

2022 PPC AirVenture Clinic Syllabus

Provide educational resources and opportunities to develop better, safer pilots.

Clinic Overview

Clinic Title: Killer Procedures

Clinic Subtitle: Managing Risk in a Risky Environment

Clinic Description: Airport operations account for a disproportionate number of accidents given the short amount of time pilots spend in their vicinity. What makes takeoff, climb, approach, and landing so dangerous? This clinic is focused on the risks associated with airport operations and how pilots can learn to recognize and mitigate the situations that lead to fatalities.

About the Participants

- Pre-registered
- Minimum of a Sport or Private Pilot Certificate

Handouts for Participants

- Keynote and Breakout Session slide decks
- Flight Sim Briefing and Scenario Packets

Equipment

- 11 Redbird LD AATDs with a combination of glass and analog gauges
- 1 Redbird LD AATD for CFI training

Keynote

- 45 minutes
- “Danger Zone”
- Presenter: Charlie Precourt
- Facilitator: Harvey Madison

Breakout Sessions

- 45 minutes each
- “Push the Power and Go?”, Charlie Precourt
- “Base to Final: How & Why”, Ed Wischmeyer
- “The Story Behind the Data”, Josh Harnagel

Debrief

- 40 minutes
- Presenters: Harvey Madison and Josh Harnagel

PPC Volunteer Qualifications: CFI, understanding of takeoff and landing risk profiles.

Wings Credit: TBD

Presenter Bios

Charlie Precourt is the vice president and general manager of Propulsion Systems at Northrop Grumman. He built a VariEze that first flew in 1987. Charlie, who retired as an Air Force colonel in 2000, was graduated from the U.S. Air Force Academy in 1977 with a degree in aeronautical engineering. He was an F-15 pilot, instructor, and flight commander, and a graduate of the U.S. Air Force Test Pilot School. He is a veteran of four space flights and member of the Astronaut Hall of Fame.

Charlie held several management positions within NASA, including deputy program manager for the International Space Station, chief of the Astronaut Corps, and director of operations for NASA at the Gagarin Cosmonaut Training Center in Star City, Russia. Charlie also serves on the Board of Directors for the National Business Aviation Association, and the Safety Committee of the Citation Jet Pilots Association.

Ed Wischmeyer is the Principal of greatusermanuals.com. His background includes a Ph.D. in engineering from MIT, 30 years in high tech with all the technical writing that comes with it, 15 years of selling feature articles to national publications, 30 years in aviation, 10 years of aviation safety research, and teaching at the graduate level.

Josh Harnagel currently serves as Vice President, Marketing for Redbird Flight Simulations, an Austin Texas based flight training technology company. He oversees a team that is responsible for marketing, communications, and product development. He has held a number of key positions at Redbird in the 14 years he has been with the company and has been instrumental in the explosive growth that Redbird has experienced since its inception.

Josh is a third-generation pilot and flight instructor. He attended Texas A&M and Embry-Riddle, after college he served as a full-time flight instructor in the Washington DC area. He is part owner of a T-6 Texan and has over 3,000 hours of General Aviation experience.

Keynote

Title: “Danger Zone”

Description: The data is clear: takeoff, climb, approach, and landing account for a small portion of total flight time, but a disproportionate number of accidents, especially fatal ones. We’ll explore why pilots get themselves into unrecoverable situations close to the ground and at the edge of the aircraft’s performance envelope. We’ll discuss what can be learned from past mistakes and how pilots can manage the risks associated with this critical phase of flight.

Objective: By the end of this address, attendees will have learned the types and nature of aviation incidents that occur within a 5nm radius of airports, their frequency compared to incidents further from an airport, which incidents are most common, what strategies they can employ to manage the risks, and which type of incidents/scenarios will be addressed in each breakout session.

Keynote Presenter: Charlie Precourt

Agenda

Topic	Presenter	Duration
Welcome, Bathroom, Exits	Harvey Madison	5 mins
Danger Zone	Charlie Precourt	35 mins
Logistics	Jason Archer	5 mins

Breakout Session 1

Title: “Push the Power and Go?”

Description: When was the last time you were proud of your takeoff? Approach and landing tend to receive most of the focus from pilots, but 300% more fatal accidents occur during the takeoff and climb. Most takeoffs are a non-event, but the aircraft is low and slow and flying near the bottom edge of the envelope. The margin for error is small and the risks are easy to overlook. Complacency creeps in and pretty soon an otherwise safe pilot puts themselves and their passengers on the edge of tragedy. This breakout will explore how takeoff and climb accidents occur and ways to avoid them.

Objectives: By the end of the session, attendees will understand the nature and causes of takeoff and climb incidents. They will be able to identify and ameliorate lapses in proper preflight planning, in-flight ADM, and stick and rudder proficiency that contribute to incidents during takeoff and climb.

Type of Presentation: PowerPoint with Interactive Discussion

Presenter: Charlie Precourt

Equipment: Whiteboard, markers, and AV for PowerPoint

Instructor Mindset:

- Lay the foundation for the lesson by reviewing key concepts.
- Facilitate deep thinking by posing questions rather than lecturing.
- Bring your unique style, techniques, and experiences to the lesson.

Participant Mindset:

- Be engaged and interactive.
- Visualize and simulate.
- Do the mental and physical work needed to answer the questions posed.

Breakout Session 2

Title: “Base to Final: How & Why”

Description: The danger of a base-to-final loss of control is something of which every pilot is aware, yet they keep happening. In this session, we will be reintroduced to base-to-final LOC-I, what it is, how and why it happens, and how to best to avoid them.

Objectives: By the end of the session, attendees will have a detailed understanding of the elements of a base-to-final stall/spin, including contributing sub-elements such as slipping and skidding turns and the different types of low speed spiral entries. Attendees will learn how to practice maneuvers intended to familiarize them with flying near the edge of the envelope where base-to-final incidents occur.

Type of Presentation: PowerPoint with Interactive Discussion

Presenter: Ed Wischmeyer

Equipment: Whiteboard, markers, and AV for PowerPoint

Instructor Mindset:

- Lay the foundation for the lesson by reviewing key concepts.
- Facilitate deep thinking by posing questions rather than lecturing.
- Bring your unique style, techniques, and experiences to the lesson.

Participant Mindset:

- Be engaged and interactive.
- Visualize and simulate.
- Do the mental and physical work needed to answer the questions posed.

Breakout Session 3

Title: “The Story Behind the Data”

Description: Reading accident reports and pursuing the NTSB database is a somewhat morbid passtime of many pilots, but how do we turn the data into actionable information that can help manage the risks of General Aviation? In the breakout, we will discuss what data is available, how it is generated, what it can teach us, and what its limitations are. We will explore how pilots can train themselves to recognize hidden risks before they materialize.

Objectives: By the end of the session, attendees will be aware of detailed incident information derived for official data collected by the FAA and NTSB. They will understand how that data is generated and how that process impacts the final output. They will also gain an understanding of how to better interpret this data on their own moving forward, and will leave the session with actionable safety information.

Type of Presentation: PowerPoint with Interactive Discussion

Presenter: Josh Harnagel

Equipment: Whiteboard, markers, and AV for PowerPoint

Instructor Mindset:

- Lay the foundation for the lesson by reviewing key concepts.
- Facilitate deep thinking by posing questions rather than lecturing.
- Bring your unique style, techniques, and experiences to the lesson.

Participant Mindset:

- Be engaged and interactive.
- Visualize and simulate.
- Do the mental and physical work needed to answer the questions posed.

Breakout Session 4: Flight Scenarios

Special note: Please do not discuss, reference, or allude to the specifics about Sim Scenario 2, 3, or 4. The goal is to see if participants can understand and adjust to the risk profiles presented in each scenario.

Simulator Scenario 1

Title: “Envelope Discovery”

Description: Spend a few minutes getting used to flying the Redbird LD simulator in edge of the envelope situations.

Objective: Familiarization with flying the sim close to stall speed, at high angles of attack, and in takeoff and landing configurations in preparation for the following flight scenario exercises.

Duration: 10 Minutes

Starting Conditions:

- In air at 8,500 over Oshkosh, WI, at 100 KIAS, cruise configuration
- 20NM Vis, 120 at 8 kts, SCT at 14,400, ALT 30.32, 24/19

Lesson Overview:

- Slow the airplane to 65 KIAS while adding full flaps and maintaining altitude
- Perform several 30 degree left and right banks
- Slow to 55 KIAS
- Perform several 30 degree left and right banks
- Perform a power-off stall warning and recover to a Vx climb with no flaps
- Slow to 55 KIAS with no flaps
- Perform several 30 degree left and right banks
- Add full power and begin a Vx climb
- From a Vx climb, increase back pressure on the yoke to perform a power-on stall
- Recover from power-on stall warning to a Vx climb
- End Flight

In-Flight Objectives:

- Gain a feel for flying the Redbird simulator through several edge of the envelope maneuvers

Material and Equipment Needs:

- Redbird LD
- CFI tablet computer

Instructor Mindset:

- Encourage pilot to put the Redbird through its paces to gain a proper level of physical familiarity with flying
- Remember that this isn't a checkride or Flight Review. The goal is to help the pilot get comfortable with the simulator in preparation for the other tasks.

- Only repeat a maneuver if the pilot completely failed to execute the task. A simple introduction is all that is required.

Participant Mindset:

- The sim will be different then the airplane you fly. Focus on learning how the simulator responds and how it feels in different situations.

Simulator Scenario 2

Title: “Just a Quick Trip Around the Patch”

Description: Fly a normal VFR traffic pattern in a busy environment.

Objective: Learn to recognize distractions, external pressures, and environmental conditions to identify potential causes of approach and landing accidents.

Duration: 10 Minutes

Starting Conditions:

- In air at 1,500, downwind for RWY17L at KAUS at 90 KIAS, cruise configuration
- 9NM Vis, 114 at 11 G 19kts, BKN at 3,700, ALT 29.48, 32/11
- C172 traffic on short final for RWY17L, B737 traffic on extended final for RWY17L, B777 traffic on final for RWY17R

Lesson Overview:

- Instructor acts as ATC and informs pilot of traffic, tells pilot that ATC will call their base turn.
- Fly normal downwind leg while C172 lands on RWY 17L
- Instructor as ATC tells pilot to turn a tight base to squeeze them in between C172 and B737 for RWY 17L and they should extend their base until ATC tells them to turn final
- C172 takes a long time to exit runway and B777 proceeds down final approach for RWY 17R, directly in front of the pilot
- Once the pilot has crossed the extend centerline of RWY 17L, but before they cross the midline of the airport, the instructor as ATC clears pilot to land RWY 17L, tells them to turn short final, and *excitedly* encourages them to hurry because the B737 is closing on them fast
- Pilot makes base-to-final turn from difficult position with a strong quartering headwind
- Instructor pauses simulation in the turn, ideally with the airplane in an uncoordinated condition and in an unstabilized approach
- Instructor asks the pilot to recognize what has happened and asks if there were points earlier in the approach that the pilot did or could have seen this situation developing
- Instructor un-pauses flight and pilot attempts to complete the landing
- Flight ends on landing or crash or go-around

In-Flight Objectives:

- Emphasize importance of continuing to fly safely regardless of external pressures such as other traffic and ATC

- Identify specific conditions in during the flight contributing to a higher chance of entering a stall/spin

Material and Equipment Needs:

- Redbird LD
- CFI tablet computer

Instructor Mindset:

- Observe pilot as pressures mount that could lead to a stall/spin
- At the moment the pilot is most likely to enter a stall condition, be ready to pause the flight and discuss
- Share personal experiences or stories as applicable

Participant Mindset:

- Put mind in approach mode
- Enter the session with curiosity and a willingness to make mistakes

Simulator Scenario 3

Title:“High, Hot, and Heavy”

Description: In a high density altitude environment while at max gross, perform a safe takeoff and climb...if you can

Objective: Experience the conditions that might lead to a stall/settle event for the purpose of identifying contributing factors and sharpening recognition abilities.

Duration: 10 Minutes

Starting Conditions:

- On the ground at KFMN, holding short of RWY 25 at Echo, ready for takeoff
- 30NM Vis, 330 at 4 G 7kts, SKC, ALT 29.04, 35/09 (roughly 10,000 ft density altitude)
- Airplane is near max gross weight and the aft CG limit
- RWY 25 west of Echo is closed for maintenance

Lesson Overview:

- Instructor acts as ATC and clears pilot for takeoff on RWY 25 at Echo
- Pilot performs a takeoff using any procedure they wish
- Instructor pauses simulation at key moments to reinforce the learning points
- Pilot could lean mixture for best power, request RWY 23 for full length, use short field takeoff procedures, etc

In-Flight Objectives:

- Determine all the factors in this flight that will contribute to a challenging takeoff
- Apply appropriate ADM and stick and rudder skills necessary to maximize the best possible outcome.

Material and Equipment Needs:

- Redbird LD

- CFI tablet computer

Instructor Mindset:

- Observe pilot as pressures mount that could lead to a stall/settle incident
- Pause the flight as needed to provide “learning moment” instruction
- Share personal experiences or stories as applicable

Participant Mindset:

- Put mind in takeoff mode
- Enter the session with curiosity and a willingness to make mistakes

Simulator Scenario 4

Title: “Impossible Turn”

Description: Let’s not mince words ... you’re going to lose your engine during takeoff and it’s not coming back.

Objective: Learn to anticipate engine failure on each flight and determine how best to maximize safety while still on the ground.

Duration: 10-15 Minutes

Starting Conditions:

- KAVX 122107 05002KT 10SM FEW036 FEW055 BKN250 24/17 A3000
- On taxiway holding short RWY 4
- Runup complete ready for taxi and departure
- Destination is French Valley Airport F70, due 063°M

Lesson Overview:

- Instructor acts as ATC and clears pilot for takeoff on RWY XX
- Pilot performs a takeoff using any procedure they wish
- Engine fails at 650 AGL
- Pilot crashes, restart the flight
- Pilot and instructor work together to develop a plan to survive this engine failure

In-Flight Objectives:

- First, experience power failure and end flight in a crash
- Subsequently, consider and apply different strategies during takeoff which increase the odds of a safe landing

Material and Equipment Needs:

- Redbird LD
- CFI tablet computer

Instructor Mindset:

- After a try or two, encourage the pilot to consider alternative to a straight out takeoff and climb
- Share personal experiences or stories as applicable

Participant Mindset:

- Mind open to learning, even though crashes are all but certain during the exercise
- Bring a creative mindset, and be willing to try different strategies

Debrief

Objectives: A post-clinic debrief that will tie together the keynote, breakout sessions, and flight simulations.

Key Participant Take-aways:

- Understand the risks inherent in airport operations
- Learn to recognize the situations that lead to accidents
- Situational awareness in stressful situations
- Pay attention
- Be here now
- Use all the tools
- Have fun

Leading Questions/Group Discussion Ideas:

- Was there anything surprising that you learned today?
- How is what you learned today different from what you have been doing?
- What risks will you be considering next time you line up for takeoff?
- What do you think you can learn from the accident record?
- What did you miss or lose focus on while you were flying?
- Where was your attention?
- What would you say is your biggest take-away from today?

Presenters: Harvey Madison and Josh Harnagel

Equipment: Whiteboard, Markers and AV for PowerPoint