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Flight Instructor Training

Welcome to the

Bootcamp Pilot Training Network

Today's Bootcamp+ Network Programming

What's on for Today?

Live Show – 1st Hour – Wings Credit

Open Mic – 2nd Hour – End

Monitor the Chat – Links/Info

Wings Credit - End of the Live Show

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What's New?

PH Rebroadcasts Wed evenings 8pm Eastern

Powerhour Podcasts – Full shows

New CFI Aeronautical Knowledge Gaps Course set for release

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Airports

Your First Towered Airport

How to Operate Correctly

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AGENDA

What we'll cover

Built so a VFR pilot walks out comfortable in front of any tower controller in the country

1	**Why a tower exists**	What controllers actually do for you
2	**Class B, C, D — the towered classes**	Where each kind of tower lives
3	**Pre-flight prep**	ATIS, charts, frequencies, NOTAMs, hot spots
4	**Anatomy of a radio call**	Who-Who-Where-What and ATIS code
5	**Inbound calls — sample scripts**	Class D, Class C, Class B
6	**Inside the pattern**	Tower instructions you'll hear and read back
7	**Departure — ground & tower**	From clearance to airborne
8	**Lost comms**	Squawk 7600 + light gun signals
9	**Common mistakes**	What controllers see most often

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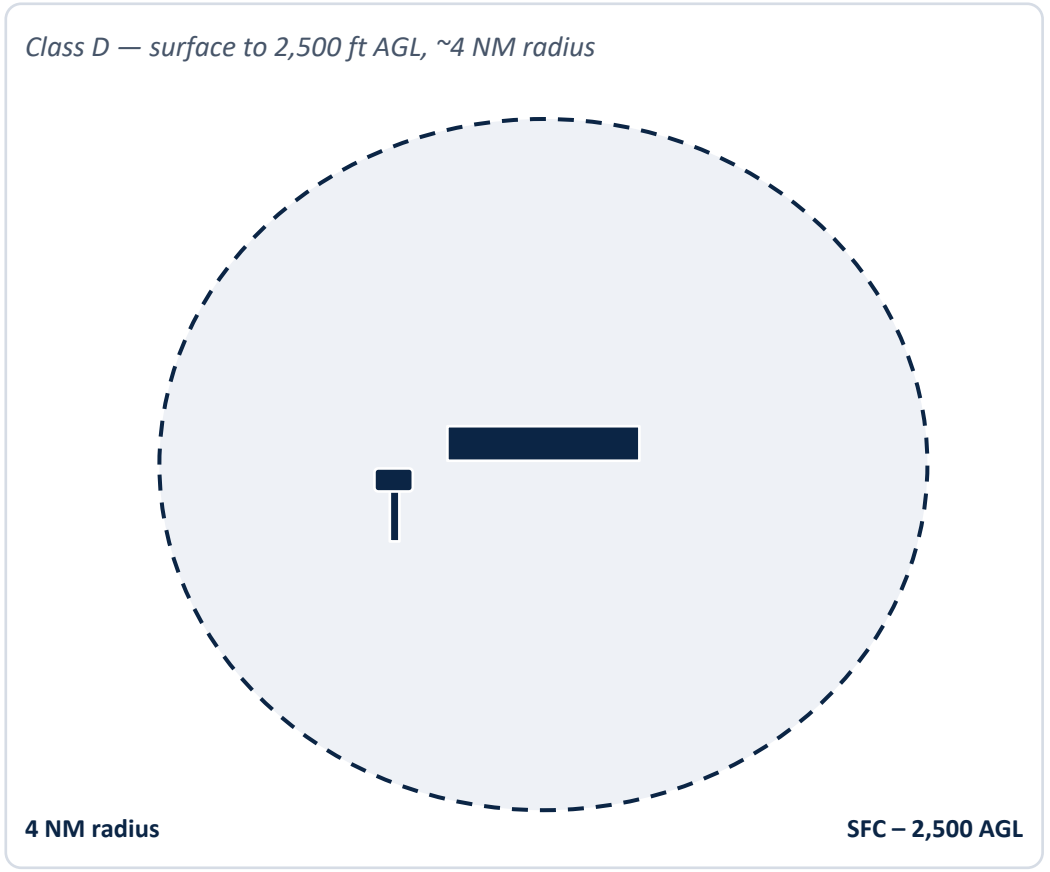
What a control tower actually does

- Sequences arrivals and departures so airplanes don't run into each other on the ground or in the pattern.
- Issues runway clearances — only ATC can authorize you to LAND, TAKE OFF, or CROSS a runway.
- Provides advisories — traffic, wake-turbulence cautions, runway changes, wind, braking action.
- Owns the surface area: usually 4 NM radius, surface to 2,500 ft AGL (Class D).



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Three kinds of towered airports

CLASS D

Single layer

Tower-only operation

- Two-way radio required
- Surface to 2,500 ft AGL
- Roughly 4 NM radius
- No transponder requirement (unless within Mode-C veil)
- Examples: small/medium GA towered fields

CLASS C

Cake — 2 tiers

Tower + Approach

- Two-way radio established before entry
- Mode-C transponder required
- Inner: 5 NM SFC–4,000 AGL
- Outer: 10 NM 1,200–4,000 AGL
- Examples: most mid-size airports

CLASS B

Inverted wedding cake

Tower + Approach + Center

- ATC clearance required to enter
- Mode-C transponder + ADS-B Out
- Tailored shelves up to 10,000 ft MSL
- Mode-C veil = 30 NM regardless
- Examples: major-hub airports

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Class D — establish two-way radio, then enter

- **Magic words: "Established two-way radio communication" — that's your entry ticket.**
  - You are "established" when the controller calls you back BY CALL SIGN — even if just "Skyhawk 12345, standby." That counts.
  - A response of "aircraft calling, standby" is NOT establishment — your call sign was not used.
- **Required equipment: VHF radio. (Transponder only required if you're inside a Mode-C veil or under Class B.)**
- **Surface area: 4 NM radius, surface to 2,500 ft AGL.**
- **Weather minimums: 3 SM visibility, 1,000 ft ceiling for VFR (and the standard 152s of cloud clearance).**
- **Special VFR available in many Class Ds — request from the tower.**

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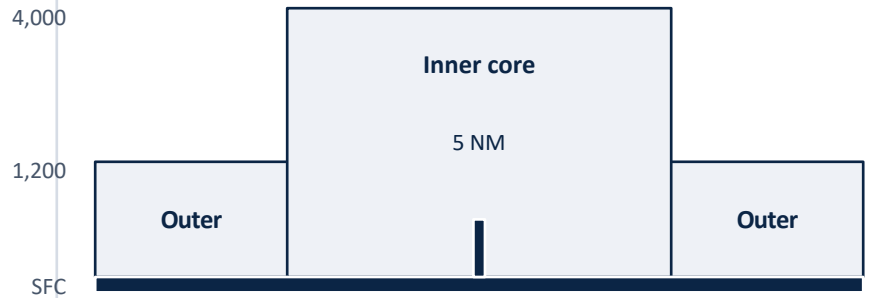
Class C — Approach controls before Tower does

- **Talk to APPROACH before you enter the airspace, not Tower.**
  - Two-way radio established before entry (same "call you by call sign" rule).
- **Mode-C transponder + ADS-B Out required throughout.**
- **Approach hands you off to Tower as you near the airport — listen for "Contact tower 118.3."**
- **Inner ring: 5 NM, surface to 4,000 ft AGL. Outer ring: 10 NM, 1,200 to 4,000 ft AGL.**
  - Outer area (advisory only): 20 NM — services available, but NOT regulatory airspace.
- **If you're VFR transitioning, Approach will sequence you with IFR traffic — expect vectors.**

Class C cross-section



Inner core: 5 NM, SFC – 4,000 AGL · Outer shelf: 10 NM, 1,200 – 4,000 AGL

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Class B — clearance required, no exceptions

- **You need an explicit clearance: "Skyhawk 12345, cleared into the Bravo." Anything less and you stay out.**
  - Checking in is NOT enough. "Roger" is not a clearance. "Standby" is not a clearance.
- **Mode-C transponder + ADS-B Out required inside the Bravo and inside the Mode-C veil (30 NM).**
- **Cloud clearance reduces to clear of clouds (no specific feet); visibility 3 SM.**
- **VFR Bravo arrival? Request "VFR services" from Approach 30+ NM out and have your tail number, position, altitude, and intentions ready.**
- **VFR transitions through Bravo: published "VFR corridors" or "flyway" charts in many cities (LA, NY, ATL).**
- **Pilot certificate floor: PPL minimum, OR student/sport/recreational with a §61.95 endorsement.**

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What you need by airspace class

Requirement	Class D	Class C	Class B
Two-way VHF radio	**Required**	**Required**	**Required**
Two-way comms established before entry	**Yes**	**Yes**	—
Explicit ATC clearance to enter	—	—	**REQUIRED**
Mode-C transponder	*Only in Mode-C veil*	**Required**	**Required**
ADS-B Out	*Only in Mode-C veil*	**Required**	**Required**
VFR cloud clearance	152s + 1,000 ceil	152s + 1,000 ceil	Clear of clouds, 3 SM
Minimum pilot certificate	Student+	Student+	Private (or §61.95)

"152s" = 1 SM viz, 500 below / 1,000 above / 2,000 horizontal cloud clearance.

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Pre-flight prep — five things you do before you key the mic

1. **Pull up the airport diagram**

   Runways, taxiways, ramps, hot spots, FBO location. Print or have on EFB.

2. **Find the frequencies**

   ATIS/AWOS, Approach, Tower, Ground, Clearance Delivery, CTAF after-hours. Note them on a kneeboard sheet.

3. **Read the chart supplement**

   Hours of operation, noise abatement, right-traffic runways, special procedures, LAHSO availability.

4. **Check NOTAMs**

   Runway/taxiway closures, displaced thresholds, lighting, tower out-of-service, TFRs.

5. **Brief the runway expected**

   From ATIS or wind: which runway, expected pattern direction, expected taxi route. Brief BEFORE the call.

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Anatomy of an initial radio call — Who · Who · Where · What

WHO YOU'RE CALLING

"Centennial Tower,"

Facility name + facility type.

WHO YOU ARE

"Skyhawk one-two-three-four-five,"

Type + N-number, slowly.

WHERE YOU ARE

"Ten miles east at five thousand five hundred,"

Position, altitude, distance from field.

WHAT YOU WANT

"Inbound for full stop with information Tango."

Intentions + ATIS code.

PUT TOGETHER

"Centennial Tower, Skyhawk one-two-three-four-five, ten east at five thousand five hundred, inbound for full stop, information Tango."

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ATIS — copy this, then key the mic

- **ATIS is a recorded loop of weather + active runway + special instructions. Updated hourly (or when conditions change).**
  - Each broadcast carries an identifier letter — "Information Tango" — that you read back to prove you have the current data.
- Wind, visibility, sky condition, temp/dewpoint, altimeter — same as METAR.
- Active runway(s) — "landing and departing runway 17-Right."
- NOTAMs in effect, runway closures, equipment outages, bird/wildlife alerts.
- Approach / departure procedures — "VFR aircraft expect right traffic 17-Right."
- Closing line: "Advise on initial contact you have information Tango."

SAMPLE ATIS

```
Centennial Airport information Tango.

One-five-five-four Zulu observation.
Wind one-eight-zero at one-zero.
Visibility one-zero. Sky clear.
Temperature two-five, dewpoint one-zero.
Altimeter three-zero-zero-two.

Landing and departing runway one-seven-right.
VFR aircraft expect right traffic.
Notice: taxiway Bravo closed between Charlie and
Delta.

Advise on initial contact you have information
Tango.
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Inbound to a Class D — call ~10 NM out

- Tune ATIS first, copy the code, then switch to TOWER (not Approach — there isn't one).
- Make the initial call ~10 NM from the field (or earlier if a pattern is busy).
- Wait until the controller calls YOU back BY CALL SIGN before crossing the surface area.
- Tower will issue a pattern entry — "enter left base 17-Right" or "report 2-mile final."

PILOT	"Centennial Tower, Skyhawk one-two-three-four-five, ten east at five thousand five hundred, inbound for full stop, information Tango."
TOWER	"Skyhawk one-two-three-four-five, Centennial Tower, enter left downwind runway one-seven-right, report two-mile downwind."
PILOT	"Left downwind one-seven-right, report two-mile downwind, Skyhawk three-four-five."

Read back the ASSIGNMENT (runway + pattern) and the REPORTING POINT — every time.

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Inbound to a Class C — Approach first, then Tower

- Initial contact with APPROACH (or sometimes Center if remote). Listen first to confirm the freq is alive.
- Approach will assign a squawk code, work you into the flow, and (eventually) hand you off to Tower.
- Switch to Tower only when told: "Skyhawk three-four-five, contact Tower, one-one-eight point three."

PILOT	"Colorado Springs Approach, Skyhawk one-two-three-four-five with you, two-zero northwest at seven thousand five hundred, landing Springs with information Mike."
APP	"Skyhawk three-four-five, Colorado Springs Approach, squawk four-three-five-six, ident, expect runway one-seven-Left, advise when you have the field."
PILOT	"Squawk four-three-five-six, ident, expect runway one-seven-Left, will advise field in sight, Skyhawk three-four-five."
APP	"Skyhawk three-four-five, contact Tower one-one-eight point seven."
PILOT	"Tower one-one-eight point seven, Skyhawk three-four-five, good day."

Read back EVERY squawk, every frequency, every runway. "Ident" gets your tail to flash on their scope.

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Inbound to a Class B — listen for the magic word "cleared"

- Call APPROACH 30+ NM out — Bravo controllers are busy and you do not want to be the airplane that surprises them.
- Until you hear "Cleared into the Bravo" — DO NOT enter. "Standby" and silence are not clearances.
- If you must hold short of the Bravo to wait for clearance, fly a holding pattern outside the airspace.

PILOT	"Denver Approach, Skyhawk one-two-three-four-five, three-zero south at eight thousand five hundred, request VFR transition through the Bravo, north-bound."
APP	"Skyhawk three-four-five, Denver Approach, squawk four-six-seven-one, ident, remain clear of the Bravo."
PILOT	"Squawk four-six-seven-one, ident, remain clear of the Bravo, Skyhawk three-four-five."
APP	"Skyhawk three-four-five, radar contact, two-five south of Denver, maintain VFR at or below seven thousand five hundred, cleared into the Class Bravo."
PILOT	"Maintain VFR at or below seven thousand five hundred, cleared into the Class Bravo, Skyhawk three-four-five."

Read back the Bravo clearance and the altitude restriction WORD-FOR-WORD. This is non-negotiable.

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Tower instructions you'll hear — and what they mean

Cleared to land	You may land. Period. Make sure the runway number matches what you expect.
Cleared for the option	Touch-and-go, low approach, full stop, stop-and-go — your choice. Common for trainers.
Cleared for touch-and-go	Touch down, retract flaps appropriate, full power, lift off again. No taxi-back.
Make short approach	Tighten the pattern — turn base early, descend steeper. Tower needs you down quickly.
Extend downwind	Continue past the normal base turn until told otherwise. Watch your distance from the field.
I'll call your base	Don't turn base until I tell you to. You're being sequenced behind other traffic.
Maintain visual separation	Keep eyes on the traffic the controller pointed out and stay clear of them yourself.
Line up and wait	Taxi onto the runway, align, hold position. NOT a takeoff clearance.
Go around / Discontinue approach	Climb straight ahead, make appropriate radio call, expect re-sequencing.

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What you MUST read back

READ BACK

- Hold-short instructions (any runway or taxiway)
- Cleared-to-cross instructions (any active runway)
- Take-off clearance (with runway)
- Landing clearance (with runway)
- Line up and wait
- Heading & altitude assignments
- Frequency changes
- Squawk codes
- Class B clearances ("cleared into the Bravo")

ACKNOWLEDGE ONLY

- Routine traffic advisories ("traffic, twelve o'clock")
- Wind / altimeter on initial check-in (a brief acknowledgement is fine)
- Single-letter ATIS code (already in your initial call)
- Wake-turbulence cautions (acknowledge — not a verbatim read-back)

Bottom line: if it has a NUMBER (runway, frequency, squawk, heading, altitude), read it back.

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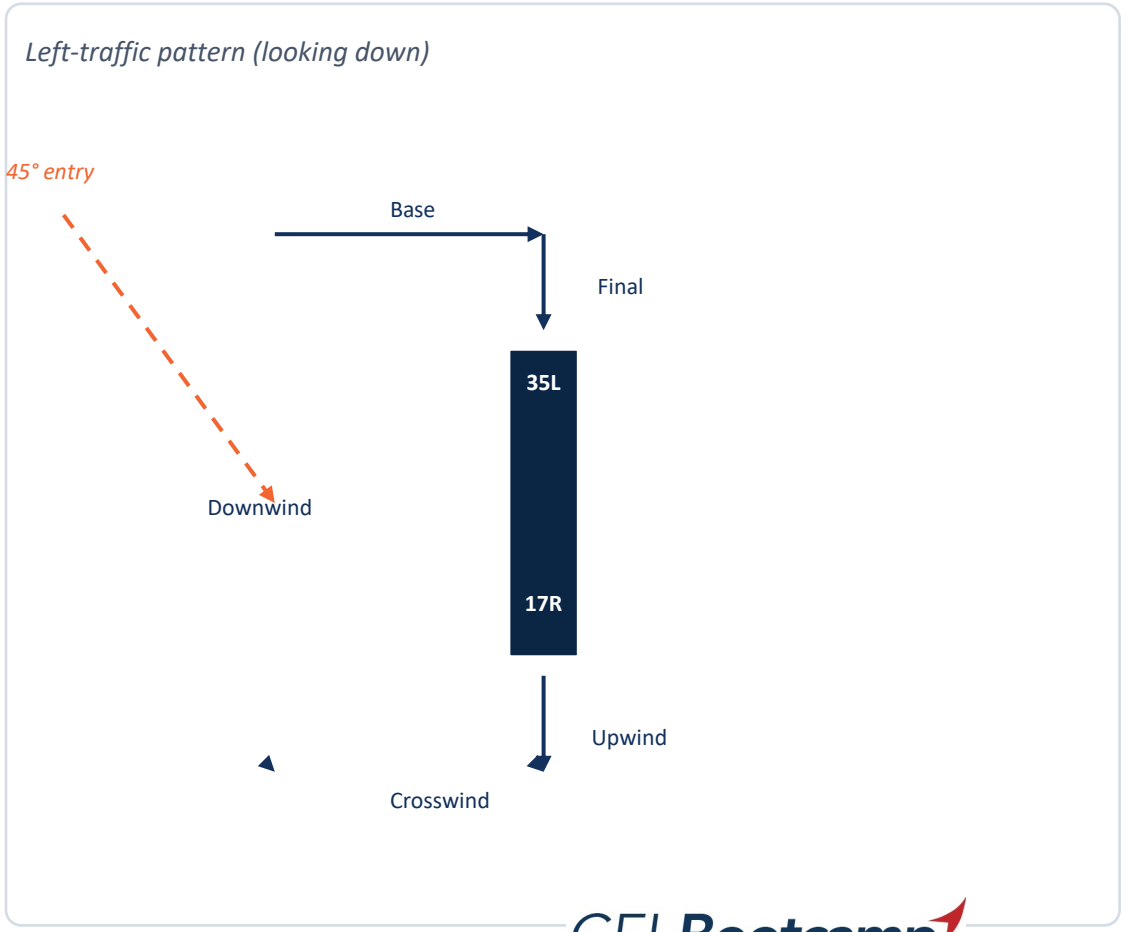
Standard pattern entries — what tower can ask for

- **STRAIGHT-IN — fly the extended runway centerline to final.**
  - Common at Class C/B. Tower will sequence you with pattern traffic.
- **LEFT/RIGHT BASE ENTRY — turn directly to base.**
  - Common at Class D. Saves time but requires careful pattern scan.
- **LEFT/RIGHT DOWNWIND — fly past the field on the side, then turn base.**
  - The classic. "Enter left downwind 17-Right."
- **45° ENTRY — angle into downwind midfield, 45° to runway heading.**
  - Standard at non-towered fields; used at Class D when tower asks.



Land-and-Hold-Short — know your aircraft's distance

- LAHSO = Land And Hold Short of an intersecting runway, taxiway, or other point.
- PIC AUTHORITY: you can decline LAHSO at any time. Tower must accept your decline. Decline if you are unsure.
- PIC RESPONSIBILITY: know your Available Landing Distance (ALD) and your aircraft's required landing distance for today's weight, wind, and runway condition.
- Student pilots may NOT accept LAHSO — period. (AIM 4-3-11.)
- ALDs are published in the Chart Supplement. Read them BEFORE the flight, not during the call.
- Read-back includes the runway, the hold-short point, and your call sign.

TOWER	"Skyhawk three-four-five, cleared to land runway one-zero, hold short of runway one-seven-right."
PILOT	"Cleared to land one-zero, hold short of one-seven-right, Skyhawk three-four-five."

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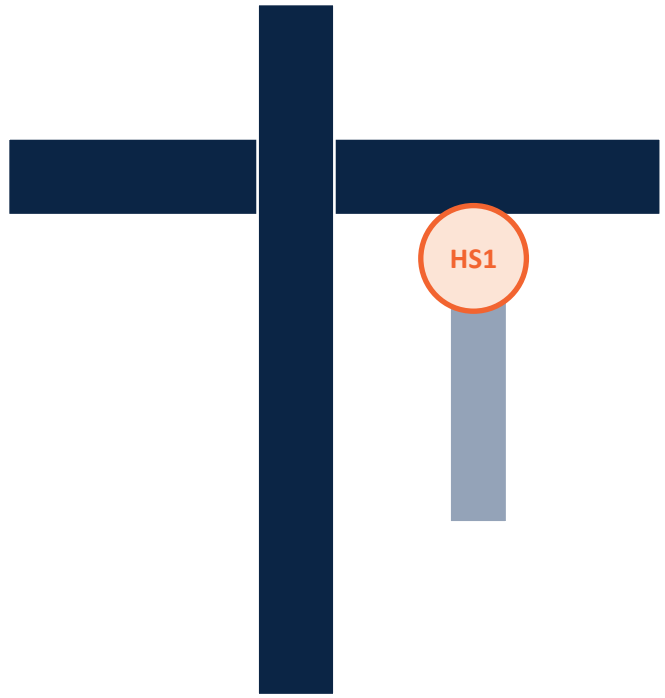
Runway incursion prevention

- **ANY time you cross any runway — active or not — you need an explicit clearance.**
  - Listen for "cross runway X" or "hold short of runway X."
- **Read the airport diagram before you taxi. Identify hot spots (marked with circled numerals on FAA diagrams).**
  - Hot spots are confusing intersections — short taxiways, multiple turns, mistaken-runway entries.
- **STOP AT EVERY HOLD-SHORT LINE. Confirm runway number painted on the surface. Verify clearance. Then go.**
- **Lost on a taxiway? Stop, set the brake, tell ground: "Skyhawk 345 is unsure of position, request progressive taxi."**
- **Heads-up window flying — at towered fields, conversation in the cockpit drops on the ground. Eyes outside.**

Hot spot — example diagram



Where a short taxiway dumps you within feet of an active runway. Read the diagram BEFORE you taxi here.

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Departure — Clearance Delivery → Ground → Tower

- **VFR departure from a Class D — call GROUND only.**
- **Class C/B — you may need CLEARANCE DELIVERY first for a VFR clearance with squawk and departure freq, then GROUND.**
- **Tell ground: type, location on the field, ATIS code, intentions.**

PILOT	"Centennial Ground, Skyhawk one-two-three-four-five at the south ramp, ready to taxi, VFR east-bound, information Tango."
GND	"Skyhawk three-four-five, Centennial Ground, runway one-seven-right, taxi via Alpha, hold short of runway three-five-left at Alpha-three."
PILOT	"Runway one-seven-right via Alpha, hold short of runway three-five-left at Alpha-three, Skyhawk three-four-five."

Always read back the runway, the taxi route, and EVERY hold-short instruction. Wrong-runway events almost always start here.

Tower call — what to expect at takeoff

- Switch to TOWER once Ground has handed you off (often "Monitor Tower 118.3" — that means listen, don't check in).
- When you reach the runway, key the mic: who you are, where you are, what you want.
- Tower may issue: "Hold short," "Line up and wait," or "Cleared for takeoff."
- You can request a downwind departure, on-course turn, intersection departure, or the option.

PILOT	"Centennial Tower, Skyhawk three-four-five, holding short runway one-seven-right at Alpha-three, ready for departure, east-bound."
TOWER	"Skyhawk three-four-five, Centennial Tower, runway one-seven-right, cleared for take-off, left turn east approved."
PILOT	"Cleared for take-off runway one-seven-right, left turn on course, Skyhawk three-four-five."

Frequency changes — when, how, and the gotchas

- **Tower departure: you may be told "frequency change approved" once you're clear of the surface area, OR you may be handed to Departure (Class C/B).**
  - Always confirm the new freq in your read-back. "One-two-five point seven, Skyhawk three-four-five."
- **If you don't get a freq change explicitly, STAY on the controller's frequency until told otherwise.**
- **Going to Flight Following? Wait until clear of the airport's airspace, then call the appropriate ARTCC/Approach with your tail, position, altitude, and request "VFR flight following to KXYZ."**
- **Returning to a tower at night when its frequency goes uncontrolled? Switch to CTAF (often the same number) and self-announce.**

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Lost comms — squawk, look, and remember the light gun

- **First — verify it's a comm failure. Check volume, headset, mic plug, comm radio, frequency, transmit selector, audio panel.**
  - Try the secondary comm radio. Try the standby frequency. Try the previous controller's freq.
- **Squawk 7600. The controller's scope flashes "RDOF" on your tag.**
- **Stay clear of the surface area until you can re-establish comms — circle outside if you must.**
- **If you must land — fly a normal pattern at an altitude that lets you see the tower cab. WATCH FOR LIGHT GUN SIGNALS.**
- **Land with care: stay alert for traffic ATC has not been able to coordinate.**
- **After landing, taxi clear and call the tower by phone. (Number is in the Chart Supplement.)**

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Light gun signals — memorize this chart

Signal	On the ground	In flight
STEADY GREEN	Cleared for take-off	Cleared to land
FLASHING GREEN	Cleared to taxi	Return for landing (steady green at right time)
STEADY RED	Stop	Give way to other aircraft and continue circling
FLASHING RED	Taxi clear of the runway in use	Airport unsafe — DO NOT LAND
FLASHING WHITE	Return to starting point on airport	*(Not used in flight)*
ALTERNATING RED/GREEN	Exercise extreme caution	Exercise extreme caution

Acknowledge an in-flight light signal by rocking your wings (day) or flashing nav lights (night).

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Where pilots most often go wrong with tower

Assuming "standby" or "aircraft calling" is establishment	It isn't. Wait for your tail number. Stay outside the surface area until you hear it.
Stepping on transmissions	Pause a half-second after pressing the mic before speaking. Listen first.
Reading back "roger"	"Roger" means "I heard you." It is NOT a clearance and NOT a read-back.
Forgetting the ATIS code on initial call	Tower has to ask. Wastes airtime. Always include "with information X."
Crossing a hold-short line without clearance	This is a runway incursion. Even at unfamiliar fields it gets pilot deviation reports filed.
Mumbling N-numbers	Slow down. "Skyhawk one-two-three-four-five" — every digit clear.
Not knowing your runway distance	Especially at LAHSO. If you don't know it, decline.
Switching freq without permission	If you didn't hear "frequency change approved" or a hand-off, you stay on freq.

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A complete VFR arrival into a Class D — start to finish

20 NM out	Tune ATIS — copy code, weather, runway.
12 NM out	Switch to Tower freq, listen 30 sec for traffic & flow.
10 NM out	Initial call: who-who-where-what + ATIS code.
8 NM out	Tower assigns pattern entry. Read back assignment + reporting point.
5 NM out	Tighten scan — pattern traffic, wake-turbulence cautions.
3 NM out	Begin pattern leg as instructed (downwind, base, etc.).
2 NM rep.	Make assigned report. Tower issues landing clearance.
1 NM final	Verify runway number on the painted threshold matches clearance.
Touchdown	Land. Decelerate. Tower may ask for taxi-clear instructions.
Clear of runway	Switch to Ground (or stay if combined) — request taxi to ramp.

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PART TWO

Throw real-world flow at the class. The mic is the only place this gets fluent.

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EXERCISES

Three scenarios — write the radio calls

1

VFR arrival into a Class D

10 east, 4,500 ft, calm winds, runway 17 in use, full stop. Write the initial Tower call AND the read-back you expect to give.

2

VFR transition through Class C

Approach, Tower, departure freq. Write THREE radio calls: the initial Approach call, the Tower contact, and the Approach release back to the en-route freq.

3

Class B clearance request

30 south of a major Bravo, 7,500 ft, want to transit north-bound. Write the request — include enough information for clearance to issue immediately.

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RESOURCES

What to read after this lesson

Aeronautical Information Manual (AIM)	Chapter 4 — ATC; 4-1 to 4-3 are the meat. Light gun signals: 4-3-13.
Pilot/Controller Glossary	End of the AIM — exact definitions of every phrase you'll hear.
FAA-H-8083-25 PHAK	Chapter 14 — Airport Operations and ATC.
FAA-H-8083-3 Airplane Flying Handbook	Chapter 8 — Approaches and Landings (pattern entries, sequencing).
Chart Supplement (formerly A/FD)	Tower hours, frequencies, NOTAMs, special procedures, LAHSO ALDs.
AC 90-66B	Non-Towered Airports — useful contrast for what tower DOES that CTAF doesn't.
VFR Sectional + TAC charts	Bravo/Charlie/Delta boundaries and the Mode-C veil.
AOPA Air Safety Institute	Free "Say It Right" interactive course — practice patterns.

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Special Announcement!

Reminders!

CFI Study Group on FaceBook

Join SAFE and the Facebook CFI Study Group by Clicking on the Images Above

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