Aero Playground

The complete player's manual

Manual version 1.1 · 2026-11-26
Written for game build beta bundle 15 (commit b7c911693); text and figures from beta bundle 8a (b917c530c) and the parachute, split-screen and Bush Plane commits 85ac1a3c2, e1f788eea, 7880f595e

Contents

1 About this manual 6

1.1 How to use this manual 6

1.2 Words used for each device 6

1.3 What this build does not have 7

2 Getting started 8

2.1 What you need 8

2.2 The first launch 8

2.3 Your first flight 9

2.4 Taking off 10

2.5 Landing 11

2.6 Stopping, pausing and leaving 12

3 The landing page and the flying screen 13

3.1 The landing page 13

3.2 The Quick guide 18

3.3 The flying screen 19

4 Controls 21

4.1 All controls at a glance 21

4.2 Touch controls 22

4.3 Tilt flying and TILT FLIES 24

4.4 Keyboard 25

4.5 Gamepad 27

4.6 Joysticks, throttles and rudder pedals 28

4.7 Looking around 29

4.8 Headset controllers 29

4.9 Phone as a controller, TV and Cardboard 30

5 The aircraft 31

5.1 The fleet 31

5.2 Glider Trainer 31

5.3 Aerobatic Glider Trainer 33

5.4 Classic Trainer 34

5.5 Classic Trainer on Floats 36

5.6 Bush Plane 37

5.7 Tricycle Gear Trainer 39

5.8 Aerobatic Trainer 40

5.9 Advanced Aerobatic Biplane 42

5.10 Advanced Aerobatic Monoplane 43

5.11 Paint schemes 45

5.12 Undercarriage 45
5.13 The Bush Plane's hangar 46
5.14 Operating notes 47

6 The world **51**
6.1 The island 51
6.2 Where you can start 51
6.3 Start positions 52
6.4 Other places to land 52
6.5 Things to find 54
6.6 Environment 54
6.7 The chart and navigation 56

7 Activities **58**
7.1 Free flight, challenges and lessons 58
7.2 Racing 59
7.3 STOL 61
7.4 Crop dusting 64
7.5 Aerobatic box 64
7.6 Combat 65
7.7 Graded challenges 67
7.8 Lessons 68

8 Cameras **70**
8.1 Choosing a view 70
8.2 The views 70
8.3 Zoom 72
8.4 The cockpit view 72
8.5 Spotter 73
8.6 Drone 74
8.7 RC Mode 75
8.8 Tire Shot 76
8.9 Split panes 76
8.10 After a bail-out 76

9 The HUD and instruments **78**
9.1 Three ways to see your instruments 78
9.2 The green HUD 78
9.3 Dials 79
9.4 Cockpit instruments 79
9.5 Flying aids 80
9.6 The Butter Meter 80
9.7 The AERO panel 81

9.8 Radio and intercom 81

10 Bailing out, crashing and surviving **82**

10.1 Leaving the aircraft 82

10.2 What happens, second by second 83

10.3 When the parachute goes wrong 84

10.4 Landing under the parachute 84

10.5 What happens after 85

10.6 Crashing 85

10.7 Engine and system failures 86

11 Replay, clips and recording **87**

11.1 Replay 87

11.2 Clips and recording 88

12 Scoring, lives and credits **90**

12.1 Pilot level 90

12.2 The Store 90

13 Flying with other pilots **91**

13.1 Split screen 91

13.2 Things that are not here yet 93

14 Settings **94**

14.1 Where the settings are 94

14.2 View 95

14.3 Controls 95

14.4 Instruments 96

14.5 Flying aids 97

14.6 Display 97

14.7 Sound 98

14.8 Clips 98

14.9 Players 98

14.10 Pilot 98

14.11 Game 99

14.12 Help 99

14.13 Instructor 99

14.14 Developer 100

14.15 Updates 100

15 Flying in a headset **101**

15.1 What is different 101

15.2 The headset menu 101

15.3 Controllers 103

15.4 Fly by hand 103

15.5 Comfort 104
15.6 Recording in a headset 104
16 Troubleshooting **105**
16.1 Starting and updating 105
16.2 Controls 105
16.3 Flying 106
16.4 Performance and picture 107
16.5 Other pilots 107
Glossary **108**
Index **112**
Revision history **144**

1 About this manual

This is the complete player's manual for **Aero Playground**, a flight simulator you can fly on a phone, a tablet, a computer or a VR headset. It covers every aircraft, every place you can start, every activity, every control and every setting in the build named on the cover.

Manual version 1.1, 2026-11-26. Written for game build: beta bundle 15 (commit b7c911693); text and figures from beta bundle 8a (b917c530c) and the parachute, split-screen and Bush Plane commits 85ac1a3c2, e1f788eea, 7880f595e.

Aero Playground is in beta. The game changes often, and this manual changes with it: every revision is listed in the revision history at the end, with the game build it describes. If something on your screen does not match a page here, check that history first, then Troubleshooting.

1.1 How to use this manual

- **Search.** In the web edition, type in the search box at the top (or press `/`). Results link straight to the section.
- **Contents.** The list on the left (the ≡ button on a phone) links to every chapter and section.
- **Index and glossary.** The index lists subjects alphabetically. The glossary explains flying terms and the game's own words.
- **Cross-references.** Blue text inside a paragraph is a link to the section that explains it.
- **PDF.** The PDF edition has the same text, with bookmarks and page numbers, for printing or reading offline.
- **In a hurry?** The one-page Quick start covers the basics. The same guide is built into the game: see The Quick guide.

1.2 Words used for each device

The game is the same on every device. Where something differs, this manual says which devices it applies to, using these words:

This manual says	It means
Phone or tablet	iPhone, iPad, Android phone or Android tablet
Computer	Mac, Windows PC or Linux PC
Flat screen	Any phone, tablet or computer (everything except a headset)
Headset	A Meta Quest headset

Text in CAPITALS such as FLY NOW or OPTIONS is a button or heading exactly as it appears on screen. If the game is set to Spanish, the labels are in Spanish; this manual gives the English ones.

1.3 What this build does not have

So that you do not go looking for them, these things are **not** in this build:

- **Lives, credits or a points shop.** Nothing is locked, nothing is bought with points, and a crash costs you nothing. See Scoring, lives and credits.
- **Mouse free look.** Looking around with the mouse is not in this build on any device. See Looking around for what is.
- **Selectable clouds, visibility and night.** The sky has clouds and the time of day can be set from morning to sunset, but cloud cover, visibility and night flying cannot be chosen yet. See Environment.
- **Winch launch for gliders.** Gliders are launched by aerotow only.
- **Lessons, challenges and replay in a headset.** A headset flies free flight only. See Flying in a headset.

2 Getting started

2.1 What you need

Aero Playground runs on iPhone and iPad, Android phones and tablets, Mac, Windows and Linux computers, and Meta Quest headsets. You can fly with nothing but the device itself:

- **Phone or tablet:** two on-screen pads, or tilt the device.
- **Computer:** the keyboard.
- **Headset:** the two controllers.

A gamepad works on every device. A USB joystick, throttle and rudder pedals work on computers, and in a simpler form on phones, tablets and headsets. See Controls.

The beta is delivered differently on each device (TestFlight on iPhone and iPad, a download on the others). Follow the instructions that came with your invitation. If the game later offers you an update, see Updates.

2.2 The first launch

There is no title screen. The game opens on its menu, which this manual calls the **landing page**, with the world paused behind it.

The very first time, the **Quick guide** appears on top: one scrolling page with the controls for your device, how to read the screen, how to take off and land, how to bail out, and how the cameras work. Read it, then press CLOSE. It never appears by itself again, and you can open it whenever you like (see The Quick guide).

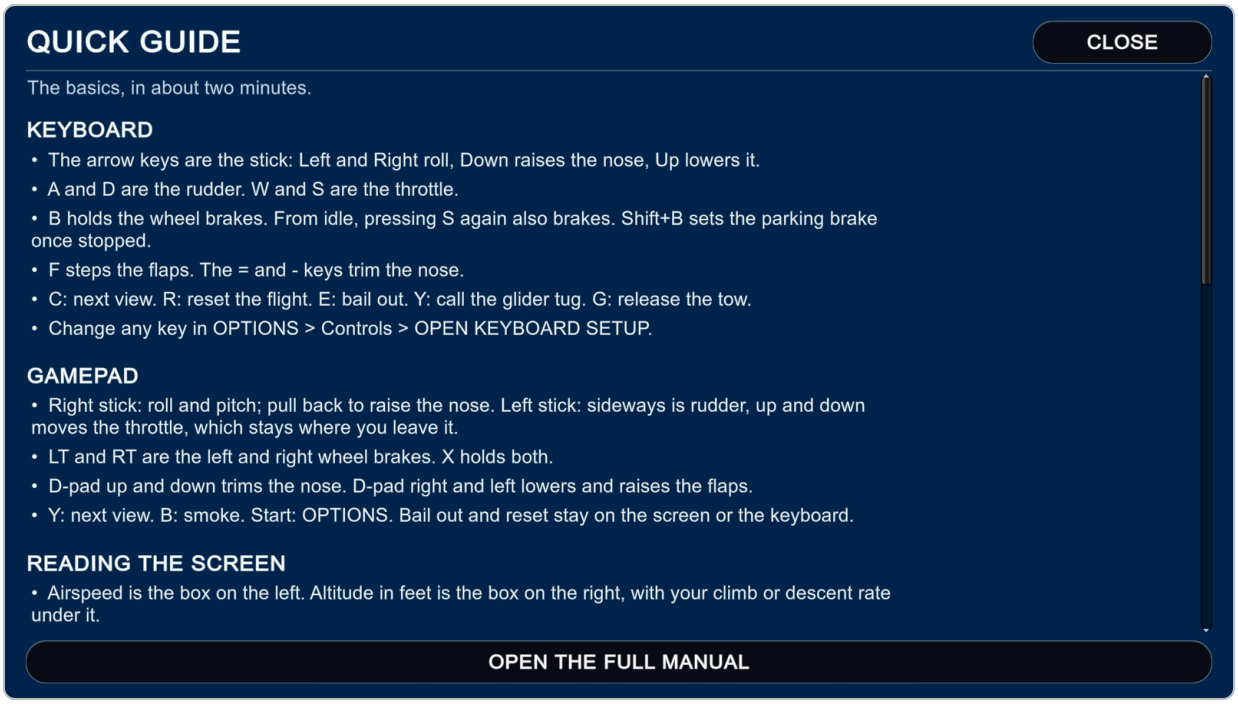

Figure 1. The Quick guide, as it appears on the first launch on a computer.

You may also see a one-time invitation, FLY WITH OTHER PILOTS, with the buttons NOT NOW and TRY MULTIPLAYER. Choose NOT NOW to fly alone first; see Flying with other pilots for what the other button does.

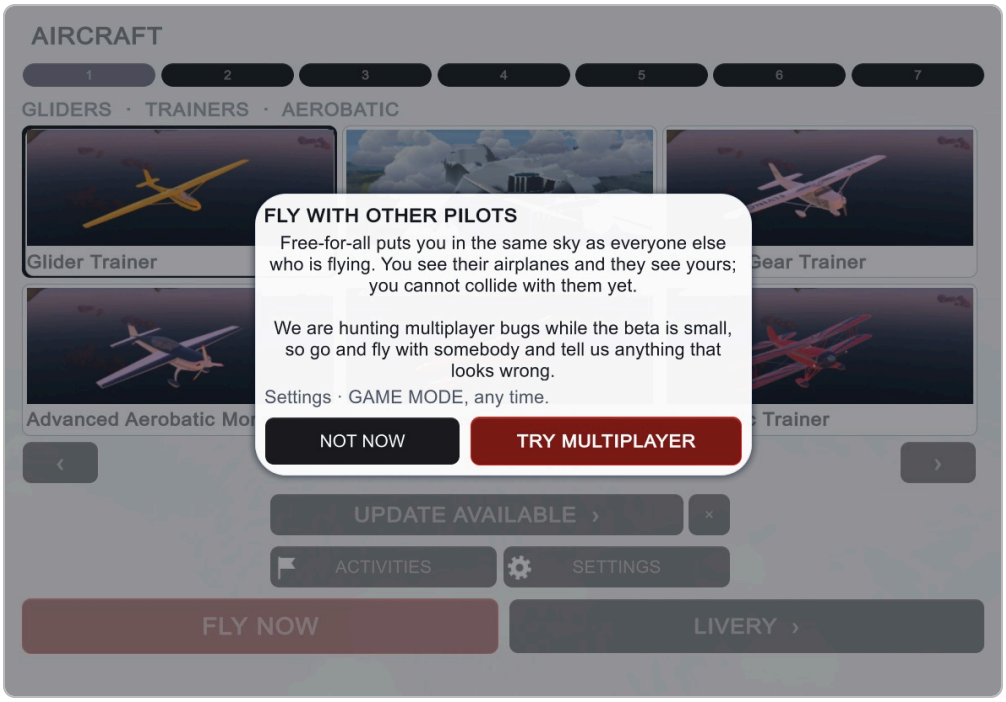

Figure 2. The one-time invitation to fly with other pilots, over the AIRCRAFT page.

2.3 Your first flight

1. On the landing page, press the red **FLY NOW** button. You do not have to choose anything first.
2. You are now flying the **Glider Trainer**, already in the air at 10,000 feet over the airport PHDH. A glider has no engine, so there is nothing to manage: just fly.
3. Move the stick gently (see the table below). Roll into a turn, level out, raise and lower the nose and watch the speed change.
4. Try the cameras: press **VIEW** on the top bar.
5. When you run out of height, land if you can, or press **Reset** to start again in the air. Nothing is lost by crashing.

To do this	Phone or tablet	Keyboard	Gamepad	Headset
Roll left and right	Right pad, sideways	← →	Right stick	Right thumbstick
Nose up	Right pad, slide **down**	↓	Right stick back	Right thumbstick back
Nose down	Right pad, slide **up**	↑	Right stick forward	Right thumbstick forward
Rudder	Left pad, sideways	A D	Left stick, sideways	Left thumbstick, sideways
Start again	Reset button	R	(on screen)	Menu › Reset flight

The stick works like a real one: pull it toward you (down on a pad, the ↓ key) and the nose rises.



Figure 3. The flying screen: the top bar, and the green HUD over the outside view.

To fly something with an engine, go back to the landing page with **MENU**, pick an aircraft on the AIRCRAFT page, and press FLY NOW again. The landing page chapter explains every step.

2.4 Taking off

A flight normally starts in the air. To start on the ground:

1. On the landing page go to step 5, **LOCATION**.
2. Under **START**, choose **On the runway**. You begin at the runway threshold with the engine idling.
3. Press **FLY NOW**.

Then, in a powered aircraft:

1. Open the throttle fully (left pad up, `W`, or the left stick forward).
2. Keep straight with the rudder. Tailwheel aircraft need quick, small rudder inputs as the tail comes up.
3. As the speed builds, ease the stick back a little and let the aircraft fly itself off the ground. Do not haul it off.
4. Climb at a steady speed. If the speed falls, lower the nose.

Aircraft with flaps (the Tricycle Gear Trainer and the Bush Plane) can use half flap for a shorter take-off.

A **glider** started on the runway is already hooked to a tow plane. See Aerotow. A **floatplane** started "on the runway" starts on the water. See Floatplanes.



Figure 4. Lined up on the runway in the Bush Plane.

2.5 Landing

The easiest way to practise is the **On final** start (LOCATION › START), which puts you 300 feet up, lined up with the runway.

1. **Approach.** Bring the power back and descend toward the runway at a steady speed. Use flaps if the aircraft has them. In a glider, use the spoilers to steepen the descent (see Gliders).
2. **Aim.** Keep the point where you want to touch down steady in the windscreen. If it moves up, you are getting low: add power (or close the spoilers). If it moves down, you are high.
3. **Flare.** Just above the ground, raise the nose gently and hold the aircraft off. Let it settle onto the wheels as the speed fades.
4. **Roll out.** Keep straight with the rudder. Then brake to a stop (see Brakes).
5. **Score it.** Once stopped, a **Rate my landing** button appears for a few seconds. It opens the Butter Meter, which scores the landing out of 100.

If the approach goes wrong, open the throttle, climb away and try again. On the one-way backcountry strips there is no room to go around: see Backcountry strips.



Figure 5. On final approach in the Tricycle Gear Trainer.

2.6 Stopping, pausing and leaving

- **OPTIONS** (top right) opens the settings and pauses the world while they are open.
- **MENU** (top left) goes back to the landing page. The flight ends there: FLY NOW starts a new one.
- **TIME** on the top bar slows time to 50, 25 or 10 percent, for practising something difficult.
- There is no quit button. Close the game the way you close any app on your device.
- In a headset, the menu button on the left controller opens the menu and pauses. See Flying in a headset.

3 The landing page and the flying screen

3.1 The landing page

The landing page is the game's menu. It is a line of seven steps, walked left to right:

1 AIRCRAFT → 2 LIVERY → 3 CONFIGURATION → 4 LOAD → 5 LOCATION → 6 ENVIRONMENT → 7 GAMEPLAY

You never have to walk all of it. Three things are always on screen:

- **FLY NOW** (red, bottom left). Flies with whatever is chosen so far. It is on every page.
- **The next step** (bottom right). The button names the page it leads to, for example "LIVERY ›".
- **The step strip** (top). Seven numbered pills; the one you are on is lit. Tap any number to jump there.

A back button at the top left returns to the previous step. Pages longer than the screen scroll by dragging (or the mouse wheel), with "▲ MORE ABOVE" and "▼ MORE BELOW" markers. Your choices are remembered for the next launch.

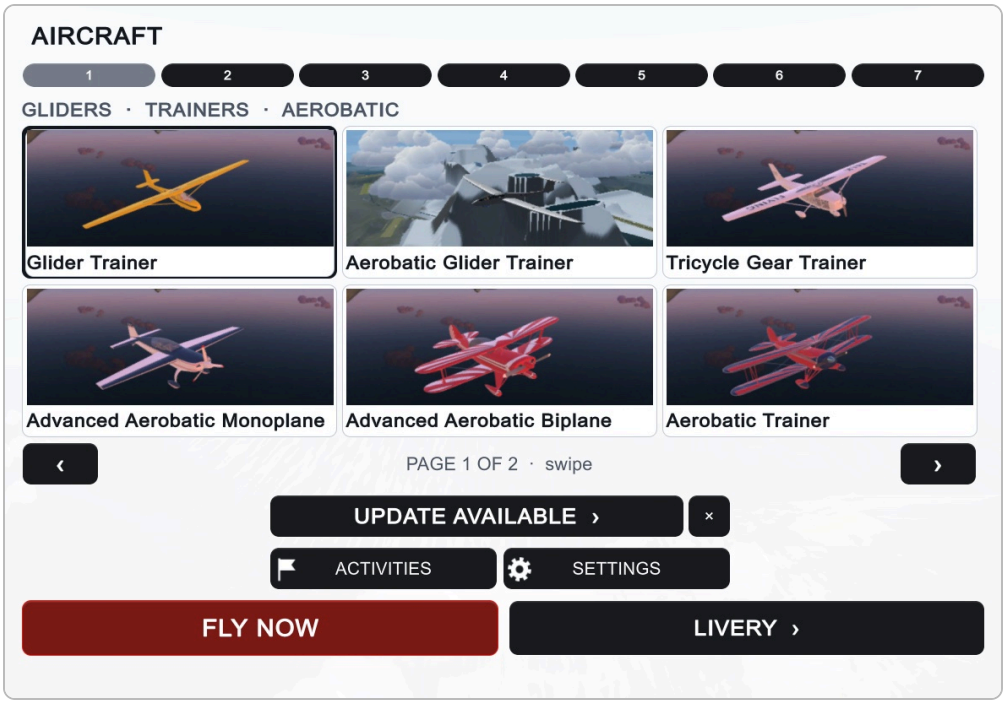

Figure 6. Step 1, AIRCRAFT: the fleet in shelves, with ACTIVITIES and SETTINGS at the foot.

Step 1: AIRCRAFT

The fleet, as picture tiles on shelves: GLIDERS, TRAINERS, AEROBATIC, and BUSH & UTILITY. Tap a tile to select it. If there are more tiles than fit, swipe or use the page arrows.

At the foot of this page are buttons that are not steps:

- **ACTIVITIES** opens the list of challenges and lessons. See Activities. This page is the only way to it.

- **SETTINGS** opens the settings. See Settings.
- **QUICK GUIDE** opens the Quick guide. (It joins this row in the first build that includes the guide; the picture above was taken just before.)

When a newer beta build is available, an **UPDATE AVAILABLE ›** bar appears above them: see Updates.

A tile that is greyed out, with a note such as "Not in this activity", cannot be used in the activity you have picked. Every aircraft is described in The aircraft.

Step 2: LIVERY

A large picture of the aircraft and, under PAINT, the schemes it comes in. The Advanced Aerobatic Monoplane, the Advanced Aerobatic Biplane and the Aerobatic Trainer each have several; the others have one. See Paint schemes.

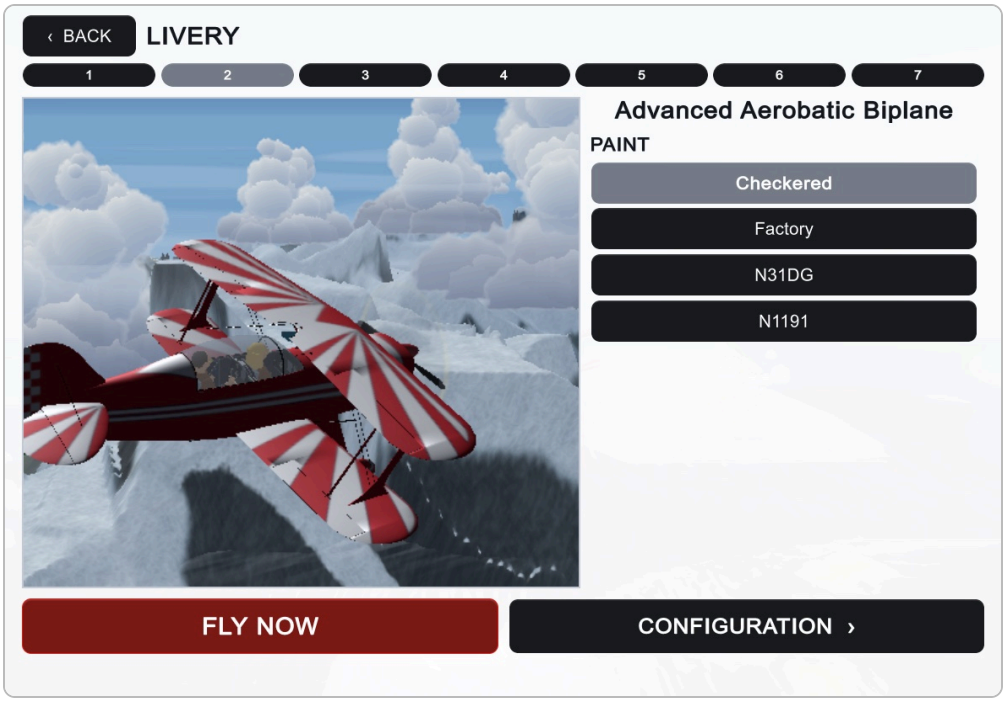

Figure 7. Step 2, LIVERY, for the Advanced Aerobatic Biplane.

Step 3: CONFIGURATION

What the aircraft stands on: standard tires, tundra tires, wheel-skis or floats. For a glider this page also sets the tow plane and tow height. For the Bush Plane it also holds the **hangar**: engine, propeller, flaps, gear and more. See Undercarriage, Aerotow and The Bush Plane's hangar.

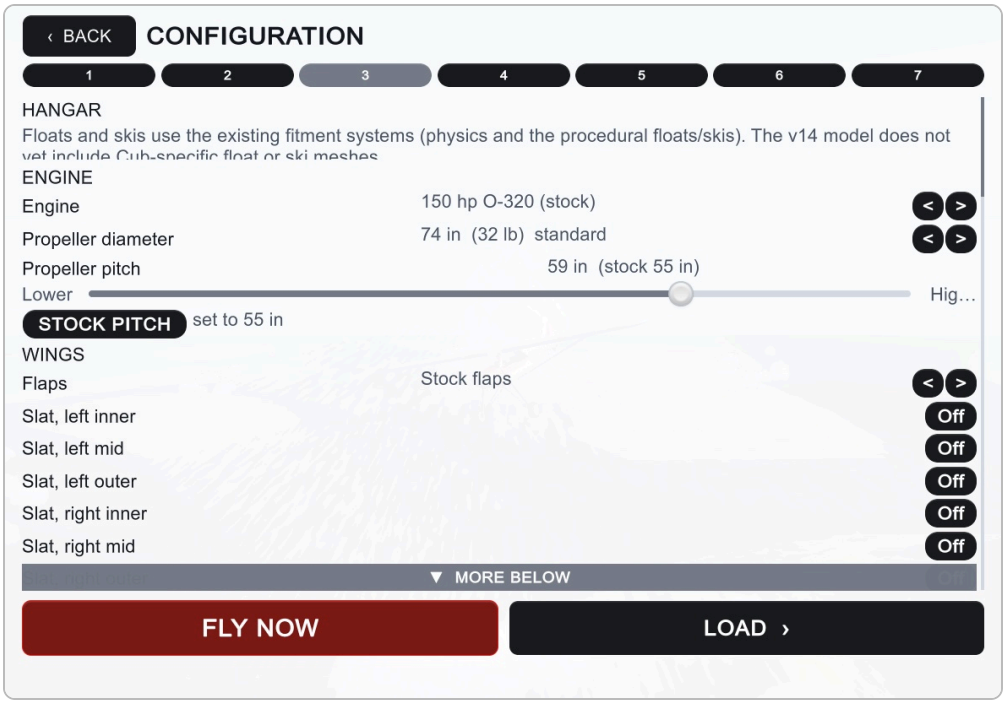

Figure 8. Step 3, CONFIGURATION, for the Bush Plane.

Step 4: LOAD

Who and what is aboard:

- **WEIGHT & BALANCE** shows a badge, IN LIMITS, CAUTION or OUT OF LIMITS, and a Details button that draws the envelope.
- **PEOPLE.** Choose a male or female pilot. Tap a seat to cycle it through You, Passenger, Friend and Empty. The – and + buttons change a person's weight.
- **FUEL** has four quick settings from empty to full. Gliders have none.
- **BAGGAGE** is set with – and + for each baggage station.

Weight and balance never stops you flying. If you press FLY NOW out of limits, the game warns you that handling will suffer and offers **Go back** or **Fly**.

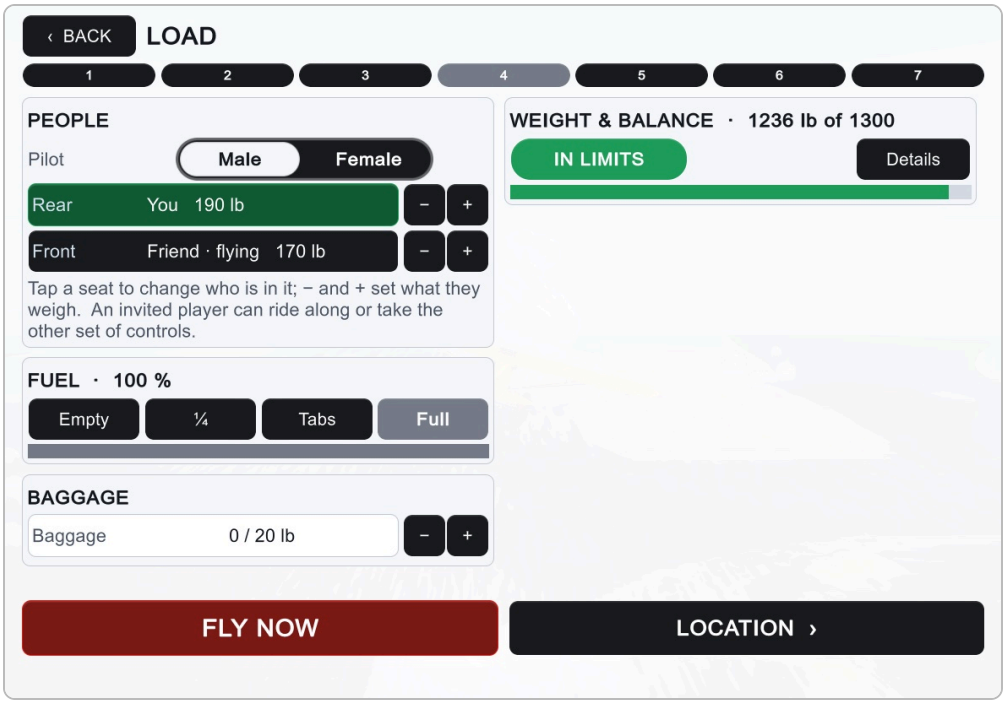

Figure 9. Step 4, LOAD, for the Tricycle Gear Trainer.

Step 5: LOCATION

Where and how the flight begins: an airport card, a START choice, and for an air start the ALTITUDE. A CHART button opens the map. See Where you can start and Start positions.

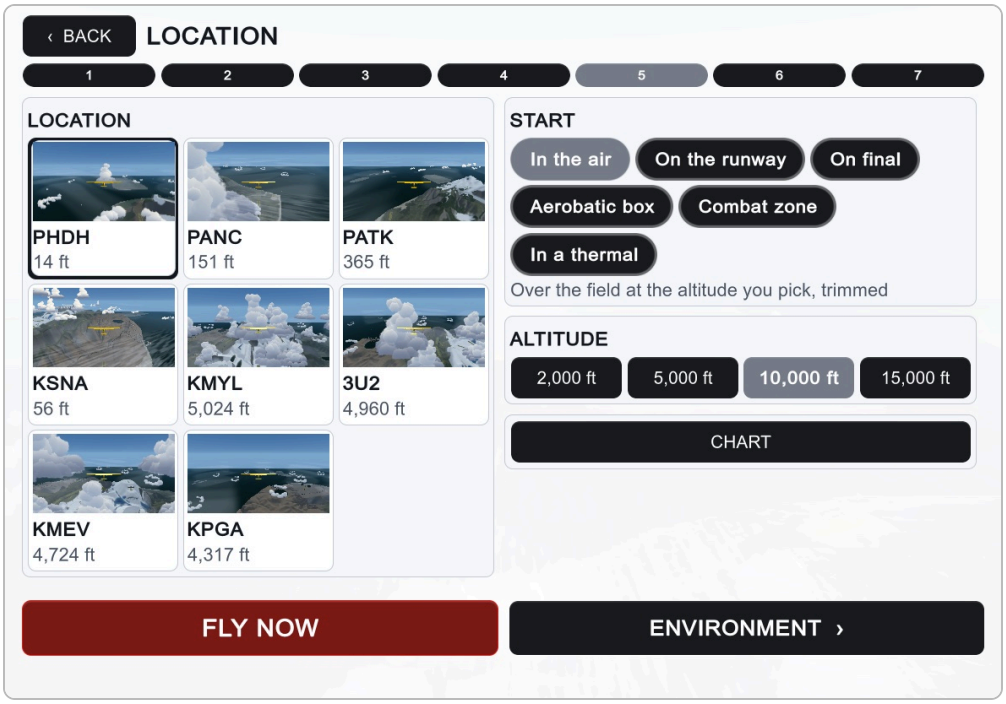

Figure 10. Step 5, LOCATION.

Step 6: ENVIRONMENT

Wind, turbulence, time of day, temperature and thermals. See Environment.

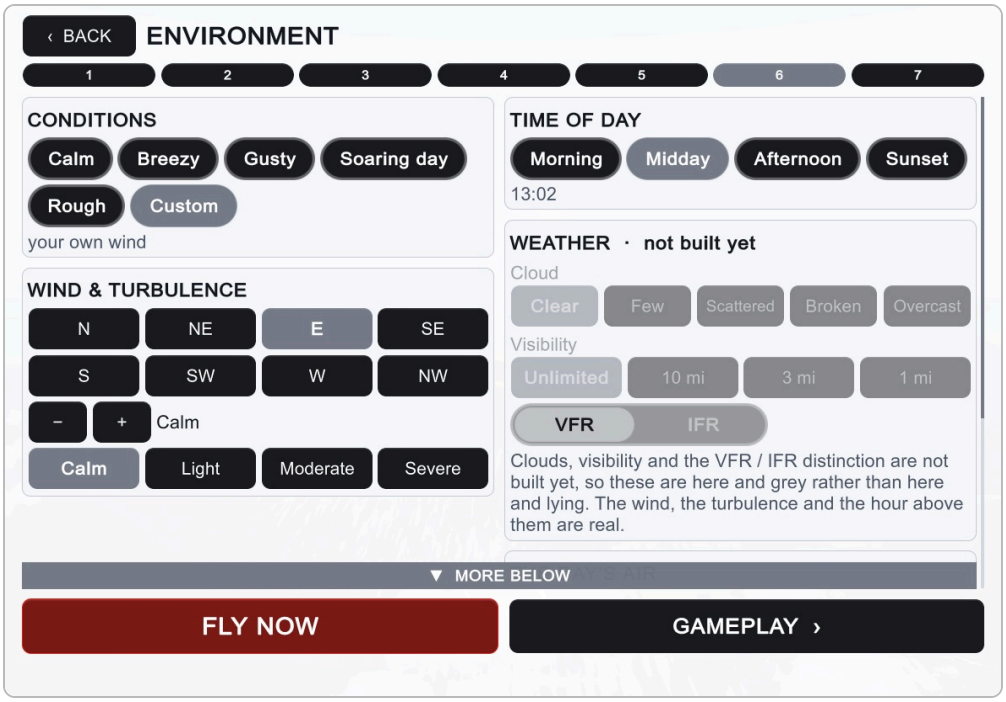

Figure 11. Step 6, ENVIRONMENT.

Step 7: GAMEPLAY

- **Build.** The first line shows the build of the game you are running. Quote it when you report a problem.
- **VIEWPOINT.** The camera the flight starts in. See Cameras.
- **UNITS.** Standard (lb · ft · kt) or Metric (kg · m · km/h).
- **RELIABILITY.** *Never fails* (the default), *Realistic*, *Tired engine* or *Training*. Anything other than Never fails allows the engine and systems to fail in flight.
- **OPEN SETTINGS ›** opens the settings.

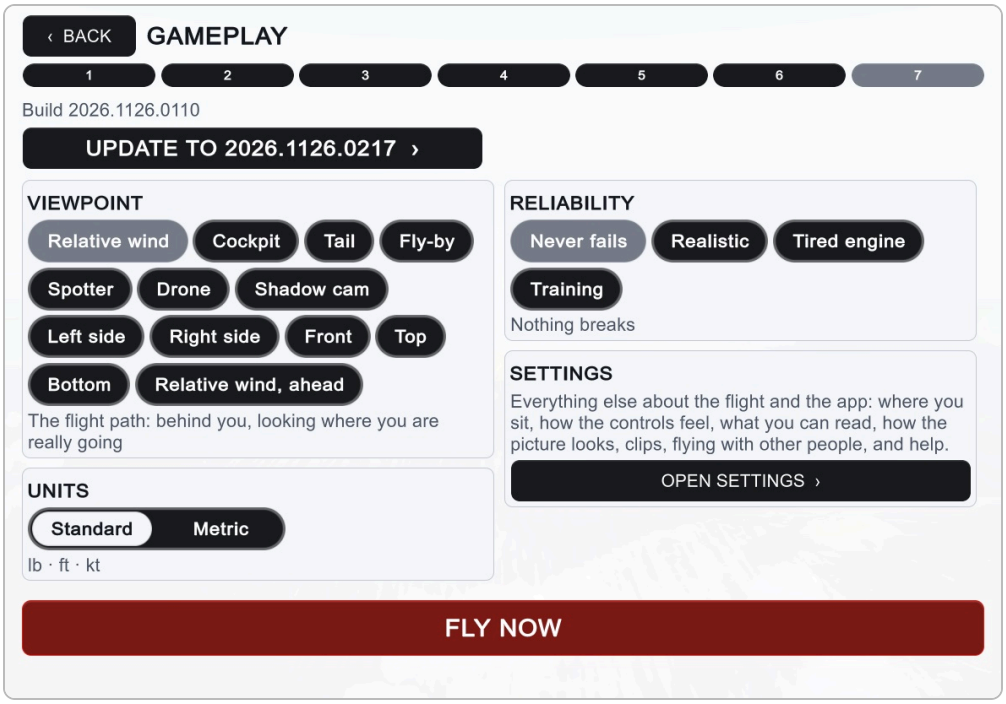

Figure 12. Step 7, GAMEPLAY.

3.2 The Quick guide

The Quick guide is the game's built-in one-page reference: your device's controls, reading the screen, taking off, landing, bailing out, the cameras, and where this manual is.

- It appears by itself on the **first launch**, over the landing page.
- Press **CLOSE** to dismiss it (on a keyboard, `Esc` or `Enter` also closes it).
- Open it again at any time: the **QUICK GUIDE** button at the foot of the AIRCRAFT page; or **OPTIONS › Help › Quick guide** in flight; or SETTINGS › Help on the landing page.
- **OPEN THE FULL MANUAL** at the bottom opens this manual in your web browser.
- In a headset the guide is a page of the menu: choose the **Quick guide** row. See The headset menu.

The guide shows the controls for the device you are holding: touch and gamepad on a phone or tablet, keyboard and gamepad on a computer, the controllers in a headset.

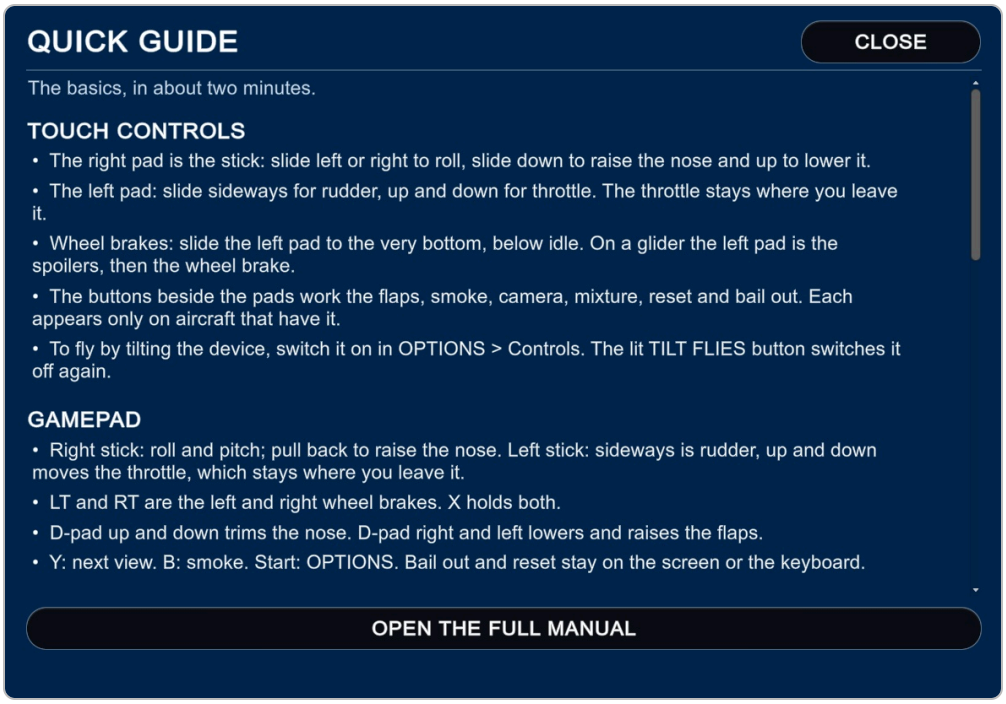

Figure 13. The Quick guide on a tablet: the touch controls come first.

3.3 The flying screen

In flight, a single row of buttons runs along the top of a flat screen:

Button	What it does
MENU	Back to the landing page. The flight ends.
VIEW	Opens CHOOSE A VIEW: every camera, plus zoom. See Cameras.
REPLAY	Plays back the last ten minutes. See Replay.
CLIP	Saves the last moments as a video. See Clips and recording.
REC	Starts and stops a recording.
AERO	Opens the AERO panel: force arrows, performance graphs and loading. See The AERO panel.
TIME	Steps the speed of time: 100, 50, 25, 10 percent. Not available when flying with other pilots.
CHART	Opens the chart. See The chart.
END	Lessons only: ends the lesson.
OPTIONS	Opens the settings and pauses.

On a phone or tablet the flying controls sit below: see Touch controls. On a computer the same buttons can be clicked with the mouse.

Your own quick-access row

You can pin up to four settings to a second row under the top bar, so that one tap changes them in flight. In OPTIONS, each setting that can be pinned has a small **+** square at the left of its row; tap it to pin (it becomes **–**; tap again to unpin).

Settings that can be pinned include the flight path vector, force vectors, flight test data, the atmosphere map, the compass letters, the Butter Meter, lift markers, air bubbles, the instrument mode, nav radios, graphics quality, key hints, language and pause-on-menu.



Figure 14. Two settings pinned to the quick-access row, under the top bar.

The row is hidden on the landing page, during a replay, and while a panel is open. In a headset, the pinned settings are the first rows of the menu instead.

Messages on the flying screen

Short lines of text appear at the top centre when something needs saying: a race clock, a tow status, a combat zone, a structural failure, or the status of a bail-out. If the game has lowered the graphics quality to keep the flight smooth, a line "Graphics lowered to …" appears with RESTORE and X buttons: see Graphics quality.

4 Controls

The aircraft has the same controls on every device: a stick (roll and pitch), a rudder, a throttle, wheel brakes, and where fitted flaps, trim, mixture, propeller, spoilers, water rudder and smoke. This chapter gives every way of working them.

4.1 All controls at a glance

Action	Phone or tablet	Keyboard	Gamepad	Headset controllers
Roll and pitch	Right pad, or tilt the device	Arrow keys	Right stick	Right thumbstick, or grab the stick
Rudder	Left pad, sideways	`A` / `D`	Left stick, sideways	Left thumbstick, sideways
Throttle	Left pad, up and down	`W` / `S`	Left stick up and down, or RB / LB	Left thumbstick up and down, or grab the lever
Wheel brakes	Bottom of the left pad	`B` (hold)	X (hold); LT / RT for each wheel	The two triggers
Parking brake	Parking Brake button when stopped	`Shift`+`B`	Right stick click when stopped	Menu row
Flaps	FLAP 0 / 50 / 100	`F`	D-pad right (down) / left (up)	X (down) / Y (up)
Pitch trim	Slider beside the right pad	`=` / `-`	D-pad up / down	A / B
Gear or skis	GEAR or SKIS button	`L`	on screen	Right thumbstick click
Water rudder	W.RUDDER button	`U`	on screen	X + Y together
Smoke	SMOKE	on screen	B	Right grip
Mixture	MIX button, then its slider	`]` richer / `[` leaner	on screen	Cockpit lever (Fly by hand)
Propeller	PROP button, then its slider	`'` up / `;` down	on screen	Cockpit lever (Fly by hand)
Spoilers (gliders)	Left pad, up and down	`W` / `S`	Left stick up and down	Left thumbstick, or the handle
Call the tug / release the tow	TOW / RELEASE	`Y` / `G`	on screen	Right thumbstick click (gliders)
Next view	VIEW or CAM	`C`	Y	Menu › View
Direction-lock view	VIEW menu	`V`	VIEW menu	Menu › View
Look around (cockpit)	Look pad, or move the device	Head tracking only	Hold left stick click + D-pad	Turn your head

Action	Phone or tablet	Keyboard	Gamepad	Headset controllers
Zoom	Pinch	Mouse wheel	Hold left stick click + D-pad up / down	not available
Options (pauses)	OPTIONS	on screen	Start	Menu button
Reset the flight	Reset	R	on screen	Menu › Reset flight
Bail out	BAIL OUT	E	on screen	Menu row (choose twice), or by hand
Replay	REPLAY	on screen	on screen	not available
Save a clip / record	CLIP / REC	on screen	View (Select) button starts and stops REC	Hold A + B for one second
Guns (combat zones)	FIRE (hold)	Space	A (hold)	Right grip

"On screen" means: click or tap the on-screen button. A gamepad has no button for gear, bail-out or reset.

4.2 Touch controls

On a phone or tablet, two pads sit at the bottom corners of the screen.

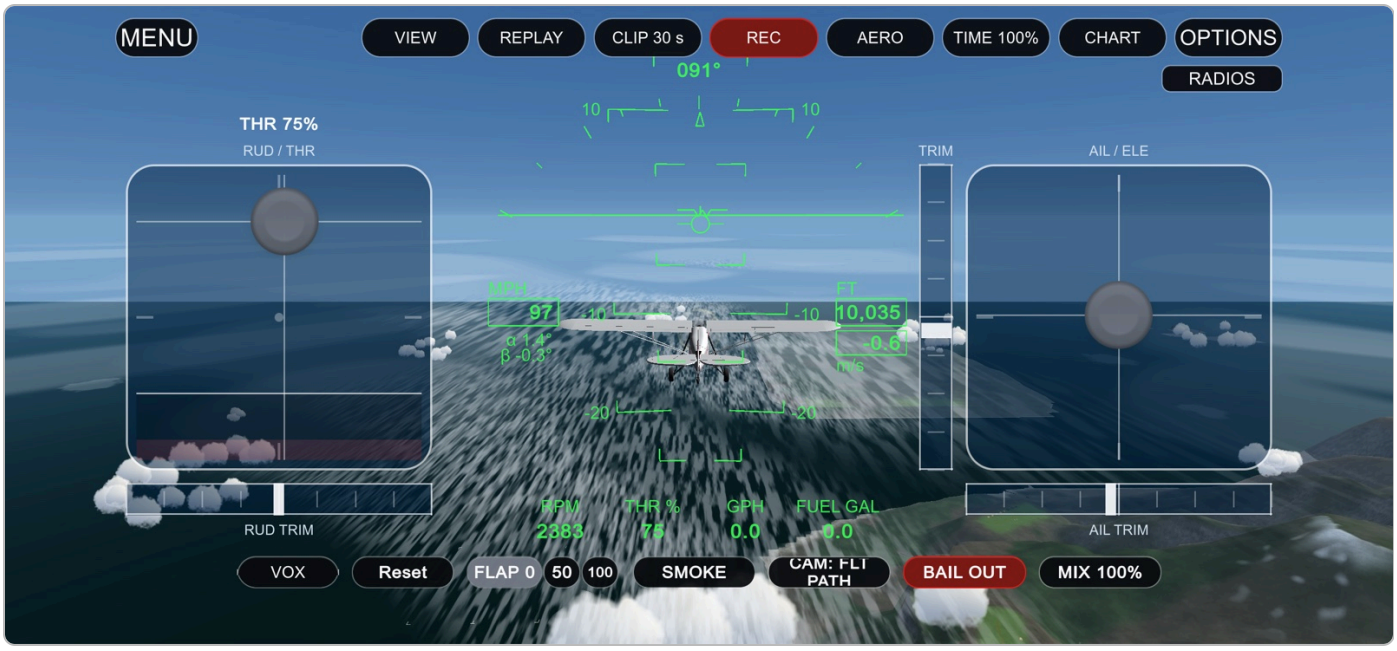

Figure 15. The touch controls in a powered aircraft: the left pad (rudder and throttle), the right pad (the stick), and the buttons along the bottom.

The right pad: AIL / ELE

The right pad is the stick.

- Slide **left or right** to roll (aileron).

- Slide **down** to raise the nose and **up** to lower it (elevator).
- Let go and the stick returns to the centre.

After a bail-out the pad is labelled CHUTE L / R and steers the parachute.

The left pad: RUD / THR

The left pad is the rudder and the throttle together.

- Slide **sideways** for rudder. It springs back to the centre.
- Slide **up and down** for throttle. The throttle **stays where you leave it**. Idle is a quarter of the way up the pad, and you can feel it as a stop.
- Slide **below idle**, through a short dead band, for the **wheel brakes**. The further down, the harder they brake; let go and the pad returns to idle. While braking, sliding sideways brakes one wheel more than the other, to steer.

The readout beside the pad shows THR and a percentage, or BRAKES ON.

In a **glider** the same pad works the spoilers instead of a throttle: the top is spoilers closed, lower opens them, and the very bottom is the wheel brake. The readout shows SPOILER.

Trim sliders

A vertical slider beside the right pad is the **pitch trim**. Horizontal bars under the pads are **RUD TRIM** and **AIL TRIM**. All three stay where you leave them. Use pitch trim to hold a speed without holding the stick.

The buttons

A button appears only when the aircraft has the thing it works.

Button	What it does
Reset	Starts the flight again from its starting point.
FLAP 0 / 50 / 100	Tap the third of the button for the setting you want. Tricycle Gear Trainer and Bush Plane.
GEAR	Raises and lowers retractable gear. No aircraft in this build has it.
SKIS	With wheel-skis fitted: switches between wheels and skis.
W.RUDDER	Floatplanes: raises and lowers the water rudder.
SMOKE	Smoke on and off. Every aircraft has smoke.
CAM	Steps between the two chase views and the cockpit.
MIX	Opens the mixture slider. The bottom of the slider is CUTOFF, which stops the engine.
PROP	Opens the propeller slider, on aircraft with a constant-speed propeller.
TOW / **RELEASE**	Gliders: call the tow plane on the ground; release the rope on tow.

Button	What it does
BAIL OUT	Leave the aircraft. One tap, no confirmation. Reads **EXIT** when stopped. See Bailing out.
FIRE	Hold to fire. Appears only inside a combat zone.
Parking Brake	Appears when stopped.
MORE	Appears if you have set bail-out and smoke to show on demand: tap it to show them for a few seconds.

In **cockpit view** three more appear: ◀ **LOOK**, **AHEAD** and **LOOK** ▶ (tap to snap the view, hold to pan), and a look pad under the top bar. See Looking around.

Portrait, and other layouts

- Hold the device upright and the controls move to a tray along the bottom. To stop the screen turning, set OPTIONS › Display › Screen to Portrait or Landscape.
- **OPTIONS › Controls › Rudder and throttle as two separate sliders** replaces the left pad with a THROTTLE slider that stays and a RUDDER slider that springs back.
- **Bail out, smoke: Always / On demand** hides those two buttons until you tap MORE.
- There is no left-handed swap of the two pads.
- When a gamepad is in use, the pads hide. With **Hide on-screen controls when a controller is connected** on (the default), the buttons hide too; tap the screen to bring them back for a few seconds.

4.3 Tilt flying and TILT FLIES

A phone or tablet with a gyro can be flown by tilting it. Tilt works the ailerons, elevator and rudder only; the throttle stays on the screen.

To turn it on: OPTIONS › Controls › **Fly by tilting the phone**. It is off by default.

- **Tilt sensitivity** sets how far you tilt for full control: from 60° (gentle) down to 10° (twitchy). The default is 35°.
- **Yaw turns the rudder** (on by default) uses twisting the device for rudder. The gyro drifts slowly, so re-centre now and then.
- **Show flight controls while tilting** (off by default). When off, the pads go away and a wide THROTTLE band stays; sliding sideways on it brakes one wheel or the other.
- **Reverse roll**, **Reverse pitch**, **Reverse yaw** flip a direction that feels wrong to you.

Centring. The position you are holding the device in when you switch tilt on becomes "controls centred". To set a new centre, hold the device where you want it and press **CENTRE TILT HERE** in OPTIONS, or **CENTRE TILT** on the cockpit look pad.

The TILT FLIES button. While tilt is flying the aircraft, a lit button labelled **TILT FLIES** is on screen, so that it is always clear why the aircraft moves when the device does. Tap it to turn tilt **off** and get the pads back. It only turns tilt off; turn it on again in OPTIONS › Controls.



Figure 16. Tilt flying with the pads hidden: the wide THROTTLE band takes the place of the left pad.

Tilt flying and "move the device to look around" cannot be used at the same time: while tilt flies, device look is off.

4.4 Keyboard

A keyboard works on every device, including a Bluetooth keyboard paired with a phone, tablet or headset.

Default keys

Flying (hold)

Key	Action
← →	Roll left and right
↓	Stick back: nose up
↑	Stick forward: nose down
A D	Rudder left and right
W S	Throttle up and down. S stops at idle; press it again from idle to brake.
= −	Pitch trim
B	Wheel brakes
Space	Guns (combat zones)
] [	Mixture richer and leaner
' ;	Propeller RPM up and down

Cockpit (press once)

Key	Action
F	Flaps, one step: 0 → 50 → 100 → 0
L	Gear, or wheels and skis
U	Water rudder
E	Bail out
R	Reset the flight
V	Direction-lock view on and off
F12	Re-centre the view and head tracking
1 … 9, 0	Switch to aircraft 1 to 10

World and activities

Key	Action
T	Step the turbulence
K	Step the wind direction
, .	Wind slower and faster
C	Start (or retry) the challenge. Also steps to the next view: see the note below.
N	Next challenge
Y	Aerotow: call the tug
G	Release the tow
H	Thermal markers on and off

Fixed keys (these cannot be changed)

Key	Action
C	Next view
Shift + B	Parking brake, when stopped
Enter	Rate the landing, when the button is showing
Esc	Close the landing scorecard
P	Re-park the Spotter, RC Mode or drone camera beside the aircraft

> **The C key does two jobs**
> `C` always steps to the next view, and by default it is also the "start the challenge" key. If that gets in your way during a graded challenge, give "Start the challenge" a different key in the keyboard setup.

Keys are ignored while the landing page, OPTIONS, a replay or a text box is up, and while `Ctrl`, `Alt`/`Option` or `Cmd`/`Win` is held. There is no key for OPTIONS, replay, smoke or clips: click the buttons.

Changing the keys

OPTIONS › Controls › **OPEN KEYBOARD SETUP**. Click a function or a key, then press the new key. If the key is already used, the game asks whether to MOVE it HERE. DEFAULT restores one function, CLEAR removes its key, and RESET TO DEFAULTS restores them all. Changes are saved at once. `Esc`, `Enter` and the modifier keys cannot be assigned.

Key hints on screen (OPTIONS › Controls) shows a one-line reminder of the main keys at the top of the flying screen.

The mouse

The mouse clicks buttons, scrolls menus, and its wheel zooms the view. In the Spotter view, dragging with the right or middle button pans the camera. **There is no mouse free look in this build**, on any device.

4.5 Gamepad

Xbox, PlayStation and other standard gamepads work on every flat screen, and over Bluetooth in a headset. A gamepad starts flying the aircraft the first time you move a stick or press a button on it. The layout is fixed; button names below are Xbox names.

Control	Action
Right stick	Roll and pitch. Pull back for nose up.
Left stick, sideways	Rudder
Left stick, up and down	Throttle. It moves the throttle while held and leaves it where it is when released; idle to full takes about two seconds.
RB / LB (hold)	Throttle up / down
LT / RT	Left and right wheel brake, as hard as you squeeze
X (hold)	Both wheel brakes
D-pad up / down (hold)	Trim nose down / nose up
D-pad right / left	Flaps down / up one step
A (hold)	Guns
B	Smoke

Control	Action
Y	Next view
Start (Menu)	Open and close OPTIONS
View (Select)	Start and stop REC
Hold left stick click + D-pad	Look around in the cockpit; up and down zoom
Right stick click	Re-centre the view. When stopped: parking brake, or rate the landing.
Hold either stick click for a moment	Let go of that stick's controls; hold again to take them back

Settings for it are in OPTIONS › Controls, under GAMEPAD AND STICK:

- **Gamepad: stick-free** (off by default): the controls float free whenever the stick is centred, as if you had let go.
- **Gamepad: click and hold a stick to let go of its controls** (on by default).
- A status line shows which gamepad the game has found.

4.6 Joysticks, throttles and rudder pedals

On a computer, any USB flight stick, throttle and pedals can be set up at OPTIONS › Controls › **OPEN CONTROLLER SETUP**:

- Six axes can be assigned: roll, pitch, rudder, throttle, left toe brake, right toe brake. Any axis of any device can drive any control, with INVERT and its own dead zone.
- Buttons can be given to: brakes, guns, flaps down, flaps up, flaps half, gear, water rudder, trim up, trim down, autopilot disconnect, pause, reset, view, smoke, stick free, and head-tracking re-centre.
- **GUIDED SETUP** walks through it one control at a time. RESET ALL clears it.
- The joystick's hat looks around in the cockpit.
- A stick that has not been set up still flies: its X, Y, twist and throttle lever are used as they are.

On a phone, tablet or headset, a USB flight stick plugged into the device flies roll, pitch, twist rudder and throttle, with its hat as pitch trim. A "Joystick setup" button appears in OPTIONS › Controls when one is found. USB rudder pedals can be set up on Android and in a headset (axis, invert, dead zone and a guided calibration).

Stick feel applies to every kind of stick and pad (OPTIONS › Controls › STICK FEEL):

Setting	Range	Default
Stick expo (softens the stick near the centre)	0 to 70 %	30 %
Aileron, elevator and rudder dead zone	0 to 30 %	The aircraft's own
Idle-to-brake dead zone	5 to 20 %	15 %
USB flight stick: reverse the throttle lever	on / off	off

Aircraft defaults puts the stick feel back.

The controller setup screens were built without access to every device; if yours misbehaves, see Troubleshooting.

4.7 Looking around

Looking around applies to the **cockpit view**. In the outside views the camera frames the aircraft for you.

Device	How to look around
Phone or tablet	The look pad under the top bar (▲ ◀ ▶ ▼ with a centre key), the ◀ LOOK / AHEAD / LOOK ▶ buttons, or **move the device**
Computer	A gamepad (hold the left stick click and use the D-pad), a joystick hat, or head tracking
Headset	Turn your head

Move the device to look around (OPTIONS › Controls, off by default) turns the view as you turn the phone or tablet, like a window into the cockpit. *Look gain* (1 to 10, default 3.5) sets how far the view turns for a given movement, and *Steady the view* smooths it. RECENTRE on the look pad sets "straight ahead" to where the device points now. It cannot be used while tilt flying.

Head tracking (computers only): OPTIONS › Controls › HEAD TRACKING (TrackIR / OpenTrack). On Windows the game reads TrackIR 5, or OpenTrack set to "freetrack 2.0 Enhanced". On Windows, Mac and Linux it also listens for OpenTrack's UDP output on this computer, port 4242. Options: Lean and crane (6DOF), Reverse head turn, Reverse head tilt, Recenter, and a joystick button for re-centring. `F12` re-centres.

Mouse free look is not in this build. Earlier notes describe free look as a Mac and Windows feature; this build does not include it on any device.

4.8 Headset controllers

Control	Action
Right thumbstick	Roll and pitch
Left thumbstick, sideways	Rudder
Left thumbstick, up and down	Throttle; stays where you leave it. Spoilers on a glider.
Left grip, then move your hand	Take hold of the throttle: about 20 cm of hand travel is the whole lever
Left / right trigger	Left / right wheel brake
Right grip	Smoke; guns inside a combat zone
A / B (hold)	Trim nose up / nose down
X / Y	Flaps down / up one notch
X + Y together	Water rudder

Control	Action
Right thumbstick click	Gear; on a glider, tow and release
Left thumbstick click	Re-centre your view. Held for a second, it also opens the menu.
Menu button (left controller)	Open the menu and pause
A + B held for a second	Start and stop recording

Fly by hand (a row in the menu, off by default) draws your body in the seat and lets you take the real stick, throttle, latches and switches with the grips or your tracked hands. With the controllers put down, your bare hands do not fly the aircraft by themselves: a left pinch held for a second opens the menu, and a right pinch held for a second re-centres.

More in Flying in a headset.

4.9 Phone as a controller, TV and Cardboard

- **TV screen (iPhone and iPad).** With a TV or external display connected, OPTIONS › Display › TV screen offers *Mirror* or *Game on TV*. With Game on TV, the picture goes to the TV and the device becomes the controller, with a TOUCH FLIES / GYRO FLIES button.
- **Companion.** An iPhone or iPad can be paired with a Mac (by QR code or PIN) as its controls: OPTIONS › Controls › OTHER DEVICES. The same section can share a Mac's joystick with a phone or tablet on the same Wi-Fi.
- **Second monitor (Mac).** OPTIONS › Display › Second monitor: Instruments.
- **Cardboard headset.** OPTIONS › Controls › VR (Cardboard headset) splits a phone's screen for a cardboard viewer, with head tracking. Hold a finger on the screen to re-centre. Touch controls are hidden, so fly with a gamepad.
- **Local 2-player.** Two pilots on one screen, with two controllers, or with the keyboard or touch controls and one controller. See Split screen.

5 The aircraft

5.1 The fleet

Nine aircraft are in the picker on every device. All of them are available from the start: nothing has to be unlocked.

Name in the game	Shelf	What it is	Engine	Seats
Glider Trainer	GLIDERS	Two-seat training glider	none	2
Aerobatic Glider Trainer	GLIDERS	Two-seat aerobatic glider	none	2
Classic Trainer	BUSH & UTILITY	Light tailwheel trainer	85 hp	2
Classic Trainer on Floats	(a configuration of the Classic Trainer)	The same aircraft on twin floats	85 hp	2
Bush Plane	BUSH & UTILITY	Tailwheel bush aircraft with a hangar of modifications	150 hp (others in the hangar)	2
Tricycle Gear Trainer	TRAINERS	Four-seat nosewheel trainer	180 hp	4
Aerobatic Trainer	AEROBATIC	Open-cockpit aerobatic biplane	180 hp	2
Advanced Aerobatic Biplane	AEROBATIC	High-performance aerobatic biplane	260 hp	2
Advanced Aerobatic Monoplane	AEROBATIC	Unlimited aerobatic monoplane	300 hp	2

Every aircraft can make **smoke**, powered or not, and none has retractable gear. Speeds in this chapter are the markings on each aircraft's own airspeed indicator, in the unit that aircraft uses (mph or knots). G limits are the structural limits the game applies: see Breaking the aircraft.

Some activities allow only some aircraft: lessons are flown in the trainers, and the aerobatic box in the aerobatic types. See Activities.

5.2 Glider Trainer

The first aircraft you fly, and the default. A yellow, strut-braced, two-seat training glider: slow, forgiving and honest.



Figure 17. The Glider Trainer.

Engine	None. Launched by aerotow.
Seats	Front seat (default), Rear seat
Landing gear	One main wheel with a brake, a nose skid, and tail and wingtip skids
Speed control	Spoilers, on the throttle control. The wheel brake comes on at the very end of the spoiler travel.
Flaps	None
Never exceed	98 mph. Normal range 38 to 65 mph (green), caution 65 to 98 mph (yellow).
G limits	+4.67 / −2.33
Trim	A lever with four marked positions: On tow, Penetration, Best glide, Min sink
Other	Tow release. The canopy can be jettisoned for a bail-out. A nose ballast weight can be loaded on the LOAD page.

Flying it. The "throttle" control is the spoilers: fully up (or forward) is closed, which is where you want them except on approach. Best glide is a little over 50 mph (the Best glide challenge asks for 23.5 m/s, which is about 53 mph). Use the rudder with the ailerons in every turn: a long-winged glider yaws noticeably the wrong way if you do not, and the yaw string on the canopy shows it.



Figure 18. The Glider Trainer from the front seat.

5.3 Aerobatic Glider Trainer

A modern two-seat glider stressed for aerobatics. Much faster and slipperier than the Glider Trainer.



Figure 19. The Aerobatic Glider Trainer.

Engine	None. Launched by aerotow.

Seats	Front seat (default), Rear seat
Landing gear	Fixed: a main wheel with a brake, a steerable nose wheel and a tail wheel
Speed control	Airbrakes, on the throttle control. They add drag and also reduce lift.
Flaps	None
Never exceed	151 knots, reducing with altitude. The airspeed indicator reads knots.
G limits	+6.5 / −4.0 (reducing to +5.3 / −3.0 at the never-exceed speed; +3.5 / −1.5 with the airbrakes out)
Other	Tow release. Jettisonable canopy. Front trim weights can be loaded on the LOAD page.

Flying it. It gains speed quickly with the nose down: watch the airspeed in aerobatics and keep the airbrakes for the approach. It is one of the four aircraft allowed in the aerobatic box.



Figure 20. The Aerobatic Glider Trainer from the front seat.

5.4 Classic Trainer

A light, fabric-covered, two-seat tailwheel trainer. Low power, low speed, and the classic way to learn to use your feet.



Figure 21. The Classic Trainer.

Engine	85 hp, fixed-pitch wooden propeller, 2,575 rpm maximum
Seats	Rear seat (solo, the default), Front seat
Landing gear	Tailwheel, with a steerable tailwheel
Flaps	None
Never exceed	122 mph. The airspeed indicator reads mph.
G limits	+3.8 / –1.5
Fuel and load	One nose tank; a small baggage space
Hangar	Tire pressure, 8 to 24 psi (on wheels)
Other	Can act as a tow plane. The door folds open; nothing is jettisoned for a bail-out.

Flying it. Flown solo from the **rear** seat, so the view ahead on the ground is poor: weave gently when taxiing. On take-off the tail comes up early; keep straight with small, quick rudder movements. Land it three-point (all three wheels together) at a walking pace.



Figure 22. The Classic Trainer from the rear seat.

5.5 Classic Trainer on Floats

The Classic Trainer on twin floats. You choose it as the **Floats** card on the Classic Trainer's CONFIGURATION page, not as a separate aircraft.



Figure 23. The Classic Trainer on Floats.

Engine	85 hp, metal propeller
Landing gear	Twin floats. No wheels and no brakes.
Water rudder	Retractable, on the left float
Maximum weight	Higher than the landplane

See Floatplanes for how to handle it on the water.



Figure 24. A water start in the Classic Trainer on Floats.

5.6 Bush Plane

A two-seat tailwheel bush aircraft with flaps, built to get in and out of short, rough places. It is the only aircraft with a full hangar of modifications, and it is the aircraft of the STOL Cub courses.



Figure 25. The Bush Plane, from its left side.

Engine	150 hp as standard, fixed-pitch metal propeller. Three other engines in the hangar.
Seats	Front seat, Rear seat
Landing gear	Tailwheel. Standard tires, or tundra tires, wheel-skis or floats.
Flaps	Yes: 0, 50 and 100 percent
Airspeed marks	Red line 153 mph. Flap range 43 to 85 mph (white), normal range 47 to 121 mph (green), caution 121 to 153 mph (yellow).
G limits	+3.8 / –1.52

Flying it. Full flap and a slow, steep approach are what it is for. With power on and full flap it will fly remarkably slowly; keep the nose from rising too far, because the stall arrives with little warning at that weight of drag.



Figure 26. The Bush Plane from the front seat.

5.7 Tricycle Gear Trainer

A four-seat, high-wing, nosewheel trainer. The easiest powered aircraft to take off and land.



Figure 27. The Tricycle Gear Trainer.

Engine	180 hp, fixed-pitch propeller

Seats	Pilot, Right front, Rear left, Rear right. You can sit in either front seat.
Landing gear	Tricycle, with a steerable nose wheel
Flaps	Yes: 0, 50 and 100 percent
Airspeed marks	Red line 163 knots. Flap range 40 to 85 knots (white), normal range 48 to 129 knots (green), caution 129 to 163 knots (yellow).
G limits	+3.8 / −1.52
Fuel and load	Two wing tanks; two baggage areas

Flying it. A nosewheel aircraft tracks straight on the ground by itself, so it needs far less footwork than the tailwheel types. Fly the approach inside the white arc with full flap. This aircraft was the last to join the fleet and is the least polished: if a control surface you can see does not appear to move, that is a known drawing fault and the aircraft is still responding.



Figure 28. The Tricycle Gear Trainer from the pilot's seat.

5.8 Aerobatic Trainer

A two-seat, open-cockpit aerobatic biplane. Graceful rather than fast, and a fine first aerobatic aircraft.



Figure 29. The Aerobatic Trainer.

Engine	180 hp, constant-speed propeller governed to 2,700 rpm
Seats	Rear seat (solo, the default), Front seat
Landing gear	Tailwheel
Flaps	None
Airspeed marks	Never exceed 153 mph. Normal range 58 to 120 mph (green), caution 120 to 153 mph (yellow).
G limits	+5.4 / −4.0
Fuel	Top wing tank and fuselage header tank
Paint	Red sunburst, White stripes

Flying it. It has a propeller lever as well as a throttle and mixture: see Engine controls. Leave the propeller fully forward for aerobatics. There is no canopy, so a bail-out is immediate.



Figure 30. The Aerobatic Trainer from the rear seat.

5.9 Advanced Aerobatic Biplane

A small, powerful two-seat aerobatic biplane. Very quick in roll and demanding on the ground.



Figure 31. The Advanced Aerobatic Biplane.

Engine	260 hp, constant-speed propeller governed to 2,500 rpm (2,700 maximum)

Seats	Rear seat (solo, the default), Front seat
Landing gear	Tailwheel
Flaps	None
Airspeed marks	Never exceed 212 mph. Normal range 63 to 154 mph (green), caution 154 to 212 mph (yellow).
G limits	+6 / −5
Fuel	Main fuselage tank and upper wing auxiliary tank
Paint	Checkered, Factory, N31DG, N1191
Other	Jettisonable canopy

Flying it. You cannot see ahead over the nose on the ground or in the flare: look to the sides. It lands fast for its size and wants to swap ends if you stop flying it before it stops rolling.



Figure 32. The Advanced Aerobatic Biplane from the rear seat.

5.10 Advanced Aerobatic Monoplane

A two-seat, mid-wing, composite monoplane built for unlimited aerobatics. The strongest and fastest-rolling aircraft in the fleet.



Figure 33. The Advanced Aerobatic Monoplane.

Engine	300 hp, three-blade constant-speed propeller governed to 2,500 rpm
Seats	Rear seat (solo, the default), Front seat
Landing gear	Tailwheel
Flaps	None
Airspeed marks	Never exceed 220 knots. Normal range 60 to 158 knots (green), caution 158 to 220 knots (yellow).
G limits	+10 / −10
Fuel	Acro (centre) tank, left wing tank, right wing tank
Paint	Unmarked, Talk Flying, N300UY
Other	The canopy is not jettisoned in a bail-out

Flying it. It will pull more g than you can: see G effects on the pilot. It is the fastest way round the race courses.



Figure 34. The Advanced Aerobatic Monoplane from the rear seat.

5.11 Paint schemes

Chosen on step 2, LIVERY:

Aircraft	Schemes
Advanced Aerobatic Monoplane	Unmarked, Talk Flying, N300UY
Advanced Aerobatic Biplane	Checkered, Factory, N31DG, N1191
Aerobatic Trainer	Red sunburst, White stripes
All others	One scheme

On some phone builds only the first scheme of each aircraft is installed, to keep the download small.

5.12 Undercarriage

Chosen on step 3, CONFIGURATION. The cards offered depend on the aircraft.

Card	What it is for
Standard tires (Wheels, or Standard, on the gliders)	Runways and firm ground. Required for lessons and scored contests.
Tundra tires, 26, 29, 31 or 35 in, and 35 in heavy duty	Big soft tires for gravel bars and rough ground

Card	What it is for
Wheel-skis (centre and tip skis on gliders)	Snow and glacier landings; the wheels still work on hard ground. A SKIS button and the L key switch between them.
Floats	Water only. Gross weight is raised by 20 percent.

Notes:

- Only the Classic Trainer has floats that were built and flown as their own aircraft. On the other powered aircraft the float fit is worked out from the landplane and is marked "derived, unflown": it works, but expect rough edges.
- On floats the Glider Trainer becomes a small flying boat, with a planing hull and wingtip floats.
- Straight skis and amphibious floats are not offered.
- An activity can lock this choice. A greyed card reads "Not in this activity".

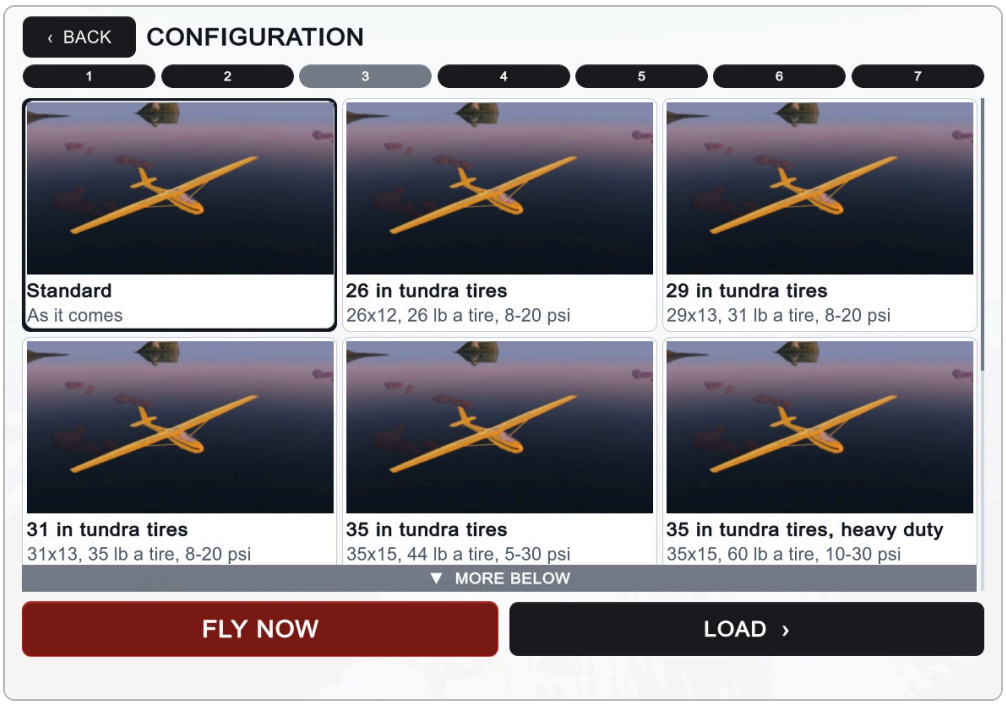

Figure 35. CONFIGURATION for a glider: undercarriage, TOW PLANE and TOW HEIGHT.

5.13 The Bush Plane's hangar

With the Bush Plane selected, the CONFIGURATION page continues below the undercarriage cards with a hangar. Each change is a real change to the aircraft you fly.

Group	Options
ENGINE	150 hp O-320 (stock) · 180 hp O-360, fixed pitch · 215 hp O-390, constant speed · 160 hp Rotax 916 iS turbo, constant speed. Propeller diameter 74 to 84 in, propeller pitch, and STOCK PITCH.
WINGS	Stock flaps or double-element flaps. Six leading-edge slat switches.

Group	Options
UNDERCARRIAGE	Main gear: standard, +6 in, or +18 in Storch-style. Suspension: bungee (stock) or hydraulic and tunable (spring rate, compression and rebound damping). Tire pressure 5 to 30 psi. Tailwheel: standard, tundra with spring steel, or tundra with a shock-absorber tail.
BALANCE	Tail weight, 0 to 40 lb, one foot ahead of the tail post
CONTROLS	Oversize elevator, oversize rudder, vortex generators on wing and tail, stabilizer-tip finlets, control throw and bias for each axis, and STOCK THROWS
RESULT	A readout of what your choices add up to: empty weight, flying weight, centre of gravity, propeller ground clearance and three-point attitude

The two constant-speed engines add a PROP control in flight. On floats, the wheel rows are greyed out. The Classic Trainer has a much smaller hangar: tire pressure only.

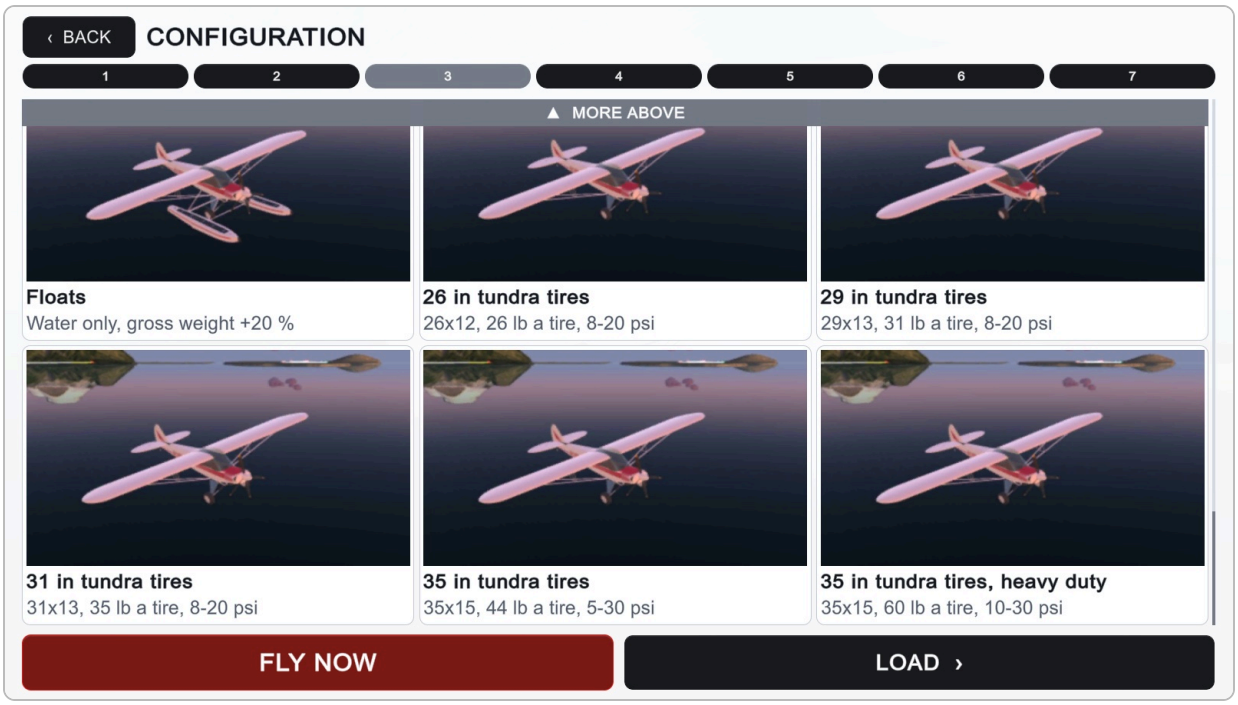

Figure 36. The foot of the Bush Plane's CONFIGURATION page: the hangar.

5.14 Operating notes

Brakes

All the wheeled aircraft have wheel brakes.

- **Phone or tablet:** slide the left pad to the very bottom, below idle.
- **Keyboard:** hold `B`. From idle, pressing `S` again also brakes.
- **Gamepad:** hold X for both, or squeeze LT and RT for the left and right wheel.
- **Headset:** the two triggers.

Braking one wheel more than the other steers on the ground. Braking hard in a tailwheel aircraft at speed can put it on its nose.

A **Parking Brake** button appears once you have stopped (`Shift`+`B`; right stick click on a gamepad).

Engine controls

- **Throttle.** Every powered aircraft.
- **Mixture.** Every powered aircraft has a **MIX** control (keys `]` and `[`). Full rich is correct at low altitude. Leaning helps high up, at the mountain airports. The bottom of the mixture control is **CUTOFF**, which stops the engine.
- **Propeller.** The Aerobatic Trainer, both Advanced Aerobatic types and the Bush Plane's two constant-speed engines have a **PROP** control (keys `'` and `;`). Fully forward is maximum RPM, for take-off and aerobatics. Pulling it back lowers the RPM for a quieter, more economical cruise.

There is no separate starter: flights begin with the engine running.

Flaps

The Tricycle Gear Trainer and the Bush Plane have flaps with three positions, 0, 50 and 100 percent (`F` steps through them; on a touch screen tap the third of the FLAP button you want). Use them only inside the white arc on the airspeed indicator. In a lesson, the flap setting is chosen on the lesson's own page and the FLAP button is hidden.

Trim

Pitch trim holds a speed for you. Set the attitude you want with the stick, then trim until you can let go (`=` and `–`, the slider beside the right pad, the D-pad, or A and B in a headset). On a touch screen there are also rudder and aileron trim bars.

Smoke

Every aircraft has a smoke system: exhaust smoke on the powered types and wingtip canisters on the gliders. Use the SMOKE button, B on a gamepad, or the right grip in a headset. In a race the smoke is switched on for you. There is no choice of smoke colour.

Gliders

A glider has no throttle. The control that would be the throttle works the **spoilers** (Glider Trainer) or **airbrakes** (Aerobatic Glider Trainer): closed at the top of its travel, open below, with the wheel brake at the very bottom.

To stay up, find rising air: thermals (see Thermals) or the windward side of a ridge. Turn on **Show lift** or **Air bubbles** in OPTIONS › Flying aids to see it. The variometer (the vertical-speed dial, in knots) tells you whether you are climbing.

Aerotow

A glider started **On the runway** is hooked to a tow plane on a 61 metre rope straight away.

1. The tug accelerates. Keep the wings level and stay directly behind it.
2. The glider lifts off first. Hold it a few feet up until the tug flies.
3. Follow the tug: keep it in the same place in your windscreen. Bank when it banks.
4. At the tow height you chose, **release**: the RELEASE button, `G`, or a right thumbstick click in a headset. Turn away from the tug.

On the CONFIGURATION page a glider has two extra choices:

- **TOW HEIGHT:** 1,000, 2,000, 3,000 or 4,000 feet above the ground. The default is 2,000.
- **TOW PLANE:** for the Aerobatic Glider Trainer, a Pawnee or a Super Cub. The Glider Trainer is towed by a Great Lakes biplane for now.

On the ground at any other time, the **TOW** button (or `Y`) calls the tug to you. There is no winch launch.



Figure 37. A Glider Trainer hooked to its tow plane at the start of a runway launch.

Floatplanes

With floats fitted, the **On the runway** and **On final** starts use water: a marked water lane if the airport has one long enough (PANC has one, on Lake Hood), otherwise the nearest suitable lake or the open sea.

- **Taxiing.** Lower the water rudder (W.RUDDER, `U`, or X + Y in a headset) and steer with the rudder. There are no brakes: the aircraft moves whenever the engine is running.
- **Taking off.** Raise the water rudder. Stick fully back, full power. As the floats climb onto the "step" the nose drops: ease the stick forward to hold that planing attitude, let the speed build, then ease back to lift off.

- **Landing.** Land into the wind in a slightly nose-up attitude and hold the stick back as it slows.
- **Currents.** Lakes are still. The sea has a slow tidal stream. Rivers run fast and shallow: floats ground in them.
- A floatplane's propeller can strike the water if you let the nose dig in.

Seats and the canopy

In the two-seaters you choose where you sit: OPTIONS › View › **Cockpit seat** (Rear or Front), or the SEAT button on the cockpit look pad. Solo aerobatics is flown from the rear seat, which is why the aerobatic types and the Classic Trainer default to it.

OPTIONS › View › **Canopy** opens and shuts the canopy on aircraft that have one you can open. It opens only at low speed; faster than that it shuts and locks.

6 The world

6.1 The island

There is one world: a single island about 40 kilometres across, surrounded by open sea. Its regions are modelled on very different places: a tropical coast, an Alaskan port with a seaplane lake, a California coastal city, high mountain valleys, a desert with a dry lake, a canyon lake with a dam, glaciers, and a roadless backcountry of river canyons. There is no map selector; you choose where on the island to start.

There is no wall at the edge of the world. Fly out to sea and you simply have a long way to fly back. The sea is drawn to about 45 kilometres from the centre.

The highest ground is Frank Church (8,072 ft). Other peaks: Sierra (7,329 ft), Chugach (5,915 ft), Drake Hill (5,750 ft), Fairweather (5,187 ft), Mokuleia (2,950 ft), Catalina (2,100 ft), and a volcano at Sitka with a rim at 2,600 ft.

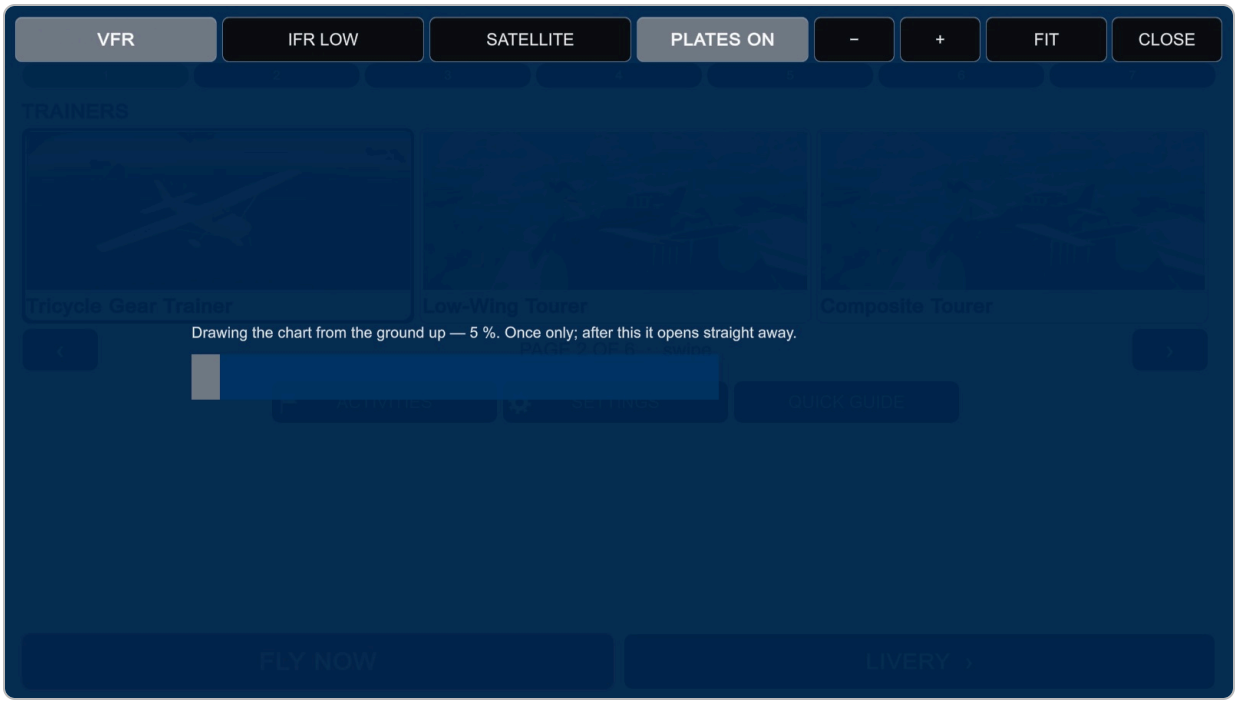

Figure 38. The chart, opened from the LOCATION page.

6.2 Where you can start

The LOCATION page offers eight airports. Each card shows the airport's identifier and its elevation. PHDH is the default.

Airport	Elevation	Runways	Character
PHDH	14 ft	8/26, 9,007 × 75 ft, asphalt	Sea level, long and calm. The home field.

Airport	Elevation	Runways	Character
PANC	151 ft	16/34, 10,865 × 200 ft, asphalt. Water lane 16W/34W on Lake Hood (4,541 ft). Gravel strip 2,200 ft.	The big airport, with the island's seaplane base
PATK	365 ft	2/20, 3,500 × 75 ft, asphalt	Small-town strip
KSNA	56 ft	2L/20R, 5,700 × 150 ft; 2R/20L, 2,886 × 75 ft, asphalt	City airport, next to OC Fly City
KMYL	5,024 ft	17/35, 6,101 × 75 ft, asphalt	High mountain valley
3U2	4,960 ft	19/1, 3,400 × 150 ft, turf, sloping	Mountain turf strip: land on 19, depart on 1
KMEV	4,724 ft	17/35, 7,399 × 100 ft; 13/31, 5,299 × 75 ft, asphalt; a 2,000 ft grass runway	High valley with crossing runways
KPGA	4,317 ft	16/34, 5,950 × 150 ft; 10/28, 2,201 × 75 ft, asphalt	Desert canyon country, by Lake Powell

At the high airports (above 4,000 ft) every aircraft takes longer to get off the ground and climbs more slowly. Lean the mixture there.

6.3 Start positions

Under **START** on the LOCATION page:

Start	Where you begin
In the air	Over the field at the altitude you pick, trimmed. The default.
On the runway	At the threshold, engine idling. Gliders are hooked to the tow plane; floatplanes start on water.
On final	300 ft up on final approach, trimmed at best glide
Aerobatic box	Running in to the box at 2,300 ft
Combat zone	Entering the zone, guns hot
In a thermal	Circling at minimum sink, trimmed

- **ALTITUDE** (In the air only): 2,000, 5,000, 10,000 or 15,000 ft. The default is 10,000.
- **RUNWAY** (On the runway and On final): *Into wind* takes whichever runway the wind favours. *Crosswind* takes the main runway whatever the wind is doing, which is the one to practise on.

An activity sets its own start and locks these choices.

6.4 Other places to land

You can only *start* at the eight airports above, but you can land anywhere flat enough, and many more fields are built.

Airports you can fly to

Field	What is there
KAVX, Catalina	3,000 ft asphalt runway on a hilltop at 1,602 ft
KMHV, Mojave	Three runways, the longest 10,000 ft, beside a dry lake
KSZP, Santa Paula	2,665 × 60 ft, unlit, with hangars and letters on the hillside
SITX, Sitka Sound	3,609 ft waterfront runway
TERN, NHVN (North Haven), KITE (Kite Anchorage), RIME (Rime Harbour)	Gravel strips on the outer islands, 2,460 to 2,953 ft
DRAKE	A one-way grass strip **inside** the Drake Hill cavern: see Things to find

Airparks. Fourteen small strips, 60 ft wide and 1,500 to 2,800 ft long, of grass, gravel or dirt: Payette, Talkeetna village, Carson Valley, Mokuleia ranch, Windward bluff, Upcountry ranch (on a 3 percent slope), Point Mac, a Willow-style strip with a float pond, Turnagain bench, Yellow Pine, Payette east shore, Bullfrog, Navajo mesa and Trabuco ranch. They range from 180 ft to 4,925 ft above sea level.

Bush strips, beaches and pads. The Knik River bar strip (gravel) and Seldon's Strip (grass), both 1,200 ft and one-way. Six hard-sand beaches, 300 to 350 metres long. Two mesa-top pads near Page. A ski landing zone on the Fairweather glacier at 1,300 ft, for wheel-skis.

The carrier. An aircraft carrier steams in a slow circle off OC Fly City at 18 knots. Its 330 metre deck can be landed on. There is no arresting gear.

Backcountry strips

The Frank Church backcountry has nine turf and dirt strips in river canyons, between about 3,500 and 4,100 ft.

Strip	Length	Notes
Chamberlain	1,100 m	Two-way
Big Creek	1,070 m	Two-way
Thomas Creek	1,220 m	Two-way
Sulphur Creek	915 m	Two-way
Indian Creek	1,220 m	Two-way
Mackay Bar	460 m	Two-way
Soldier Bar	400 m	**One-way**, 4.5 percent slope
Cabin Creek	460 m	**One-way**, 6.5 percent slope
Dewey Moore	370 m	**One-way**, 7 percent slope

On a one-way strip you land uphill and take off downhill, whatever the wind. Once you are low on the approach there is no going around: the ground ahead rises faster than the aircraft can climb. Fly them in the Bush Plane or the Classic Trainer.

6.5 Things to find

- **Aerobatic boxes.** Three marked boxes, each 1,000 metres square and from 100 to 1,100 metres above the surface: AB1 Dillingham near PHDH and AB2 Cook Inlet near PANC, both over water and marked by moored rafts and orange corner buoys; and AB3 McCall near KMYL, a high box marked on the ground.
- **Combat zones.** Four practice areas where the guns work: AP KAIWI MOA (north-east), AP PAINTED MOA (east-south-east) and AP SUSITNA MOA (north-west), each well out from the centre, and AP TERN MESA MOA over Tern Island. Each has target drones, a bridge and a rock arch. See Combat zone.
- **The Drake Hill cavern.** A hidden chamber 820 metres long inside Drake Hill, with a single portal on its north side and a runway inside.
- **The pirate cave** on Catalina, with a skylight and a wreck inside, and the **Catalina sea arch** (280 metre span). Two more arches: the Gateway river arch and the Powell arch.
- **OC Fly City**, east of KSNA: 25 towers up to 300 metres, one with a hole through it, rooftop rings to fly through, a spinning ring, and a rooftop landing pad 120 metres up.
- **The ring race course**, from a ridge arch down through the city to the coast. See Racing.
- **Lake Powell**: a dam, rock spires, a marina and a float base. **Lake Hood** at PANC: the float base and hangar.
- **Mojave**: the dry lake (15,000 × 6,000 ft of flat ground), an aircraft boneyard and wind turbines.
- **Knik**: braided gravel river bars, a glacier, and an ice lake with drifting icebergs that calve from the glacier front. A second glacier at Fairweather.
- **Water**: 22 lakes, canyon rivers and two dozen creeks.

Obstacles are solid. Six radio towers (35 to 180 metres, with red lights), five sets of power lines with marker balls, every building, and every tree will damage or destroy the aircraft.

6.6 Environment

Step 6 of the landing page. In a scored contest these are set by the contest and locked.

CONDITIONS is a row of presets:

Preset	Wind	Turbulence	Thermals
Calm	none	Calm	Weak
Breezy	10 kt	Light	Normal
Gusty	18 kt	Moderate	Normal
Soaring day	6 kt	Light	Boomer
Rough	25 kt	Severe	Weak

Preset	Wind	Turbulence	Thermals
Custom	your own	your own	your own

Changing any single setting below switches the preset to Custom.

WIND & TURBULENCE

- Direction: eight compass buttons, N to NW. The wind comes *from* that direction.
- Speed: – and + in 5 knot steps, 0 to 40.
- Turbulence: Calm, Light, Moderate, Severe.

In flight, on a keyboard, `T` steps the turbulence, `K` steps the wind direction, and `,` and `.` change the wind speed.

TIME OF DAY: Morning (09:15), Midday, Afternoon (15:45) or Sunset (18:45). The clock moves on as you fly, but night never falls: after dusk the day begins again. When flying with other pilots, everyone shares one clock.

THE DAY'S AIR

- **Temperature**: warmer or colder than standard, in 2.5 °C steps, up to 30 either way. Hot air is thin air: at the mountain airports on a hot day, take-offs are long.
- **Thermals**: Off, Weak, Normal, Strong or Boomer. See below.
- **Regional / One wind**: with *Regional*, each part of the island makes its own weather inside the wind you set, and the home field (PHDH) stays calm. *One wind* blows the same everywhere. Free flight only.

WEATHER · not built yet. Cloud cover, visibility and VFR/IFR are drawn greyed out. The sky does have clouds, including cumulus over thermals, but you cannot choose them yet.

Thermals and lift

Thermals are columns of rising air, strongest on a "Boomer" day. Cumulus clouds mark their tops. Wind blowing against a ridge also rises, on the windward side.

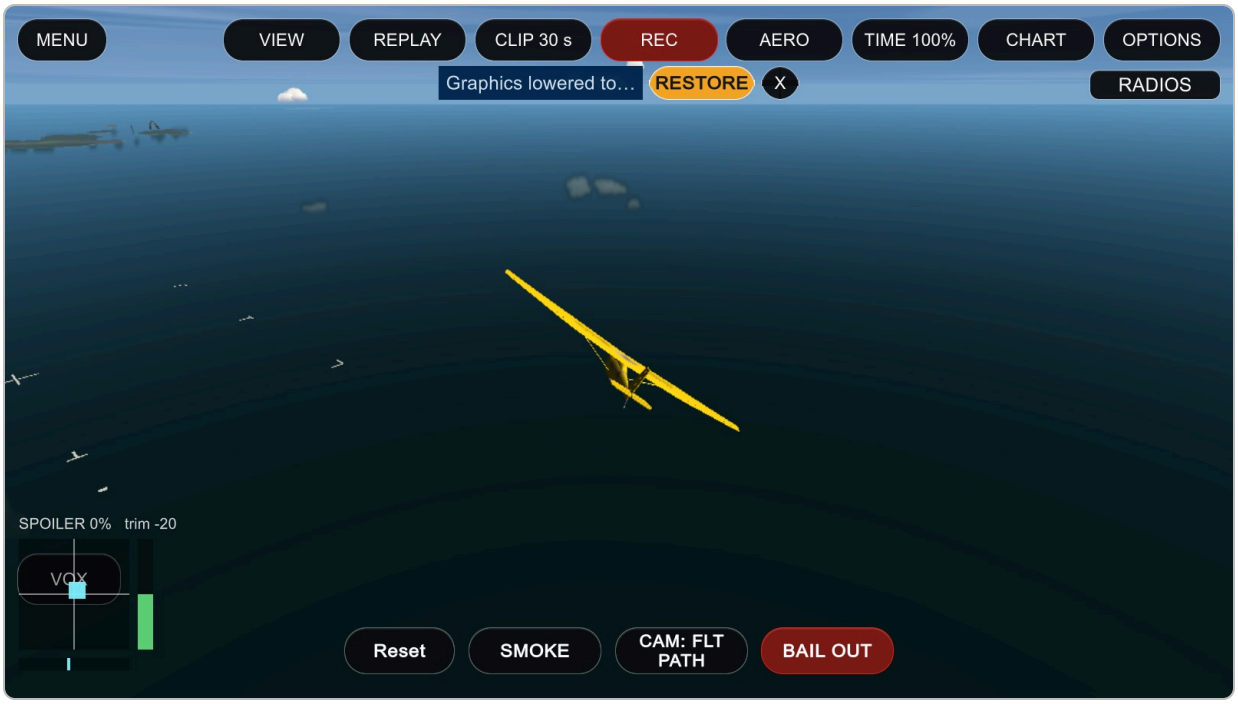

Figure 39. A thermal made visible with the lift markers and air bubbles.

To see the air: OPTIONS › Flying aids › **Show lift** (Auto, On or Off), **Air bubbles**, and the **Atmosphere map**. On a keyboard, H toggles the thermal markers. The **In a thermal** start puts you straight into one.

Windsocks and lights

- **Windsocks.** Three at every land runway. A sock shows the wind where it stands: it stiffens one band for every 3 knots and is fully out at 15 knots.
- **Approach slope lights.** PANC, KSNA, PHDH, KMYL, KMEV, KPGA and KMHV have PAPI lights; KAVX and PATK have VASI. White means high, red means low; a mix means on the slope.
- **Runway edge lights** are at those airports, at the Lake Hood water lane, on the outer islands and at a few airparks. The turf strip 3U2, the backcountry strips and KSZP are unlit.

6.7 The chart and navigation

Open the chart with the **CHART** button on the LOCATION page, on the top bar in flight, or in OPTIONS › Help.

- Layers: **VFR**, **IFR LOW** and **SATELLITE**. PLATES ON / OFF shows approach plates, and FIT fits the chart to the screen.
- The chart does **not** show your position. There is no moving map, no GPS, no minimap and no waypoint arrow. You navigate as a pilot without a GPS does: by landmarks, heading and time.
- The chart shows the eight starting airports and covers part of the island.

Nav radios. OPTIONS › Instruments › *Nav radios, heading card and leg clock* (on by default) adds a RADIOS panel: two fixed navigation receivers with a course deviation indicator, an ADF, a heading card and a LEG TIME clock. The radio beacons date from an earlier version of the world and do not yet line up with the island's airports, so treat the panel as practice equipment rather than a way home. The radios cannot be tuned.

In a combat zone the game does tell you the name and distance of the nearest zone.

7 Activities

7.1 Free flight, challenges and lessons

The **ACTIVITIES** button at the foot of the AIRCRAFT page opens the list. It has three parts:

- **Free flight**: "Anything, anywhere". The default. Any aircraft, any start, your own weather, and the only activity you can fly with other pilots.
- **CHALLENGES**: races, STOL contests, crop dusting, the aerobatic box, combat, and six graded flying tasks.
- **LESSONS**: eighteen short flying lessons in which the game flies part of the aircraft for you.

Choosing an activity changes the rest of the landing page: it may choose the aircraft, lock the undercarriage, set the start and lock the weather. Aircraft that the activity does not allow are greyed out. Then press FLY NOW as usual. To go back to free flight, choose Free flight again.

Challenges and lessons are flown solo, and on flat screens only: a headset flies free flight.

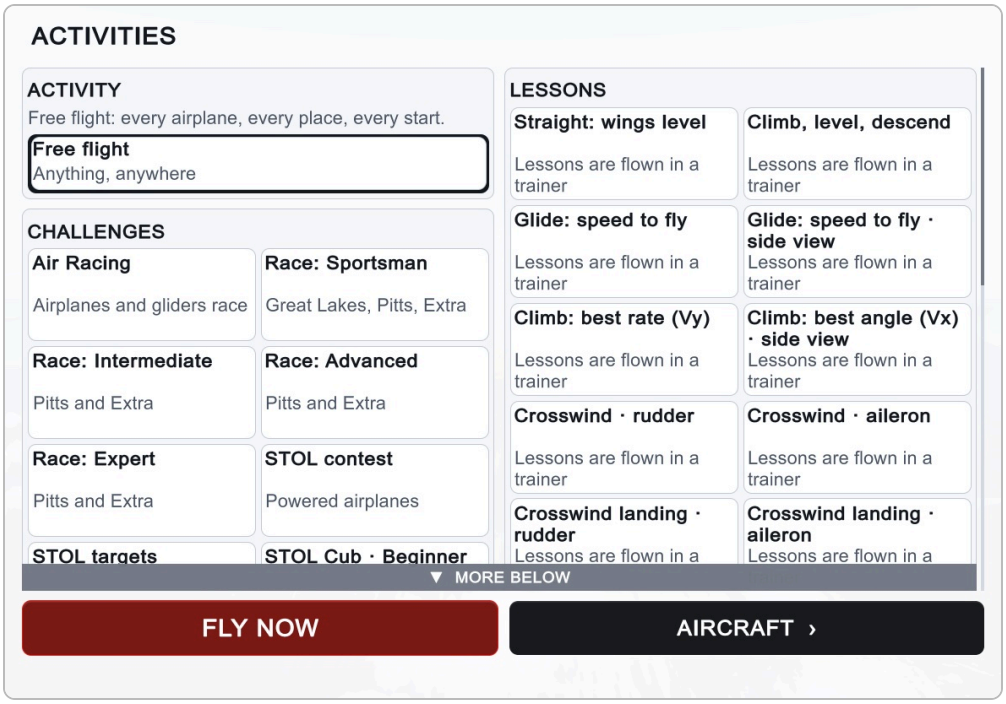

Figure 40. The ACTIVITIES page.

Activity	Aircraft	Scored by
Air Racing	Any except floatplanes on hulls; gliders may race	Time
Race: Sportsman, Intermediate, Advanced, Expert	Aerobatic types (Sportsman also allows the Aerobatic Trainer)	Time, plus penalties
STOL contest	Powered landplanes	Feet of runway used
STOL targets	Powered aircraft	Points, less time

Activity	Aircraft	Scored by
STOL Cub courses, five of them	Bush Plane only	Points, less time and penalties
Crop dusting	Powered landplanes	Time, plus penalties
Aerobatic box	The three aerobatic types and the Aerobatic Glider Trainer	Not scored
Combat zone	Powered aircraft	Not scored
Dogfight 1 v 1	Powered landplanes	Win or lose
Graded challenges, six of them	Glider Trainer	Percent, pass or try again
Lessons, eighteen of them	The trainers	Percent

7.2 Racing

All the races work the same way:

1. The flight starts in the air, short of the course, with a **five-second countdown** during which the world is held still. Use it to arm REC or change view. Smoke is switched on for you.
2. The clock starts as you pass through the **START arch** and stops at the **FINISH** arch.
3. Fly through the gates **in order**.
4. The screen shows the clock, your split against your best at each gate, the name of the next gate, and how many gates remain.
5. Your **best time for each course is saved** on your device. There are no medals.
6. **Reset** puts you back at the countdown.



Figure 41. The countdown at the start of a race.

Air Racing: the ring race

The OC Fly City ring race: 6.3 kilometres in three legs, RIDGE, MIDWAY and COASTLINE, running downhill from an arch on a ridge, through the city, to the coast. Thirteen gates, three of them rotating. It is flown in dead calm. Any aircraft may enter, gliders included; the start is 800 metres short of the first gate.

The four acro race courses

Four courses that mix gates with aerobatic manoeuvres. Some gates must be flown **inverted** or in **knife-edge** (wings vertical), and some legs call for a roll, a snap roll or a loop between gates.

Course	Where	Gates	What it asks for	Aircraft
Race: Sportsman	Rosamond Dry Lake and the turbine farm	15	One roll to the right between two gates	Aerobatic Trainer, Advanced Aerobatic Biplane, Advanced Aerobatic Monoplane
Race: Intermediate	A river canyon	17	Rolls left and right, one gate flown inverted, a winding climb	Advanced Aerobatic Biplane, Advanced Aerobatic Monoplane
Race: Advanced	A canyon, 40 metres above the ground	14	Rolls, an inverted gate, a knife-edge gate, combination rolls	Advanced Aerobatic Biplane, Advanced Aerobatic Monoplane
Race: Expert	The glacier	19	A four-point roll, a snap roll, two stacked loops, inverted and knife-edge gates	Advanced Aerobatic Biplane, Advanced Aerobatic Monoplane

Penalties. A missed manoeuvre, or a gate flown in the wrong attitude (more than 15 degrees out), adds **3 seconds** to your time. You are never disqualified: keep going.



Figure 42. On the Sportsman course.

7.3 STOL

STOL means short take-off and landing. Three kinds of event test it.

STOL contest

Three landings and three take-offs, alternating, measured from a white line across the contest strip. Tundra tires are fitted for you. You start on a 1.2 kilometre final.

- **Landing:** touch down at or beyond the line and stop. Your distance is from the line to where you stop. Touching down short of the line, or leaving the strip, is a **FOUL** and that attempt is flown again.
- **Take-off:** start from the line. Your distance is to where the wheels last touched.
- The strip is marked every 10 feet for 600 feet.
- **Result:** "FINAL n ft", your take-off average plus your landing average. Lower is better. No best is saved.



Figure 43. On final for the STOL contest strip.

STOL targets

Nine platforms out at sea, each painted with a ring target. Some are 300 feet across; the centre ones are 500 feet across and **rotate**, once every 48 seconds. Land on them in turn.

- You score by the ring where the **main wheels first touch**. The bullseye, 50 feet across, is 100 points; the rings fall away to 10 at the edge.
- A missed target stays lit and must be hit before later ones count. The clock runs throughout.
- **Result = points − seconds ÷ 3.** Three seconds cost one point.

Weather is your own choice for this event.



Figure 44. STOL targets: the platforms out at sea.

STOL Cub courses

Five courses for the **Bush Plane** on standard tires. Each is a run of ring targets set on real places: playas, gravel bars, rooftops, barges, mesa tops and a box canyon. You start in the air short of a start arch, lined up for the first target.

Course	Place	Targets	What makes it harder
STOL Cub · Beginner	Powell Playa	Four, 300 ft across	Calm air
STOL Cub · Sportsman	Knik River Bars	Five, 240 ft	Two masts to avoid, a light crosswind
STOL Cub · Intermediate	Fly City Coast	Five, 200 ft	A rooftop and a sloping terrace, cranes, a crosswind
STOL Cub · Advanced	Page Mesas	Five, 150 ft	Gusts, and one loop to fly between targets
STOL Cub · Expert	Sulphur Creek Box Canyon	Five, 100 to 110 ft	A hard crosswind, one loop, and a target inside a box canyon

Scoring is the same as STOL targets (points for where the main wheels first touch, less one point for every three seconds), with two additions:

- A loop the course asks for and you do not fly costs **50 points**.
- The box canyon target scores nothing if you drop in over the rim. Fly in through the canyon mouth.



Figure 45. A STOL Cub course: the first target ahead.

7.4 Crop dusting

A field has been part-sprayed and five passes are left to fly, in a racetrack pattern. Air is calm.

- The spray comes on by itself when you are below 25 metres over the field.
- A pass counts only if you are **5 to 20 feet above the crop**, at **80 to 110 knots** over the ground, and within 6 metres of the line.
- Your score is your flying time plus penalty seconds for time spent outside those limits. "FIELD DONE n s" ends it.
- A power line crosses the field. Hit it and the run is over.

This event still uses a field from an earlier version of the world and is the least finished of the activities.

7.5 Aerobatic box

Starts you running in to an aerobatic box at 2,300 feet in calm air, in one of the three aerobatic aircraft or the Aerobatic Glider Trainer. Nothing is judged: the box is a place to practise. In the cockpit of the aerobatic types there is a **sequence card** holder; OPTIONS › Instruments lets you step through the cards.



Figure 46. Running in to the aerobatic box.

7.6 Combat

Combat zone

Starts you entering one of the four combat zones with the guns live. Guns work **only inside a zone**.

- Inside, the screen reads "COMBAT ZONE guns HOT" with your rounds, drones shot down and hits. Outside it reads "GUNS COLD" with the name and distance of the nearest zone.
- Each zone has three orbiting target drones. A drone you shoot down comes back after eight seconds.
- Fire with FIRE (hold), `Space`, A on a gamepad, or the right grip in a headset.
- There is no score and no end: it is target practice.



Figure 47. In a combat zone.

Dogfight 1 v 1

One opponent, flown by the game. You start head-on, 1,500 metres apart, over a combat zone. On the ACTIVITIES page choose the opponent's aircraft under AGAINST and its SKILL: Easy, Moderate (the default) or Difficult.



Figure 48. The start of a dogfight.

Guns stay cold until you have passed each other, and outside the zone. The fight ends with one of: "SPLASH ONE - YOU WIN", "HE FLEW INTO THE GROUND - YOU WIN", "SHOT DOWN - HE WINS", or "YOU'RE OUT OF THE FIGHT". Reset to fight again.

7.7 Graded challenges

Six short flying tasks in the Glider Trainer, each starting from its own position. You are asked to hold something (an attitude, a speed, a heading) inside a tolerance band, shown as a strip on screen.

Challenge	The task	To pass
Wings level	Hold the wings level for 30 seconds	80 %
Best glide	Hold best-glide speed for 30 seconds	75 %
Cardinal turn	Turn to a compass heading and roll out on it	70 %
Stall recovery	Stall the glider and recover	70 %
Headwind landing	Fly a steady approach into a headwind	70 %
Crosswind landing	Fly a steady approach in a crosswind	65 %

Your score is the share of the time you spent inside the band. At the end the screen shows **PASS** or **TRY AGAIN**. On a keyboard, `C` retries and `N` goes to the next challenge. The two landing challenges grade the approach (speed and heading), not the touchdown: for the touchdown, use the Butter Meter.



Figure 49. A graded challenge: the tolerance strip and the running score.

7.8 Lessons

Eighteen lessons. In each one, **the game flies every control except the one you are learning**, so you can concentrate on one thing at a time. Lessons are flown in a trainer on standard tires: the Glider Trainer, the Aerobatic Glider Trainer, the Classic Trainer, the Bush Plane or the Tricycle Gear Trainer. Lessons that need an engine cannot be flown in a glider.

Subject	Lessons
Straight and level	Straight: wings level · Climb, level, descend
Gliding	Glide: speed to fly · Glide: speed to fly · side view
Climbing	Climb: best rate (Vy) · Climb: best angle (Vx) · side view
Crosswinds	Crosswind · rudder · Crosswind · aileron · Crosswind landing · rudder · Crosswind landing · aileron
Landing	Round-out & flare · Flare · side view · Approach · side view
Turns	S-turns 45° · Test: S-turns, one speed cycle
Stalls	Stall · side view · Stall, wing drop · rudder · Stall, recover · elevator

On the ACTIVITIES page, a chosen lesson shows **THIS LESSON**:

- **YOU FLY**: which controls are yours (AIL, ELE, RUD, THR), where the lesson lets you choose.
- **FLAPS**: UP, HALF or FULL, on aircraft with flaps.
- **PRACTICE WIND**, for the crosswind lessons.

Each lesson opens with a briefing and a 3-2-1 countdown. While you fly, a coloured orb shows how you are doing: green, yellow, orange or red. Staying in the green earns points every second; red loses them. At the end the result is spoken and shown as a percentage. Hitting the ground ends the lesson with zero. The **END** button on the top bar ends a lesson early.

The "side view" lessons show the aircraft from the side, so you can see the flight path and the angle of the wing: these are the clearest way to understand glide, flare and stall.

Lessons use tall labelled strips on a touch screen (ELEVATOR, THROTTLE, BRAKES or SPOILERS) in place of the usual pads.



Figure 50. A lesson briefing.

Your best score in each lesson is kept, and it feeds your **pilot level**: see Pilot level.

8 Cameras

8.1 Choosing a view

- **VIEW** on the top bar opens **CHOOSE A VIEW**: a grid of every camera, with the current one lit, a zoom row and CLOSE.
- On a keyboard `C` steps to the next view; on a gamepad, Y.
- On a phone or tablet the **CAM** button beside the pads steps between the two chase views and the cockpit.
- In a headset, use the **View** row of the menu.
- The view a flight *starts* in is set under VIEWPOINT on the GAMEPLAY page.



Figure 51. CHOOSE A VIEW, opened from the top bar.

8.2 The views

View	What you see
Relative wind	The default chase view. The camera sits behind the aircraft **on the line it is actually flying along**, not behind its tail, so you see the nose swing when you slip or pull. On the ground it falls back to behind the nose.
Relative wind, ahead	The same line, seen from in front of the aircraft looking back
Cockpit	From the pilot's seat. See The cockpit view.

View	What you see
Tail, **Left side**, **Right side**, **Top**, **Bottom**, **Front**	Cameras fixed to the airframe. They roll and pitch with the aircraft.
Fly-by	The camera parks ahead and to one side of your path, watches you pass, then moves on. It zooms by itself.
Direction lock	A chase camera that keeps pointing one way while it rides along, so you see the aircraft turn in front of it. V toggles it.
Spotter	A camera on a tripod on the ground. See Spotter.
Drone	A filming drone that chases the aircraft. See Drone.
RC Mode	You stand on the ground beside the runway, watching the aircraft as if flying a radio-controlled model. See RC Mode.
Shadow cam	Follows the aircraft's shadow across the ground or water
Tire shot	A slow-motion close-up of the touchdown. Replay only. See Tire Shot.

The camera never jumps away when the aircraft breaks up: it stays with the part that has the seats in it.

In a headset the list is shorter: Cockpit, Chase, Fixed chase, Fly-by, Spotter, Drone, RC Mode and Shadow cam. The views bolted to the airframe are left out, because being swung around with the aircraft is uncomfortable in a headset.



Figure 52. Fly-by.



Figure 53. Shadow cam.

8.3 Zoom

Outside views zoom the lens, from ×0.6 to ×6. The setting is remembered.

- **Phone or tablet:** pinch with two fingers, away from the pads.
- **Computer:** the mouse wheel.
- **Gamepad:** hold the left stick click and press D-pad up or down.
- **Any flat screen:** ZOOM – and ZOOM + in the VIEW menu. Tap the number between them to return to ×1.0.

The cockpit view has its own zoom, which widens or narrows your field of view: OPTIONS › View › Cockpit zoom. Zoom is not available in a headset.

8.4 The cockpit view

From the seat you see the aircraft's own instrument panel, with working instruments (see Cockpit instruments).

- **Look around** with the look pad under the top bar (▲ ◀ ▶ ▼, with a centre key), the ◀ LOOK / AHEAD / LOOK ▶ buttons, by moving the device, with a gamepad or joystick hat, with head tracking, or by turning your head in a headset. See Looking around. You can look about 160 degrees to either side, 75 up and 60 down.
- **SEAT** on the look pad changes seat in a two-seater.
- **OPTIONS › View** has Cockpit seat, Canopy, Cockpit zoom and Panel lights.

If you bail out in cockpit view, you stay in first person through the fall, the parachute and the landing.



Figure 54. The cockpit view on a phone, with the look pad at the top left.

8.5 Spotter

A camera on a tripod on the ground. A small panel at the top left controls it:

- **Auto-center** (on by default) keeps the camera aimed at the aircraft.
- **Place** puts the tripod down beside the aircraft. **Fence** moves it to the nearest airport fence.
- A move pad shifts the tripod, **+H** raises it, and – / + zoom.
- **Subj:** chooses what it watches, when there is more than one thing to watch.

You can also aim it yourself, which turns Auto-center off: drag with one finger and pinch to zoom on a touch screen; on a computer drag with the right or middle mouse button, or use `I` `J` `K` `L`, with `G` for Auto-center, `P` to place it and `F` for the fence.

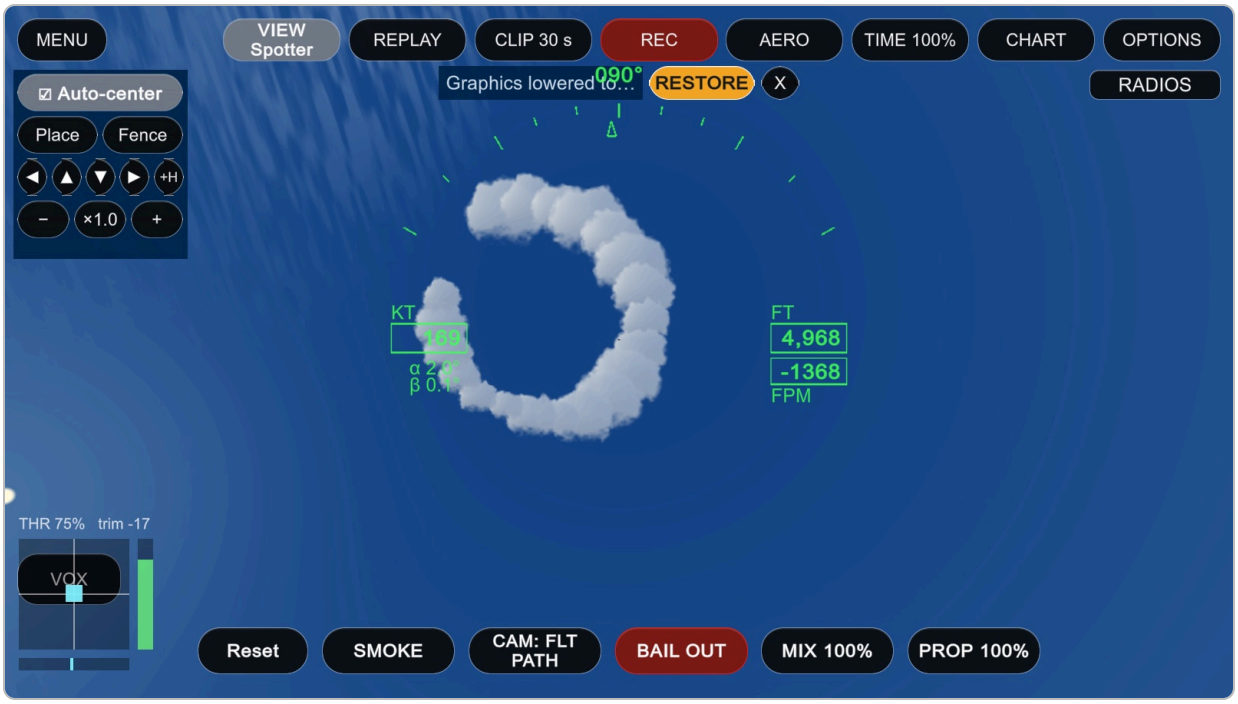

Figure 55. The Spotter view and its control panel.

8.6 Drone

A filming drone that flies with the aircraft. It has two modes.

Auto flies itself, chasing from behind. It works in flight and in replay and has no controls. This is what you get when you pick Drone from the VIEW menu.

Manual lets you fly the drone yourself, and is available **in replay only**. While watching a replay in the Drone view, a **Manual** button appears at the top left. It opens:

- **Auto / Manual**
- **FPV / GPS**: two ways the drone handles. *FPV* is the self-levelling "angle" mode of a racing drone: it leans the way you push and levels itself when you let go. *GPS* behaves like a camera drone that holds its position when you let go. In both, you see the drone's view from just behind and above it, locked on the aircraft.
- **Reset**: puts the drone back beside the aircraft.
- **Film:** chooses what the drone films.
- **Maximum speed**: 25 to 300 mph.

	Touch	Keyboard	Gamepad
Turn and climb	Left pad, YAW / CLIMB (let go to hover)	`Q` `E` turn; `R` or `PgUp` climb; `F` or `PgDn` descend	Left stick; shoulder buttons climb and descend
Move	Right pad, ROLL / PITCH	`W` `A` `S` `D` or the arrow keys	Right stick
Zoom	(the zoom row)	`=` `−`	

	Touch	Keyboard	Gamepad
Bring the drone back	Reset	P	

OPTIONS › View › FILMING DRONE CAMERA sets the drone's maximum speed (25 to 300 mph, default 200) and how much its motion is smoothed (default 65 %).



Figure 56. The Drone view in Auto.

8.7 RC Mode

You stand on the ground at eye height, beside the runway or on nearby open ground, and watch the aircraft the way a radio-control pilot watches a model. The view pans after the aircraft with a slight, human lag and zooms in gently as it gets further away. If the aircraft goes more than about 500 metres away, or behind something, you are moved to a new spot with a brief blink. P re-parks you beside the aircraft.

Flying from here is hard, in the same way that flying a model is hard: when the aircraft comes toward you, left and right are reversed.



Figure 57. RC Mode: watching from the ground.

8.8 Tire Shot

The Tire Shot is a slow-motion close-up of your touchdown, shot from a camera running along the runway beside the wheel.

- It exists **in replay only**, and only when the recording contains a landing.
- It starts **by itself** if you open the replay on the ground within a minute and a half of landing.
- You can also start it with the **Tire shot** button on the Butter Meter scorecard, or pick it in the replay's VIEW menu.
- The camera moves at half your ground speed, so that the tire first touches right beside it. Playback slows to one tenth for five seconds around the touch, then returns to normal.
- Changing the replay speed cancels it. Leaving the replay puts your view back.

8.9 Split panes

The VIEW menu also offers **1-UP, 2-UP, 3-UP and 4-UP**: two, three or four cameras on screen at once. Each pane has a button that steps it through Cockpit, Fly-by, Shadow cam, Spotter, Relative wind, Tire shot, Tail and RC Mode. Panes are not available in local 2-player split screen.

8.10 After a bail-out

When you leave the aircraft the camera follows **you**: it flies alongside like a second skydiver until the parachute is open or you are down. If you step out on the ground, it holds on you walking away. With passengers, it

frames the whole group and the aircraft. If your pilot is killed, the camera holds his rising figure in the foreground with the aircraft, or what is left of it, behind him. See Bailing out.

9 The HUD and instruments

9.1 Three ways to see your instruments

OPTIONS › Instruments › **Instruments** chooses how the flying screen shows your flight data:

- **HUD** (the default): green symbols drawn over the world, like a fighter's head-up display.
- **Dials**: round, see-through gauges floating beside the aircraft.
- **None**: nothing but the view.

In the cockpit view you also have the aircraft's own panel.

9.2 The green HUD

The picture in Your first flight shows the HUD in an outside view.

Where	What it shows
Left box	**Airspeed**, in the unit that aircraft's own indicator uses: MPH or KT
Under the left box	**α** (angle of attack) and **β** (sideslip), in degrees
Right box	**Altitude** in feet
Under the right box	**Vertical speed**: climbing or descending, and how fast
Top centre	**Heading**, three digits
Top arc	**Bank scale**, with a pointer showing your angle of bank
Centre	**Pitch ladder**: the long line is the horizon, the rungs are degrees of pitch
Centre	**-W-**, the waterline: where the nose is pointing
Centre	A **small circle with wings**, the flight path marker: where the aircraft is actually going
Bottom centre (outside views)	The **engine band**: RPM, throttle percent, fuel flow and fuel remaining, plus manifold pressure on aircraft with a propeller control

Reading the two centre symbols together is the heart of the HUD. The gap *up and down* between the -W- and the circle is your angle of attack: a big gap means the wing is working hard and a stall is near. A gap *sideways* means you are slipping or skidding: use the rudder to close it. Put the circle on the place you want to arrive, and that is where the aircraft is going.

The HUD does not show g, trim, flap position or wind. The engine band is hidden in the cockpit view (read the panel) and in replay.

9.3 Dials



Figure 58. Dials mode.

Round gauges, drawn see-through so the world shows behind them:

- **Airspeed**, with the aircraft's real coloured arcs: white (flap range), green (normal), yellow (caution) and the red line (never exceed).
- **Altimeter**, with three pointers like a real one.
- **G meter**, marked with the aircraft's limits, with tell-tale needles that stay at the highest and lowest g you have pulled.
- **Vertical speed**: on gliders a variometer in knots; otherwise in feet per minute.
- On powered aircraft, an engine row: **TACH**, **THR**, **FLOW** and **FUEL**.

In the cockpit view, the dials are shown only for aircraft without a working panel of their own.

9.4 Cockpit instruments

In the cockpit view every aircraft has its own three-dimensional panel, and the instruments on it work: airspeed, altimeter, vertical speed or variometer, g meter, tachometer, and on the better-equipped types a turn coordinator, attitude indicator and heading indicator.

- **Altimeter setting.** OPTIONS › Instruments has −0.01 and +0.01 for the altimeter's pressure setting, and buttons to set it to field elevation or to zero here.
- **Panel lights.** OPTIONS › View › Panel lights, for flying toward sunset.
- **DME.** The Tricycle Gear Trainer has a DME switch: NAV 1, NAV 2 or HOLD.
- **Sequence card.** The aerobatic types carry an aerobatic sequence card in the cockpit: step through the cards, add or remove one, in OPTIONS › Instruments.

In a headset the panel is the main way to read the aircraft: see Flying in a headset.

9.5 Flying aids

OPTIONS › **Flying aids** adds things no real aircraft has, to help you see what the air and the aircraft are doing. All are off unless noted, and each can be pinned to your quick-access row.

Aid	What it shows
Flight path vector (3 s, air-relative)	A line showing where the aircraft will be in three seconds
Force vectors	Arrows on the aircraft for lift, drag, thrust and weight
Flight test data	A block of numbers: indicated and true airspeed, Mach, α, β and g
Atmosphere map	A picture of the wind and lift around you
N / S / E / W letters on the horizon	Compass letters standing on the horizon
Flight model identity	A line naming the aircraft model in use; useful when reporting a problem
Spin readout	In a spin: seconds per turn, height lost per turn, and descent rate
Butter Meter (on by default)	Offers to score each landing. See below.
Show lift (Auto / On / Off)	Markers where the air is rising
Air bubbles, with **Dense bubbles** and **Bubble streaks**	Bubbles that drift with the air, so you can see wind, lift and the aircraft's own wake

9.6 The Butter Meter

The Butter Meter scores your landings. It is on by default (OPTIONS › Flying aids › Butter Meter).

After you land and come to a **complete stop**, a **Rate my landing** button appears for about five seconds (it goes away sooner if you move off under power). Press it (`Enter` on a keyboard; right stick click on a gamepad) for the scorecard: a score from 0 to 100, a comment, and a butter-dish gauge.

On a runway, the score averages five things:

Row	Full marks for
Centered	Staying within 5 feet of the centreline during the roll-out
Aligned	Touching down pointing within 2.5 degrees of the runway
Drift	Touching down with no sideways drift (within 2.5 degrees)
Slow	Touching down between 1.0 and 1.1 times the stall speed; or, in a tailwheel aircraft, in the three-point attitude
Soft	Touching down at 50 feet per minute or less

Off a runway or on water, it averages three: Drift, Slow and Soft.

Damage and **Runway Excursion** rows only take points away. A crash scores at or near zero. The comments run from "Ghee Whiz, that was good, pure butter!" for a perfect 100 down to "You must be Navy." for the worst.

The scorecard has **Close** and **Tire shot** buttons: the second plays your touchdown in slow motion (see Tire Shot).

9.7 The AERO panel

AERO on the top bar opens a panel for the curious:

- **Force vectors**, with labels.
- **Insets**: the lift curve with your current point on it, lift-to-drag, power required, a slip-skid ball, an angle-of-attack gauge and the weight-and-balance envelope.
- An **autopilot**.
- **Weight and balance** sliders, so you can feel what moving the load does without going back to the landing page.

9.8 Radio and intercom

When flying with other pilots you can talk to them. A **PTT** (push to talk) button and a **VOX** (voice-activated) button are on the flying screen. OPTIONS › Sound sets the radio frequency: 122.80 (the default), 122.75 or 123.45. Pilots on the same frequency hear each other. There is no air traffic control.

10 Bailing out, crashing and surviving

10.1 Leaving the aircraft

You can leave the aircraft at any time.

Device	How
Phone or tablet	Tap the red **BAIL OUT** button. One tap; there is no confirmation.
Keyboard	E
Gamepad	There is no gamepad button: use the on-screen button
Headset	Open the menu, choose the **Bail out** row, and choose it again within three seconds to confirm. Or do it by hand: see Leaving by hand.

The button reads **BAIL OUT** while you are flying or rolling, and **EXIT** once you are stopped on the ground or afloat. An EXIT is a calm step out; no parachute is involved.

If you would rather not have the button on screen all the time, set OPTIONS › Controls › *Bail out, smoke* to **On demand**; a MORE button then reveals it for a few seconds.



Figure 59. Free fall, seconds after bailing out.

10.2 What happens, second by second

1. **The canopy or door goes** about one second after you press, on aircraft that jettison it (not on the ground, and not on the Advanced Aerobatic Monoplane or the Classic Trainer, where you climb out past it).
2. **The harness releases** half a second later.
3. **You climb out and step off.** This takes about two seconds in steady flight, and a second longer for every g the aircraft is pulling. You do not leap clear: you step off the sill or the door step with the aircraft's own speed, and for the first moment you fall beside it. In an open cockpit or under a top-opening canopy, negative g throws you clear at once.
4. **Free fall.** The status line reads "FREE FALL", with your height, speed and the seconds until the parachute opens. The stick sets your body position: neutral tracks you away from the aircraft, back is flat and slow, forward is head-down and fast.
5. **The parachute opens by itself** three seconds after you leave, or sooner if you are low. It is a round canopy of real cloth on 24 lines, and it opens the way a real one does: a small pilot chute pulls it out, the lines stretch ("LINE STRETCH"), then the cloth fills with air ("INFLATING") over a second or two, and you feel the opening as a jolt.
6. **Under the canopy.** The status line reads "CANOPY", with your height and sink rate. **Steer left and right with the roll control** (the right pad, the arrow keys, the right stick). You descend at about 6.5 metres per second and can drive forward a little.



Figure 60. The canopy filling, a moment after the lines stretch.

Your weight comes off the aircraft when your harness releases, so it flies on lighter, and balanced a little differently, than it did with you in it.

You can hit your own wing or tail on the way out. Leaving from level, unhurried flight is safest: see When the parachute goes wrong.

No parachute opens if you got out on the ground or on the water.



Figure 61. Under the canopy.

10.3 When the parachute goes wrong

The canopy and its lines are worked out as cloth and cord, piece by piece, so they can be damaged, and they can catch on things. The same is true for your passengers.

What happens	What it does
The canopy opens too fast. It is built to open at up to 150 knots. Opened well beyond that, after leaving a very fast aircraft or a long dive, panels tear.	A few torn panels let air through and you come down faster. With most of them gone the canopy cannot hold air at all, and you fall. Which panels go is different every time.
The aircraft flies through your lines. A wing, the tail or the landing gear catches them.	Lines snap. The ones that hold can jerk the aircraft around hard, and can pull you into it.
The aircraft hits you.	The same four outcomes as a landing, judged by how hard: at 14 metres per second or more it kills.
A turning propeller reaches you or your lines.	It cuts lines and shreds cloth, and it always kills.

None of this needs anything from you except distance. Get out from steady flight if you can, and remember that the aircraft you left is still flying, and may come back round.

10.4 Landing under the parachute

How you fare depends on how hard you hit:

Hardest impact	Outcome
Under 7.5 m/s	**WALKED AWAY**
7.5 to 9 m/s	**BRUISED**
9 to 14 m/s	**INJURED**
14 m/s or more	**KILLED**

Water is kinder: it takes about 1.6 times the speed to do the same harm. A steep slope can send you tumbling. A spoken line, with a caption, tells you how it went, and your pilot is shown getting up, bandaged, or on crutches.

If you bailed out of an aircraft that had *already* crashed, the crash counts too: the result is the worse of the crash and the landing.

10.5 What happens after

- **The aircraft flies on without you**, under full physics and without your weight: stick and rudder centred, trim and throttle where you left them. It may fly for a long time. After a ground EXIT the throttle is closed and the brakes are released.
- **The camera follows you**, not the aircraft.
- **The flight instruments disappear** until your next flight.
- **Passengers** leave too, one second apart. In flight they go first and you go last.
- **To fly again**, press **Reset** (R; in a headset, Reset flight in the menu), or go to MENU and choose another aircraft. You are put back in a fresh aircraft at the start of the flight.
- **It costs you nothing.** There are no lives, no penalty and no score for bailing out. The replay's debrief simply counts it.
- **If your pilot is killed**, in the crash, by the aircraft or its propeller after getting out, or by a landing that was too hard, his body stays where it happened: strapped in his seat, hanging on his lines, or lying on the ground or in the water, with his real parachute if it was out. A translucent figure leaves it and is carried upward under a parachute of his own, labelled **GONE WEST**, an old pilots' phrase. When the aircraft is part of the scene, the camera keeps it in the picture behind him as he rises. Reset as usual.

10.6 Crashing

There is no "game over". After a crash you can look around, watch the replay, read the debrief, or reset.

- **Reset** (R, the Reset button, or the headset menu) puts the same aircraft back at the start, and restarts the time of day. In a race it takes you back to the countdown.
- If the aircraft ends up **on its back**, the game says so and reminds you how to reset.
- Your pilot's fate is worked out from how hard the seat was hit and how much the cabin was crushed, using the same four outcomes as a parachute landing.

Breaking the aircraft

Each aircraft has a rated g limit (see The aircraft), and it is enforced.

Load	What happens
Up to the rated limit	Nothing. That is what the limit means.
About 1.5 times the limit	The airframe groans and pops: a warning
About 2 times the limit, held briefly	The wings break off

After the wings go, the fuselage, tail and engine keep flying, briefly, and the elevator, rudder and throttle still work. A line on the screen says what you have lost. Bail out.

Flying faster than the red line can also damage or break the aircraft, and bent parts stay bent. Hitting the ground, water, trees, buildings, towers and wires does what you would expect: landing gear collapses, propellers bend, parts come off and lie where they fall.

G effects on the pilot

In the **cockpit view**, sustained g affects what you can see, as it would in life. It is a visual effect only: it never takes the controls away from you.

- **Positive g** (pulling): the picture greys from the edges at about 4 g, blacks out at 5 g, and after several seconds beyond that you lose consciousness (G-LOC) for about ten seconds.
- **Negative g** (pushing): a pink veil, then a red-out at about −2.5 g.

OPTIONS › View › G EFFECTS turns it on and off and sets your tolerance: +3 to +12 g (default 5.0) and −1.5 to −6 g (default 2.5). It is on by default on flat screens and off by default in a headset. It is not shown in replays unless you ask for it.

Water

A landplane that lands on water stops quickly and may flip. Once it is stopped, the button reads EXIT. If your view goes below the surface you see the cockpit underwater.

10.7 Engine and system failures

By default nothing fails (GAMEPLAY › RELIABILITY › *Never fails*). Choose *Realistic*, *Tired engine* or *Training* to have things go wrong by themselves.

To make a particular thing fail on purpose, use OPTIONS › **Instructor**: the "CFI — FAILURE SWITCHBOARD". Each row is one failure, Working or FAIL, and **When** chooses the moment: Now, on a Timer, Above or Below an altitude, or at Full power. ALL OFF mends everything. The replay's debrief lists what failed, when, and what you did about it.

11 Replay, clips and recording

11.1 Replay

The game is always recording the last **ten minutes** of your flight. Press **REPLAY** on the top bar to watch it. (You need at least a couple of seconds of flight, and the game must not be paused.)

The replay opens thirty seconds before the present and plays at normal speed. The live flight is frozen while you watch; **EXIT REPLAY** puts you back in it exactly where you left it.

A bar along the bottom controls the replay:

Control	What it does
The header	Your position in the recording, its length, and the playback speed
The track	Tap or drag to move through the recording
–10 s, **PLAY / PAUSE**, **+10 s**	Step back, play or pause, step forward
SPEED	×0.25, ×0.5, ×1, ×2, ×4
SMOKE AS FLOWN / SMOKE MANUAL	Show the smoke as you flew it, or switch it on and off yourself for the replay
VIEW	Every camera, as in flight, plus the two that exist only here: Tire Shot and the hand-flown drone
OPTIONS	The settings
CLIP, **REC**	Save video of the replay
EXIT REPLAY	Back to the flight
DEBRIEF	A list of what happened: failures, crashes and bail-outs, with the time of each. Tap a line to jump to a few seconds before it.

Everything you saw is in the recording: the aircraft and its controls, smoke, damage and breakage, fire, the canopy, tire marks, wakes and spray on water, sounds, and a bail-out with its parachute.

Replay is not available in a headset.

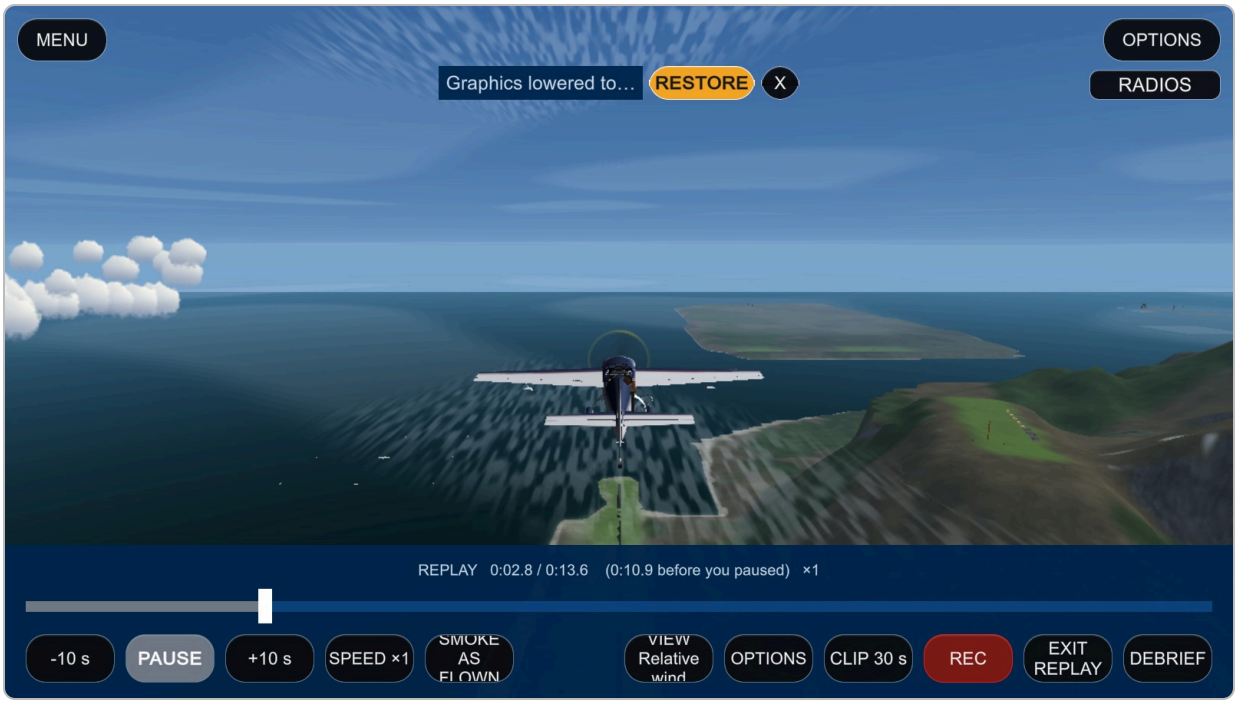

Figure 62. The replay bar.

11.2 Clips and recording

- **CLIP** saves the most recent stretch of flying as a video. The length is set in OPTIONS › Clips (15 seconds to 3 minutes; the default is 30 seconds).
- **REC** starts a recording; press it again (**STOP REC**) to finish and save.

Both work in flight and in a replay. The video is of the world, with the game's sound, **without** the on-screen buttons.

OPTIONS › **Clips**:

Setting	Default
Clip length, 15 to 180 seconds	30
Clip shape: AS FLOWN, 16:9 or 9:16	AS FLOWN
Save the other shape as well	off
Include instruments in clips	off
Show my screen in clips	off
Record my voice in clips	off
Watermark clips with the game's name	on

Which devices can save clips. On **iPhone and iPad** clips are saved to Photos, and the **Mac** app saves them too. On **Android, Windows and Linux** clip saving is not available in this build. A **headset** has its own recorder:

hold A + B for one second, or use the Record video row in the menu; the video is saved in the headset's Movies folder.

There is no separate photo mode: use your device's own screenshot function.

12 Scoring, lives and credits

There are no lives and no credits in this build. You cannot run out of attempts, nothing is lost in a crash, and nothing has to be earned or bought before you can fly it. Every aircraft, airport and activity is open from the first launch.

What the game does keep score of:

What	How it is scored	Is a best kept?
Races	Time from the start arch to the finish, plus 3 seconds for each missed manoeuvre on the acro courses	Yes, your best time for each course
STOL contest	Average take-off distance plus average landing distance, in feet. Lower is better.	No
STOL targets and STOL Cub	Ring points, less one point for every three seconds, less 50 for a loop not flown	No
Crop dusting	Time, plus penalty seconds	No
Dogfight	Win or lose	No
Graded challenges	Percent of the time inside the band; PASS or TRY AGAIN	No
Lessons	Percent	Yes, your best for each lesson
Landings	The Butter Meter, 0 to 100	No

There are no medals, leaderboards or online rankings.

12.1 Pilot level

Your lesson scores add up to a **pilot level**. OPTIONS › **Pilot** shows it as "You are: …", with what is needed for the next level: how many lessons still have to be flown, and to what percentage.

The levels, in order: **Student pilot (pre-solo)**, **Student pilot (solo)**, **Pilot**, **Blind Flying**, **Commercial pilot**, **Flight Instructor**. The first two need lesson scores of 70 percent; later ones need 78, 83, 88 and 93. Some later levels are marked "coming soon", because the aircraft they are flown in is not in the game yet.

Your level is shown as a badge. Three switches on the Pilot page control it: *Show other pilots' badges and scores*, *Show my own badge on screen*, and *Let other pilots see my badge and score*.

A level is a record of what you have practised. It does not unlock anything.

12.2 The Store

OPTIONS › Players has a **Store** button. The store describes a free trial, a one-time unlock and an online pass, but **nothing in this beta is locked or sold**: you can ignore it. "Sign in with an existing membership" is not available yet.

13 Flying with other pilots

Multiplayer is for **free flight**. Choosing a challenge or a lesson puts you back in Solo.

Set the mode with **GAME MODE**, at the top of the SETTINGS page of the landing page (or OPTIONS › Players):

Mode	Who you fly with
Solo	Nobody. The default.
Free-for-all	Everyone who is flying online, in one sky
Room by code	Only the pilots who type the same six-character code. Press **Create** to make a code, and share it.
Same network	Devices on the same Wi-Fi, with no internet and no server. An optional room code keeps groups apart. **Find** takes another pilot's address if the devices do not see each other. On devices that support it, **No wifi router** lets them make their own link.

What to expect:

- You see the other aircraft and a **name tag** over each. Set your name under OPTIONS › Players › Pilot (up to 16 characters). A new player is given a name such as "Pilot472".
- You **cannot collide** with other pilots.
- Everyone shares one time of day.
- Slow motion (the TIME button) is off.
- Talk to the others with the PTT or VOX buttons: see Radio and intercom.
- An online pilot who has not touched the controls for 15 minutes is dropped.
- In a headset, only Solo and Same network are offered.

The first time you launch the game it offers TRY MULTIPLAYER, which takes you straight into Free-for-all.

13.1 Split screen

Two pilots can share one flat screen, each with half of it and an aircraft of the same type. It works on iPhone, iPad, Android, Mac, Windows and Linux. It does not work in a headset: two headsets fly together over the same network instead (see Flying with other pilots).

Turning it on. OPTIONS › Controls › **Local 2-player (split screen): two controllers, or keyboard / touch plus one controller, from the next FLY**. Tap it twice; the second tap confirms. It is off by default, and it starts on the next FLY. It works in free flight and from the combat zone start, with multiplayer set to Solo. Turning it off ends a split that is running.

Who flies with what. Player 1 flies as usual: touch controls, keyboard, or a controller. Player 2 always flies with a controller: right stick for roll and pitch, left stick for rudder and power, the triggers for the toe brakes, the d-pad for trim and flaps, X for the brakes, B for smoke, Y for the next view, and Menu to open OPTIONS. Player 2 has no guns, bail-out or landing-gear button yet.

The two buttons in the middle. While the screen is split, **FLIGHT** opens a small panel with a reset button and a view button for each player, and **1 PLAYER** ends the split at once and gives the whole screen back to Player 1.

Giving Player 2 a controller

Press a button to join. When the split starts and Player 2 has no controller, Player 2's half of the screen says **PLAYER 2: press any button on a controller to join**. Press any button on a controller that is not already flying: a face button, a shoulder button, a trigger, Start or Select, a stick click or the d-pad. Moving a stick alone does not count. If no controller is connected at all, the message adds "No controller found. Plug one in or switch it on, then press a button." The game answers **PLAYER 2 JOINED** with the controller's name, and remembers the choice. If nobody has joined after 20 seconds the message shrinks to one line along the bottom of Player 2's half, "P2: no controller. Press a button on one to join", and stays there until somebody does.



Figure 63. Split screen before Player 2 has joined: the message on Player 2's half.

Plugging one in during the flight. A controller that is plugged in or switched on while the split is running goes to Player 2, if Player 2 has none.

With only one controller. Player 1 gets it first. Player 2's half then explains that only one controller is connected and offers a button, **GIVE IT TO PLAYER 2**. Press it and Player 1 flies with the keyboard (Mac, Windows, Linux) or the touch controls (iPhone, iPad, Android) while Player 2 takes the controller. That is remembered too.

Changing your mind. Once the split-screen switch is on, OPTIONS › Controls shows a **Split-screen controllers** block under it:

Row	What it does
Player 1: the controller's name, or "keyboard / touch controls"	**TAKE OFF** takes that controller away from Player 1
Player 2: the controller's name, or "none: press any button on a controller to join"	**TAKE OFF** takes it away from Player 2
SWAP PLAYER 1 / PLAYER 2	The two players exchange controllers
Not flying: one row for each connected controller nobody is using	**TO P1** or **TO P2** gives it to that player

The buttons appear when there is a controller for them to act on; with none connected the block shows only the two player rows, as in the picture.



Figure 64. OPTIONS › Controls with split screen on and no controller connected: the Split-screen controllers rows.

Changes apply at once, before the next FLY or in the middle of a split. A controller you take off stays off until somebody presses a button on it or assigns it again.

What is remembered. The choice is saved for each controller, by its name (and serial number where it has one), so it survives restarting the game and unplugging the controller. A controller that comes back gets its seat back.

13.2 Things that are not here yet

- **Sharing one cockpit.** On the LOAD page a seat can be set to "Friend", but inviting a friend into your aircraft is not working in this build.
- **Formation and racing against other pilots** as scored activities.

14 Settings

14.1 Where the settings are

The same settings are reached two ways:

- **From the landing page:** the SETTINGS button at the foot of the AIRCRAFT page, or OPEN SETTINGS on the GAMEPLAY page. The settings appear as cards on four shelves.
- **In flight:** the **OPTIONS** button, which pauses the world and shows the same pages as tabs. The header says "world paused" or "flying on".

Shelf	Pages
FLYING IT	View, Controls, Instruments, Flying aids
THIS DEVICE	Display, Sound, Clips
PEOPLE	Players, Pilot
THE APP	Game, Help, Instructor, Developer

Settings are saved as you change them. Some display changes take effect on the next flight. A small **+** at the left of a row pins that setting to your quick-access row.

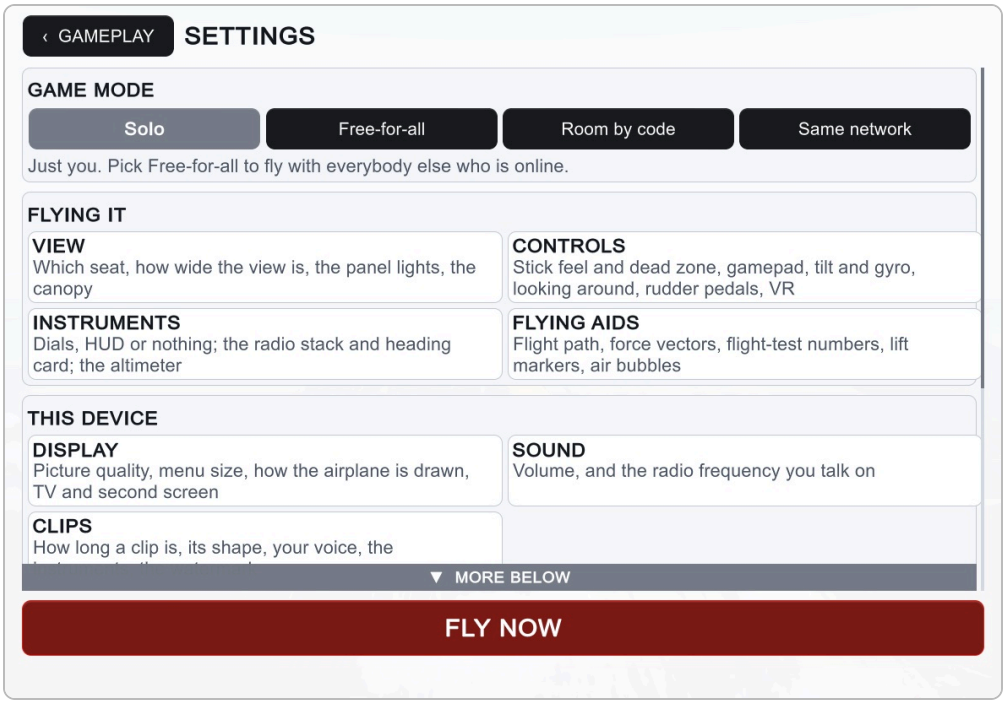

Figure 65. The SETTINGS page of the landing page.

14.2 View

Setting	Choices	Default
Cockpit seat	Rear (PIC) / Front (two-seaters)	Rear
Canopy	Shut / Open	Shut
Cockpit zoom	60 to 160 %	100 %
Filming drone: maximum speed	25 to 300 mph	200
Filming drone: smoothing	0 to 100 %	65 %
G effects	On / Off	On (off in a headset)
+G tolerance	3 to 12	5.0
−G tolerance	1.5 to 6	2.5
Show G effects in replay	On / Off	Off
Panel lights	0 to 100 %	50 %

See Cameras and G effects on the pilot.

14.3 Controls



Figure 66. OPTIONS › Controls, in flight (tablet layout).

Section	What is in it
CONTROLLER SETUP (computers)	OPEN CONTROLLER SETUP: see Joysticks, throttles and rudder pedals
KEYBOARD SETUP	OPEN KEYBOARD SETUP: see Changing the keys
KEYS	Key hints on screen (off)
ON-SCREEN CONTROLS	Hide on-screen controls when a controller is connected (on). On phones and tablets: Rudder and throttle as two separate sliders (off); Bail out, smoke: Always / On demand (Always).
STICK FEEL	Stick expo 0 to 70 % (30 %); aileron, elevator and rudder dead zones 0 to 30 %; Idle-to-brake dead zone 5 to 20 % (15 %); Joystick setup; Aircraft defaults
GAMEPAD AND STICK	Stick-free (off); click and hold a stick to let go (on); reverse the throttle lever of a USB stick (off); Local 2-player split screen (off), and under it, once it is on, the **Split-screen controllers** rows (Player 1, Player 2, SWAP PLAYER 1 / PLAYER 2, and TO P1 / TO P2 for each spare controller): see Giving Player 2 a controller
MAIN WHEEL TOE	Toe the main wheels in or out, –3° to +6°, with BACK TO AS RIGGED. This changes how the aircraft tracks on the ground.
LOOKING AROUND, AND THE PHONE AS A CONTROLLER	TV controller: Touch / Gyro. Fly by tilting the phone, with sensitivity, reverse switches and CENTRE TILT HERE: see Tilt flying. Move the device to look around, Look gain, Steady the view, snap-back: see Looking around.
HEAD TRACKING	See Looking around
VR (Cardboard headset)	Split screen for a cardboard viewer, with eye spacing 55 to 75 mm
OTHER DEVICES	Share a joystick with, or use the joystick of, another device; Companion pairing
Rudder pedals (phones, tablets, headsets)	Axis, invert, dead zone, Calibrate (guided), Reset to detected

14.4 Instruments

Setting	Choices	Default
Instruments	Dials / HUD / None	HUD
Nav radios, heading card and leg clock	On / Off	On
DME (Tricycle Gear Trainer)	NAV 1 / NAV 2 / HOLD	
Altimeter	–0.01, +0.01, set to field elevation, zero here	
Aerobatic sequence card	Previous, next, add, remove	

See The HUD and instruments.

14.5 Flying aids

Listed in Flying aids. All are off by default except the Butter Meter and, within Air bubbles, Dense bubbles and Long streaks.

14.6 Display

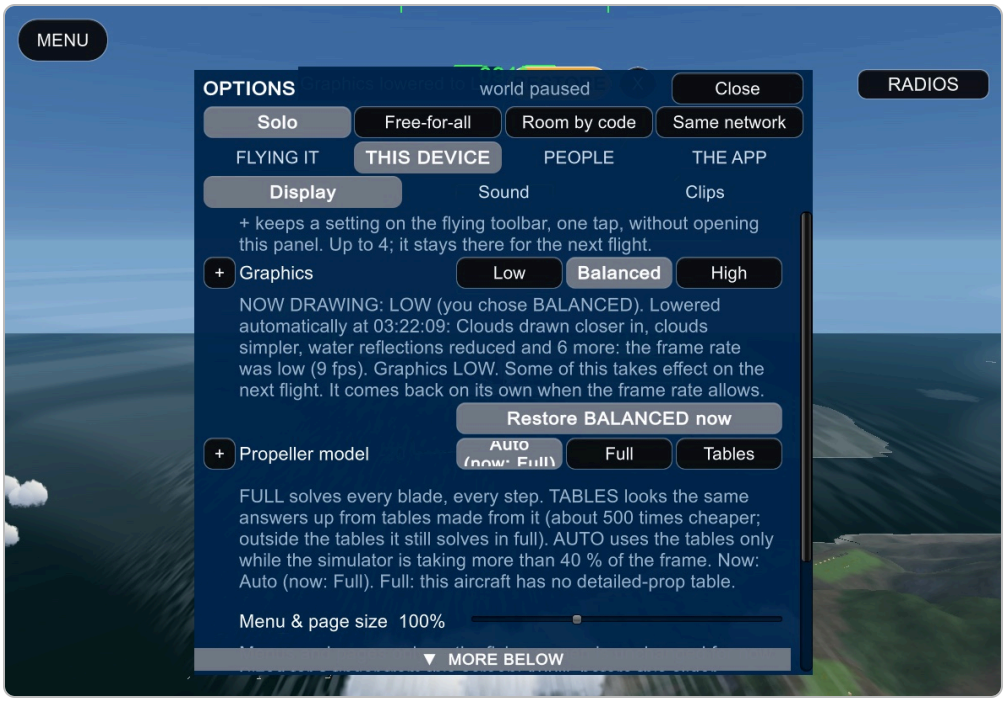

Figure 67. OPTIONS › Display.

Setting	Choices	Default
Graphics	Low / Balanced / High	High on a computer; Balanced on a phone, tablet or headset
Propeller model	How the propeller's thrust is computed: FULL, TABLES or AUTO	Auto
Menu & page size	70 to 160 %, with Revert and Reset to defaults	100 %
Airframe	Which 3-D model of each aircraft is drawn: Drawn / Downloaded / Ours	Downloaded
Screen (phones and tablets)	Auto / Portrait / Landscape	Auto
TV screen (iPhone, iPad)	Game on TV / Mirror	
Second monitor (Mac)	Off / Instruments	Off

Graphics quality

Tier	What you get
Low	Three-quarter resolution, simpler water and clouds, less haze, a smaller water reflection, small aircraft details only up close, and no road traffic in the city
Balanced	Full resolution, a sharper reflection, traffic
High	Detailed scenery, wind ripples on water, and the sharpest reflection

Every tier keeps water reflections and the aircraft's shadow on the ground, because you judge height by them.

The game protects smooth flying. If frames become slow, it lowers the tier by itself and shows a line on the flying screen: **"Graphics lowered to …"**, with **RESTORE** and **X**. It never goes above the tier you chose, and it restores your choice by itself when the frame rate recovers. The Display page shows "NOW DRAWING: … (you chose …)" with a "Restore … now" button.

The game aims for 60 frames per second. There is no frame-rate setting, except in a headset, where the menu offers Display: 72 Hz or 90 Hz.

14.7 Sound

- **Sound volume.**
- **Radio frequency**: 122.80, 122.75 or 123.45. See Radio and intercom.

There is no music.

14.8 Clips

Listed in Clips and recording.

14.9 Players

Your **Pilot** name, the room **Code** and **Create**, the Same network options, and the **Store** button. See Flying with other pilots.

14.10 Pilot

Your level, what the next one needs, and the three badge switches: see Pilot level. The G EFFECTS settings are repeated here.

14.11 Game

Setting	Choices	Default
Language	System / English / Español	System
Pause while a menu is open	On / Off	On
Speed of time	100 / 50 / 25 / 10 %	100 %
Reset all settings	Press, then press **Confirm reset all**	

A language change takes effect at once. Units (feet and knots, or metres and km/h) are set on the GAMEPLAY page.

14.12 Help

- **Quick guide**: opens the Quick guide.
- **Help (opens the web)**: the support page, in your browser.
- **Copy diagnostics**: copies a short description of your device and build, to paste into a problem report.
- **Credits** and **Chart**.

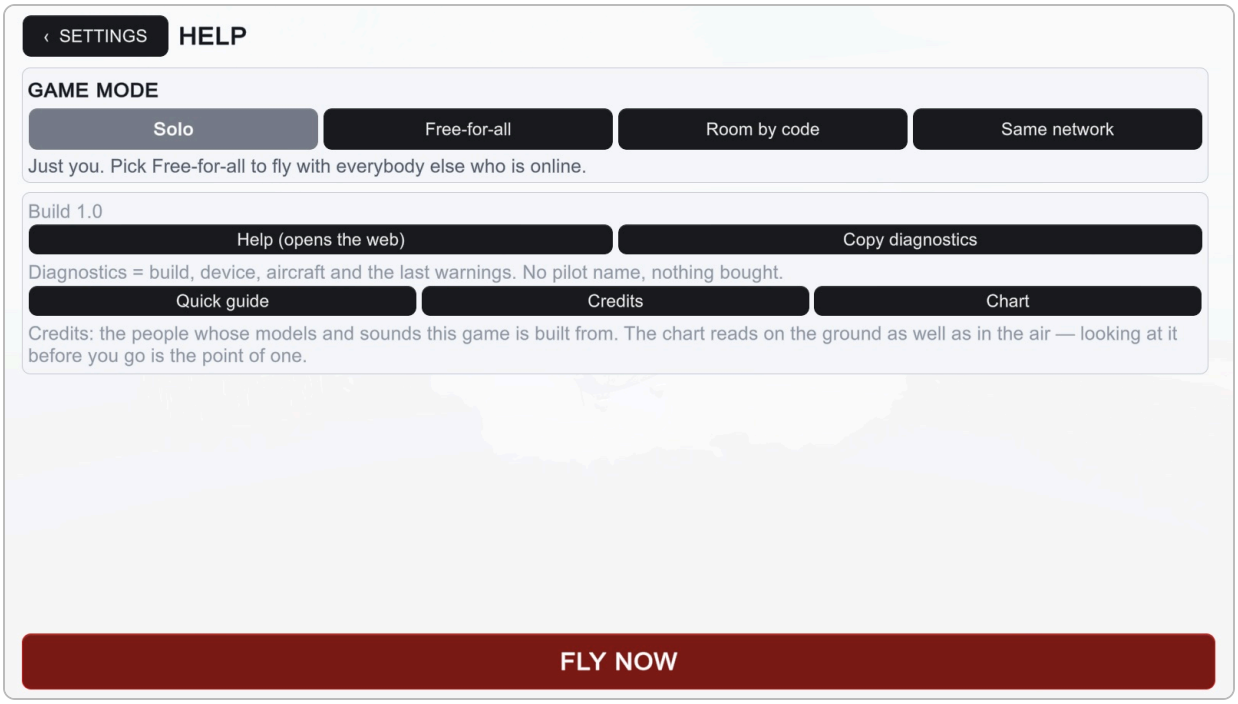

Figure 68. The Help page, with the Quick guide button.

14.13 Instructor

The failure switchboard: see Engine and system failures. It needs a flight in progress.

14.14 Developer

A page for the game's testers. It is locked behind a code that the developer issues and that expires. You do not need it to play.

14.15 Updates

On Android phones and on computers, the landing page shows **UPDATE AVAILABLE ›** when a newer beta build exists. It leads to an UPDATE page: the first time, type the **BETA CODE** from your invitation and press ACTIVATE AND DOWNLOAD; after that it is DOWNLOAD THE UPDATE. OPEN THE BETA PAGE opens the download page in your browser.

On iPhone and iPad, updates arrive through TestFlight. A headset is updated through its store.

15 Flying in a headset

15.1 What is different

In a Meta Quest headset you sit in the cockpit. You look around by turning your head, the instruments are the ones on the panel in front of you, and the menu is a panel floating in the cockpit. The aircraft and the world are the same as on every other device.

What a headset **does not have** in this build:

- **Activities.** A headset flies free flight. Challenges and lessons are not in its menu.
- **Replay**, the top bar, the VIEW grid, the AERO panel and the chart.
- **Paint schemes, wind and turbulence settings, graphics tiers, sound and clip settings.** Time of day and a simple weather choice are in the menu.
- **Online rooms.** Solo and Same network only.
- **Zoom.**
- **The flat HUD and dials.** Turn on *HUD in cockpit* for a small floating readout.

Some aircraft limit which seat you can take in a headset: the Classic Trainer is flown from the rear seat, and the Tricycle Gear Trainer from the front seats.

15.2 The headset menu

To open it: press the menu button on the left controller; or touch the small floating **MENU** tab at the lower left of the cockpit; or hold the left thumbstick click for a second; or, with bare hands, hold a left pinch for a second. Opening the menu **pauses** the flight. Its title reads "AERO PLAYGROUND - PAUSED".

To use it: move the highlight with a thumbstick; push the stick left or right to change a value; press **A or X** to select; press **B or Y**, or the menu button, to close. The triggers do not select: they are the brakes. With bare hands, point and pinch.

The game starts on this menu. It is one list.

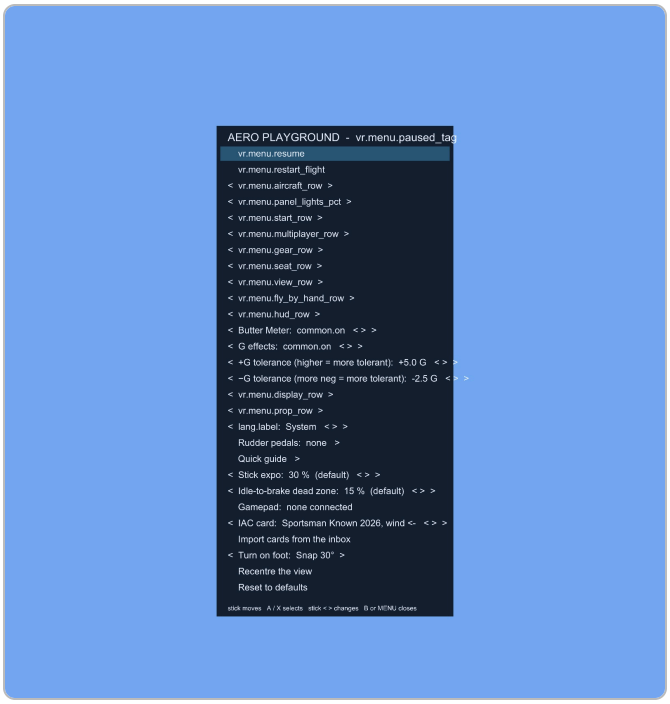

Figure 69. The headset menu before a flight.

Before a flight: FLY; Aircraft; Configuration; the Bush Plane's hangar; Location; Start; Tow height; Passenger; Fuel; Panel lights; Time of day; Weather; Engine (reliability); Units; and a line showing weight and balance.

During a flight: RESUME; your pinned settings; RESTART FLIGHT; CHANGE AIRCRAFT (back to the list above, without restarting the game); Parking brake; Rate my landing; Altimeter; Reset flight; and Bail out.

At any time: Multiplayer; Gear; Seat; View; Fly by hand; HUD in cockpit; Butter Meter; G effects and tolerances; Display (72 or 90 Hz); Propeller model; Language; Rudder pedals; **Quick guide**; Stick expo; Idle-to-brake dead zone; Gamepad; sequence card; Record video; Turn on foot; Recentre the view; Reset to defaults.

The Quick guide in a headset

The Quick guide is a page of this menu. On the first launch the menu opens on it. Afterwards, choose the **Quick guide** row. Push the thumbstick left or right (or select the "Page … of …" row) to turn its pages; **Back to the menu**, or B or Y, closes it.

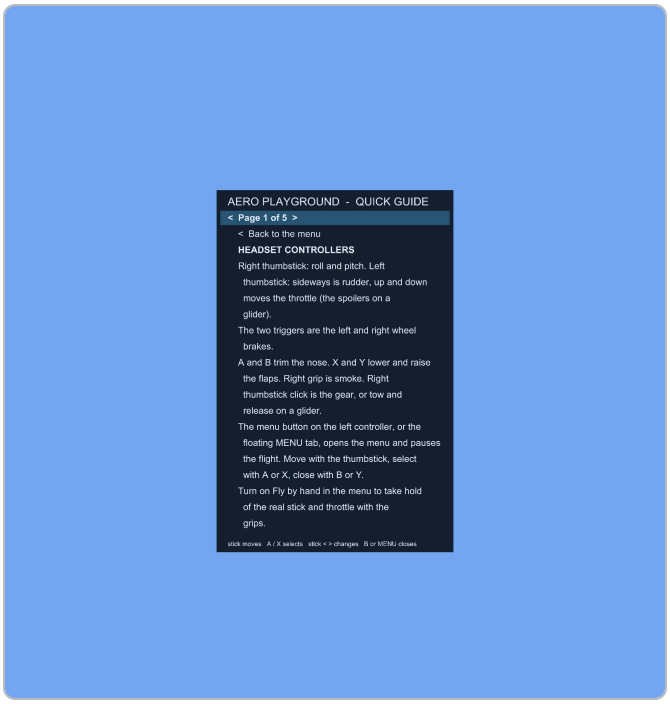

Figure 70. The Quick guide in a headset: the first of its pages.

15.3 Controllers

The full table is in Headset controllers. In short: right thumbstick is the stick; left thumbstick is rudder and throttle; the triggers are the brakes; A and B trim; X and Y work the flaps; the right grip is smoke.

For the first few flights, small tip cards in the cockpit remind you where the menu and the throttle are.

A Bluetooth gamepad, a USB flight stick and USB rudder pedals also work in a headset. Rudder pedals have their own page in the menu.

15.4 Fly by hand

Turn on **Fly by hand** in the menu and your body is drawn in the seat. Reach out, squeeze a grip, and you are holding the real stick; your other hand can take the throttle. Latches, switches and, in the Glider Trainer, the spoiler handle, trim lever and tow release can all be worked by hand.

With the controllers put down and your bare hands tracked, your hands do not fly the aircraft by themselves: a left pinch held for a second opens the menu, and a right pinch held for a second re-centres.

Leaving by hand

With Fly by hand on you can abandon the aircraft the way a pilot does: unlatch and push the canopy open, release your belts, unplug the headset cord, push down on the cockpit sill to climb out, and then pull the ripcord handle on your left chest strap. On this path the parachute does **not** open by itself: you must pull.

The Bail out row of the menu does it all for you, parachute included.

15.5 Comfort

- The game is played **seated**.
- **Recentre the view** (the menu row, or a left thumbstick click) if the cockpit is not where you are sitting.
- **Views.** Cockpit is the natural one. The outside views offered in a headset are the ones that do not swing with the aircraft.
- **G effects** are off by default in a headset.
- **Display: 72 Hz / 90 Hz.** 72 is the default and the smoother choice on a busy scene.
- **Turn on foot** (Off, Snap 30°, or Smooth) applies after you have got out of the aircraft on the ground.

15.6 Recording in a headset

Hold **A + B** for a second, or use **Record video** in the menu. Starting from the menu closes it so the film begins on the flying. Videos are saved to the headset's Movies folder.

16 Troubleshooting

When you report a problem, include the **build number** from the top of the GAMEPLAY page and the text from OPTIONS › Help › **Copy diagnostics**.

16.1 Starting and updating

The game opens on a page of text I did not ask for. That is the Quick guide, shown once on the first launch. Press CLOSE.

I pressed MENU and my flight is gone. MENU ends the flight and returns to the landing page. To pause without ending, use OPTIONS instead.

The game asks for a BETA CODE. The first update on a device asks for the code that came with your invitation. Type it on the UPDATE page and press ACTIVATE AND DOWNLOAD. See Updates.

There is no update button. iPhone and iPad update through TestFlight, and a headset through its store. Only Android phones and computers show UPDATE AVAILABLE.

Everything is in Spanish (or English) and I want the other. OPTIONS › Game › Language (in Spanish: OPCIONES › Juego › Idioma).

I am stuck in the headset menu and it will not close. Before a flight the menu cannot be closed: choose **FLY**. If you are in the Quick guide, choose Back to the menu first.

16.2 Controls

The aircraft moves by itself when I move my phone. Tilt flying is on. Tap the lit **TILT FLIES** button to turn it off. See Tilt flying.

Tilt flying drifts, or level is not level. Hold the device the way you want "centred" to be and press CENTRE TILT. The rudder part drifts slowly by nature; re-centre now and then, or turn off "Yaw turns the rudder".

The on-screen pads have disappeared. A gamepad, joystick or keyboard is in use, or tilt flying is on. Tap the screen to bring the buttons back for a few seconds, or turn off OPTIONS › Controls › *Hide on-screen controls when a controller is connected*.

BAIL OUT and SMOKE have disappeared. OPTIONS › Controls › *Bail out, smoke* is set to On demand. Tap MORE, or set it back to Always.

Up and down feel reversed. The stick works like a real one: pull back (slide down, or press ↓) to raise the nose. There is no invert setting for touch or keyboard. A joystick axis can be inverted in the controller setup, and tilt has Reverse pitch.

The aircraft will not go straight on the ground. Tailwheel aircraft need constant small rudder corrections; the Tricycle Gear Trainer is far easier. Check that a wheel brake is not held on (a trigger or pedal resting off-centre), and that OPTIONS › Controls › MAIN WHEEL TOE is BACK TO AS RIGGED.

The aircraft will not move when I open the throttle. The parking brake is on (tap the button, or `Shift`+`B`), or the mixture is at CUTOFF (push MIX up), or it is a glider. A floatplane on land will not move at all.

The throttle does nothing in the glider. A glider has no engine. That control works the spoilers. See Gliders.

My gamepad does nothing. A gamepad starts working the first time you move a stick or press a button. OPTIONS › Controls shows which gamepad has been found. A gamepad has no button for gear, bail-out or reset: use the screen.

In split screen, Player 2's controller does nothing. Press any button on it (not just a stick): it joins as Player 2. With only one controller connected, Player 1 has it; press GIVE IT TO PLAYER 2 on Player 2's half of the screen, or use OPTIONS › Controls › Split-screen controllers. See Giving Player 2 a controller.

My joystick or pedals are wrong. On a computer, run GUIDED SETUP in OPTIONS › Controls › OPEN CONTROLLER SETUP, or RESET ALL and start again. If the throttle works backwards, turn on *reverse the throttle lever*. Rudder pedals are not supported on iPhone and iPad.

The stick is too sensitive near the middle. Raise OPTIONS › Controls › Stick expo. Lower it for a more direct feel.

Keys do nothing. Keys are ignored while a menu, OPTIONS, a replay or a text box is open, and while `Ctrl`, `Alt` or `Cmd` is held. If you changed the keys and lost track, use RESET TO DEFAULTS in the keyboard setup.

Pressing C starts a challenge when I only wanted to change view. By default `C` does both. Give "Start the challenge" another key in the keyboard setup.

I cannot look around with the mouse. Mouse free look is not in this build. Use a gamepad, a joystick hat or head tracking; see Looking around.

16.3 Flying

I am upside down on the ground, or the aircraft is wrecked. Press **Reset** (`R`; in a headset, Reset flight in the menu).

The screen went grey, black or red. That is the effect of g on your pilot, in the cockpit view. Ease off the stick and it clears. Change or switch it off in OPTIONS › View › G EFFECTS.

The wings came off. You pulled about twice the aircraft's g limit, or flew well past its red-line speed. See Breaking the aircraft.

The aircraft drops a wing and spins. You stalled it with the rudder off-centre. To recover: throttle to idle, ailerons neutral, full rudder against the spin, stick forward until the spinning stops, then ease out of the dive. Turn on OPTIONS › Flying aids › Spin readout to see what the spin is doing.

The engine has stopped. Either the mixture was pulled to CUTOFF, the fuel has run out (LOAD page), or RELIABILITY is set to something other than Never fails. Glide to a landing: every aircraft glides.

It will not climb at the mountain airports. The air is thin at 5,000 feet, more so on a warm day. Lean the mixture, use the whole runway, and climb patiently. Check that the ENVIRONMENT temperature is not set high.

I cannot find my way back. The chart does not show your position. Use the heading at the top of the HUD and the landmarks in The world, or go to MENU and start again where you like.

The glider will not stay up. Set ENVIRONMENT › Thermals to Strong or Boomer, turn on OPTIONS › Flying aids › Show lift, and circle in the rising air; or use the In a thermal start.

The floatplane will not turn on the water. Lower the water rudder (W.RUDDER, or `U`). Raise it again before take-off.

The Rate my landing button did not appear. The aircraft must come to a complete stop, and the Butter Meter must be on (OPTIONS › Flying aids). The button is only there for about five seconds.

REPLAY does nothing. A replay needs a couple of seconds of flight and cannot start while the game is paused. There is no replay in a headset.

I pressed CLIP and no video was saved. Clips are saved on iPhone, iPad and the Mac app only in this build. On iPhone and iPad, allow the game to add to Photos when asked.

16.4 Performance and picture

"Graphics lowered to …" appeared. The game lowered the picture quality to keep the flight smooth. It restores your choice by itself when it can. RESTORE puts it back now; X dismisses the line. See Graphics quality.

The game is slow or stutters. Set OPTIONS › Display › Graphics to **Low**. Close other apps. On a phone, let the device cool: a hot phone slows itself down. The city around KSNA is the busiest scene on the island; open water is the lightest.

The text and buttons are too small, or too big. OPTIONS › Display › Menu & page size, 70 to 160 %. Revert undoes the last change.

The screen keeps turning. OPTIONS › Display › Screen: choose Portrait or Landscape.

Buttons are hidden behind the notch or the rounded corners. They should not be: the game keeps its controls inside the safe area of the screen. Report it with a screenshot and your device model.

In the headset the picture judders. Set Display to 72 Hz in the menu, and choose a less busy airport than KSNA.

16.5 Other pilots

I cannot see my friend. Both of you must be in free flight, in the same mode, with the same room code or on the same Wi-Fi, and near the same airport. In Same network mode, try the Find field with the other device's address.

I was dropped. Online pilots who do not touch the controls for 15 minutes are removed. Press FLY NOW to rejoin.

The time of day changed. Everyone in a shared sky uses one clock.

Glossary

Flying terms, and the game's own words, as this manual uses them.

AGL
Above ground level: height above the ground directly below, as opposed to altitude above sea level.

Aerotow
Launching a glider by towing it behind a powered aircraft on a rope. See Aerotow.

Aileron
The hinged surfaces near the wingtips that roll the aircraft. Moved by the stick, left and right.

Airbrakes
Panels that rise out of a glider's wing to add drag and steepen the descent. See also *spoilers*.

Angle of attack (α)
The angle at which the wing meets the oncoming air. Too large an angle and the wing stalls, whatever the airspeed.

Butter Meter
The game's landing scorer. "Butter" is pilots' slang for a very smooth landing. See The Butter Meter.

CFI
Certified flight instructor. In the game, the Instructor page that lets you fail things on purpose.

Constant-speed propeller
A propeller whose blade angle changes by itself to hold the RPM you set with the propeller control.

Crosswind
Wind blowing across the runway rather than along it.

Dead zone
A small range around the centre of a stick in which movement is ignored, so that a worn or shaky stick does not fly the aircraft.

Elevator
The hinged surface on the tailplane that raises and lowers the nose. Moved by the stick, forward and back.

Expo
Short for exponential: a setting that makes a stick less sensitive near its centre and more sensitive toward its ends.

Final
The last, straight part of an approach, lined up with the runway.

Flaps
Surfaces on the back of the wing that lower to let the aircraft fly more slowly and descend more steeply.

Flare
Raising the nose just before touchdown to slow the descent. Also called the round-out.

Flat screen
In this manual: any phone, tablet or computer, as opposed to a headset.

Flight path marker
The small circle with wings on the HUD: where the aircraft is actually going.

Free flight
Flying with no task and no score. The default activity.

G
The load on the aircraft and pilot as a multiple of normal weight. Level flight is 1 g; a tight turn or pull-up is more.

G-LOC
Loss of consciousness caused by sustained high g.

Gate
An arch or ring on a race course that must be flown through.

Go-around
Abandoning a landing by applying power and climbing away to try again.

Gone west
An old pilots' phrase for a pilot who has died. In the game, the label on the translucent figure that rises after a fatal crash, strike or landing, while the body stays where it fell.

Headset
In this manual: a Meta Quest VR headset.

HUD
Head-up display: flight data drawn over the view outside. See The green HUD.

Idle
The throttle position at which the engine just keeps running.

Indicated airspeed
The speed the airspeed indicator shows: the speed the wing feels, which is what matters for stalling and structural limits.

Knife-edge
Flying with the wings vertical, held up by the fuselage and rudder.

Knot (kt)
One nautical mile per hour: 1.15 mph, or 1.85 km/h.

Landing page
This manual's name for the game's menu: the seven steps from AIRCRAFT to GAMEPLAY.

Livery
A paint scheme.

Mixture

The control that sets how much fuel is mixed with the air going into the engine. Pulled all the way back, it cuts the fuel off.

MSL
Mean sea level. An altitude "MSL" is height above the sea.

Never-exceed speed (Vne)
The red line on the airspeed indicator. Beyond it the aircraft may be damaged.

One-way strip
A sloping airstrip on which you always land uphill and take off downhill.

PAPI, VASI
Rows of lights beside a runway that show whether you are above or below the right approach slope.

Pitch
Nose up and nose down.

PTT
Push to talk: the button you hold to speak on the radio.

Roll
Banking the wings left or right.

Rudder
The hinged surface on the fin that swings the nose left and right. Used to keep the aircraft straight on the ground and balanced in turns.

Sideslip (β)
Flying somewhat sideways through the air, nose pointing to one side of the direction of travel.

Spades
Small plates below the ailerons of some aerobatic aircraft that lighten the stick forces.

Spoilers
Panels on a glider's wing that open to destroy some lift and add drag. See also *airbrakes*.

Stall
When the wing's angle of attack becomes too large for the air to follow it, and lift falls away. Recovered by lowering the nose.

STOL
Short take-off and landing.

Step (on the)
A floatplane skimming on the flat bottom of its floats, at speed, rather than ploughing through the water.

Tailwheel aircraft
An aircraft with two main wheels and a small wheel under the tail. Also called a taildragger. Harder to keep straight on the ground than a nosewheel aircraft.

Thermal

A column of rising warm air, used by gliders to climb.

Three-point landing
Landing a tailwheel aircraft with all three wheels touching together.

Threshold
The beginning of the runway.

Tier
One of the three graphics quality levels: Low, Balanced, High.

Trim
An adjustment that holds a control in place so that you do not have to.

Tug
The aircraft that tows a glider.

Tundra tires
Large, soft, low-pressure tires for landing on rough ground and gravel bars.

Variometer
A glider's vertical-speed instrument, sensitive enough to show weak lift and sink.

VOX
Voice-operated transmit: the radio transmits when you speak, with no button to hold.

Vx, Vy
The speeds for the steepest climb (Vx) and the fastest climb (Vy).

Waterline (-W-)
The HUD symbol that shows where the nose is pointing.

Water rudder
A small rudder at the back of a float, lowered for steering on the water and raised for take-off and landing.

Weight and balance (W&B)
How much the aircraft weighs and where that weight sits. Out of limits, it handles badly.

Yaw
Swinging the nose left or right.

Yaw string
A piece of yarn taped to a glider's canopy. It streams straight back when the glider is flying cleanly and blows to one side when it is slipping.

Index

Each entry links to the section that covers it. In the PDF, the page number follows.

#

2-UP
8.9 Split panes p. 76

3-UP
8.9 Split panes p. 76

3U2
6.2 Where you can start p. 51

4-UP
8.9 Split panes p. 76

A

Abandoned aircraft
10.5 What happens after p. 85

Acro race courses
The four acro race courses p. 60

Activities
7.1 Free flight, challenges and lessons p. 58

ACTIVITIES button
Step 1: AIRCRAFT p. 13

ACTIVITIES page
7.1 Free flight, challenges and lessons p. 58

Advanced Aerobatic Biplane
5.9 Advanced Aerobatic Biplane p. 42

Advanced Aerobatic Monoplane
5.10 Advanced Aerobatic Monoplane p. 43

AERO button
3.3 The flying screen p. 19; 9.7 The AERO panel p. 81

AERO panel
9.7 The AERO panel p. 81

Aerobatic box, activity
7.5 Aerobatic box p. 64

Aerobatic box, start
6.3 Start positions p. 52

Aerobatic boxes
6.5 Things to find p. 54

Aerobatic Glider Trainer
5.3 Aerobatic Glider Trainer p. 33

Aerobatic Trainer
5.8 Aerobatic Trainer p. 40

Aerobatics
7.5 Aerobatic box p. 64

Aerotow
Aerotow p. 49

After a bail-out
10.5 What happens after p. 85

AIL / ELE pad
4.2 Touch controls p. 22

AIL TRIM
Trim sliders p. 23

Aileron trim
Trim p. 48

Air bubbles
Thermals and lift p. 55; 9.5 Flying aids p. 80

Air Racing
7.2 Racing p. 59

Airbrakes
5.3 Aerobatic Glider Trainer p. 33; Gliders p. 48

AIRCRAFT page
Step 1: AIRCRAFT p. 13

Aircraft will not respond
16.2 Controls p. 105

Aircraft, choosing
Step 1: AIRCRAFT p. 13

Aircraft, list of
5.1 The fleet p. 31

Airframe setting
14.6 Display p. 97

Airparks
6.4 Other places to land p. 52

Airport, choosing
Step 5: LOCATION p. 16

Airports
6.2 Where you can start p. 51

Airspeed
9.2 The green HUD p. 78

Airspeed indicator
9.3 Dials p. 79

Altimeter
9.3 Dials p. 79

Altimeter setting
9.4 Cockpit instruments p. 79; 14.4 Instruments p. 96

Altitude
9.2 The green HUD p. 78

Altitude, starting
Step 5: LOCATION p. 16; 6.3 Start positions p. 52

Android
1.2 Words used for each device p. 6

Angle of attack
9.2 The green HUD p. 78

Approach
2.5 Landing p. 11

Atmosphere map
9.5 Flying aids p. 80

Auto drone
8.6 Drone p. 74

Auto-center
8.5 Spotter p. 73

Autopilot
9.7 The AERO panel p. 81

B

Backcountry strips
Backcountry strips p. 53

Badge
12.1 Pilot level p. 90

Baggage
Step 4: LOAD p. 15

BAIL OUT button
The buttons p. 23; 10.1 Leaving the aircraft p. 82

Bail-out
10.1 Leaving the aircraft p. 82

Bail-out camera
8.10 After a bail-out p. 76

Bail-out sequence
10.2 What happens, second by second p. 83

Bail-out, by hand
Leaving by hand p. 103

Bailing out
10.1 Leaving the aircraft p. 82

Balanced
Graphics quality p. 98

Bank scale
9.2 The green HUD p. 78

Beaches
6.4 Other places to land p. 52

Best glide
7.7 Graded challenges p. 67

Beta build
1 About this manual p. 6

BETA CODE
14.15 Updates p. 100

Big Creek
Backcountry strips p. 53

Biplane
5.8 Aerobatic Trainer p. 40

Blackout
G effects on the pilot p. 86

Bottom view
8.2 The views p. 70

Brakes
Brakes p. 47

Brakes, after landing
2.5 Landing p. 11

Brakes, touch
The left pad: RUD / THR p. 23

Breezy
6.6 Environment p. 54

BRUISED
10.4 Landing under the parachute p. 84

Bubble streaks
9.5 Flying aids p. 80

Build number
Step 7: GAMEPLAY p. 17

Bullseye
STOL targets p. 62

Bush Plane
5.6 Bush Plane p. 37

Bush Plane, modifications
5.13 The Bush Plane's hangar p. 46

Bush strips
6.4 Other places to land p. 52

Butter Meter
9.6 The Butter Meter p. 80

Buttons, touch
The buttons p. 23

C

Cabin Creek
Backcountry strips p. 53

Calibration
4.6 Joysticks, throttles and rudder pedals p. 28

Calm
6.6 Environment p. 54

CAM button
The buttons p. 23; 8.1 Choosing a view p. 70

Cameras
8.1 Choosing a view p. 70

Canopy jettison
10.2 What happens, second by second p. 83

Canopy, opening
Seats and the canopy p. 50

Canopy, torn
10.3 When the parachute goes wrong p. 84

Cardboard VR
4.9 Phone as a controller, TV and Cardboard p. 30

Cardinal turn
7.7 Graded challenges p. 67

Carrier
6.4 Other places to land p. 52

Catalina
6.4 Other places to land p. 52

Caves
6.5 Things to find p. 54

CENTRE TILT
4.3 Tilt flying and TILT FLIES p. 24

CFI
10.7 Engine and system failures p. 86

Challenges
7.1 Free flight, challenges and lessons p. 58

Chamberlain
Backcountry strips p. 53

Chart
6.7 The chart and navigation p. 56

CHART button
Step 5: LOCATION p. 16; 3.3 The flying screen p. 19

Chase view
8.2 The views p. 70

CHOOSE A VIEW
8.1 Choosing a view p. 70

Classic Trainer
5.4 Classic Trainer p. 34

Classic Trainer on Floats
5.5 Classic Trainer on Floats p. 36

CLIP button
3.3 The flying screen p. 19; 11.2 Clips and recording p. 88

Clips
11.2 Clips and recording p. 88

Cockpit instruments
9.4 Cockpit instruments p. 79

Cockpit seat
Seats and the canopy p. 50

Cockpit view
8.2 The views p. 70; 8.4 The cockpit view p. 72

Cockpit zoom
14.2 View p. 95

Combat zone, activity
Combat zone p. 65

Combat zone, start
6.3 Start positions p. 52

Combat zones
6.5 Things to find p. 54

Comfort
15.5 Comfort p. 104

Companion
4.9 Phone as a controller, TV and Cardboard p. 30

Compass letters
9.5 Flying aids p. 80

CONDITIONS presets
6.6 Environment p. 54

CONFIGURATION page
Step 3: CONFIGURATION p. 14; 5.12 Undercarriage p. 45

Constant-speed propeller
Engine controls p. 48

Control problems
16.2 Controls p. 105

Controller
4.5 Gamepad p. 27

CONTROLLER SETUP
4.6 Joysticks, throttles and rudder pedals p. 28

Controller, second
13.1 Split screen p. 91

Controllers, supported
2.1 What you need p. 8

Controls settings
14.3 Controls p. 95

Controls, summary table
4.1 All controls at a glance p. 21

Copy diagnostics
14.12 Help p. 99

Countdown
7.2 Racing p. 59

Crash
10.6 Crashing p. 85

Crashing
10.6 Crashing p. 85

Credits
1.3 What this build does not have p. 7; 12 Scoring, lives and credits p. 90; 14.12 Help p. 99

Crop dusting
7.4 Crop dusting p. 64

Crosswind landing
7.7 Graded challenges p. 67

Crosswind start
6.3 Start positions p. 52

CUTOFF
Engine controls p. 48

D

Dead zone
4.6 Joysticks, throttles and rudder pedals p. 28; 14.3 Controls p. 95

Debrief
11.1 Replay p. 87

Default aircraft
5.2 Glider Trainer p. 31

Density altitude
6.6 Environment p. 54

Developer page
14.14 Developer p. 100

Device look
4.7 Looking around p. 29

Dewey Moore
Backcountry strips p. 53

Dials
9.1 Three ways to see your instruments p. 78; 9.3 Dials p. 79

Direction lock
8.2 The views p. 70

Display settings
14.6 Display p. 97

Ditching
Water p. 86

Dogfight
Dogfight 1 v 1 p. 66

Drake Hill cavern
6.5 Things to find p. 54

Drone mode
8.6 Drone p. 74

Drone view
8.2 The views p. 70; 8.6 Drone p. 74

Drones
Combat zone p. 65

E

Egress
10.1 Leaving the aircraft p. 82

END button
3.3 The flying screen p. 19

Engine band
9.2 The green HUD p. 78

Engine failure
10.7 Engine and system failures p. 86

Engine failures
Step 7: GAMEPLAY p. 17

Engine, choosing
5.13 The Bush Plane's hangar p. 46

Engine, stopping
Engine controls p. 48

English
14.11 Game p. 99

Entanglement
10.3 When the parachute goes wrong p. 84

Environment
6.6 Environment p. 54

ENVIRONMENT page
Step 6: ENVIRONMENT p. 17

EXIT button
The buttons p. 23; 10.1 Leaving the aircraft p. 82

EXIT REPLAY
11.1 Replay p. 87

Expo
4.6 Joysticks, throttles and rudder pedals p. 28

F

Failures
10.7 Engine and system failures p. 86

Fence
8.5 Spotter p. 73

Field elevation
6.2 Where you can start p. 51

Filming drone
8.6 Drone p. 74

FIRE button
The buttons p. 23; Combat zone p. 65

First flight
2.3 Your first flight p. 9

First launch
2.2 The first launch p. 8; 3.2 The Quick guide p. 18

FLAP button
The buttons p. 23

Flaps
Flaps p. 48

Flaps, Bush Plane
5.6 Bush Plane p. 37

Flare
2.5 Landing p. 11

Flat screen
1.2 Words used for each device p. 6

Fleet
5.1 The fleet p. 31

Flight Instructor
12.1 Pilot level p. 90

Flight model identity
9.5 Flying aids p. 80

Flight path marker
9.2 The green HUD p. 78

Flight path vector
9.5 Flying aids p. 80

Flight stick
4.6 Joysticks, throttles and rudder pedals p. 28

Flight test data
9.5 Flying aids p. 80

Floatplane
5.5 Classic Trainer on Floats p. 36

Floatplanes
Floatplanes p. 49

Floats
5.12 Undercarriage p. 45

Flutter
Breaking the aircraft p. 86

Fly by hand
4.8 Headset controllers p. 29; 15.4 Fly by hand p. 103

Fly City Coast
STOL Cub courses p. 63

FLY NOW
2.3 Your first flight p. 9; 3.1 The landing page p. 13

Fly-by view
8.2 The views p. 70

Flying aids
9.5 Flying aids p. 80

Flying lessons
7.8 Lessons p. 68

Flying problems
16.3 Flying p. 106

Flying screen
3.3 The flying screen p. 19

Force vectors
9.5 Flying aids p. 80

Formation
13.2 Things that are not here yet p. 93

FOUL
STOL contest p. 61

Four-seat aircraft
5.7 Tricycle Gear Trainer p. 39

FPV
8.6 Drone p. 74

Frame rate
Graphics quality p. 98

Frank Church
Backcountry strips p. 53

Free fall
10.2 What happens, second by second p. 83

Free flight
7.1 Free flight, challenges and lessons p. 58

Free look
1.3 What this build does not have p. 7; The mouse p. 27; 4.7 Looking around p. 29

Free-for-all
13 Flying with other pilots p. 91

Front seat
Seats and the canopy p. 50

Front view
8.2 The views p. 70

Fuel
9.2 The green HUD p. 78

Fuel, loading
Step 4: LOAD p. 15

G

G effects
G effects on the pilot p. 86

G EFFECTS setting
14.2 View p. 95

G limits
Breaking the aircraft p. 86

G meter
9.3 Dials p. 79

G tolerance
G effects on the pilot p. 86

G-LOC
G effects on the pilot p. 86

GAME MODE
13 Flying with other pilots p. 91

Game on TV
4.9 Phone as a controller, TV and Cardboard p. 30

Game settings
14.11 Game p. 99

Gamepad
4.5 Gamepad p. 27

GAMEPLAY page
Step 7: GAMEPLAY p. 17

Gates
7.2 Racing p. 59

GEAR button
The buttons p. 23

Ghost
10.5 What happens after p. 85

GIVE IT TO PLAYER 2
Giving Player 2 a controller p. 92

Glacier landing
6.4 Other places to land p. 52

Glider Trainer
5.2 Glider Trainer p. 31

Glider Trainer, first flight
2.3 Your first flight p. 9

Glider, aerobatic
5.3 Aerobatic Glider Trainer p. 33

Glider, training
5.2 Glider Trainer p. 31

Gliders
Gliders p. 48

Glossary
Glossary p. 108

Glossary, how to use
1.1 How to use this manual p. 6

Go-around
2.5 Landing p. 11

GONE WEST
10.5 What happens after p. 85

GPS
6.7 The chart and navigation p. 56

GPS mode
8.6 Drone p. 74

Grade orb
7.8 Lessons p. 68

Graded challenges
7.7 Graded challenges p. 67

Graphics lowered notice
Messages on the flying screen p. 20; Graphics quality p. 98

Graphics quality
14.6 Display p. 97; Graphics quality p. 98

Grey-out
G effects on the pilot p. 86

Ground observer
8.7 RC Mode p. 75

Guns
Combat zone p. 65

GUNS COLD
Combat zone p. 65

GUNS HOT
Combat zone p. 65

Gusty
6.6 Environment p. 54

Gyro
4.3 Tilt flying and TILT FLIES p. 24

H

Hand tracking
15.4 Fly by hand p. 103

Hands, in a headset
15.4 Fly by hand p. 103

Hangar
Step 3: CONFIGURATION p. 14; 5.13 The Bush Plane's hangar p. 46

Hangar, fleet
5.1 The fleet p. 31

Head tracking
4.7 Looking around p. 29

Heading
9.2 The green HUD p. 78

Headset
1.2 Words used for each device p. 6; 15.1 What is different p. 101

Headset controls
4.8 Headset controllers p. 29

Headset menu
15.2 The headset menu p. 101

Headwind landing
7.7 Graded challenges p. 67

Help page
14.12 Help p. 99

Help, in the game
3.2 The Quick guide p. 18

High
Graphics quality p. 98

HOTAS
4.6 Joysticks, throttles and rudder pedals p. 28

HUD
9.1 Three ways to see your instruments p. 78

HUD, reading
9.2 The green HUD p. 78

I

Icebergs
6.5 Things to find p. 54

Idle detent
The left pad: RUD / THR p. 23

In a thermal
6.3 Start positions p. 52

In the air
6.3 Start positions p. 52

Index, how to use
1.1 How to use this manual p. 6

Indian Creek
Backcountry strips p. 53

INJURED
10.4 Landing under the parachute p. 84

Injury
10.4 Landing under the parachute p. 84

Install problems
16.1 Starting and updating p. 105

Installing
2.1 What you need p. 8

Instructor page
10.7 Engine and system failures p. 86

Instrument mode
9.1 Three ways to see your instruments p. 78

Instruments
9.1 Three ways to see your instruments p. 78

Instruments settings
14.4 Instruments p. 96

Intercom
9.8 Radio and intercom p. 81

Into wind
6.3 Start positions p. 52

Inverted gate
The four acro race courses p. 60

iOS
1.2 Words used for each device p. 6

Island
6.1 The island p. 51

J

Joystick
4.6 Joysticks, throttles and rudder pedals p. 28

K

KAVX
6.4 Other places to land p. 52

Key bindings
4.4 Keyboard p. 25

Key hints
4.4 Keyboard p. 25

Keyboard
4.4 Keyboard p. 25

KEYBOARD SETUP
4.4 Keyboard p. 25

Keys, default
4.4 Keyboard p. 25

Keys, summary
4.1 All controls at a glance p. 21

KILLED
10.4 Landing under the parachute p. 84

KMEV
6.2 Where you can start p. 51

KMHV
6.4 Other places to land p. 52

KMYL
6.2 Where you can start p. 51

Knife-edge gate
The four acro race courses p. 60

Knik glacier
6.5 Things to find p. 54

Knik River Bars
STOL Cub courses p. 63

KPGA
6.2 Where you can start p. 51

KSNA
6.2 Where you can start p. 51

KSZP
6.4 Other places to land p. 52

L

Lake Hood
6.2 Where you can start p. 51

Lake Powell
6.5 Things to find p. 54

LAN
13 Flying with other pilots p. 91

Landing
2.5 Landing p. 11

Landing page
3.1 The landing page p. 13

Landing score
9.6 The Butter Meter p. 80

Landmarks
6.5 Things to find p. 54

Landscape
Portrait, and other layouts p. 24

Language
14.11 Game p. 99

Leaderboards
12 Scoring, lives and credits p. 90

Left pad
4.2 Touch controls p. 22

Left-handed
Portrait, and other layouts p. 24

Lessons
7.1 Free flight, challenges and lessons p. 58; 7.8 Lessons p. 68

Lift
Thermals and lift p. 55

Lift curve
9.7 The AERO panel p. 81

Line stretch
10.2 What happens, second by second p. 83

Lines, parachute
10.3 When the parachute goes wrong p. 84

Linux
1.2 Words used for each device p. 6

Liveries
Step 2: LIVERY p. 14; 5.11 Paint schemes p. 45

LIVERY page
Step 2: LIVERY p. 14; 5.11 Paint schemes p. 45

Lives
1.3 What this build does not have p. 7; 10.5 What happens after p. 85; 12 Scoring, lives and credits p. 90

LOAD page
Step 4: LOAD p. 15

Local 2-player
4.9 Phone as a controller, TV and Cardboard p. 30; 13.1 Split screen p. 91

LOCATION page
Step 5: LOCATION p. 16

Look pad
4.7 Looking around p. 29; 8.4 The cockpit view p. 72

Looking around
4.7 Looking around p. 29

Low
Graphics quality p. 98

Low frame rate
16.4 Performance and picture p. 107

M

Mac
1.2 Words used for each device p. 6

Mackay Bar
Backcountry strips p. 53

Main wheel toe
14.3 Controls p. 95

Manifold pressure
Engine controls p. 48

Manual drone
8.6 Drone p. 74

Manual, version
1 About this manual p. 6

Map
6.1 The island p. 51; 6.7 The chart and navigation p. 56

Medals
12 Scoring, lives and credits p. 90

MENU button
2.6 Stopping, pausing and leaving p. 12; 3.3 The flying screen p. 19

Menu size
14.6 Display p. 97

MENU tab
15.2 The headset menu p. 101

Menu, main
3.1 The landing page p. 13

Mesa pads
6.4 Other places to land p. 52

Messages
Messages on the flying screen p. 20

Minimap
6.7 The chart and navigation p. 56

MIX button
The buttons p. 23

Mixture
Engine controls p. 48

Mojave
6.4 Other places to land p. 52

MORE button
The buttons p. 23

Mouse
The mouse p. 27

Mouse look
1.3 What this build does not have p. 7

Mouse wheel
8.3 Zoom p. 72

Multi-angle
8.9 Split panes p. 76

Multiplayer
13 Flying with other pilots p. 91

Multiplayer problems
16.5 Other pilots p. 107

N

Nav radios
6.7 The chart and navigation p. 56

Nav radios setting
14.4 Instruments p. 96

Navigation
6.7 The chart and navigation p. 56

NDB
6.7 The chart and navigation p. 56

Never-exceed speed
Breaking the aircraft p. 86

Night
1.3 What this build does not have p. 7

Nosewheel
5.7 Tricycle Gear Trainer p. 39

O

Obstacles
6.5 Things to find p. 54

OC Fly City
6.5 Things to find p. 54

OC Fly City ring race
Air Racing: the ring race p. 60

Ocean
6.1 The island p. 51

On final
6.3 Start positions p. 52

On its back
10.6 Crashing p. 85

On the runway
6.3 Start positions p. 52

One-way strips
Backcountry strips p. 53

Online
13 Flying with other pilots p. 91

Open cockpit
5.8 Aerobatic Trainer p. 40

Opening speed
10.3 When the parachute goes wrong p. 84

OpenTrack
4.7 Looking around p. 29

Opponent
Dogfight 1 v 1 p. 66

OPTIONS
14.1 Where the settings are p. 94

OPTIONS button
2.6 Stopping, pausing and leaving p. 12; 3.3 The flying screen p. 19

Outer islands
6.4 Other places to land p. 52

Overstress
Breaking the aircraft p. 86

P

Pads, on-screen
4.2 Touch controls p. 22

Page Mesas
STOL Cub courses p. 63

Paint schemes
Step 2: LIVERY p. 14; 5.11 Paint schemes p. 45

PANC
6.2 Where you can start p. 51

Panel
9.4 Cockpit instruments p. 79

Panel lights
8.4 The cockpit view p. 72; 9.4 Cockpit instruments p. 79; 14.2 View p. 95

PAPI
Windsocks and lights p. 56

Parachute
10.1 Leaving the aircraft p. 82

Parachute landing
10.4 Landing under the parachute p. 84

Parachute, tangled
10.3 When the parachute goes wrong p. 84

Parachute, torn
10.3 When the parachute goes wrong p. 84

Parking brake
The buttons p. 23; Brakes p. 47

PASS
7.7 Graded challenges p. 67

Passengers
Step 4: LOAD p. 15

PATK
6.2 Where you can start p. 51

Pause
2.6 Stopping, pausing and leaving p. 12

Pause while a menu is open
14.11 Game p. 99

Paywall
12.2 The Store p. 90

PDF edition
1.1 How to use this manual p. 6

Penalties, race
The four acro race courses p. 60

Performance
Graphics quality p. 98

Performance problems
16.4 Performance and picture p. 107

Personal best
7.2 Racing p. 59

PHDH
6.2 Where you can start p. 51

Phone controls
4.2 Touch controls p. 22

Photos
11.2 Clips and recording p. 88

Pilot level
12.1 Pilot level p. 90

Pilot name
13 Flying with other pilots p. 91; 14.9 Players p. 98

Pinch zoom
8.3 Zoom p. 72

Pinned settings
Your own quick-access row p. 20

Pins
Your own quick-access row p. 20

Pipeline
3.1 The landing page p. 13

Pirate cave
6.5 Things to find p. 54

Pitch ladder
9.2 The green HUD p. 78

Pitch trim
Trim p. 48

Platforms
1.2 Words used for each device p. 6

Platforms, offshore
STOL targets p. 62

Player 2
13.1 Split screen p. 91

PLAYER 2 JOINED
Giving Player 2 a controller p. 92

Players settings
14.9 Players p. 98

PlayStation controller
4.5 Gamepad p. 27

Points
1.3 What this build does not have p. 7; 12 Scoring, lives and credits p. 90

Portrait
Portrait, and other layouts p. 24

Powell Playa
STOL Cub courses p. 63

PROP button
The buttons p. 23

Propeller control
Engine controls p. 48

Propeller model
14.6 Display p. 97

Propeller strike
10.3 When the parachute goes wrong p. 84

Propeller, choosing
5.13 The Bush Plane's hangar p. 46

PTT
9.8 Radio and intercom p. 81

Purchases
12.2 The Store p. 90

Q

Quest
1.2 Words used for each device p. 6; 15.1 What is different p. 101

Quest controllers
4.8 Headset controllers p. 29

Quick guide
3.2 The Quick guide p. 18

Quick guide, first launch
2.2 The first launch p. 8

Quick reference guide
3.2 The Quick guide p. 18

Quick start guide
1.1 How to use this manual p. 6

Quick-access row
Your own quick-access row p. 20

Quit
2.6 Stopping, pausing and leaving p. 12

R

Race courses

7.2 Racing p. 59

Race: Advanced
The four acro race courses p. 60

Race: Expert
The four acro race courses p. 60

Race: Intermediate
The four acro race courses p. 60

Race: Sportsman
The four acro race courses p. 60

Racing
7.2 Racing p. 59

Radio
9.8 Radio and intercom p. 81

Radio control view
8.7 RC Mode p. 75

Radio frequency
9.8 Radio and intercom p. 81

RADIOS panel
6.7 The chart and navigation p. 56

Rank
12.1 Pilot level p. 90

Rate my landing
9.6 The Butter Meter p. 80

RC Mode
8.2 The views p. 70; 8.7 RC Mode p. 75

Rear seat
Seats and the canopy p. 50

Rebinding keys
4.4 Keyboard p. 25

REC button
3.3 The flying screen p. 19; 11.2 Clips and recording p. 88

RECENTRE
4.7 Looking around p. 29

Recentre
15.2 The headset menu p. 101

Recording video
11.2 Clips and recording p. 88

Redout
G effects on the pilot p. 86

Relative wind view
8.2 The views p. 70

RELEASE button
The buttons p. 23; Aerotow p. 49

Reliability
Step 7: GAMEPLAY p. 17; 10.7 Engine and system failures p. 86

Replay
11.1 Replay p. 87

Replay bar
11.1 Replay p. 87

REPLAY button
3.3 The flying screen p. 19; 11.1 Replay p. 87

Requirements
2.1 What you need p. 8

Reset
10.5 What happens after p. 85

Reset all settings
14.1 Where the settings are p. 94; 14.11 Game p. 99

Reset button
The buttons p. 23

Ridge lift
Thermals and lift p. 55

Right pad
4.2 Touch controls p. 22

Ring race
Air Racing: the ring race p. 60

Ripcord
10.2 What happens, second by second p. 83; Leaving by hand p. 103

Room by code
13 Flying with other pilots p. 91

Room code
14.9 Players p. 98

Rough
6.6 Environment p. 54

RPM
9.2 The green HUD p. 78

RUD / THR pad
4.2 Touch controls p. 22

RUD TRIM
Trim sliders p. 23

Rudder pedals
4.6 Joysticks, throttles and rudder pedals p. 28

Rudder trim
Trim p. 48

Rudder, touch
The left pad: RUD / THR p. 23

RUNWAY choice
6.3 Start positions p. 52

Runway lights
Windsocks and lights p. 56

Runway start
2.4 Taking off p. 10

Runways
6.2 Where you can start p. 51

S

Same network
13 Flying with other pilots p. 91

Santa Paula
6.4 Other places to land p. 52

Scorecard
9.6 The Butter Meter p. 80

Scoring
12 Scoring, lives and credits p. 90

Screen orientation
14.6 Display p. 97

Scrubbing
11.1 Replay p. 87

Sea arch
6.5 Things to find p. 54

Seaplane
5.5 Classic Trainer on Floats p. 36

Search
1.1 How to use this manual p. 6

SEAT button
8.4 The cockpit view p. 72

Seated play
15.5 Comfort p. 104

Seats
Seats and the canopy p. 50

Second monitor
4.9 Phone as a controller, TV and Cardboard p. 30

Sequence card
7.5 Aerobatic box p. 64

Settings
14.1 Where the settings are p. 94

SETTINGS button
Step 1: AIRCRAFT p. 13

SETTINGS page
14.1 Where the settings are p. 94

Shadow cam
8.2 The views p. 70

Shared cockpit
13.2 Things that are not here yet p. 93

Short take-off and landing
7.3 STOL p. 61

Show lift
Thermals and lift p. 55; 9.5 Flying aids p. 80

Side views
8.2 The views p. 70

Sideslip
9.2 The green HUD p. 78

Skill, dogfight
Dogfight 1 v 1 p. 66

Skis
5.12 Undercarriage p. 45

SKIS button
The buttons p. 23

Slats
5.13 The Bush Plane's hangar p. 46

Slip ball
9.7 The AERO panel p. 81

Slow
16.4 Performance and picture p. 107

Slow motion
2.6 Stopping, pausing and leaving p. 12

Slow motion, landing
8.8 Tire Shot p. 76

Smoke
Smoke p. 48

SMOKE button
The buttons p. 23

Snap turn
15.5 Comfort p. 104

Soaring
Gliders p. 48

Soaring day
6.6 Environment p. 54

Soldier Bar
Backcountry strips p. 53

Solo
13 Flying with other pilots p. 91

Sound settings
14.7 Sound p. 98

Spades
5.9 Advanced Aerobatic Biplane p. 42

Spanish
14.11 Game p. 99

Speed of time
14.11 Game p. 99

Spin readout
9.5 Flying aids p. 80

Spin recovery
16.3 Flying p. 106

Split panes
8.9 Split panes p. 76

Split screen
4.9 Phone as a controller, TV and Cardboard p. 30; 13.1 Split screen p. 91

Split sliders
Portrait, and other layouts p. 24

Split-screen controllers
13.1 Split screen p. 91

Spoilers
5.2 Glider Trainer p. 31; Gliders p. 48

Spotter view
8.2 The views p. 70; 8.5 Spotter p. 73

Spraying
7.4 Crop dusting p. 64

Stall
16.3 Flying p. 106

Stall recovery
7.7 Graded challenges p. 67

Standard tires
5.12 Undercarriage p. 45

START options
Step 5: LOCATION p. 16; 6.3 Start positions p. 52

Status lines
Messages on the flying screen p. 20

Step, on the
Floatplanes p. 49

Steps, the seven
3.1 The landing page p. 13

Stick expo
14.3 Controls p. 95

Stick-free
4.5 Gamepad p. 27

STOL
7.3 STOL p. 61

STOL aircraft
5.6 Bush Plane p. 37

STOL contest
STOL contest p. 61

STOL Cub courses
STOL Cub courses p. 63

STOL targets
STOL targets p. 62

Store
12 Scoring, lives and credits p. 90; 12.2 The Store p. 90

Structural damage
Breaking the aircraft p. 86

Stuck
16.1 Starting and updating p. 105

Stuck throttle
16.2 Controls p. 105

Student pilot
12.1 Pilot level p. 90

Stutter
16.4 Performance and picture p. 107

Sulphur Creek
Backcountry strips p. 53

Sulphur Creek Box Canyon
STOL Cub courses p. 63

Super Cub STOL courses
STOL Cub courses p. 63

Support
14.12 Help p. 99

Suspension
5.13 The Bush Plane's hangar p. 46

SWAP PLAYER 1 / PLAYER 2
Giving Player 2 a controller p. 92

T

Tablet controls
4.2 Touch controls p. 22

Tachometer
9.3 Dials p. 79

Tail view
8.2 The views p. 70

Taildragger
5.4 Classic Trainer p. 34

Tailwheel
5.4 Classic Trainer p. 34

Tailwheel, tundra
5.13 The Bush Plane's hangar p. 46

TAKE OFF (controller)
Giving Player 2 a controller p. 92

Take-off
2.4 Taking off p. 10

Temperature
6.6 Environment p. 54

Tester code
14.14 Developer p. 100

Thermal markers
Thermals and lift p. 55

Thermals
Thermals and lift p. 55

Thermals, flying in
Gliders p. 48

Thermals, setting
Step 6: ENVIRONMENT p. 17

Thomas Creek
Backcountry strips p. 53

Throttle, take-off
2.4 Taking off p. 10

Throttle, touch
The left pad: RUD / THR p. 23

TILT FLIES
4.3 Tilt flying and TILT FLIES p. 24

Tilt flying
4.3 Tilt flying and TILT FLIES p. 24

Tilt sensitivity
4.3 Tilt flying and TILT FLIES p. 24

TIME button
3.3 The flying screen p. 19

Time of day
Step 6: ENVIRONMENT p. 17

Tire shot
8.2 The views p. 70

Tire Shot
8.8 Tire Shot p. 76

Toe brakes
Brakes p. 47

Toolbar
3.3 The flying screen p. 19

Top bar
3.3 The flying screen p. 19

Top view
8.2 The views p. 70

Touch controls
4.2 Touch controls p. 22

Touchdown replay
8.8 Tire Shot p. 76

TOW button
The buttons p. 23; Aerotow p. 49

Tow height
Aerotow p. 49

Tow plane
Aerotow p. 49

Tow release
Aerotow p. 49

Towers
6.5 Things to find p. 54

TrackIR
4.7 Looking around p. 29

Trainers
7.8 Lessons p. 68

Trial
12.2 The Store p. 90

Tricycle Gear Trainer
5.7 Tricycle Gear Trainer p. 39

Trim
Trim p. 48

Trim, touch
Trim sliders p. 23

Tripod camera
8.5 Spotter p. 73

Troubleshooting
16.1 Starting and updating p. 105

TRY AGAIN
7.7 Graded challenges p. 67

Tug
Aerotow p. 49

Tundra tires
5.12 Undercarriage p. 45

Turbulence
6.6 Environment p. 54

Turbulence, setting
Step 6: ENVIRONMENT p. 17

Turn on foot
15.5 Comfort p. 104

TV
4.9 Phone as a controller, TV and Cardboard p. 30

Two players
13.1 Split screen p. 91

U

Undercarriage
5.12 Undercarriage p. 45

Undercarriage, choosing
Step 3: CONFIGURATION p. 14

Underwater
Water p. 86

Units
Step 7: GAMEPLAY p. 17

Unlimited aerobatics
5.10 Advanced Aerobatic Monoplane p. 43

Unlocks
12 Scoring, lives and credits p. 90

UPDATE AVAILABLE
14.15 Updates p. 100

Update problems
16.1 Starting and updating p. 105

Updates
14.15 Updates p. 100

Upside down
16.3 Flying p. 106

V

Variometer
9.3 Dials p. 79

VASI
Windsocks and lights p. 56

Version of this manual
1 About this manual p. 6

Vertical speed
9.2 The green HUD p. 78

Video
11.2 Clips and recording p. 88

VIEW button
3.3 The flying screen p. 19; 8.1 Choosing a view p. 70

View settings
14.2 View p. 95

Viewpoint
8.1 Choosing a view p. 70

Viewpoint, starting
Step 7: GAMEPLAY p. 17

Views
8.1 Choosing a view p. 70

Virtual reality
15.1 What is different p. 101

Volume
14.7 Sound p. 98

VOR
6.7 The chart and navigation p. 56

Vortex generators
5.13 The Bush Plane's hangar p. 46

VOX
9.8 Radio and intercom p. 81

VR
15.1 What is different p. 101

VR controls
4.8 Headset controllers p. 29

VR menu
15.2 The headset menu p. 101

W

W.RUDDER button
The buttons p. 23

Walk-away camera
8.10 After a bail-out p. 76

WALKED AWAY
10.4 Landing under the parachute p. 84

Water landing
Floatplanes p. 49; Water p. 86

Water rudder
5.5 Classic Trainer on Floats p. 36; Floatplanes p. 49

Water take-off
Floatplanes p. 49

Waterline
9.2 The green HUD p. 78

Watermark
11.2 Clips and recording p. 88

Weather
6.6 Environment p. 54

Weather, clouds
1.3 What this build does not have p. 7

Weight and balance
Step 4: LOAD p. 15

Wheel brakes
Brakes p. 47

Wheel-skis
5.12 Undercarriage p. 45

Winch launch
1.3 What this build does not have p. 7

Wind
6.6 Environment p. 54

Wind, setting
Step 6: ENVIRONMENT p. 17

Windows
1.2 Words used for each device p. 6

Windsocks
Windsocks and lights p. 56

Wings level
7.7 Graded challenges p. 67

Wings, breaking
Breaking the aircraft p. 86

Wires
6.5 Things to find p. 54

Wires, crop dusting
7.4 Crop dusting p. 64

World
6.1 The island p. 51

World edge
6.1 The island p. 51

Wreck
10.6 Crashing p. 85

X

Xbox controller
4.5 Gamepad p. 27

Z

Zoom
8.3 Zoom p. 72

Revision history

Every revision of the Aero Playground manual and Quick guide, newest first. Times are Pacific Time (PT).

The rule (Ty Frisby, 2026-11-26). Any change to the game that affects this manual or the Quick guide (controls, UI, settings, aircraft, features or screens) needs a revision here, in the same lane or a linked follow-up. Each entry records: the PT timestamp, the manual version, the game build or commit the text and screenshots were taken from, what changed, and which screenshots were replaced.

1.1, published with beta bundle 15 — 2026-11-26 PT

- **Published:** to aeroplayground.app/manual/ (HTML and PDF) with beta bundle 15, by Aero (Ty Frisby 2026-11-26 10:04 PM PT: publish the pending English revision with tonight's beta, including the new notes). The chapter text and figures are still the 1.1 edition below; this entry records what changed in the game since bundle 10 that the manual should know about.
- **Game build:** beta bundle 15, `wip/aero-beta-bundle15-20261126` @ `b7c911693` (iOS, Android, Mac, Windows, Linux and Quest all from the same commit).
- **What changed in the game (new notes for this revision):**
- **Ailerons.** On ten aircraft the ailerons now move through the travel in their type certificates, with the real up/down differential (more up than down): Cessna 172 20° up / 15° down, PA-28 25/12.5, Super Cub, Bush Plane and Cub on floats 18/18, Pawnee 23/23, Seminole 23/17, Stearman 23/18, Great Lakes 24/22, Grob 103 25.6/13.9, Swift 22/17, DC-3 20/14. The Schweizer 2-33 has a 38° up / 18° down differential. Expect a little less adverse yaw; the Swift rolls about 8% slower, the Pawnee and Stearman a little faster. Still fly with coordinated rudder.
- **Ailerons and flaps stay on a bending wing.** When a wing flexes or is bent by damage, its ailerons and flaps bend with it, held at three hinge points on the rear spar, on every aircraft.
- **Super Cub v15 livery picker and cabin door.** The Super Cub (and the Bush Plane and Super Cub on floats) has a new exterior and a photo-real instrument panel. The Hangar livery picker offers White / red (N1894A, the default) and Cub yellow (N1636A). A Cabin door Shut / Open toggle is in the Hangar and in OPTIONS › View; the two-piece clamshell door opens up under the wing and down beside the fuselage. The cabin sides are solid from both seats.
- **Replay camera lens.** On the landing rollout the ground-level Tire Shot camera no longer flips to a telephoto lens for a frame or two on uneven ground; it keeps one continuous lens. A towed glider's replay shows the tug and rope where they were at that moment.
- **Open-class sailplane weak link.** The open-class sailplane (modelled on the Binder EB29R) uses its certificated aerotow weak link, 935 daN (9,350 N; EASA TCDS A.559), instead of the generic 300 daN link. On a normal aerotow the tug's own link is now the weakest point. The Grob 103, Schweizer 2-33 and Swift keep 300 daN (2,940 N) in this build.
- **Also in this build:** smoke shadows land on the ground instead of hanging in the sky; the aircraft shadow on a cliff wall is its true size; mountain faces streak less; the start-up menu no longer freezes while the world loads; the cockpit seat button and look pad no longer overlap on phones.
- **Not yet in the text (for the next revision, J35):** all of the notes above, in the aircraft, controls, cameras/replay and gliding chapters; the Super Cub figures still show the earlier model; plus the bundle 10 items listed below.

- **Screenshots replaced:** none in this entry.
- **Spanish:** not changed and not verified (see SPANISH-REVIEW.md). Translations (J38) are separate and not published.

1.1, published with beta bundle 10 — 2026-11-26 PT

- **Published:** to aeroplayground.app/manual/ (HTML and PDF) with beta bundle 10, by Aero. The text and figures are the 1.1 edition below; this entry records what bundle 10 changed in the game.
- **Game build:** beta bundle 10, `wip/aero-beta-bundle10-20261126` @ `10168bf43` (iOS 2027.0 (202611261254), Mac 2026.1126.1256, Windows 2026.1126.1259, Linux 2026.1126.1301, Android and Quest from the same commit).
- **What changed in the game in bundle 10:**
- **Bailing out is two steps (AER-78).** BAIL OUT starts the exit; one second later the same control reads PULL RIPCORD, and the parachute opens only when you pull it. There is no automatic opener. The view re-frames after you leave the aircraft.
- **Split screen (AER-79).** Both players can share one aircraft (TRANSFER hands it over), each player has their own screen, and the phone layouts no longer overlap.
- **Tire Shot (AER-81).** OPTIONS › View can turn off the automatic Tire Shot after a landing; the camera sits 1.5 ft up and the tyre fills about a third of the frame; standard tyres show tread and sidewall lettering.
- **Super Cub and Bush Plane (AER-80, AER-88).** Finlets top and bottom of the stabilizer tips; the main and tail wheels touch where they are drawn.
- **Wheels and propellers (AER-89, AER-87).** They turn about their own hubs (the Great Lakes wheels were off-centre); a broken propeller is the size of the one fitted.
- **Butter Meter (AER-91)** scores in hundredths out of 10.
- **After a parachute landing (AER-90)** the TRACK camera stays level on the pilot.
- **Clips and recording on every platform (AER-84)**, and mouse free look on Mac and Windows.
- **iPhone LOOK buttons (AER-95)** sit together under the toolbar in both orientations.
- **Not yet in the text (for the next revision, J35):** the two-step bail-out and PULL RIPCORD in the Bail-out chapter, the Controls reference and the Quick guide; "Mouse free look is not in this build" in About and Controls is no longer true; Tire Shot options and framing; Butter Meter hundredths; split-screen shared aircraft and TRANSFER; the finlets in the aircraft chapter.
- **Screenshots replaced:** none in this entry.
- **Spanish:** not changed and not verified (see SPANISH-REVIEW.md).

1.1 — 2026-11-26 09:40 PT

- **Game build:** three feature branches that follow beta bundle 8a and are not yet in a build testers have. Parachute: `wip/aero-chute-physics-20261126` @ `85ac1a3c2`. Split screen: `wip/aero-splitscreen-p2-20261126` @ `e1f788eea`. Bush Plane: `wip/aero-bushplane-visuals-20261126` @ `7880f595e`. Text and figures were taken from those commits.
- **What changed:**
- **The manual is public** at aeroplayground.app/manual. The quick start's last line gives that address.

- **Bailing out (AER-78, with AER-75).** You step off the sill and fall beside the aircraft at first, and your weight leaves it when the harness releases. The parachute is a cloth canopy on 24 lines. New section When the parachute goes wrong: a canopy torn by opening too fast, lines caught by the aircraft, being hit by the aircraft, the propeller. When a pilot is killed the body stays where it happened and the GONE WEST figure leaves it, with the aircraft kept in the picture. The cameras chapter and the glossary say the same.
- **Split screen (AER-79).** The section is rewritten: Player 2 joins by pressing a button on a controller, a controller plugged in during the flight goes to Player 2, GIVE IT TO PLAYER 2 when there is only one, the Split-screen controllers rows in OPTIONS › Controls (TAKE OFF, SWAP PLAYER 1 / PLAYER 2, TO P1 / TO P2), what is remembered, Player 2's controller layout, and the FLIGHT and 1 PLAYER buttons. Player 1 can now fly by keyboard or touch while Player 2 has the only controller. The settings reference, the controls chapter and Troubleshooting point to it.
- **Bush Plane (AER-80).** The registration on the left side of the fuselage now reads correctly. No text needed changing; the picture did.
- The Quick guide in the game and the one-page Quick start: no wording changed (the basics of bailing out are the same). No Spanish string was added or changed.
- **Screenshots replaced** (same file names):
- `bailout-freefall`, `bailout-canopy`: from `85ac1a3c2`, showing the cloth canopy.
- `aircraft-pa18-cub-like`: from `7880f595e`, left side, registration N1894A reading correctly, and framed twice as close as before (the centre of a double-size capture).
- **Screenshots added:**
- `bailout-opening` (the canopy filling), from `85ac1a3c2`.
- `split-screen` (Player 2's join message) and `options-split-controllers` (the Split-screen controllers rows), from `e1f788eea`.
- **Where the figures came from:** the game in Editor play mode on forge, driven through its own entry points as in 1.0, graphics pinned to High, 1600x900, from a throwaway worktree checked out at each commit above.
- **To replace at the next revision:**
- Everything listed under 1.0 still stands, except the Bush Plane's framing.
- `split-screen` shows two overlaps that are in the game at this commit, not in the capture: the 1 PLAYER button sits over the second line of Player 2's message, and Player 1's on-screen buttons cover the one-line message at the bottom. Retake when that is fixed.
- The other split-screen states (PLAYER 2 JOINED, GIVE IT TO PLAYER 2, the one-line message) have no picture yet: they need a real controller.

1.0 — 2026-11-26 04:30 PT

- **Game build:** beta bundle 8a, `wip/aero-beta-bundle8a-20261125` @ `b917c530c` (the beta that shipped on every platform at 1:35 AM PT on 2026-11-26), plus the Quick guide added by this job on `wip/claude-game-manual-20261126`.
- **What changed:** first edition. The complete manual (15 chapters, glossary, index), the Quick guide in the game (flat screens and headset), and the one-page Quick start.
- **Screenshots replaced:** none; every figure is new.

- **Where the figures came from** (67 figures, all of the running game):
- **The shipped bundle 8a Mac Player** (build 202611260110), run through its own self-test modes, for the screens where the shipped build is what matters: every `menu-*` (the Player shows the shipping fleet; the Editor shows the development fleet), `first-launch-invite`, `quick-row`, `options-controls`, `options-display`, the three `phone-touch-*` layouts, and `thermal`.
- `ManualShots.Run` on this branch (the game in Editor play mode on forge, graphics pinned to High, 1600x900): `flight-hud`, `flight-dials`, `guide-desktop`, `chart`, `view-*`, `bailout-*`, `replay-bar`, every `aircraft-*` and `cockpit-*`, every `start-*`, every `activity-*`, `menu-configuration-end`, `settings-help`.
- `ManualShots.Guide`: `touch-guide`. `ManualShots.QuestMenu`: `quest-menu`, `quest-guide-1`.
- **To replace at the next revision:**
- `menu-aircraft` predates the QUICK GUIDE button in the AIRCRAFT page's foot row. Retake it from the first Player build that contains the guide.
- `quick-row`, `phone-touch-*`, `options-*`, `view-spotter` and `thermal` show the "Graphics lowered to …" line, because the capture machine was busy with other builds. Retake on a quiet machine.
- The aircraft pictures are the game's own Left side view, in which the aircraft is small. A closer framing would serve the aircraft chapter better.