AOPA AIR SAFETY INSTITUTE | FOCUSED FLIGHT REVIEW

FOCUS: **POSITIVE AIRCRAFT CONTROL**

The AOPA Air Safety Institute has identified *positive aircraft control* as an area where strengthening pilot knowledge and performance can help reduce general aviation accidents. This flight profile covers safety "essentials" and elements from 14 CFR Part 91 to help pilots meet the Flight Review requirements outlined in 14 CFR 61.56. The curriculum also offers pilots an opportunity to develop risk management strategies, and it aids CFIs in deciding whether clients are proficient and safe to act as pilot in command.

All tasks and maneuvers should be performed to the Airman Certification Standards for the client's certificate or rating.

CFIs may choose to add their own expertise, tasks, and maneuvers to make the flight review unique to their clients' certification level, background, experience, proficiency, the type of flying they do most often, and expectations.

🔎 Look for the magnify glass icon for additional insights.

OBJECTIVES

- ☐ **Meet the requirements of 14 CFR 61.56:**

  🔎 Minimum 1 hour ground/1 hour flight *for proficient pilots.*

- ☐ **Verify the pilot's proficiency at a level suitable to act as pilot-in-command under the certificate/ratings being used.**
- ☐ **Help the review pilot gain a better understanding of real-world reasons for in-flight loss of control. Improve the pilot's ability to maneuver safely in dynamic flight environments.**

FLIGHT REVIEW PREP: CLIENT AND CFI SELF-STUDY

Clients and CFIs should review the following materials independently prior to the flight review and come to the ground discussion prepared to talk about the associated questions:

- ☐ *ASI Flight Review Quiz (quiz, 5 min.)*
  - How does your proficiency change over time?
  - Is the rate of change different for different skills? For example, some pilots believe that aircraft control "atrophies" more slowly than other flying skills.
  - How often do you review aircraft systems and abnormal/emergency procedures?
- ☐ *Essential Aerodynamics (online course, 45-60 min.)*

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- Think about an average flight: How does angle of attack vary from takeoff through touchdown?
- What are the two main ways that a wing can generate more lift?

☐ *Energy Management (AOPA Pilot (online), August 2015)*

- What does it mean to get "behind the power curve," and how might you find yourself in that situation?

☐ *Accident Case Study: Communication Breakdown (video, 15 min.)*

- What does the accident scenario tell you about the causes of some maneuvering accidents?
- What maneuver in particular is most prone to such an overreaction?

☐ *Impossible Turn, Practice Makes Possible? (video, 6 min.)*

- When is it safe to attempt a turn-back to the runway after losing an engine immediately after departure?

☐ *Engine Out in a P-51 Mustang (video, 4 min.)*

- Why is a partial engine out potentially more dangerous that a complete engine failure?

GROUND, PART 1 OF 2: DISCUSS THE FOLLOWING

PILOT:

☐ **Answers to the self-study questions above.**
☐ **Your recent (or lack of recent) flight experience including hours flown, takeoffs and landings, and instrument approaches, if applicable.**
☐ **Your expectations for this flight review.**
☐ **CFI's criteria for satisfactory completion.**

AIRCRAFT SYSTEMS AND PERFORMANCE:

☐ **Critical airspeeds and their meanings:**

- V_{S0}, V_S (or V_{S1}), V_X, V_Y, V_A, V_{NO}, V_{NE}, and best glide speed. Other airspeeds may include V_R, V_{XSE}, V_{YSE}, V_{REF}, and V_{MC}.

☐ **Fuel capacity and usable fuel (total and each tank).**
☐ **Fuel consumption in gallons per hour (GPH).**
☐ **Oil capacity.**
☐ **Maximum crosswind component.**
☐ **Flight instrumentation and automation unique to the aircraft being used for the flight review.**
☐ **Proper use of Angle of Attack indicator, if installed.**

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☐ **Angle-of-attack as it relates to accelerated stalls, and situations where these most often occur**.
- Discuss proper use of the Angle of Attack indicator, if installed.

> 🔑 Despite the lines on the airspeed indicator, there is no one "stall speed."

☐ **For commercial and ATP clients, review how to perform Lazy 8s and their importance.**
☐ **For sport and private pilot clients, review how to perform S-turns across a road.**
☐ **Elements of a stabilized approach to landing (energy management), including:**
- Airspeed.
- Rate of descent.
- Power setting.
- Altitude.
- Runway alignment.
- Configuration (gear, flaps).

☐ **Various factors that can affect approach speed, including:**
- Gross weight.
- Turbulence.
- Wind gusts.
- Wind shear.
- Density altitude.

> 🔑 Because a given IAS corresponds to a higher TAS at higher density altitudes, pilots sometimes allow visual cues to "trick" them into flying slower than they should.

PILOT PERFORMANCE, KNOWLEDGE, AND DECISION MAKING:

☐ **The importance of single-pilot CRM (crew/cockpit resource management).**
- Pros and cons of using all of the resources available to you, which could lead to task saturation, versus using only what you need, when you need it.

> 🔑 Effective CRM involves the proper and timely use of resources outside the cockpit (Flight Service, ATC, AWOS/ASOS, etc.).

☐ **Elements of a passenger safety briefing, including:**
- Instructions and procedures for minimizing distractions (sterile cockpit).
- Use of doors, windows, seatbelts, and harnesses.

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- Location of the fire extinguisher, first aid kit, ELT, personal locator beacon, handheld radio, survival kit, etc.
- Basic use of radios, handheld radio, and emergency frequency.

☐ **Elements of a pre-takeoff safety briefing, including:**

- Confirming correct runway and direction of flight after departure.
- Density altitude.
- Rotation speed.
- Abort point.
- Rotation speed.
- Any system abnormalities during the takeoff roll.
- Partial power loss during the takeoff roll.
- Power loss just after liftoff.
- Minimum safe altitudes (MSL) for attempted return to runway.
- Minimum parachute deployment altitude, if applicable.

> 🔑 Rule of thumb: Abort takeoff if not at least 70% of rotation speed by the runway midpoint.
> 🔑 Briefings help prevent "heat of the moment" mistakes and can save critical time during emergencies.
> 🔑 Maneuvering speed is often understood as the speed at which you can make abrupt control surface deflections without causing structural damage. However, certain aircraft have limitations on abrupt rudder inputs (e.g., rapid, full-scale right and then left inputs). Refer to your aircraft's POH for details.

☐ **Techniques for escaping severe or extreme turbulence/wake turbulence.**

- Explore the concept of V_A and how it varies with aircraft weight.

☐ **Go-around decision making and execution.**

- For greater precision and safety, state the go-around determination point (altitude), pitch attitude and power setting.

> 🔑 Where go-arounds are concerned, the earlier the better. Last-second, low-altitude, low-airspeed go-arounds have a considerably smaller margin of safety.

EMERGENCIES:

☐ **Indications of failure or malfunction of the following systems/components and proper actions:**

- Engine (partial and full failure) during takeoff, departure, en route, and landing.
- Electrical systems.

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- Engine instruments.
- Fuel, oil, and hydraulic fluids.
- Alternator.
- Radio/communications.
- Autopilot.
- Instrumentation and automation.
- Control surfaces.
- Runaway trim.
- Autopilot.
- Landing gear, if applicable.
- Deicing and anti-icing equipment.

☐ **Preparations for time-critical engine emergencies, e.g., low-altitude engine failures, fires, etc.**

- Not all malfunctions rise to the level of a true emergency, but regardless, pilots are encouraged to act in the best interest of safety by exercising PIC authority and declaring an emergency with ATC in the best interest of safety.
- Keep in mind that responding to and troubleshooting any malfunction may require extending your flight time, which burns more fuel. The key is to not get distracted and end up with bigger problems like running out of fuel or losing critical altitude.
- It's good practice to have the bold-face steps (or equivalent) from the checklist memorized. Verify them later.
- Engine failures are not always sudden and complete. Partial power loss is common and can lead to diagnostic and decision-making quandaries.
- According to AC 61-98, instructors should never actually render an automated system inoperative, such as turning off switches or disengaging circuit breakers.

GROUND, PART 2 OF 2: DO THE FOLLOWING

☐ **Review and "chair fly" spin recovery techniques.**

- In the absence of manufacturer-specific recovery procedures, consider using the PARE mnemonic for recovery: Power to idle, Ailerons neutral, Rudder in opposite direction of turn, and Elevator forward. After rotation stops, rudder to neutral and pull to straight and level or climb.

- The "classic" stall-spin accident happens at such a low altitude (usually in the traffic pattern) that recovery is almost impossible.

☐ **Plan a cross-country flight to an airport selected by the CFI.**

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- If practical, choose one not often used by the client—preferably one that adds potential challenges involving different ATC service levels, different airport configurations, etc.
- Understand how large weather systems may impact alternate choices due to fuel and other limitations.
- Review airspace, communication, equipment, and altitude requirements and limitations.
- Determine runway lengths at departure and destination airports, fuel requirements, and alternatives if the flight cannot be completed as planned.
- Check for NOTAMs and TFRs along the route of flight.
- Note any high terrain and/or obstacles that could interfere with flight operations.
- For diversion planning related to weather, equipment malfunction, or emergency, check the availability of services including airport lighting (if operating at night) for airports along the route of flight. An airport that is NOTAM'd closed may not have operating lights.
- Depending on the situation, this may offer the potential for a topic-relevant scenario (e.g., terrain in airport vicinity; localized weather).

> 🔑 For clients using paper charts, discuss backing up with EFB resources, and vice-versa.
> 🔑 Use the profile view in Google Earth, ForeFlight, Aviation Weather Center, and other sources to view your route of flight over terrain.

☐ **Obtain a weather briefing (reports and forecasts) and discuss various sources of weather information.**

- Ascertain knowledge of available products and introduce new ones if applicable.

> 🔑 While there's really no such thing as an "official" source of weather information (unless you're required to have an "approved" source of weather for operations under Part 135 or 121), it is important to use a source that keeps a record of your briefing—just in case you need proof.

☐ **Weight and balance calculations for takeoff and landing.**

- Include calculations for different realistic flight scenarios, like flying the family on vacation with a full load, which may require carrying less fuel.

☐ **Perform weight and balance calculations for takeoff and landing.**

- Include calculations for different realistic CG and weight scenarios that can influence the aircraft's ability to recover safely from a stall in flight.

☐ **Use POH to determine takeoff and landing performance.**

- Write down the numbers for later comparison with actual performance.

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> 🔑 ASI's 50/50 rule means adding 50% to the calculated takeoff distance over a 50-foot obstacle.

PREFLIGHT

PILOT

☐ **Discuss the use of pilot self-assessment tools such as IMSAFE and personal minimums.**

- Both the client and CFI should determine whether they're fit to fly.

> 🔑 Use ASI's VFR Personal Minimums and IFR Personal Minimums to develop and update your personal minimums.

AIRCRAFT

☐ **Check to see whether the required inspections are complete and up to date.**

☐ **Conduct a thorough aircraft inspection in line with best practices.**

- Verbalize each step of the inspection.
- Discuss the "whys" behind some of the items.
- Discuss what kinds of items would render the aircraft unairworthy.

☐ **Demonstrate good checklist discipline, now and throughout the flight**.

> 🔑 A realistic distraction in the middle of a checklist is a good way to test this.

ENVIRONMENTAL FACTORS

☐ **Discuss any airport and aircraft security issues with the CFI.**

☐ **Factor the information from the weather briefing you received earlier into your go/no-go decision.**

☐ **Review departure airport diagram, including likely taxi routes and potential incursion hotspots.**

- Consider some "what if" scenarios (e.g., taxiway and runway closures).

MANEUVERS

☐ **Brief all the maneuvers in the FLIGHT section below prior to flight.**

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FLIGHT

DEPARTURE

- ☐ **Deliver a passenger safety briefing.**
- ☐ **Deliver a pre-takeoff safety briefing.**

> 🔑 Note the importance of actively thinking about this while doing it, not just repeating from rote.

- ☐ **Perform cross-check of systems and engine health on takeoff roll.**
- ☐ **Precision normal takeoff: Rotate at target airspeed, climb at V_X, transition to V_Y.**
  - Ensure airspeeds are held to within +5/-0 knots.
  - Compare results to calculated performance.

> 🔑 Keep it safe and simple: power to idle and apply full braking.

> 🔑 Using the command-performance flying method requires knowing the pitch and power settings to achieve desired performance.

- ☐ **Practice an aborted takeoff.**

- ☐ **Cope with a simulated or actual open door in the pattern.**

> 🔑 Stress that in many cases this should be a non-event from a safety standpoint—it's often an over-reaction that's the problem. However, an open door in a composite aircraft in which the door provides structural integrity to the fuselage could indeed be an emergency. Refer to your aircraft's POH for details.

AIR WORK

- ☐ **Demonstrate precise flight to specified airspeeds, altitudes, and headings.**
  - Focus on precise coordination.
  - Consider turbulence and other factors.

> 🔑 Don't fixate on this to exclusion of more important issues.

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- ☐ **Steep turns in both directions.**
- ☐ **Practice slow flight, stepping down to the final airspeed in 5-knot increments.**
  - Note change in sound, visual cues, and control feel with each step.
  - Practice recognition of pre-stall cues, without reference to instruments.
  - Practice in climbs, turns, and descents.
- ☐ **Stalls with emphasis on dividing attention inside and outside the cockpit and connection to real-life maneuvering situations (listed below next to each type of stall).**
  - Power-OFF stall (airspeed decay on final).
  - Power-OFF turning stall with 20-30 degrees of bank (base-to-final turn).
  - Power-ON stall (takeoff/initial climb over obstructions).
  - Power-ON turning stall with 20-30 degrees of bank (go-arounds or missed approach).

> 🔑 More than 25 percent of fatal general aviation accidents occur during the maneuvering phase of flight. Of those accidents, half involved stall/spin scenarios.

- ☐ **Practice dynamic maneuvering: S-turns across a road (sport and private pilot clients only).**
  - Discuss why the maneuver is performed.

> 🔑 Key to this maneuver is practicing dividing your attention inside and outside the cockpit – a critical skill in preventing loss of control accidents during base-to-final turns.

- ☐ **Practice dynamic maneuvering: Lazy 8s (commercial and ATP clients only).**
  - Discuss why the maneuver is performed.
- ☐ **Practice flight by instruments in simulated IMC and execute IMC escape strategy.**
  - Conditions and instructor qualifications allowing, a flight involving some time in actual IMC is ideal.

> 🔑 Many pilots are trained to escape IMC by performing an immediate 180-degree turn. However, the key is escaping to the nearest VMC as safely and quickly as possible, which could mean turning 90 degrees to the left or right.

- ☐ **Unusual attitude recovery (VMC or simulated IMC at pilot's discretion).**
- ☐ **Simulate various engine problems, including:**
  - Carburetor ice.
  - Rough engine.
  - Partial loss of engine power.
  - Total loss of engine power.

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☐ **Practice troubleshooting techniques for the items listed above while looking for suitable landing area.**

> 🔑 Remember to gently "clear" the engine periodically to make sure it's still running.

☐ **Simulate hydraulic failures (if applicable).**

- Discuss or demonstrate use of alternate systems (gear, flaps, etc.).
- Is a gear failure an emergency? What about flaps? Should you divert or wait until the destination? What might factor into your thinking?

☐ **Simulate a total electrical failure.**

- Assuming it's night, what should your priorities be?

> 🔑 Much of your response will depend on the time of day and the weather conditions, with night IMC being the most critical situation.

☐ **Perform (or discuss procedures for) an emergency descent.**

- Identify primary need for emergency descent (fire) and emphasize the importance of acting immediately.

☐ **At a safe altitude, practice overshooting base to final and apply correct control inputs.**

☐ **At a safe altitude with a hard deck, perform a simulated turn-back ("impossible turn") following engine failure on takeoff**.

> 🔑 In real life, these situations sometimes end badly as the pilot stalls/spins in a misguided attempt to save the aircraft at any cost.

ARRIVAL

☐ **Practice crosswind takeoffs and landings (conditions permitting).**

> 🔑 While there are more landing accidents than takeoff accidents, the latter are more fatal.

☐ **Practice go-around procedures from short final.**

- Emphasize calm, deliberate control inputs.

> 🔑 Hasty, last-second go-arounds often end badly.

☐ **Practice a no-flap landing.**

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- ☐ **Power-off landing following engine failure in the airport environment.**

  > 🔑 Emphasis should be on judgment and flexibility depending on where the failure occurred, current winds, etc.

DEBRIEF

- ☐ **Client's review and perceptions of the performed tasks and maneuvers.**
- ☐ **CFI's guided evaluation of the performed tasks and maneuvers.**
- ☐ **Discuss lessons learned.**
- ☐ **Plan of action for continued proficiency.**

So, how was it? Please use the "feedback" feature in the right margin of the Focused Flight Review home page (www.airsafetyinstitute.org/focusedflightreview) to send us your feedback.

Providing a relevant and engaging flight review program is only made possible by making continual improvements to ensure clients and CFIs have good experiences with *Focused Flight Review*. It is our hope that you will make it a regular and frequent part of your training curriculum and goals.

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KNEEBOARD FOR FLIGHT TASKS ONLY

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DEPARTURE

- ☐ Deliver a passenger safety briefing.
- ☐ Deliver a pre-takeoff safety briefing.
- ☐ Perform cross-check of systems and engine health on takeoff roll.
- ☐ Precision normal takeoff: Rotate at target airspeed, climb at V_X, transition to V_Y.
- ☐ Practice an aborted takeoff.
- ☐ Cope with a simulated or actual open door in the pattern.

AIR WORK

- ☐ Demonstrate precise flight to specified airspeeds, altitudes, and headings.
- ☐ Steep turns in both directions.
- ☐ Practice slow flight, stepping down to the final airspeed in 5-knot increments.
- ☐ Power-off and power-on stalls (straight ahead and turning) with emphasis on dividing attention inside and outside the cockpit and connection to real-life maneuvering situations.
- ☐ Practice dynamic maneuvering: S-turns across a road (private and sport).
- ☐ Practice dynamic maneuvering: Lazy 8s (commercial and ATP).
- ☐ Practice flight by instruments in simulated IMC and execute IMC escape strategy.
- ☐ Unusual attitude recovery (VMC or simulated IMC at pilot's discretion).
- ☐ Simulate various engine problems (carb ice, rough engine, partial power loss, total engine failure) and practice troubleshooting techniques for each one while looking for suitable landing area.
- ☐ Simulate hydraulic failures (if applicable).
- ☐ Simulate a total electrical failure.
- ☐ Perform (or discuss procedures for) an emergency descent.
- ☐ At a safe altitude, practice overshooting base to final and apply correct control inputs.
- ☐ At a safe altitude with a hard deck, perform a simulated turn-back (“impossible turn”) following engine failure on takeoff.

ARRIVAL

- ☐ Practice crosswind takeoffs and landings (conditions permitting).
- ☐ Practice go-around procedures from short final.
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FOLD HERE

Pilot: _____

Aircraft: _____

Date: _____

NOTES

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