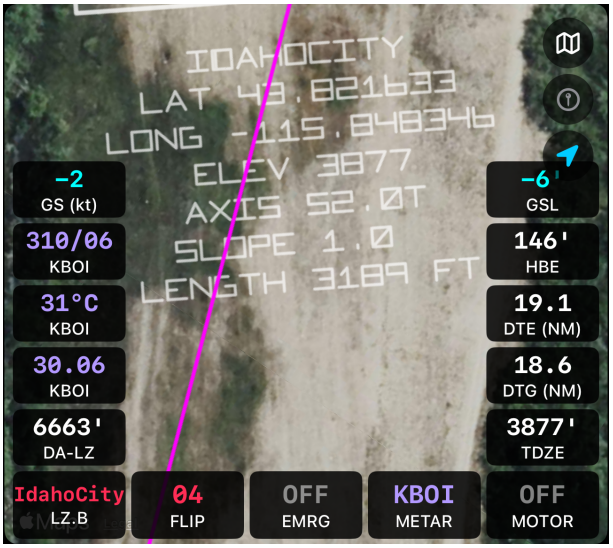
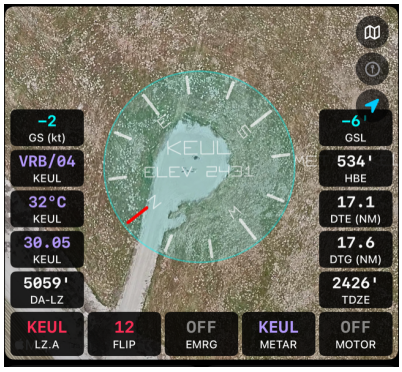
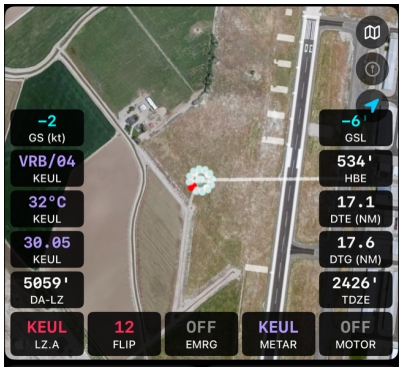


Figure 43. Detailed runway-end information. At close zoom, TLAR writes the active LZ name, coordinates, elevation, true axis, slope, and length along the runway.



METAR STATION — CLOSE



METAR STATION — FLAG TEXT

Figure 44. METAR-station examples. At close zoom the station is shown as a wind marker; farther out, its METAR text flows downwind from the station like a flag.

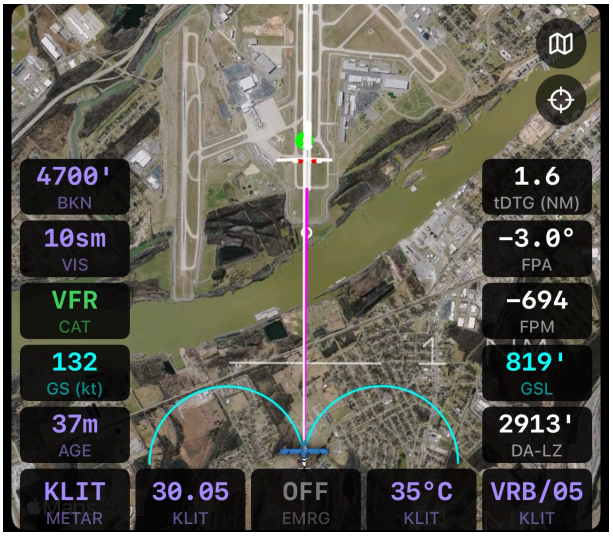


Figure 45. Map flight-path cues. The white FPA hash, green GPS-derived FPA marker, white track vector, and cyan turn-radius whiskers are shown together.

The standard iOS location chevron shows current position and heading. The green GPS-derived FPA marker shows where the current GPS-derived flight path projects ahead of the aircraft. The white track vector projects current ground track. The short white FPA hash shows where a continued descent at the selected flight-path angle meets the LZ touchdown-zone elevation. Cyan turn-radius whiskers show the left and right turns available at a 30-degree bank; they appear only while flying when the computed radius is within the display range.

Use the upper-right map button to switch between satellite imagery and the standard map. Its symbol identifies the other available style. The center-mode control switches between Auto-Zoom, where TLAR chooses the scale while following the aircraft, and LZ-Centered, which keeps the active LZ centered. The recenter button appears after a manual pan, zoom, or rotation; tap it to resume the selected center mode.

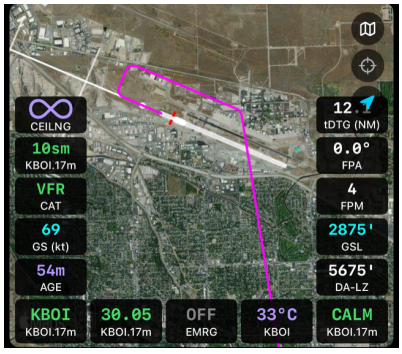
On the back of the Map tile, choose the traffic-pattern mode. Std L and Std R draw a standard left- or right-pattern route, including a downwind-entry sequence when outside the decision radius. Left and Right route to the closest normal point in that pattern. AUTO chooses the most efficient route to the approach end without imposing normal traffic-pattern geometry. The setting returns to AUTO when TLAR is restarted.



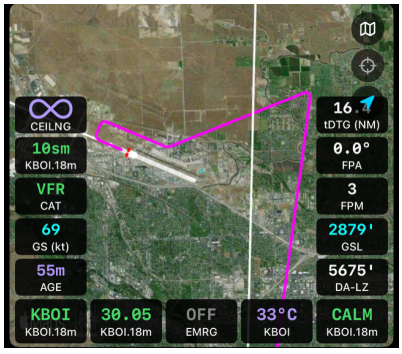
STD R



RIGHT



LEFT



STD L

Figure 46. Traffic-pattern route examples. The magenta route changes with the selected pattern mode and the aircraft's position relative to the active LZ.

HUD

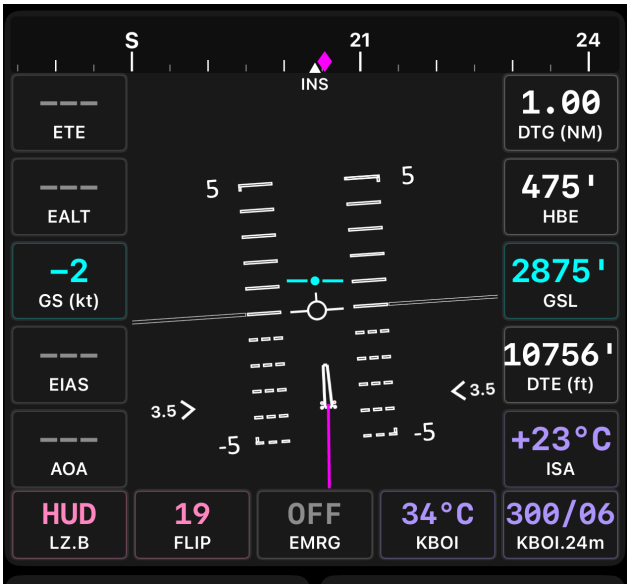


Figure 47. HUD reference display from an iPhone. The heading tape, pitch ladder, waterline, flight-path marker, magenta LZ projection, FPA chevrons, and attitude controls are visible.

The HUD places a scrolling true heading/track tape across the top and an attitude-referenced pitch ladder behind the fixed waterline. The magenta diamond on the tape is the LZ bearing pointer. The waterline's two wings and center dot show where the aircraft nose is pointing. In INS mode, TLAR places a flight-path marker on the HUD which shows the plane's current path. The vertical difference between the path marker and waterline marker is approximately the aircraft's current angle of attack. When an active LZ is loaded, the magenta LZ projection runs from present position toward the active LZ approach-end fence-height crossing point. The chevrons beside the ladder mark the selected flight-path angle; in Expert emergency mode they move to the engine-out glide angle.

The circular symbol with short wings is the flight-path marker: it shows where the aircraft is actually going vertically. In GPS attitude mode, pitch is derived from GPS elevation change, so the waterline and flight-path marker coincide. With INS or AHRS selected, the flight-path marker is drawn separately from the waterline.

Choose GPS, INS, or AHRS with ATTITUDE on the back of the HUD tile or with the ATT button. It is the same setting as PITCH/ROLL SOURCE on the 3D Terrain tile in LIVE mode, and a source that is not currently available is greyed out. GPS derives pitch and roll from satellite motion; it is mount-orientation independent but can lag or react to poor GPS data. INS uses the iPhone or iPad inertial sensors. Mount the device aligned with the aircraft yaw axis, select INS with the ATT button, and press SYNC only in level, unaccelerated flight to level the display and store its bias. iOS filtering corrects acceleration-induced error over time, which can take about a minute. AHRS uses external attitude data from OnSpeed or X-Plane. If the selected source drops out, TLAR uses the next available source (AHRS, then INS, then GPS), and the ATTITUDE label shows the substitution, for example (INS unavailable — using GPS). Treat all TLAR attitude presentations as situational awareness only, not a primary attitude reference.

Takeoff

Use the Takeoff or Smart TOLD tiles to review the active runway, the computed takeoff distances, the selected takeoff flap setting, and the selected climb profile before brake release. The Smart TOLD tile auto-switches: it is a Takeoff tile on the ground and a Land tile when flying. The calculation uses the active LZ, current aircraft loading, weather/performance reference, runway slope and surface, selected flaps, power-

push setting, and selected climb mode. It is an advisory performance estimate; compare it with the aircraft documentation, runway condition, and your operational judgment.

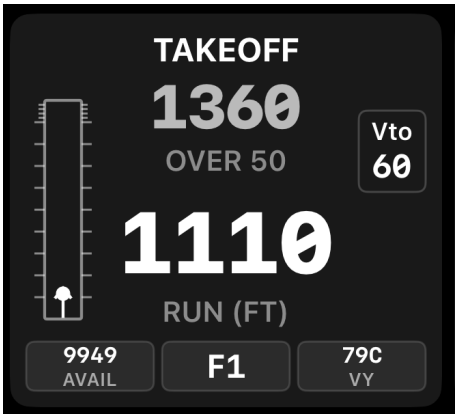


Figure 48. Takeoff tile with normal results. The upper value is distance over the selected fence height; the large lower value is the ground run to liftoff.

Read the Takeoff tile

OVER 50 is the takeoff distance from brake release to clear the fence height selected in Vertical Nav; the number after OVER changes with that selected height. RUN is the predicted ground distance from brake release to liftoff. Vto is the computed liftoff speed in KCAS for the currently selected takeoff flap setting.

The vertical runway bar is a scaled runway diagram. The arrow runs from the brake-release point to the over-fence point. The dot marks the predicted liftoff point. The runway graphic has distance remaining tick marks. The longer marks show 1,000-foot remaining intervals; shorter marks show 200-foot intervals in the last 1,000 feet. When length units are meters, those intervals become 1,000 and 200 meters.

The bottom-center F1 control is the takeoff-flap button. Tap it to cycle through the aircraft's available takeoff flap settings; a non-default setting is shown in the caution color. The left and right positions are configurable information chicklets. In these examples, AVAIL is runway available and the right chicklet shows the selected climb mode and its target speed. Tap the tile to flip it: the back lets you choose the left and right chicklets. Pro and Expert users can also enable ASTOP there; the large lower readout then changes from RUN to calculated accelerate-stop distance.

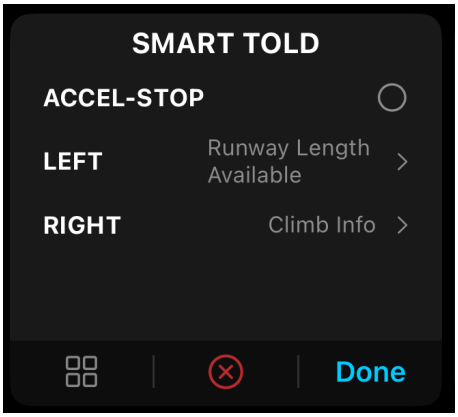


Figure 49. Smart TOLD back side. Tap ACCEL-STOP to enable calculated accelerate-stop distance. Tap LEFT or RIGHT to choose the information chicklet shown in that position, then tap Done to return to the front of the tile.

How TLAR calculates takeoff run

TLAR calculates the ground roll in 0.1-second steps. At each step it uses the current ground speed plus headwind to determine airspeed, computes thrust at maximum-power RPM, computes lift and drag at the selected takeoff flap setting, applies the effects of runway slope, surface type, and surface condition, and resolves thrust along the runway. TLAR expert with high resolution terrain downloaded computes a high-resolution slope for the portion of the runway the plane is over. TLAR-pro (and -expert without terrain down loaded) uses the runway's average slope from approach to departure ends. TLAR-basic uses zero slope always. If Power Push is nonzero, throttle begins at 16 percent and rises linearly to full power over the selected Power Push time; with Power Push set to zero, full power is used immediately.

The reported RUN is the integrated distance to liftoff plus a rotation segment: RUN = distance to lift-off + Vg at lift-off × 0.9 second. TLAR rounds the resulting distance to the nearest 10 feet. The 0.9-second rotation allowance is included in the displayed ground run and in the liftoff point used by the runway graphics.

How TLAR calculates distance over the fence

The over-fence calculation starts with the displayed RUN, then models the airplane’s transition from Vto to the selected climb speed while sharing excess power between acceleration and climb. It calculates the distance required to accelerate, the altitude gained during that acceleration, runway elevation change between liftoff and the departure end, and the remaining climb distance required to reach the selected fence height.

The selected climb mode therefore matters. A different speed or climb-rate target changes the acceleration segment, climb gradient, and distance required to clear the fence. Review the climb mode shown in the right chicklet before using the result.

TLAR accounts for the elevation difference between the liftoff point and the departure end of the runway. On an upslope departure, the airplane must climb farther to clear the selected fence height; on a downslope departure, liftoff can occur above that height. TLAR posts a slope advisory when liftoff is above the fence height, and the Takeoff Brief calls out meaningful slope-related clearance or a climb gradient that is less than, or only barely exceeds, the uphill runway slope.

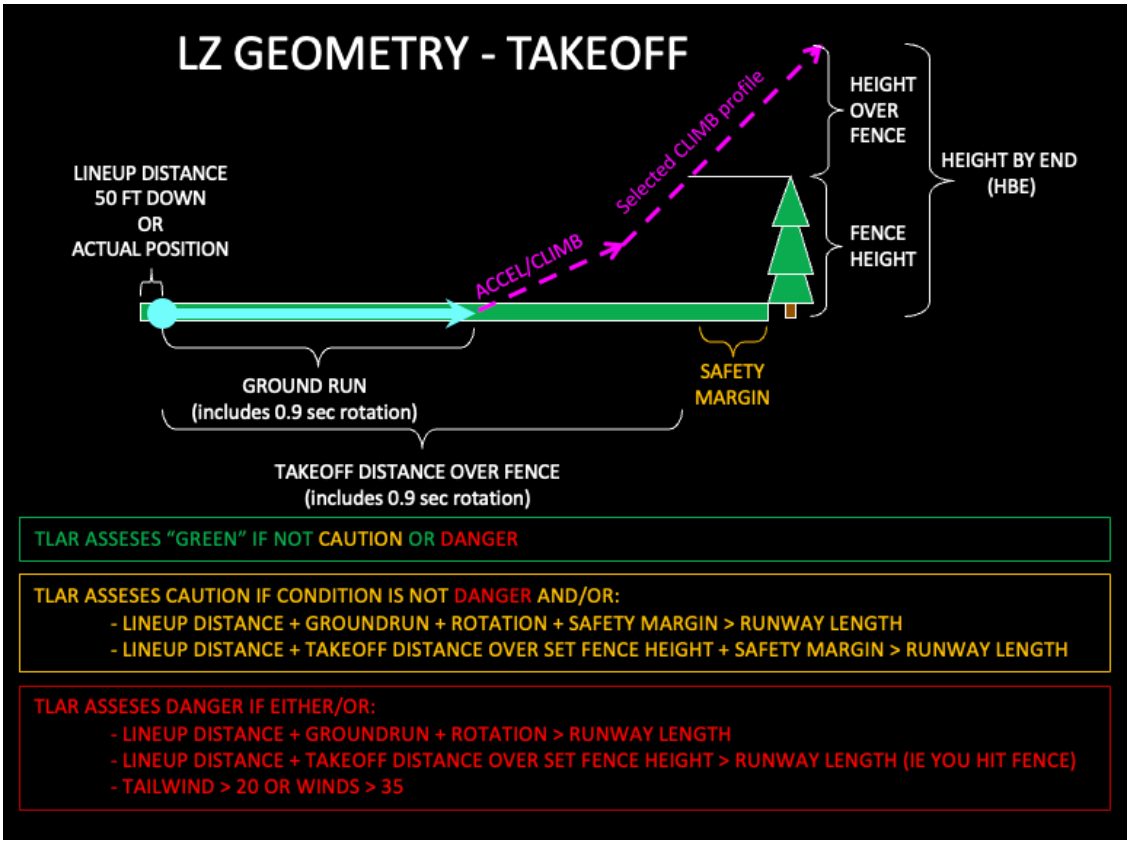


Figure 50. Normal takeoff geometry. Ground run begins at the selected line-up point and ends at liftoff; the climb profile then determines distance over the selected fence height.

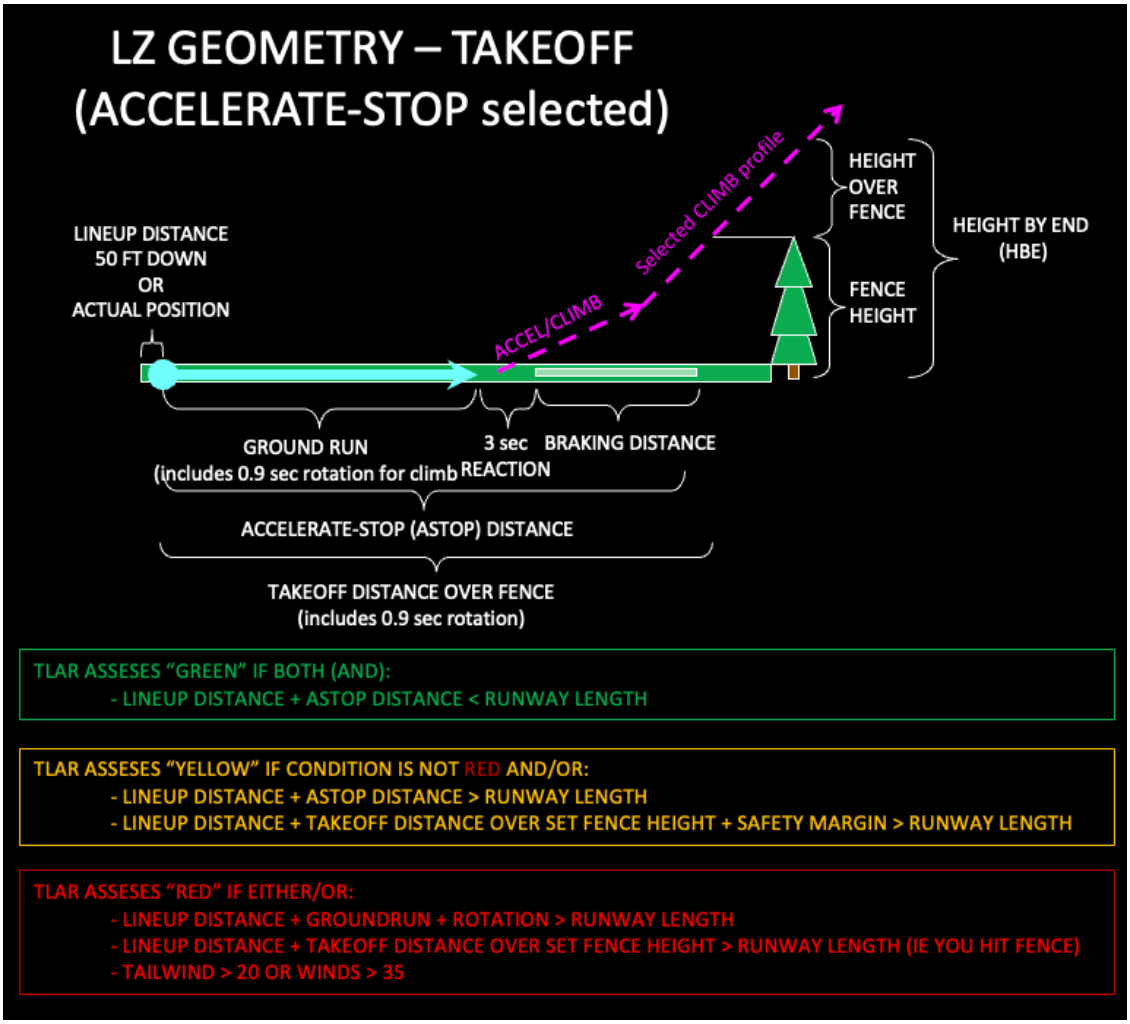
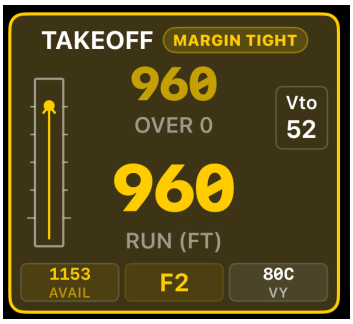


Figure 51. Accelerate-stop geometry. With ASTOP selected, TLAR includes the selected reaction time and calculated braking distance in the accelerate-stop distance.

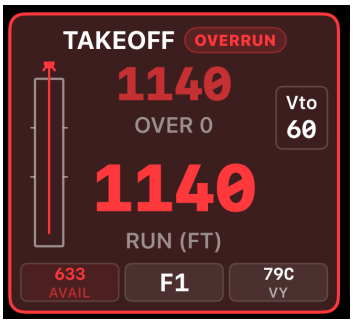
Yellow and red Takeoff results

The tile uses its most serious condition to set the border, tint, values, and message pill. Yellow displays MARGIN TIGHT. With RUN selected, yellow means the ground run plus the Pilot Safety Margin exceeds the available runway. With ASTOP selected, yellow means calculated accelerate-stop distance exceeds the available runway; ASTOP already includes its braking distance, so TLAR does not add the Safety Margin again. Yellow also occurs when the over-fence distance plus the Pilot Safety Margin exceeds available runway.

Red displays OVERRUN when the ground run exceeds runway available, and BELOW FENCE when the over-fence distance exceeds runway available. A wind-danger condition also makes the tile red and replaces both distance values with WIND. When lined up, TLAR uses GPS-measured distance remaining to the departure end as the available runway length; otherwise it assumes line-up occurs 50 feet down the runway and subtracts that from the length to obtain runway available.



YELLOW — MARGIN TIGHT



RED — OVERRUN

Figure 52. Takeoff cautions. Yellow means the applicable distance plus its required margin no longer fits; red means the predicted takeoff distance exceeds runway available.

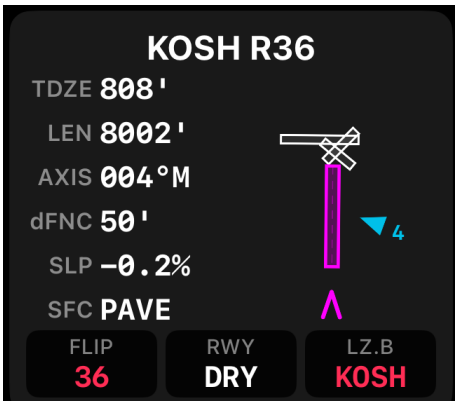


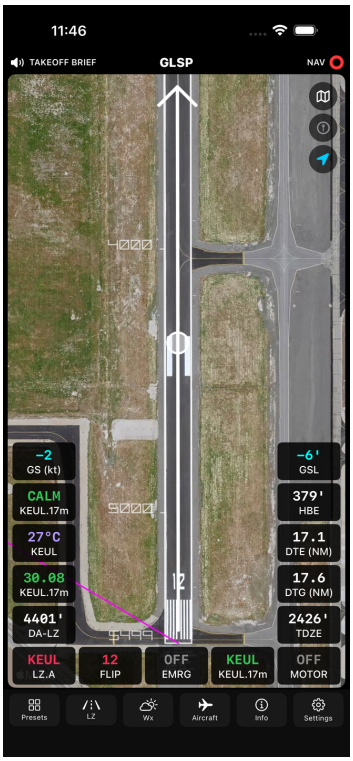
Figure 53. Runway tile. FLIP switches the active runway to its opposite direction, swapping the approach and departure ends. RWY cycles the runway condition through DRY, WET, and ICY. The LZ button selects LZ Alpha, LZ Bravo, Off, or—on Expert—AUTO.

Runway geometry on the HSI and Map

On the ground, the HSI and Map draw the active runway to scale and orient it to the runway axis. The takeoff line begins at the brake-release point, extends to the computed over-fence point, and ends in an arrowhead. The liftoff point is the filled circle positioned at the displayed RUN distance. Distance labels and tick marks identify remaining runway distance. These graphics use the same takeoff distances and condition colors as the Takeoff tile.



HSI RUNWAY GEOMETRY



MAP RUNWAY GEOMETRY

Figure 54. Runway geometry on the HSI and Map. The arrow shows brake release to fence clearance, and the circle marks predicted liftoff. The markings follow the active runway axis.

Climb

Use the Climb tile, or the Smart Climb/Cruise tile when it is displaying Climb, to select and review the intended post-liftoff profile. The tile shows the speed to fly at left and predicted climb performance at right. The curved graph plots climb rate against airspeed; the vertical line and dot identify the selected profile. Check the displayed mode, speed, power label, and predicted result before using the profile for takeoff planning or flight.

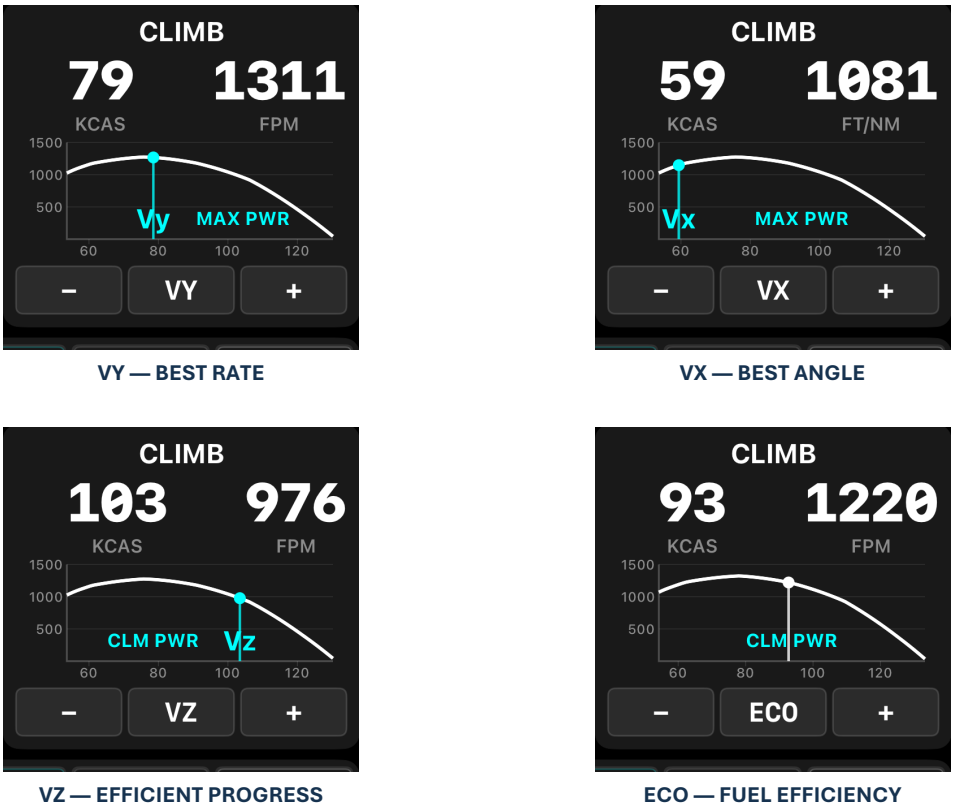


Figure 55. Climb profiles. The curve and marker update for the selected profile and current aircraft, weather, weight, and performance reference.

Read and control the Climb tile

The center bottom control cycles the available climb profiles. Pro and Expert users can use the − and + controls to change the displayed climb speed; either control changes the active profile to CAS. The left value is the displayed airspeed target. The right value is predicted climb rate in feet per minute, except in Vx mode, where it is wind-corrected climb gradient in feet per nautical mile.

Vx and Vy use maximum power available. Vx uses the selected takeoff flap setting; all other profiles use flaps up. Vz, ECO, CAS, TAS, and FPM use the aircraft's configured climb power. The tile turns yellow when the selected predicted climb rate is positive but below 200 FPM, and red when the selected mode cannot produce a positive climb rate.

Climb profiles

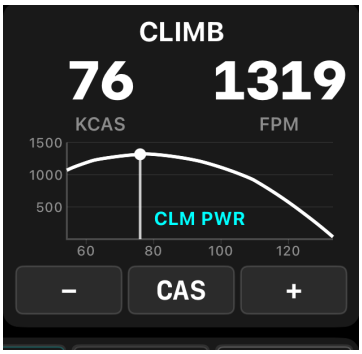
Vy. Best rate of climb. Fly the displayed speed when maximum climb rate is the objective.

Vx. Best angle of climb. Fly the displayed speed when maximum climb gradient is the objective. The tile reports wind-corrected feet per nautical mile rather than FPM.

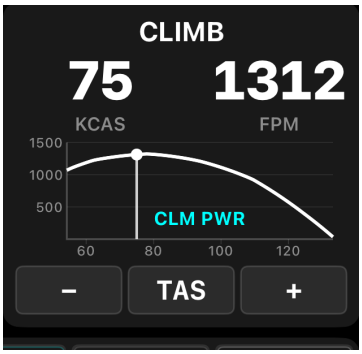
Vz. A higher-speed, practical climb profile intended to balance climb rate with forward progress toward the destination. TLAR uses a Vz speed of 1.32 times Vy.

ECO. The fuel-efficient profile for the route to the active LZ. TLAR selects a climb speed intended to minimize total climb, cruise, and descent fuel for the selected cruise altitude and cruise setting. ECO is available only

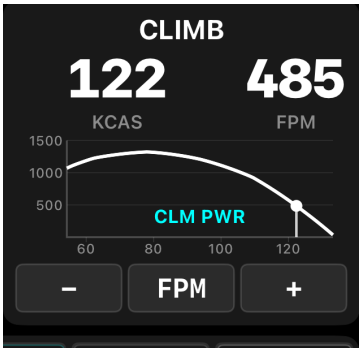
when an active LZ and LZ bearing pointer are enabled. If the selected cruise altitude cannot be reached and descended from before the destination, choose a feasible lower cruise altitude.



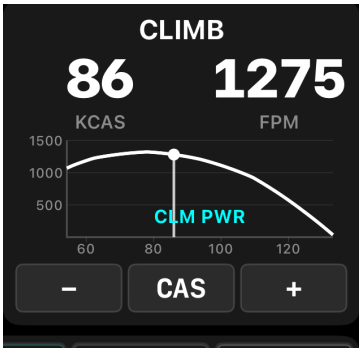
CAS — CONSTANT CALIBRATED SPEED



TAS — CONSTANT TRUE SPEED



FPM — CONSTANT CLIMB RATE



CAS — ADJUSTED TARGET

Figure 56. Constant-target modes. Set the CAS, TAS, and FPM targets in Vertical Nav; the ± controls provide a direct CAS adjustment on the tile.

CAS. Hold the selected calibrated airspeed. Use it when a published or personally selected calibrated climb speed is appropriate.

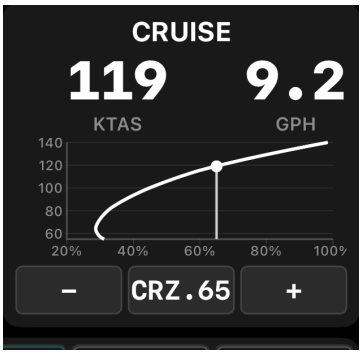
TAS. Hold the selected true airspeed. Use it when the climb procedure is based on true airspeed.

FPM. Hold the selected climb rate. Set the target in Vertical Nav; the target can be set from 200 FPM up to the computed Vy climb rate.

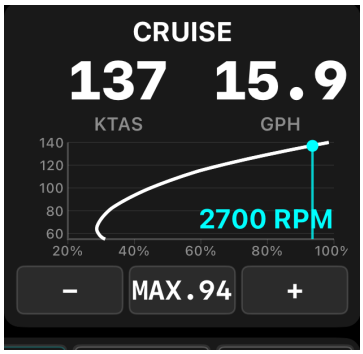
For CAS, TAS, and FPM, confirm that the selected target remains achievable as aircraft weight, density altitude, and available power change. TLAR updates the predicted result from the current conditions.

Cruise

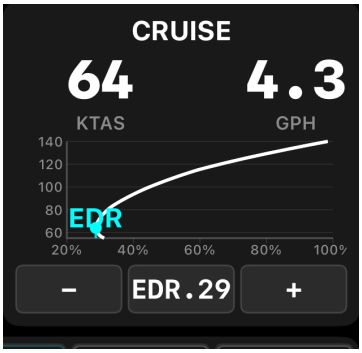
Use the Cruise tile, or the Smart Climb/Cruise tile when it is displaying Cruise, to select and review cruise performance. The left value is predicted true airspeed (KTAS); the right value is predicted fuel flow (GPH). The chart plots true airspeed against percent power. Its vertical marker and dot identify the selected cruise setting.



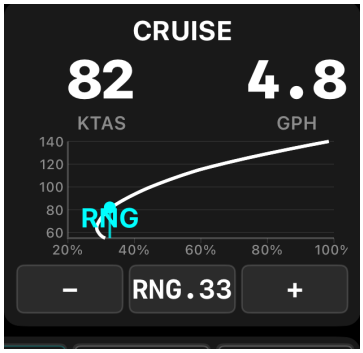
CRZ .65 — SET CRUISE POWER



MAX .94 — MAXIMUM SPEED



EDR .29 — BEST ENDURANCE



RNG .33 — BEST RANGE

Figure 57. Cruise modes. The selected marker, predicted TAS, and predicted fuel flow update for current aircraft, altitude, weather, and performance reference.

Read and control the Cruise tile

The center bottom control cycles Endurance, Range, Set Cruise, and Max. The left and right controls decrease or increase the selected power. Either control selects Set Cruise, shown as CRZ followed by the selected percent power. Basic users see CRZ .65; its mode control is not interactive. Cruise-mode selection and power adjustment are available in Pro and Expert.

TLAR uses the performance-reference density altitude to calculate the chart, speed, and fuel flow: aircraft altitude and weather when the reference is Aircraft; active-LZ elevation and weather when the reference is LZ; or the pilot-entered elevation and weather when the reference is Manual. TLAR uses the configured cruise RPM for Endurance, Range, and Set Cruise. Max uses maximum rated RPM and full throttle rather than the cruise-RPM assumption.

Cruise modes

Endurance (EDR). Select Endure for best endurance—the lowest fuel flow.

Range (RNG). Select Range for best range—the greatest still-air nautical miles per gallon.

Max. Select Max for maximum speed at full throttle.

Set Cruise (CRZ). Select Set to enter a desired cruise power, up to the maximum available for the current pressure altitude and temperature at cruise RPM.

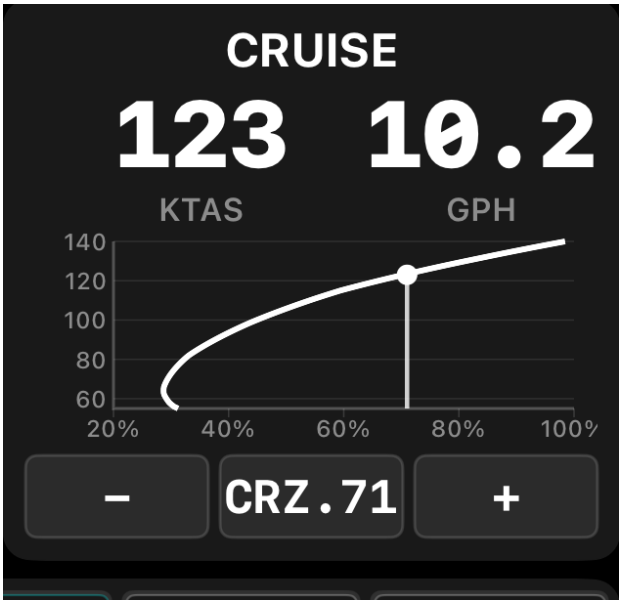


Figure 58. Set Cruise adjusted to 71 percent power. Tap – or + to change power in one-percent increments; the tile updates the associated TAS and fuel flow.

If the requested altitude and conditions do not permit cruise flight, the Cruise tile turns red. Use the red result as a prompt to review the selected performance reference, elevation, weather, aircraft loading, and available power before relying on a cruise prediction.

Descent

Use the HSI, Map, and HUD to manage a descent that reaches the active LZ approach end at the selected fence height. Each display presents vertical-navigation information for the same destination and selected route. The FPA-required and FPM-required chicklets report the descent profile required at the current groundspeed, assuming the airplane follows the magenta route to the LZ.

Direct distance and track distance

Outside 10 NM, the magenta line routes directly to the approach end. The distance chicklet is DTG, and the required FPA and FPM are based on that direct distance. Inside 10 NM, TLAR switches to the selected pattern route: Std L, Std R, Left, Right, or AUTO. The distance chicklet becomes tDTG (track distance to go), and TLAR uses that routed distance to compute the required FPA and FPM. A required value therefore changes as groundspeed, altitude, position, and the remaining route change.

The set fence height defines the arrival target at the approach end. Use the required-profile chicklets to decide when to start down and to monitor whether the planned route will arrive at that target. The set FPA is the pilot-selected descent reference; it is separately displayed on the Map and HUD.

HSI descent information



Figure 59. HSI descent vertical-navigation aids. The FPA and FPM chicklets show the profile required to reach the approach-end fence-height target. The GSI dots show deviation from the selected FPA; each dot represents 0.5 degree.

The HSI provides the route, required-profile chicklets, and Glideslope Indicator (GSI) in one view. Follow the magenta route while comparing the current descent to the required FPA or FPM. The GSI diamonds show the aircraft relationship to the selected FPA: each dot is 0.5 degree from the set FPA. When approach guidance is active, the companion CDI/GSI markings also help show lateral and vertical relationship to the runway approach.

Map descent information

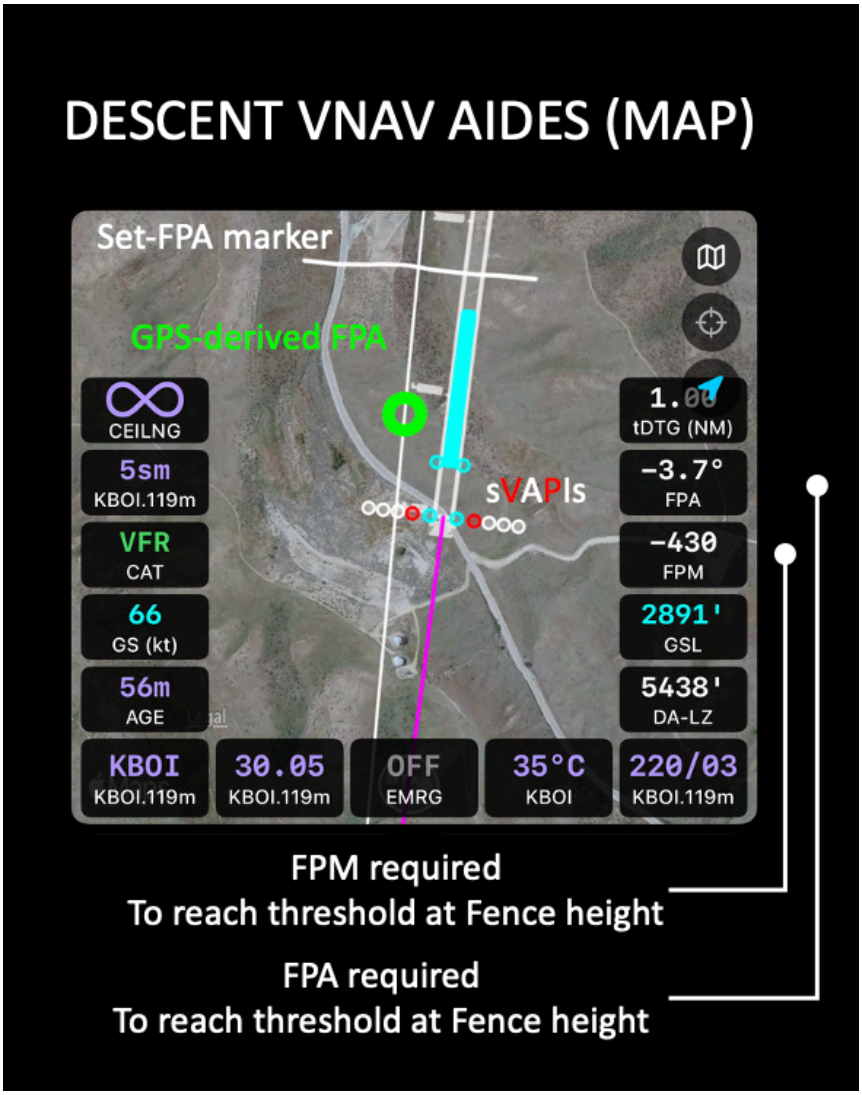


Figure 60. Map descent vertical-navigation aids. The green GPS-derived FPA marker, white set-FPA hash, and sVAPIs show the descent path and runway reference.

The Map adds a spatial view of the descent. The green marker is the GPS-derived flight-path angle. The white hash marks the selected FPA. Compare those markers while following the magenta route: their relative position shows whether the present GPS-derived path is steeper or shallower than the selected descent angle. The sVAPIs appear beside the runway and provide a visual approach reference at the active LZ.

HUD descent information

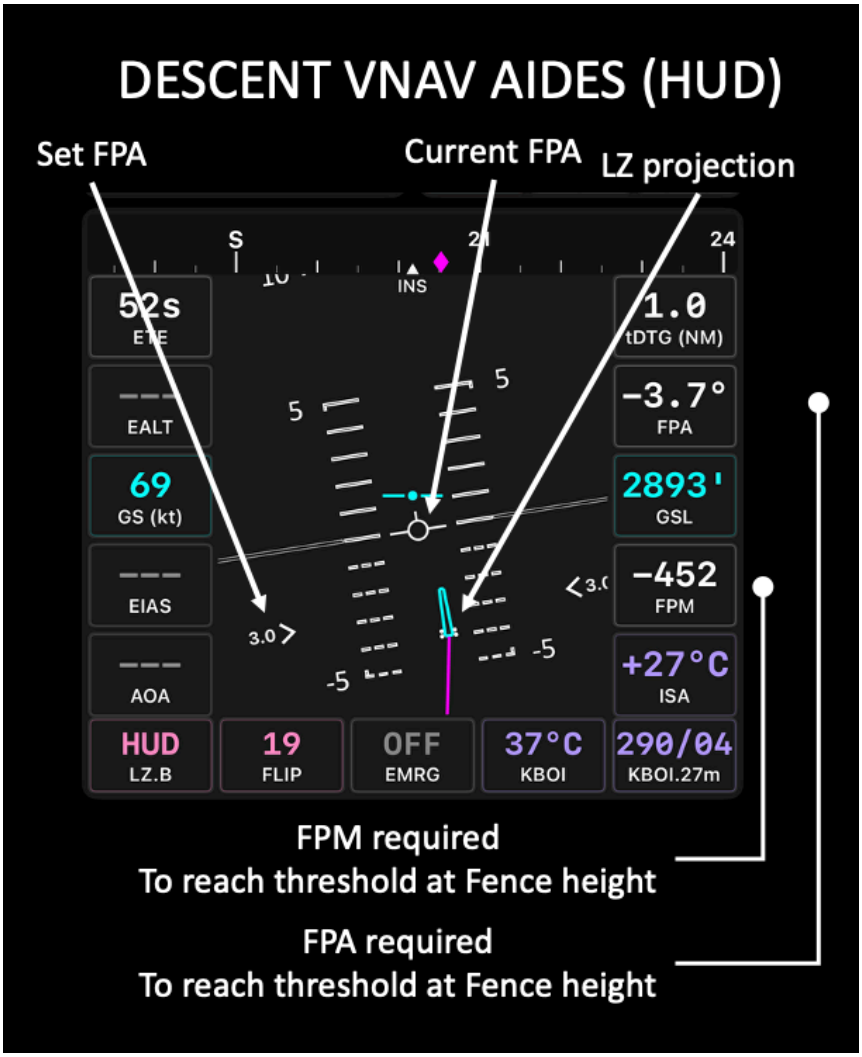


Figure 61. HUD descent vertical-navigation aids. The display combines the LZ projection, current flight-path angle, and selected FPA with the required-profile chicklets.

On the HUD, the LZ projection shows where the active LZ lies ahead of the aircraft. The flight-path marker shows current FPA, while the set-FPA marks provide the selected descent reference on the pitch ladder. Use the FPA- and FPM-required chicklets with those cues to maintain the route and adjust the descent as required to reach the approach-end fence-height target.

Landing

Use the Land tile, or the Smart TOLD tile when it has switched to Land in flight, to plan the runway needed for the selected approach. Set and confirm the active LZ, weather, aircraft weight, landing-flap setting, braking selection, and normal or STOL speed selection before using the result. The Land tile and the runway graphics on the HSI and Map use the same landing geometry and color state.

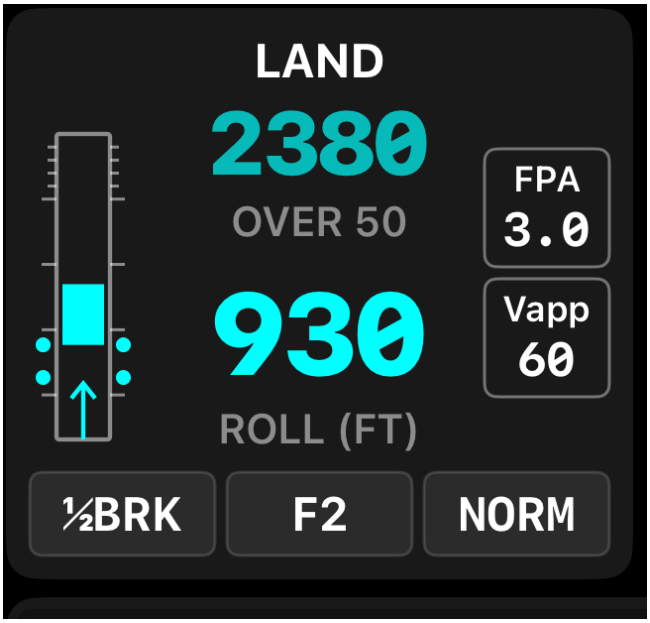


Figure 62. Land tile with a normal result. OVER 50 is the predicted landing distance over the selected fence height; ROLL is the predicted braking distance after touchdown.

Read and control the Land tile

OVER 50 is the predicted distance from the approach-end fence-height crossing to a stop. The number after OVER (for example, 50) is the selected fence height. The fence height and effective flight-path angle (FPA adjusted for runway slope) determine the length of the fence shadow (see Figure 59, Landing geometry). The total distance OVER XX is the sum of the fence shadow, Touchdown Zone Length from Pilot Settings, and braking roll. The touchdown zone (TDZ) is the distance required to round-out, flare, touchdown, and begin braking. If necessary to stop on the runway, TLAR shrinks the touchdown zone and cautions you by coloring the Land tile yellow and posting a notification. ROLL is the predicted braking distance. It is determined by touchdown groundspeed, runway surface type (for example, paved) and condition (for example, wet), and brake setting (for example, MAX).

High-resolution runway slope (Expert). With 1 m or 10 m LZ terrain downloaded, TLAR uses the slope of the runway under the actual braking segment, rather than the average runway slope, for the landing roll, the Emergency-mode straight-ahead landing roll, and the stopping check at each turnback aimpoint. Without that data, it uses the average runway slope. The Vertical Profile tile shows these values as TO SLP and LD SLP.

The FPA badge shows the selected approach flight-path angle. The Vapp badge shows the calculated reference approach speed for the selected landing flap and speed mode. Use the left button to select partial braking (½BRK) or maximum braking (MAX). Use the center button to cycle the landing flap setting. Use the right button to select NORM or STOL; STOL uses the STOL approach-speed ratio, while NORM uses the normal approach-speed ratio. Yellow button text identifies a nonstandard or short-field selection that deserves a deliberate review.

Landing geometry

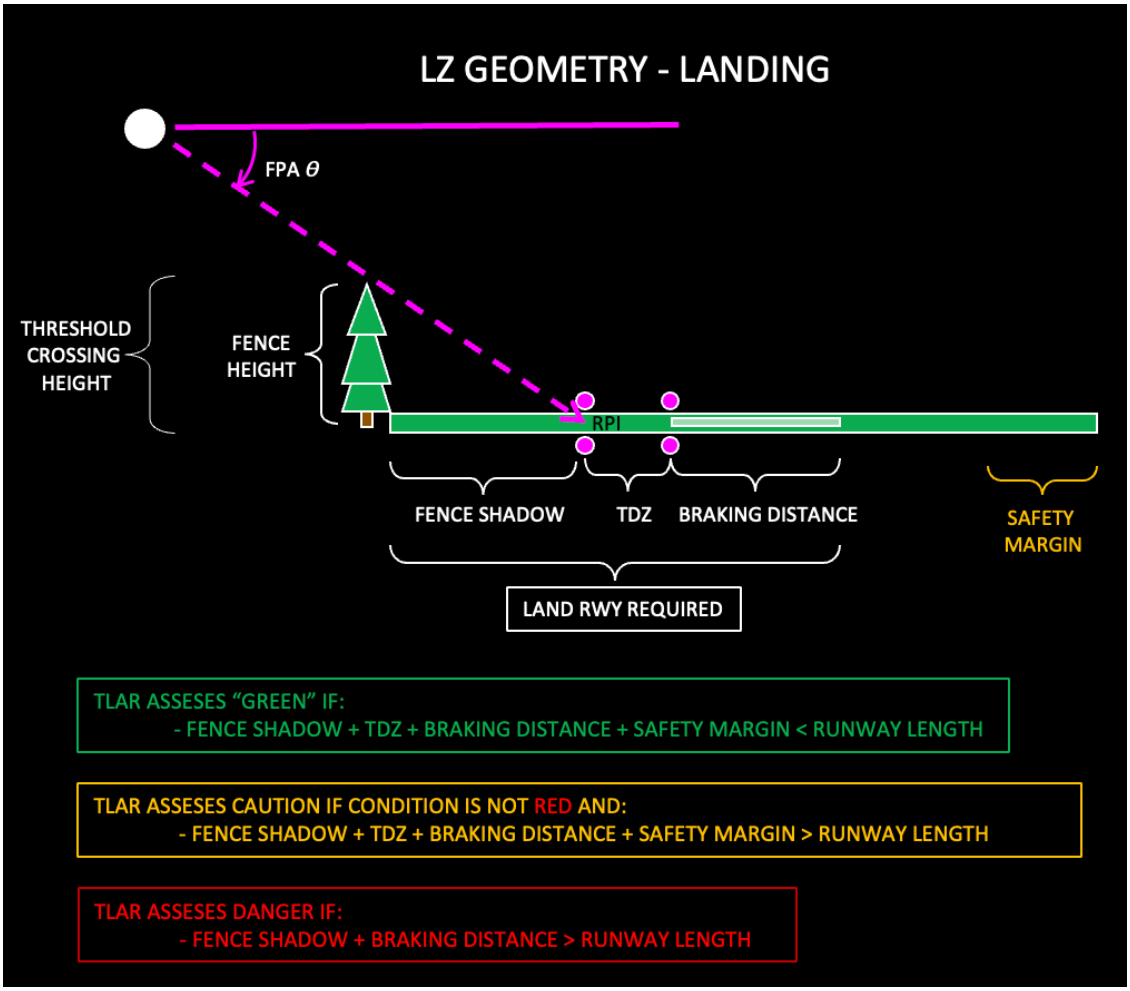


Figure 63. Landing geometry. The selected FPA and approach-end fence height establish the fence shadow; TLAR then adds the touchdown zone and braking distance.

The diagram marks the runway point where TLAR expects the touchdown zone to begin, then shows the braking rectangle through the predicted stop point. Landing performance is sensitive to approach speed, wind, density altitude, weight, runway surface, runway condition, braking selection, slope, fence height, selected FPA, and the Touchdown Zone and Safety Margin values in Pilot Settings. Treat the prediction as a planning aid and confirm that its assumptions match the intended operation.

Landing cues on the flight displays

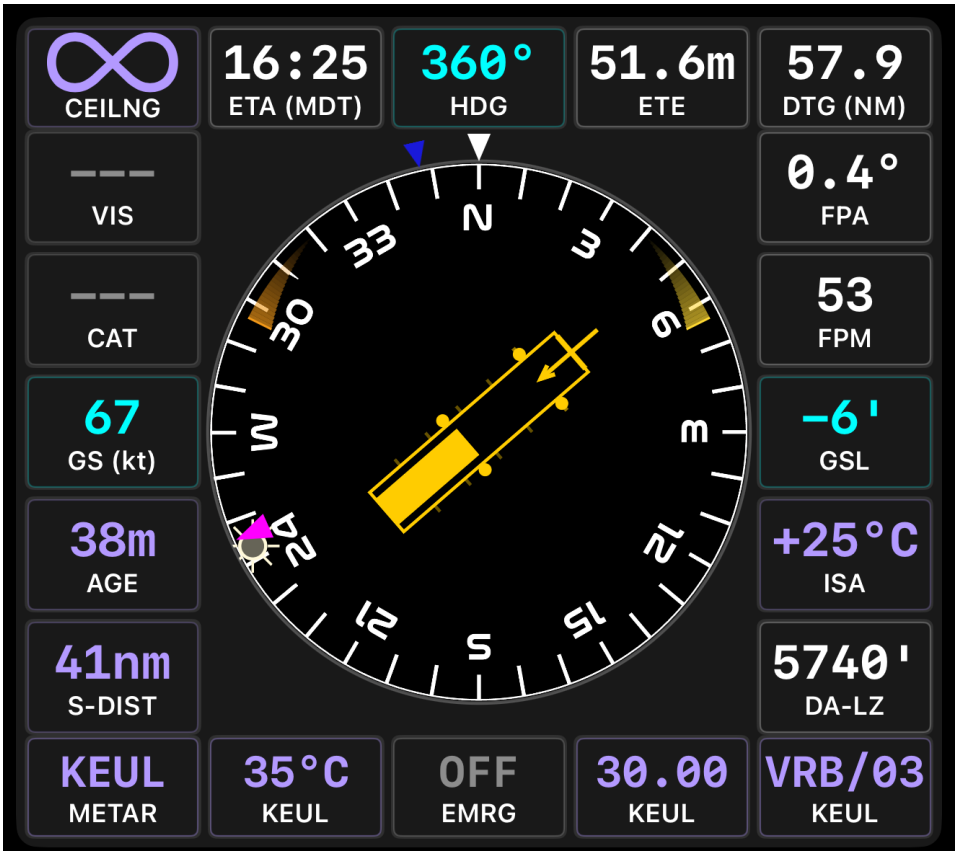


Figure 64. HSI landing presentation. The runway is drawn at its true axis with the same fence-shadow, touchdown-zone, and braking geometry used by the Land tile.

In flight, the HSI and Map draw four touchdown-zone dots, two on each side of the runway. The filled rectangle beyond them is the predicted braking distance, and the arrow leading to the touchdown area is the fence-shadow approach. These marks use the same color as the Land tile: white or the active palette color for a normal result, yellow for caution, and red for danger. The landing runway graphic is available only when the active LZ has the precise coordinates required for runway-relative geometry.

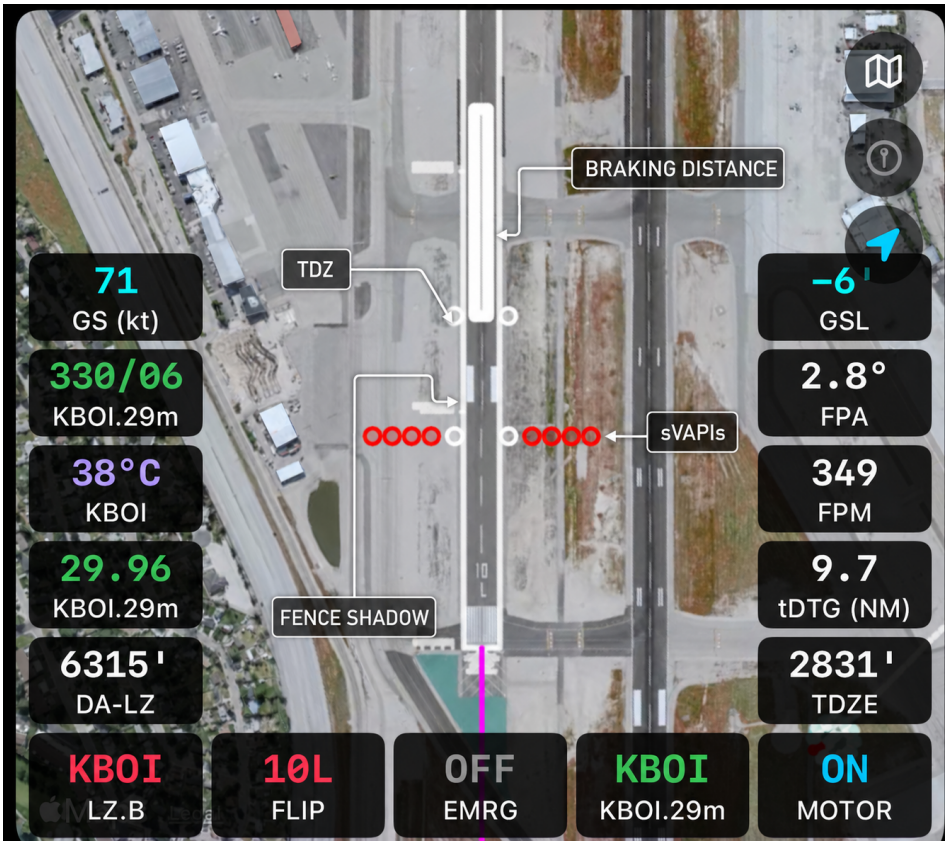


Figure 65. Map landing cues. The callouts identify the fence shadow, touchdown zone (TDZ), braking distance, and the runway-side sVAPIs.

The HUD complements these runway views with the LZ projection, current flight-path marker, selected-FPA cues, and the required-profile chicklets described in Descent. Use the HUD to fly the approach path; use the HSI or Map to see where that path, touchdown zone, braking distance, and remaining runway fit together. The displays support one landing decision—they do not replace the pilot's evaluation of runway condition, obstacles, approach stability, and aircraft performance.

Smart Visual Approach Path Indicators (sVAPIs)

The two rows of lights beside the approach end are Smart Visual Approach Path Indicators (sVAPIs). They give glidepath guidance to the selected approach-end fence height, not only on final but also on a recognizable downwind, base, or turn-to-final route. Once inside 10 NM, TLAR uses the active magenta route to calculate track distance to go (tDTG), required flight-path angle (FPA), and required feet per minute (FPM) along that route. A conventional PAPI is referenced to a straight-line final approach; sVAPIs compute based on track distance to go which includes turns.



Figure 66. sVAPI states. The rows compare the aircraft's current FPA with the FPA selected in Pilot Settings. (Legacy TLAR sVAPIs shown; current ones are very similar.)

The lights change in 0.5-degree bands relative to the selected FPA: four red means more than 1° low; three red and one white means 0.5° to 1° low; two red and two white means within 0.5° of the selected FPA; one red and three white means 0.5° to 1° high; and four white means more than 1° high. The selected FPA and fence height are pilot settings. sVAPIs do not provide terrain or obstacle-clearance awareness, so select and verify settings appropriate to the operation.

Cautions and warnings

A normal result uses the standard tile color. Yellow means that the landing geometry still fits under TLAR's danger test, but the selected safety margin or touchdown zone has been reduced. The tile shows MARGIN TIGHT when the safety margin is the limiting factor. It shows TDZ REDUCED when the fence shadow and braking distance fit but the full touchdown zone does not. Review the approach configuration and do not treat a yellow result as excess runway.

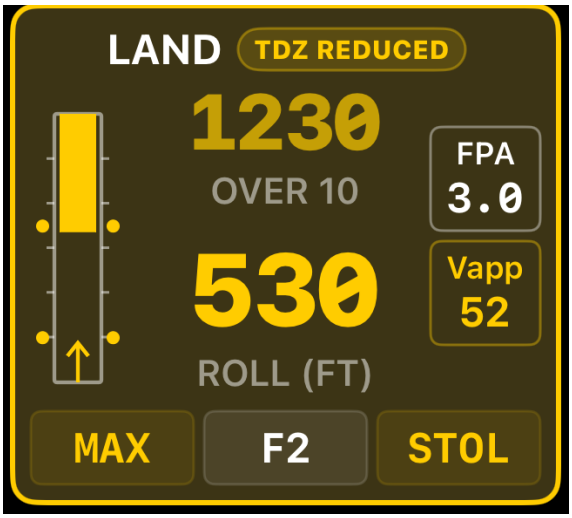


Figure 67. Land tile caution. TDZ REDUCED identifies a case in which the full touchdown zone does not fit, even though the fence shadow and braking distance do.

Red shows OVERRUN when the fence shadow plus braking distance exceeds runway length, or when the active wind condition is outside TLAR's limits. In a red-wind condition, the tile replaces the calculated values with WIND. The Land tile is intentionally conservative about the distinction between a reduced touchdown zone and a true overrun: a calculated touchdown-zone allowance is not a substitute for a stable approach, a safe flare, and timely braking.

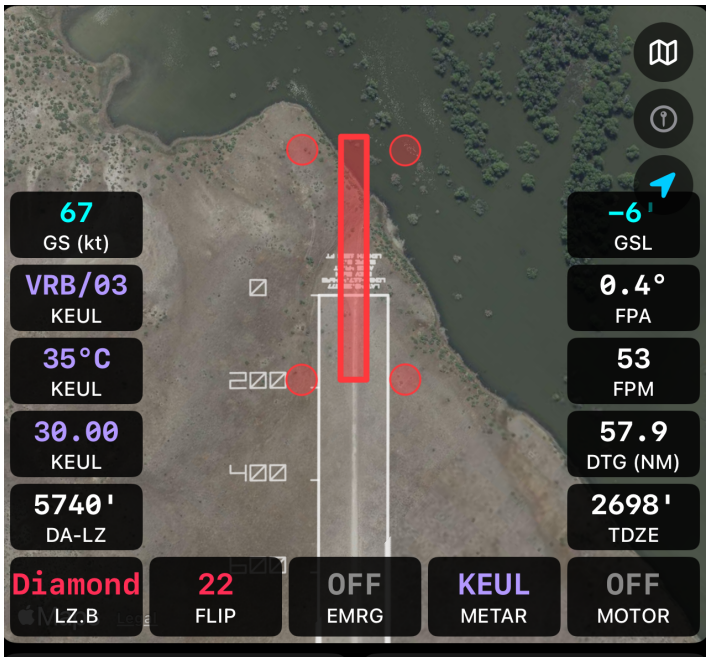


Figure 68. Landing overrun example on the Map. The red runway presentation matches the red Land-tile condition.

Stabilized Approach Monitoring

The Stabilized Approach Monitoring system makes one approach assessment as the aircraft crosses the stabilization point. It is available only with a precise active LZ and a valid runway-relative approach. The assessment compares the airplane's required approach profile and groundspeed with the values TLAR expects for the selected landing configuration, then reports the predicted stopping result independently.

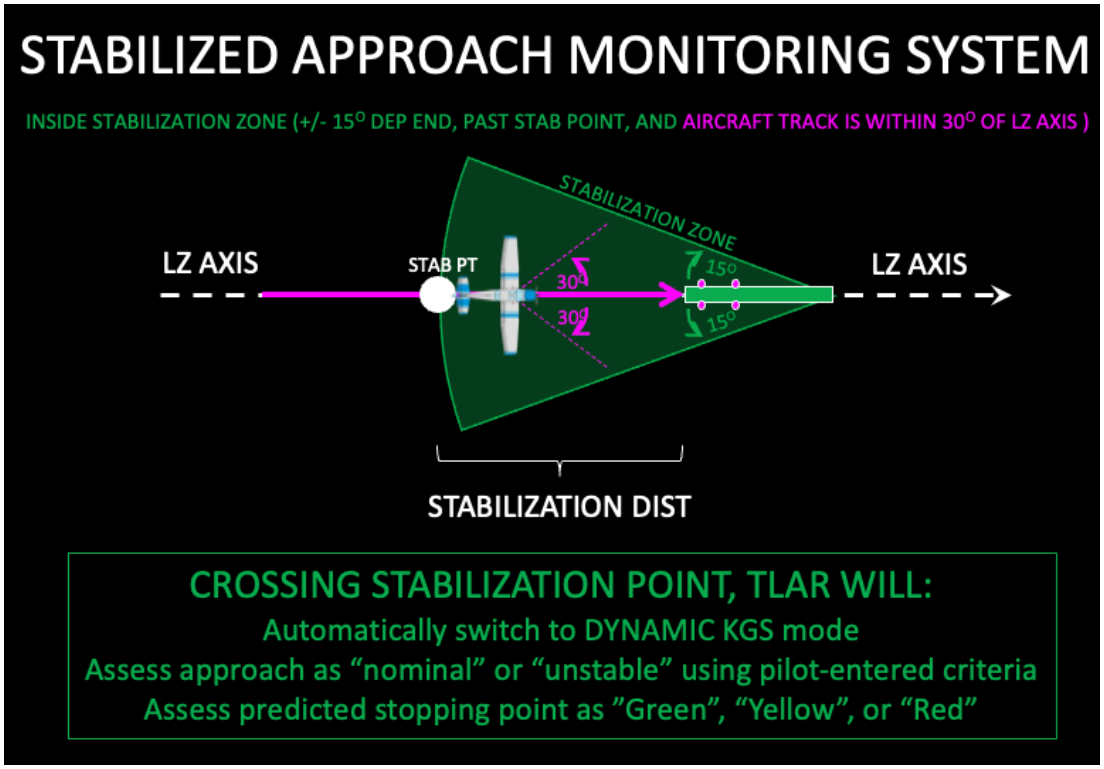


Figure 69. Stabilized Approach Monitoring. On a qualifying final approach, crossing the stabilization point switches TLAR to Dynamic KGS mode and triggers the stability and stopping assessments.

Set the stabilization distance

Set Stab Dist in Pilot Settings. It is adjustable from 0.00 to 2.00 NM in 0.05-NM increments; the default is 0.25 NM. This distance places the stabilization point before the approach end. TLAR uses twice the selected stabilization distance as the base-to-final rollout point, so changing Stab Dist changes both the monitoring point and the traffic-pattern geometry. Choose a distance that gives enough time to establish the intended final approach for the aircraft, runway, and operating technique.

TLAR assesses a qualifying approach when the aircraft reaches the selected distance, is flying toward the active LZ, its GPS track is within 30 degrees of runway axis, and it is within the arrival wedge. It does not make a stabilized-approach assessment merely because the aircraft happens to be near the runway.

What TLAR assesses at the stabilization point

At the stabilization point, TLAR automatically changes to Dynamic KGS mode for the landing calculation, unless Emergency mode is active. It then compares current groundspeed with the predicted approach groundspeed and compares the required glidepath with the selected FPA. A nominal approach is within 10 knots of predicted groundspeed and within 1.0 degree of the selected FPA. If either limit is exceeded, TLAR calls the approach unstable and identifies the condition as Fast, Slow, Steep, and/or Shallow.

The stopping assessment is separate from the stability assessment. Green means the predicted landing fits without reducing the selected safety margin. Yellow means the predicted stop encroaches on the safety margin or requires a reduced touchdown zone. Red means the predicted landing cannot stop on the runway, or the active wind condition is dangerous. A nominal approach can therefore be Yellow or Red on a short runway, and an unstable approach can still be Green on a long runway.

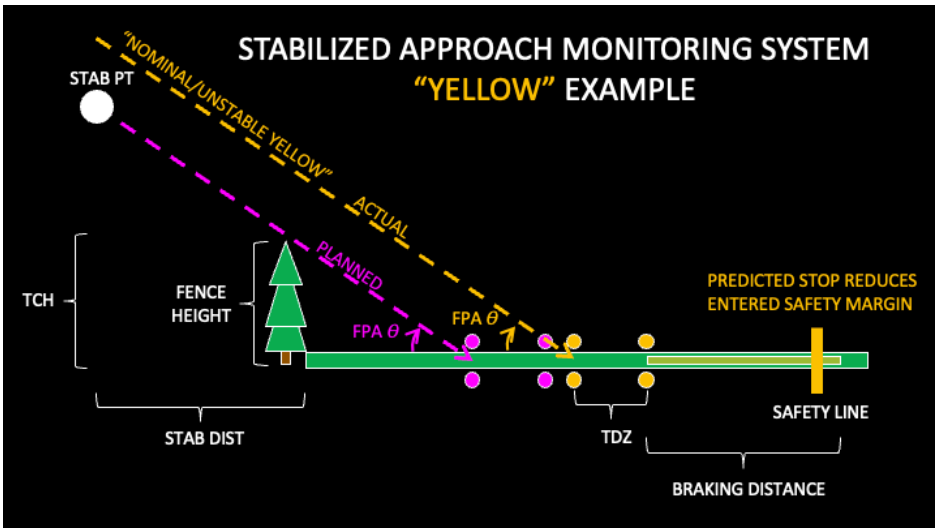


Figure 70. Yellow example. The aircraft is high relative to the planned profile, and the predicted stopping point reduces the selected safety margin.

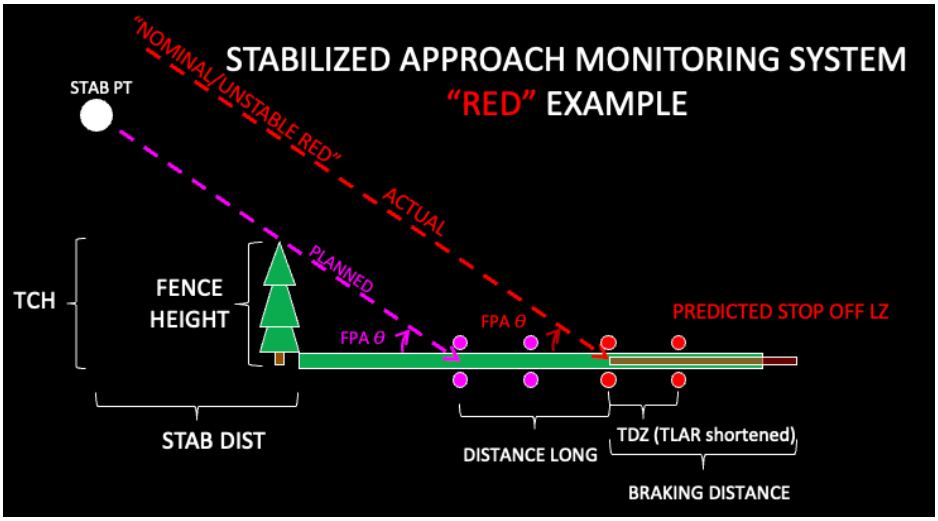


Figure 71. Red example. The approach is long relative to the planned profile and the predicted stop is beyond the available runway.

With audio callouts enabled, TLAR speaks the result once on entry to the stabilization zone. Calls begin with Nominal or Unstable, add any detected speed or glidepath condition, and end with Green, Yellow, or Red—for

example, “Unstable Fast Steep Red.” Use the call as a cross-check, not as a substitute for the pilot’s decision to continue or go around.

Emergency mode

TLAR's emergency glide system is a useful guide for pilots to assess the complex and changing physics/aerodynamics of an engine-out glide to a runway. Before getting into the specifics of TLAR settings in this mode, it is useful to understand the geometry of a gliding return to a runway.

WARNING – The emergency turnback maneuver is inherently dangerous, even conducted in training with an operating engine. It involves maneuvering the aircraft with precision, near stall-speed, and close to the ground. In most cases the safest course of action is to glide-land the aircraft on the most suitable off-airport surface that is in front of the aircraft. Stalling the aircraft is the primary threat.

Turnback geometry

A turnback is an engine-out return to the departure runway after takeoff. Its two essentials are starting above the minimum turnback altitude for the conditions and maintaining aircraft control throughout the turn. There is no single minimum altitude that applies to every aircraft or every takeoff.

The turnback altitude changes with aircraft type and drag configuration, aircraft weight, temperature, pressure, field elevation, wind, climb profile, distance from the airfield, propeller and engine condition, glide ratio and glide speed, Vref, and selected turnback bank angle. A lower bank angle increases stall margin but also reduces the region in which a turnback is predicted to be possible. For best results, make sure TLAR has the most accurate weather, aircraft, and runway inputs as possible, garbage in equals garbage out.

Emergency settings

Setting	What TLAR uses
Vg Ratio	The airplane’s best-glide L/D, or maximum-range glide ratio, at maximum gross weight. TLAR uses it with Vg Speed to tune its Emergency-mode aerodynamic model.
Vg Speed	The best-range glide speed at maximum gross weight. TLAR corrects the best-glide speed for current gross weight.
Computed Vref	The flaps-up stall speed multiplied by the NORM approach ratio in Pilot Settings. It is TLAR’s target speed for the emergency turnback. Change the NORM ratio to change this computed Vref.
Emergency AOB	The average bank angle planned for the turnback. Lower bank angles reduce stall risk, but shrink the turnback-possible envelope. TLAR limits the setting to 45 degrees.

Vg and Vref serve different purposes. Vg is the maximum-range glide speed: it is the speed that produces the greatest still-air distance for each foot of altitude lost. Vref is essentially a minimum-sink target: it favors time aloft and, in TLAR, is the speed used for the engine-out turnback and glide-to-runway calculation.

Angle of attack (AoA) versus Vref in a turnback. Flying a suitable AoA is a constant-AoA, variable-speed maneuver and is safer because it preserves a known margin from stall as bank angle and loading change. Flying Vref—or any other fixed airspeed—is a constant-speed, variable-AoA maneuver. As bank angle or load factor increases, the AoA required to hold that speed rises and the stall margin can become dangerously small. If the aircraft has a properly calibrated AoA indication and the pilot is trained to use it, fly the turnback by AoA rather than attempting to hold a constant Vref.

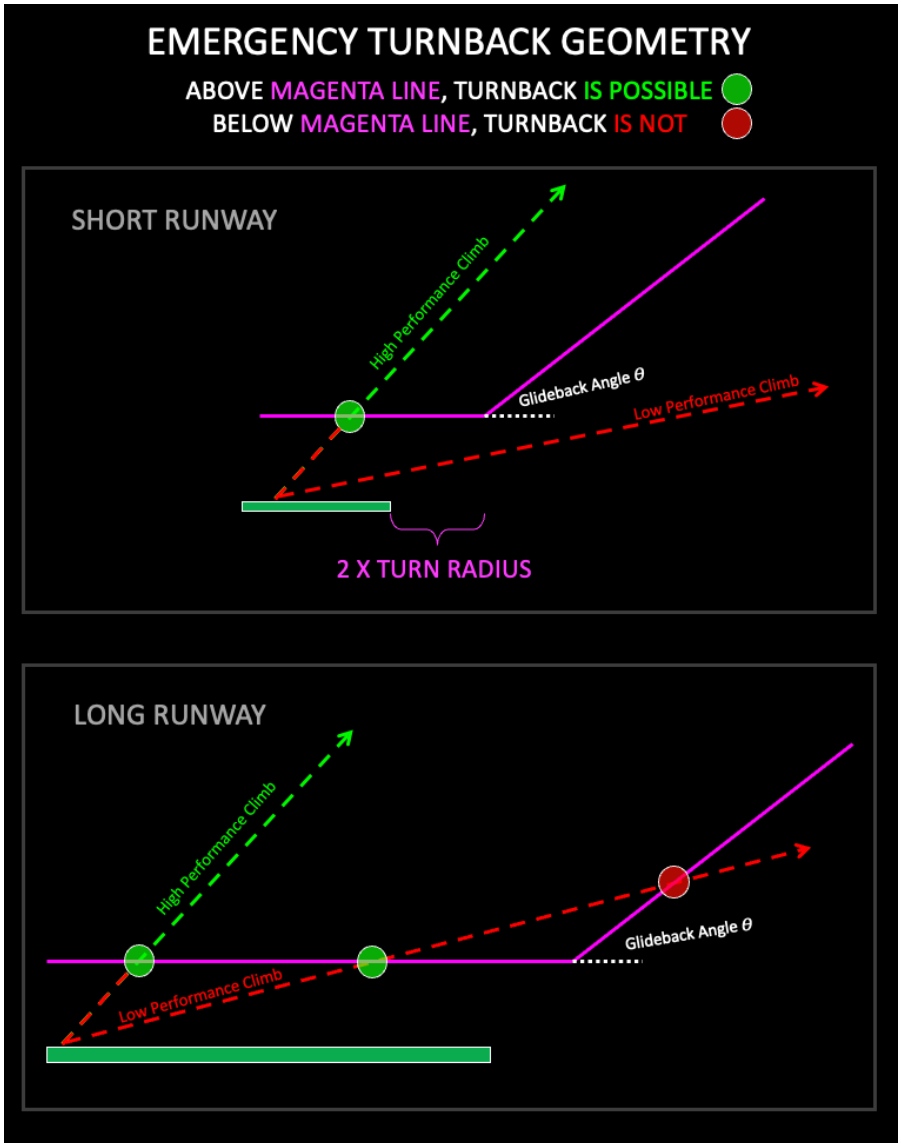


Figure 72. Emergency turnback geometry. The magenta boundary separates modeled turnback capability from the region in which a turnback is not predicted to be possible. The short- and long-runway examples show why runway length and current climb performance both matter.

The figure above compares the vertical geometry of the emergency turnback on a shorter runway versus a longer runway. As expected, high-performing aircraft reach a turnback-possible condition sooner than lower-performing aircraft. Also note that if the climb angle is less than the glide-back angle, the result can be reaching a turnback-possible condition for a period and then exiting that condition back to a negative turnback condition. This can occur even for shallow (low-performance) climbs on long runways (see red profile in the figure below). These examples presuppose a straight-ahead climb and departure. One way to improve the likelihood of reaching a turnback-possible condition would be to execute a turn shortly after takeoff while remaining close to the runway (such as a turn to a downwind departure) or even spiral up over the runway.

TURNBACK LIMITATION A calculated turnback is decision support, not a guarantee of a safe maneuver. Before relying on it, verify the aircraft Emergency Settings, current loading, active LZ, weather, climb profile, and the selected Emergency AOB.

Using Emergency mode

TLAR's Emergency mode has two sub-modes. On the ground, TLAR predicts the ability of your plane to conduct a turnback shortly after takeoff. In flight, TLAR continuously evaluates the ability of your plane to conduct an engine-out glide to the active runway. Even though its roots come from computing an engine-out glide-back on takeoff, this capability works just as well in cruise flight. It is an Expert feature. Before arming it, load a precise active LZ, verify the aircraft Emergency Settings, confirm the current weather and aircraft loading, and select the intended climb profile. Emergency mode is not a substitute for a practiced emergency procedure, aircraft control, or the pilot's judgment about terrain, obstacles, airspace, traffic, and landing areas.

Tap the EMRG button at the bottom of the Map to turn Emergency mode on or off. TLAR uses Predictive mode on the ground and automatically changes to Dynamic mode when the aircraft is flying. The full-screen examples in this section show the Map together with the Takeoff and Land tiles, which lets the pilot relate the emergency cues to the current takeoff, climb, and landing assumptions.

NOTE Screenshots in this section were made using TLAR's Emergency Simulation tile. The symbology is identical to what TLAR displays on the Map tile during a live takeoff, except the Map tile does not show "SIMULATING," "PAUSE," or "STOP," as the Emergency Simulation tile does.

Predictive mode: planning before takeoff

On the ground, TLAR computes a 5NM track-distance departure route using the set climb profile and current/entered conditions. The departure can be straight ahead, or you can place a right/left turn at a specified distance from liftoff using the departure controls on the back of the Map and Emergency Sim tiles. The yellow X is the latest point at which TLAR predicts the aircraft can still stop or land straight ahead on the runway. If the X is before liftoff, it is the latest abort point before liftoff. If it is beyond liftoff, it is the latest point from which a straight-ahead engine-out return to the runway is predicted to be possible.

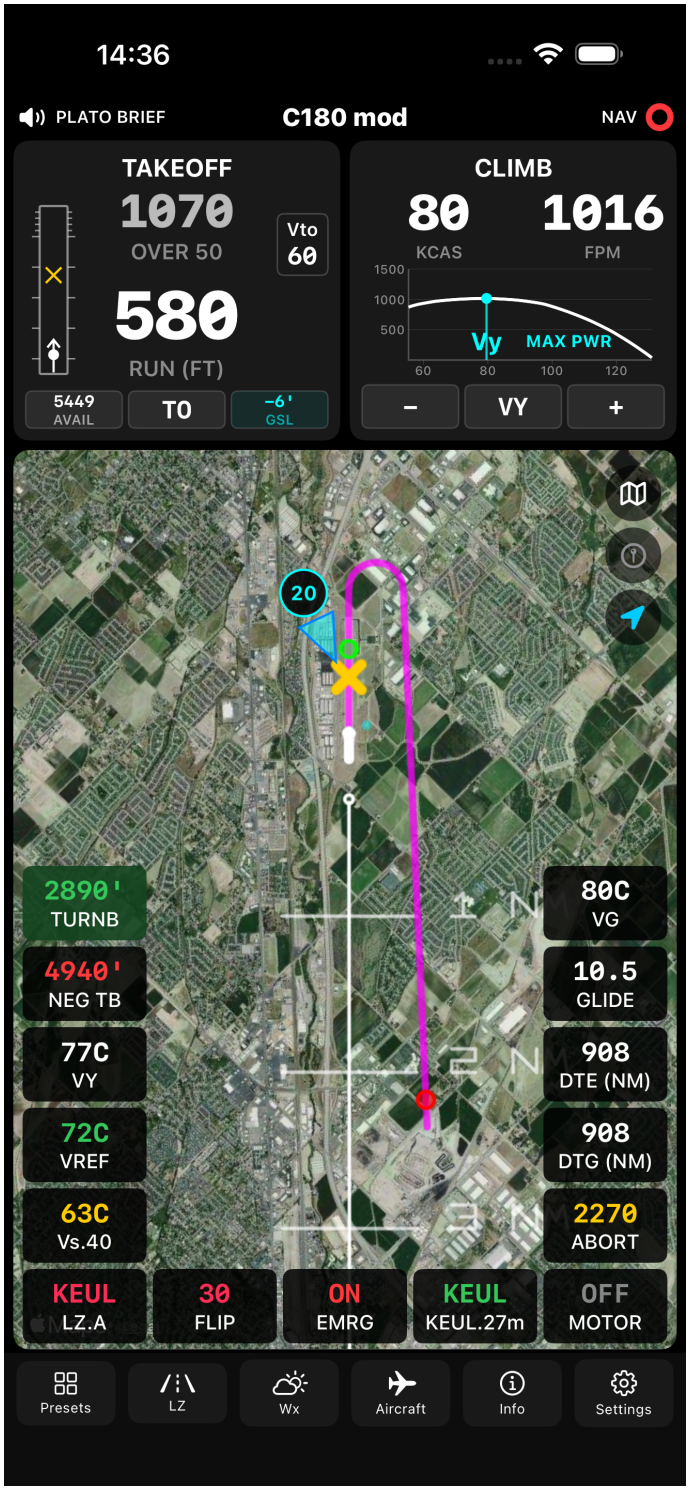


Figure 73. Predictive emergency display with a right-turn departure route. TLAR uses the selected departure route when computing the 5-NM predictive profile.

Takeoff Tile. With Emergency mode armed, the Takeoff tile adds the yellow X to its runway graphic. It marks the last point at which TLAR predicts that the airplane can stop, or land straight ahead and stop by the departure end, using the brake setting selected on the Land tile. The normal arrow still shows the takeoff-over-fence distance and the dot shows the predicted liftoff point.

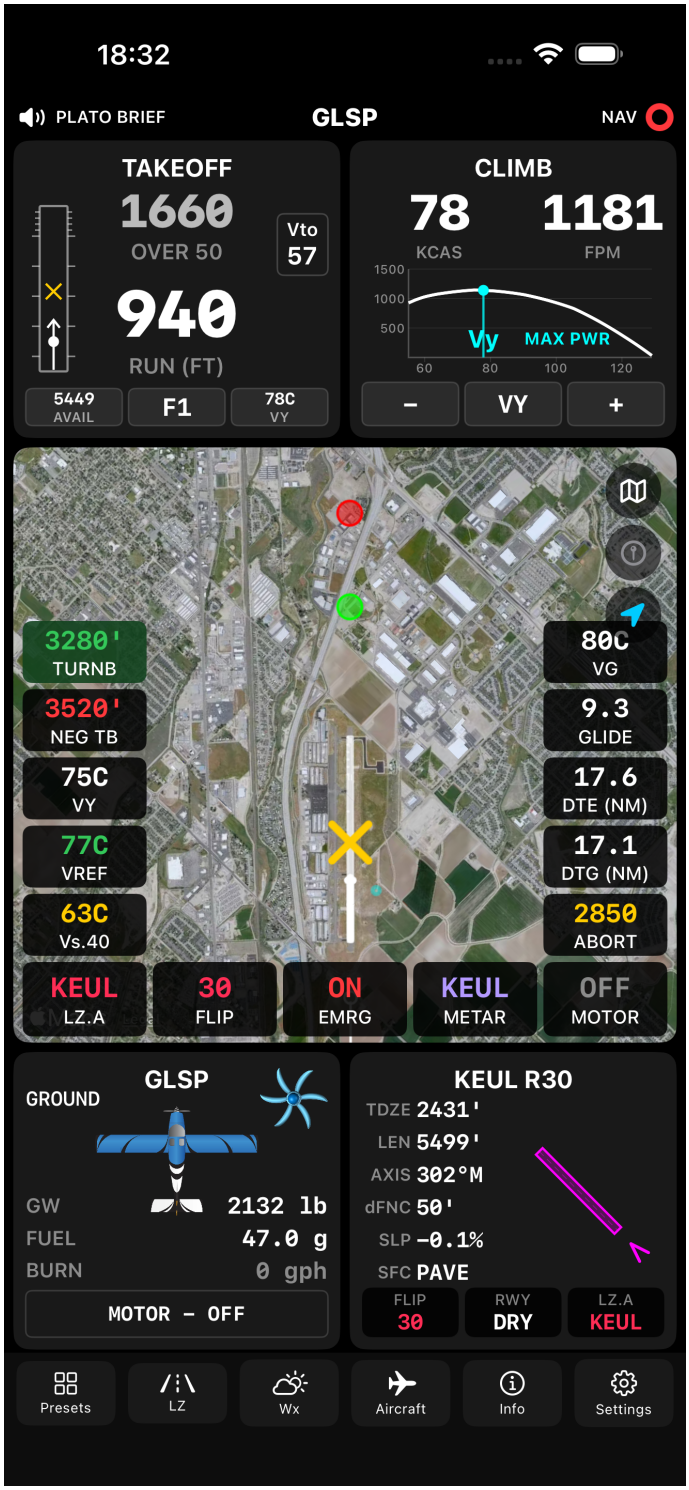


Figure 74. Emergency-mode planning display. The yellow X is the latest abort/straight-ahead point; the green dot is the earliest predicted turnback point, and the red dot marks where a previously possible turnback is predicted to become unavailable.

The green dot is the earliest location where an engine-out turnback is predicted to be possible. TURNB shows the corresponding altitude. When a continued straight-ahead climb later leaves the turnback-capable region, TLAR draws a red dot and shows NEG TB. If no turnback is predicted, TLAR shows no green dot and TURNB reads N/A. These predictions change with aircraft configuration and performance, glide data, weather, weight, selected climb profile, Emergency AOB, and Vref settings; there is no single turnback altitude that applies to every takeoff.

Departure Profile

Departure Profile sets the departure that TLAR evaluates. Open it on the back of the Map, Emergency Sim, or 3D Terrain tile. All three share the same saved settings, so a change on one tile applies to the others.

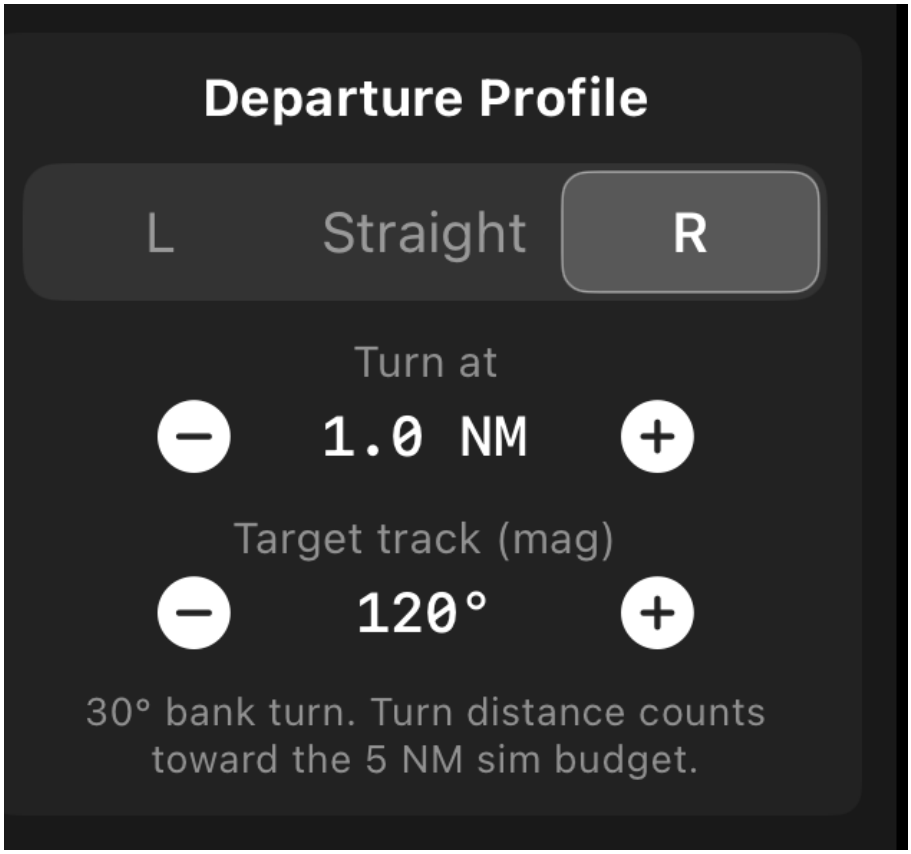


*Figure **75**. Departure Profile controls on the Map tile back. Select the turn direction, turn distance, and target magnetic track.*

L / Straight / R. Select a left turn, a straight departure, or a right turn. With Straight selected, the turn-distance and target-track buttons are disabled. A turning departure begins along the runway direction, turns at the selected distance from liftoff, then follows the selected target track. The modeled departure covers a 5 NM track-distance route. TLAR flies the modeled turn at 30 degrees of bank, and the turn distance counts toward the 5 NM route.

Turn at. Use minus or plus to move the turn point. Choices are 0, 0.25, 0.50, 0.75, and 1.00 NM, then half-mile steps through 4.00 NM. Zero places the modeled turn at liftoff. Target track (mag). Use minus or plus to change the desired track after the turn in 10-degree increments. This is a magnetic track, not a turn through the displayed number of degrees.

Hide in flight. Turn this on to hide the departure route and its terrain-impact marker after liftoff. It changes the display only, not the departure geometry; 3D OBSTACLE mode still shows the route. The departure selection does not change the arrival traffic pattern.

Dynamic mode: live engine-out guidance

Once flying, TLAR re-evaluates the aircraft's actual position, altitude, speed, track, wind, and current emergency configuration at least once per second. It does not continue to assume the selected climb profile. The display first identifies whether a straight-ahead landing is available, then shows either a glide footprint or a computed route to a landable point on the active LZ.

Land Tile. While flying in Emergency mode, the Land tile replaces normal OVER XX with AHEAD / threshold crossing height (TCH), the predicted height above ground at the runway aimpoint. In Emergency mode, TLAR selects flaps up for landing as this is the best gliding configuration. TLAR also changes the set FPA to the engine-out glide angle. TCH is green when it exceeds the altitude loss for a 360-degree turn at the selected emergency bank angle, yellow when it is above the selected fence height but below that 360-degree margin, and red when it is at or below the fence height. The runway graphic shows the aimpoint: a green dot and cyan arrow show a reachable aimpoint and the predicted braking roll; a red dot shows the best aimpoint when the active LZ is not reachable. ROLL uses the predicted braking distance for the direction of the emergency landing.

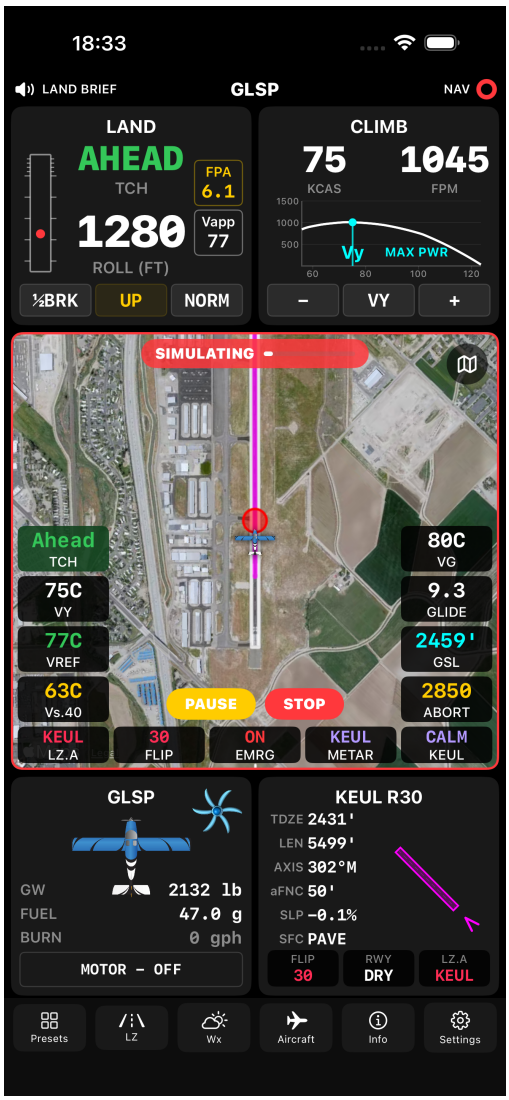


Figure 76. AHEAD indication. A green AHEAD on the Land tile means TLAR predicts that a straight-ahead runway landing is possible from the current state.

TLAR displays AHEAD when it assesses that you can stop straight ahead on the runway.

GPS elevation correction

For a precise active LZ, TLAR automatically calibrates a GPS-elevation correction while the aircraft is stopped on the runway. It compares a running average of the device's GPS-derived altitude with the known runway elevation at the aircraft's location. TLAR obtains that known elevation by interpolating between the approach- and departure-end elevations, so runway slope is included in the correction. If Auto-correct elevations is on

and 1 m terrain covers the runway, TLAR instead uses the 1 m elevation directly under the airplane, which also captures humps and dips in the runway surface. This correction is displayed on the GSL chicklet in parentheses (eg "GSL (+9)")

When the aircraft moves, calibration stops and the latest correction remains active during the flight. It is cleared when a new LZ loads, precise location is turned off, or telemetry is in use. TLAR applies the correction to the altitude-above-runway calculations that support Emergency mode; it does not change the flight instruments or the GPS altitude displayed elsewhere in the app.

Off Field and Glide footprint

When TLAR can no longer reach the active LZ, either straight ahead or by turning back, it announces “Off Field” and draws a cyan, wind-corrected glide footprint around the aircraft. It estimates the area the aircraft can reach with the current engine-out glide assumptions. Where downloaded terrain covers the area, TLAR shortens the footprint where the glide would meet the ground. That check uses bare-terrain only, without trees or a clearance margin; where TLAR has no terrain data under part of the footprint, that part shows performance-only reach. The check uses the LZ's downloaded terrain and, beyond it, regional terrain at about 150 m or finer. If you have downloaded regional terrain at more than one resolution, TLAR uses only the finest one, so regions downloaded only at a coarser resolution are not checked. TLAR samples the ground every 30 m below about 500 feet above the terrain, every 100 m up to about 3,000 feet, and every 300 m above that, so a narrow ridge can be missed when you are high. The footprint is not obstacle- or airspace-aware, an area inside it is not necessarily landable, and it does not by itself prove that a runway return can be completed.

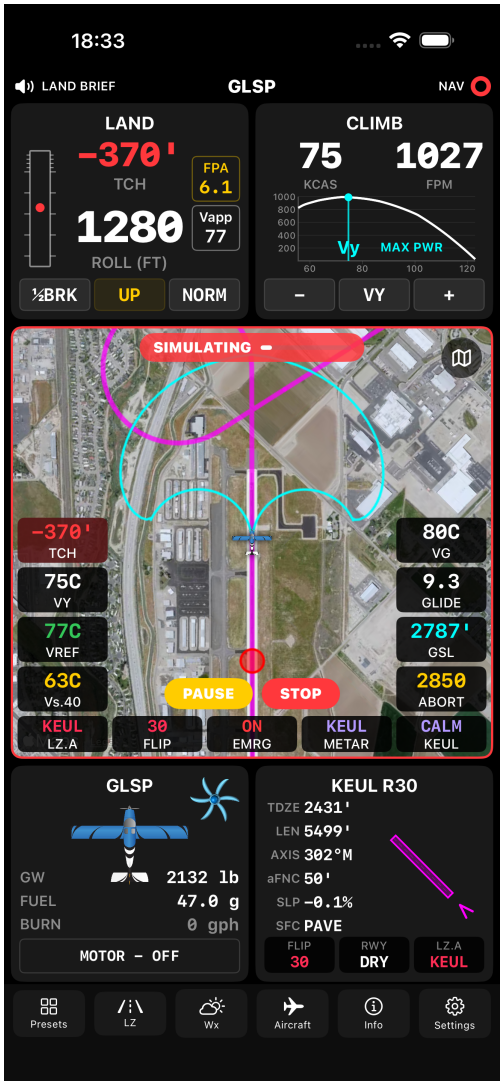


Figure 77. Glide footprint. The cyan outline shows the current wind-corrected engine-out reach estimate while the runway is not yet a viable return.

A runway may fall within the footprint before a turnback is actually viable. TLAR must also allow for the turn needed to align with a landable point on the runway; that turn increases sink rate and reduces glide range. TLAR therefore changes from the footprint to a route only when its engine-out calculation identifies a landable runway point after including the required turns.

Turnback Possible

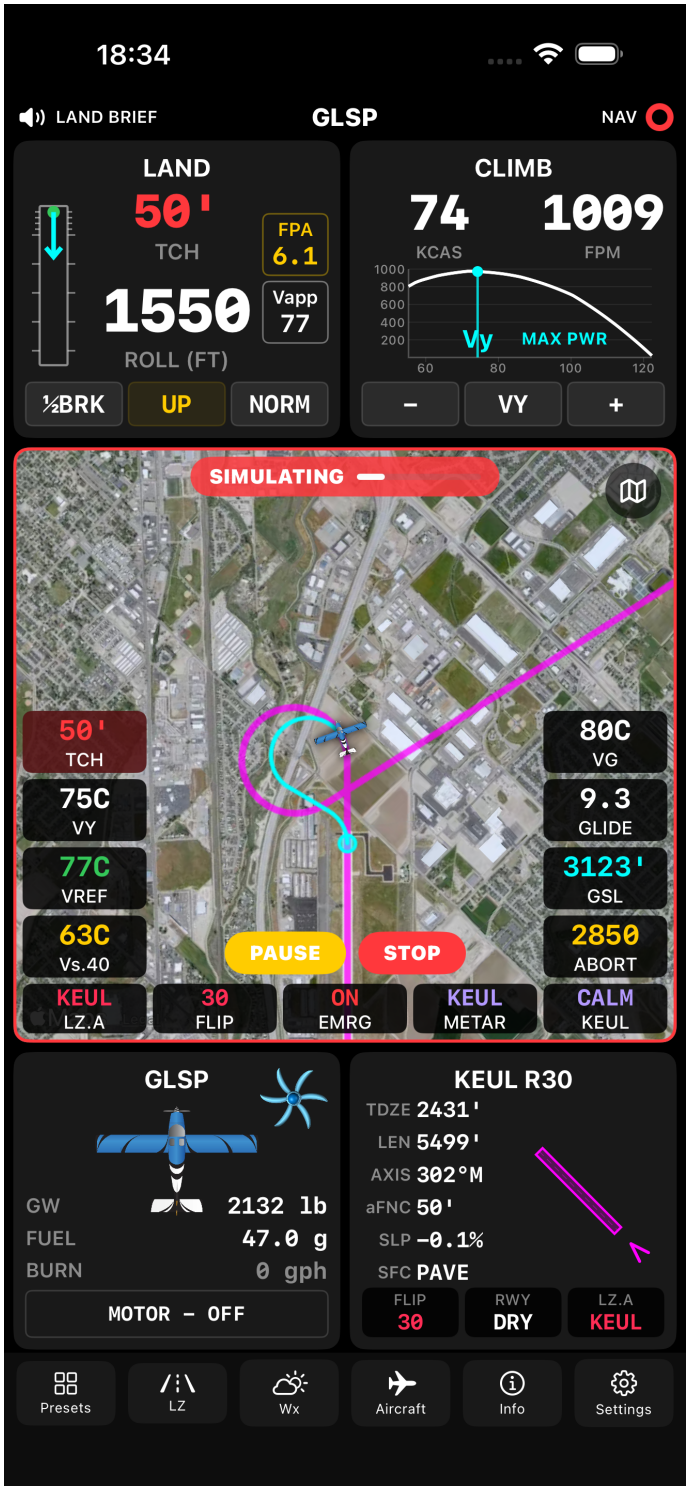


Figure 78. Computed turnback route. When a runway return is predicted to be viable, the footprint is replaced by the cyan route and the Land tile shows predicted threshold-crossing height (TCH).

TLAR announces “Turnback possible” when it computes that a turnback is possible and displays a route back to the runway on the Map.

The route is the computed glide path, including turns, to the selected landable point on the active LZ. Threshold crossing height (TCH) is the predicted altitude above ground that you would arrive at the runway

aimpoint after an engine-out turnback/glide to that point. It assumes a Vref speed glide using the selected bank angle and factors in current aircraft and environmental conditions. There is also an adjustment for the current energy state. Caution - TLAR does not consider airspace or traffic in the emergency turnback route.

Route colors. When downloaded terrain covers the route, TLAR checks it against terrain and available tree canopy and colors it: green when the route clears them by more than the Obstacle Safety Margin, yellow when it is inside that margin at one or more points, and red when it would strike terrain. The margin is zero at the touchdown point and widens along a 2-degree cone until it reaches the Obstacle Safety Margin; close to touchdown, the route turns red only if it is more than 5 feet below the terrain. A cyan route has no terrain classification, usually because there is no terrain coverage; cyan does not mean the route is clear, and missing tree data does not mean there are no trees. A route inside the margin is announced as “Turnback possible, caution terrain,” and a route that would strike terrain or trees is not announced as possible. This check uses the LZ's downloaded terrain and tree data; sample points without coverage count as clear. Regional terrain is not used for the route check, so where the route leaves the LZ's coverage it is not checked against terrain. TLAR samples the route every 100 feet of track distance. TLAR also uses these colors to choose the route: it prefers a green route to a yellow one and a yellow one to a red one, and it tries burning excess altitude with a left or a right 360 to find a clearer path. If a route that was announced as possible later turns red, TLAR announces “Negative turnback, terrain.”

NOTE The glide route drawn on the screen is the wind-corrected ground track. It is the same path TLAR uses for the TCH calculation, the terrain check, and the “Turnback possible” call.

CAUTION TLAR declares Turnback Possible as soon as the predicted TCH is greater than zero; fence height is not used in the turnback calculation. In many cases, a turnback glide will cross the runway somewhere midfield rather than at the departure end. TLAR does check the route against terrain and trees: a route that would strike them is not announced, and one that clears them by less than the Obstacle Safety Margin (25 feet by default) is announced as “Turnback possible, caution terrain.” The 50-foot default fence height applies to normal takeoff and landing calculations.

Negative Turnback

During a turnback, TLAR continuously recomputes TCH. iOS has an approximate three-second lag in track during turns. TLAR includes a correction to remove most of this error, but it is not perfect. In flight testing, TCH tends to decay in the early part of a turn and recover in the latter part. If TCH decays below negative 20 feet during the turnback and more than 60 degrees of turn remain, TLAR will announce “Negative Turnback.” As always, it is up to the pilot to determine the best course of action.

Emergency Mode in Cruise Flight

In Emergency mode and while flying, TLAR constantly evaluates whether the plane can glide to a land-able point on the active LZ, including turns or a turnback. This means that if you turn on Emergency mode during cruise and/or at altitude, TLAR will display the same glide footprint or route to a land-able point on the active LZ, along with computed TCH.

If TCH is high enough to require at least one 360-degree turn to “burn excess altitude,” TLAR will draw a circle corresponding to the turn radius at Vref and selected bank angle that intersects the best land-able point on the LZ.

Emergency chicklets

When Emergency mode is armed, TLAR temporarily replaces some information chicklets with emergency values on tiles that show them, such as the Map and 3D Terrain tiles. On the ground, TURNB shows the predicted turnback altitude in feet MSL. NEG TB shows the predicted altitude of the later negative-turnback transition, or >5NM when no such transition is found within the modeled departure. These are not height-above-runway values. The climb-mode chicklet shows the selected climb speed; VREF shows the computed reference speed; Vs followed by a bank angle shows the corresponding stall speed. Speeds with a C suffix are calibrated airspeeds.

VG and GLIDE show the model’s computed best-glide speed and glide ratio. A red indication can identify a glide-calibration mismatch; review the Emergency settings rather than treating a red value as a new target. ABORT shows the modeled distance remaining to the departure end at the last-chance abort point, in the selected distance units. The emergency-owned slots are locked while EMRG is active; disarming it restores the normal chicklet arrangement.

In flight, TCH replaces TURNB and PER 360 replaces NEG TB. TCH shows Ahead when TLAR assesses that the aircraft can stop straight ahead on the runway; otherwise it shows the computed crossing height in feet. PER 360 is the predicted altitude loss for one full gliding turn at the modeled emergency conditions. This can assist the pilot to determine how many 360's are needed to get down and how much excess altitude needs to be "burned" to set up a landing.

TCH colors. Ahead is green. A numeric TCH is green when it exceeds the predicted altitude loss for a full 360-degree turn. Otherwise it is yellow when it exceeds the greater of the approach and departure fence heights, and red when it does not. This coloring is separate from the spoken turnback-possible threshold described under Turnback Possible. A red TCH can therefore still be positive; do not interpret color as a substitute for reading the value.

4. 3D Terrain Tile

The 3D Terrain tile combines a terrain model, a movable viewpoint, flight information, and both simulated takeoff/emergency glide and live modes. Use it before flight to explore the area around an LZ, inspect approach and departure obstacles, and rehearse a departure. In LIVE mode, it follows the aircraft and can also display emergency-glide information.

3D Terrain requires an Expert subscription and for you to download terrain/tree data (see section on downloading/managing terrain data). Place it in a 2×2 position, full screen, or the tall lower position of the Map+Two layout; the larger sizes give the terrain and controls more room. When you pick the tile, a spinner on its tile-picker button shows that TLAR is preparing the scene, which takes a few seconds.



Figure 79. X-Plane and TLAR side by side at Garden Valley R10. X-Plane supplies the simulated aircraft state; TLAR draws its own terrain, runway, route, and performance information.

The screenshots in this chapter use X-Plane to supply aircraft position and attitude to TLAR running in the iOS Simulator. The terrain is TLAR's own elevation and tree data, not X-Plane scenery.

Note: 3D terrain is disk and CPU intensive. Older iPhone/iPads may struggle to render 1m resolution data. TLAR is programmed to dump the scene if your device cannot "hack it" to avoid iOS killing the app in what would appear to you as a crash. Even newer devices will stall for a few seconds when terrain data is loading into RAM. Once loaded, TLAR will perform as expected.

Set up the tile

Load the runway into Alpha or Bravo and make the intended LZ active. Confirm the runway direction, aircraft, weight, weather, performance reference, and climb profile. Download terrain and tree data from LZ › Terrain Data, as described in Set up.

Tap an open part of the tile to flip it to the back. Choose MODE and PALETTE, then tap Done. Scroll the back panel if its controls do not all fit in the selected tile size.

Modes and cameras

MODE on the back sets what the tile does: LIVE, DRONE, OBSTACLE, or SIMULATION. LIVE follows the aircraft. When LIVE is selected, a separate CAMERA control chooses the viewpoint: ORBIT, CHASE, or FPV (first-person view). In ORBIT you can pinch, zoom, and rotate the display; in CHASE the camera follows the plane; in FPV the camera is in the nose.

DRONE lets you fly a virtual camera around the terrain with two joysticks: look along a valley, inspect either runway end, or view a planned route from another direction. Its readouts describe the camera, not the aircraft.

OBSTACLE adds approach and departure reference surfaces, so you can see terrain and trees that rise through them. Entering OBSTACLE turns Emergency mode off and restores the normal approach FPA.

SIMULATION flies the predicted departure through the terrain scene, and with Emergency mode armed, TURNBACK rehearses the engine-out return. A running simulation feeds its simulated position, altitude, track, and groundspeed to TLAR's calculations, so other tiles respond to it.

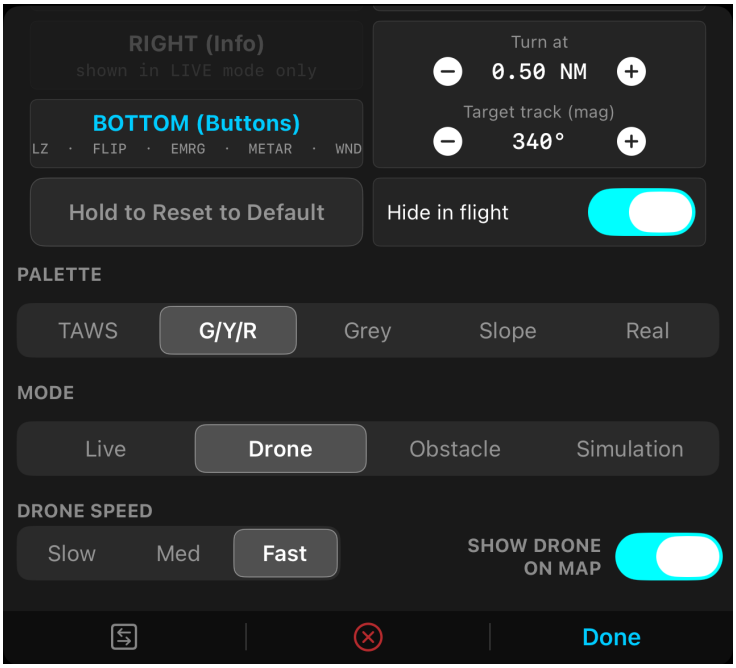


Figure 80. 3D Terrain back side in DRONE mode. Departure Profile, PALETTE, MODE, and DRONE SPEED with SHOW DRONE ON MAP are separate controls. Left and right information chicklets are available only in LIVE mode.

If the tile shows LZ mode is OFF, make an LZ active. If it shows No terrain data, download terrain for the LZ from LZ › Terrain Data. Regional terrain, when downloaded, extends the scene beyond the LZ's close-in coverage. With only regional terrain, the tile still draws the runway outline on the regional terrain surface.

Plan with the terrain

DRONE — explore the terrain

Select Drone on the back and tap Done. The two round controls at the bottom are joysticks. Drag a joystick away from its center to move the camera; release it to stop that commanded movement. The two narrow vertical controls between them change viewing pitch and zoom.

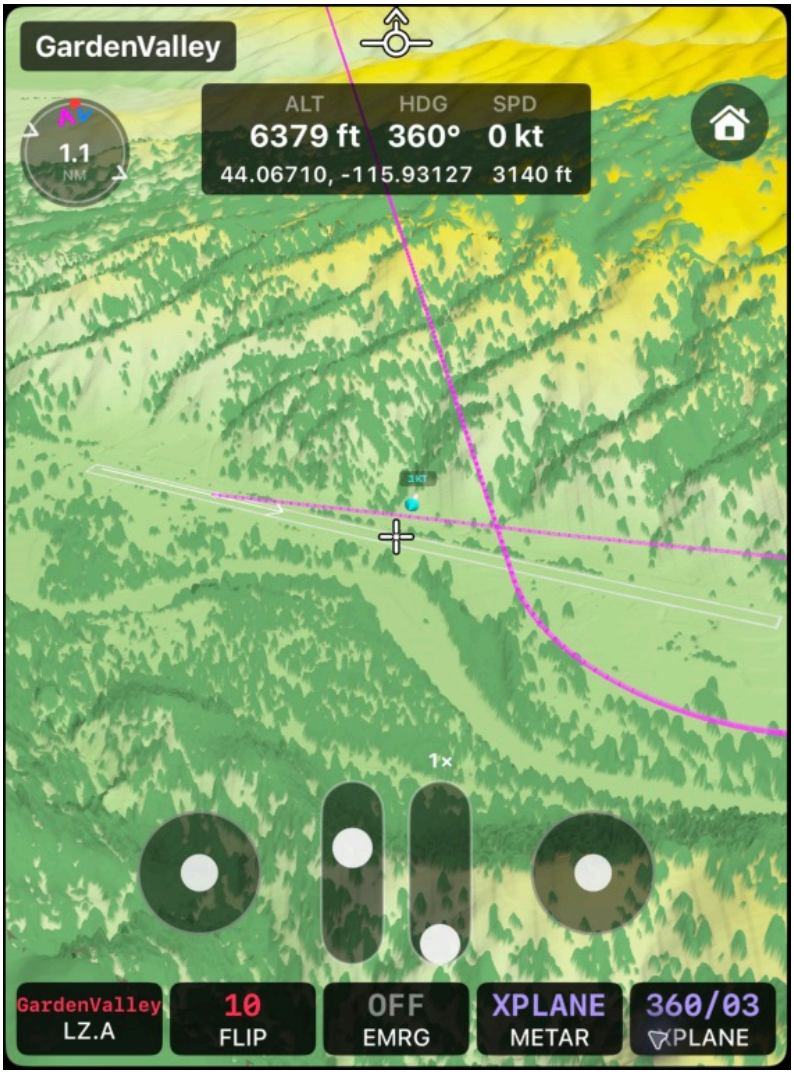


Figure 81. DRONE planning view at Garden Valley. The readout describes the camera; the center crosshair samples the terrain. Two joysticks, pitch and zoom controls, and Home move the viewpoint without flying the aircraft.

Left joystick. Move it left or right to turn the camera. Move it up to climb or down to descend. Right joystick. Move it up to travel forward, down to move backward, or sideways to slide left or right without changing the camera's heading.

Pitch control. The left vertical control tilts the view from the horizon toward straight down without changing altitude. Zoom control. The right vertical control narrows the view from 1× to 25× without moving the camera. Home. Tap the house icon to return the camera to its starting viewpoint near the active LZ, looking toward it. With only regional terrain downloaded, that viewpoint is about 1,500 feet above the LZ.

SPEED. On the back, choose Slow, Med, or Fast to set the camera's top speed to 50, 200, or 600 knots; turn rate changes with it. Use Slow for close inspection.

The camera keeps its position, altitude, and orientation when you change the layout or remove and re-add the 3D Terrain tile. It returns to the starting viewpoint when the active LZ changes or TLAR restarts.

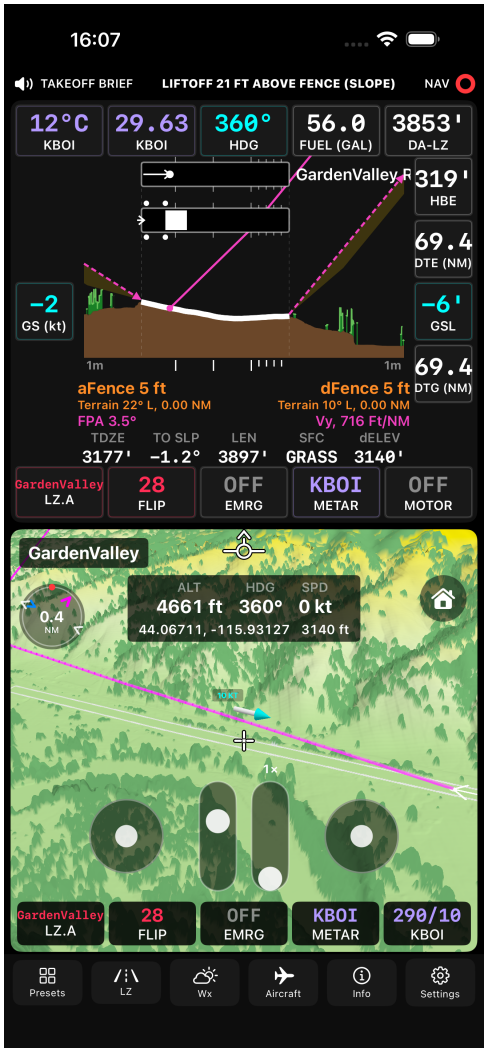


Figure 82. Dual Quad layout at Garden Valley with 1 m terrain and tree data loaded: the Vertical Profile (top) and the 3D Terrain tile in DRONE mode (bottom).

SHOW DRONE ON MAP. Beside DRONE SPEED on the back, turn this on to mark the drone camera on the Map tile with a small cyan quadcopter and a short arrow pointing in the camera's direction. The marker appears only while a drone camera is live in a visible 3D Terrain tile, and it requires an Expert subscription.

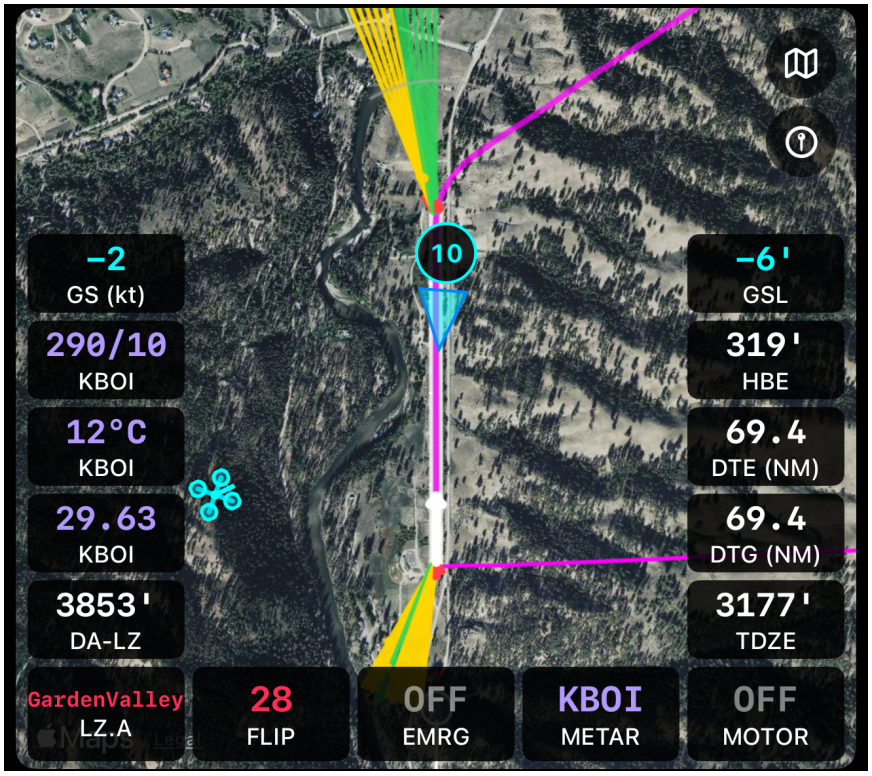


Figure 83. SHOW DRONE ON MAP at Garden Valley with 1 m terrain loaded. The small cyan quadcopter on the Map marks the drone camera's position, and its arrow points in the camera's direction.

ALT is camera altitude in feet MSL. HDG is the camera's true heading. SPD is its horizontal movement speed and falls to zero when the movement control is released. The latitude, longitude, and elevation below these values describe the terrain under the center crosshair. Dashes mean there is no terrain intersection to report. The small compass gives the camera's orientation and distance to the active runway's approach end.

The center crosshair is the point you are examining. The wing-and-circle marker shows the camera's forward horizontal direction, so it separates from the crosshair when you tilt the view down.

OBSTACLE — inspect approach and departure margins

Select Obstacle on the back and tap Done. The tile draws two translucent white surfaces: one extends outward from the approach end at the selected approach FPA, and one extends from the departure end using the selected climb performance. The departure surface accounts for the wind in each fan direction, so it need not be a flat, symmetric ramp.

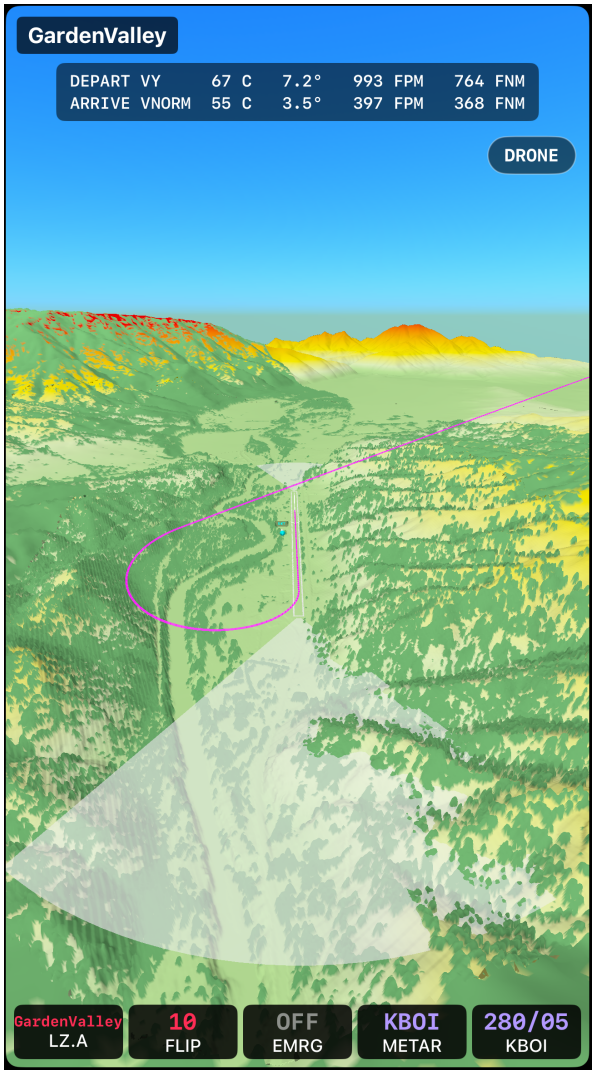


Figure 84. OBSTACLE mode at Garden Valley R10. DEPART and ARRIVE identify the profiles behind the reference surfaces. The DRONE button frees the camera for a closer or lower-angle inspection.

These surfaces start at runway-end elevation and show the bare approach and climb geometry, without a fence-height allowance. Look for terrain or tree canopy protruding through them; if a surface is nearly edge-on, move the camera to the side or above the runway end. White marks reference geometry only, not safe or unsafe.

The approach fan extends 0.25 NM beyond the approach end and the departure fan 0.5 NM beyond the departure end, each 30 degrees either side of the extended centerline. The planned departure runs well beyond the fans, so check its route and the surrounding terrain too.

DEPART shows the climb profile, calibrated airspeed (C, in knots), climb angle, climb rate (FPM), and climb gradient in feet per nautical mile (FNM). ARRIVE shows NORM or STOL, calibrated airspeed, and the approach angle, descent rate, and gradient, all shown as positive numbers.

Tap DRONE on the front to get the camera joysticks, pitch, zoom, and Home controls without leaving OBSTACLE mode; tap DRONE OFF to return. This button changes only the camera.

AUTO Fence and the obstacle case are set elsewhere: the case on the back of the Map or Vertical Profile tile, and AUTO Fence in Vertical Nav settings or on the back of the Vertical Profile tile. The 3D back has neither

control. A visible fan does not mean AUTO Fence is on; check the fence values on the Vertical Profile or Runway tile. See Terrain obstacle analysis and AUTO Fence in Chapter 3.

To compare options, keep aircraft and weather fixed, change one departure or climb setting, and compare the route and obstacles. Then try the opposite runway direction if it is available. The scene shows only TLAR's terrain and tree data, not wires, masts, buildings, or other obstructions.

Palettes — know what the colors mean

G/Y/R colors the terrain by height above the runway elevation: light green near field elevation, then yellow, orange, and red for higher ground. The colors do not show aircraft clearance; a green hill can still lie across your path.

Grey shows the shape of the ground in shades of gray, with trees. Slope colors terrain by steepness, from green (flat) to red (steep); green does not mean a field is landable. Real uses natural-looking colors on the rendered terrain model.

TAWS colors terrain relative to the aircraft instead of the runway. Changing the palette changes only the drawing, never the terrain or the performance calculation; judge a plan with the OBSTACLE surfaces and the predicted path, not by color alone.

TAWS colors are active in LIVE, while the DRONE camera is in use, and during a running simulation. Terrain at or above 100 feet below the aircraft (or the simulated aircraft) is red, and terrain 100 to 1,000 feet below is yellow. The bands are drawn in elevation steps, so their edges are approximate, and they follow the aircraft, not the camera. In OBSTACLE mode or an idle simulation, TAWS shows plain terrain. G/Y/R is the default palette.

Rehearse a departure (SIMULATION)

Select Simulation on the back and tap Done. Confirm the precise active LZ, aircraft inputs, climb mode, and Departure Profile before pressing START. SIM: IDLE means the run has not started. With Emergency mode off, this is a normal departure rehearsal and TURNBACK is not shown.

The run follows the departure set in Departure Profile on the tile back (see Departure Profile in Chapter 3). Before you start, look at the magenta departure path from more than one viewpoint: a path that looks clear from above can still meet a ridge or trees on its climb. TLAR marks the first predicted terrain or tree strike with a red X. Change the climb profile, departure direction, or turn point and check the new route before running another simulation.

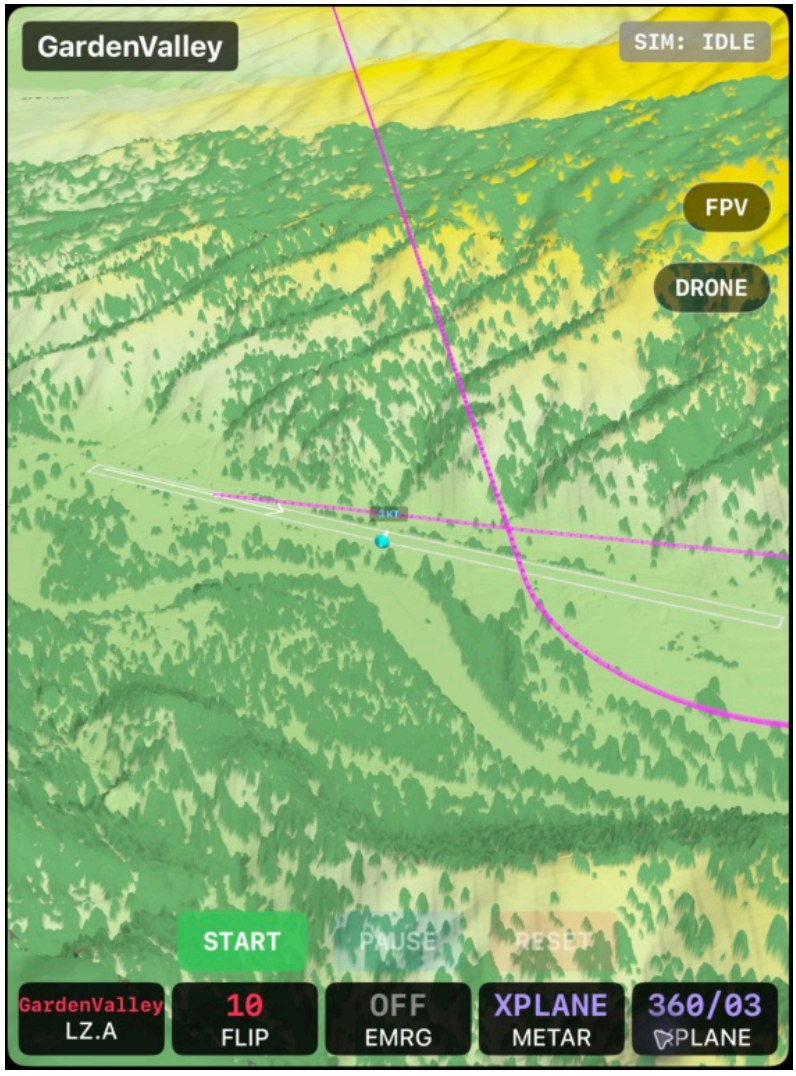


Figure 85. SIMULATION ready to start, with Emergency mode off. START begins playback; PAUSE and RESET are inactive until a run starts. FPV and DRONE select alternative viewpoints.

START. Tap to begin the modeled takeoff and departure; it needs a computed departure path. The button changes to RUNNING and the badge to SIM: DEPART. The simulated aircraft state runs through TLAR's calculations; this is more than an animation.

PAUSE / RESUME. Pause freezes the simulated aircraft so you can inspect its position; Resume continues the same run. RESET. Reset stops the run and returns to idle. Reset before changing the scenario; a run in progress does not rebuild itself around new settings.

FPV. Tap to look from the simulated pilot's seat, before START or during playback; FPV OFF returns. DRONE. Tap to inspect the run with the free camera. Selecting one turns the other off, and moving the camera does not move the simulated aircraft.

During a run, a readout row at the top shows the simulated aircraft's IAS (in KCAS), HDG (track), ALT, HAT, and TCH. After a simulated landing, TLAR draws the braking distance on the runway.

A red DEPARTURE ROUTE IMPACTS TERRAIN banner reports that the modeled departure meets terrain. SIM: CRASHED and SIM: LANDED mark the end of a run; tap RESET to prepare another.

Rehearse an engine-out turnback

To include an engine-out rehearsal, arm EMRG before START and review the emergency speed and bank-angle settings described in Emergency mode. Arming it before the run also captures the preflight emergency prediction markers for that run. The TURNBACK button appears only when Emergency mode is armed, the active LZ is precise, and the LZ bearing pointer is turned on. It becomes available once the modeled aircraft is at least 50 feet above the runway's average elevation and a return path is available.

TURNBACK plays the computed engine-out return from that point. If TLAR still predicts a straight-ahead landing on the remaining runway, the simulation uses that instead. An enabled button does not mean the return will succeed; the run can end short. While the return plays, the badge reads SIM: TURNBACK.

LIVE versus SIMULATION. LIVE uses the changing aircraft state and recomputes the emergency route as the aircraft moves. In SIMULATION, TURNBACK captures one return route for playback; moving the camera afterward does not recompute it. The preflight green and red markers stay in place for the rehearsal, while the yellow abort marker keeps updating during the departure and freezes when TURNBACK begins. Tap RESET to prepare another run.

Follow the aircraft (LIVE)

Tap the tile to open its back, select Live, and choose a CAMERA and PITCH/ROLL SOURCE, then tap Done. LIVE follows the aircraft position TLAR receives: from the device's navigation in actual use, or from X-Plane when connected. Confirm the navigation status and active LZ before reading the runway-relative picture.

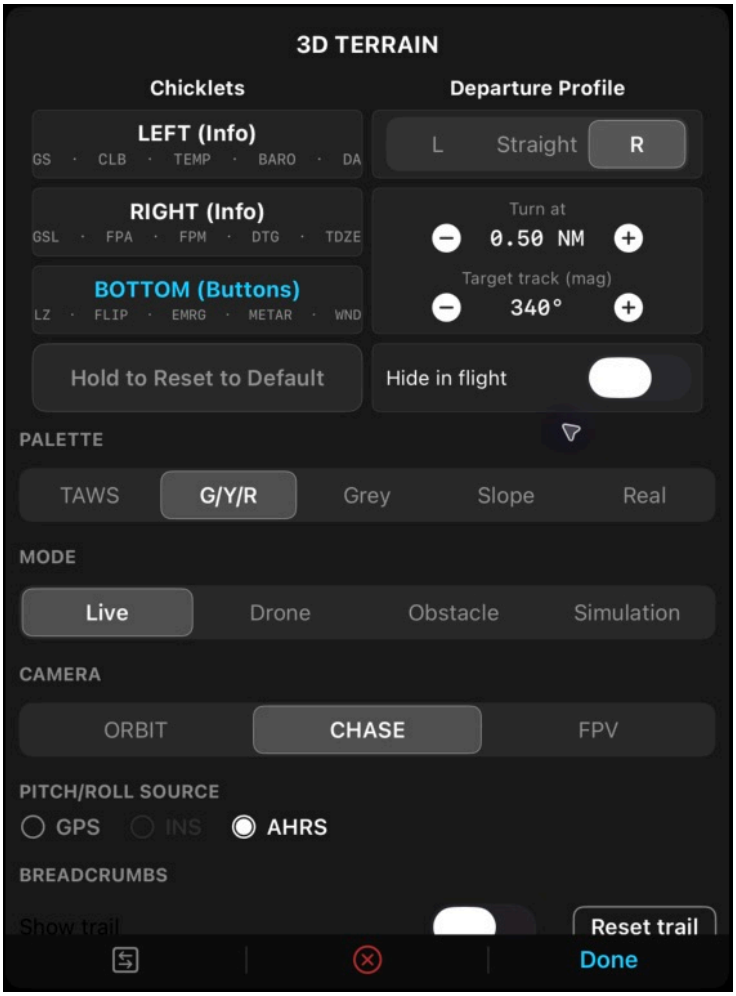


Figure 86. LIVE controls on the back of 3D Terrain. CAMERA selects the viewpoint; PITCH/ROLL SOURCE selects the attitude input. Show trail and Reset trail control breadcrumbs independently.

LEFT and RIGHT configure the information chicklets shown in LIVE; they are disabled in the other modes, which have their own readouts. BOTTOM configures button chicklets; the center EMRG button stays on the 3D tile. Hold to Reset to Default restores the chicklet arrangement only.

ORBIT. See the aircraft, runway, and terrain from outside. Drag to change the viewing angle and pinch to change the scale. The small compass is north-up, and there is no attitude ladder.

CHASE. The camera follows behind and above the aircraft model, with the attitude ladder overlaid. Spread two fingers to move the camera closer; pinch to move it back.

FPV. First-person view puts the camera at the aircraft and hides the model, showing the terrain ahead with the attitude ladder, flight-path marker, and selected-FPA marks. CHASE and FPV use a track-up small compass.



Figure 87. LIVE CHASE in normal flight. The aircraft model is visible below the nose and flight-path markers. The magenta line shows the arrival profile; the right chicklets show required track FPA, required FPM, and track distance to go.

Pitch and roll sources

GPS. TLAR derives the flight-path angle from navigation data and estimates bank from the rate of turn. GPS describes the aircraft's motion, not where the nose points, so the separate nose marker is hidden.

INS. TLAR uses the iPhone's motion sensors for pitch and roll. Secure the device so it cannot move, then use the HUD tile's SYNC control with the aircraft at the reference attitude; the 3D back has no SYNC button. Moving the device afterward changes the indicated attitude. INS is unavailable in the iOS Simulator.

AHRS. TLAR uses available external attitude data from X-Plane, OnSpeed, or the legacy UDP simulator bridge. X-Plane can provide heading, pitch, and roll; with OnSpeed, the terrain view uses its pitch and roll while retaining the navigation-derived track for orientation. See the integration instructions in Special Features for connecting each source.

The source preference is shared with the HUD tile, and unavailable sources are disabled. If the selected input drops out, TLAR falls back in the order AHRS, INS, GPS and says so beside PITCH/ROLL SOURCE. Your preference is kept, so the preferred source returns when its data do.

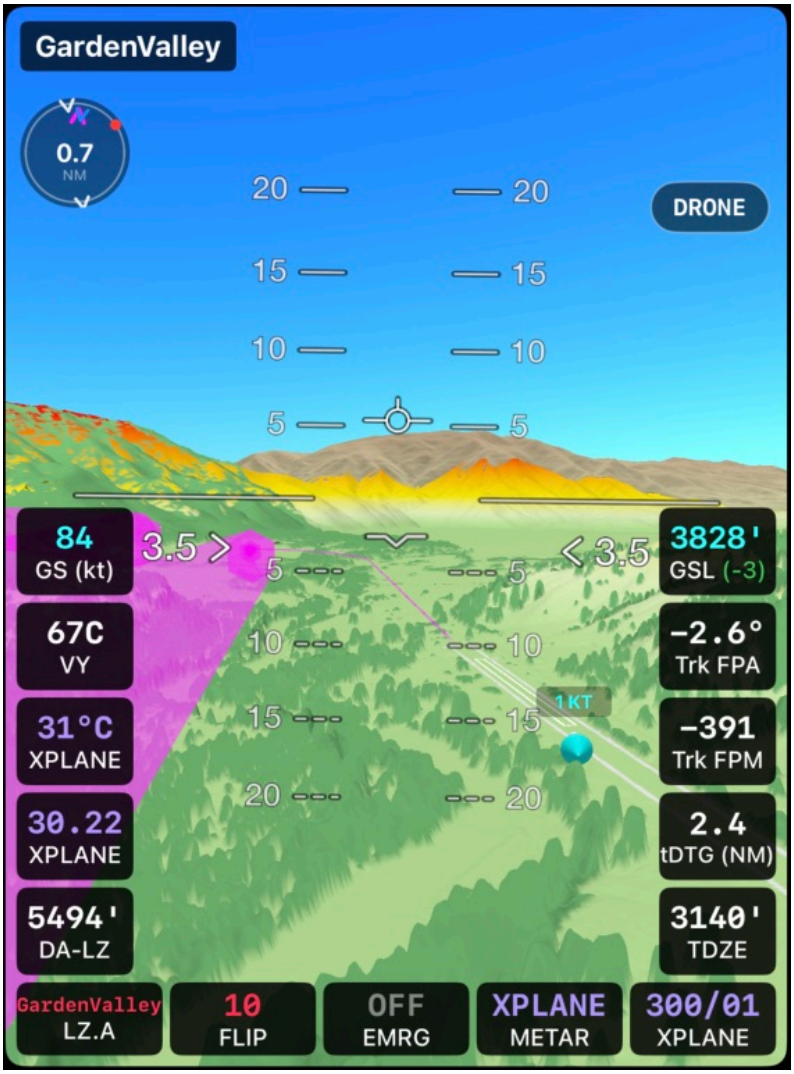


Figure 88. LIVE FPV with X-Plane running. The aircraft model is hidden. The winged nose marker, circular flight-path marker, pitch ladder, and 3.5-degree selected-FPA marks remain visible over the terrain.

LIVE markings

Wind arrow. The large arrow near the runway points downwind. Its label gives the active LZ's wind speed and any gust. (The small compass's blue chevron shows where the wind comes from.) The arrow is hidden in calm wind or when the runway scene is out of range.

Attitude ladder. The long horizontal marks identify the horizon. Shorter rungs are spaced at 5-degree intervals through 20 degrees above and below it. The rungs above the horizon are solid; those below are dashed. The ladder rotates with bank. It appears in CHASE and FPV, but not ORBIT or the free DRONE-camera view.

Flight-path marker. The circle with wings and an upper stem shows the GPS-derived flight path. When INS or AHRS supplies pitch and roll, a separate winged nose marker shows where the nose points. The gap between them is not a calibrated angle-of-attack measurement.

Selected FPA. The inward-pointing chevrons and number mark the selected flight-path angle. With Emergency mode off, they use the selected approach FPA. With Emergency mode on, they use the computed wind-corrected engine-out glide angle and change to the warning color. Compare the flight-path marker with these marks to see the relationship between current and selected path.

Small compass. The red dot is north. White chevrons mark the runway axis: outward toward the departure, inward for the reciprocal. The blue chevron shows where the wind comes from. In CHASE and FPV, a magenta pointer shows the LZ bearing. The center number is straight-line distance to the approach end, not track distance.

Runway and magenta paths. The runway shows the same takeoff and landing markings as the Map, with the meanings given under Takeoff and Landing. On the ground, the magenta departure follows the selected climb profile and Departure Profile. In normal flight, the magenta approach follows the Map's route: direct from outside the pattern area, then the selected arrival route. In Emergency mode, the glide route and altitude-loss loops replace it.

When the aircraft is below the selected FPA, the 3D approach line shows level flight to the intercept; when above, it descends from the current altitude along the remaining track. The line ends at the approach-end runway elevation, not at the fence height, so use the required-profile and fence-height readouts for the crossing height.

Normal approach example. Trk FPA and Trk FPM are the descent required along the route from the current position, and tDTG is the remaining track distance. The white marks show the selected FPA, not the required one. In the figure below, both happen to be 3.5 degrees; earlier or later in the approach, the required value can be steeper or shallower.



Figure 89. Normal approach in CHASE. The selected FPA marks show 3.5 degrees; Trk FPA shows −3.5 degrees, Trk FPM −448, and tDTG 2.1 NM. The magenta profile bends with the selected arrival route.

Moving the viewpoint changes neither calculation. If the departure line clutters the arrival, turn on Hide in flight under Departure Profile to hide it after liftoff.

LIVE DRONE: move the camera, not the aircraft

Tap DRONE on the front of the LIVE tile to get the joysticks, pitch and zoom controls, lock, and Home button while LIVE keeps tracking the aircraft. The title changes from the LZ name to the aircraft name. The lock appears only in LIVE.



Figure 90. LIVE DRONE viewed from above and to one side of the aircraft, with Emergency mode off. The cyan closed lock indicates latch on. The camera is offset from the aircraft rather than fixed behind it as in CHASE.

Latch on. The cyan closed lock means the camera moves with the aircraft at the offset you set. For a side view, move the right joystick left or right, then turn the camera with the left joystick until the aircraft is framed. The offset keeps its compass direction; it does not swing behind the aircraft when it turns.

Latch off. Tap the lock to release the camera. It stays where it is and the aircraft can fly out of view, which is useful for watching it pass. Tap the lock again to reattach at the current offset. Home reattaches behind and above the aircraft, and DRONE OFF returns to the ORBIT, CHASE, or FPV camera.

Pausing an external simulator can stop its attitude data. TLAR may then fall back from AHRS to GPS, changing the ladder and removing the nose marker. The paused examples here show route geometry and camera position, not live attitude.

In this free-camera view, the small compass describes the camera: its magenta aircraft symbol points to the aircraft, and the center number is the distance to it. The runway pointers and attitude ladder are hidden.

Breadcrumbs

On the back, Show trail draws a magenta three-dimensional history of the flown path, sampled about once a second and kept for up to 1,800 points (about 30 minutes). Show trail is on by default; TLAR records the trail only while it is on.

Reset trail clears the breadcrumbs. It does not affect the telemetry recording described in Special Features.

Emergency mode in the 3D view

Tap the bottom EMRG button to arm Emergency mode, then confirm the precise active LZ, aircraft, wind, glide calibration, and emergency bank angle. LIVE keeps using the current aircraft state. As described in Chapter 3, Emergency mode works in cruise as well as on departure.

On the ground, TLAR places emergency markers along the selected 5 NM departure in three dimensions: green spheres where a turnback becomes possible, red spheres where it stops being possible, and a yellow X at the last-chance straight-ahead abort point. A departure can have more than one turnback-possible stretch, and a marker appears only when its event is found.

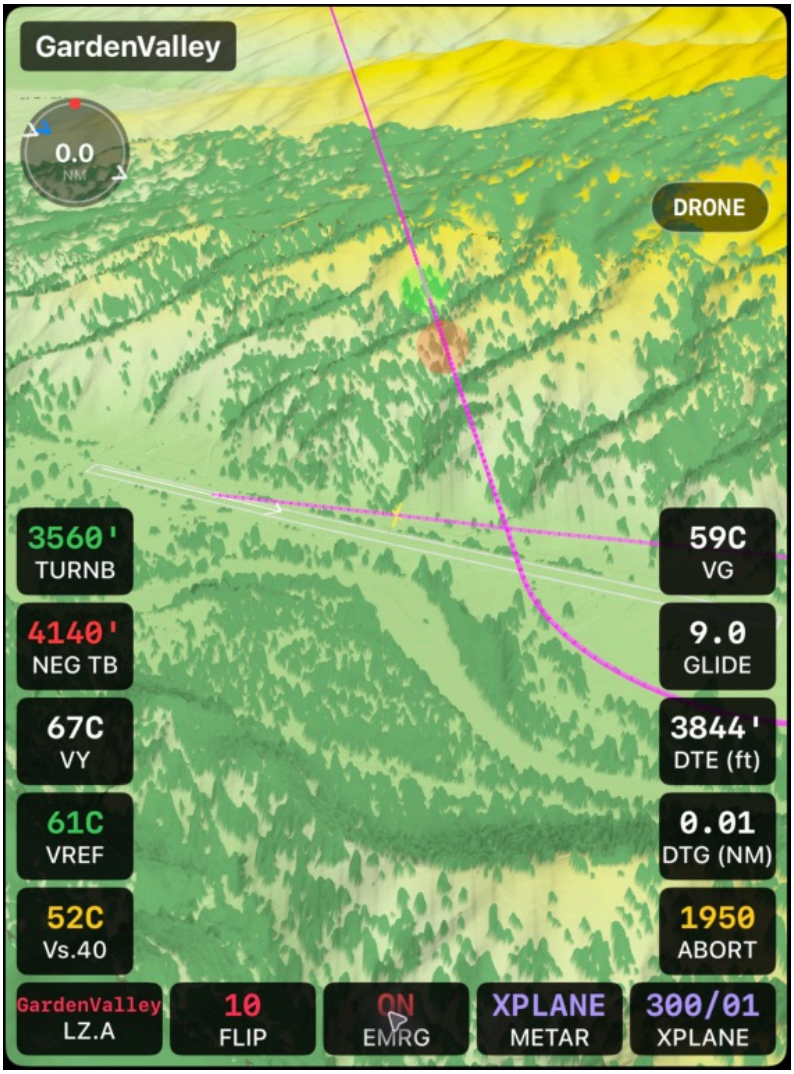


Figure 91. Ground emergency readouts in LIVE ORBIT. TURNB and NEG TB are predicted MSL altitudes; ABORT is distance remaining to the departure end at the last-chance abort point. The magenta line is the selected departure. The transition markers may be outside or obscured in a particular viewpoint.

The emergency chicklets (TURNB, NEG TB, TCH, PER 360, and others) temporarily replace some LIVE information chicklets. They are described under Emergency chicklets in Chapter 3.

Off field: the glide footprint

When TLAR is flying in Emergency mode and cannot glide to the active LZ, the 3D view draws the cyan, wind-corrected terrain-aware glide footprint. It is shaped by the turn needed to reach each direction, so it is not a circle around the aircraft.

As on the Map, TLAR shortens the footprint where the modeled glide meets bare-earth terrain, without trees or a clearance margin; see Off Field and Glide footprint in Chapter 3. The 3D view draws the outline only where the LZ's downloaded terrain lies beneath it; elsewhere, including areas covered only by regional terrain, that part of the outline is not drawn, so use the Map to see the complete footprint. The 3D terrain shows tree tops, but the footprint ignores them, so in wooded areas it can extend past the point where the glide would actually reach the trees.



Figure 92. Off-field example in LIVE CHASE. The cyan footprint is drawn against the terrain. TCH is −230 feet. The magenta departure and green preflight transition sphere are not the current emergency return route.

The footprint shows how far you can glide when the LZ is out of reach; the return route appears when the live calculation finds a way to the runway. The preflight green and red spheres can stay visible along the planned departure; a green sphere does not mean a return is possible from where you are now.

Return route and excess-altitude loops

When the active LZ is reachable, the return route shows the computed path, including turns, to its landable point, at its modeled heights. LIVE recomputes the route and TCH as the aircraft moves. Read the announcements and TCH along with the route; terrain, airspace, and traffic can still rule out the maneuver.

With enough height, the route can include descending 360-degree circles that use up excess altitude before the runway, drawn at their modeled heights. PER 360 shows the altitude lost per circle. This also works when Emergency mode is armed in cruise.

The return route uses the same terrain colors as on the Map: green (no issues), yellow (route inside pilot's set obstacle safety margin), red (strikes terrain), or cyan when it is not classified (no terrain coverage) (see Route colors under Turnback Possible in Chapter 3). The cyan altitude-loss loops are different: their color marks the part of the route spent using up excess altitude. TLAR terrain-checks the last circle (closest to the ground). On the Map and in Emergency Sim, the route line takes the route color and any additional burn circle is drawn separately in cyan.

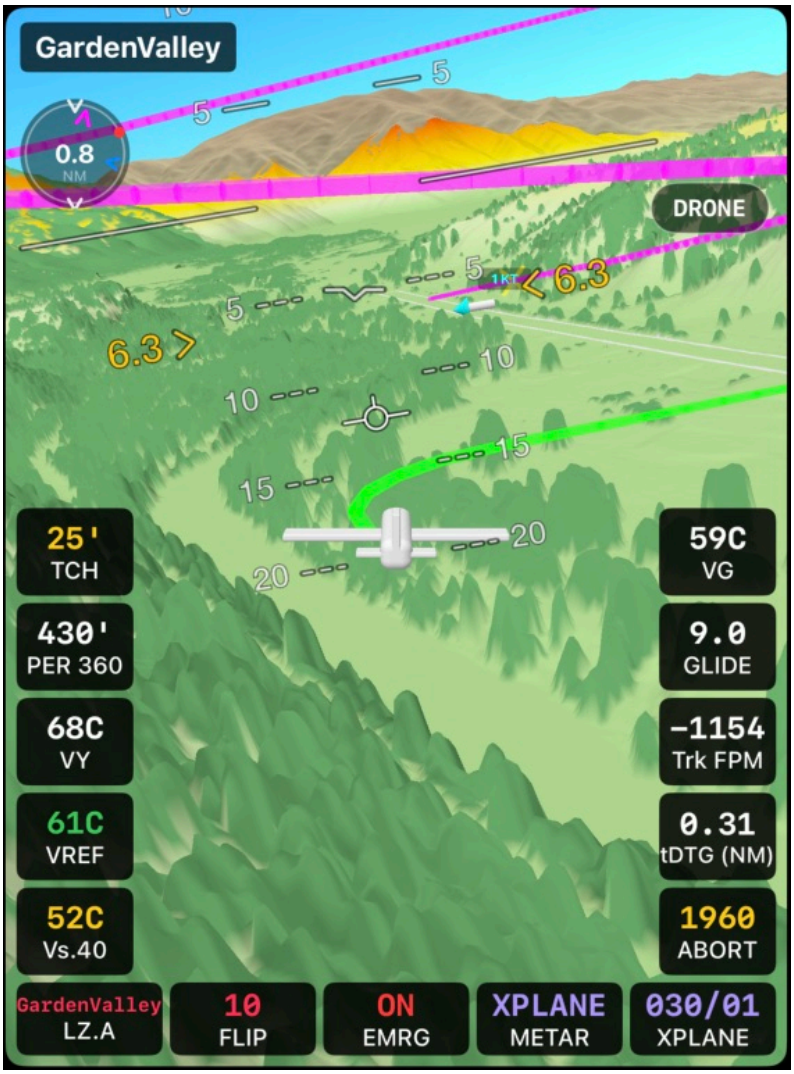


Figure 93. Emergency return in a turn. The green glide route is terrain-classified; TCH is yellow at 25 feet. Route color and TCH color answer different questions. The magenta line is the separate planned departure overlay.

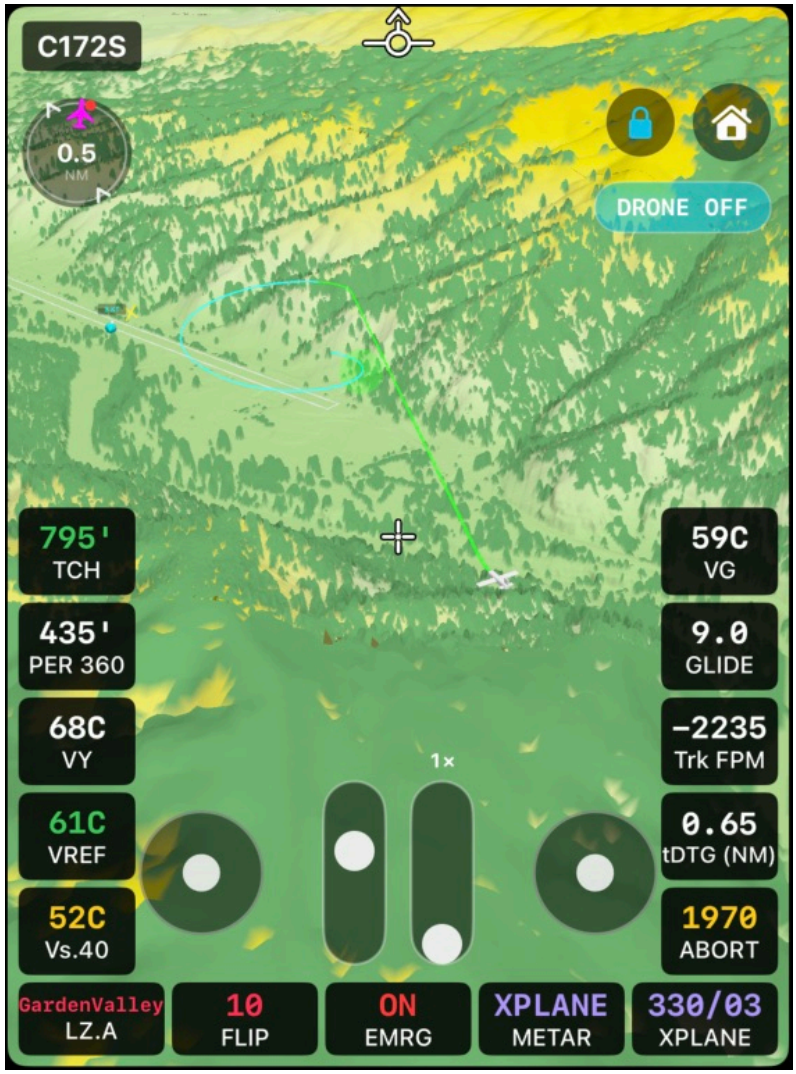


Figure 94. Excess-altitude example in the LIVE DRONE camera. The green segment leads toward the runway and the cyan loop depicts altitude loss. TCH is 795 feet and PER 360 is 435 feet. X-Plane is paused for this geometry view; the cyan lock shows latch on.

To inspect the circles, tap DRONE and move to a viewpoint above and to one side of the runway, then tilt until both the route and the loop are visible. More excess altitude means more loops. TCH is the predicted height at the aimpoint before using that excess height.

5. Special Features

This chapter covers features that extend TLAR beyond the normal planning and flight-display workflow. Feature availability depends on the installed subscription level. When a control is not available at your level, TLAR identifies the level required in the relevant menu.

New UI and Legacy UI Switching

TLAR retains the legacy interface for existing users while the new tile-based interface is introduced. On launch, an existing user can select Legacy or New. New customers on iOS 17 or later open directly into the new interface.

To return to the legacy interface from the new interface, open Settings and use Switch to Legacy UI. Existing users can also turn on Always boot to new UI in Settings to skip the selection prompt at future launches. The setting affects which interface TLAR opens; it does not delete LZs, aircraft settings, or other saved TLAR data.

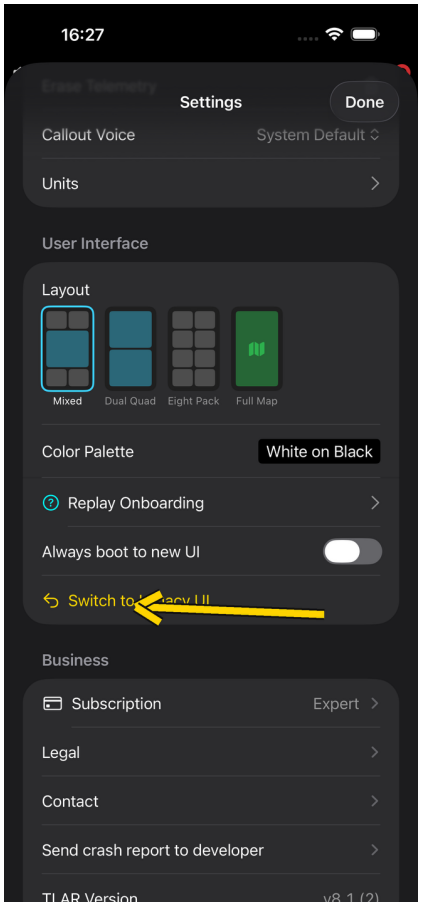


Figure 95. New interface Settings. Tap Switch to Legacy UI to open the legacy interface.

In the legacy interface, tap the cyan NEW UI control along the bottom of the Performance, Big Sky, or HUD display to return to the new tile-based interface. These three legacy screens are shown here in full because this is the only section of the new-interface guide that documents the legacy display.

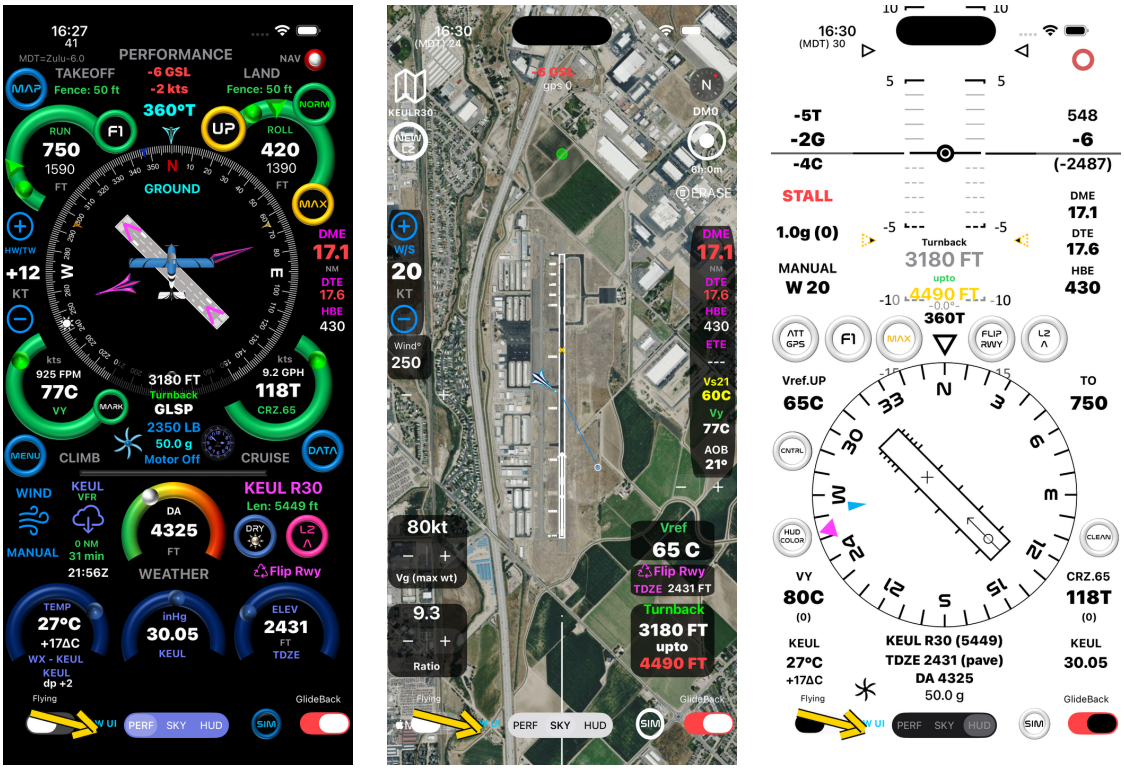


Figure 96. Legacy interface return controls. Tap the cyan NEW UI control (arrowed) on any of these full-screen legacy displays to return to the new interface.

Simulate Flying

The Simulate > Flying switch in Aircraft Settings injects a false groundspeed to trick TLAR into its flying state. It is useful for learning the airborne display, checking how tiles change after liftoff, and evaluating an LZ or flight setup at a desk. Turn the switch off when finished so TLAR returns to normal GPS-derived ground/flying detection. TLAR disables this setting if actual groundspeed exceeds the predicted takeoff groundspeed, preventing an actual flight with a false groundspeed.

SIMULATION NOTE Simulate Flying changes TLAR's flight-state logic; it does not supply a simulated position, attitude, or weather feed. Use the X-Plane interface when you need TLAR to follow an actual flight simulator in real time.

Debrief

Debrief (BETA) records a compact summary of the most recent takeoff and landing. It is available in two forms. Add the 1×1 Debrief tile through the tile picker for a quick read-only dashboard summary. Open Aircraft Settings > Debrief (BETA) for the full report.

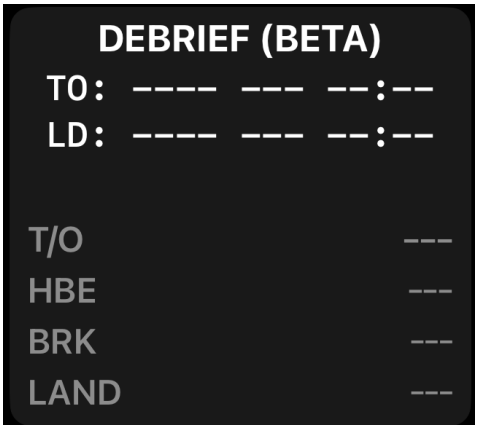


Figure 97. Debrief 1×1 tile. Add it to any compatible dashboard position for an at-a-glance summary of the latest takeoff and landing.

The tile shows the recorded takeoff and landing identifiers and times, followed by a compact four-line summary: T/O, HBE (height by end), BRK (braking), and LAND. It is intended to tell the pilot that a debrief record is available; use the full report when you need the captured details.

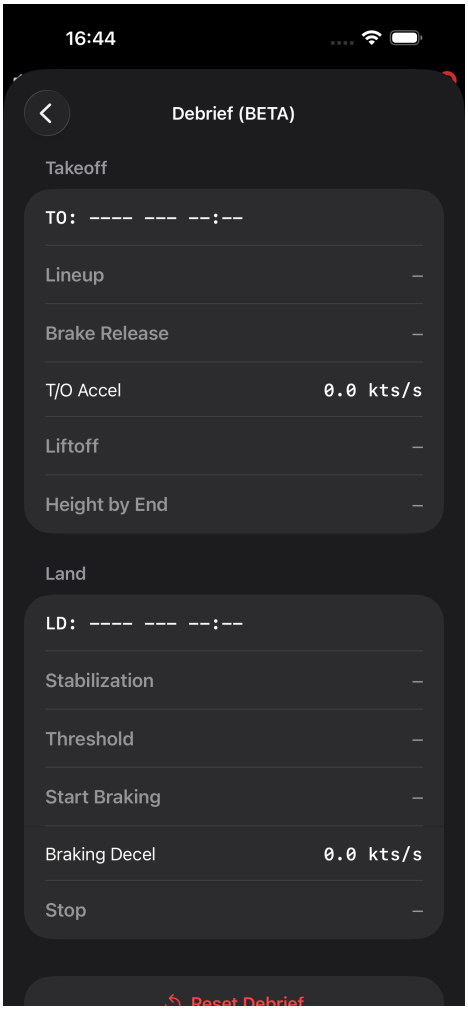


Figure 98. Full Debrief report, opened from Aircraft Settings > Debrief (BETA).

The full report records Lineup, Brake Release, T/O Accel, Liftoff, and Height by End for takeoff. For landing it records Stabilization, Threshold, Start Braking, Braking Decel, and Stop. Each phase shows its captured

values and status, allowing the pilot to compare the actual event with the setup and predicted performance used by TLAR. Use Reset Debrief at the bottom of the full report to clear the captured takeoff and landing metrics before a new evaluation.

Managing Terrain Data

Chapter 3 covers downloading terrain for the active LZ. This section covers the rest of the Terrain Data menu: downloading data for your saved strips, regional coverage for wider areas, automatic downloads, storage, and deleting data. Open it from LZ › Terrain Data.

Data sources and coverage

TLAR builds its terrain picture from public elevation and tree-height datasets that you download to the device. In the United States, the close-in high-resolution layer comes from the USGS 3D Elevation Program (3DEP): 1 m lidar where USGS has it and 5 m IfSAR in Alaska. TLAR also labels Hawaii data 5 m. For a long runway the close-in layer can be somewhat coarser than 1 m. The 10 m layer and the regional layers (about 600 m down to about 40 m) come from the AWS Terrain Tiles dataset, which uses USGS 3DEP inside the United States and coarser sources elsewhere. Tree heights come from Meta's global high-resolution canopy height map (CC BY 4.0); in the 10 m layer TLAR keeps the tallest tree in each cell so it does not understate an obstacle. Map Survey elevations come from the USGS Elevation Point Query Service in U.S. areas and from Open-Meteo elsewhere.

Outside the United States, the 1 m layer is not available. Best available becomes the 10 m terrain and tree bundle: the 1 m request fails without affecting the 10 m download, and the inventory keeps showing the 1 m items as missing (1m US only). Saved-strip batch downloads skip the 1 m layer outside U.S. areas. The 10 m terrain layer covers the world, but outside the United States its underlying data is closer to 30 m. Tree data is global but exists only where forest was detected, so a treeless site can show trees as missing. Regional terrain is offered for the United States (four regions, Alaska, and Hawaii), Canada, Mexico and Central America, the Caribbean, South America, Europe, Africa, the Middle East and Central Asia, East and Southeast Asia, and Australia and New Zealand.

Treat all terrain and tree data as advisory. The 1 m lidar is accurate typically within about a foot of elevation. The 10 m data is typically within 2 to 3 m and can be worse than a surveyed runway elevation, which is why only 1 m data is used to correct runway elevations. Satellite-derived tree heights typically differ from lidar by 2.5 to 3 m. TLAR does not adjust for differences in the datasets' vertical references, so elevations from different sources can differ by a few feet. None of these datasets is an obstacle database: they do not show towers, wires, buildings, or recently cut or grown trees.

Download data for saved strips

Under Download MyStrips Data, tap Selectively Download... to check the saved strips you want, then tap Download and confirm the estimated size. Tap Bulk Download... to request the best-available bundle for all pilot-created strips that still need data. Both methods request terrain and trees and skip components already stored. You can continue using TLAR while the batch runs; its progress appears on the Terrain Data page. While a batch runs, a progress banner shows how many strips have succeeded or failed; tap Stop to end the batch early.

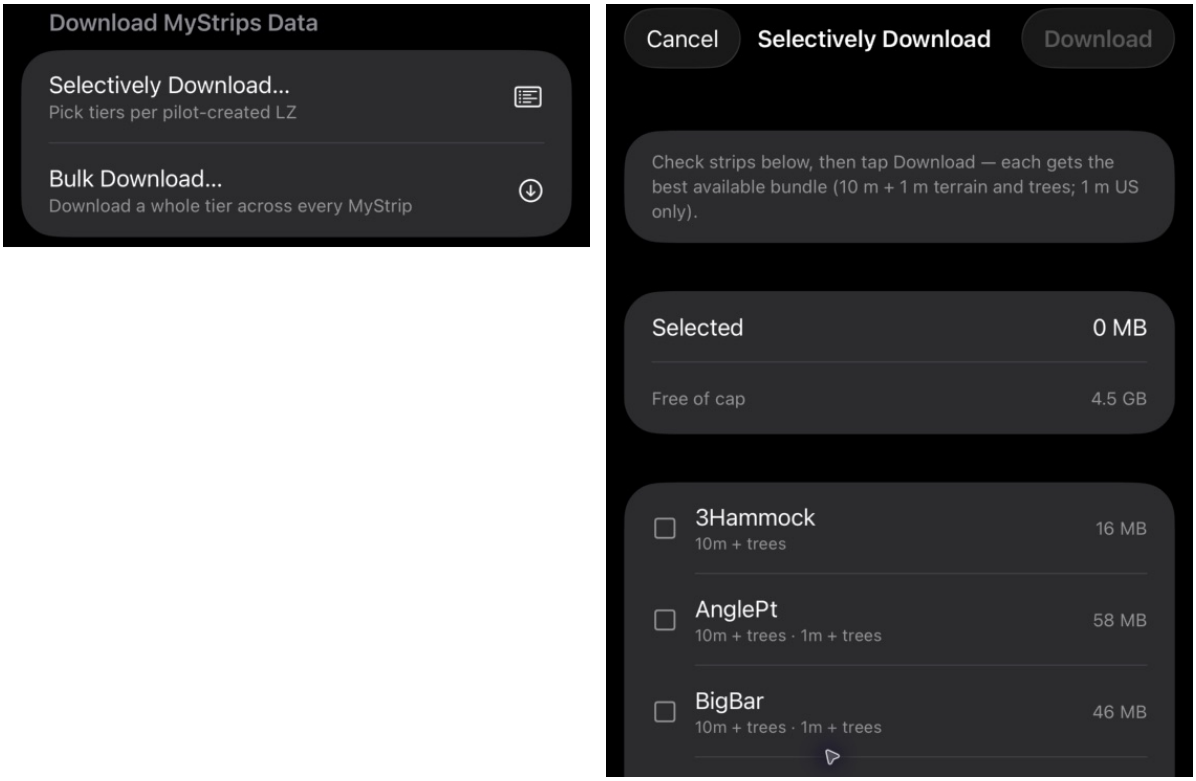


Figure 99. MyStrips terrain downloads. Open Selectively Download or Bulk Download (left). The selective page lists strips and the data still needed (right); select strips before tapping Download.

Download regional terrain

From the Terrain Data chooser, tap Regional Terrain and select a region. Choose a resolution: approximately 600 m, 300 m, 150 m, 75 m, or 40 m. Finer spacing uses more storage. Review the estimated download size and time, then tap Download for that region. Regional downloads provide ground-elevation coverage; obtain the separate LZ tree data for runway-area tree information. The 3D Terrain tile also uses regional terrain to draw the area beyond an LZ's close-in coverage.

The region list distinguishes Not downloaded, Partial, and Downloaded. If a download was interrupted, reopen the region and tap Resume at the same resolution. Cancel Download stops an active download. If you choose a different resolution, TLAR asks before replacing the existing regional data. Replacement deletes the old resolution before downloading the new one; an interruption can therefore leave the region incomplete.

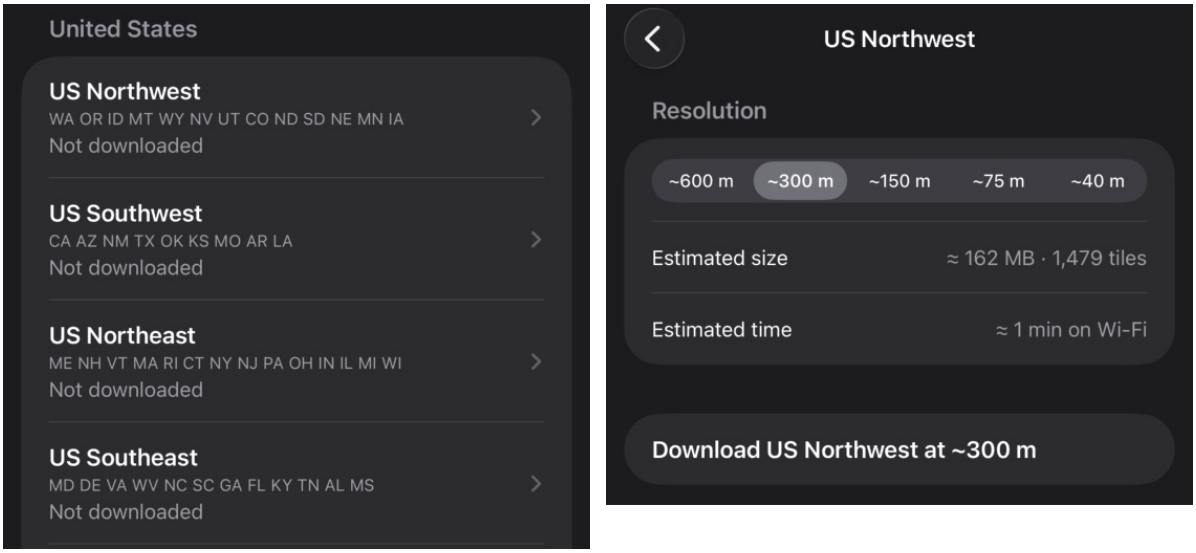


Figure 100. Regional terrain. Choose a region (left), then review its resolution, estimated size, and download time (right). Opening this page does not start a download.

Automatic downloads and storage

Open Terrain Management to see LZ terrain storage, regional terrain storage, and the combined total. Use Storage cap to set the allowance from 1 to 50 GB. The cap cannot be reduced below the data already stored; delete unwanted data first. If a download reaches the storage cap, make room or increase the cap and try again.

Under Auto-Download When LZ Loaded, turn on Auto-download best available to request the LZ bundle when you load a new runway. Select Wi-Fi only, Cellular only, or Both in the Network control. The Wi-Fi and Cellular readouts show which connections are available. These settings are saved. Merely switching between already-loaded Alpha and Bravo slots, or flipping the runway direction, does not trigger a new automatic download.

Automatic downloading depends on the selected network being available. It does not guarantee that a download has completed. Open LZ Terrain and check the terrain-and-trees inventory before relying on stored coverage.

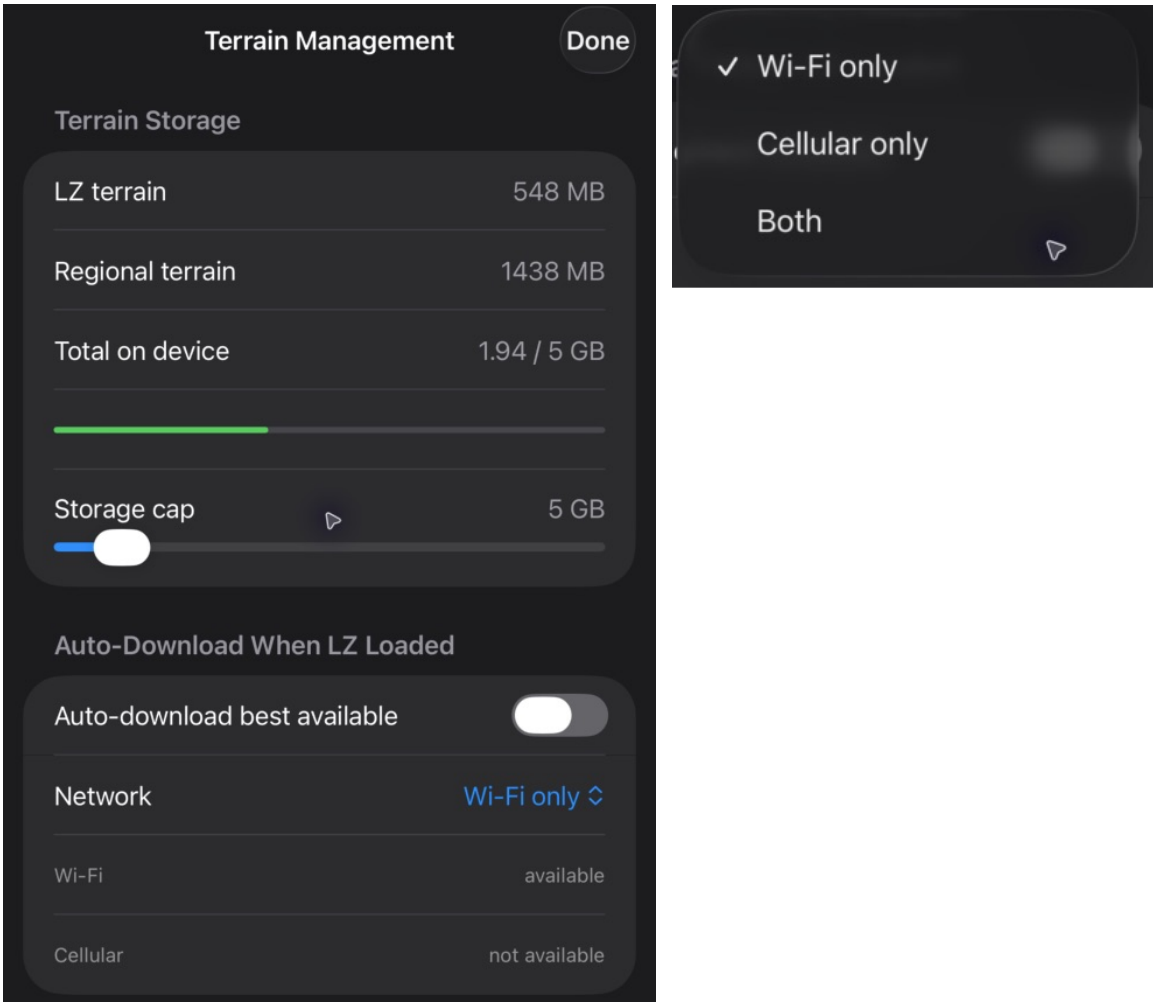


Figure 101. Terrain storage and automatic downloads. The management page shows combined storage and the cap. The Network menu chooses which connection may be used for automatic LZ downloads. Automatic downloading is off in this example.

Delete downloaded data

In Terrain Management, tap Select data to delete…. Check the LZ data groups or regional entries you want to remove, tap Delete, and confirm. The Delete button shows the selected storage amount. To remove larger groups, tap Bulk delete… and choose Delete All LZ Terrain, Delete All Regional Terrain, or Delete Everything, as available.

To delete just one region, you can also open it in Regional Terrain and tap Delete followed by the region name. Deleting terrain data removes the downloaded files from this device, not the runway entries in MyStrips. Deleted coverage must be downloaded again before it can be used offline. If automatic downloading remains enabled, loading the LZ again can request its data again.

Below Expert. Terrain features require an Expert subscription. If your subscription changes to below Expert while terrain data is stored, TLAR asks Delete downloaded terrain? Tap Delete to remove all LZ and regional terrain from the device and recover the storage, or tap Keep if you plan to return to Expert. TLAR does not ask again after you keep the data; while you remain below Expert, Settings shows an Erase … Terrain Data button you can use later.

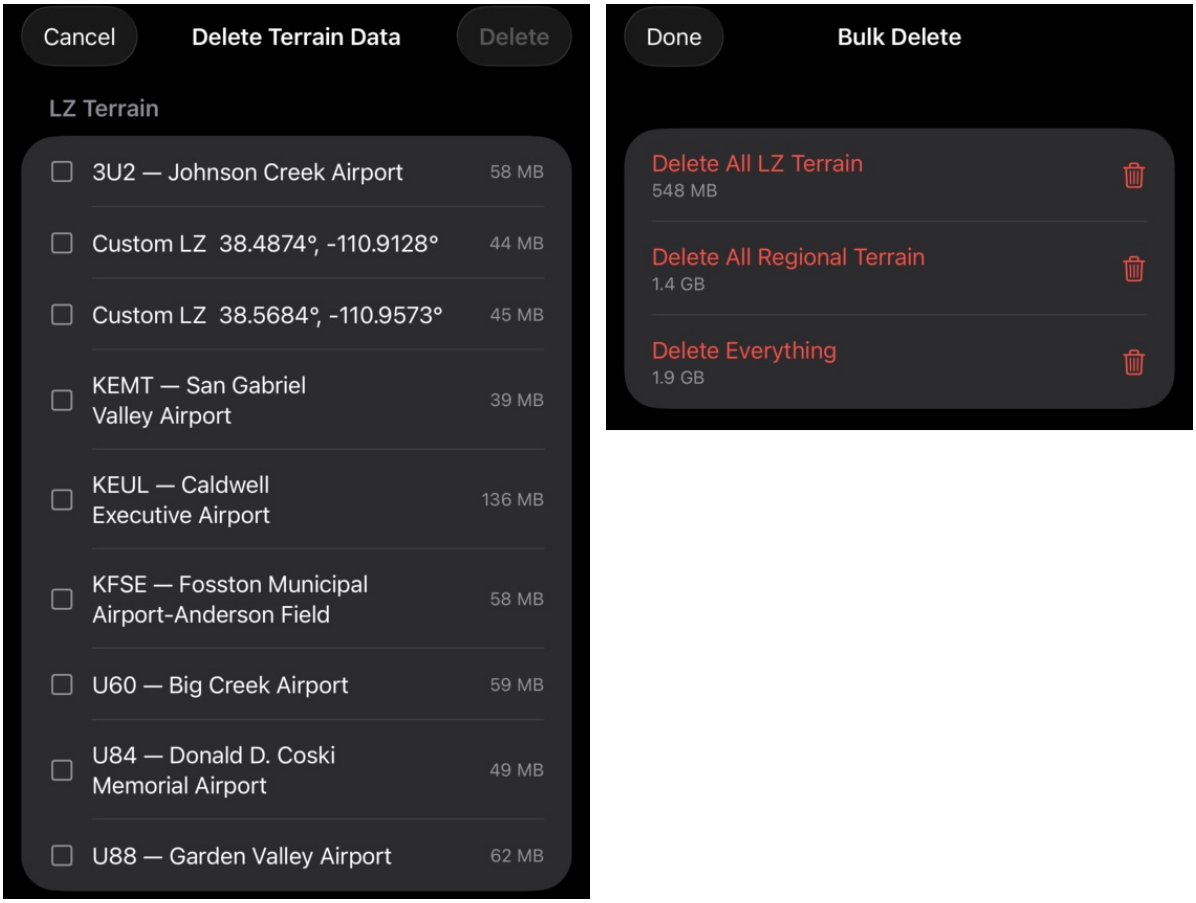


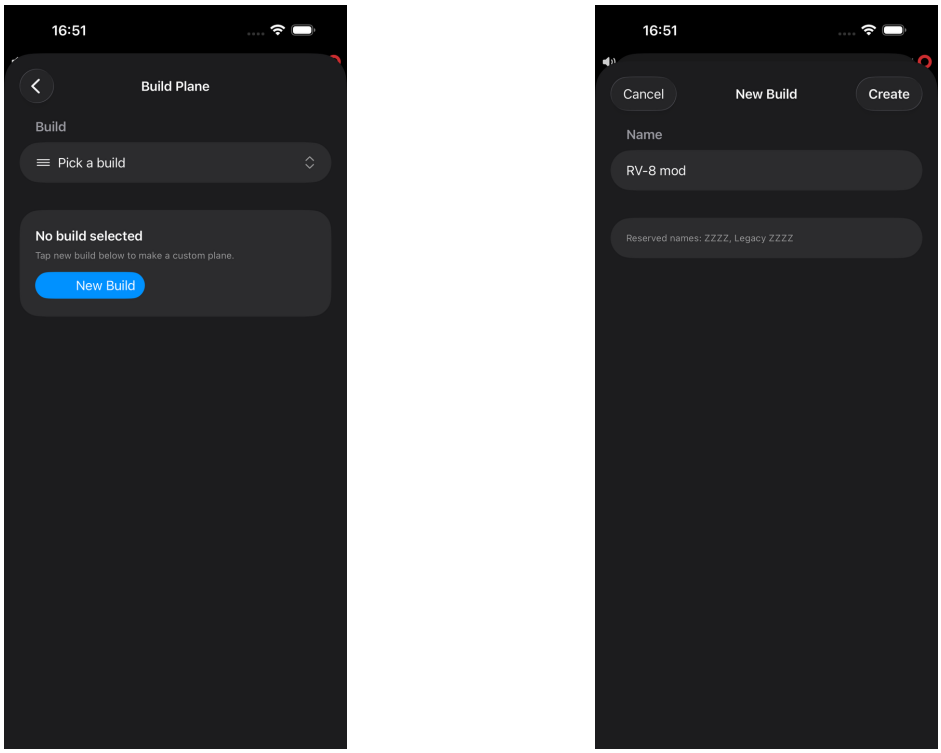
Figure 102. Delete downloaded terrain. Select individual entries (left), or choose a bulk-deletion scope (right). TLAR asks for confirmation before deleting the selected data.

Build Custom Planes

Expert users can create a custom aircraft from Aircraft Settings > Build Plane > Build Custom Aircraft. A custom build is a performance model, not simply a label or a collection of V-speeds. Build it from reliable POH, AFM, manufacturer, and flight-test data, then compare TLAR's results with the actual aircraft under matching conditions before operational use.

Create and select a build

Open Build Custom Aircraft, then tap New Build. Give the build a useful, unique name and tap Create. TLAR reserves the names ZZZZ and Legacy ZZZZ because they are used for the legacy custom-aircraft path. The Build picker at the top of the screen lists every saved custom build; use it to change builds, create another one, or delete the current build.



1. Tap New Build **2. Name it and tap Create**

Figure 103. Starting a custom aircraft build. Each build is separately named and saved.

To delete a build, open the Build picker, tap Delete, then confirm the permanent removal. Deleting the custom build currently loaded as the aircraft returns TLAR to the C172S stock aircraft. A Legacy ZZZZ entry is different: Delete stops TLAR from importing its legacy mirror; it does not delete the legacy ZZZZ aircraft. You can restore that import later from Aircraft Settings.

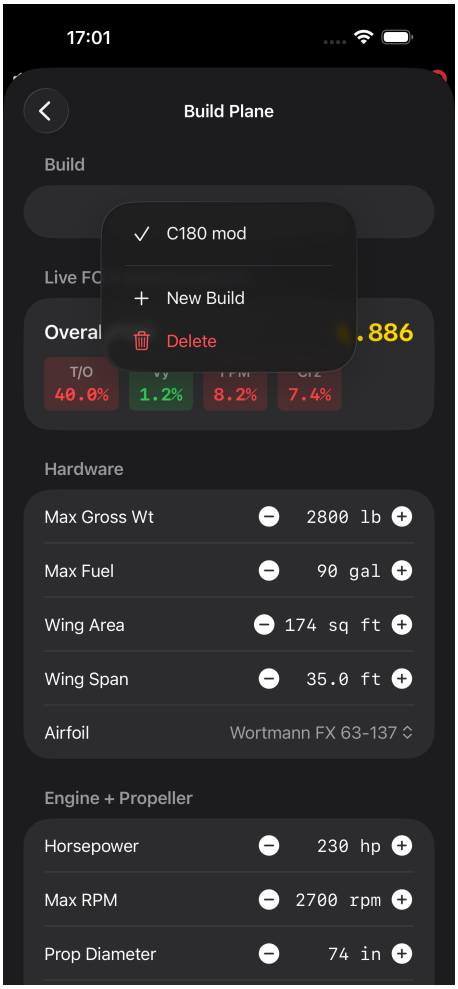
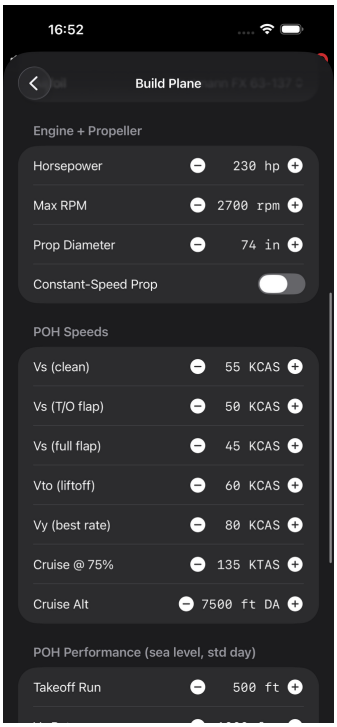


*Figure **104**. Deleting a custom build. Open the Build picker, tap Delete, and confirm the permanent removal.*

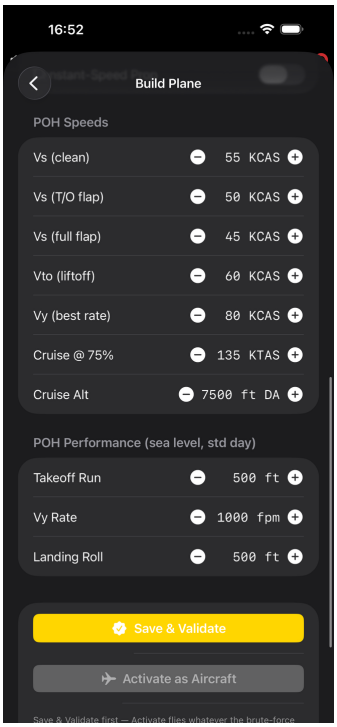
Enter the aircraft data

The builder uses plus and minus controls to enter the airframe, engine/propeller, speed, and performance targets below. Enter values for the exact configuration you want TLAR to model. The POH performance section is explicitly sea-level, standard-day data; use values published for that reference condition, not results from a different weight, density altitude, flap setting, or power setting.

Section	Required data
Hardware	Maximum gross weight, maximum fuel, wing area, wing span, and an airfoil selection.
Engine + Propeller	Installed horsepower, maximum RPM, propeller diameter, and whether the propeller is constant speed.
POH Speeds	Clean, takeoff-flap, and full-flap stall speeds; liftoff speed; Vy; 75-percent cruise true airspeed; and the density altitude used for that cruise target.
POH Performance	Takeoff run, Vy rate, and landing roll at sea level on a standard day.



Hardware and engine/propeller



POH speeds and performance

*Figure **105**. Custom-aircraft inputs. Use source data that describe the same aircraft configuration and reference condition.*

Live FOM and aerodynamic guard rails

As you edit a build, TLAR runs a live hybrid search after a short pause and displays an Overall Figure of Merit (FOM), together with separate error chips for takeoff, Vy, climb rate, and cruise. The FOM is one minus the average fractional error between TLAR's computed result and the entered target for those four measures. A value closer to 1.000 means a closer match. Individual chips are green below 2-percent error, yellow from 2 to less than 5 percent, and red at 5 percent or more. Overall FOM is green at 0.950 or higher, yellow from 0.800 to less than 0.950, and red below 0.800.

The live calculation uses a coarse search followed by two bounded refinement searches, allowing you to see the likely fit while entering values. It is a working estimate, not the validation result. A live FOM below 0.80 warns you to review the entered targets and use Save & Validate for the full search.

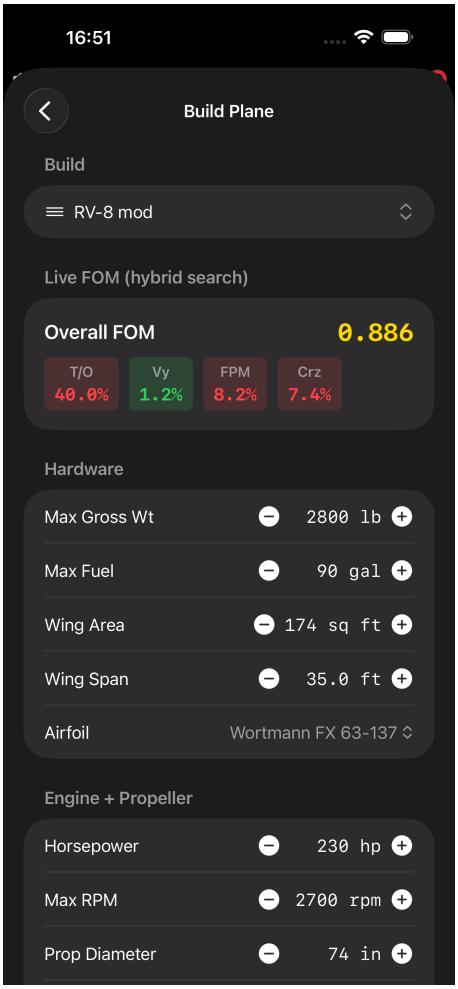


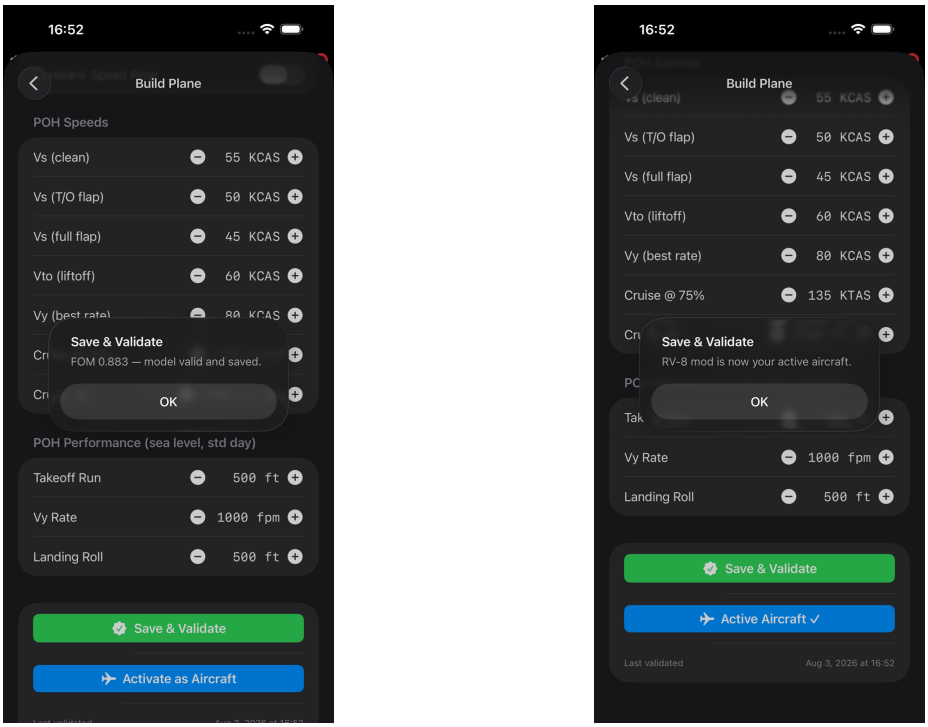
*Figure **106**. Live FOM. The Overall FOM and four chips show how closely the current aerodynamic model matches the entered takeoff, Vy, climb-rate, and cruise targets.*

TLAR also posts non-blocking sanity warnings when the input combination falls outside empirical piston-aircraft ranges: wing loading 5–30 lb/sq ft, installed horsepower-to-weight 0.04–0.20 hp/lb, or static propeller-tip Mach 0.60–0.95. These warnings are guard rails, not proof that a combination is correct. The selected airfoil's aerodynamic data must also be capable of producing the entered stall speeds; a physically impossible wing/stall-speed combination cannot form a valid aerodynamic model.

Validate before activation

Tap Save & Validate when the entered data and live FOM look reasonable. TLAR then runs its full 960-case brute-force search, the same validation approach used by the legacy custom-aircraft workflow. It searches the bounded aerodynamic parameters that shape induced drag and propeller efficiency, then recomputes the model against the entered takeoff run, Vy, Vy rate, cruise, and landing-roll targets. This full search, rather than the live estimate, is the trust anchor for activating a custom aircraft.

A build passes only when its combined model is valid and its average FOM exceeds 0.80. A successful result turns Save & Validate green, saves the build, records the validation time, and enables Activate as Aircraft. If the FOM is below 0.80, TLAR saves the build but leaves it unvalidated; review the POH targets and inputs, correct the mismatch, and validate again. TLAR will not enable activation of an unvalidated build.



Validated and saved **Active aircraft confirmed**

Figure **107***. Validate first, then activate. The active-aircraft control remains unavailable until the validation pass succeeds.*

Saved builds, selection, and sharing

Custom builds persist across app launches. You can create and retain several builds, then select one from Aircraft Settings > Aircraft; TLAR lists them in the Custom Builds section beneath the stock aircraft. Selecting a validated custom build makes it the active aircraft and loads its model into TLAR. Reopen Build Custom Aircraft at any time to select and revise a saved build. A legacy ZZZZ build may appear as a read-through mirror; duplicate that entry before editing it.

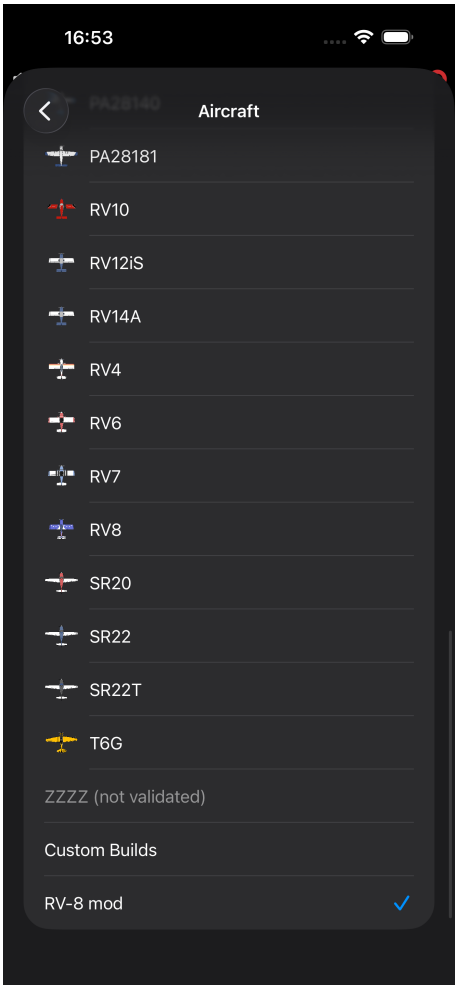


Figure 108. Aircraft picker. Saved custom aircraft appear in the Custom Builds section and can be selected like stock aircraft.

A validated active custom build can be shared from the Share Custom Aircraft section in Aircraft Settings. TLAR can share the build through the iOS share sheet or send it to Flight Lead. See Sharing Data for the receiving pilot's import and review process.

CUSTOM-AIRCRAFT CAUTION Validation means the model has matched the entered targets within TLAR's acceptance gate; it does not validate the source data, the aircraft, a modification, or a particular flight. Compare TLAR predictions with actual aircraft performance in comparable conditions before using a custom build operationally.

Telemetry and Data Marks

Telemetry recording is an Expert feature. TLAR records a telemetry row with each GPS position update, about once per second, while the aircraft is flying or lined up on the active runway (within 100 feet of it and tracking within 5 degrees of its axis). Recording starts and stops automatically and uses only the device's own GPS; it does not record simulator or replayed data. The buffer holds 21,600 rows, about six hours, and is not saved between app launches. Add the DATA MARK chicklet to a compatible tile to see its state: DM and the current mark count, with REC in red while recording, OFF when not recording, and FULL in red when the buffer is full.

While recording, the DATA MARK chicklet logs a numbered mark at the current point in the flight record and TLAR announces the mark number. Each tap starts a new mark number, which is written in the dm column of every row until the next mark. Data marks count up. The first is 1, second is 2, so on and so forth. Use this to

make it easier to find a particular maneuver, configuration change, test point, or event in the exported telemetry. If telemetry is not recording, tapping DATA MARK produces a “Not recording” callout and no mark is stored.

To erase the current telemetry buffer, open Settings and tap Erase Telemetry, then tap Erase in the confirmation dialog. This removes every recorded row and resets the data-mark count to zero. Export, share, or review any data you need before confirming; the erase cannot be undone.

NEXRAD Weather Radar

Weather tile

The 2×2 Weather tile places animated NEXRAD precipitation imagery on a north-up compass display. It is available in the United States for Expert subscribers and remains centered on the aircraft. The cyan wind arrow shows wind direction and speed. The sun symbol is plotted at the current sun azimuth; the number inside it is sun elevation in degrees, negative when the sun is below the horizon.

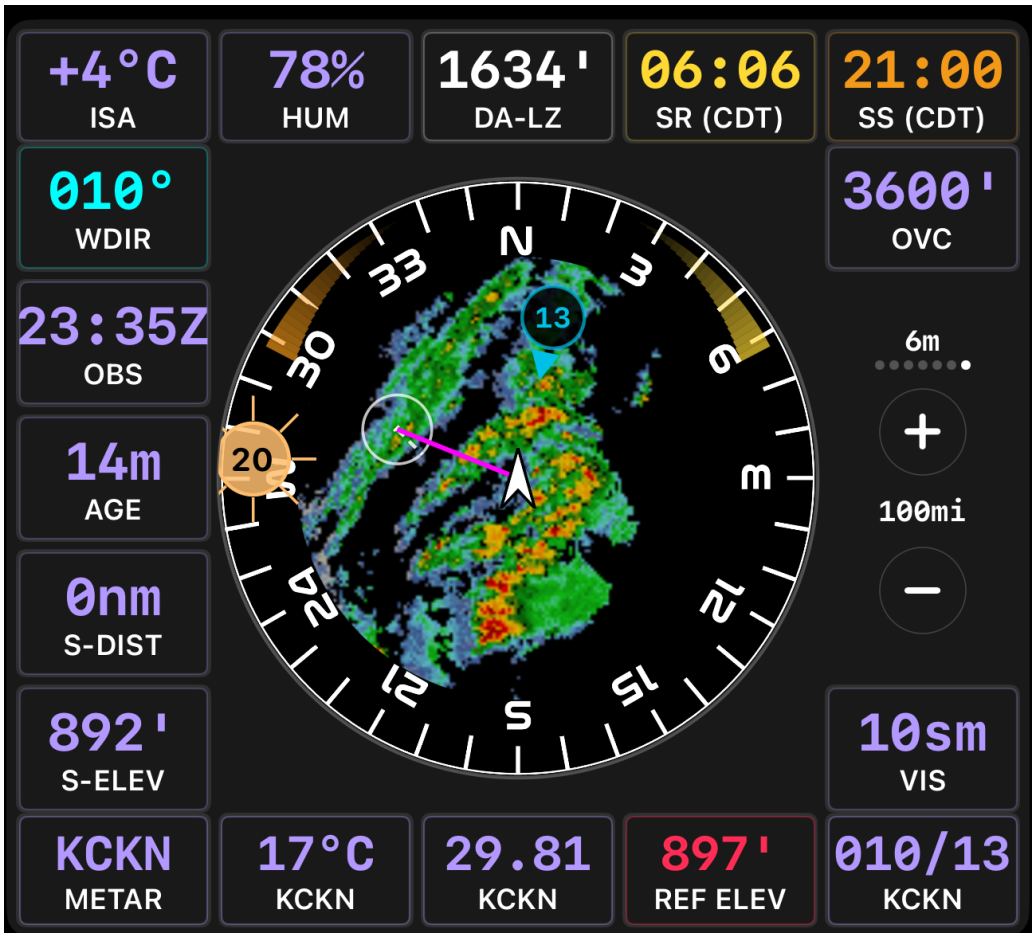


Figure 109. Weather tile front. The compass contains the radar image, wind and solar symbology, the active-LZ overlay, radar-time indicator, and range controls.

Use + and − at the right of the display to step through the radar range. The selectable ranges are AUTO, 200, 100, 50, 25, 10, and 5 statute miles. Tap the range label to return to AUTO. With an active LZ, AUTO sizes the display to include the aircraft-to-LZ distance, the LZ’s 10 NM ring, and a small margin; without an active LZ it uses 200 miles. The age above the range controls is the age of the displayed radar frame. The dots beneath it show the loaded frames and the currently displayed point in the animation cycle.

When an LZ is active, the weather tile draws a magenta line from the aircraft to the approach end. It also draws the runway, a dashed 10 NM run-in extending from the approach end, and a 10 NM ring centered on that approach end. These are geographic overlays on the radar display; they help put precipitation in relation to the active runway and its approach path.

NEXRAD intensity and sensitivity

The NEXRAD image is intentionally filtered for aviation usefulness rather than presented as an unmodified reflectivity product. TLAR masks the light-blue, turquoise, and most green-family returns that commonly correspond to low reflectivity—bird and insect returns, ground clutter, and drizzle—then retains the yellow-green-through-white portion of the N0Q palette. The cutoff is tuned at approximately 20 dBZ. This is a noise-reduction display choice, not a calibrated onboard weather-radar scale.



*Figure **110**. NEXRAD display legend. Low-intensity returns are filtered; displayed colors indicate increasingly stronger precipitation.*

The tile loads up to seven frames spanning roughly the preceding 30 minutes, and refreshes radar data periodically. Internet availability, source timing, image processing, and display refresh all introduce delay. Use it with current weather reports, onboard observations, and all available weather information; do not use it as the sole basis for thunderstorm or convective-weather decisions.

Weather tile back side

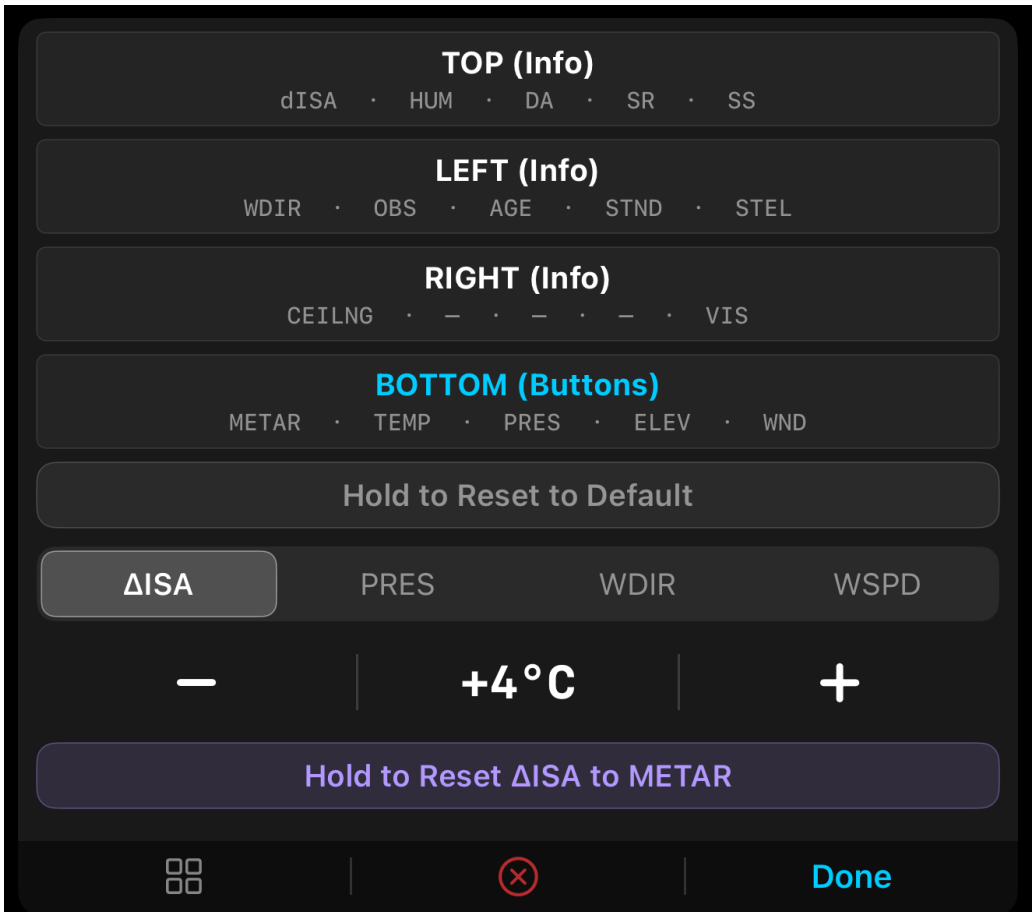


Figure 111. Weather tile back side. Use the upper controls to select chicklets and the lower panel to make a weather override.

Tap the tile to flip it. On a 2×2 Weather tile, the TOP, LEFT, and RIGHT rows select information chicklets; the BOTTOM row selects button chicklets. Tap a row, choose a position, and select the desired chicklet. Hold Reset to Default to restore the standard layout. The 1×1 Weather tile uses a fixed chicklet arrangement and therefore does not show this selector.

The lower override panel controls ΔISA, pressure, wind direction, and wind speed. Tap the desired parameter, use − or + to change it, then hold the Reset control to return that one parameter to the METAR value. These controls create a manual weather override for the selected value; verify the displayed source and value before relying on a resulting performance calculation. On the 1×1 Weather tile, the pressure value is shown without units.

Sharing Data

TLAR shares Landing Zones, dashboard presets, and custom aircraft as TLAR files. Select a sharing method from the iOS share sheet, then have the receiving pilot open the received file in TLAR. TLAR presents an import sheet that identifies the type of item, shows the available details and validation warnings, and lets the receiver import it or cancel. Import capability follows the receiving pilot's subscription: Basic cannot import shared LZs or presets; Pro can import LZs and presets but cannot import custom aircraft; Expert can import all three types.

Share Landing Zone

Tap LZ in the bottom navigation bar to open Landing Zones. The Share Alpha and Share Bravo controls at the bottom share the runway currently loaded in that slot. Tap the control for the slot you intend to send, then

choose a delivery method in the iOS share sheet. Share an LZ only after verifying its runway identity, coordinates, elevations, surface, and current operational suitability.

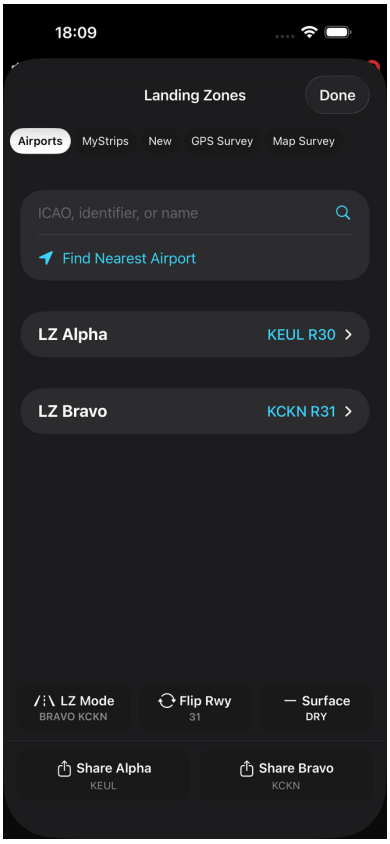


Figure 112. Landing Zones sharing controls. Tap Share Alpha or Share Bravo to send the LZ loaded in that slot.

Share Presets

Tap Presets in the bottom navigation bar to open Dashboard Presets. Each saved preset has a share icon directly beneath it; tap that icon to send that preset through the iOS share sheet. The preset panel also reminds you that tapping a preset loads it and long-pressing a preset saves the current layout to it. A shared preset carries its dashboard arrangement and associated preset configuration, not a complete copy of the sender's aircraft, LZ, or weather state.

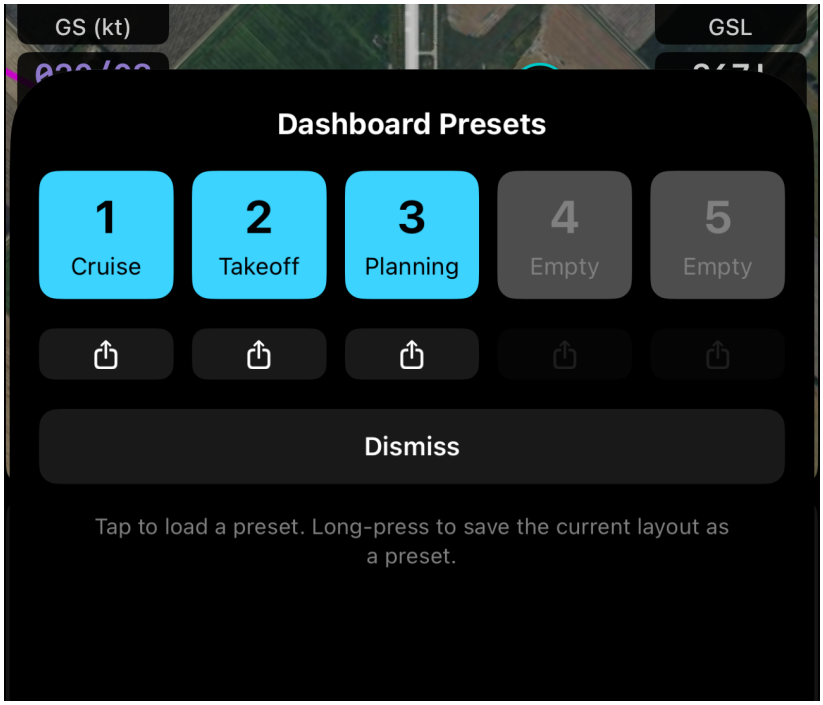


Figure 113. Dashboard Presets. Tap the share icon under a saved preset to send that preset.

Share Custom Planes

Open Aircraft Settings and scroll to Share Custom Aircraft. This Share Aircraft menu is visible only when the custom aircraft you want to share is the active loaded aircraft. If a receiver already has a build with the same name, TLAR offers an overwrite choice or a new unique name, allowing several versions or aircraft-specific builds to be retained.

Tap Share Aircraft to choose a delivery method in the iOS share sheet, or Send to Flight Lead to send the build to us (the app developer: Owyhee Aviation LLC). The custom aircraft remains subject to the validation and operating cautions in Build Custom Planes; importing it does not validate the source data or the recipient's aircraft.

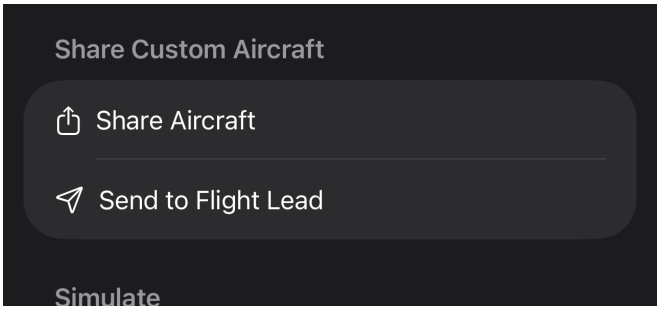


Figure 114. Share Custom Aircraft in Aircraft Settings. Choose Share Aircraft or Send to Flight Lead.

SITREPs

Settings > Send SITREP creates a short Situation Report containing the current TLAR flight-state summary for sharing or logging. Pro users can send the report without telemetry. Expert users are asked whether to include telemetry before the report is created. Review the destination selected in the iOS share sheet and the information being sent, particularly when the report includes operational or location data.

The example below is a SITREP sent without telemetry. Its content reflects the current TLAR state at the time it is created, including flight progress, position, weather source and values, and any available remarks.

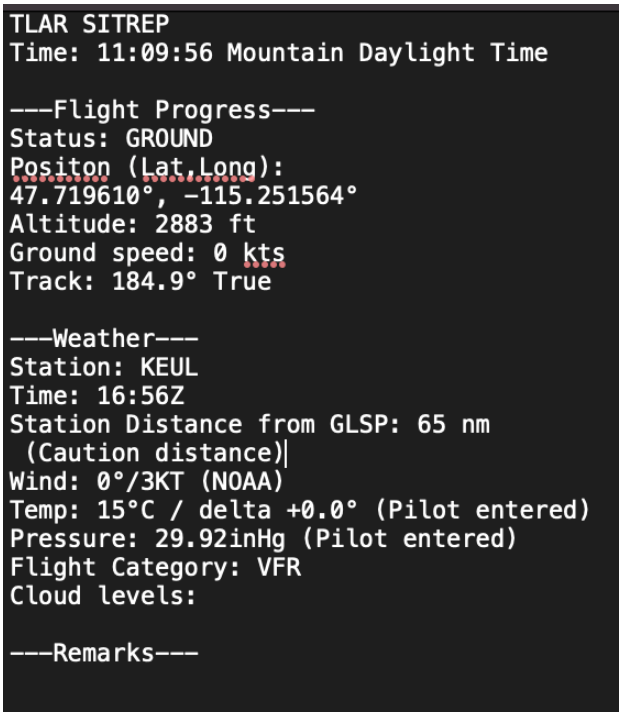


Figure 115. Example SITREP without telemetry.

Telemetry Export Fields

When an Expert user includes telemetry with a SITREP, TLAR appends the recorded rows to the end of the report as comma-separated text under a TLAR TELEMETRY header line. Nothing is appended if no telemetry has been recorded since the last erase. Row 0 is a blank starting row. The exported field names and their current meanings are listed below. Fields sourced from optional sensors or external data feeds can be zero or unavailable when that source is not in use.

Export field	Description
row	Sequential telemetry row number (row 0 is a blank starting row).
dm	Current Data Mark number; carried on every row until the next mark.
elapsedTime	Seconds since the previous GPS fix.
HH	Local time hour.
MM	Local time minute.
SS	Local time second.
Lat	Aircraft latitude, degrees.
Long	Aircraft longitude, degrees.
geoAlt	GPS geometric altitude, feet.
iOSKgs	Groundspeed, knots.
tlarTrk	TLAR true ground track, degrees.
aircraftDa	Density altitude at the aircraft, feet.
Trk	Duplicate of tlarTrk.
HdgT	TLAR corrected true heading, degrees.
HdgM	TLAR corrected magnetic heading, degrees.
turnRt	Derived turn rate, degrees per second.
bank	Bank angle derived from turn rate, degrees.
aKgs	Groundspeed change since the prior fix, knots per second.
iOSPressure	Pressure measured by the device barometer, inches Hg.

Export field	Description
iBaro	Altimeter setting derived from device pressure and geometric altitude.
gpsAltCor	Applied GPS altitude correction, feet.
hError	Device-reported horizontal position error, meters.
vError	Device-reported vertical position error, meters.
sError	Device-reported speed error, meters per second.
tError	Device-reported track error, degrees.
gw	Aircraft gross weight, pounds.
cdo	Baseline aircraft drag coefficient.
cdoBias	Pilot-entered drag-coefficient adjustment.
cdp	Windmilling-propeller drag coefficient.
cdpBias	Windmilling-propeller drag-coefficient adjustment.
setAob	Selected bank angle for gliding turns, degrees.
hw	Headwind component at the aircraft, knots.
ktas	Computed true airspeed, knots.
kcas	Computed calibrated airspeed, knots.
isFly	TRUE when TLAR identifies the aircraft as flying; otherwise FALSE.
lzLat	Active LZ approach-end latitude.
lzLong	Active LZ approach-end longitude.
trkDtg	Track distance remaining to the approach end, including route turns, feet.
trkFpa	Required flight-path angle to the approach end along the selected track, degrees.
fence	Selected fence height, feet.
lzTemp	Temperature at the active LZ, degrees C.
deltaT	LZ temperature difference from standard day, degrees C.
aircraftTemp	Temperature at the aircraft, degrees C.
selAlt	Selected altimeter setting, inches Hg.
wdir	Active-LZ wind direction, magnetic.
ws	Active-LZ wind speed, knots.
lzda	Density altitude at the active LZ, feet.
usePlaneDa?	TRUE when TLAR uses aircraft density altitude rather than LZ density altitude.
vRefSelected	Selected Vref, knots.
avrVviFps	Average vertical speed since glide calibration started, feet per second.
AvrVFps	Vref converted to true airspeed, feet per second.
eFt	Energy-altitude margin at the next turn point (best available option when no glide solution), feet.
tch	Predicted threshold-crossing height (highest of pattern solutions), feet.
landStAhead?	TRUE when TLAR predicts a straight-ahead landing on the runway is possible.
glideToRwy?	TRUE when TLAR predicts a glide to the active runway is possible.
hudAttSrc	Attitude source actually driving the HUD, as a code: 0 = GPS, 1 = INS, 2 = MIX (legacy UI only), 3 = AHRS (new UI only).
hudPitch	Pitch used by the HUD (sign inverted), degrees.
pitAdjust	HUD pitch synchronization adjustment.
hudRoll	Roll used by the HUD, degrees.
rollAdjust	HUD roll synchronization adjustment.
hudFltPath	Flight-path angle used for the HUD flight-path marker, degrees.
aoaPitch	Computed angle of attack, degrees.
pctLift	Computed percent lift.

Export field	Description
pKCAS	Pressure-derived calibrated airspeed, knots.
aKCAS	Angle-derived calibrated airspeed, knots.
aoaKCAS	Angle-of-attack-derived calibrated airspeed, knots.
fKCAS	Fused calibrated airspeed, knots.
cmMotHdg	Core Motion device heading.
sWDir	Sensor-provided wind direction.
sWSpd	Sensor-derived wind speed, knots.
hdgCorr	Applied device-heading correction.
drift	Computed wind-drift angle, degrees.
clTrueHdg	Core Location true heading.
sKcas	Sensor-bootstrap calibrated airspeed, knots.
clHdgAcc	Core Location heading accuracy, degrees (negative when invalid).
clMagHdg	Core Location raw magnetic heading.
cmMagAcc	Core Motion magnetic-field accuracy: -1 unset, 0 uncalibrated, 1 low, 2 medium, 3 high.
hdgCbN	Running count of Core Location heading updates.
hdgAgeS	Seconds since the last heading update (-1 if none).
locCbN	Running count of Core Location position updates.
accAuth	Location accuracy authorization (0 full, 1 reduced).
authSt	Location authorization status code.
driftSrc	Heading source: 1 sensor, 2 stored sensor wind, 3 Core Location, 0 none.

External Interfaces

X-Plane 12

TLAR can follow X-Plane 12 through its WebAPI interface. X-Plane 12.1 or later includes this API and supplies position, attitude, airspeed, ground track, and surface-weather data directly from X-Plane datarefs. TLAR uses that data to update its simulated flight state and supported displays.

X-Plane's Web API listens only on 127.0.0.1:8086—the simulator computer itself. An iPhone or iPad on the Wi-Fi network cannot reach that address directly. Run a TLAR bridge on the simulator computer: it listens on port 8087 on the local network and forwards traffic to X-Plane's local port 8086. The bridge must be running whenever TLAR is connected.

Connect TLAR to X-Plane

1. Launch X-Plane 12.1 or later on the simulator computer. The Web API is enabled by default. 2. Start one of the bridge options below on that computer. 3. Put the iPhone or iPad and simulator computer on the same Wi-Fi network. 4. Find the simulator computer's LAN IP address: on macOS, System Settings > Network > Wi-Fi > Details, or use the bridge menu-bar icon; on Windows, run ipconfig and note the IPv4 Address. 5. In TLAR, open Aircraft Settings > X-Plane WebAPI. Enter that IP address as Host IP, set Port to 8087, and turn on Enable X-Plane WebAPI. 6. Load a flight and select Ready to fly. TLAR should connect within a few seconds; the status row shows Connecting, Connected, Disconnected, or an error.

ORDER MATTERS The bridge listens on port 8087 and forwards to X-Plane's port 8086. Start X-Plane first and let it fully load. Then start the bridge, then turn on TLAR's X-Plane WebAPI switch. If the bridge was already running when X-Plane launched, X-Plane can fail to bind port 8086 and display a "port 8086 unavailable" warning.

Option A — TLAR X-Plane Bridge App (macOS)

This is the recommended Mac option. In TLAR's X-Plane WebAPI Setup Instructions, select Send TLAR X-Plane Bridge to My Mac and use AirDrop, Mail, Messages, iCloud Drive, or Files to transfer the included .zip to the Mac that runs X-Plane. AirDrop normally places it in Downloads.

On the Mac, find the .zip and double-click it to create TLAR X-Plane Bridge.app. Drag the app to Applications, or leave it in Downloads. Double-click the app to launch it. It does not open a window or appear in the Dock; a small menu-bar icon appears at the top right. Click that icon to find or copy the Mac's IP address. The app listens on port 8087 and forwards to X-Plane on 8086. When you finish, choose Quit from the menu-bar icon.

MAC BRIDGE The included bridge app is a signed, Apple-notarized Universal macOS app for Apple Silicon and Intel Macs running macOS 12 or later. First launch can take a moment while macOS validates it.

Option B — Python Bridge Script

Use this option on macOS or Windows when you prefer to run the bridge from a command window. Leave Terminal or PowerShell open while TLAR is connected. A successful launch prints: Forwarding 0.0.0.0:8087 -> 127.0.0.1:8086.

macOS Terminal

Open Terminal on the Mac, paste the script below, and press Return. It requires Python 3. On the first python3 run, macOS may offer to install Xcode Command Line Tools; choose Install, wait for it to finish, then run the script again. If no installer appears and python3 is not found, run xcode-select --install in Terminal.

```
python3 -c "
import socket, threading
s = socket.socket(); s.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)
s.bind(('', 8087)); s.listen(5)
print('Forwarding 0.0.0.0:8087 -> 127.0.0.1:8086')
def pipe(a, b):
    try:
        while True:
            d = a.recv(4096)
            if not d: break
            b.sendall(d)
    finally:
        try: a.close()
        except: pass
        try: b.close()
        except: pass
while True:
    c, _ = s.accept()
    d = socket.create_connection(('127.0.0.1', 8086))
    threading.Thread(target=pipe, args=(c, d), daemon=True).start()
    threading.Thread(target=pipe, args=(d, c), daemon=True).start()
"
```

Windows PowerShell

Install Python 3 from python.org before starting and select Add python.exe to PATH during installation. Open PowerShell, paste the following block, and press Enter. It writes the bridge to %TEMP%\tlar_bridge.py and runs it. Use this PowerShell form rather than a one-line python -c command; the here-string preserves the underscores in the Python identifiers.

```
$script = @'
import socket, threading
s = socket.socket()
s.setsockopt(socket.SOL_SOCKET, socket.SO_REUSEADDR, 1)
s.bind(('', 8087))
s.listen(5)
print('Forwarding 0.0.0.0:8087 -> 127.0.0.1:8086')
def pipe(a, b):
    try:
        while True:
            d = a.recv(4096)
            if not d: break
            b.sendall(d)
    finally:
        try: a.close()
        except: pass
        try: b.close()
        except: pass
while True:
    c, _ = s.accept()
    d = socket.create_connection(('127.0.0.1', 8086))
    threading.Thread(target=pipe, args=(c, d), daemon=True).start()
    threading.Thread(target=pipe, args=(d, c), daemon=True).start()
'@
$path = Join-Path $env:TEMP 'tlar_bridge.py'
$script | Set-Content -Path $path -Encoding UTF8
python $path
```

X-PLANE SETUP If TLAR does not connect, confirm that both devices are on the same Wi-Fi network, the bridge is still running, the Host IP has not changed, and the simulator computer firewall permits incoming connections on port 8087. If the script reports Address already in use, another process is holding port 8087; stop that process or restart the simulator computer.

OnSpeed EFIS

TLAR can ingest AHARS data from the OnSpeed Angle Of Attack system, which transmits this data over Wi-Fi. TLAR automatically reads this data when the iOS device running TLAR is connected to the OnSpeed Wi-Fi network. For more information about the OnSpeed system, see www.flyonspeed.org.

When connected to a compatible OnSpeed EFIS data stream, TLAR can use live EFIS information in supported tiles and chicklets. The available data includes indicated airspeed, pressure altitude, percent lift/AoA, G load, pitch, roll, vertical speed, flight-path information, flap state, and OnSpeed lift-band limits. Live sensor information is shown in cyan; stale OnSpeed data dims after three seconds.

The AOA tile uses the OnSpeed percent-lift bands to show the current lift condition, and the DATA MARK and AoA-tone controls can be used with the connected data stream. The selectable OnSpeed EFIS attitude source is an upcoming capability in the current UI. Verify the EFIS connection and the selected data source before relying on an EFIS-derived value; a missing or stale stream is not a valid substitute for the aircraft instruments.

Appendices

Appendix A — TLAR Aero and Physics Model

TLAR is an equation-based performance model, not a collection of fixed performance tables. TLAR's performance engine runs a physics and aerodynamic model that predicts aircraft performance in real time. It does this once per second by calculating the three-dimensional position, attitude, and speed of your aircraft as a function of the physical forces (e.g. lift vs weight, thrust vs drag) that affect all aircraft as they move through the air. Why should you care? This enables TLAR to make reasonably accurate predictions of performance between and beyond the conditions explicitly covered by the POH.

What the model uses

Input group	Examples used in the calculation
Aircraft model	Wing area and lift characteristics; baseline drag and drag calibration; engine, propeller, and power data; flap effects; fuel state; gross-weight limits; and braking characteristics.
Atmosphere and energy	Temperature, pressure, humidity/dewpoint where applicable, density altitude, wind, aircraft altitude, current speed, and fuel weight.
Runway and landing zone	Runway length, approach and departure elevations, slope, surface and condition, fence height, position on the runway, and available runway remaining.
Pilot selections	Takeoff and landing flaps, braking, touchdown-zone length, safety margin, climb and cruise targets, approach FPA, and emergency glide settings.

TLAR's Heartbeat

TLAR lives in a 1 Hz world. With a GPS lock, iOS processes GPS position data one time per second. The arrival of a new GPS "hit" kicks off TLAR's computational cycle. Everything that TLAR does and computes is re-accomplished between each GPS update, with a few exceptions. Without a GPS lock, TLAR falls back to a one-second timer that kicks off the same computational cycle. When you use TLAR's built-in simulated takeoff mode, or integrate with an external simulator such as X-Plane, TLAR bypasses its GPS-driven heartbeat and injects false GPS data inside the one-second timer-based heartbeat.

Performance Reference

One of the most important settings to get right in TLAR is selecting the Performance Reference in Weather Settings. If you select LZ, TLAR uses the LZ's elevation and weather conditions to compute all performance data. If you select Aircraft, TLAR uses your iDevice's GPS elevation and weather conditions near your position to compute performance. If you select Manual, TLAR computes performance based on your manually entered elevation and selects weather conditions closest to your position.

Aircraft data, calibration, and limits

TLAR's supplied aircraft models are tuned against manufacturer-stated and/or POH performance. We stake the model using a wide range of altitudes/temperatures and their associated performances to get the best all-around model we can. TLAR's build plane feature does not have this luxury. We ask you to enter a single density altitude for takeoff, climb, and landing. And a second density altitude for cruise. That's it. So, TLAR is staking the model to just these two altitudes, which means the custom-build plane function will not produce as accurate of a model as we can produce in our normal process. Our experience shows that predicted climb rate is the most sensitive metric to this issue and landing ground roll the least.

GARBAGE IN, GARBAGE OUT All models are wrong, some are useful. We think TLAR is in the useful category, but make sure you feed TLAR accurate inputs if you expect accurate predictions!

Appendix B — Tiles and Chicklets Reference

Tiles are the working displays on the dashboard. A tile presents one operational view; tap most tiles to flip them and reach its settings or chicklet selector. Chicklets are the small badges around a tile. An Info chicklet displays a value and opens its information when tapped. A Button chicklet performs an action or cycles a mode when tapped. On tiles that use both kinds, Info chicklets belong on the top and side edges; Button chicklets are on the bottom edge.

TILE SIZE MATTERS Not every tile is available in every dashboard position. Map can be 1×1, 2×2, or full-screen; HSI, HUD, Clock, Position, Weather, and AOA can be 1×1 or 2×2; Emergency Sim and 3D Terrain can be 2×2 or full-screen; Vertical Profile is 2×2 only. The available chicklet edges change with tile size. Use the Tile picker and the back of the selected tile to see the choices that apply to that location.

Tile Reference — Basic, Pro, and Expert

The following is the complete set of dashboard tile types available through the Expert tier. A tile can only be selected where its size is supported by the current dashboard layout.

Tier	Tile	Purpose and controls
Basic	**Aircraft**	Active aircraft status, gross weight, fuel, flap configuration, and motor state. Flip to set fuel on board and cruise burn rate.
Basic	**Takeoff**	Computed takeoff run, over-fence distance, Vto, flap setting, runway graphic, and cautions/warnings. The back selects two Info chicklets and ASTOP.
Basic	**Land**	Computed landing roll, over-fence distance, FPA, Vapp, flap/brake/approach selections, runway graphic, and cautions/warnings.
Basic	**Climb**	Selected climb mode, speed, and predicted climb rate. The tile lets the pilot select a profile or adjust the relevant target.
Basic	**Cruise**	Cruise chart, mode, power setting, TAS, and fuel-flow information. A red state indicates requested cruise is not possible.
Basic	**HSI**	Heading-and-runway view with wind, route, runway geometry, and navigation cues. The 1×1 version has top Info and bottom Button chicklets; the 2×2 adds left and right Info positions.
Basic	**Position**	Raw GNSS latitude/longitude, geometric altitude, speed, track, and sensor-accuracy status.

Tier	Tile	Purpose and controls
Basic	**Clock**	Aviation clock with local/Zulu time, date, solar/lunar information, and selectable clock face/color/time-zone options. The time-zone label includes the Zulu conversion, for example MDT (Zulu=Local+6); the 1×1 analog faces show only the abbreviation.
Pro	**Runway**	Active-LZ runway geometry, elevations, length, slope, surface, and wind. Front controls flip runway direction and cycle LZ mode.
Pro	**Weather**	LZ weather, wind, solar information, and available NEXRAD. Flip for chicklet selection and manual weather controls.
Pro	**Smart TOLD**	Automatically shows Takeoff on the ground and Land in flight, with the applicable view's controls and configurable chicklets.
Pro	**Smart Climb / Cruise**	Automatically shows Climb while on the ground, climbing, or near the active LZ, and Cruise otherwise.
Pro	**Map**	Moving map with LZ, route, METAR stations, runway, and flight-path cues. Available as 1×1, 2×2, or full-screen; 1×1 has no chicklet overlays.
Pro	**V-Speeds**	Computed CAS V-speeds for the current aircraft weight and selected configuration, with a tile-local flap selection.
Pro	**Debrief**	Post-flight takeoff and landing metrics, capture status, and RESET control.
Expert	**HUD**	Tile-sized head-up display with attitude, flight path, LZ projection, and configurable side/bottom chicklets. The heading tape reserves the top edge.
Expert	**Emergency Sim**	Ground-based simulated takeoff and emergency analysis. Available 2×2 or full-screen; front controls start/stop simulation and the back configures the map, chicklets, and departure profile.
Expert	**AOA**	Angle-of-attack (percent lift) display driven by OnSpeed data. Available 1×1 or 2×2.
Expert	**Vertical Profile**	Side view of the runway, terrain, trees, and predicted approach and departure paths, with fence readouts. The back sets the obstacle case and AUTO FENCE. 2×2 only.
Expert	**3D Terrain**	Three-dimensional terrain view with DRONE, OBSTACLE, SIMULATION, and LIVE modes, departure and emergency-glide displays. Available 2×2 or full-screen.

Info Chicklet Reference — Basic, Pro, and Expert

Info chicklets display a value. Assign them on a compatible tile's back; Blank leaves a slot empty. This table lists only the chicklets you can select. The emergency values TLAR places automatically while Emergency mode is active are described under Emergency chicklets in Chapter 3. Names below are as shown in the chicklet picker.

Tier	Chicklet	Use	Meaning
Basic	**Blank**	Selectable	Empty Info slot.
Basic	**Temperature**	Selectable	Ambient temperature in °C with delta-from-ISA hint.
Basic	**Barometer**	Selectable	Altimeter setting in inHg or mB.
Basic	**Heading/Track**	Selectable	Current heading or GPS track in degrees true.

Tier	Chicklet	Use	Meaning
Basic	**Fuel**	Selectable	Estimated fuel remaining.
Basic	**Density Alt**	Selectable	Density altitude.
Basic	**Ground Speed**	Selectable	GPS-derived groundspeed in selected units.
Basic	**GPS Altitude**	Selectable	GPS geometric altitude, geoid-corrected if available.
Basic	**Gross Weight**	Selectable	Current gross weight in selected units.
Basic	**Burn Rate**	Selectable	Current fuel-burn rate.
Basic	**Takeoff Run**	Selectable	Computed ground roll for takeoff.
Basic	**Takeoff Over 50**	Selectable	Computed takeoff distance over the selected 50-foot obstacle reference.
Basic	**Land Roll**	Selectable	Computed landing braking roll.
Basic	**Land Over 50**	Selectable	Computed landing distance over the selected 50-foot obstacle reference.
Basic	**Sunrise**	Selectable	Sunrise time at the LZ.
Basic	**Sunset**	Selectable	Sunset time at the LZ.
Basic	**Climb Info**	Selectable	Active climb rate / target-speed pair.
Basic	**Delta ISA**	Selectable	Difference between current temperature and ISA at field elevation.
Basic	**Stall Speed (Vs) @ Land Flaps**	Selectable	Stall speed at the landing flap setting and current weight.
Basic	**Takeoff Speed (Vto) @ Takeoff Flaps**	Selectable	Computed liftoff speed at the selected takeoff flap setting.
Basic	**Reference Speed (Vref) @ Land Flaps**	Selectable	Approach reference speed at landing flap setting.
Basic	**Best Rate (Vy) @ Flaps Up**	Selectable	Best rate-of-climb speed.
Basic	**Best Angle (Vx) @ Takeoff Flaps**	Selectable	Best angle-of-climb speed at takeoff flap setting.
Basic	**Normal Approach (Vnorm) @ Land Flaps**	Selectable	Normal approach speed from Vs and the Normal Vapp ratio.
Basic	**Best Glide (Vg) @ Flaps Up**	Selectable	Best-glide speed for engine-out maximum range.
Basic	**Set FPA**	Selectable	Pilot-selected approach flight-path angle.
Basic	**CPU Load**	Selectable	CPU usage of the TLAR app, in percent; green up to 50%, yellow above 50%, red above 80%.
Pro	**Required Flight Path Angle**	Selectable	FPA required to arrive at the threshold at fence height.

Tier	Chicklet	Use	Meaning
Pro	**Required Feet Per Minute**	Selectable	FPM required to arrive at the threshold at fence height.
Pro	**Height By End**	Selectable	On ground, predicted height at runway end; in flight, required FPA to threshold at fence height.
Pro	**Dist To End**	Selectable	On ground, distance to runway end; in flight, required FPM to threshold at fence height.
Pro	**Dist To Go**	Selectable	Distance to the active destination: direct outside 10 NM and track distance including the selected route inside 10 NM.
Pro	**Wind**	Selectable	Wind direction and speed at the LZ.
Pro	**TDZE**	Selectable	Touchdown-zone elevation.
Pro	**Runway Length Available**	Selectable	Active runway length. Its color shows whether the predicted distances fit: on the Takeoff tile it reflects takeoff performance only; elsewhere it reflects takeoff on the ground and landing in flight.
Pro	**Slope**	Selectable	Runway slope percentage; positive is uphill.
Pro	**Surface**	Selectable	Runway surface type.
Pro	**Wind Direction**	Selectable	Wind-from direction in degrees magnetic.
Pro	**Wind Speed**	Selectable	Wind speed in knots.
Pro	**Bearing To Dest**	Selectable	Bearing to the active destination in degrees true.
Pro	**ETE**	Selectable	Estimated time en route.
Pro	**ETA**	Selectable	Estimated time of arrival.
Pro	**Humidity**	Selectable	Relative humidity derived from temperature and dewpoint.
Pro	**Flight Category**	Selectable	Reported VFR, MVFR, IFR, or LIFR category.
Pro	**METAR Time**	Selectable	Latest weather observation time in Zulu.
Pro	**METAR Age**	Selectable	Age of latest weather observation.
Pro	**Station Distance**	Selectable	Distance from weather station to LZ.
Pro	**Station Elevation**	Selectable	Weather-station elevation.
Pro	**Ceiling**	Selectable	Reported cloud ceiling AGL.
Pro	**Visibility**	Selectable	Reported visibility.
Pro	**Smart Run/Roll**	Selectable	Takeoff run on ground; landing roll in flight.
Pro	**Smart Over 50**	Selectable	Takeoff over-50 distance on ground; landing over-50 distance in flight.
Pro	**Va**	Selectable	Maneuvering speed at flaps up and current weight.

Tier	Chicklet	Use	Meaning
Pro	**STOL Approach (Vstol) @ Land Flaps**	Selectable	STOL approach speed from Vs and the STOL Vapp ratio.
Pro	**Required AOB**	Selectable	Bank angle required to roll out on final approach centerline.
Pro	**Dewpoint**	Selectable	Dewpoint used for density altitude and performance; 0 °C (dry air) when the temperature source is Manual or the elevation reference is not the LZ.
Pro	**G Load**	Selectable	Vertical G load from OnSpeed when available, otherwise phone accelerometer or bank-angle estimate.
Expert	**GPS Elev Correction**	Selectable	Auto-calibrated GPS-altitude bias while stopped on a precise LZ runway.
Expert	**Reject Distance**	Selectable / Automatic	Distance from the departure end back to the latest reject/abort point (tile label ABORT). Placed automatically on HSI, HUD, Map, and 3D Terrain tiles in Emergency mode.
Expert	**IAS (OnSpeed AHRS required)**	Selectable	Indicated airspeed from a connected OnSpeed AHRS; shows No EFIS when none is connected.
Expert	**Pressure Alt (OnSpeed AHRS required)**	Selectable	Pressure altitude from a connected OnSpeed AHRS.
Expert	**AOA (OnSpeed AHRS required)**	Selectable	Angle of attack in degrees from a connected OnSpeed AHRS.
Expert	**AOA % (OnSpeed AHRS required)**	Selectable	Percent lift from OnSpeed; matches the AOA tile.
Expert	**OAT (OnSpeed AHRS required)**	Selectable	Outside air temperature from the OnSpeed probe.
Expert	**Altitude Lost per 360**	Selectable / Automatic	Altitude lost in one 360° turn at emergency glide speed and the set bank angle (tile label PER 360). Placed automatically in flight in Emergency mode.

Button Chicklet Reference — Basic, Pro, and Expert

Button chicklets act when tapped. Blank Button is a selectable empty Button slot.

Tier	Chicklet	Use	Action
Basic	**Blank Button**	Selectable	Empty Button slot.
Basic	**Motor**	Selectable	Toggles engine-running state. AUTO requires Expert.
Basic	**Climb Mode**	Selectable	Cycles the active climb profile.
Basic	**Cruise Mode**	Selectable	Cycles Endurance, Range, Set Power, and Max. Basic: display only, fixed at 65% cruise.
Basic	**Land Flaps**	Selectable	Cycles landing-flap setting.
Basic	**Takeoff Flaps**	Selectable	Cycles takeoff-flap setting.

Tier	Chicklet	Use	Action
Basic	**Performance Source**	Selectable	Cycles the elevation reference: LZ, Aircraft, or Manual. Basic: shows REF ELEV and stays on Manual.
Pro	**LZ Mode**	Selectable	Cycles LZ use mode: Auto, Alpha, Bravo, or Off. AUTO requires Expert.
Pro	**Flip Runway**	Selectable	Swaps active runway approach and departure ends.
Pro	**METAR**	Selectable	Requests a METAR refresh.
Pro	**Smart Flaps**	Selectable	Cycles takeoff flap on ground and landing flap in flight.
Pro	**Brakes**	Selectable	Selects partial or maximum braking.
Pro	**Runway Condition**	Selectable	Cycles Dry, Wet, and Icy runway condition.
Pro	**STOL**	Selectable	Toggles STOL approach.
Pro	**Mark Point**	Selectable	Drops a position marker at current location.
Pro	**Reset Mark**	Selectable	Clears active position marker.
Pro	**Temp Source**	Selectable	Cycles temperature source: METAR, Manual, or ASOS when active.
Pro	**Pressure Source**	Selectable	Cycles pressure source: METAR, Manual, iBaro, or ASOS when active.
Pro	**Wind Source**	Selectable	Cycles wind source: METAR, Manual, or ASOS when active.
Expert	**Emergency**	Selectable	Toggles Emergency mode or arms Emergency simulation.
Expert	**Attitude Source**	Selectable	Cycles attitude source GPS, INS, and AHRS, skipping unavailable sources.
Expert	**Pitch/Roll Sync**	Selectable	Zeros pitch and roll relative to current orientation.
Expert	**Data Mark**	Selectable	Writes the next telemetry reference number to the flight log.
Expert	**AOA Tones**	Selectable	Toggles OnSpeed audio AOA tones.

Chicklet colors

The chicklet color identifies the source or reference, not necessarily the urgency of the value. Purple identifies METAR data. Green identifies ASOS wind, barometer, and visibility values that are newer than the METAR (Expert; in the terminal area, or on the ground within 0.25 NM of the approach end). Blue identifies a manually entered or overridden value. Cyan identifies live sensor data such as GPS, OnSpeed, or iBaro. Pink identifies an active-LZ reference. Yellow and red elsewhere in the interface are caution and danger colors; read the tile's label and advisory rather than treating color alone as the message.

Subscription Availability Matrix

An X means the item is included at that subscription level. Higher tiers retain the items available at lower tiers. This matrix covers the public Basic, Pro, and Expert levels; Insider-only development items are not listed.

Tiles

Item	-basic	-pro	-expert

Item	-basic	-pro	-expert
Aircraft	X	X	X
Takeoff	X	X	X
Land	X	X	X
Climb	X	X	X
Cruise	X	X	X
HSI	X	X	X
Position	X	X	X
Clock	X	X	X
Runway		X	X
Weather		X	X
Smart TOLD		X	X
Smart Climb / Cruise		X	X
Map		X	X
V-Speeds		X	X
Debrief		X	X
HUD			X
Emergency Sim			X
AOA			X
Vertical Profile			X
3D Terrain			X

Chicklets

Item	-basic	-pro	-expert
Info — Blank	X	X	X
Info — Temperature	X	X	X
Info — Barometer	X	X	X
Info — Heading / Track	X	X	X

Item	-basic	-pro	-expert
Info — Fuel	X	X	X
Info — Density Alt	X	X	X
Info — Ground Speed	X	X	X
Info — GPS Altitude	X	X	X
Info — Gross Weight	X	X	X
Info — Burn Rate	X	X	X
Info — Takeoff Run	X	X	X
Info — Takeoff Over 50	X	X	X
Info — Land Roll	X	X	X
Info — Land Over 50	X	X	X
Info — Sunrise	X	X	X
Info — Sunset	X	X	X
Info — Climb Info	X	X	X
Info — Delta ISA	X	X	X
Info — Vs	X	X	X
Info — Vto	X	X	X
Info — Vref	X	X	X
Info — Vy	X	X	X
Info — Vx	X	X	X
Info — Vnorm	X	X	X
Info — Vg	X	X	X
Info — Set FPA	X	X	X
Info — CPU Load	X	X	X
Info — Required FPA		X	X
Info — Required FPM		X	X
Info — Height By End		X	X
Info — Dist To End		X	X

Item	-basic	-pro	-expert
Info — DTG		X	X
Info — Wind		X	X
Info — TDZE		X	X
Info — Runway Length Available		X	X
Info — Slope		X	X
Info — Surface		X	X
Info — Wind Direction		X	X
Info — Wind Speed		X	X
Info — Bearing To Destination		X	X
Info — ETE		X	X
Info — ETA		X	X
Info — Humidity		X	X
Info — Flight Category		X	X
Info — METAR Time		X	X
Info — METAR Age		X	X
Info — Station Distance		X	X
Info — Station Elevation		X	X
Info — Ceiling		X	X
Info — Visibility		X	X
Info — Smart Run / Roll		X	X
Info — Smart Over 50		X	X
Info — Va		X	X
Info — Vstol		X	X
Info — Required AOB		X	X

Item	-basic	-pro	-expert
Info — Dewpoint		X	X
Info — G Load		X	X
Info — GPS Elevation Correction			X
Info — Reject Distance			X
Info — IAS (OnSpeed)			X
Info — Pressure Alt (OnSpeed)			X
Info — AOA (OnSpeed)			X
Info — AOA % (OnSpeed)			X
Info — OAT (OnSpeed)			X
Info — Altitude Lost per 360			X
Button — Blank	X	X	X
Button — Motor	X	X	X
Button — Climb Mode	X	X	X
Button — Cruise Mode	X	X	X
Button — Land Flaps	X	X	X
Button — Takeoff Flaps	X	X	X
Button — Performance Source	X	X	X
Button — LZ Mode		X	X
Button — Flip Runway		X	X
Button — METAR		X	X
Button — Smart Flaps		X	X
Button — Brakes		X	X
Button — Runway Condition		X	X
Button — STOL		X	X
Button — Mark Point		X	X

Item	-basic	-pro	-expert
Button — Reset Mark		X	X
Button — Temp Source		X	X
Button — Pressure Source		X	X
Button — Wind Source		X	X
Button — Emergency			X
Button — Attitude Source			X
Button — Pitch / Roll Sync			X
Button — Data Mark			X
Button — AOA Tones			X

Features

Item	-basic	-pro	-expert
Solar Data	X	X	X
Global Airfield Database		X	X
NAV Status		X	X
Preset Layouts		X	X
Stabilized Approach Monitoring		X	X
Wind in Performance Calculations		X	X
METAR / Weather Source Selection		X	X
Advisories		X	X
SITREP		X	X
Share / Import LZs and Presets		X	X
HSI Bearing Pointer		X	X
AUTO-LZ Selector			X
Audio Briefings			X

Item	-basic	-pro	-expert
Custom Build Airplanes			X
Emergency Glide / Turnback			X
NEXRAD Radar			X
OnSpeed Integration			X
Recorded Telemetry			X
Sub-hourly ASOS Updates			X
X-Plane Integration			X
High-Resolution Terrain and Tree Data (LZ, Regional)			X
AUTO Fence			X
Obstacle Fans and Obstacle Case			X
Obstacle Safety Margin			X
Terrain-Aware Glide Footprint and Turnback Route			X
High-Resolution Runway Slope			X
Map Terrain Basemap			X
Departure Profile			X
AUTO Motor			X
SITREP with Telemetry			X
Share / Import Custom Planes			X

Appendix C — Aircraft Model Accuracy

The following tables reproduce the TLAR Performance Validation Report for each currently included aircraft model. Each row compares the published/reference value in the report with the TLAR model result at the stated gross weight and condition. The Accuracy column is reproduced as reported in the source validation workbook.

8KCAB

REPORT NOTE POH land roll based on 1.12 1 approach/stall ratio. TLAR ships with POH recommended 1.41 ratio. Land rolls reflect that.

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1800	**Vg KCAS**	65.2	65.0	-0.2	0.998
1800	**Vg Ratio**	8.0	8.0	0.0	0.994
1800	**Stall full flaps KCAS**	46.1	48.3	2.2	0.951
1800	**Takeoff Ground Run (0 msl / 0 C)**	456.0	460.0	4.0	0.991
1800	**Takeoff Ground Run (0 msl / 20 C)**	508.0	480.0	-28.0	0.945
1800	**Takeoff Ground Run (0 msl / 40 C)**	559.0	530.0	-29.0	0.948
1800	**Takeoff Ground Run (3000 msl / 0 C)**	561.0	540.0	-21.0	0.963
1800	**Takeoff Ground Run (3000 msl / 20 C)**	624.0	610.0	-14.0	0.978
1800	**Takeoff Ground Run (3000 msl / 40 C)**	688.0	690.0	2.0	0.997
1800	**Takeoff Ground Run (6000 msl / 0 C)**	708.0	700.0	-8.0	0.989
1800	**Takeoff Ground Run (6000 msl / 20 C)**	781.0	800.0	19.0	0.976
1800	**Takeoff Ground Run (6000 msl / 40 C)**	869.0	920.0	51.0	0.941
1800	**Takeoff 50 (0 msl / 0 C)**	833.0	880.0	47.0	0.944
1800	**Takeoff 50 (0 msl / 20 C)**	928.0	910.0	-18.0	0.981
1800	**Takeoff 50 (0 msl / 40 C)**	1021.0	990.0	-31.0	0.970
1800	**Takeoff 50 (3000 msl / 0 C)**	1026.0	1020.0	-6.0	0.994
1800	**Takeoff 50 (3000 msl / 20 C)**	1141.0	1130.0	-11.0	0.990
1800	**Takeoff 50 (3000 msl / 40 C)**	1258.0	1250.0	-8.0	0.994
1800	**Takeoff 50 (6000 msl / 0 C)**	1294.0	1280.0	-14.0	0.989
1800	**Takeoff 50 (6000 msl / 20 C)**	1438.0	1440.0	2.0	0.999
1800	**Takeoff 50 (6000 msl / 40 C)**	1588.0	1620.0	32.0	0.980
1800	**Vy KCAS (0 msl / 15 C)**	69.5	75.0	5.5	0.921
1800	**Vy KCAS (5000 msl / 5 C)**	67.8	70.2	2.4	0.964
1800	**Vy KCAS (10000 msl / -5 C)**	65.2	67.8	2.7	0.959
1800	**Vy FPM (0 msl / 15 C)**	1230.0	1169.4	-60.6	0.951
1800	**Vy FPM (5000 msl / 5 C)**	880.0	902.9	22.9	0.974
1800	**Vy FPM (10000 msl / -5 C)**	520.0	649.7	129.7	0.751
1800	**55% cruise KTAS (5000 msl / Std Day)**	111.2	111.0	-0.2	0.998
1800	**55% cruise KTAS (7500 msl / Std Day)**	113.8	115.0	1.2	0.990

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1800	**55% cruise KTAS (10000 msl / Std Day)**	115.6	118.0	2.4	0.979
1800	**65% cruise KTAS (5000 msl / Std Day)**	120.8	121.0	0.2	0.998
1800	**65% cruise KTAS (7500 msl / Std Day)**	122.5	124.0	1.5	0.988
1800	**65% cruise KTAS (10000 msl / Std Day)**	126.0	128.0	2.0	0.984
1800	**75% cruise KTAS (5000 msl / Std Day)**	127.7	129.0	1.3	0.990
1800	**75% cruise KTAS (7500 msl / Std Day)**	131.2	132.0	0.8	0.994
1800	**55% cruise FF (5000 msl / Std Day)**	7.6	7.8	0.2	0.969
1800	**55% cruise FF (7500 msl / Std Day)**	7.6	7.8	0.2	0.969
1800	**55% cruise FF (10000 msl / Std Day)**	7.6	7.8	0.2	0.969
1800	**65% cruise FF (5000 msl / Std Day)**	8.5	9.0	0.5	0.940
1800	**65% cruise FF (7500 msl / Std Day)**	8.5	9.0	0.5	0.940
1800	**65% cruise FF (10000 msl / Std Day)**	8.5	9.0	0.5	0.940
1800	**75% cruise FF (5000 msl / Std Day)**	9.5	10.1	0.6	0.936
1800	**75% cruise FF (7500 msl / Std Day)**	9.5	10.0	0.5	0.950
1800	**Normal approach CAS (1.410 to 1)**	52.1	68.1	16.0	0.694
1800	**Land roll (0 msl / 0 C)**	413.0	630.0	217.0	0.475
1800	**Land roll (0 msl / 20 C)**	428.0	670.0	242.0	0.435
1800	**Land roll (0 msl / 40 C)**	442.0	720.0	278.0	0.371
1800	**Land roll (3000 msl / 0 C)**	437.0	700.0	263.0	0.398
1800	**Land roll (3000 msl / 20 C)**	453.0	750.0	297.0	0.344
1800	**Land roll (3000 msl / 40 C)**	468.0	800.0	332.0	0.291
1800	**Land roll (6000 msl / 0 C)**	462.0	770.0	308.0	0.333
1800	**Land roll (6000 msl / 20 C)**	479.0	830.0	351.0	0.267
1800	**Land roll (6000 msl / 40 C)**	495.0	890.0	395.0	0.202

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Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3100	**Stall clean KCAS**	62.5	62.3	-0.2	0.997
3100	**Stall partial flaps KCAS**	60.0	58.8	-1.2	0.980
3100	**Stall full flaps KCAS**	58.0	58.0	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3100	**Takeoff Ground Run (0 msl / 15 C)**	800.0	840.0	40.0	0.950
3100	**Takeoff Ground Run (4000 msl / 7 C)**	1150.0	1160.0	10.0	0.991
3100	**Takeoff Ground Run (8000 msl / -1 C)**	1600.0	1640.0	40.0	0.975
3100	**Takeoff 50 (0 msl / 15 C)**	1350.0	1490.0	140.0	0.896
3100	**Takeoff 50 (4000 msl / 7 C)**	2050.0	2000.0	-50.0	0.976
3100	**Takeoff 50 (8000 msl / -1 C)**	2900.0	2820.0	-80.0	0.972
3100	**Takeoff KCAS**	68.5	66.5	-2.0	0.970
3100	**Vy FPM (0 msl / 15 C)**	1330.0	1288.7	-41.3	0.969
3100	**Vy FPM (6000 msl / 3 C)**	960.0	916.5	-43.5	0.955
3100	**Vy FPM (12000 msl / -10 C)**	565.0	558.1	-6.9	0.988
3100	**Normal approach CAS (1.300 to 1)**	75.5	75.4	-0.1	0.999
3100	**Land roll (0 msl / 15 C)**	910.0	910.0	0.0	1.000
3100	**Land roll (4000 msl / 7 C)**	1015.0	1020.0	5.0	0.995
3100	**Land roll (8000 msl / -3 C)**	1150.0	1140.0	-10.0	0.991
3600	**Vg KCAS**	110.0	108.0	-2.0	0.982
3600	**Vg Ratio**	10.2	10.3	0.1	0.985
3600	**Stall clean KCAS**	65.0	65.0	0.0	1.000
3600	**Stall full flaps KCAS**	55.5	55.5	0.0	1.000
3600	**Takeoff Ground Run (0 msl / 15 C)**	1100.0	1240.0	140.0	0.873
3600	**Takeoff Ground Run (4000 msl / 7 C)**	1550.0	1730.0	180.0	0.884
3600	**Takeoff Ground Run (8000 msl / -1 C)**	2180.0	2580.0	400.0	0.817
3600	**Takeoff 50 (0 msl / 15 C)**	2020.0	2130.0	110.0	0.946
3600	**Takeoff 50 (4000 msl / 7 C)**	2850.0	2950.0	100.0	0.965
3600	**Takeoff 50 (8000 msl / -1 C)**	4100.0	4370.0	270.0	0.934
3600	**Takeoff KCAS**	71.5	71.6	0.1	0.998
3600	**Vy KCAS (0 msl / 15 C)**	96.0	96.0	0.0	1.000
3600	**Vy KCAS (6000 msl / 3 C)**	96.0	96.0	0.0	1.000
3600	**Vy KCAS (12000 msl / -10 C)**	96.0	96.0	0.0	1.000
3600	**Vy FPM (0 msl / 15 C)**	1030.0	979.5	-50.5	0.951
3600	**Vy FPM (6000 msl / 3 C)**	685.0	647.9	-37.1	0.946

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3600	**Vy FPM (12000 msl / -10 C)**	350.0	325.2	-24.8	0.929
3600	**55% cruise KTAS (0 msl / Std Day)**	138.0	130.0	-8.0	0.942
3600	**55% cruise KTAS (6000 msl / Std Day)**	142.8	137.0	-5.8	0.959
3600	**55% cruise KTAS (10000 msl / Std Day)**	134.0	142.0	8.0	0.940
3600	**65% cruise KTAS (0 msl / Std Day)**	149.8	141.0	-8.8	0.941
3600	**65% cruise KTAS (6000 msl / Std Day)**	156.0	149.0	-7.0	0.955
3600	**65% cruise KTAS (10000 msl / Std Day)**	149.5	155.0	5.5	0.963
3600	**75% cruise KTAS (0 msl / Std Day)**	159.2	150.0	-9.2	0.942
3600	**75% cruise KTAS (6000 msl / Std Day)**	167.5	159.0	-8.5	0.949
3600	**55% cruise FF (0 msl / Std Day)**	11.5	11.4	-0.1	0.991
3600	**55% cruise FF (6000 msl / Std Day)**	11.5	11.4	-0.1	0.991
3600	**55% cruise FF (10000 msl / Std Day)**	10.3	11.4	1.1	0.894
3600	**65% cruise FF (0 msl / Std Day)**	13.3	13.4	0.1	0.991
3600	**65% cruise FF (6000 msl / Std Day)**	13.3	13.4	0.1	0.991
3600	**65% cruise FF (10000 msl / Std Day)**	11.5	13.4	1.9	0.833
3600	**75% cruise FF (0 msl / Std Day)**	15.2	15.0	-0.2	0.988
3600	**75% cruise FF (6000 msl / Std Day)**	15.2	15.0	-0.2	0.988
3600	**Normal approach CAS (1.300 to 1)**	72.0	72.2	0.2	0.998
3600	**Land roll (0 msl / 15 C)**	825.0	840.0	15.0	0.982
3600	**Land roll (4000 msl / 7 C)**	940.0	940.0	0.0	1.000
3600	**Land roll (8000 msl / -3 C)**	1060.0	1050.0	-10.0	0.991

C150M

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1600	**Vg KCAS**	59.0	59.0	0.0	1.000
1600	**Vg Ratio**	8.2	8.6	0.4	0.957
1600	**Stall clean KCAS**	48.5	48.5	0.0	1.000
1600	**Stall partial flaps KCAS**	45.5	45.5	0.0	1.000
1600	**Stall full flaps KCAS**	42.0	42.0	-0.0	1.000
1600	**Takeoff Ground Run (0 msl / 0 C)**	655.0	740.0	85.0	0.870

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1600	**Takeoff Ground Run (0 msl / 20 C)**	765.0	770.0	5.0	0.993
1600	**Takeoff Ground Run (0 msl / 30 C)**	820.0	820.0	0.0	1.000
1600	**Takeoff Ground Run (3000 msl / 0 C)**	870.0	880.0	10.0	0.989
1600	**Takeoff Ground Run (3000 msl / 20 C)**	1010.0	1010.0	0.0	1.000
1600	**Takeoff Ground Run (3000 msl / 30 C)**	1090.0	1090.0	0.0	1.000
1600	**Takeoff Ground Run (6000 msl / 0 C)**	1160.0	1190.0	30.0	0.974
1600	**Takeoff Ground Run (6000 msl / 20 C)**	1360.0	1370.0	10.0	0.993
1600	**Takeoff Ground Run (6000 msl / 30 C)**	1465.0	1480.0	15.0	0.990
1600	**Takeoff 50 (0 msl / 0 C)**	1245.0	1410.0	165.0	0.867
1600	**Takeoff 50 (0 msl / 20 C)**	1435.0	1460.0	25.0	0.983
1600	**Takeoff 50 (0 msl / 30 C)**	1540.0	1540.0	0.0	1.000
1600	**Takeoff 50 (3000 msl / 0 C)**	1650.0	1670.0	20.0	0.988
1600	**Takeoff 50 (3000 msl / 20 C)**	1915.0	1900.0	-15.0	0.992
1600	**Takeoff 50 (3000 msl / 30 C)**	2065.0	2030.0	-35.0	0.983
1600	**Takeoff 50 (6000 msl / 0 C)**	2245.0	2260.0	15.0	0.993
1600	**Takeoff 50 (6000 msl / 20 C)**	2640.0	2610.0	-30.0	0.989
1600	**Takeoff 50 (6000 msl / 30 C)**	2870.0	2810.0	-60.0	0.979
1600	**Takeoff KCAS**	53.0	52.6	-0.4	0.992
1600	**Vx KCAS (0 msl / 0 C)**	56.0	57.0	1.0	0.982
1600	**Vy KCAS (0 msl / 40 C)**	68.0	65.1	-2.9	0.957
1600	**Vy KCAS (4000 msl / 20 C)**	65.0	63.9	-1.1	0.983
1600	**Vy KCAS (8000 msl / -20 C)**	63.0	63.2	0.2	0.997
1600	**Vy FPM (0 msl / -20 C)**	770.0	741.0	-29.0	0.962
1600	**Vy FPM (0 msl / 20 C)**	655.0	655.5	0.5	0.999
1600	**Vy FPM (0 msl / 40 C)**	595.0	611.9	16.9	0.972
1600	**Vy FPM (4000 msl / -20 C)**	580.0	573.9	-6.1	0.989
1600	**Vy FPM (4000 msl / 20 C)**	465.0	482.3	17.3	0.963
1600	**Vy FPM (4000 msl / 40 C)**	405.0	440.4	35.4	0.913
1600	**Vy FPM (8000 msl / -20 C)**	390.0	402.0	12.0	0.969
1600	**Vy FPM (8000 msl / 20 C)**	280.0	313.9	33.9	0.879

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1600	**Vy FPM (8000 msl / 40 C)**	215.0	272.9	57.9	0.731
1600	**55% cruise KTAS (2000 msl / Std Day)**	90.0	88.0	-2.0	0.978
1600	**55% cruise KTAS (6000 msl / Std Day)**	93.0	91.0	-2.0	0.978
1600	**55% cruise KTAS (10000 msl / Std Day)**	96.0	93.0	-3.0	0.969
1600	**65% cruise KTAS (2000 msl / Std Day)**	96.0	96.0	0.0	1.000
1600	**65% cruise KTAS (6000 msl / Std Day)**	99.0	99.0	0.0	1.000
1600	**65% cruise KTAS (10000 msl / Std Day)**	102.0	101.0	-1.0	0.990
1600	**75% cruise KTAS (2000 msl / Std Day)**	102.0	103.0	1.0	0.990
1600	**75% cruise KTAS (6000 msl / Std Day)**	105.5	104.0	-1.5	0.986
1600	**55% cruise FF (2000 msl / Std Day)**	4.2	4.3	0.1	0.982
1600	**55% cruise FF (6000 msl / Std Day)**	4.2	4.3	0.1	0.982
1600	**55% cruise FF (10000 msl / Std Day)**	4.2	4.3	0.1	0.982
1600	**65% cruise FF (2000 msl / Std Day)**	4.9	4.9	0.0	0.990
1600	**65% cruise FF (6000 msl / Std Day)**	4.9	4.9	0.0	0.990
1600	**65% cruise FF (10000 msl / Std Day)**	4.8	4.8	-0.1	0.985
1600	**75% cruise FF (2000 msl / Std Day)**	5.6	5.7	0.1	0.991
1600	**75% cruise FF (6000 msl / Std Day)**	5.6	5.4	-0.2	0.971
1600	**Normal approach CAS (1.310 to 1)**	52.0	55.0	3.0	0.942
1600	**Land roll (0 msl / 0 C)**	425.0	430.0	5.0	0.988
1600	**Land roll (0 msl / 20 C)**	455.0	460.0	5.0	0.989
1600	**Land roll (0 msl / 40 C)**	484.0	490.0	6.0	0.988
1600	**Land roll (4000 msl / 0 C)**	490.0	490.0	0.0	1.000
1600	**Land roll (4000 msl / 20 C)**	525.0	520.0	-5.0	0.990
1600	**Land roll (4000 msl / 40 C)**	560.0	560.0	0.0	1.000
1600	**Land roll (8000 msl / 0 C)**	570.0	560.0	-10.0	0.982
1600	**Land roll (8000 msl / 20 C)**	610.0	600.0	-10.0	0.984
1600	**Land roll (8000 msl / 40 C)**	655.0	640.0	-15.0	0.977

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Wt.	Metric / condition	POH	TLAR	Delta	Accuracy

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1670	**Vg KCAS**	60.0	60.0	0.0	1.000
1670	**Vg Ratio**	9.6	9.6	-0.0	0.996
1670	**Stall clean KCAS**	47.0	47.0	0.0	1.000
1670	**Stall partial flaps KCAS**	44.5	44.5	0.0	1.000
1670	**Stall full flaps KCAS**	42.0	42.0	-0.0	1.000
1670	**Takeoff Ground Run (0 msl / 0 C)**	640.0	730.0	90.0	0.859
1670	**Takeoff Ground Run (0 msl / 20 C)**	755.0	750.0	-5.0	0.993
1670	**Takeoff Ground Run (0 msl / 30 C)**	810.0	800.0	-10.0	0.988
1670	**Takeoff Ground Run (3000 msl / 0 C)**	855.0	870.0	15.0	0.982
1670	**Takeoff Ground Run (3000 msl / 20 C)**	1000.0	980.0	-20.0	0.980
1670	**Takeoff Ground Run (3000 msl / 30 C)**	1080.0	1050.0	-30.0	0.972
1670	**Takeoff Ground Run (6000 msl / 0 C)**	1145.0	1160.0	15.0	0.987
1670	**Takeoff Ground Run (6000 msl / 20 C)**	1345.0	1330.0	-15.0	0.989
1670	**Takeoff Ground Run (6000 msl / 30 C)**	1455.0	1430.0	-25.0	0.983
1670	**Takeoff 50 (0 msl / 0 C)**	1190.0	1410.0	220.0	0.815
1670	**Takeoff 50 (0 msl / 20 C)**	1390.0	1440.0	50.0	0.964
1670	**Takeoff 50 (0 msl / 30 C)**	1495.0	1530.0	35.0	0.977
1670	**Takeoff 50 (3000 msl / 0 C)**	1600.0	1660.0	60.0	0.963
1670	**Takeoff 50 (3000 msl / 20 C)**	1870.0	1860.0	-10.0	0.995
1670	**Takeoff 50 (3000 msl / 30 C)**	2020.0	1980.0	-40.0	0.980
1670	**Takeoff 50 (6000 msl / 0 C)**	2200.0	2210.0	10.0	0.995
1670	**Takeoff 50 (6000 msl / 20 C)**	2610.0	2520.0	-90.0	0.966
1670	**Takeoff 50 (6000 msl / 30 C)**	2855.0	2700.0	-155.0	0.946
1670	**Takeoff KCAS**	52.0	54.3	2.3	0.955
1670	**Vx KCAS (0 msl / 0 C)**	55.5	55.0	-0.5	0.991
1670	**Vy KCAS (0 msl / 40 C)**	67.0	65.1	-1.9	0.971
1670	**Vy KCAS (4000 msl / 20 C)**	65.0	63.0	-2.0	0.969
1670	**Vy KCAS (8000 msl / -20 C)**	62.0	61.5	-0.5	0.992
1670	**Vy FPM (0 msl / -20 C)**	835.0	806.4	-28.6	0.966
1670	**Vy FPM (0 msl / 20 C)**	700.0	707.5	7.5	0.989

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1670	**Vy FPM (0 msl / 40 C)**	630.0	658.7	28.7	0.954
1670	**Vy FPM (4000 msl / -20 C)**	635.0	614.0	-21.0	0.967
1670	**Vy FPM (4000 msl / 20 C)**	505.0	526.8	21.8	0.957
1670	**Vy FPM (4000 msl / 40 C)**	445.0	480.9	35.9	0.919
1670	**Vy FPM (8000 msl / -20 C)**	440.0	450.1	10.1	0.977
1670	**Vy FPM (8000 msl / 20 C)**	320.0	359.3	39.3	0.877
1670	**Vy FPM (8000 msl / 40 C)**	265.0	308.5	43.5	0.836
1670	**55% cruise KTAS (2000 msl / Std Day)**	88.0	86.0	-2.0	0.977
1670	**55% cruise KTAS (6000 msl / Std Day)**	90.0	89.0	-1.0	0.989
1670	**55% cruise KTAS (10000 msl / Std Day)**	92.0	91.0	-1.0	0.989
1670	**65% cruise KTAS (2000 msl / Std Day)**	95.0	94.0	-1.0	0.989
1670	**65% cruise KTAS (6000 msl / Std Day)**	98.0	97.0	-1.0	0.990
1670	**65% cruise KTAS (10000 msl / Std Day)**	101.0	101.0	-0.0	1.000
1670	**75% cruise KTAS (2000 msl / Std Day)**	101.0	100.0	-1.0	0.990
1670	**75% cruise KTAS (6000 msl / Std Day)**	105.0	103.0	-2.0	0.981
1670	**55% cruise FF (2000 msl / Std Day)**	4.5	4.5	-0.0	0.994
1670	**55% cruise FF (6000 msl / Std Day)**	4.5	4.5	-0.0	0.994
1670	**55% cruise FF (10000 msl / Std Day)**	4.4	4.5	0.1	0.983
1670	**65% cruise FF (2000 msl / Std Day)**	5.3	5.2	-0.1	0.987
1670	**65% cruise FF (6000 msl / Std Day)**	5.3	5.2	-0.1	0.987
1670	**65% cruise FF (10000 msl / Std Day)**	5.3	5.2	-0.1	0.987
1670	**75% cruise FF (2000 msl / Std Day)**	6.1	6.0	-0.1	0.985
1670	**75% cruise FF (6000 msl / Std Day)**	6.1	6.0	-0.1	0.985
1670	**Normal approach CAS (1.310 to 1)**	55.0	55.0	0.0	1.000
1670	**Land roll (0 msl / 0 C)**	450.0	450.0	0.0	1.000
1670	**Land roll (0 msl / 20 C)**	485.0	480.0	-5.0	0.990
1670	**Land roll (0 msl / 40 C)**	515.0	510.0	-5.0	0.990
1670	**Land roll (4000 msl / 0 C)**	520.0	510.0	-10.0	0.981
1670	**Land roll (4000 msl / 20 C)**	560.0	540.0	-20.0	0.964
1670	**Land roll (4000 msl / 40 C)**	580.0	580.0	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1670	**Land roll (8000 msl / 0 C)**	605.0	590.0	-15.0	0.975
1670	**Land roll (8000 msl / 20 C)**	650.0	630.0	-20.0	0.969
1670	**Land roll (8000 msl / 40 C)**	675.0	670.0	-5.0	0.993

C170B

REPORT NOTE Predicted distance over 50-foot obstacle significantly shorter than POH. See TLAR manual for details.

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2200	**Vg KCAS**	60.0	60.0	0.0	1.000
2200	**Vg Ratio**	9.6	7.1	-2.5	0.737
2200	**Stall clean KCAS**	50.4	50.4	-0.0	1.000
2200	**Stall partial flaps KCAS**	46.9	46.9	0.0	1.000
2200	**Stall full flaps KCAS**	45.2	45.2	0.0	1.000
2200	**Takeoff Ground Run (0 msl / -7 C)**	513.0	630.0	117.0	0.772
2200	**Takeoff Ground Run (0 msl / 16 C)**	618.0	630.0	12.0	0.981
2200	**Takeoff Ground Run (0 msl / 38 C)**	758.0	740.0	-18.0	0.976
2200	**Takeoff Ground Run (4000 msl / -7 C)**	802.0	810.0	8.0	0.990
2200	**Takeoff Ground Run (4000 msl / 16 C)**	980.0	950.0	-30.0	0.969
2200	**Takeoff Ground Run (4000 msl / 38 C)**	1193.0	1250.0	57.0	0.952
2200	**Takeoff Ground Run (7000 msl / -7 C)**	1178.0	1240.0	62.0	0.947
2200	**Takeoff Ground Run (7000 msl / 16 C)**	1419.0	1500.0	81.0	0.943
2200	**Takeoff Ground Run (7000 msl / 38 C)**	1693.0	1820.0	127.0	0.925
2200	**Takeoff 50 (0 msl / -7 C)**	1350.0	1760.0	410.0	0.696
2200	**Takeoff 50 (0 msl / 16 C)**	1625.0	1770.0	145.0	0.911
2200	**Takeoff 50 (0 msl / 38 C)**	1995.0	1990.0	-5.0	0.997
2200	**Takeoff 50 (4000 msl / -7 C)**	2110.0	2220.0	110.0	0.948
2200	**Takeoff 50 (4000 msl / 16 C)**	2580.0	2560.0	-20.0	0.992
2200	**Takeoff 50 (4000 msl / 38 C)**	3140.0	3090.0	-50.0	0.984
2200	**Takeoff 50 (7000 msl / -7 C)**	3100.0	3180.0	80.0	0.974
2200	**Takeoff 50 (7000 msl / 16 C)**	3735.0	3740.0	5.0	0.999

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2200	**Takeoff 50 (7000 msl / 38 C)**	4455.0	4450.0	-5.0	0.999
2200	**Takeoff KCAS**	50.0	48.7	-1.3	0.974
2200	**Vx KCAS (0 msl / -7 C)**	58.0	56.0	-2.0	0.966
2200	**Vy KCAS (0 msl / 38 C)**	77.3	72.1	-5.3	0.932
2200	**Vy KCAS (4000 msl / 16 C)**	73.0	71.3	-1.7	0.977
2200	**Vy KCAS (7000 msl / -7 C)**	68.6	69.8	1.1	0.984
2200	**Vy FPM (0 msl / -7 C)**	740.0	713.3	-26.7	0.964
2200	**Vy FPM (0 msl / 16 C)**	690.0	663.7	-26.3	0.962
2200	**Vy FPM (0 msl / 38 C)**	645.0	618.0	-27.0	0.958
2200	**Vy FPM (4000 msl / -7 C)**	555.0	541.5	-13.5	0.976
2200	**Vy FPM (4000 msl / 16 C)**	510.0	494.3	-15.7	0.969
2200	**Vy FPM (4000 msl / 38 C)**	465.0	450.2	-14.8	0.968
2200	**Vy FPM (7000 msl / -7 C)**	420.0	415.7	-4.3	0.990
2200	**Vy FPM (7000 msl / 16 C)**	370.0	369.8	-0.2	0.999
2200	**Vy FPM (7000 msl / 38 C)**	325.0	326.5	1.5	0.995
2200	**55% cruise KTAS (2500 msl / Std Day)**	97.3	96.0	-1.3	0.986
2200	**55% cruise KTAS (5000 msl / Std Day)**	98.2	98.0	-0.2	0.998
2200	**55% cruise KTAS (7500 msl / Std Day)**	99.9	101.0	1.1	0.989
2200	**65% cruise KTAS (2500 msl / Std Day)**	104.3	106.0	1.7	0.983
2200	**65% cruise KTAS (5000 msl / Std Day)**	106.9	107.0	0.1	0.999
2200	**65% cruise KTAS (7500 msl / Std Day)**	108.6	109.0	0.4	0.997
2200	**75% cruise KTAS (2500 msl / Std Day)**	109.5	111.0	1.5	0.986
2200	**75% cruise KTAS (5000 msl / Std Day)**	113.8	112.0	-1.8	0.984
2200	**55% cruise FF (2500 msl / Std Day)**	7.0	7.0	-0.0	0.999
2200	**55% cruise FF (5000 msl / Std Day)**	7.0	7.0	-0.0	0.999
2200	**55% cruise FF (7500 msl / Std Day)**	7.0	7.0	-0.0	0.999
2200	**65% cruise FF (2500 msl / Std Day)**	8.3	8.3	-0.0	0.999
2200	**65% cruise FF (5000 msl / Std Day)**	8.2	8.3	0.1	0.988
2200	**65% cruise FF (7500 msl / Std Day)**	8.2	8.3	0.1	0.988
2200	**75% cruise FF (2500 msl / Std Day)**	9.6	9.6	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2200	**75% cruise FF (5000 msl / Std Day)**	9.6	9.3	-0.3	0.972
2200	**Normal approach CAS (1.288 to 1)**	58.2	58.2	-0.0	1.000
2200	**Land roll (0 msl / -7 C)**	428.0	430.0	2.0	0.995
2200	**Land roll (0 msl / 16 C)**	458.0	460.0	2.0	0.996
2200	**Land roll (0 msl / 38 C)**	486.0	490.0	4.0	0.992
2200	**Land roll (4000 msl / -7 C)**	482.0	490.0	8.0	0.983
2200	**Land roll (4000 msl / 16 C)**	512.0	520.0	8.0	0.984
2200	**Land roll (4000 msl / 38 C)**	540.0	560.0	20.0	0.963
2200	**Land roll (7000 msl / -7 C)**	522.0	540.0	18.0	0.966
2200	**Land roll (7000 msl / 16 C)**	552.0	580.0	28.0	0.949
2200	**Land roll (7000 msl / 38 C)**	580.0	630.0	50.0	0.914

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Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1900	**Takeoff Ground Run (0 msl / 0 C)**	505.0	500.0	-5.0	0.990
1900	**Takeoff Ground Run (0 msl / 20 C)**	580.0	550.0	-30.0	0.948
1900	**Takeoff Ground Run (0 msl / 30 C)**	620.0	590.0	-30.0	0.952
1900	**Takeoff Ground Run (3000 msl / 0 C)**	660.0	630.0	-30.0	0.955
1900	**Takeoff Ground Run (3000 msl / 20 C)**	760.0	720.0	-40.0	0.947
1900	**Takeoff Ground Run (3000 msl / 30 C)**	815.0	770.0	-45.0	0.945
1900	**Takeoff Ground Run (6000 msl / 0 C)**	870.0	840.0	-30.0	0.966
1900	**Takeoff Ground Run (6000 msl / 20 C)**	1010.0	950.0	-60.0	0.941
1900	**Takeoff Ground Run (6000 msl / 30 C)**	1080.0	1020.0	-60.0	0.944
1900	**Takeoff 50 (0 msl / 0 C)**	915.0	950.0	35.0	0.962
1900	**Takeoff 50 (0 msl / 20 C)**	1035.0	1040.0	5.0	0.995
1900	**Takeoff 50 (0 msl / 30 C)**	1105.0	1100.0	-5.0	0.995
1900	**Takeoff 50 (3000 msl / 0 C)**	1180.0	1180.0	0.0	1.000
1900	**Takeoff 50 (3000 msl / 20 C)**	1345.0	1320.0	-25.0	0.981
1900	**Takeoff 50 (3000 msl / 30 C)**	1435.0	1390.0	-45.0	0.969
1900	**Takeoff 50 (6000 msl / 0 C)**	1555.0	1540.0	-15.0	0.990

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1900	**Takeoff 50 (6000 msl / 20 C)**	1785.0	1720.0	-65.0	0.964
1900	**Takeoff 50 (6000 msl / 30 C)**	1910.0	1830.0	-80.0	0.958
1900	**Takeoff KCAS**	53.0	51.8	-1.2	0.978
2100	**Takeoff Ground Run (0 msl / 0 C)**	630.0	620.0	-10.0	0.984
2100	**Takeoff Ground Run (0 msl / 20 C)**	725.0	700.0	-25.0	0.966
2100	**Takeoff Ground Run (0 msl / 30 C)**	780.0	750.0	-30.0	0.962
2100	**Takeoff Ground Run (3000 msl / 0 C)**	830.0	800.0	-30.0	0.964
2100	**Takeoff Ground Run (3000 msl / 20 C)**	955.0	920.0	-35.0	0.963
2100	**Takeoff Ground Run (3000 msl / 30 C)**	1025.0	990.0	-35.0	0.966
2100	**Takeoff Ground Run (6000 msl / 0 C)**	1100.0	1080.0	-20.0	0.982
2100	**Takeoff Ground Run (6000 msl / 20 C)**	1275.0	1250.0	-25.0	0.980
2100	**Takeoff Ground Run (6000 msl / 30 C)**	1370.0	1360.0	-10.0	0.993
2100	**Takeoff 50 (0 msl / 0 C)**	1130.0	1160.0	30.0	0.973
2100	**Takeoff 50 (0 msl / 20 C)**	1290.0	1290.0	0.0	1.000
2100	**Takeoff 50 (0 msl / 30 C)**	1375.0	1370.0	-5.0	0.996
2100	**Takeoff 50 (3000 msl / 0 C)**	1475.0	1470.0	-5.0	0.997
2100	**Takeoff 50 (3000 msl / 20 C)**	1690.0	1670.0	-20.0	0.988
2100	**Takeoff 50 (3000 msl / 30 C)**	1805.0	1770.0	-35.0	0.981
2100	**Takeoff 50 (6000 msl / 0 C)**	1965.0	1960.0	-5.0	0.997
2100	**Takeoff 50 (6000 msl / 20 C)**	2270.0	2230.0	-40.0	0.982
2100	**Takeoff 50 (6000 msl / 30 C)**	2435.0	2390.0	-45.0	0.982
2100	**Takeoff KCAS**	55.0	54.5	-0.5	0.991
2300	**Vg KCAS**	66.0	66.0	0.0	1.000
2300	**Vg Ratio**	9.0	9.1	0.1	0.991
2300	**Stall clean KCAS**	51.5	51.5	-0.0	1.000
2300	**Stall partial flaps KCAS**	49.0	49.0	0.0	1.000
2300	**Stall full flaps KCAS**	45.5	45.5	-0.0	1.000
2300	**Takeoff Ground Run (0 msl / 0 C)**	775.0	860.0	85.0	0.890
2300	**Takeoff Ground Run (0 msl / 20 C)**	895.0	880.0	-15.0	0.983
2300	**Takeoff Ground Run (0 msl / 30 C)**	960.0	940.0	-20.0	0.979

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2300	**Takeoff Ground Run (3000 msl / 0 C)**	1020.0	1020.0	0.0	1.000
2300	**Takeoff Ground Run (3000 msl / 20 C)**	1180.0	1180.0	0.0	1.000
2300	**Takeoff Ground Run (3000 msl / 30 C)**	1270.0	1270.0	0.0	1.000
2300	**Takeoff Ground Run (6000 msl / 0 C)**	1365.0	1400.0	35.0	0.974
2300	**Takeoff Ground Run (6000 msl / 20 C)**	1580.0	1630.0	50.0	0.968
2300	**Takeoff Ground Run (6000 msl / 30 C)**	1700.0	1780.0	80.0	0.953
2300	**Takeoff 50 (0 msl / 0 C)**	1380.0	1560.0	180.0	0.870
2300	**Takeoff 50 (0 msl / 20 C)**	1575.0	1590.0	15.0	0.990
2300	**Takeoff 50 (0 msl / 30 C)**	1685.0	1690.0	5.0	0.997
2300	**Takeoff 50 (3000 msl / 0 C)**	1815.0	1840.0	25.0	0.986
2300	**Takeoff 50 (3000 msl / 20 C)**	2085.0	2090.0	5.0	0.998
2300	**Takeoff 50 (3000 msl / 30 C)**	2235.0	2230.0	-5.0	0.998
2300	**Takeoff 50 (6000 msl / 0 C)**	2450.0	2480.0	30.0	0.988
2300	**Takeoff 50 (6000 msl / 20 C)**	2850.0	2870.0	20.0	0.993
2300	**Takeoff 50 (6000 msl / 30 C)**	3070.0	3100.0	30.0	0.990
2300	**Takeoff KCAS**	57.0	57.0	0.0	0.999
2300	**Vx KCAS (0 msl / 0 C)**	61.0	61.0	0.0	1.000
2300	**Vy KCAS (0 msl / 40 C)**	78.0	78.5	0.5	0.994
2300	**Vy KCAS (4000 msl / 20 C)**	74.0	75.4	1.4	0.981
2300	**Vy KCAS (8000 msl / -20 C)**	70.0	73.0	3.0	0.957
2300	**Vy FPM (0 msl / -20 C)**	755.0	702.7	-52.3	0.931
2300	**Vy FPM (0 msl / 20 C)**	630.0	625.5	-4.5	0.993
2300	**Vy FPM (0 msl / 40 C)**	565.0	585.7	20.7	0.963
2300	**Vy FPM (4000 msl / -20 C)**	555.0	543.2	-11.8	0.979
2300	**Vy FPM (4000 msl / 20 C)**	440.0	459.0	19.0	0.957
2300	**Vy FPM (4000 msl / 40 C)**	380.0	420.9	40.9	0.892
2300	**Vy FPM (8000 msl / -20 C)**	365.0	378.8	13.8	0.962
2300	**Vy FPM (8000 msl / 20 C)**	255.0	298.3	43.3	0.830
2300	**Vy FPM (8000 msl / 40 C)**	200.0	261.1	61.1	0.695
2300	**55% cruise KTAS (2000 msl / Std Day)**	98.0	98.0	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2300	**55% cruise KTAS (6000 msl / Std Day)**	100.0	102.0	2.0	0.980
2300	**55% cruise KTAS (10000 msl / Std Day)**	103.5	106.0	2.5	0.976
2300	**65% cruise KTAS (2000 msl / Std Day)**	108.0	108.0	0.0	1.000
2300	**65% cruise KTAS (6000 msl / Std Day)**	110.0	111.0	1.0	0.991
2300	**65% cruise KTAS (10000 msl / Std Day)**	114.0	112.0	-2.0	0.982
2300	**75% cruise KTAS (2000 msl / Std Day)**	113.0	114.0	1.0	0.991
2300	**75% cruise KTAS (6000 msl / Std Day)**	118.0	116.0	-2.0	0.983
2300	**55% cruise FF (2000 msl / Std Day)**	6.5	6.3	-0.2	0.977
2300	**55% cruise FF (6000 msl / Std Day)**	6.4	6.3	-0.1	0.984
2300	**55% cruise FF (10000 msl / Std Day)**	6.5	6.3	-0.2	0.969
2300	**65% cruise FF (2000 msl / Std Day)**	7.3	7.3	0.0	0.999
2300	**65% cruise FF (6000 msl / Std Day)**	7.2	7.3	0.1	0.985
2300	**65% cruise FF (10000 msl / Std Day)**	7.3	7.0	-0.3	0.960
2300	**75% cruise FF (2000 msl / Std Day)**	8.2	8.4	0.2	0.976
2300	**75% cruise FF (6000 msl / Std Day)**	8.2	8.1	-0.1	0.984
2300	**Normal approach CAS (1.363 to 1)**	62.0	62.0	-0.0	1.000
2300	**Land roll (0 msl / 0 C)**	495.0	500.0	5.0	0.990
2300	**Land roll (0 msl / 20 C)**	530.0	530.0	0.0	1.000
2300	**Land roll (0 msl / 40 C)**	565.0	570.0	5.0	0.991
2300	**Land roll (4000 msl / 0 C)**	570.0	570.0	0.0	1.000
2300	**Land roll (4000 msl / 20 C)**	615.0	610.0	-5.0	0.992
2300	**Land roll (4000 msl / 40 C)**	655.0	650.0	-5.0	0.992
2300	**Land roll (8000 msl / 0 C)**	665.0	660.0	-5.0	0.992
2300	**Land roll (8000 msl / 20 C)**	710.0	700.0	-10.0	0.986
2300	**Land roll (8000 msl / 40 C)**	760.0	750.0	-10.0	0.987

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Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1900	**Takeoff Ground Run (0 msl / 0 C)**	470.0	460.0	-10.0	0.979
1900	**Takeoff Ground Run (0 msl / 20 C)**	540.0	520.0	-20.0	0.963

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1900	**Takeoff Ground Run (0 msl / 30 C)**	580.0	550.0	-30.0	0.948
1900	**Takeoff Ground Run (3000 msl / 0 C)**	615.0	590.0	-25.0	0.959
1900	**Takeoff Ground Run (3000 msl / 20 C)**	710.0	670.0	-40.0	0.944
1900	**Takeoff Ground Run (3000 msl / 30 C)**	760.0	710.0	-50.0	0.934
1900	**Takeoff Ground Run (6000 msl / 0 C)**	810.0	760.0	-50.0	0.938
1900	**Takeoff Ground Run (6000 msl / 20 C)**	940.0	880.0	-60.0	0.936
1900	**Takeoff Ground Run (6000 msl / 30 C)**	1010.0	940.0	-70.0	0.931
1900	**Takeoff 50 (0 msl / 0 C)**	865.0	920.0	55.0	0.936
1900	**Takeoff 50 (0 msl / 20 C)**	985.0	1020.0	35.0	0.964
1900	**Takeoff 50 (0 msl / 30 C)**	1045.0	1070.0	25.0	0.976
1900	**Takeoff 50 (3000 msl / 0 C)**	1115.0	1140.0	25.0	0.978
1900	**Takeoff 50 (3000 msl / 20 C)**	1275.0	1270.0	-5.0	0.996
1900	**Takeoff 50 (3000 msl / 30 C)**	1365.0	1340.0	-25.0	0.982
1900	**Takeoff 50 (6000 msl / 0 C)**	1470.0	1450.0	-20.0	0.986
1900	**Takeoff 50 (6000 msl / 20 C)**	1690.0	1640.0	-50.0	0.970
1900	**Takeoff 50 (6000 msl / 30 C)**	1810.0	1730.0	-80.0	0.956
1900	**Takeoff KCAS**	53.0	51.8	-1.2	0.978
2100	**Takeoff Ground Run (0 msl / 0 C)**	585.0	570.0	-15.0	0.974
2100	**Takeoff Ground Run (0 msl / 20 C)**	680.0	650.0	-30.0	0.956
2100	**Takeoff Ground Run (0 msl / 30 C)**	725.0	690.0	-35.0	0.952
2100	**Takeoff Ground Run (3000 msl / 0 C)**	770.0	750.0	-20.0	0.974
2100	**Takeoff Ground Run (3000 msl / 20 C)**	890.0	850.0	-40.0	0.955
2100	**Takeoff Ground Run (3000 msl / 30 C)**	955.0	910.0	-45.0	0.953
2100	**Takeoff Ground Run (6000 msl / 0 C)**	1025.0	980.0	-45.0	0.956
2100	**Takeoff Ground Run (6000 msl / 20 C)**	1185.0	1140.0	-45.0	0.962
2100	**Takeoff Ground Run (6000 msl / 30 C)**	1275.0	1230.0	-45.0	0.965
2100	**Takeoff 50 (0 msl / 0 C)**	1070.0	1120.0	50.0	0.953
2100	**Takeoff 50 (0 msl / 20 C)**	1220.0	1240.0	20.0	0.984
2100	**Takeoff 50 (0 msl / 30 C)**	1300.0	1310.0	10.0	0.992
2100	**Takeoff 50 (3000 msl / 0 C)**	1390.0	1420.0	30.0	0.978

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2100	**Takeoff 50 (3000 msl / 20 C)**	1595.0	1590.0	-5.0	0.997
2100	**Takeoff 50 (3000 msl / 30 C)**	1710.0	1690.0	-20.0	0.988
2100	**Takeoff 50 (6000 msl / 0 C)**	1850.0	1840.0	-10.0	0.995
2100	**Takeoff 50 (6000 msl / 20 C)**	2140.0	2100.0	-40.0	0.981
2100	**Takeoff 50 (6000 msl / 30 C)**	2300.0	2240.0	-60.0	0.974
2100	**Takeoff KCAS**	55.0	54.5	-0.5	0.991
2300	**Vg KCAS**	66.0	66.0	0.0	1.000
2300	**Vg Ratio**	9.0	9.1	0.1	0.991
2300	**Stall clean KCAS**	51.5	51.5	-0.0	1.000
2300	**Stall partial flaps KCAS**	49.0	49.0	0.0	1.000
2300	**Stall full flaps KCAS**	45.5	45.5	-0.0	1.000
2300	**Takeoff Ground Run (0 msl / 0 C)**	720.0	790.0	70.0	0.903
2300	**Takeoff Ground Run (0 msl / 20 C)**	835.0	820.0	-15.0	0.982
2300	**Takeoff Ground Run (0 msl / 30 C)**	895.0	870.0	-25.0	0.972
2300	**Takeoff Ground Run (3000 msl / 0 C)**	950.0	940.0	-10.0	0.989
2300	**Takeoff Ground Run (3000 msl / 20 C)**	1100.0	1080.0	-20.0	0.982
2300	**Takeoff Ground Run (3000 msl / 30 C)**	1185.0	1150.0	-35.0	0.970
2300	**Takeoff Ground Run (6000 msl / 0 C)**	1265.0	1260.0	-5.0	0.996
2300	**Takeoff Ground Run (6000 msl / 20 C)**	1475.0	1470.0	-5.0	0.997
2300	**Takeoff Ground Run (6000 msl / 30 C)**	1585.0	1600.0	15.0	0.991
2300	**Takeoff 50 (0 msl / 0 C)**	1300.0	1480.0	180.0	0.862
2300	**Takeoff 50 (0 msl / 20 C)**	1490.0	1520.0	30.0	0.980
2300	**Takeoff 50 (0 msl / 30 C)**	1590.0	1610.0	20.0	0.987
2300	**Takeoff 50 (3000 msl / 0 C)**	1710.0	1760.0	50.0	0.971
2300	**Takeoff 50 (3000 msl / 20 C)**	1970.0	1980.0	10.0	0.995
2300	**Takeoff 50 (3000 msl / 30 C)**	2115.0	2090.0	-25.0	0.988
2300	**Takeoff 50 (6000 msl / 0 C)**	2305.0	2320.0	15.0	0.993
2300	**Takeoff 50 (6000 msl / 20 C)**	2680.0	2650.0	-30.0	0.989
2300	**Takeoff 50 (6000 msl / 30 C)**	2895.0	2870.0	-25.0	0.991
2300	**Takeoff KCAS**	57.0	57.0	0.0	0.999

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2300	**Vx KCAS (0 msl / 0 C)**	61.0	59.0	-2.0	0.967
2300	**Vy KCAS (0 msl / 40 C)**	73.0	78.5	5.5	0.925
2300	**Vy KCAS (4000 msl / 20 C)**	71.0	76.3	5.3	0.925
2300	**Vy KCAS (8000 msl / -20 C)**	69.0	73.8	4.8	0.930
2300	**Vy FPM (0 msl / -20 C)**	875.0	786.6	-88.4	0.899
2300	**Vy FPM (0 msl / 20 C)**	755.0	706.3	-48.7	0.936
2300	**Vy FPM (0 msl / 40 C)**	695.0	665.0	-30.0	0.957
2300	**Vy FPM (4000 msl / -20 C)**	655.0	618.3	-36.7	0.944
2300	**Vy FPM (4000 msl / 20 C)**	545.0	530.4	-14.6	0.973
2300	**Vy FPM (4000 msl / 40 C)**	485.0	490.6	5.6	0.988
2300	**Vy FPM (8000 msl / -20 C)**	440.0	444.0	4.0	0.991
2300	**Vy FPM (8000 msl / 20 C)**	335.0	361.0	26.0	0.922
2300	**Vy FPM (8000 msl / 40 C)**	280.0	322.5	42.5	0.848
2300	**55% cruise KTAS (2000 msl / Std Day)**	101.0	102.0	1.0	0.990
2300	**55% cruise KTAS (6000 msl / Std Day)**	105.0	107.0	2.0	0.981
2300	**55% cruise KTAS (10000 msl / Std Day)**	108.0	110.0	2.0	0.981
2300	**65% cruise KTAS (2000 msl / Std Day)**	109.0	111.0	2.0	0.982
2300	**65% cruise KTAS (6000 msl / Std Day)**	113.0	114.0	1.0	0.991
2300	**65% cruise KTAS (10000 msl / Std Day)**	116.0	115.0	-1.0	0.991
2300	**75% cruise KTAS (2000 msl / Std Day)**	116.0	117.0	1.0	0.991
2300	**75% cruise KTAS (6000 msl / Std Day)**	120.0	118.0	-2.0	0.983
2300	**55% cruise FF (2000 msl / Std Day)**	6.2	6.5	0.3	0.957
2300	**55% cruise FF (6000 msl / Std Day)**	6.4	6.5	0.1	0.989
2300	**55% cruise FF (10000 msl / Std Day)**	6.2	6.5	0.3	0.957
2300	**65% cruise FF (2000 msl / Std Day)**	7.3	7.1	-0.2	0.975
2300	**65% cruise FF (6000 msl / Std Day)**	7.3	7.1	-0.2	0.975
2300	**65% cruise FF (10000 msl / Std Day)**	7.2	6.9	-0.3	0.962
2300	**75% cruise FF (2000 msl / Std Day)**	8.4	8.9	0.5	0.940
2300	**75% cruise FF (6000 msl / Std Day)**	8.4	8.4	-0.0	0.994
2300	**Normal approach CAS (1.363 to 1)**	62.0	62.0	-0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2300	**Land roll (0 msl / 0 C)**	495.0	500.0	5.0	0.990
2300	**Land roll (0 msl / 20 C)**	530.0	530.0	0.0	1.000
2300	**Land roll (0 msl / 40 C)**	565.0	570.0	5.0	0.991
2300	**Land roll (4000 msl / 0 C)**	570.0	570.0	0.0	1.000
2300	**Land roll (4000 msl / 20 C)**	615.0	610.0	-5.0	0.992
2300	**Land roll (4000 msl / 40 C)**	655.0	650.0	-5.0	0.992
2300	**Land roll (8000 msl / 0 C)**	665.0	660.0	-5.0	0.992
2300	**Land roll (8000 msl / 20 C)**	710.0	700.0	-10.0	0.986
2300	**Land roll (8000 msl / 40 C)**	760.0	750.0	-10.0	0.987

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REPORT NOTE 8000/12000 ft cruise delta caused by %power available at those altitudes. See TLAR manual for details

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2200	**Takeoff Ground Run (0 msl / 0 C)**	610.0	620.0	10.0	0.984
2200	**Takeoff Ground Run (0 msl / 20 C)**	705.0	700.0	-5.0	0.993
2200	**Takeoff Ground Run (0 msl / 30 C)**	760.0	750.0	-10.0	0.987
2200	**Takeoff Ground Run (4000 msl / 0 C)**	870.0	880.0	10.0	0.989
2200	**Takeoff Ground Run (4000 msl / 20 C)**	1010.0	1000.0	-10.0	0.990
2200	**Takeoff Ground Run (4000 msl / 30 C)**	1090.0	1070.0	-20.0	0.982
2200	**Takeoff Ground Run (8000 msl / 0 C)**	1270.0	1300.0	30.0	0.976
2200	**Takeoff Ground Run (8000 msl / 20 C)**	1475.0	1520.0	45.0	0.969
2200	**Takeoff Ground Run (8000 msl / 30 C)**	1580.0	1640.0	60.0	0.962
2200	**Takeoff 50 (0 msl / 0 C)**	1055.0	1060.0	5.0	0.995
2200	**Takeoff 50 (0 msl / 20 C)**	1205.0	1190.0	-15.0	0.988
2200	**Takeoff 50 (0 msl / 30 C)**	1290.0	1260.0	-30.0	0.977
2200	**Takeoff 50 (4000 msl / 0 C)**	1490.0	1480.0	-10.0	0.993
2200	**Takeoff 50 (4000 msl / 20 C)**	1725.0	1670.0	-55.0	0.968
2200	**Takeoff 50 (4000 msl / 30 C)**	1855.0	1770.0	-85.0	0.954
2200	**Takeoff 50 (8000 msl / 0 C)**	2195.0	2170.0	-25.0	0.989

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2200	**Takeoff 50 (8000 msl / 20 C)**	2555.0	2500.0	-55.0	0.978
2200	**Takeoff 50 (8000 msl / 30 C)**	2745.0	2700.0	-45.0	0.984
2200	**Takeoff KCAS**	53.0	57.4	4.4	0.917
2400	**Takeoff Ground Run (0 msl / 0 C)**	745.0	760.0	15.0	0.980
2400	**Takeoff Ground Run (0 msl / 20 C)**	860.0	860.0	0.0	1.000
2400	**Takeoff Ground Run (0 msl / 30 C)**	925.0	930.0	5.0	0.995
2400	**Takeoff Ground Run (4000 msl / 0 C)**	1065.0	1090.0	25.0	0.977
2400	**Takeoff Ground Run (4000 msl / 20 C)**	1240.0	1260.0	20.0	0.984
2400	**Takeoff Ground Run (4000 msl / 30 C)**	1335.0	1350.0	15.0	0.989
2400	**Takeoff Ground Run (8000 msl / 0 C)**	1560.0	1680.0	120.0	0.923
2400	**Takeoff Ground Run (8000 msl / 20 C)**	1815.0	1980.0	165.0	0.909
2400	**Takeoff Ground Run (8000 msl / 30 C)**	1950.0	2160.0	210.0	0.892
2400	**Takeoff 50 (0 msl / 0 C)**	1275.0	1290.0	15.0	0.988
2400	**Takeoff 50 (0 msl / 20 C)**	1470.0	1450.0	-20.0	0.986
2400	**Takeoff 50 (0 msl / 30 C)**	1570.0	1540.0	-30.0	0.981
2400	**Takeoff 50 (4000 msl / 0 C)**	1830.0	1830.0	0.0	1.000
2400	**Takeoff 50 (4000 msl / 20 C)**	2130.0	2090.0	-40.0	0.981
2400	**Takeoff 50 (4000 msl / 30 C)**	2295.0	2230.0	-65.0	0.972
2400	**Takeoff 50 (8000 msl / 0 C)**	2755.0	2790.0	35.0	0.987
2400	**Takeoff 50 (8000 msl / 20 C)**	3240.0	3270.0	30.0	0.991
2400	**Takeoff 50 (8000 msl / 30 C)**	3500.0	3540.0	40.0	0.989
2400	**Takeoff KCAS**	56.0	60.0	4.0	0.929
2550	**Vg KCAS**	68.4	68.0	-0.4	0.994
2550	**Vg Ratio**	9.0	9.0	0.0	0.995
2550	**Stall clean KCAS**	53.0	53.0	0.0	1.000
2550	**Stall partial flaps KCAS**	50.0	50.0	0.0	1.000
2550	**Stall full flaps KCAS**	48.0	48.0	0.0	1.000
2550	**Takeoff Ground Run (0 msl / 0 C)**	860.0	970.0	110.0	0.872
2550	**Takeoff Ground Run (0 msl / 20 C)**	995.0	1010.0	15.0	0.985
2550	**Takeoff Ground Run (0 msl / 30 C)**	1070.0	1080.0	10.0	0.991

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2550	**Takeoff Ground Run (4000 msl / 0 C)**	1235.0	1290.0	55.0	0.955
2550	**Takeoff Ground Run (4000 msl / 20 C)**	1440.0	1500.0	60.0	0.958
2550	**Takeoff Ground Run (4000 msl / 30 C)**	1550.0	1610.0	60.0	0.961
2550	**Takeoff Ground Run (8000 msl / 0 C)**	1820.0	2020.0	200.0	0.890
2550	**Takeoff Ground Run (8000 msl / 20 C)**	2120.0	2430.0	310.0	0.854
2550	**Takeoff Ground Run (8000 msl / 30 C)**	2280.0	2670.0	390.0	0.829
2550	**Takeoff 50 (0 msl / 0 C)**	1465.0	1630.0	165.0	0.887
2550	**Takeoff 50 (0 msl / 20 C)**	1690.0	1690.0	0.0	1.000
2550	**Takeoff 50 (0 msl / 30 C)**	1810.0	1790.0	-20.0	0.989
2550	**Takeoff 50 (4000 msl / 0 C)**	2120.0	2160.0	40.0	0.981
2550	**Takeoff 50 (4000 msl / 20 C)**	2480.0	2470.0	-10.0	0.996
2550	**Takeoff 50 (4000 msl / 30 C)**	2685.0	2640.0	-45.0	0.983
2550	**Takeoff 50 (8000 msl / 0 C)**	3265.0	3380.0	115.0	0.965
2550	**Takeoff 50 (8000 msl / 20 C)**	3880.0	4020.0	140.0	0.964
2550	**Takeoff 50 (8000 msl / 30 C)**	4225.0	4410.0	185.0	0.956
2550	**Takeoff KCAS**	58.0	61.8	3.8	0.934
2550	**Vx KCAS (0 msl / 0 C)**	61.0	62.0	1.0	0.983
2550	**Vy KCAS (0 msl / 40 C)**	74.0	76.6	2.6	0.965
2550	**Vy KCAS (4000 msl / 20 C)**	73.0	75.4	2.4	0.967
2550	**Vy KCAS (8000 msl / 0 C)**	72.0	73.0	1.0	0.986
2550	**Vy FPM (0 msl / 0 C)**	785.0	784.4	-0.6	0.999
2550	**Vy FPM (0 msl / 20 C)**	710.0	730.6	20.6	0.971
2550	**Vy FPM (0 msl / 40 C)**	645.0	680.3	35.3	0.945
2550	**Vy FPM (4000 msl / 0 C)**	620.0	584.7	-35.3	0.943
2550	**Vy FPM (4000 msl / 20 C)**	555.0	533.7	-21.3	0.962
2550	**Vy FPM (4000 msl / 40 C)**	495.0	485.4	-9.6	0.981
2550	**Vy FPM (8000 msl / 0 C)**	405.0	392.3	-12.7	0.969
2550	**Vy FPM (8000 msl / 20 C)**	345.0	343.4	-1.6	0.995
2550	**Vy FPM (8000 msl / 40 C)**	285.0	296.5	11.5	0.960
2550	**55% cruise KTAS (4000 msl / Std Day)**	103.0	104.0	1.0	0.990

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2550	**55% cruise KTAS (8000 msl / Std Day)**	105.0	107.0	2.0	0.981
2550	**55% cruise KTAS (12000 msl / Std Day)**	109.0	110.0	1.0	0.991
2550	**65% cruise KTAS (4000 msl / Std Day)**	112.0	114.0	2.0	0.982
2550	**65% cruise KTAS (8000 msl / Std Day)**	115.0	118.0	3.0	0.974
2550	**65% cruise KTAS (12000 msl / Std Day)**	119.0	115.0	-4.0	0.966
2550	**75% cruise KTAS (4000 msl / Std Day)**	118.5	121.0	2.5	0.979
2550	**75% cruise KTAS (8000 msl / Std Day)**	123.0	120.0	-3.0	0.976
2550	**55% cruise FF (4000 msl / Std Day)**	7.8	7.9	0.1	0.985
2550	**55% cruise FF (8000 msl / Std Day)**	7.7	7.9	0.2	0.972
2550	**55% cruise FF (12000 msl / Std Day)**	7.8	7.9	0.1	0.985
2550	**65% cruise FF (4000 msl / Std Day)**	9.0	9.1	0.1	0.989
2550	**65% cruise FF (8000 msl / Std Day)**	9.1	9.1	0.0	1.000
2550	**65% cruise FF (12000 msl / Std Day)**	8.9	8.4	-0.5	0.943
2550	**75% cruise FF (4000 msl / Std Day)**	10.2	10.2	0.1	0.994
2550	**75% cruise FF (8000 msl / Std Day)**	10.2	9.4	-0.8	0.925
2550	**Normal approach CAS (1.333 to 1)**	64.0	64.0	-0.0	1.000
2550	**Land roll (0 msl / 0 C)**	545.0	550.0	5.0	0.991
2550	**Land roll (0 msl / 20 C)**	585.0	580.0	-5.0	0.991
2550	**Land roll (0 msl / 40 C)**	605.0	620.0	15.0	0.975
2550	**Land roll (4000 msl / 0 C)**	630.0	630.0	0.0	1.000
2550	**Land roll (4000 msl / 20 C)**	675.0	670.0	-5.0	0.993
2550	**Land roll (4000 msl / 40 C)**	700.0	720.0	20.0	0.971
2550	**Land roll (8000 msl / 0 C)**	735.0	720.0	-15.0	0.980
2550	**Land roll (8000 msl / 20 C)**	790.0	770.0	-20.0	0.975
2550	**Land roll (8000 msl / 40 C)**	815.0	830.0	15.0	0.982

C180K

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2400	**Vg KCAS**	69.0	69.0	0.0	1.000
2400	**Vg Ratio**	10.5	10.6	0.1	0.995

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2400	**Takeoff Ground Run (0 msl / 0 C)**	395.0	400.0	5.0	0.987
2400	**Takeoff Ground Run (0 msl / 20 C)**	450.0	450.0	0.0	1.000
2400	**Takeoff Ground Run (0 msl / 30 C)**	485.0	470.0	-15.0	0.969
2400	**Takeoff Ground Run (3000 msl / 0 C)**	510.0	500.0	-10.0	0.980
2400	**Takeoff Ground Run (3000 msl / 20 C)**	590.0	570.0	-20.0	0.966
2400	**Takeoff Ground Run (3000 msl / 30 C)**	630.0	600.0	-30.0	0.952
2400	**Takeoff Ground Run (6000 msl / 0 C)**	670.0	650.0	-20.0	0.970
2400	**Takeoff Ground Run (6000 msl / 20 C)**	775.0	750.0	-25.0	0.968
2400	**Takeoff Ground Run (6000 msl / 30 C)**	830.0	800.0	-30.0	0.964
2400	**Takeoff 50 (0 msl / 0 C)**	770.0	890.0	120.0	0.844
2400	**Takeoff 50 (0 msl / 20 C)**	875.0	980.0	105.0	0.880
2400	**Takeoff 50 (0 msl / 30 C)**	930.0	1010.0	80.0	0.914
2400	**Takeoff 50 (3000 msl / 0 C)**	995.0	1080.0	85.0	0.915
2400	**Takeoff 50 (3000 msl / 20 C)**	1135.0	1190.0	55.0	0.952
2400	**Takeoff 50 (3000 msl / 30 C)**	1210.0	1230.0	20.0	0.983
2400	**Takeoff 50 (6000 msl / 0 C)**	1310.0	1340.0	30.0	0.977
2400	**Takeoff 50 (6000 msl / 20 C)**	1505.0	1490.0	-15.0	0.990
2400	**Takeoff 50 (6000 msl / 30 C)**	1610.0	1560.0	-50.0	0.969
2400	**Takeoff KCAS**	49.0	49.0	0.0	1.000
2600	**Takeoff Ground Run (0 msl / 0 C)**	475.0	470.0	-5.0	0.989
2600	**Takeoff Ground Run (0 msl / 20 C)**	545.0	530.0	-15.0	0.972
2600	**Takeoff Ground Run (0 msl / 30 C)**	585.0	570.0	-15.0	0.974
2600	**Takeoff Ground Run (3000 msl / 0 C)**	620.0	600.0	-20.0	0.968
2600	**Takeoff Ground Run (3000 msl / 20 C)**	710.0	690.0	-20.0	0.972
2600	**Takeoff Ground Run (3000 msl / 30 C)**	765.0	740.0	-25.0	0.967
2600	**Takeoff Ground Run (6000 msl / 0 C)**	815.0	800.0	-15.0	0.982
2600	**Takeoff Ground Run (6000 msl / 20 C)**	945.0	920.0	-25.0	0.974
2600	**Takeoff Ground Run (6000 msl / 30 C)**	1015.0	990.0	-25.0	0.975
2600	**Takeoff 50 (0 msl / 0 C)**	925.0	1030.0	105.0	0.886
2600	**Takeoff 50 (0 msl / 20 C)**	1050.0	1120.0	70.0	0.933

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2600	**Takeoff 50 (0 msl / 30 C)**	1120.0	1180.0	60.0	0.946
2600	**Takeoff 50 (3000 msl / 0 C)**	1200.0	1260.0	60.0	0.950
2600	**Takeoff 50 (3000 msl / 20 C)**	1375.0	1390.0	15.0	0.989
2600	**Takeoff 50 (3000 msl / 30 C)**	1470.0	1460.0	-10.0	0.993
2600	**Takeoff 50 (6000 msl / 0 C)**	1600.0	1600.0	0.0	1.000
2600	**Takeoff 50 (6000 msl / 20 C)**	1850.0	1790.0	-60.0	0.968
2600	**Takeoff 50 (6000 msl / 30 C)**	1990.0	1900.0	-90.0	0.955
2600	**Takeoff KCAS**	51.0	51.0	0.0	0.999
2800	**Vg KCAS**	74.0	75.0	1.0	0.986
2800	**Vg Ratio**	10.5	10.6	0.1	0.995
2800	**Stall clean KCAS**	54.0	54.0	0.0	1.000
2800	**Stall partial flaps KCAS**	50.0	50.0	0.0	1.000
2800	**Stall full flaps KCAS**	49.0	49.0	0.0	1.000
2800	**Takeoff Ground Run (0 msl / 0 C)**	560.0	620.0	60.0	0.893
2800	**Takeoff Ground Run (0 msl / 20 C)**	645.0	630.0	-15.0	0.977
2800	**Takeoff Ground Run (0 msl / 30 C)**	695.0	670.0	-25.0	0.964
2800	**Takeoff Ground Run (3000 msl / 0 C)**	735.0	730.0	-5.0	0.993
2800	**Takeoff Ground Run (3000 msl / 20 C)**	850.0	840.0	-10.0	0.988
2800	**Takeoff Ground Run (3000 msl / 30 C)**	910.0	900.0	-10.0	0.989
2800	**Takeoff Ground Run (6000 msl / 0 C)**	975.0	990.0	15.0	0.985
2800	**Takeoff Ground Run (6000 msl / 20 C)**	1130.0	1140.0	10.0	0.991
2800	**Takeoff Ground Run (6000 msl / 30 C)**	1215.0	1230.0	15.0	0.988
2800	**Takeoff 50 (0 msl / 0 C)**	1090.0	1270.0	180.0	0.835
2800	**Takeoff 50 (0 msl / 20 C)**	1245.0	1290.0	45.0	0.964
2800	**Takeoff 50 (0 msl / 30 C)**	1330.0	1350.0	20.0	0.985
2800	**Takeoff 50 (3000 msl / 0 C)**	1430.0	1480.0	50.0	0.965
2800	**Takeoff 50 (3000 msl / 20 C)**	1645.0	1640.0	-5.0	0.997
2800	**Takeoff 50 (3000 msl / 30 C)**	1765.0	1740.0	-25.0	0.986
2800	**Takeoff 50 (6000 msl / 0 C)**	1935.0	1920.0	-15.0	0.992
2800	**Takeoff 50 (6000 msl / 20 C)**	2255.0	2190.0	-65.0	0.971

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2800	**Takeoff 50 (6000 msl / 30 C)**	2435.0	2340.0	-95.0	0.961
2800	**Takeoff KCAS**	53.0	53.0	-0.0	0.999
2800	**Vx KCAS (0 msl / 0 C)**	58.0	63.0	5.0	0.914
2800	**Vy KCAS (0 msl / 40 C)**	80.0	77.5	-2.5	0.969
2800	**Vy KCAS (4000 msl / 20 C)**	77.0	75.4	-1.6	0.980
2800	**Vy KCAS (8000 msl / -20 C)**	74.0	73.8	-0.2	0.998
2800	**Vy FPM (0 msl / -20 C)**	1250.0	1138.3	-111.7	0.911
2800	**Vy FPM (0 msl / 20 C)**	1080.0	1030.9	-49.1	0.955
2800	**Vy FPM (0 msl / 40 C)**	995.0	972.5	-22.5	0.977
2800	**Vy FPM (4000 msl / -20 C)**	980.0	920.9	-59.1	0.940
2800	**Vy FPM (4000 msl / 20 C)**	825.0	798.7	-26.3	0.968
2800	**Vy FPM (4000 msl / 40 C)**	750.0	740.8	-9.2	0.988
2800	**Vy FPM (8000 msl / -20 C)**	715.0	692.2	-22.8	0.968
2800	**Vy FPM (8000 msl / 20 C)**	575.0	572.4	-2.6	0.996
2800	**Vy FPM (8000 msl / 40 C)**	505.0	517.2	12.2	0.976
2800	**55% cruise KTAS (2000 msl / Std Day)**	117.0	116.0	-1.0	0.991
2800	**55% cruise KTAS (6000 msl / Std Day)**	120.5	121.0	0.5	0.996
2800	**55% cruise KTAS (10000 msl / Std Day)**	124.0	125.0	1.0	0.992
2800	**65% cruise KTAS (2000 msl / Std Day)**	126.0	126.0	0.0	1.000
2800	**65% cruise KTAS (6000 msl / Std Day)**	131.0	131.0	0.0	1.000
2800	**65% cruise KTAS (10000 msl / Std Day)**	135.0	136.0	1.0	0.993
2800	**75% cruise KTAS (2000 msl / Std Day)**	134.0	134.0	0.0	1.000
2800	**75% cruise KTAS (6000 msl / Std Day)**	139.0	139.0	0.0	1.000
2800	**55% cruise FF (2000 msl / Std Day)**	9.4	9.5	0.1	0.990
2800	**55% cruise FF (6000 msl / Std Day)**	9.5	9.5	-0.0	0.999
2800	**55% cruise FF (10000 msl / Std Day)**	9.4	9.5	0.1	0.990
2800	**65% cruise FF (2000 msl / Std Day)**	11.1	11.1	0.0	0.999
2800	**65% cruise FF (6000 msl / Std Day)**	11.1	11.1	0.0	0.999
2800	**65% cruise FF (10000 msl / Std Day)**	11.1	11.1	-0.0	0.996
2800	**75% cruise FF (2000 msl / Std Day)**	12.8	12.7	-0.1	0.994

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2800	**75% cruise FF (6000 msl / Std Day)**	12.8	12.6	-0.3	0.977
2800	**Normal approach CAS (1.327 to 1)**	65.0	65.0	-0.0	1.000
2800	**Land roll (0 msl / 0 C)**	455.0	470.0	15.0	0.967
2800	**Land roll (0 msl / 20 C)**	490.0	500.0	10.0	0.980
2800	**Land roll (0 msl / 40 C)**	520.0	530.0	10.0	0.981
2800	**Land roll (4000 msl / 0 C)**	525.0	530.0	5.0	0.990
2800	**Land roll (4000 msl / 20 C)**	565.0	570.0	5.0	0.991
2800	**Land roll (4000 msl / 40 C)**	605.0	610.0	5.0	0.992
2800	**Land roll (8000 msl / 0 C)**	615.0	610.0	-5.0	0.992
2800	**Land roll (8000 msl / 20 C)**	655.0	650.0	-5.0	0.992
2800	**Land roll (8000 msl / 40 C)**	700.0	700.0	0.0	1.000

C182P

REPORT NOTE TLAR cruise speed slow vs POH. However, C182P POH vs C180K POH also inconsistent. See TLAR manual for details

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2400	**Takeoff Ground Run (0 msl / 0 C)**	395.0	400.0	5.0	0.987
2400	**Takeoff Ground Run (0 msl / 20 C)**	455.0	440.0	-15.0	0.967
2400	**Takeoff Ground Run (0 msl / 30 C)**	485.0	470.0	-15.0	0.969
2400	**Takeoff Ground Run (3000 msl / 0 C)**	515.0	500.0	-15.0	0.971
2400	**Takeoff Ground Run (3000 msl / 20 C)**	590.0	570.0	-20.0	0.966
2400	**Takeoff Ground Run (3000 msl / 30 C)**	630.0	600.0	-30.0	0.952
2400	**Takeoff Ground Run (6000 msl / 0 C)**	670.0	650.0	-20.0	0.970
2400	**Takeoff Ground Run (6000 msl / 20 C)**	770.0	750.0	-20.0	0.974
2400	**Takeoff Ground Run (6000 msl / 30 C)**	825.0	800.0	-25.0	0.970
2400	**Takeoff 50 (0 msl / 0 C)**	775.0	820.0	45.0	0.942
2400	**Takeoff 50 (0 msl / 20 C)**	875.0	900.0	25.0	0.971
2400	**Takeoff 50 (0 msl / 30 C)**	930.0	950.0	20.0	0.978
2400	**Takeoff 50 (3000 msl / 0 C)**	995.0	1020.0	25.0	0.975
2400	**Takeoff 50 (3000 msl / 20 C)**	1130.0	1130.0	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2400	**Takeoff 50 (3000 msl / 30 C)**	1205.0	1210.0	5.0	0.996
2400	**Takeoff 50 (6000 msl / 0 C)**	1300.0	1310.0	10.0	0.992
2400	**Takeoff 50 (6000 msl / 20 C)**	1490.0	1480.0	-10.0	0.993
2400	**Takeoff 50 (6000 msl / 30 C)**	1595.0	1560.0	-35.0	0.978
2400	**Takeoff KCAS**	53.0	49.5	-3.5	0.934
2700	**Takeoff Ground Run (0 msl / 0 C)**	520.0	520.0	0.0	1.000
2700	**Takeoff Ground Run (0 msl / 20 C)**	595.0	580.0	-15.0	0.975
2700	**Takeoff Ground Run (0 msl / 30 C)**	635.0	610.0	-25.0	0.961
2700	**Takeoff Ground Run (3000 msl / 0 C)**	675.0	670.0	-5.0	0.993
2700	**Takeoff Ground Run (3000 msl / 20 C)**	775.0	760.0	-15.0	0.981
2700	**Takeoff Ground Run (3000 msl / 30 C)**	830.0	810.0	-20.0	0.976
2700	**Takeoff Ground Run (6000 msl / 0 C)**	885.0	880.0	-5.0	0.994
2700	**Takeoff Ground Run (6000 msl / 20 C)**	1020.0	1020.0	0.0	1.000
2700	**Takeoff Ground Run (6000 msl / 30 C)**	1095.0	1100.0	5.0	0.995
2700	**Takeoff 50 (0 msl / 0 C)**	1000.0	1050.0	50.0	0.950
2700	**Takeoff 50 (0 msl / 20 C)**	1135.0	1160.0	25.0	0.978
2700	**Takeoff 50 (0 msl / 30 C)**	1210.0	1230.0	20.0	0.983
2700	**Takeoff 50 (3000 msl / 0 C)**	1295.0	1340.0	45.0	0.965
2700	**Takeoff 50 (3000 msl / 20 C)**	1485.0	1490.0	5.0	0.997
2700	**Takeoff 50 (3000 msl / 30 C)**	1585.0	1570.0	-15.0	0.991
2700	**Takeoff 50 (6000 msl / 0 C)**	1730.0	1730.0	0.0	1.000
2700	**Takeoff 50 (6000 msl / 20 C)**	1995.0	1970.0	-25.0	0.987
2700	**Takeoff 50 (6000 msl / 30 C)**	2150.0	2100.0	-50.0	0.977
2700	**Takeoff KCAS**	56.0	52.5	-3.5	0.937
2950	**Vg KCAS**	72.0	73.0	1.0	0.986
2950	**Vg Ratio**	9.5	9.7	0.2	0.982
2950	**Stall clean KCAS**	57.5	57.5	0.0	1.000
2950	**Stall partial flaps KCAS**	53.0	53.0	0.0	1.000
2950	**Stall full flaps KCAS**	52.0	52.0	0.0	1.000
2950	**Takeoff Ground Run (0 msl / 0 C)**	635.0	690.0	55.0	0.913

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2950	**Takeoff Ground Run (0 msl / 20 C)**	730.0	720.0	-10.0	0.986
2950	**Takeoff Ground Run (0 msl / 30 C)**	780.0	770.0	-10.0	0.987
2950	**Takeoff Ground Run (3000 msl / 0 C)**	825.0	830.0	5.0	0.994
2950	**Takeoff Ground Run (3000 msl / 20 C)**	950.0	960.0	10.0	0.989
2950	**Takeoff Ground Run (3000 msl / 30 C)**	1020.0	1030.0	10.0	0.990
2950	**Takeoff Ground Run (6000 msl / 0 C)**	1090.0	1140.0	50.0	0.954
2950	**Takeoff Ground Run (6000 msl / 20 C)**	1260.0	1330.0	70.0	0.944
2950	**Takeoff Ground Run (6000 msl / 30 C)**	1350.0	1440.0	90.0	0.933
2950	**Takeoff 50 (0 msl / 0 C)**	1220.0	1370.0	150.0	0.877
2950	**Takeoff 50 (0 msl / 20 C)**	1395.0	1420.0	25.0	0.982
2950	**Takeoff 50 (0 msl / 30 C)**	1490.0	1500.0	10.0	0.993
2950	**Takeoff 50 (3000 msl / 0 C)**	1605.0	1640.0	35.0	0.978
2950	**Takeoff 50 (3000 msl / 20 C)**	1850.0	1850.0	0.0	1.000
2950	**Takeoff 50 (3000 msl / 30 C)**	1985.0	1980.0	-5.0	0.997
2950	**Takeoff 50 (6000 msl / 0 C)**	2185.0	2190.0	5.0	0.998
2950	**Takeoff 50 (6000 msl / 20 C)**	2555.0	2500.0	-55.0	0.978
2950	**Takeoff 50 (6000 msl / 30 C)**	2765.0	2690.0	-75.0	0.973
2950	**Takeoff KCAS**	57.0	54.9	-2.1	0.963
2950	**Vx KCAS (0 msl / 0 C)**	62.0	64.0	2.0	0.968
2950	**Vy KCAS (0 msl / 40 C)**	80.0	83.3	3.3	0.959
2950	**Vy KCAS (4000 msl / 20 C)**	77.0	81.7	4.7	0.940
2950	**Vy KCAS (8000 msl / -20 C)**	75.0	78.8	3.8	0.950
2950	**Vy FPM (0 msl / -20 C)**	1040.0	1009.7	-30.3	0.971
2950	**Vy FPM (0 msl / 20 C)**	870.0	904.0	34.0	0.961
2950	**Vy FPM (0 msl / 40 C)**	785.0	852.2	67.2	0.914
2950	**Vy FPM (4000 msl / -20 C)**	820.0	801.2	-18.8	0.977
2950	**Vy FPM (4000 msl / 20 C)**	660.0	691.9	31.9	0.952
2950	**Vy FPM (4000 msl / 40 C)**	585.0	642.5	57.5	0.902
2950	**Vy FPM (8000 msl / -20 C)**	600.0	590.8	-9.2	0.985
2950	**Vy FPM (8000 msl / 20 C)**	460.0	487.3	27.3	0.941

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2950	**Vy FPM (8000 msl / 40 C)**	390.0	439.7	49.7	0.873
2950	**55% cruise KTAS (2000 msl / Std Day)**	122.0	116.0	-6.0	0.951
2950	**55% cruise KTAS (6000 msl / Std Day)**	124.5	120.0	-4.5	0.964
2950	**55% cruise KTAS (10000 msl / Std Day)**	129.0	124.0	-5.0	0.961
2950	**65% cruise KTAS (2000 msl / Std Day)**	131.0	126.0	-5.0	0.962
2950	**65% cruise KTAS (6000 msl / Std Day)**	135.0	131.0	-4.0	0.970
2950	**65% cruise KTAS (10000 msl / Std Day)**	140.0	133.0	-7.0	0.950
2950	**75% cruise KTAS (2000 msl / Std Day)**	138.5	134.0	-4.5	0.968
2950	**75% cruise KTAS (6000 msl / Std Day)**	143.5	137.0	-6.5	0.955
2950	**55% cruise FF (2000 msl / Std Day)**	10.3	10.6	0.3	0.967
2950	**55% cruise FF (6000 msl / Std Day)**	10.3	10.6	0.3	0.967
2950	**55% cruise FF (10000 msl / Std Day)**	10.4	10.6	0.2	0.977
2950	**65% cruise FF (2000 msl / Std Day)**	12.1	12.5	0.4	0.967
2950	**65% cruise FF (6000 msl / Std Day)**	12.0	12.5	0.5	0.962
2950	**65% cruise FF (10000 msl / Std Day)**	11.9	11.9	-0.0	0.996
2950	**75% cruise FF (2000 msl / Std Day)**	13.9	14.3	0.4	0.974
2950	**75% cruise FF (6000 msl / Std Day)**	13.9	13.7	-0.3	0.980
2950	**Normal approach CAS (1.231 to 1)**	64.0	64.0	-0.0	1.000
2950	**Land roll (0 msl / 0 C)**	560.0	570.0	10.0	0.982
2950	**Land roll (0 msl / 20 C)**	600.0	610.0	10.0	0.983
2950	**Land roll (0 msl / 40 C)**	640.0	650.0	10.0	0.984
2950	**Land roll (4000 msl / 0 C)**	650.0	650.0	0.0	1.000
2950	**Land roll (4000 msl / 20 C)**	670.0	700.0	30.0	0.955
2950	**Land roll (4000 msl / 40 C)**	740.0	740.0	0.0	1.000
2950	**Land roll (8000 msl / 0 C)**	755.0	750.0	-5.0	0.993
2950	**Land roll (8000 msl / 20 C)**	810.0	800.0	-10.0	0.988
2950	**Land roll (8000 msl / 40 C)**	865.0	860.0	-5.0	0.994

C240T

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3000	**Vg KCAS**	102.0	98.0	-4.0	0.961
3000	**Vg Ratio**	13.0	13.1	0.1	0.994
3000	**Takeoff Ground Run (0 msl / 0 C)**	780.0	760.0	-20.0	0.974
3000	**Takeoff Ground Run (0 msl / 20 C)**	903.0	850.0	-53.0	0.941
3000	**Takeoff Ground Run (0 msl / 30 C)**	968.0	940.0	-28.0	0.971
3000	**Takeoff Ground Run (4000 msl / 0 C)**	944.0	910.0	-34.0	0.964
3000	**Takeoff Ground Run (4000 msl / 20 C)**	1088.0	1070.0	-18.0	0.983
3000	**Takeoff Ground Run (4000 msl / 30 C)**	1164.0	1190.0	26.0	0.978
3000	**Takeoff Ground Run (8000 msl / 0 C)**	1144.0	1100.0	-44.0	0.962
3000	**Takeoff Ground Run (8000 msl / 20 C)**	1318.0	1360.0	42.0	0.968
3000	**Takeoff 50 (0 msl / 0 C)**	1277.0	1210.0	-67.0	0.948
3000	**Takeoff 50 (0 msl / 20 C)**	1430.0	1320.0	-110.0	0.923
3000	**Takeoff 50 (0 msl / 30 C)**	1511.0	1450.0	-61.0	0.960
3000	**Takeoff 50 (4000 msl / 0 C)**	1482.0	1380.0	-102.0	0.931
3000	**Takeoff 50 (4000 msl / 20 C)**	1661.0	1590.0	-71.0	0.957
3000	**Takeoff 50 (4000 msl / 30 C)**	1756.0	1760.0	4.0	0.998
3000	**Takeoff 50 (8000 msl / 0 C)**	1731.0	1610.0	-121.0	0.930
3000	**Takeoff 50 (8000 msl / 20 C)**	1948.0	1950.0	2.0	0.999
3000	**Takeoff KCAS**	59.0	70.9	11.9	0.799
3000	**Vx KCAS (0 msl / 0 delta C)**	78.0	71.0	-7.0	0.910
3000	**Vy KCAS (0 msl / 30 delta C)**	108.0	108.0	0.0	1.000
3000	**Vy KCAS (14000 msl / 0 delta C)**	108.0	108.0	0.0	1.000
3000	**Vy KCAS (24000 msl / -20 delta C)**	108.0	108.0	0.0	1.000
3000	**Vy FPM (0 msl / -20 delta C)**	1920.0	1643.2	-276.8	0.856
3000	**Vy FPM (0 msl / 0 delta C)**	1635.0	1653.6	18.6	0.989
3000	**Vy FPM (0 msl / 30 delta C)**	1230.0	1344.5	114.5	0.907
3000	**Vy FPM (14000 msl / -20 delta C)**	1945.0	1713.8	-231.2	0.881
3000	**Vy FPM (14000 msl / 0 delta C)**	1635.0	1713.6	78.6	0.952
3000	**Vy FPM (14000 msl / 30 delta C)**	1210.0	1317.9	107.9	0.911
3000	**Vy FPM (24000 msl / -20 delta C)**	1420.0	1677.3	257.3	0.819

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3000	**Vy FPM (24000 msl / 0 delta C)**	1140.0	1350.0	210.0	0.816
3000	**Vy FPM (24000 msl / 30 delta C)**	750.0	951.4	201.4	0.731
3300	**Takeoff Ground Run (0 msl / 0 C)**	969.0	960.0	-9.0	0.991
3300	**Takeoff Ground Run (0 msl / 20 C)**	1118.0	1070.0	-48.0	0.957
3300	**Takeoff Ground Run (0 msl / 30 C)**	1197.0	1190.0	-7.0	0.994
3300	**Takeoff Ground Run (4000 msl / 0 C)**	1169.0	1150.0	-19.0	0.984
3300	**Takeoff Ground Run (4000 msl / 20 C)**	1343.0	1350.0	7.0	0.995
3300	**Takeoff Ground Run (4000 msl / 30 C)**	1434.0	1500.0	66.0	0.954
3300	**Takeoff Ground Run (8000 msl / 0 C)**	1411.0	1370.0	-41.0	0.971
3300	**Takeoff Ground Run (8000 msl / 20 C)**	1621.0	1730.0	109.0	0.933
3300	**Takeoff 50 (0 msl / 0 C)**	1513.0	1480.0	-33.0	0.978
3300	**Takeoff 50 (0 msl / 20 C)**	1699.0	1610.0	-89.0	0.948
3300	**Takeoff 50 (0 msl / 30 C)**	1797.0	1780.0	-17.0	0.991
3300	**Takeoff 50 (4000 msl / 0 C)**	1762.0	1700.0	-62.0	0.965
3300	**Takeoff 50 (4000 msl / 20 C)**	1979.0	1960.0	-19.0	0.990
3300	**Takeoff 50 (4000 msl / 30 C)**	2093.0	2160.0	67.0	0.968
3300	**Takeoff 50 (8000 msl / 0 C)**	2063.0	1950.0	-113.0	0.945
3300	**Takeoff 50 (8000 msl / 20 C)**	2326.0	2420.0	94.0	0.960
3300	**Takeoff KCAS**	62.0	74.3	12.3	0.801
3300	**Vx KCAS (0 msl / 0 delta C)**	81.0	75.0	-6.0	0.926
3300	**Vy KCAS (0 msl / 30 delta C)**	110.0	110.0	0.0	1.000
3300	**Vy KCAS (14000 msl / 0 delta C)**	110.0	110.0	0.0	1.000
3300	**Vy KCAS (24000 msl / -20 delta C)**	110.0	110.0	0.0	1.000
3300	**Vy FPM (0 msl / -20 delta C)**	1780.0	1447.5	-332.5	0.813
3300	**Vy FPM (0 msl / 0 delta C)**	1515.0	1455.4	-59.6	0.961
3300	**Vy FPM (0 msl / 30 delta C)**	1145.0	1168.3	23.3	0.980
3300	**Vy FPM (14000 msl / -20 delta C)**	1780.0	1497.7	-282.3	0.841
3300	**Vy FPM (14000 msl / 0 delta C)**	1495.0	1491.5	-3.5	0.998
3300	**Vy FPM (14000 msl / 30 delta C)**	1110.0	1122.5	12.5	0.989
3300	**Vy FPM (24000 msl / -20 delta C)**	1315.0	1446.9	131.9	0.900

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3300	**Vy FPM (24000 msl / 0 delta C)**	1055.0	1144.9	89.9	0.915
3300	**Vy FPM (24000 msl / 30 delta C)**	700.0	776.0	76.0	0.891
3300	**Normal approach CAS (1.448 to 1)**	83.0	83.2	0.2	0.998
3300	**Land roll (0 msl / 0 C)**	1180.0	1140.0	-40.0	0.966
3300	**Land roll (0 msl / 15 C)**	1200.0	1200.0	0.0	1.000
3300	**Land roll (0 msl / 30 C)**	1250.0	1260.0	10.0	0.992
3300	**Land roll (4000 msl / 0 C)**	1300.0	1310.0	10.0	0.992
3300	**Land roll (4000 msl / 15 C)**	1390.0	1380.0	-10.0	0.993
3300	**Land roll (4000 msl / 30 C)**	1450.0	1450.0	0.0	1.000
3300	**Land roll (8000 msl / 0 C)**	1520.0	1510.0	-10.0	0.993
3300	**Land roll (8000 msl / 15 C)**	1600.0	1600.0	0.0	1.000
3300	**Land roll (8000 msl / 30 C)**	1690.0	1690.0	0.0	1.000
3600	**Vg KCAS**	110.0	108.0	-2.0	0.982
3600	**Vg Ratio**	13.0	13.1	0.1	0.994
3600	**Stall clean KCAS**	73.0	73.0	0.0	1.000
3600	**Stall partial flaps KCAS**	66.0	66.0	0.0	1.000
3600	**Stall full flaps KCAS**	60.0	60.0	0.0	1.000
3600	**Takeoff Ground Run (0 msl / 0 C)**	1159.0	1260.0	101.0	0.913
3600	**Takeoff Ground Run (0 msl / 20 C)**	1333.0	1320.0	-13.0	0.990
3600	**Takeoff Ground Run (0 msl / 30 C)**	1426.0	1470.0	44.0	0.969
3600	**Takeoff Ground Run (4000 msl / 0 C)**	1393.0	1400.0	7.0	0.995
3600	**Takeoff Ground Run (4000 msl / 20 C)**	1597.0	1670.0	73.0	0.954
3600	**Takeoff Ground Run (4000 msl / 30 C)**	1705.0	1880.0	175.0	0.897
3600	**Takeoff Ground Run (8000 msl / 0 C)**	1677.0	1710.0	33.0	0.980
3600	**Takeoff Ground Run (8000 msl / 20 C)**	1924.0	2170.0	246.0	0.872
3600	**Takeoff 50 (0 msl / 0 C)**	1749.0	1860.0	111.0	0.937
3600	**Takeoff 50 (0 msl / 20 C)**	1967.0	1950.0	-17.0	0.991
3600	**Takeoff 50 (0 msl / 30 C)**	2083.0	2150.0	67.0	0.968
3600	**Takeoff 50 (4000 msl / 0 C)**	2041.0	2030.0	-11.0	0.995
3600	**Takeoff 50 (4000 msl / 20 C)**	2296.0	2380.0	84.0	0.963

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3600	**Takeoff 50 (4000 msl / 30 C)**	2430.0	2650.0	220.0	0.909
3600	**Takeoff 50 (8000 msl / 0 C)**	2395.0	2380.0	-15.0	0.994
3600	**Takeoff 50 (8000 msl / 20 C)**	2703.0	2970.0	267.0	0.901
3600	**Takeoff KCAS**	65.0	77.6	12.6	0.806
3600	**Vx KCAS (0 msl / 0 delta C)**	84.0	83.0	-1.0	0.988
3600	**Vy KCAS (0 msl / 30 delta C)**	112.0	112.0	0.0	1.000
3600	**Vy KCAS (14000 msl / 0 delta C)**	112.0	112.0	0.0	1.000
3600	**Vy KCAS (24000 msl / -20 delta C)**	112.0	112.0	0.0	1.000
3600	**Vy FPM (0 msl / -20 delta C)**	1645.0	1281.3	-363.7	0.779
3600	**Vy FPM (0 msl / 0 delta C)**	1400.0	1287.0	-113.0	0.919
3600	**Vy FPM (0 msl / 30 delta C)**	1055.0	1019.2	-35.8	0.966
3600	**Vy FPM (14000 msl / -20 delta C)**	1640.0	1310.3	-329.7	0.799
3600	**Vy FPM (14000 msl / 0 delta C)**	1380.0	1299.1	-80.9	0.941
3600	**Vy FPM (14000 msl / 30 delta C)**	1025.0	959.3	-65.7	0.936
3600	**Vy FPM (24000 msl / -20 delta C)**	1215.0	1250.2	35.2	0.971
3600	**Vy FPM (24000 msl / 0 delta C)**	975.0	969.2	-5.8	0.994
3600	**Vy FPM (24000 msl / 30 delta C)**	645.0	624.7	-20.3	0.969
3600	**55% cruise KTAS (8000 msl / Std Day)**	168.0	169.0	1.0	0.994
3600	**55% cruise KTAS (16000 msl / Std Day)**	184.0	182.0	-2.0	0.989
3600	**55% cruise KTAS (25000 msl / Std Day)**	208.0	194.0	-14.0	0.933
3600	**65% cruise KTAS (8000 msl / Std Day)**	179.0	183.0	4.0	0.978
3600	**65% cruise KTAS (16000 msl / Std Day)**	196.0	196.0	0.0	1.000
3600	**65% cruise KTAS (25000 msl / Std Day)**	218.0	211.0	-7.0	0.968
3600	**75% cruise KTAS (8000 msl / Std Day)**	189.0	193.0	4.0	0.979
3600	**75% cruise KTAS (16000 msl / Std Day)**	207.0	208.0	1.0	0.995
3600	**75% cruise KTAS (25000 msl / Std Day)**	227.0	225.0	-2.0	0.991
3600	**55% cruise FF (8000 msl / Std Day)**	14.0	14.6	0.6	0.960
3600	**55% cruise FF (16000 msl / Std Day)**	14.0	14.6	0.6	0.960
3600	**55% cruise FF (25000 msl / Std Day)**	15.0	14.6	-0.4	0.970
3600	**65% cruise FF (8000 msl / Std Day)**	17.0	17.3	0.3	0.980

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3600	**65% cruise FF (16000 msl / Std Day)**	17.0	17.3	0.3	0.980
3600	**65% cruise FF (25000 msl / Std Day)**	18.0	17.3	-0.7	0.963
3600	**75% cruise FF (8000 msl / Std Day)**	20.0	20.4	0.4	0.978
3600	**75% cruise FF (16000 msl / Std Day)**	20.0	20.4	0.4	0.978
3600	**75% cruise FF (25000 msl / Std Day)**	21.0	20.4	-0.6	0.974

CA185F

REPORT NOTE %Power available at 7500 ft, 2550 rpm, and 23 inches MP different between TLAR and POH.

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2300	**Takeoff Ground Run (0 msl / 15 C)**	330.0	340.0	10.0	0.970
2300	**Takeoff Ground Run (2500 msl / 10 C)**	395.0	390.0	-5.0	0.987
2300	**Takeoff Ground Run (7500 msl / 0 C)**	565.0	550.0	-15.0	0.973
2300	**Takeoff 50 (0 msl / 15 C)**	785.0	660.0	-125.0	0.841
2300	**Takeoff 50 (2500 msl / 10 C)**	865.0	750.0	-115.0	0.867
2300	**Takeoff 50 (7500 msl / 0 C)**	1090.0	1020.0	-70.0	0.936
2300	**Vy FPM (0 msl / 15 C)**	1815.0	1806.8	-8.2	0.995
2300	**Vy FPM (5000 msl / 5 C)**	1460.0	1454.1	-5.9	0.996
2300	**Vy FPM (10000 msl / -5 C)**	1115.0	1123.0	8.0	0.993
2800	**Takeoff Ground Run (0 msl / 15 C)**	515.0	500.0	-15.0	0.971
2800	**Takeoff Ground Run (2500 msl / 10 C)**	610.0	600.0	-10.0	0.984
2800	**Takeoff Ground Run (7500 msl / 0 C)**	885.0	860.0	-25.0	0.972
2800	**Takeoff 50 (0 msl / 15 C)**	1025.0	930.0	-95.0	0.907
2800	**Takeoff 50 (2500 msl / 10 C)**	1150.0	1100.0	-50.0	0.957
2800	**Takeoff 50 (7500 msl / 0 C)**	1530.0	1540.0	10.0	0.993
3350	**Vg KCAS**	71.3	72.0	0.8	0.989
3350	**Vg Ratio**	7.9	7.9	-0.1	0.992
3350	**Stall clean KCAS**	56.5	56.5	0.0	1.000
3350	**Stall partial flaps KCAS**	50.4	50.4	0.0	1.000
3350	**Stall full flaps KCAS**	48.7	48.7	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3350	**Takeoff Ground Run (0 msl / 15 C)**	770.0	760.0	-10.0	0.987
3350	**Takeoff Ground Run (2500 msl / 10 C)**	930.0	910.0	-20.0	0.978
3350	**Takeoff Ground Run (7500 msl / 0 C)**	1350.0	1380.0	30.0	0.978
3350	**Takeoff 50 (0 msl / 15 C)**	1365.0	1370.0	5.0	0.996
3350	**Takeoff 50 (2500 msl / 10 C)**	1590.0	1610.0	20.0	0.987
3350	**Takeoff 50 (7500 msl / 0 C)**	2325.0	2410.0	85.0	0.963
3350	**Vx KCAS (0 msl / 0 C)**	60.0	65.0	5.0	0.916
3350	**Vy KCAS (0 msl / 15 C)**	88.0	87.0	-1.0	0.989
3350	**Vy KCAS (5000 msl / 5 C)**	82.0	83.0	1.0	0.988
3350	**Vy KCAS (10000 msl / -5 C)**	77.0	79.4	2.4	0.968
3350	**Vy FPM (0 msl / 15 C)**	1045.0	1054.8	9.8	0.991
3350	**Vy FPM (5000 msl / 5 C)**	785.0	788.5	3.5	0.995
3350	**Vy FPM (10000 msl / -5 C)**	515.0	533.8	18.8	0.964
3350	**55% cruise KTAS (2500 msl / Std Day)**	121.7	121.0	-0.7	0.995
3350	**55% cruise KTAS (7500 msl / Std Day)**	126.4	126.0	-0.4	0.997
3350	**55% cruise KTAS (10000 msl / Std Day)**	128.6	129.0	0.4	0.997
3350	**65% cruise KTAS (2500 msl / Std Day)**	131.2	131.0	-0.2	0.998
3350	**65% cruise KTAS (7500 msl / Std Day)**	136.4	138.0	1.6	0.988
3350	**65% cruise KTAS (10000 msl / Std Day)**	139.9	140.0	0.1	0.999
3350	**75% cruise KTAS (2500 msl / Std Day)**	138.2	140.0	1.8	0.987
3350	**75% cruise KTAS (7500 msl / Std Day)**	146.0	142.0	-4.0	0.973
3350	**55% cruise FF (2500 msl / Std Day)**	11.7	11.6	-0.1	0.995
3350	**55% cruise FF (7500 msl / Std Day)**	11.7	11.6	-0.1	0.995
3350	**55% cruise FF (10000 msl / Std Day)**	11.7	11.6	-0.1	0.995
3350	**65% cruise FF (2500 msl / Std Day)**	13.7	13.6	-0.1	0.993
3350	**65% cruise FF (7500 msl / Std Day)**	13.7	13.6	-0.1	0.993
3350	**65% cruise FF (10000 msl / Std Day)**	13.7	13.4	-0.3	0.977
3350	**75% cruise FF (2500 msl / Std Day)**	15.8	15.6	-0.2	0.987
3350	**75% cruise FF (7500 msl / Std Day)**	15.8	14.6	-1.2	0.922
3350	**Normal approach CAS (1.446 to 1)**	70.4	70.4	-0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3350	**Land roll (0 msl / 15 C)**	480.0	470.0	-10.0	0.979
3350	**Land roll (5000 msl / 5 C)**	540.0	540.0	0.0	1.000
3350	**Land roll (7500 msl / 0 C)**	575.0	580.0	5.0	0.991

DA40

REPORT NOTE TLAR predicts a significantly shorter takeoff run @2640 lbs and 8000 feet MSL than the POH.

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2205	**Vg KCAS**	72.0	70.0	-2.0	0.972
2205	**Vg Ratio**	8.8	8.9	0.1	0.993
2205	**Stall clean KCAS**	55.0	54.8	-0.2	0.996
2205	**Stall partial flaps KCAS**	53.0	52.9	-0.1	0.999
2205	**Stall full flaps KCAS**	51.0	51.1	0.1	0.998
2205	**Takeoff Ground Run (0 msl / 0 C)**	492.1	690.0	197.9	0.598
2205	**Takeoff Ground Run (4000 msl / 15 C)**	984.3	1000.0	15.7	0.984
2205	**Takeoff Ground Run (8000 msl / 25 C)**	1706.0	1530.0	-176.0	0.897
2205	**Takeoff 50 (0 msl / 0 C)**	918.6	1110.0	191.4	0.792
2205	**Takeoff 50 (4000 msl / 15 C)**	1443.6	1550.0	106.4	0.926
2205	**Takeoff 50 (8000 msl / 25 C)**	2624.7	2300.0	-324.7	0.876
2205	**Takeoff KCAS**	60.0	57.2	-2.8	0.953
2205	**Vy KCAS (0 msl / 30 C)**	73.0	83.8	10.8	0.852
2205	**Vy FPM (0 msl / -5 C)**	1200.0	1169.2	-30.8	0.974
2205	**Vy FPM (4000 msl / 15 C)**	720.0	940.5	220.5	0.694
2205	**Vy FPM (8000 msl / 30 C)**	295.0	690.6	395.6	-0.341
2205	**Normal approach CAS (1.300 to 1)**	65.0	66.5	1.5	0.978
2205	**Land roll (0 msl / 0 C)**	721.8	750.0	28.2	0.961
2205	**Land roll (4000 msl / 15 C)**	853.0	900.0	47.0	0.945
2205	**Land roll (8000 msl / 30 C)**	1115.5	1100.0	-15.5	0.986
2640	**Vg KCAS**	77.0	77.0	0.0	1.000
2640	**Vg Ratio**	8.8	8.9	0.1	0.993

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2640	**Stall clean KCAS**	60.0	59.9	-0.1	0.999
2640	**Stall partial flaps KCAS**	58.0	57.9	-0.1	0.999
2640	**Stall full flaps KCAS**	56.0	55.9	-0.1	0.999
2640	**Takeoff Ground Run (0 msl / 0 C)**	862.9	1080.0	217.1	0.748
2640	**Takeoff Ground Run (4000 msl / 15 C)**	1574.8	1540.0	-34.8	0.978
2640	**Takeoff Ground Run (8000 msl / 25 C)**	3116.8	2490.0	-626.8	0.799
2640	**Takeoff 50 (0 msl / 0 C)**	1312.3	1670.0	357.7	0.727
2640	**Takeoff 50 (4000 msl / 15 C)**	2313.0	2330.0	17.0	0.993
2640	**Takeoff 50 (8000 msl / 25 C)**	4429.1	3700.0	-729.1	0.835
2640	**Takeoff KCAS**	62.0	62.5	0.5	0.991
2640	**Vx KCAS (0 msl / 0 C)**	68.0	66.0	-2.0	0.971
2640	**Vy KCAS (0 msl / 30 C)**	80.0	86.7	6.7	0.916
2640	**Vy FPM (0 msl / -5 C)**	920.0	891.3	-28.7	0.969
2640	**Vy FPM (4000 msl / 15 C)**	540.0	687.0	147.0	0.728
2640	**Vy FPM (8000 msl / 30 C)**	200.0	463.2	263.2	-0.316
2640	**55% cruise KTAS (2000 msl / Std Day)**	113.0	113.0	0.0	1.000
2640	**55% cruise KTAS (6000 msl / Std Day)**	118.0	118.0	0.0	1.000
2640	**55% cruise KTAS (10000 msl / Std Day)**	122.0	123.0	1.0	0.992
2640	**65% cruise KTAS (2000 msl / Std Day)**	123.0	121.0	-2.0	0.984
2640	**65% cruise KTAS (6000 msl / Std Day)**	129.0	126.0	-3.0	0.977
2640	**65% cruise KTAS (10000 msl / Std Day)**	131.0	130.0	-1.0	0.992
2640	**75% cruise KTAS (2000 msl / Std Day)**	132.0	128.0	-4.0	0.970
2640	**75% cruise KTAS (6000 msl / Std Day)**	136.0	132.0	-4.0	0.971
2640	**55% cruise FF (2000 msl / Std Day)**	7.5	7.5	0.0	1.000
2640	**55% cruise FF (6000 msl / Std Day)**	7.5	7.5	0.0	1.000
2640	**55% cruise FF (10000 msl / Std Day)**	7.5	7.5	0.0	1.000
2640	**65% cruise FF (2000 msl / Std Day)**	8.5	8.5	0.0	1.000
2640	**65% cruise FF (6000 msl / Std Day)**	8.5	8.5	0.0	1.000
2640	**65% cruise FF (10000 msl / Std Day)**	8.5	8.3	-0.2	0.976
2640	**75% cruise FF (2000 msl / Std Day)**	9.5	9.5	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2640	**75% cruise FF (6000 msl / Std Day)**	9.5	9.3	-0.2	0.976
2640	**Normal approach CAS (1.300 to 1)**	73.0	72.7	-0.3	0.996
2640	**Land roll (0 msl / 0 C)**	853.0	890.0	37.0	0.957
2640	**Land roll (4000 msl / 15 C)**	1148.3	1070.0	-78.3	0.932
2640	**Land roll (8000 msl / 30 C)**	1378.0	1310.0	-68.0	0.951

FX2

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1304	**Stall full flaps KCAS**	31.3	31.7	0.4	0.988
1304	**Takeoff Ground Run (0 msl / 15 C)**	110.0	110.0	0.0	1.000
1304	**Vx KCAS (0 msl / 15 C)**	43.4	50.0	6.6	0.849
1304	**Vy KCAS (0 msl / 15 C)**	61.7	54.0	-7.7	0.875
1304	**Vy FPM (0 msl / 15 C)**	2000.0	2007.9	7.9	0.996
1304	**75% cruise KTAS (0 msl / Std Day)**	95.6	98.0	2.4	0.975
1304	**Normal approach CAS (1.300 to 1)**	40.7	41.2	0.5	0.988
1304	**Land roll (0 msl / 15 C)**	140.0	140.0	0.0	1.000

FX3

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1345	**Stall full flaps KCAS**	32.2	32.2	0.0	1.000
1345	**Takeoff Ground Run (0 msl / 15 C)**	90.0	90.0	0.0	1.000
1345	**Vx KCAS (0 msl / 15 C)**	49.5	50.0	0.5	0.990
1345	**Vy KCAS (0 msl / 15 C)**	61.7	64.0	2.3	0.962
1345	**Vy FPM (0 msl / 15 C)**	2400.0	2380.7	-19.3	0.992
1345	**75% cruise KTAS (0 msl / Std Day)**	117.3	117.0	-0.3	0.997
1345	**Normal approach CAS (1.300 to 1)**	41.8	41.8	0.0	1.000
1345	**Land roll (0 msl / 15 C)**	155.0	160.0	5.0	0.968

GLSP

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1750	**Takeoff KCAS**	51.6	51.6	0.0	0.999
1750	**Vy FPM (0 msl / 15 C)**	1624.0	1624.2	0.2	1.000
1750	**65% cruise KTAS (8000 msl / Std Day)**	128.0	128.0	0.0	1.000
1750	**75% cruise KTAS (8000 msl / Std Day)**	134.0	134.0	0.0	1.000
1750	**65% cruise FF (8000 msl / Std Day)**	9.2	9.2	0.0	0.996
1750	**75% cruise FF (8000 msl / Std Day)**	10.5	10.4	-0.1	0.988
1750	**Land roll (0 msl / 15 C)**	430.0	430.0	0.0	1.000
2350	**Vg KCAS**	80.0	80.0	0.0	1.000
2350	**Vg Ratio**	9.5	9.4	-0.1	0.986
2350	**Stall clean KCAS**	57.8	57.8	-0.0	1.000
2350	**Stall partial flaps KCAS**	50.8	50.7	-0.1	0.999
2350	**Stall full flaps KCAS**	46.7	46.7	-0.0	0.999
2350	**Takeoff Ground Run (0 msl / 15 C)**	800.0	800.0	0.0	1.000
2350	**Takeoff 50 (0 msl / 15 C)**	1450.0	1560.0	110.0	0.924
2350	**Takeoff KCAS**	59.8	59.8	0.0	1.000
2350	**Vx KCAS (0 msl / 0 C)**	64.4	64.0	-0.4	0.994
2350	**Vy KCAS (0 msl / 15 C)**	81.3	82.0	0.7	0.991
2350	**Vy FPM (0 msl / 15 C)**	1086.0	1086.3	0.3	1.000
2350	**65% cruise KTAS (8000 msl / Std Day)**	125.0	125.0	0.0	1.000
2350	**75% cruise KTAS (8000 msl / Std Day)**	131.0	131.0	0.0	1.000
2350	**65% cruise FF (8000 msl / Std Day)**	9.2	9.2	0.0	0.996
2350	**75% cruise FF (8000 msl / Std Day)**	10.5	10.4	-0.1	0.988
2350	**Normal approach CAS (1.400 to 1)**	65.4	65.3	-0.1	0.999
2350	**Land roll (0 msl / 15 C)**	560.0	560.0	0.0	1.000

GLST

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1960	**Vg KCAS**	61.0	70.0	9.0	0.852
1960	**Vg Ratio**	9.1	9.7	0.6	0.935
1960	**Stall clean KCAS**	52.0	52.0	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1960	**Stall partial flaps KCAS**	45.0	45.0	0.0	1.000
1960	**Stall full flaps KCAS**	43.0	43.0	0.0	1.000
1960	**Takeoff Ground Run (0 msl / 0 C)**	617.0	720.0	103.0	0.833
1960	**Takeoff Ground Run (0 msl / 20 C)**	712.0	740.0	28.0	0.961
1960	**Takeoff Ground Run (0 msl / 40 C)**	794.0	830.0	36.0	0.955
1960	**Takeoff Ground Run (4000 msl / 0 C)**	892.0	910.0	18.0	0.980
1960	**Takeoff Ground Run (4000 msl / 20 C)**	1056.0	1030.0	-26.0	0.975
1960	**Takeoff Ground Run (4000 msl / 40 C)**	1211.0	1170.0	-41.0	0.966
1960	**Takeoff Ground Run (8000 msl / 0 C)**	1293.0	1320.0	27.0	0.979
1960	**Takeoff Ground Run (8000 msl / 20 C)**	1565.0	1510.0	-55.0	0.965
1960	**Takeoff Ground Run (8000 msl / 40 C)**	1824.0	1730.0	-94.0	0.948
1960	**Takeoff 50 (0 msl / 0 C)**	1198.0	1540.0	342.0	0.715
1960	**Takeoff 50 (0 msl / 20 C)**	1342.0	1570.0	228.0	0.830
1960	**Takeoff 50 (0 msl / 40 C)**	1467.0	1690.0	223.0	0.848
1960	**Takeoff 50 (4000 msl / 0 C)**	1778.0	1890.0	112.0	0.937
1960	**Takeoff 50 (4000 msl / 20 C)**	2103.0	2060.0	-43.0	0.980
1960	**Takeoff 50 (4000 msl / 40 C)**	2418.0	2260.0	-158.0	0.935
1960	**Takeoff 50 (8000 msl / 0 C)**	2631.0	2600.0	-31.0	0.988
1960	**Takeoff 50 (8000 msl / 20 C)**	3219.0	2900.0	-319.0	0.901
1960	**Takeoff 50 (8000 msl / 40 C)**	3812.0	3220.0	-592.0	0.845
1960	**Vx KCAS (0 msl / 0 C)**	65.0	56.0	-9.0	0.862
1960	**Vy KCAS (0 msl / 15 C)**	78.0	82.0	4.0	0.949
1960	**Vy FPM (0 msl / 15 C)**	1120.0	1015.5	-104.5	0.907
1960	**65% cruise KTAS (6000 msl / Std Day)**	122.0	124.0	2.0	0.984
1960	**75% cruise KTAS (6000 msl / Std Day)**	129.0	129.0	0.0	1.000
1960	**65% cruise FF (6000 msl / Std Day)**	7.6	8.0	0.4	0.947
1960	**75% cruise FF (6000 msl / Std Day)**	8.7	9.4	0.7	0.921
1960	**Normal approach CAS (1.354 to 1)**	55.9	58.2	2.3	0.958
1960	**Land roll (0 msl / 15 C)**	430.0	460.0	30.0	0.930

HROC2

REPORT NOTE Scant “official” information is publicly available on this experimental aircraft

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
100	**Land roll (0 msl / 15 C)**	350.0	350.0	0.0	1.000
2000	**Stall full flaps KCAS**	47.8	56.2	8.4	0.825
2000	**Takeoff Ground Run (0 msl / 15 C)**	500.0	480.0	-20.0	0.960
2000	**Vy FPM (0 msl / 15 C)**	3100.0	3252.7	152.7	0.951
2000	**55% cruise KTAS (8000 msl / Std Day)**	186.8	183.0	-3.8	0.980
2000	**75% cruise KTAS (8000 msl / Std Day)**	199.9	199.0	-0.9	0.996
2000	**Normal approach CAS (1.300 to 1)**	65.5	73.0	7.5	0.885
2000	**Land roll (0 msl / 15 C)**	500.0	590.0	90.0	0.820

J3

REPORT NOTE Significant delta between IAS & CAS at low speeds. POH uses IAS, TLAR CAS.

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1220	**Vg KCAS**	52.1	52.0	-0.1	0.998
1220	**Stall clean KCAS**	33.0	38.4	5.4	0.837
1220	**Takeoff Ground Run (0 msl / 15 C)**	370.0	370.0	0.0	1.000
1220	**Takeoff 50 (0 msl / 15 C)**	1000.0	1000.0	0.0	1.000
1220	**Takeoff KCAS**	33.9	40.3	6.5	0.809
1220	**Vx KCAS (0 msl / 15 C)**	37.4	43.0	5.6	0.849
1220	**Vy KCAS (0 msl / 15 C)**	43.4	49.0	5.6	0.872
1220	**Vy FPM (0 msl / 15 C)**	450.0	445.4	-4.6	0.990
1220	**75% cruise KTAS (0 msl / Std Day)**	73.0	73.0	0.0	1.000
1220	**75% cruise FF (0 msl / Std Day)**	4.5	4.3	-0.2	0.967
1220	**Normal approach CAS (1.200 to 1)**	42.9	46.1	3.1	0.927
1220	**Land roll (0 msl / 15 C)**	290.0	290.0	0.0	1.000

K7SS

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1550	**Stall clean KCAS**	42.1	42.1	0.0	1.000
1550	**Stall partial flaps KCAS**	33.0	38.0	5.0	0.848
1550	**Stall full flaps KCAS**	36.5	36.5	0.0	1.000
1550	**Takeoff Ground Run (0 msl / 15 C)**	290.0	350.0	60.0	0.793
1550	**Vy FPM (0 msl / 15 C)**	1000.0	1083.1	83.1	0.917
1550	**75% cruise KTAS (0 msl / Std Day)**	106.9	99.0	-7.9	0.926
1550	**Normal approach CAS (1.300 to 1)**	47.5	47.5	-0.0	0.999
1550	**Land roll (0 msl / 15 C)**	290.0	290.0	0.0	1.000

K7STI

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1550	**Stall clean KCAS**	34.0	38.5	4.5	0.868
1550	**Stall partial flaps KCAS**	33.0	35.0	2.0	0.939
1550	**Stall full flaps KCAS**	27.8	33.0	5.2	0.812
1550	**Takeoff Ground Run (0 msl / 15 C)**	150.0	160.0	10.0	0.933
1550	**Takeoff 50 (0 msl / 15 C)**	350.0	350.0	0.0	1.000
1550	**Vy FPM (0 msl / 15 C)**	1800.0	1777.1	-22.9	0.987
1550	**75% cruise KTAS (0 msl / Std Day)**	106.9	103.0	-3.9	0.964
1550	**Normal approach CAS (1.300 to 1)**	36.1	42.9	6.8	0.813
1550	**Land roll (0 msl / 15 C)**	175.0	250.0	75.0	0.571

L39

REPORT NOTE The “POH” value for climb rates is questionable. The Tech order does not have max climb-rate data.

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
8378	**Takeoff Ground Run (0 msl / 0 C)**	1082.7	1090.0	7.3	0.993
8378	**Takeoff Ground Run (0 msl / 35 C)**	1312.3	1420.0	107.7	0.918
8378	**Takeoff Ground Run (6562 msl / 0 C)**	1607.6	1840.0	232.4	0.855
8378	**Takeoff Ground Run (6562 msl / 35 C)**	2624.7	2510.0	-114.7	0.956

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
8378	**Takeoff 50 (0 msl / 0 C)**	2198.2	2460.0	261.8	0.881
8378	**Takeoff 50 (0 msl / 35 C)**	2624.7	3000.0	375.3	0.857
8378	**Takeoff 50 (6562 msl / 0 C)**	3280.8	3670.0	389.2	0.881
8378	**Takeoff 50 (6562 msl / 35 C)**	5249.3	4690.0	-559.3	0.893
8378	**Takeoff KCAS**	92.9	94.9	2.0	0.979
8378	**Normal approach CAS (1.300 to 1)**	107.5	107.2	-0.3	0.998
8378	**Land roll (0 msl / 0 C)**	1624.0	1740.0	116.0	0.929
8378	**Land roll (0 msl / 15 C)**	1656.8	1830.0	173.2	0.895
8378	**Land roll (0 msl / 35 C)**	1804.5	1950.0	145.5	0.919
8378	**Land roll (6562 msl / 0 C)**	2198.2	2190.0	-8.2	0.996
8378	**Land roll (6562 msl / 15 C)**	2296.6	2310.0	13.4	0.994
8378	**Land roll (6562 msl / 35 C)**	2624.7	2480.0	-144.7	0.945
8818	**Vg KCAS**	142.0	149.0	7.0	0.951
8818	**Vg Ratio**	11.0	10.0	-1.0	0.912
8818	**Takeoff KCAS**	96.7	97.3	0.7	0.993
8818	**Vy FPM (0 msl / 15 C)**	4330.7	5793.6	1462.9	0.662
8818	**Vy FPM (19685 msl / -24 C)**	2126.0	2476.1	350.1	0.835
10141	**Stall clean KCAS**	106.4	106.4	0.0	1.000
10141	**Stall partial flaps KCAS**	97.2	97.2	0.0	1.000
10141	**Stall full flaps KCAS**	90.7	90.7	0.0	1.000
10141	**Takeoff Ground Run (0 msl / 0 C)**	1706.0	1850.0	144.0	0.916
10141	**Takeoff Ground Run (0 msl / 35 C)**	2198.2	2180.0	-18.2	0.992
10141	**Takeoff Ground Run (6562 msl / 0 C)**	2624.7	2890.0	265.3	0.899
10141	**Takeoff Ground Run (6562 msl / 35 C)**	4199.5	4060.0	-139.5	0.967
10141	**Takeoff 50 (0 msl / 0 C)**	3444.9	3690.0	245.1	0.929
10141	**Takeoff 50 (0 msl / 35 C)**	4429.1	4200.0	-229.1	0.948
10141	**Takeoff 50 (6562 msl / 0 C)**	5249.3	5260.0	10.7	0.998
10141	**Takeoff 50 (6562 msl / 35 C)**	8366.1	6950.0	-1416.1	0.831
10141	**Takeoff KCAS**	102.6	104.4	1.8	0.983
10141	**Vy FPM (0 msl / 15 C)**	4330.7	4896.6	565.8	0.869

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
10141	**Vy FPM (19685 msl / -24 C)**	2126.0	1912.7	-213.3	0.900
10141	**Normal approach CAS (1.300 to 1)**	118.3	117.9	-0.3	0.997
10141	**Land roll (0 msl / 0 C)**	1968.5	2090.0	121.5	0.938
10141	**Land roll (0 msl / 15 C)**	1984.9	2190.0	205.1	0.897
10141	**Land roll (0 msl / 35 C)**	2132.5	2350.0	217.5	0.898
10141	**Land roll (6562 msl / 0 C)**	2624.7	2630.0	5.3	0.998
10141	**Land roll (6562 msl / 15 C)**	2919.9	2770.0	-149.9	0.949
10141	**Land roll (6562 msl / 35 C)**	3248.0	2980.0	-268.0	0.917

M20F

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2300	**Takeoff Ground Run (0 msl / 15 C)**	595.0	590.0	-5.0	0.992
2300	**Takeoff Ground Run (2500 msl / 10 C)**	730.0	710.0	-20.0	0.973
2300	**Takeoff Ground Run (5000 msl / 5 C)**	900.0	870.0	-30.0	0.967
2300	**Takeoff 50 (0 msl / 15 C)**	1020.0	970.0	-50.0	0.951
2300	**Takeoff 50 (2500 msl / 10 C)**	1235.0	1140.0	-95.0	0.923
2300	**Takeoff 50 (5000 msl / 5 C)**	1515.0	1360.0	-155.0	0.898
2300	**Takeoff KCAS**	56.5	60.1	3.6	0.936
2300	**Vy FPM (0 msl / 15 C)**	1340.0	1302.9	-37.1	0.972
2300	**Vy FPM (6000 msl / 3 C)**	1000.0	980.6	-19.4	0.981
2300	**Vy FPM (14000 msl / -13 C)**	580.0	578.1	-1.9	0.997
2300	**55% cruise KTAS (2500 msl / Std Day)**	132.0	137.0	5.0	0.962
2300	**55% cruise KTAS (5000 msl / Std Day)**	143.0	140.0	-3.0	0.979
2300	**55% cruise KTAS (10000 msl / Std Day)**	146.0	147.0	1.0	0.993
2300	**65% cruise KTAS (2500 msl / Std Day)**	140.0	146.0	6.0	0.957
2300	**65% cruise KTAS (5000 msl / Std Day)**	153.0	150.0	-3.0	0.980
2300	**65% cruise KTAS (10000 msl / Std Day)**	157.0	156.0	-1.0	0.994
2300	**75% cruise KTAS (2500 msl / Std Day)**	151.0	155.0	4.0	0.974
2300	**75% cruise KTAS (5000 msl / Std Day)**	156.0	158.0	2.0	0.987
2300	**55% cruise FF (2500 msl / Std Day)**	8.3	8.3	0.0	0.996

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2300	**55% cruise FF (5000 msl / Std Day)**	8.3	8.3	0.0	0.996
2300	**55% cruise FF (10000 msl / Std Day)**	8.3	8.3	0.0	0.996
2300	**65% cruise FF (2500 msl / Std Day)**	9.4	10.0	0.6	0.936
2300	**65% cruise FF (5000 msl / Std Day)**	9.4	10.0	0.6	0.936
2300	**65% cruise FF (10000 msl / Std Day)**	9.7	9.8	0.1	0.990
2300	**75% cruise FF (2500 msl / Std Day)**	10.8	12.0	1.2	0.889
2300	**75% cruise FF (5000 msl / Std Day)**	11.2	12.0	0.8	0.929
2300	**Land roll (0 msl / 15 C)**	640.0	670.0	30.0	0.953
2300	**Land roll (5000 msl / 5 C)**	740.0	770.0	30.0	0.959
2300	**Land roll (7500 msl / 0 C)**	800.0	830.0	30.0	0.963
2740	**Vg KCAS**	91.2	91.0	-0.2	0.998
2740	**Vg Ratio**	10.3	10.4	0.1	0.995
2740	**Stall clean KCAS**	59.1	59.1	0.0	1.000
2740	**Stall partial flaps KCAS**	55.6	55.6	0.0	1.000
2740	**Stall full flaps KCAS**	53.9	53.9	0.0	1.000
2740	**Takeoff Ground Run (0 msl / 15 C)**	880.0	910.0	30.0	0.966
2740	**Takeoff Ground Run (2500 msl / 10 C)**	1085.0	1120.0	35.0	0.968
2740	**Takeoff Ground Run (5000 msl / 5 C)**	1320.0	1400.0	80.0	0.939
2740	**Takeoff 50 (0 msl / 15 C)**	1385.0	1410.0	25.0	0.982
2740	**Takeoff 50 (2500 msl / 10 C)**	1650.0	1690.0	40.0	0.976
2740	**Takeoff 50 (5000 msl / 5 C)**	2050.0	2060.0	10.0	0.995
2740	**Takeoff KCAS**	65.2	65.6	0.4	0.994
2740	**Vx KCAS (0 msl / 5 C)**	81.7	66.0	-15.7	0.808
2740	**Vy KCAS (0 msl / 15 C)**	97.3	97.0	-0.3	0.997
2740	**Vy KCAS (6000 msl / 3 C)**	92.1	91.3	-0.8	0.991
2740	**Vy KCAS (14000 msl / -13 C)**	84.3	90.8	6.5	0.923
2740	**Vy FPM (0 msl / 15 C)**	1070.0	1014.9	-55.1	0.948
2740	**Vy FPM (6000 msl / 3 C)**	745.0	730.2	-14.8	0.980
2740	**Vy FPM (14000 msl / -13 C)**	300.0	361.7	61.7	0.794
2740	**55% cruise KTAS (2500 msl / Std Day)**	127.0	133.0	6.0	0.953

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2740	**55% cruise KTAS (5000 msl / Std Day)**	138.0	136.0	-2.0	0.986
2740	**55% cruise KTAS (10000 msl / Std Day)**	141.0	142.0	1.0	0.993
2740	**65% cruise KTAS (2500 msl / Std Day)**	135.0	144.0	9.0	0.933
2740	**65% cruise KTAS (5000 msl / Std Day)**	148.0	147.0	-1.0	0.993
2740	**65% cruise KTAS (10000 msl / Std Day)**	152.0	152.0	0.0	1.000
2740	**75% cruise KTAS (2500 msl / Std Day)**	146.0	153.0	7.0	0.952
2740	**75% cruise KTAS (5000 msl / Std Day)**	151.0	156.0	5.0	0.967
2740	**75% cruise KTAS (10000 msl / Std Day)**	161.0	161.0	0.0	1.000
2740	**55% cruise FF (2500 msl / Std Day)**	8.3	8.3	0.0	0.996
2740	**55% cruise FF (5000 msl / Std Day)**	8.3	8.3	0.0	0.996
2740	**55% cruise FF (10000 msl / Std Day)**	8.3	8.3	0.0	0.996
2740	**65% cruise FF (2500 msl / Std Day)**	9.4	10.0	0.6	0.936
2740	**65% cruise FF (5000 msl / Std Day)**	9.4	10.0	0.6	0.936
2740	**65% cruise FF (10000 msl / Std Day)**	9.7	9.8	0.1	0.990
2740	**75% cruise FF (2500 msl / Std Day)**	10.8	12.0	1.2	0.889
2740	**75% cruise FF (5000 msl / Std Day)**	11.2	12.0	0.8	0.929
2740	**75% cruise FF (10000 msl / Std Day)**	11.1	11.1	0.0	1.000
2740	**Normal approach CAS (1.300 to 1)**	70.0	70.0	0.0	1.000
2740	**Land roll (0 msl / 15 C)**	785.0	790.0	5.0	0.994
2740	**Land roll (5000 msl / 5 C)**	910.0	910.0	0.0	1.000
2740	**Land roll (7500 msl / 0 C)**	990.0	970.0	-20.0	0.980

PA18

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1750	**Vg KCAS**	60.8	63.0	2.2	0.964
1750	**Vg Ratio**	7.0	7.1	0.1	0.992
1750	**Stall full flaps KCAS**	37.4	37.4	0.0	0.999
1750	**Takeoff Ground Run (0 msl / 15 C)**	200.0	210.0	10.0	0.950
1750	**Takeoff 50 (0 msl / 15 C)**	500.0	540.0	40.0	0.920
1750	**Vx KCAS (0 msl / 15 C)**	39.1	44.0	4.9	0.875

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1750	**Vy KCAS (0 msl / 15 C)**	65.2	60.0	-5.2	0.921
1750	**Vy FPM (0 msl / 15 C)**	960.0	942.0	-18.0	0.981
1750	**55% cruise KTAS (0 msl / Std Day)**	86.9	86.0	-0.9	0.990
1750	**75% cruise KTAS (0 msl / Std Day)**	99.9	101.0	1.1	0.989
1750	**55% cruise FF (0 msl / Std Day)**	6.5	6.7	0.2	0.973
1750	**75% cruise FF (0 msl / Std Day)**	9.0	8.9	-0.1	0.989
1750	**Normal approach CAS (1.300 to 1)**	48.6	48.6	0.0	0.999
1750	**Land roll (0 msl / 15 C)**	350.0	350.0	0.0	1.000

PA22

REPORT NOTE POH lists same takeoff roll for 135 and 150 hp versions. POH has same SL cruise speed 150/160 hp versions

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2000	**Vg KCAS**	73.0	71.0	-2.0	0.973
2000	**Stall clean KCAS**	54.2	54.2	0.0	1.000
2000	**Stall full flaps KCAS**	48.7	48.7	-0.0	1.000
2000	**Takeoff Ground Run (0 msl / 15 C)**	1220.0	980.0	-240.0	0.803
2000	**Takeoff 50 (0 msl / 15 C)**	1600.0	1600.0	0.0	1.000
2000	**Takeoff KCAS**	57.4	60.4	3.1	0.947
2000	**Vx KCAS (0 msl / 15 C)**	60.8	61.0	0.2	0.997
2000	**Vy KCAS (0 msl / 15 C)**	73.0	76.0	3.0	0.959
2000	**Vy FPM (0 msl / 15 C)**	725.0	663.7	-61.3	0.915
2000	**75% cruise KTAS (0 msl / Std Day)**	106.9	106.0	-0.9	0.992
2000	**75% cruise KTAS (7000 msl / Std Day)**	114.7	110.0	-4.7	0.959
2000	**75% cruise FF (0 msl / Std Day)**	9.0	9.0	0.0	1.000
2000	**75% cruise FF (7000 msl / Std Day)**	9.0	8.8	-0.2	0.983
2000	**Normal approach CAS (1.300 to 1)**	58.2	63.3	5.0	0.913
2000	**Land roll (0 msl / 15 C)**	500.0	500.0	0.0	1.000

PA24250

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2200	**Vy FPM (0 msl / 15 C)**	1850.0	1891.6	41.6	0.978
2200	**Vy FPM (8000 msl / 0 C)**	1400.0	1321.6	-78.4	0.944
2200	**Vy FPM (16000 msl / -16 C)**	850.0	795.2	-54.8	0.936
2500	**Stall clean KCAS**	57.0	57.3	0.3	0.995
2500	**Stall partial flaps KCAS**	54.0	54.1	0.1	0.999
2500	**Stall full flaps KCAS**	51.0	50.8	-0.2	0.997
2500	**Takeoff Ground Run (0 msl / 5 C)**	760.0	800.0	40.0	0.947
2500	**Takeoff Ground Run (2000 msl / 10 C)**	950.0	930.0	-20.0	0.979
2500	**Takeoff Ground Run (4000 msl / 15 C)**	1140.0	1120.0	-20.0	0.982
2500	**Takeoff 50 (0 msl / 5 C)**	1150.0	1260.0	110.0	0.904
2500	**Takeoff 50 (2000 msl / 10 C)**	1500.0	1460.0	-40.0	0.973
2500	**Takeoff 50 (4000 msl / 15 C)**	1750.0	1740.0	-10.0	0.994
2500	**Takeoff KCAS**	66.3	66.4	0.1	0.999
2500	**Normal approach CAS (1.300 to 1)**	66.3	66.1	-0.2	0.997
2500	**Land roll (0 msl / 5 C)**	740.0	770.0	30.0	0.959
2500	**Land roll (2000 msl / 10 C)**	830.0	840.0	10.0	0.988
2500	**Land roll (4000 msl / 15 C)**	920.0	920.0	0.0	1.000
2900	**Vg KCAS**	87.0	92.0	5.0	0.942
2900	**Vg Ratio**	10.0	10.3	0.3	0.973
2900	**Stall clean KCAS**	61.7	61.7	0.0	1.000
2900	**Stall partial flaps KCAS**	58.2	58.2	0.0	1.000
2900	**Stall full flaps KCAS**	54.7	54.7	0.0	1.000
2900	**Takeoff Ground Run (0 msl / 5 C)**	1100.0	1130.0	30.0	0.973
2900	**Takeoff Ground Run (2000 msl / 10 C)**	1310.0	1280.0	-30.0	0.977
2900	**Takeoff Ground Run (4000 msl / 15 C)**	1580.0	1560.0	-20.0	0.987
2900	**Takeoff 50 (0 msl / 5 C)**	1550.0	1750.0	200.0	0.871
2900	**Takeoff 50 (2000 msl / 10 C)**	1900.0	1980.0	80.0	0.958
2900	**Takeoff 50 (4000 msl / 15 C)**	2500.0	2400.0	-100.0	0.960
2900	**Takeoff KCAS**	71.2	71.5	0.3	0.996

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2900	**Vx KCAS (0 msl / 5 C)**	74.0	72.0	-2.0	0.973
2900	**Vy KCAS (0 msl / 15 C)**	92.0	93.0	1.0	0.989
2900	**Vy KCAS (8000 msl / 0 C)**	87.0	93.0	6.0	0.931
2900	**Vy KCAS (16000 msl / -16 C)**	83.0	92.3	9.3	0.889
2900	**Vy FPM (0 msl / 15 C)**	1350.0	1306.4	-43.6	0.968
2900	**Vy FPM (8000 msl / 0 C)**	850.0	825.5	-24.5	0.971
2900	**Vy FPM (16000 msl / -16 C)**	350.0	373.1	23.1	0.934
2900	**55% cruise KTAS (0 msl / Std Day)**	133.0	130.0	-3.0	0.978
2900	**55% cruise KTAS (7000 msl / Std Day)**	137.3	139.0	1.7	0.988
2900	**55% cruise KTAS (10000 msl / Std Day)**	139.0	142.0	3.0	0.979
2900	**65% cruise KTAS (0 msl / Std Day)**	142.5	140.0	-2.5	0.982
2900	**65% cruise KTAS (7000 msl / Std Day)**	149.5	149.0	-0.5	0.997
2900	**65% cruise KTAS (10000 msl / Std Day)**	152.9	154.0	1.1	0.993
2900	**75% cruise KTAS (0 msl / Std Day)**	148.6	148.0	-0.6	0.996
2900	**75% cruise KTAS (7000 msl / Std Day)**	157.3	157.0	-0.3	0.998
2900	**55% cruise FF (0 msl / Std Day)**	10.3	10.3	0.0	1.000
2900	**55% cruise FF (7000 msl / Std Day)**	10.3	10.3	0.0	1.000
2900	**55% cruise FF (10000 msl / Std Day)**	10.3	10.3	0.0	1.000
2900	**65% cruise FF (0 msl / Std Day)**	12.3	12.3	0.0	1.000
2900	**65% cruise FF (7000 msl / Std Day)**	12.3	12.3	0.0	1.000
2900	**65% cruise FF (10000 msl / Std Day)**	12.3	12.3	0.0	1.000
2900	**75% cruise FF (0 msl / Std Day)**	14.0	14.0	0.0	1.000
2900	**75% cruise FF (7000 msl / Std Day)**	14.0	13.8	-0.2	0.983
2900	**Normal approach CAS (1.300 to 1)**	71.2	71.2	0.0	1.000
2900	**Land roll (0 msl / 5 C)**	880.0	890.0	10.0	0.989
2900	**Land roll (2000 msl / 10 C)**	950.0	970.0	20.0	0.979
2900	**Land roll (4000 msl / 15 C)**	1050.0	1050.0	0.0	1.000

PA24260

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2500	**Stall clean KCAS**	58.2	58.5	0.3	0.995
2500	**Stall partial flaps KCAS**	54.7	55.4	0.7	0.988
2500	**Stall full flaps KCAS**	51.3	52.3	1.0	0.980
2500	**Takeoff Ground Run (0 msl / -7 C)**	680.0	680.0	0.0	1.000
2500	**Takeoff Ground Run (4000 msl / 8 C)**	1000.0	990.0	-10.0	0.990
2500	**Takeoff Ground Run (8000 msl / 27 C)**	1500.0	1570.0	70.0	0.953
2500	**Takeoff 50 (0 msl / -7 C)**	950.0	1100.0	150.0	0.842
2500	**Takeoff 50 (4000 msl / 8 C)**	1450.0	1550.0	100.0	0.931
2500	**Takeoff 50 (8000 msl / 27 C)**	3000.0	2330.0	-670.0	0.777
2500	**Takeoff KCAS**	65.7	66.9	1.2	0.982
2500	**Vy FPM (0 msl / 15 C)**	1850.0	1637.2	-212.8	0.885
2500	**Vy FPM (8000 msl / 0 C)**	1200.0	1093.3	-106.7	0.911
2500	**Vy FPM (16000 msl / -16 C)**	550.0	611.6	61.6	0.888
2500	**Normal approach CAS (1.300 to 1)**	66.7	68.0	1.3	0.980
2500	**Land roll (0 msl / -7 C)**	720.0	760.0	40.0	0.944
2500	**Land roll (4000 msl / 7 C)**	900.0	900.0	0.0	1.000
2500	**Land roll (8000 msl / 27 C)**	1100.0	1120.0	20.0	0.982
2900	**Normal approach CAS (1.300 to 1)**	72.3	73.2	0.9	0.987
2900	**Land roll (0 msl / -7 C)**	850.0	870.0	20.0	0.976
2900	**Land roll (4000 msl / 7 C)**	1050.0	1040.0	-10.0	0.990
2900	**Land roll (8000 msl / 27 C)**	1280.0	1290.0	10.0	0.992
3100	**Vg KCAS**	91.2	89.0	-2.2	0.976
3100	**Vg Ratio**	10.0	10.2	0.2	0.983
3100	**Stall clean KCAS**	65.2	65.2	0.0	1.000
3100	**Stall partial flaps KCAS**	61.7	61.7	0.0	1.000
3100	**Stall full flaps KCAS**	58.2	58.2	0.0	1.000
3100	**Takeoff Ground Run (0 msl / -7 C)**	1150.0	1200.0	50.0	0.957
3100	**Takeoff Ground Run (4000 msl / 8 C)**	1650.0	1620.0	-30.0	0.982
3100	**Takeoff Ground Run (8000 msl / 27 C)**	2500.0	2730.0	230.0	0.908
3100	**Takeoff 50 (0 msl / -7 C)**	1500.0	1870.0	370.0	0.753

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3100	**Takeoff 50 (4000 msl / 8 C)**	2400.0	2410.0	10.0	0.996
3100	**Takeoff 50 (8000 msl / 27 C)**	5500.0	4020.0	-1480.0	0.731
3100	**Takeoff KCAS**	74.0	74.5	0.5	0.994
3100	**Vx KCAS (0 msl / -7 C)**	75.6	75.0	-0.6	0.992
3100	**Vy KCAS (0 msl / 15 C)**	96.5	101.0	4.6	0.953
3100	**Vy KCAS (8000 msl / 0 C)**	92.1	88.7	-3.5	0.963
3100	**Vy KCAS (16000 msl / -16 C)**	87.8	75.4	-12.4	0.859
3100	**Vy FPM (0 msl / 15 C)**	1350.0	1190.9	-159.1	0.882
3100	**Vy FPM (8000 msl / 0 C)**	850.0	733.5	-116.5	0.863
3100	**Vy FPM (16000 msl / -16 C)**	350.0	300.3	-49.7	0.858
3100	**55% cruise KTAS (0 msl / Std Day)**	129.5	131.0	1.5	0.988
3100	**55% cruise KTAS (7500 msl / Std Day)**	134.7	140.0	5.3	0.961
3100	**55% cruise KTAS (11500 msl / Std Day)**	138.2	145.0	6.8	0.951
3100	**65% cruise KTAS (0 msl / Std Day)**	139.9	141.0	1.1	0.992
3100	**65% cruise KTAS (7500 msl / Std Day)**	147.7	151.0	3.3	0.978
3100	**65% cruise KTAS (11500 msl / Std Day)**	152.9	153.0	0.1	1.000
3100	**75% cruise KTAS (0 msl / Std Day)**	148.6	149.0	0.4	0.997
3100	**75% cruise KTAS (7500 msl / Std Day)**	158.2	158.0	-0.2	0.999
3100	**55% cruise FF (0 msl / Std Day)**	11.4	11.8	0.4	0.965
3100	**55% cruise FF (7500 msl / Std Day)**	11.4	11.8	0.4	0.965
3100	**55% cruise FF (11500 msl / Std Day)**	11.4	11.8	0.4	0.965
3100	**65% cruise FF (0 msl / Std Day)**	12.7	13.0	0.3	0.976
3100	**65% cruise FF (7500 msl / Std Day)**	12.7	13.0	0.3	0.976
3100	**65% cruise FF (11500 msl / Std Day)**	12.7	12.6	-0.1	0.995
3100	**75% cruise FF (0 msl / Std Day)**	14.5	16.5	2.0	0.862
3100	**75% cruise FF (7500 msl / Std Day)**	14.5	15.4	0.9	0.937

PA28140

REPORT NOTE POH specifies Flaps-25 for takeoff, but quotes flaps-up distances over a 50-foot obstacle

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2150	**Vg KCAS**	72.1	74.0	1.9	0.974
2150	**Vg Ratio**	10.3	10.2	-0.1	0.993
2150	**Stall clean KCAS**	54.7	54.7	0.0	1.000
2150	**Stall full flaps KCAS**	46.9	46.9	0.0	1.000
2150	**Takeoff Ground Run (0 msl / 15 C)**	800.0	820.0	20.0	0.975
2150	**Takeoff Ground Run (3000 msl / 9 C)**	1200.0	1090.0	-110.0	0.908
2150	**Takeoff Ground Run (6000 msl / 3 C)**	1550.0	1540.0	-10.0	0.994
2150	**Takeoff 50 (0 msl / 15 C)**	1700.0	1840.0	140.0	0.918
2150	**Takeoff 50 (3000 msl / 9 C)**	2400.0	2420.0	20.0	0.992
2150	**Takeoff 50 (6000 msl / 3 C)**	3375.0	3340.0	-35.0	0.990
2150	**Vx KCAS (0 msl / 3 C)**	64.3	62.0	-2.3	0.964
2150	**Vy KCAS (0 msl / 15 C)**	73.9	74.0	0.2	0.998
2150	**Vy KCAS (5000 msl / 5 C)**	66.9	73.9	7.0	0.896
2150	**Vy KCAS (10000 msl / -5 C)**	65.2	67.8	2.7	0.959
2150	**Vy FPM (0 msl / 15 C)**	825.0	807.4	-17.6	0.979
2150	**Vy FPM (5000 msl / 5 C)**	585.0	569.4	-15.6	0.973
2150	**Vy FPM (10000 msl / -5 C)**	340.0	315.2	-24.8	0.927
2150	**55% cruise KTAS (2000 msl / Std Day)**	92.1	92.0	-0.1	0.999
2150	**55% cruise KTAS (6000 msl / Std Day)**	95.6	94.0	-1.6	0.983
2150	**55% cruise KTAS (10000 msl / Std Day)**	99.1	95.0	-4.1	0.959
2150	**65% cruise KTAS (2000 msl / Std Day)**	99.9	103.0	3.1	0.969
2150	**65% cruise KTAS (6000 msl / Std Day)**	104.3	106.0	1.7	0.983
2150	**65% cruise KTAS (10000 msl / Std Day)**	107.8	108.0	0.2	0.998
2150	**75% cruise KTAS (2000 msl / Std Day)**	107.8	110.0	2.2	0.979
2150	**75% cruise KTAS (6000 msl / Std Day)**	112.1	113.0	0.9	0.992
2150	**55% cruise FF (2000 msl / Std Day)**	6.2	6.3	0.1	0.984
2150	**55% cruise FF (6000 msl / Std Day)**	6.2	6.3	0.1	0.984
2150	**55% cruise FF (10000 msl / Std Day)**	6.2	6.3	0.1	0.984
2150	**65% cruise FF (2000 msl / Std Day)**	7.3	7.3	0.0	0.999
2150	**65% cruise FF (6000 msl / Std Day)**	7.3	7.3	0.0	0.999

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2150	**65% cruise FF (10000 msl / Std Day)**	7.3	7.3	0.0	0.999
2150	**75% cruise FF (2000 msl / Std Day)**	8.4	8.4	0.0	1.000
2150	**75% cruise FF (6000 msl / Std Day)**	8.4	8.4	0.0	1.000
2150	**Normal approach CAS (1.300 to 1)**	66.0	61.0	-5.0	0.924
2150	**Land roll (0 msl / 15 C)**	535.0	530.0	-5.0	0.991
2150	**Land roll (3000 msl / 9 C)**	585.0	580.0	-5.0	0.991
2150	**Land roll (6000 msl / 3 C)**	620.0	630.0	10.0	0.984

PA28181

REPORT NOTE POH specifies Flaps-25 for takeoff, but quotes flaps-up distances over a 50-foot obstacle

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2100	**Stall clean KCAS**	55.0	53.5	-1.5	0.973
2100	**Stall partial flaps KCAS**	50.0	49.0	-1.0	0.980
2100	**Stall full flaps KCAS**	46.0	47.6	1.6	0.964
2100	**Takeoff Ground Run (0 msl / 15 C)**	610.0	630.0	20.0	0.967
2100	**Takeoff Ground Run (4000 msl / 7 C)**	1000.0	840.0	-160.0	0.840
2100	**Takeoff Ground Run (6000 msl / 3 C)**	1150.0	980.0	-170.0	0.852
2100	**Takeoff 50 (0 msl / 15 C)**	1090.0	1320.0	230.0	0.789
2100	**Takeoff 50 (4000 msl / 7 C)**	1750.0	1740.0	-10.0	0.994
2100	**Takeoff 50 (6000 msl / 3 C)**	2130.0	2000.0	-130.0	0.939
2100	**Takeoff KCAS**	47.0	52.1	5.1	0.892
2100	**Normal approach CAS (1.300 to 1)**	60.0	61.9	1.9	0.968
2100	**Land roll (0 msl / 15 C)**	750.0	780.0	30.0	0.960
2100	**Land roll (4000 msl / 7 C)**	850.0	870.0	20.0	0.976
2100	**Land roll (7000 msl / -1 C)**	925.0	940.0	15.0	0.984
2550	**Vg KCAS**	76.0	77.0	1.0	0.987
2550	**Vg Ratio**	10.0	9.5	-0.5	0.955
2550	**Stall clean KCAS**	59.0	59.0	0.0	1.000
2550	**Stall partial flaps KCAS**	54.0	54.0	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2550	**Stall full flaps KCAS**	52.5	52.5	-0.0	1.000
2550	**Takeoff Ground Run (0 msl / 15 C)**	870.0	1000.0	130.0	0.851
2550	**Takeoff Ground Run (4000 msl / 7 C)**	1390.0	1390.0	0.0	1.000
2550	**Takeoff Ground Run (6000 msl / 3 C)**	1675.0	1680.0	5.0	0.997
2550	**Takeoff 50 (0 msl / 15 C)**	1650.0	1970.0	320.0	0.806
2550	**Takeoff 50 (4000 msl / 7 C)**	2650.0	2710.0	60.0	0.977
2550	**Takeoff 50 (6000 msl / 3 C)**	3250.0	3250.0	0.0	1.000
2550	**Takeoff KCAS**	54.0	57.4	3.4	0.938
2550	**Vx KCAS (0 msl / 3 C)**	59.0	67.0	8.0	0.864
2550	**Vy KCAS (0 msl / 15 C)**	78.0	78.0	0.0	1.000
2550	**Vy FPM (0 msl / 15 C)**	740.0	750.0	10.0	0.987
2550	**Vy FPM (5000 msl / 5 C)**	500.0	531.8	31.8	0.936
2550	**Vy FPM (10000 msl / -5 C)**	275.0	318.7	43.7	0.841
2550	**55% cruise KTAS (2000 msl / Std Day)**	97.5	96.0	-1.5	0.985
2550	**55% cruise KTAS (6000 msl / Std Day)**	100.5	99.0	-1.5	0.985
2550	**55% cruise KTAS (10000 msl / Std Day)**	104.5	109.0	4.5	0.957
2550	**65% cruise KTAS (2000 msl / Std Day)**	111.0	112.0	1.0	0.991
2550	**65% cruise KTAS (6000 msl / Std Day)**	114.5	116.0	1.5	0.987
2550	**65% cruise KTAS (10000 msl / Std Day)**	119.5	120.0	0.5	0.996
2550	**75% cruise KTAS (2000 msl / Std Day)**	119.0	119.0	0.0	1.000
2550	**75% cruise KTAS (6000 msl / Std Day)**	123.0	123.0	0.0	1.000
2550	**55% cruise FF (2000 msl / Std Day)**	6.3	6.4	0.1	0.978
2550	**55% cruise FF (6000 msl / Std Day)**	6.3	6.4	0.1	0.978
2550	**55% cruise FF (10000 msl / Std Day)**	6.3	6.4	0.1	0.978
2550	**65% cruise FF (2000 msl / Std Day)**	7.6	7.5	-0.1	0.993
2550	**65% cruise FF (6000 msl / Std Day)**	7.6	7.5	-0.1	0.993
2550	**65% cruise FF (10000 msl / Std Day)**	7.6	7.5	-0.1	0.993
2550	**75% cruise FF (2000 msl / Std Day)**	8.8	8.8	0.0	0.996
2550	**75% cruise FF (6000 msl / Std Day)**	8.8	8.8	0.0	0.996
2550	**Normal approach CAS (1.300 to 1)**	68.0	68.2	0.2	0.996

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2550	**Land roll (0 msl / 15 C)**	920.0	930.0	10.0	0.989
2550	**Land roll (4000 msl / 7 C)**	1040.0	1040.0	0.0	1.000
2550	**Land roll (7000 msl / -1 C)**	1145.0	1130.0	-15.0	0.987

RV10

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2200	**Stall full flaps KCAS**	49.5	49.4	-0.1	0.998
2200	**Takeoff Ground Run (0 msl / 15 C)**	360.0	330.0	-30.0	0.917
2200	**Vy FPM (0 msl / 15 C)**	1950.0	1986.6	36.6	0.981
2200	**55% cruise KTAS (8000 msl / Std Day)**	156.4	154.0	-2.4	0.985
2200	**75% cruise KTAS (8000 msl / Std Day)**	174.7	174.0	-0.7	0.996
2200	**Land roll (0 msl / 15 C)**	525.0	560.0	35.0	0.933
2700	**Vg KCAS**	91.0	91.0	0.0	1.000
2700	**Vg Ratio**	10.1	10.0	-0.1	0.993
2700	**Stall clean KCAS**	68.0	68.0	0.0	1.000
2700	**Stall partial flaps KCAS**	62.0	62.0	0.0	1.000
2700	**Stall full flaps KCAS**	54.7	54.8	0.0	1.000
2700	**Takeoff Ground Run (0 msl / 15 C)**	500.0	490.0	-10.0	0.980
2700	**Vy KCAS (0 msl / 15 C)**	90.0	95.0	5.0	0.944
2700	**Vy FPM (0 msl / 15 C)**	1450.0	1491.8	41.8	0.971
2700	**55% cruise KTAS (8000 msl / Std Day)**	152.9	149.0	-3.9	0.974
2700	**75% cruise KTAS (8000 msl / Std Day)**	171.2	171.0	-0.2	0.999
2700	**Normal approach CAS (1.300 to 1)**	71.1	71.2	0.1	0.999
2700	**Land roll (0 msl / 15 C)**	650.0	680.0	30.0	0.954

RV12iS

REPORT NOTE TLAR overestimates lightweight RV-12 performance and underestimates at gross weight compared to Van's published numbers

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1050	**Stall clean KCAS**	41.0	40.1	-0.9	0.979

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1050	**Stall partial flaps KCAS**	39.0	39.2	0.2	0.994
1050	**Stall full flaps KCAS**	37.0	36.6	-0.4	0.988
1050	**Takeoff Ground Run (0 msl / -7 C)**	513.0	410.0	-103.0	0.799
1050	**Takeoff Ground Run (0 msl / 16 C)**	600.0	460.0	-140.0	0.767
1050	**Takeoff Ground Run (0 msl / 38 C)**	699.0	540.0	-159.0	0.773
1050	**Takeoff Ground Run (4000 msl / -7 C)**	688.0	540.0	-148.0	0.785
1050	**Takeoff Ground Run (4000 msl / 16 C)**	808.0	650.0	-158.0	0.804
1050	**Takeoff Ground Run (4000 msl / 38 C)**	937.0	770.0	-167.0	0.822
1050	**Takeoff Ground Run (8000 msl / -7 C)**	930.0	770.0	-160.0	0.828
1050	**Takeoff Ground Run (8000 msl / 16 C)**	1092.0	940.0	-152.0	0.861
1050	**Takeoff Ground Run (8000 msl / 38 C)**	1267.0	1150.0	-117.0	0.908
1050	**Takeoff 50 (0 msl / -7 C)**	1034.0	920.0	-114.0	0.890
1050	**Takeoff 50 (0 msl / 16 C)**	1212.0	1010.0	-202.0	0.833
1050	**Takeoff 50 (0 msl / 38 C)**	1421.0	1160.0	-261.0	0.816
1050	**Takeoff 50 (4000 msl / -7 C)**	1397.0	1160.0	-237.0	0.830
1050	**Takeoff 50 (4000 msl / 16 C)**	1672.0	1350.0	-322.0	0.807
1050	**Takeoff 50 (4000 msl / 38 C)**	2008.0	1570.0	-438.0	0.782
1050	**Takeoff 50 (8000 msl / -7 C)**	1990.0	1580.0	-410.0	0.794
1050	**Takeoff 50 (8000 msl / 16 C)**	2511.0	1880.0	-631.0	0.749
1050	**Takeoff 50 (8000 msl / 38 C)**	3387.0	2270.0	-1117.0	0.670
1050	**Takeoff KCAS**	50.0	49.1	-0.9	0.981
1050	**Vy FPM (0 msl / -7 C)**	1345.0	1176.9	-168.1	0.875
1050	**Vy FPM (0 msl / 16 C)**	1141.0	1091.5	-49.5	0.957
1050	**Vy FPM (0 msl / 38 C)**	956.0	982.4	26.4	0.972
1050	**Vy FPM (4000 msl / -7 C)**	975.0	975.8	0.8	0.999
1050	**Vy FPM (4000 msl / 16 C)**	777.0	864.2	87.2	0.888
1050	**Vy FPM (4000 msl / 38 C)**	598.0	766.6	168.6	0.718
1050	**Vy FPM (8000 msl / -7 C)**	606.0	750.2	144.2	0.762
1050	**Vy FPM (8000 msl / 16 C)**	416.0	650.9	234.9	0.435
1050	**Vy FPM (8000 msl / 38 C)**	243.0	563.5	320.5	-0.319

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1320	**Vg KCAS**	63.0	63.0	0.0	1.000
1320	**Vg Ratio**	9.0	9.0	0.0	0.995
1320	**Stall clean KCAS**	45.0	45.0	0.0	1.000
1320	**Stall partial flaps KCAS**	44.0	44.0	0.0	1.000
1320	**Stall full flaps KCAS**	41.0	41.0	0.0	1.000
1320	**Takeoff Ground Run (0 msl / -7 C)**	641.0	770.0	129.0	0.799
1320	**Takeoff Ground Run (0 msl / 16 C)**	750.0	770.0	20.0	0.973
1320	**Takeoff Ground Run (0 msl / 38 C)**	873.0	930.0	57.0	0.935
1320	**Takeoff Ground Run (4000 msl / -7 C)**	860.0	910.0	50.0	0.942
1320	**Takeoff Ground Run (4000 msl / 16 C)**	1010.0	1120.0	110.0	0.891
1320	**Takeoff Ground Run (4000 msl / 38 C)**	1171.0	1370.0	199.0	0.830
1320	**Takeoff Ground Run (8000 msl / -7 C)**	1163.0	1380.0	217.0	0.813
1320	**Takeoff Ground Run (8000 msl / 16 C)**	1365.0	1740.0	375.0	0.725
1320	**Takeoff Ground Run (8000 msl / 38 C)**	1583.0	2220.0	637.0	0.598
1320	**Takeoff 50 (0 msl / -7 C)**	1188.0	1560.0	372.0	0.687
1320	**Takeoff 50 (0 msl / 16 C)**	1397.0	1570.0	173.0	0.876
1320	**Takeoff 50 (0 msl / 38 C)**	1647.0	1850.0	203.0	0.877
1320	**Takeoff 50 (4000 msl / -7 C)**	1619.0	1830.0	211.0	0.870
1320	**Takeoff 50 (4000 msl / 16 C)**	1952.0	2210.0	258.0	0.868
1320	**Takeoff 50 (4000 msl / 38 C)**	2379.0	2680.0	301.0	0.873
1320	**Takeoff 50 (8000 msl / -7 C)**	2355.0	2710.0	355.0	0.849
1320	**Takeoff 50 (8000 msl / 16 C)**	3082.0	3400.0	318.0	0.897
1320	**Takeoff 50 (8000 msl / 38 C)**	4720.0	4350.0	-370.0	0.922
1320	**Takeoff KCAS**	55.0	55.0	0.0	1.000
1320	**Vx KCAS (0 msl / -7 C)**	60.0	56.0	-4.0	0.934
1320	**Vy KCAS (0 msl / 38 C)**	75.0	73.0	-2.0	0.974
1320	**Vy FPM (0 msl / -7 C)**	1069.0	844.3	-224.7	0.790
1320	**Vy FPM (0 msl / 16 C)**	906.0	770.1	-135.9	0.850
1320	**Vy FPM (0 msl / 38 C)**	758.0	676.5	-81.5	0.893
1320	**Vy FPM (4000 msl / -7 C)**	774.0	672.0	-102.0	0.868

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1320	**Vy FPM (4000 msl / 16 C)**	617.0	576.2	-40.8	0.934
1320	**Vy FPM (4000 msl / 38 C)**	474.0	491.5	17.5	0.963
1320	**Vy FPM (8000 msl / -7 C)**	481.0	479.0	-2.0	0.996
1320	**Vy FPM (8000 msl / 16 C)**	330.0	392.4	62.4	0.811
1320	**Vy FPM (8000 msl / 38 C)**	192.0	315.1	123.1	0.359
1320	**55% cruise KTAS (0 msl / Std Day)**	96.0	96.0	0.0	1.000
1320	**55% cruise KTAS (5500 msl / Std Day)**	93.0	88.0	-5.0	0.946
1320	**55% cruise KTAS (11500 msl / Std Day)**	89.0	0.0	-89.0	0.000
1320	**65% cruise KTAS (0 msl / Std Day)**	107.0	107.0	0.0	1.000
1320	**65% cruise KTAS (5500 msl / Std Day)**	104.0	102.0	-2.0	0.981
1320	**65% cruise KTAS (11500 msl / Std Day)**	100.0	0.0	-100.0	0.000
1320	**75% cruise KTAS (0 msl / Std Day)**	120.0	122.0	2.0	0.983
1320	**75% cruise KTAS (5500 msl / Std Day)**	118.0	119.0	1.0	0.992
1320	**75% cruise KTAS (11500 msl / Std Day)**	114.0	110.0	-4.0	0.965
1320	**55% cruise FF (0 msl / Std Day)**	4.4	4.4	0.0	1.000
1320	**55% cruise FF (5500 msl / Std Day)**	3.6	3.6	-0.0	0.987
1320	**55% cruise FF (11500 msl / Std Day)**	2.7	2.5	-0.2	0.939
1320	**65% cruise FF (0 msl / Std Day)**	5.1	5.1	0.0	1.000
1320	**65% cruise FF (5500 msl / Std Day)**	4.2	4.5	0.3	0.940
1320	**65% cruise FF (11500 msl / Std Day)**	3.1	3.2	0.1	0.964
1320	**75% cruise FF (0 msl / Std Day)**	6.2	6.2	0.0	1.000
1320	**75% cruise FF (5500 msl / Std Day)**	5.2	5.5	0.3	0.946
1320	**75% cruise FF (11500 msl / Std Day)**	4.0	4.6	0.6	0.860
1320	**Normal approach CAS (1.340 to 1)**	55.0	54.9	-0.1	0.999
1320	**Land roll (0 msl / -7 C)**	494.0	490.0	-4.0	0.992
1320	**Land roll (0 msl / 16 C)**	532.0	530.0	-2.0	0.996
1320	**Land roll (0 msl / 38 C)**	570.0	570.0	0.0	1.000
1320	**Land roll (4000 msl / -7 C)**	566.0	560.0	-6.0	0.989
1320	**Land roll (4000 msl / 16 C)**	610.0	600.0	-10.0	0.984
1320	**Land roll (4000 msl / 38 C)**	653.0	650.0	-3.0	0.995

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1320	**Land roll (8000 msl / -7 C)**	651.0	640.0	-11.0	0.983
1320	**Land roll (8000 msl / 16 C)**	701.0	700.0	-1.0	0.999
1320	**Land roll (8000 msl / 38 C)**	752.0	750.0	-2.0	0.997

RV14A

REPORT NOTE Published takeoff performance aspirational?

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1715	**Stall full flaps KCAS**	46.9	47.3	0.3	0.993
1715	**Takeoff Ground Run (0 msl / 15 C)**	225.0	350.0	125.0	0.444
1715	**Vy FPM (0 msl / 15 C)**	2050.0	2049.6	-0.4	1.000
1715	**55% cruise KTAS (8000 msl / Std Day)**	158.2	158.0	-0.2	0.999
1715	**75% cruise KTAS (8000 msl / Std Day)**	178.1	179.0	0.9	0.995
1715	**Land roll (0 msl / 15 C)**	330.0	430.0	100.0	0.697
2050	**Stall clean KCAS**	54.8	54.9	0.0	1.000
2050	**Stall partial flaps KCAS**	53.0	53.0	-0.0	0.999
2050	**Stall full flaps KCAS**	51.3	51.7	0.4	0.992
2050	**Takeoff Ground Run (0 msl / 15 C)**	375.0	500.0	125.0	0.667
2050	**Vy FPM (0 msl / 15 C)**	1680.0	1617.5	-62.5	0.963
2050	**55% cruise KTAS (8000 msl / Std Day)**	155.5	154.0	-1.5	0.990
2050	**75% cruise KTAS (8000 msl / Std Day)**	176.4	177.0	0.6	0.997
2050	**Normal approach CAS (1.300 to 1)**	66.7	67.2	0.5	0.992
2050	**Land roll (0 msl / 15 C)**	340.0	510.0	170.0	0.500

RV4

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1160	**Stall full flaps KCAS**	41.7	41.6	-0.1	0.997
1160	**Takeoff Ground Run (0 msl / 15 C)**	300.0	290.0	-10.0	0.967
1160	**Vy KCAS (0 msl / 15 C)**	102.0	100.0	-2.0	0.981
1160	**Vy FPM (0 msl / 15 C)**	2050.0	2128.7	78.7	0.962

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1160	**55% cruise KTAS (8000 msl / Std Day)**	151.2	153.0	1.8	0.988
1160	**75% cruise KTAS (8000 msl / Std Day)**	167.7	168.0	0.3	0.998
1160	**Land roll (0 msl / 15 C)**	300.0	340.0	40.0	0.867
1500	**Vg KCAS**	80.0	80.0	0.0	1.000
1500	**Vg Ratio**	10.0	9.6	-0.4	0.963
1500	**Stall clean KCAS**	50.4	50.8	0.4	0.992
1500	**Stall partial flaps KCAS**	48.7	48.7	0.0	1.000
1500	**Stall full flaps KCAS**	46.9	47.3	0.4	0.992
1500	**Takeoff Ground Run (0 msl / 15 C)**	450.0	510.0	60.0	0.867
1500	**Vy KCAS (0 msl / 15 C)**	103.0	103.0	0.0	1.000
1500	**Vy FPM (0 msl / 15 C)**	1650.0	1525.1	-124.9	0.924
1500	**55% cruise KTAS (8000 msl / Std Day)**	150.3	149.0	-1.3	0.991
1500	**75% cruise KTAS (8000 msl / Std Day)**	166.8	164.0	-2.8	0.983
1500	**Normal approach CAS (1.300 to 1)**	61.0	61.5	0.5	0.992
1500	**Land roll (0 msl / 15 C)**	425.0	430.0	5.0	0.988

RV6

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1200	**Stall full flaps KCAS**	42.6	42.3	-0.3	0.994
1200	**Takeoff Ground Run (0 msl / 15 C)**	300.0	300.0	0.0	1.000
1200	**Vy KCAS (0 msl / 15 C)**	94.0	94.0	0.0	1.000
1200	**Vy FPM (0 msl / 15 C)**	1900.0	2194.6	294.6	0.845
1200	**55% cruise KTAS (8000 msl / Std Day)**	149.5	149.0	-0.5	0.997
1200	**75% cruise KTAS (8000 msl / Std Day)**	166.0	165.0	-1.0	0.994
1200	**Land roll (0 msl / 15 C)**	300.0	350.0	50.0	0.833
1600	**Vg KCAS**	80.0	80.0	0.0	1.000
1600	**Vg Ratio**	10.0	9.6	-0.4	0.961
1600	**Stall full flaps KCAS**	47.8	48.9	1.1	0.978
1600	**Takeoff Ground Run (0 msl / 15 C)**	535.0	540.0	5.0	0.991
1600	**Vy KCAS (0 msl / 15 C)**	98.0	98.0	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1600	**Vy FPM (0 msl / 15 C)**	1500.0	1499.0	-1.0	0.999
1600	**55% cruise KTAS (8000 msl / Std Day)**	148.6	143.0	-5.6	0.962
1600	**75% cruise KTAS (8000 msl / Std Day)**	165.1	160.0	-5.1	0.969
1600	**Normal approach CAS (1.300 to 1)**	62.6	63.5	0.9	0.985
1600	**Land roll (0 msl / 15 C)**	500.0	450.0	-50.0	0.900

RV7

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1400	**Takeoff Ground Run (0 msl / 15 C)**	275.0	340.0	65.0	0.764
1400	**Vy FPM (0 msl / 15 C)**	2200.0	2320.1	120.1	0.945
1400	**55% cruise KTAS (8000 msl / Std Day)**	158.2	158.0	-0.2	0.999
1400	**75% cruise KTAS (8000 msl / Std Day)**	177.3	179.0	1.7	0.990
1400	**Land roll (0 msl / 15 C)**	350.0	390.0	40.0	0.886
1800	**Stall full flaps KCAS**	50.4	50.5	0.1	0.999
1800	**Takeoff Ground Run (0 msl / 15 C)**	575.0	570.0	-5.0	0.991
1800	**Vy FPM (0 msl / 15 C)**	1650.0	1649.5	-0.5	1.000
1800	**55% cruise KTAS (8000 msl / Std Day)**	156.4	153.0	-3.4	0.978
1800	**75% cruise KTAS (8000 msl / Std Day)**	176.4	175.0	-1.4	0.992
1800	**Normal approach CAS (1.300 to 1)**	65.5	65.6	0.1	0.999
1800	**Land roll (0 msl / 15 C)**	500.0	490.0	-10.0	0.980

RV8

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1400	**Takeoff Ground Run (0 msl / 15 C)**	275.0	340.0	65.0	0.764
1400	**Vy FPM (0 msl / 15 C)**	2300.0	2320.1	20.1	0.991
1400	**55% cruise KTAS (8000 msl / Std Day)**	158.2	158.0	-0.2	0.999
1400	**75% cruise KTAS (8000 msl / Std Day)**	177.3	179.0	1.7	0.990
1400	**Land roll (0 msl / 15 C)**	350.0	390.0	40.0	0.886
1800	**Stall full flaps KCAS**	50.4	50.5	0.1	0.999
1800	**Takeoff Ground Run (0 msl / 15 C)**	575.0	570.0	-5.0	0.991

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
1800	**Vy FPM (0 msl / 15 C)**	1650.0	1649.5	-0.5	1.000
1800	**55% cruise KTAS (8000 msl / Std Day)**	156.4	153.0	-3.4	0.978
1800	**75% cruise KTAS (8000 msl / Std Day)**	176.4	175.0	-1.4	0.992
1800	**Normal approach CAS (1.300 to 1)**	65.5	65.6	0.1	0.999
1800	**Land roll (0 msl / 15 C)**	500.0	490.0	-10.0	0.980

SR20

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2600	**Vg KCAS**	91.0	90.0	-1.0	0.989
2600	**Vg Ratio**	9.0	9.2	0.2	0.975
2600	**Takeoff Ground Run (0 msl / 15 C)**	1023.0	1050.0	27.0	0.974
2600	**Takeoff Ground Run (4000 msl / 7 C)**	1414.0	1420.0	6.0	0.996
2600	**Takeoff Ground Run (8000 msl / -1 C)**	2004.0	2000.0	-4.0	0.998
2600	**Takeoff 50 (0 msl / 15 C)**	1566.0	1570.0	4.0	0.997
2600	**Takeoff 50 (4000 msl / 7 C)**	2141.0	2110.0	-31.0	0.986
2600	**Takeoff 50 (8000 msl / -1 C)**	3001.0	2950.0	-51.0	0.983
2600	**Takeoff KCAS**	67.0	67.2	0.2	0.997
2600	**Vy FPM (0 msl / 15 C)**	1160.0	1023.9	-136.1	0.883
2600	**Vy FPM (6000 msl / 3 C)**	760.0	730.1	-29.9	0.961
2600	**Vy FPM (10000 msl / -5 C)**	494.0	540.0	46.0	0.907
2600	**55% cruise KTAS (2000 msl / Std Day)**	127.0	126.0	-1.0	0.992
2600	**55% cruise KTAS (6000 msl / Std Day)**	132.0	132.0	0.0	1.000
2600	**55% cruise KTAS (10000 msl / Std Day)**	138.0	137.0	-1.0	0.993
2600	**65% cruise KTAS (2000 msl / Std Day)**	137.0	137.0	0.0	1.000
2600	**65% cruise KTAS (6000 msl / Std Day)**	143.0	143.0	0.0	1.000
2600	**65% cruise KTAS (10000 msl / Std Day)**	148.0	148.0	0.0	1.000
2600	**75% cruise KTAS (2000 msl / Std Day)**	146.0	146.0	0.0	1.000
2600	**75% cruise KTAS (6000 msl / Std Day)**	151.0	152.0	1.0	0.993
2600	**55% cruise FF (2000 msl / Std Day)**	9.6	9.4	-0.2	0.979
2600	**55% cruise FF (6000 msl / Std Day)**	9.3	9.4	0.1	0.995

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2600	**55% cruise FF (10000 msl / Std Day)**	9.2	9.4	0.2	0.978
2600	**65% cruise FF (2000 msl / Std Day)**	11.0	10.8	-0.2	0.984
2600	**65% cruise FF (6000 msl / Std Day)**	10.8	10.8	-0.0	0.998
2600	**65% cruise FF (10000 msl / Std Day)**	10.7	10.8	0.1	0.988
2600	**75% cruise FF (2000 msl / Std Day)**	13.0	13.1	0.1	0.992
2600	**75% cruise FF (6000 msl / Std Day)**	13.3	13.1	-0.2	0.985
3150	**Vg KCAS**	100.0	99.0	-1.0	0.990
3150	**Vg Ratio**	9.0	9.2	0.2	0.975
3150	**Stall clean KCAS**	69.0	69.0	0.0	1.000
3150	**Stall partial flaps KCAS**	62.5	62.5	0.0	1.000
3150	**Stall full flaps KCAS**	58.5	58.5	0.0	1.000
3150	**Takeoff Ground Run (0 msl / 15 C)**	1685.0	1690.0	5.0	0.997
3150	**Takeoff Ground Run (4000 msl / 7 C)**	2329.0	2370.0	41.0	0.982
3150	**Takeoff Ground Run (8000 msl / -1 C)**	3300.0	3560.0	260.0	0.921
3150	**Takeoff 50 (0 msl / 15 C)**	2530.0	2490.0	-40.0	0.984
3150	**Takeoff 50 (4000 msl / 7 C)**	3460.0	3460.0	0.0	1.000
3150	**Takeoff 50 (8000 msl / -1 C)**	4851.0	5200.0	349.0	0.928
3150	**Takeoff KCAS**	74.0	74.0	-0.0	1.000
3150	**Vx KCAS (0 msl / -1 C)**	81.0	79.0	-2.0	0.976
3150	**Vy KCAS (0 msl / 15 C)**	97.0	99.0	2.0	0.979
3150	**Vy KCAS (6000 msl / 3 C)**	94.0	94.9	0.9	0.991
3150	**Vy KCAS (10000 msl / -5 C)**	92.0	94.3	2.3	0.975
3150	**Vy FPM (0 msl / 15 C)**	864.0	737.3	-126.7	0.853
3150	**Vy FPM (6000 msl / 3 C)**	522.0	474.3	-47.7	0.909
3150	**Vy FPM (10000 msl / -5 C)**	294.0	304.4	10.4	0.965
3150	**Normal approach CAS (1.333 to 1)**	78.0	78.0	-0.0	1.000
3150	**Land roll (0 msl / 15 C)**	853.0	860.0	7.0	0.992
3150	**Land roll (4000 msl / 7 C)**	960.0	960.0	0.0	1.000
3150	**Land roll (8000 msl / -3 C)**	1085.0	1070.0	-15.0	0.986

SR22

REPORT NOTE POH takeoff and climb performmance SR22 vs SR22T seemingly contradict each other. See TLAR manual for details

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2900	**Takeoff Ground Run (0 msl / 15 C)**	684.0	690.0	6.0	0.991
2900	**Takeoff Ground Run (4000 msl / 7 C)**	959.0	900.0	-59.0	0.938
2900	**Takeoff Ground Run (8000 msl / -1 C)**	1367.0	1240.0	-127.0	0.907
2900	**Takeoff 50 (0 msl / 15 C)**	1080.0	1240.0	160.0	0.852
2900	**Takeoff 50 (4000 msl / 7 C)**	1498.0	1570.0	72.0	0.952
2900	**Takeoff 50 (8000 msl / -1 C)**	2113.0	2110.0	-3.0	0.999
2900	**Takeoff KCAS**	66.0	66.4	0.4	0.994
2900	**Vy KCAS (0 msl / 15 C)**	101.0	100.0	-1.0	0.990
2900	**Vy KCAS (6000 msl / 3 C)**	98.0	95.7	-2.3	0.977
2900	**Vy KCAS (10000 msl / -5 C)**	96.0	95.2	-0.8	0.991
2900	**Vy FPM (0 msl / 15 C)**	1732.0	1732.7	0.7	1.000
2900	**Vy FPM (6000 msl / 3 C)**	1326.0	1318.2	-7.8	0.994
2900	**Vy FPM (10000 msl / -5 C)**	1056.0	1055.3	-0.7	0.999
3400	**55% cruise KTAS (4000 msl / Std Day)**	154.0	152.0	-2.0	0.987
3400	**55% cruise KTAS (8000 msl / Std Day)**	160.0	158.0	-2.0	0.988
3400	**55% cruise KTAS (12000 msl / Std Day)**	166.0	164.0	-2.0	0.988
3400	**65% cruise KTAS (4000 msl / Std Day)**	165.0	164.0	-1.0	0.994
3400	**65% cruise KTAS (8000 msl / Std Day)**	171.0	170.0	-1.0	0.994
3400	**65% cruise KTAS (12000 msl / Std Day)**	178.0	177.0	-1.0	0.994
3400	**75% cruise KTAS (4000 msl / Std Day)**	173.0	174.0	1.0	0.994
3400	**75% cruise KTAS (8000 msl / Std Day)**	180.0	181.0	1.0	0.994
3400	**55% cruise FF (4000 msl / Std Day)**	11.3	11.3	0.0	1.000
3400	**55% cruise FF (8000 msl / Std Day)**	11.3	11.3	0.0	1.000
3400	**55% cruise FF (12000 msl / Std Day)**	11.3	11.3	0.0	1.000
3400	**65% cruise FF (4000 msl / Std Day)**	15.4	15.4	0.0	1.000
3400	**65% cruise FF (8000 msl / Std Day)**	15.4	15.4	0.0	1.000
3400	**65% cruise FF (12000 msl / Std Day)**	15.4	15.4	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3400	**75% cruise FF (4000 msl / Std Day)**	17.8	17.8	0.0	1.000
3400	**75% cruise FF (8000 msl / Std Day)**	17.8	17.8	0.0	1.000
3600	**Vg KCAS**	91.0	91.0	0.0	1.000
3600	**Vg Ratio**	8.8	8.9	0.1	0.993
3600	**Stall clean KCAS**	71.5	71.5	0.0	1.000
3600	**Stall partial flaps KCAS**	66.5	66.5	0.0	1.000
3600	**Stall full flaps KCAS**	60.5	60.5	-0.0	1.000
3600	**Takeoff Ground Run (0 msl / 15 C)**	1082.0	1130.0	48.0	0.956
3600	**Takeoff Ground Run (4000 msl / 7 C)**	1512.0	1550.0	38.0	0.975
3600	**Takeoff Ground Run (8000 msl / -1 C)**	2146.0	2200.0	54.0	0.975
3600	**Takeoff 50 (0 msl / 15 C)**	1868.0	1920.0	52.0	0.972
3600	**Takeoff 50 (4000 msl / 7 C)**	2578.0	2590.0	12.0	0.995
3600	**Takeoff 50 (8000 msl / -1 C)**	3616.0	3610.0	-6.0	0.998
3600	**Takeoff KCAS**	74.0	74.0	0.0	1.000
3600	**Vx KCAS (0 msl / -1 C)**	84.0	86.0	2.0	0.976
3600	**Vy KCAS (0 msl / 15 C)**	109.0	106.0	-3.0	0.973
3600	**Vy KCAS (6000 msl / 3 C)**	102.0	105.6	3.6	0.965
3600	**Vy KCAS (10000 msl / -5 C)**	99.0	103.4	4.4	0.955
3600	**Vy FPM (0 msl / 15 C)**	1251.0	1281.7	30.7	0.975
3600	**Vy FPM (6000 msl / 3 C)**	906.0	923.8	17.8	0.980
3600	**Vy FPM (10000 msl / -5 C)**	676.0	692.7	16.7	0.975
3600	**Normal approach CAS (1.306 to 1)**	79.0	79.0	0.0	1.000
3600	**Land roll (0 msl / 15 C)**	1178.0	1190.0	12.0	0.990
3600	**Land roll (4000 msl / 7 C)**	1326.0	1330.0	4.0	0.997
3600	**Land roll (8000 msl / -3 C)**	1499.0	1480.0	-19.0	0.987

SR22T

REPORT NOTE POH takeoff and climb performmance SR22 vs SR22T seemingly contradict each other. See TLAR manual for details

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
2900	**Takeoff Ground Run (0 msl / 15 C)**	544.0	610.0	66.0	0.879
2900	**Takeoff Ground Run (4000 msl / 7 C)**	665.0	710.0	45.0	0.932
2900	**Takeoff Ground Run (8000 msl / -1 C)**	819.0	830.0	11.0	0.987
2900	**Takeoff 50 (0 msl / 15 C)**	852.0	1220.0	368.0	0.568
2900	**Takeoff 50 (4000 msl / 7 C)**	1021.0	1350.0	329.0	0.678
2900	**Takeoff 50 (8000 msl / -1 C)**	1231.0	1500.0	269.0	0.781
2900	**Takeoff KCAS**	61.2	64.3	3.1	0.949
2900	**Vy KCAS (0 msl / 15 C)**	121.0	121.0	0.0	1.000
2900	**Vy KCAS (6000 msl / 3 C)**	121.0	121.0	0.0	1.000
2900	**Vy KCAS (10000 msl / -5 C)**	121.0	121.0	0.0	1.000
2900	**Vy FPM (0 msl / 15 C)**	1498.0	1610.0	112.0	0.925
2900	**Vy FPM (6000 msl / 3 C)**	1515.0	1595.6	80.6	0.947
2900	**Vy FPM (10000 msl / -5 C)**	1512.0	1576.5	64.5	0.957
3400	**55% cruise KTAS (6000 msl / Std Day)**	147.0	148.0	1.0	0.993
3400	**55% cruise KTAS (14000 msl / Std Day)**	157.0	160.0	3.0	0.981
3400	**55% cruise KTAS (25000 msl / Std Day)**	171.0	174.0	3.0	0.982
3400	**65% cruise KTAS (6000 msl / Std Day)**	159.0	160.0	1.0	0.994
3400	**65% cruise KTAS (14000 msl / Std Day)**	170.0	172.0	2.0	0.988
3400	**65% cruise KTAS (25000 msl / Std Day)**	188.0	189.0	1.0	0.995
3400	**75% cruise KTAS (6000 msl / Std Day)**	168.0	170.0	2.0	0.988
3400	**75% cruise KTAS (14000 msl / Std Day)**	181.0	182.0	1.0	0.994
3400	**75% cruise KTAS (25000 msl / Std Day)**	201.0	201.0	0.0	1.000
3400	**55% cruise FF (6000 msl / Std Day)**	12.7	12.7	0.0	1.000
3400	**55% cruise FF (14000 msl / Std Day)**	12.7	12.7	0.0	1.000
3400	**55% cruise FF (25000 msl / Std Day)**	12.7	12.7	0.0	1.000
3400	**65% cruise FF (6000 msl / Std Day)**	14.6	14.6	0.0	1.000
3400	**65% cruise FF (14000 msl / Std Day)**	14.6	14.6	0.0	1.000
3400	**65% cruise FF (25000 msl / Std Day)**	14.6	14.6	0.0	1.000
3400	**75% cruise FF (6000 msl / Std Day)**	16.4	16.4	0.0	1.000
3400	**75% cruise FF (14000 msl / Std Day)**	16.4	16.4	0.0	1.000

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
3400	**75% cruise FF (25000 msl / Std Day)**	16.4	16.4	0.0	1.000
3600	**Vg KCAS**	91.0	92.0	1.0	0.989
3600	**Vg Ratio**	8.6	8.6	0.0	0.995
3600	**Stall clean KCAS**	71.5	71.5	0.0	1.000
3600	**Stall partial flaps KCAS**	66.5	66.5	0.0	1.000
3600	**Stall full flaps KCAS**	60.5	60.5	-0.0	1.000
3600	**Takeoff Ground Run (0 msl / 15 C)**	1517.0	1030.0	-487.0	0.679
3600	**Takeoff Ground Run (4000 msl / 7 C)**	1856.0	1200.0	-656.0	0.647
3600	**Takeoff Ground Run (8000 msl / -1 C)**	2284.0	1400.0	-884.0	0.613
3600	**Takeoff 50 (0 msl / 15 C)**	2080.0	1910.0	-170.0	0.918
3600	**Takeoff 50 (4000 msl / 7 C)**	2505.0	2130.0	-375.0	0.850
3600	**Takeoff 50 (8000 msl / -1 C)**	3036.0	2380.0	-656.0	0.784
3600	**Takeoff KCAS**	80.0	71.7	-8.3	0.896
3600	**Vx KCAS (0 msl / -1 C)**	86.0	75.0	-11.0	0.872
3600	**Vy KCAS (0 msl / 15 C)**	121.0	121.0	0.0	1.000
3600	**Vy KCAS (6000 msl / 3 C)**	121.0	121.0	0.0	1.000
3600	**Vy KCAS (10000 msl / -5 C)**	121.0	121.0	0.0	1.000
3600	**Vy FPM (0 msl / 15 C)**	1174.0	1194.4	20.4	0.983
3600	**Vy FPM (6000 msl / 3 C)**	1110.0	1173.6	63.6	0.943
3600	**Vy FPM (10000 msl / -5 C)**	1067.0	1150.7	83.7	0.922
3600	**Normal approach CAS (1.306 to 1)**	79.0	79.0	0.0	1.000
3600	**Land roll (0 msl / 15 C)**	1178.0	1190.0	12.0	0.990
3600	**Land roll (4000 msl / 7 C)**	1326.0	1330.0	4.0	0.997
3600	**Land roll (8000 msl / -3 C)**	1499.0	1480.0	-19.0	0.987

T6G

REPORT NOTE T6G Stage 2 — aero constants entered from POH; Stage 3 validation pending

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
5000	**Vg KCAS**	82.0	78.0	-4.0	0.951

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
5000	**Vg Ratio**	9.5	9.5	0.0	0.995
5000	**Stall clean KCAS**	61.7	61.7	0.0	1.000
5000	**Stall partial flaps KCAS**	55.6	55.6	-0.0	1.000
5000	**Stall full flaps KCAS**	51.3	51.3	0.0	1.000
5000	**Takeoff Ground Run (0 msl / -5 C)**	650.0	670.0	20.0	0.969
5000	**Takeoff Ground Run (0 msl / 15 C)**	750.0	760.0	10.0	0.987
5000	**Takeoff Ground Run (0 msl / 35 C)**	800.0	880.0	80.0	0.900
5000	**Takeoff Ground Run (3000 msl / -5 C)**	750.0	750.0	0.0	1.000
5000	**Takeoff Ground Run (3000 msl / 15 C)**	850.0	860.0	10.0	0.988
5000	**Takeoff Ground Run (3000 msl / 35 C)**	950.0	980.0	30.0	0.968
5000	**Takeoff Ground Run (5000 msl / -5 C)**	900.0	800.0	-100.0	0.889
5000	**Takeoff Ground Run (5000 msl / 15 C)**	1000.0	930.0	-70.0	0.930
5000	**Takeoff Ground Run (5000 msl / 35 C)**	1150.0	1070.0	-80.0	0.930
5000	**Takeoff 50 (0 msl / -5 C)**	1200.0	1190.0	-10.0	0.992
5000	**Takeoff 50 (0 msl / 15 C)**	1300.0	1330.0	30.0	0.977
5000	**Takeoff 50 (0 msl / 35 C)**	1450.0	1510.0	60.0	0.959
5000	**Takeoff 50 (3000 msl / -5 C)**	1350.0	1280.0	-70.0	0.948
5000	**Takeoff 50 (3000 msl / 15 C)**	1500.0	1450.0	-50.0	0.967
5000	**Takeoff 50 (3000 msl / 35 C)**	1650.0	1630.0	-20.0	0.988
5000	**Takeoff 50 (5000 msl / -5 C)**	1550.0	1350.0	-200.0	0.871
5000	**Takeoff 50 (5000 msl / 15 C)**	1700.0	1540.0	-160.0	0.906
5000	**Takeoff 50 (5000 msl / 35 C)**	1850.0	1740.0	-110.0	0.941
5000	**Takeoff KCAS**	65.0	65.4	0.4	0.993
5000	**Vy FPM (0 msl / 15 C)**	1350.0	1341.6	-8.4	0.994
5000	**Vy FPM (5000 msl / 5 C)**	1350.0	1448.6	98.6	0.927
5000	**Vy FPM (15000 msl / -15 C)**	650.0	858.3	208.3	0.680
5000	**Normal approach CAS (1.102 to 1)**	56.5	56.5	-0.0	1.000
5000	**Land roll (0 msl / 15 C)**	700.0	720.0	20.0	0.971
5000	**Land roll (4000 msl / 15 C)**	800.0	820.0	20.0	0.975
5000	**Land roll (6000 msl / 15 C)**	900.0	880.0	-20.0	0.978

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
5300	**Vg KCAS**	84.0	80.0	-4.0	0.953
5300	**Vg Ratio**	9.5	9.5	0.0	0.995
5300	**Takeoff KCAS**	67.0	67.4	0.4	0.995
5300	**Vx KCAS (0 msl / -5 C)**	70.0	68.0	-2.0	0.972
5300	**Vy KCAS (0 msl / 15 C)**	97.0	98.0	1.0	0.989
5300	**Vy KCAS (5000 msl / 5 C)**	98.0	98.5	0.5	0.995
5300	**Vy KCAS (15000 msl / -15 C)**	88.0	91.2	3.2	0.964
5800	**Vg KCAS**	88.0	84.0	-4.0	0.955
5800	**Vg Ratio**	9.5	9.5	0.0	0.995
5800	**Takeoff Ground Run (0 msl / -5 C)**	900.0	1090.0	190.0	0.789
5800	**Takeoff Ground Run (0 msl / 15 C)**	1050.0	1090.0	40.0	0.962
5800	**Takeoff Ground Run (0 msl / 35 C)**	1150.0	1270.0	120.0	0.896
5800	**Takeoff Ground Run (3000 msl / -5 C)**	1050.0	1050.0	0.0	1.000
5800	**Takeoff Ground Run (3000 msl / 15 C)**	1200.0	1230.0	30.0	0.975
5800	**Takeoff Ground Run (3000 msl / 35 C)**	1350.0	1440.0	90.0	0.933
5800	**Takeoff Ground Run (5000 msl / -5 C)**	1250.0	1140.0	-110.0	0.912
5800	**Takeoff Ground Run (5000 msl / 15 C)**	1400.0	1340.0	-60.0	0.957
5800	**Takeoff Ground Run (5000 msl / 35 C)**	1600.0	1560.0	-40.0	0.975
5800	**Takeoff 50 (0 msl / -5 C)**	1550.0	1850.0	300.0	0.806
5800	**Takeoff 50 (0 msl / 15 C)**	1700.0	1850.0	150.0	0.912
5800	**Takeoff 50 (0 msl / 35 C)**	1900.0	2120.0	220.0	0.884
5800	**Takeoff 50 (3000 msl / -5 C)**	1750.0	1750.0	0.0	1.000
5800	**Takeoff 50 (3000 msl / 15 C)**	1950.0	2010.0	60.0	0.969
5800	**Takeoff 50 (3000 msl / 35 C)**	2150.0	2320.0	170.0	0.921
5800	**Takeoff 50 (5000 msl / -5 C)**	2050.0	1860.0	-190.0	0.907
5800	**Takeoff 50 (5000 msl / 15 C)**	2250.0	2150.0	-100.0	0.956
5800	**Takeoff 50 (5000 msl / 35 C)**	2500.0	2460.0	-40.0	0.984
5800	**Takeoff KCAS**	70.0	70.5	0.5	0.993
5800	**Vy FPM (0 msl / 15 C)**	1050.0	1047.7	-2.3	0.998
5800	**Vy FPM (5000 msl / 5 C)**	1050.0	1132.9	82.9	0.921

Wt.	Metric / condition	POH	TLAR	Delta	Accuracy
5800	**Vy FPM (15000 msl / -15 C)**	400.0	593.5	193.5	0.516
5800	**55% cruise KTAS (5000 msl / Std Day)**	147.0	144.0	-3.0	0.980
5800	**55% cruise KTAS (10000 msl / Std Day)**	153.0	151.0	-2.0	0.987
5800	**55% cruise KTAS (15000 msl / Std Day)**	157.0	158.0	1.0	0.994
5800	**65% cruise KTAS (5000 msl / Std Day)**	160.0	157.0	-3.0	0.981
5800	**65% cruise KTAS (10000 msl / Std Day)**	165.0	165.0	0.0	1.000
5800	**65% cruise KTAS (15000 msl / Std Day)**	164.0	170.0	6.0	0.963
5800	**75% cruise KTAS (5000 msl / Std Day)**	170.0	167.0	-3.0	0.982
5800	**75% cruise KTAS (10000 msl / Std Day)**	174.0	175.0	1.0	0.994
5800	**75% cruise KTAS (15000 msl / Std Day)**	170.0	170.0	0.0	1.000
5800	**55% cruise FF (5000 msl / Std Day)**	27.3	27.3	0.0	1.000
5800	**55% cruise FF (10000 msl / Std Day)**	27.3	27.3	0.0	1.000
5800	**55% cruise FF (15000 msl / Std Day)**	27.4	27.3	-0.1	0.997
5800	**65% cruise FF (5000 msl / Std Day)**	32.0	32.0	0.0	1.000
5800	**65% cruise FF (10000 msl / Std Day)**	32.0	32.0	0.0	1.000
5800	**65% cruise FF (15000 msl / Std Day)**	32.5	31.4	-1.1	0.966
5800	**75% cruise FF (5000 msl / Std Day)**	43.0	43.0	0.0	1.000
5800	**75% cruise FF (10000 msl / Std Day)**	43.1	43.0	-0.1	0.998
5800	**75% cruise FF (15000 msl / Std Day)**	35.0	31.4	-3.6	0.897
5800	**Land roll (0 msl / 15 C)**	900.0	820.0	-80.0	0.911
5800	**Land roll (4000 msl / 15 C)**	1000.0	950.0	-50.0	0.950
5800	**Land roll (6000 msl / 15 C)**	1000.0	1020.0	20.0	0.980

TLAR

Pilot Guide 8.4

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