NATIONAL ASSOCIATION OF FLIGHT INSTRUCTORS

# MENTOR LIVE

# *Welcome!*

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MENTOR
*LIVE*

# January 2022 Mentor*LIVE* Sponsor

GLEIM®
Aviation

# *Power Loss at 300 Feet – What Went Wrong, What Went Right*

Presented by Philip Mandel, CFI-I, MEI, AGI, IGI

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- Speaker Biographies
- MentorLIVE! Archives
- Course Evaluation
- Educational Foundation

MENTOR LIVE

# *Power Loss at 300 Feet – What Went Wrong, What Went Right*

Presented by Philip Mandel, CFI-I, MEI, AGI, IGI

# Power Loss at 300 Feet

## What Went Wrong, What Went Right

**Philip Mandel, CFI-I, MEI, AGI, IGI**

**FAA Safety Team (FAASTeam) Representative**
**2020 Portland (OR) FSDO:**
**FAASTeam Rep of the Year**
**flyphil.INFO**
**phmand@gmail.com**
**Beaverton OR**
**Member AOPA, EAA, NAFI, SAFE et al**

MENTOR LIVE

# Introduction

- **Philip and his primary student lost all engine oil and experienced significant power loss at 300 feet AGL over Vancouver, Washington, off Pearson Field (KVUO) in 2019.**

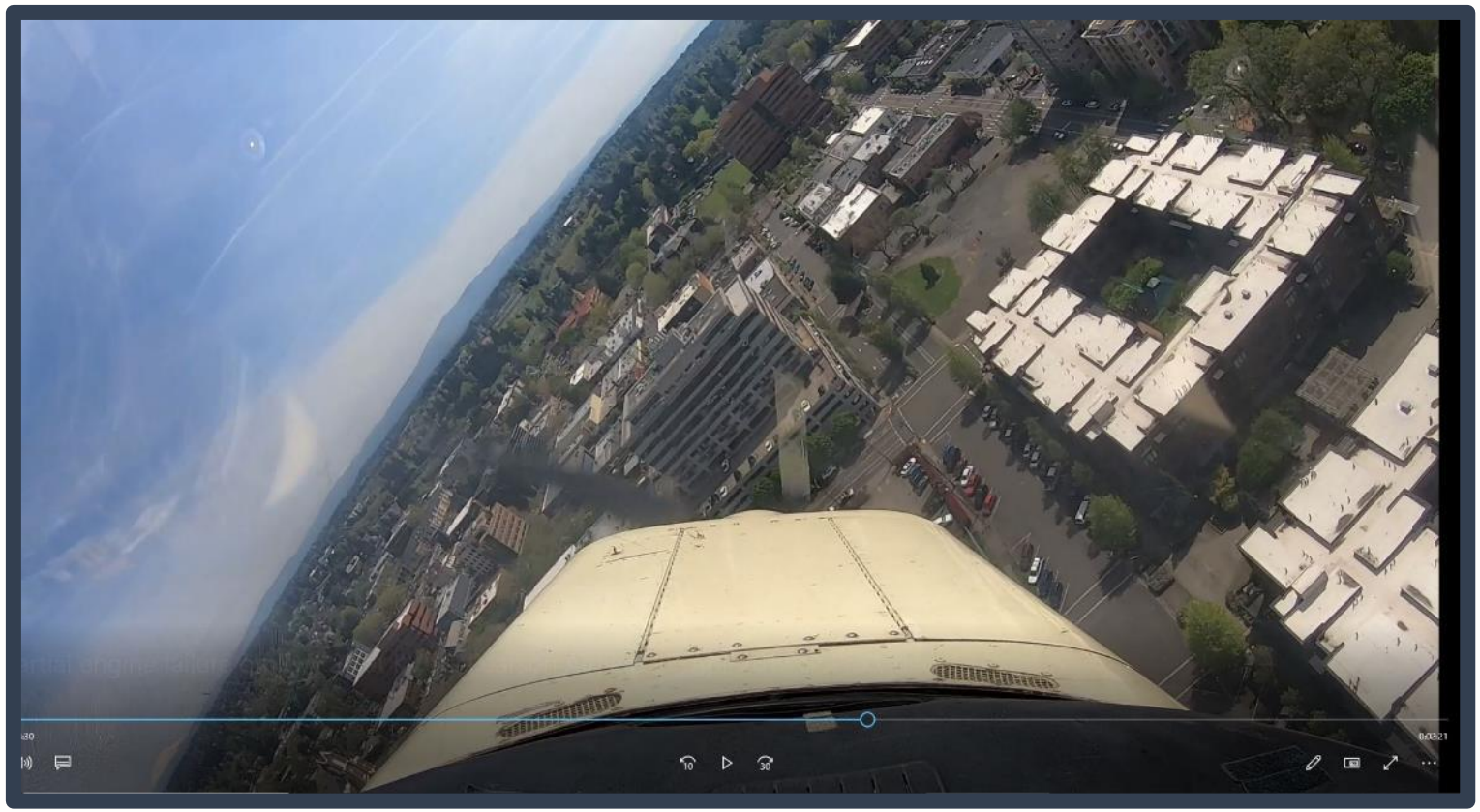
# Introduction (cont'd)

- Philip and his primary student lost all engine oil and experienced significant power loss at 300 feet AGL over Vancouver, Washington, off Pearson Field (KVUO) in 2019.
- **With the help of dashcam video that captured the event, Philip will share lessons learned from the scariest two minutes of his life.**

# Introduction (cont'd)

- Philip and his primary student lost all engine oil and experienced significant power loss at 300 feet AGL over Vancouver, Washington, off Pearson Field (KVUO) in 2019.
- With the help of dashcam video that captured the event, Philip will share lessons learned from the scariest two minutes of his life.
- **He says he did more things wrong than right, yet still managed to nurse the Beech Musketeer back to the field and land opposite direction without bending anything.**

# 1 - video excerpt



"Under pressure, you don't rise to the occasion, you sink to the level of your training."

**"Under pressure, you don't rise to the occasion, you sink to the level of your training."**

Although frequently credited to an anonymous Navy Seal (the altered quote likely is), this quote is originally attributed to the Greek lyrical poet, Archilochus (c. 650 BCE).

Paraphrased:

**Under pressure, you do not rise to the occasion, you sink to the level of your training and recent practice.**

# Presenter

**Philip Mandel**
**3500-plus TT**
**2300-plus as CFI**
**FAASteam Rep…**

**and a recovering engineer!**

- C-172
- PA-28 (140)
- Christen Eagle II
- RV-4
- C-150
- T-18
- PA-23 (Apache)
- T-18
- AA-5A
- T-18

# Thorp T-18 built by Bill Cordoza c. 1977
# Lovingly restored by Lee Walton in 2019
# N118BC

# What Went Wrong

# What Went Wrong

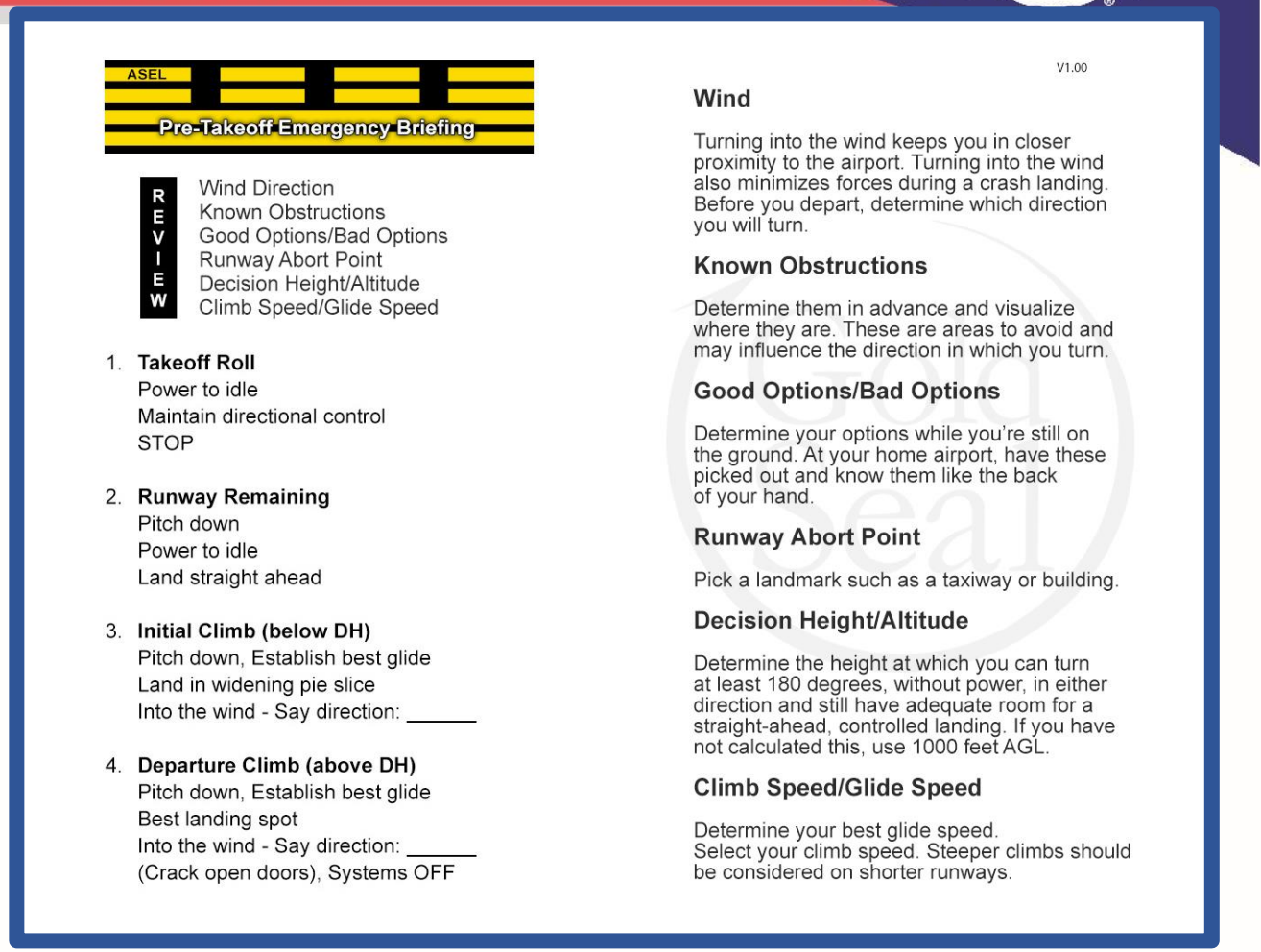
- **Complacency, inattentiveness during critical phase of flight**

# What Went Wrong

- Complacency, inattentiveness during critical phase of flight
- **Auditory issues**
  - **SSD (single sided deafness)**
  - **ANC/ANR headsets**

# What Went Wrong

- Complacency, inattentiveness during critical phase of flight
- Auditory issues
  - SSD (single sided deafness)
  - ANC/ANR headsets
- **Failure to have a plan in case of power loss on a continuous basis**



ASEL

**Pre-Takeoff Emergency Briefing**

V1.00

REVIEW
- Wind Direction
- Known Obstructions
- Good Options/Bad Options
- Runway Abort Point
- Decision Height/Altitude
- Climb Speed/Glide Speed

1. **Takeoff Roll**
   Power to idle
   Maintain directional control
   STOP

2. **Runway Remaining**
   Pitch down
   Power to idle
   Land straight ahead

3. **Initial Climb (below DH)**
   Pitch down, Establish best glide
   Land in widening pie slice
   Into the wind - Say direction: _____

4. **Departure Climb (above DH)**
   Pitch down, Establish best glide
   Best landing spot
   Into the wind - Say direction: _____
   (Crack open doors), Systems OFF

**Wind**

Turning into the wind keeps you in closer proximity to the airport. Turning into the wind also minimizes forces during a crash landing. Before you depart, determine which direction you will turn.

**Known Obstructions**

Determine them in advance and visualize where they are. These are areas to avoid and may influence the direction in which you turn.

**Good Options/Bad Options**

Determine your options while you're still on the ground. At your home airport, have these picked out and know them like the back of your hand.

**Runway Abort Point**

Pick a landmark such as a taxiway or building.

**Decision Height/Altitude**

Determine the height at which you can turn at least 180 degrees, without power, in either direction and still have adequate room for a straight-ahead, controlled landing. If you have not calculated this, use 1000 feet AGL.

**Climb Speed/Glide Speed**

Determine your best glide speed.
Select your climb speed. Steeper climbs should be considered on shorter runways.

# What Went Wrong

- Complacency, inattentiveness during critical phase of flight
- Auditory issues
  - SSD (single sided deafness)
  - ANC/ANR headsets
- **Failure to have a plan in case of power loss on a continuous basis**

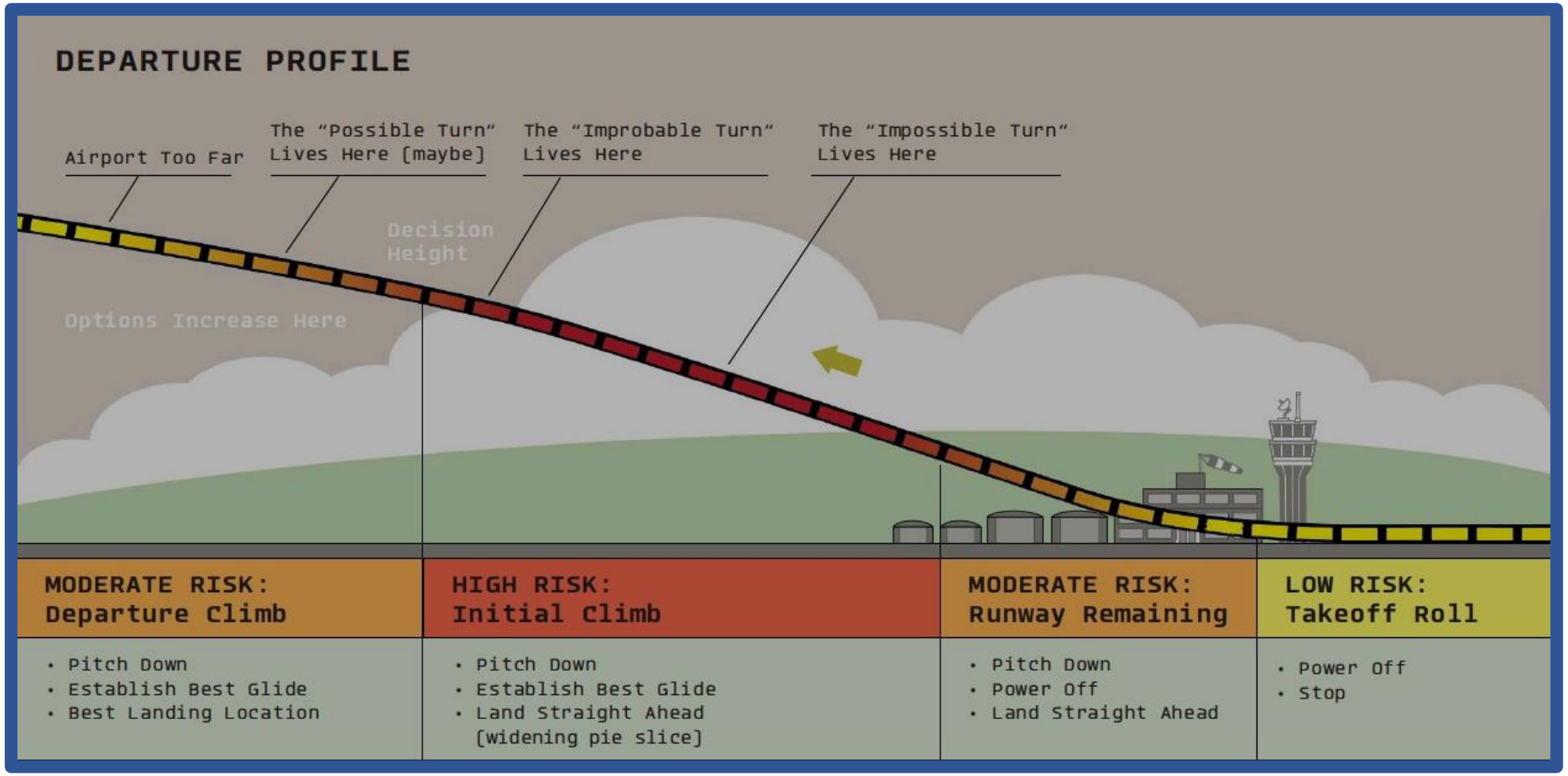

**https://youtu.be/aTWMZqFTmaM**
Gold Seal Flight Training
**groundschool.com**
Master CFI Russell Still

# What Went Wrong

https://youtu.be/aTWMZqFTmaM

# What Went Wrong

**Flying Magazine Oct-2021 p. 45 ff**

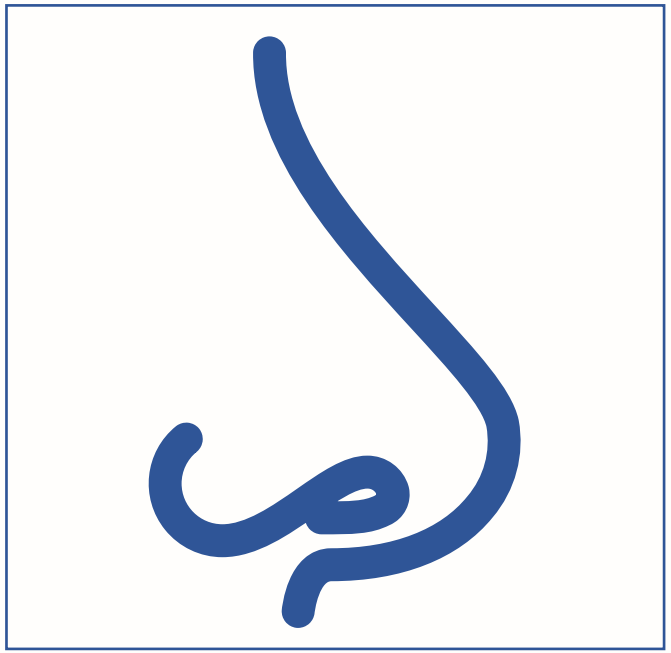


# What Went Wrong

- Complacency, inattentiveness during critical phase of flight
- Auditory issues
  - SSD (single sided deafness)
  - ANC/ANR headsets
- Failure to have a plan in cas
  a continuous basis
- **Turned toward buildings**

# What Went Wrong

- **Dismissed the strong odor too easily**



# What Went Wrong

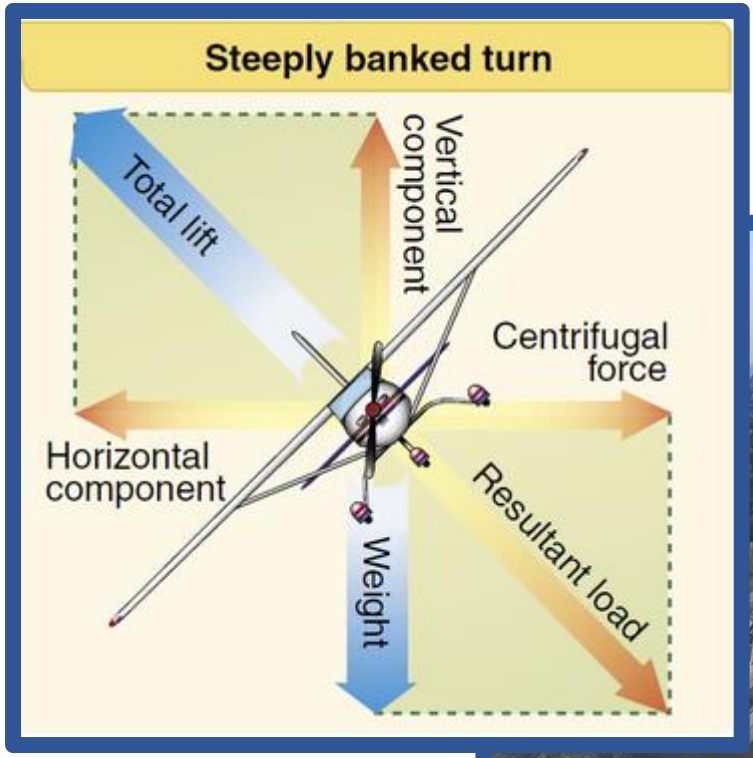
- Dismissed the strong odor too easily
- **Failed to notice engine sound change early**

# What Went Wrong

- Dismissed the strong odor too easily
- Failed to notice engine sound change
- **Banked too steeply?? Maybe…**

# What Went Wrong

- Dismissed the strong odor too easily
- Failed to notice engine sound change early
- Banked too steeply?? Maybe…
- **Excessive back pressure: Accelerated Stall**

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- Excessive back pressure: Accelerat
- **Fuel valve: OFF after landing**

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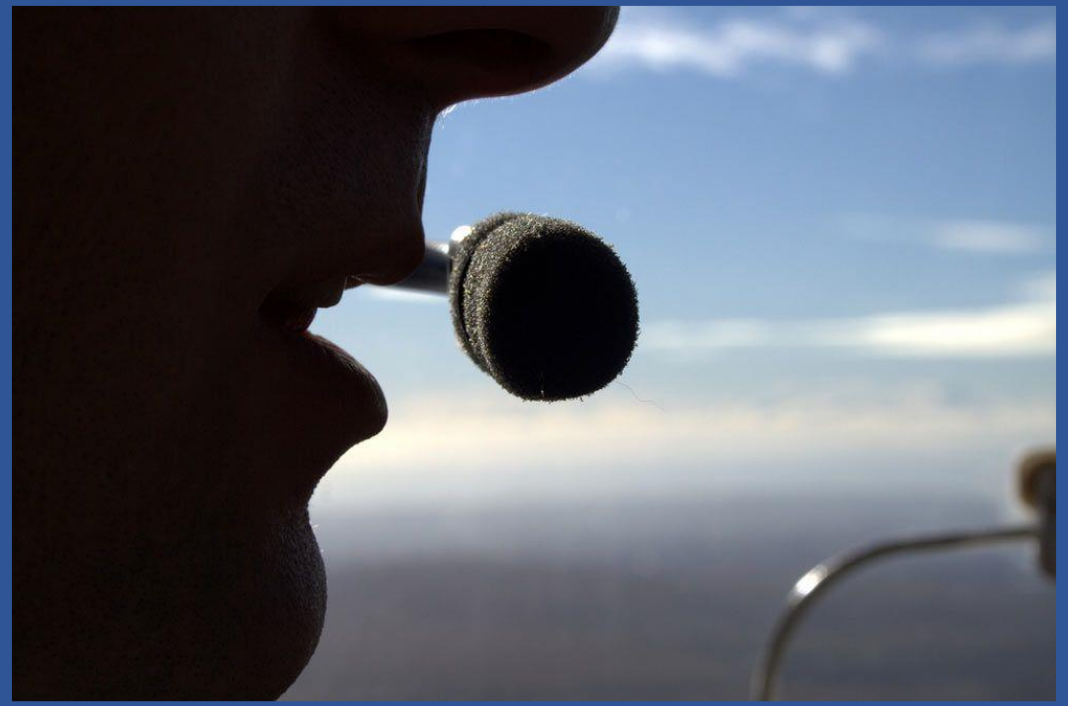
- Fuel valve: OFF after landing
- **Flaps: UP after landing**

# What Went Wrong

- Dismissed the strong odor too easily
- Failed to notice engine sound change
- Banked too steeply?? Maybe…
- Excessive back pressure: Accelerated
- Fuel valve: OFF after landing
- Flaps: UP after landing
- **Did not cancel emergency…discuss…**



# What Went Right

# What went right

- **Promptly took control of the aircraft**
  - **Positive Exchange of Flight Controls**

**Private Pilot – Airplane**

**Airman Certification Standards**

**Appendix 6: Safety of Flight**

**Positive Exchange of Flight Controls**

There must always be a clear understanding of who has control of the aircraft. Prior to flight, the pilots involved should conduct a briefing that includes reviewing the procedures for exchanging flight controls.

The FAA recommends a positive three-step process for exchanging flight controls between pilots:

- When one pilot seeks to have the other pilot take control of the aircraft, he or she will say, "You have the flight controls."
- The second pilot acknowledges immediately by saying, "I have the flight controls."
- The first pilot again says, "You have the flight controls," and visually confirms the exchange.

Pilots should follow this procedure during any exchange of flight controls, including any occurrence during the practical test. The FAA also recommends that both pilots use a visual check to verify that the exchange has occurred. There must never be any doubt as to who is flying the aircraft.

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# What went right

- **Assessed engine power – tried different throttle settings**
  - Most, if not all, power loss emergency checklists say, “Throttle – Full Open”
  - Not all power losses are total engine failure
  - Consider trying different throttle and/or mixture settings

# What went right

- **Assessed engine power – tried different throttle settings**
  - Most, if not all, power loss emerg
    say, “Throttle
  - Not a
  - Cons
    settin

**Always satisfy your POH or AFM!**

# What went right

- **Assessed engine power – tried different throttle settings**

KITPLANES®

Dealing With Off-Nominal: Part 2

*What to do when the engine has "quit."*

Paul Dye December 26, 2021

"Throttle, mixture, prop, carb heat (if applicable, or alternate induction air), fuel selector, fuel boost pump, ignition—that pretty much covers it for most planes. Move each through its range and see if it makes a difference."

# What went right

- Assessed engine power – tried different throttle settings
  - Most, if not all, power loss emergency checklists say, “Throttle – Full Open”
  - Not all power losses are total engine failure
  - Consider trying different throttle and/or mixt settings
- **Made a plan, then acted immediately**

# What went right

- **Recognized and recovered from the accelerated stall before it was too late**

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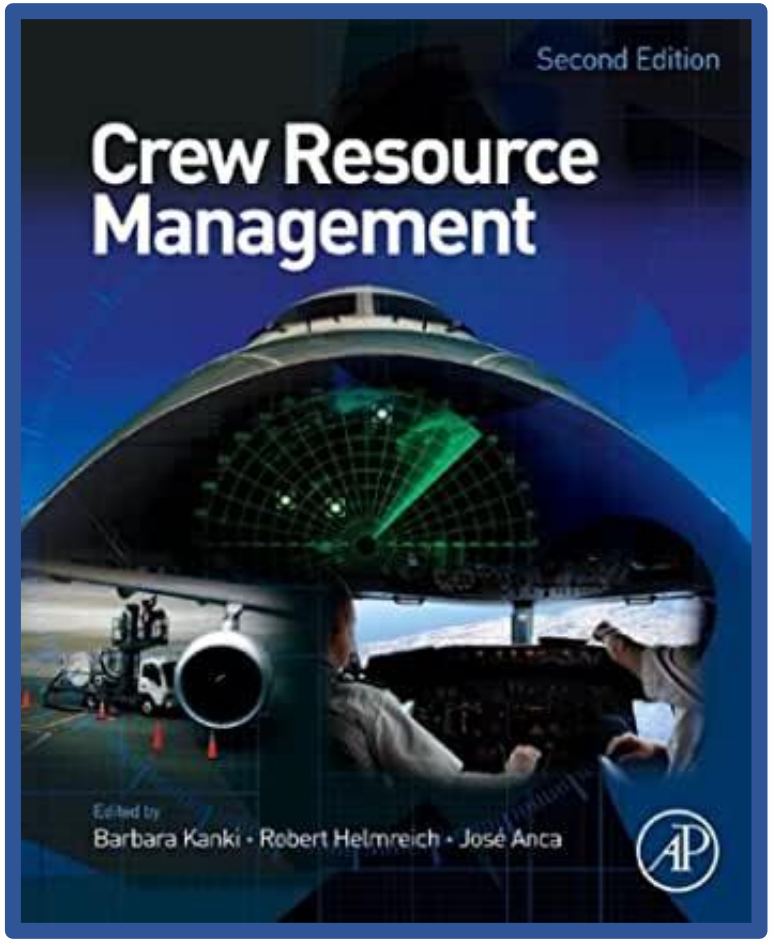
- **FLEW THE PLANE**

# What went right

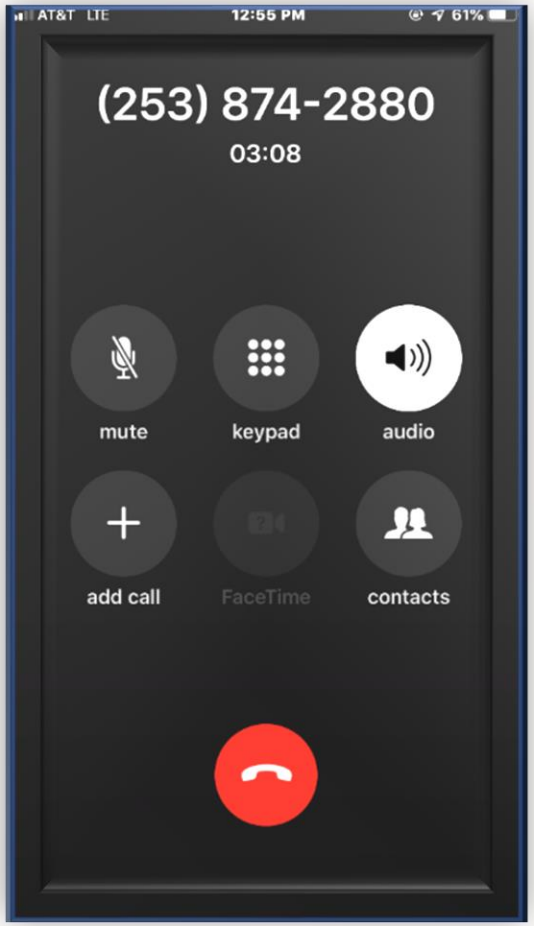
- Recognized and recovered from the accelerated stall before it was too late
- FLEW THE PLANE
- **Cockpit Resource Management (CRM)**
  - Asked student to declare emergency
  - Asked student to unlatch door and open door and window
  - Asked student to add flaps
  - Both pilots released seat belts after landing



# Engine Failure/Power Loss Checklist – A, B, C, D, E, (F)

- **A –**
- **B –**
- **C –**
- **D –**
- **E –**
- **(F) –**

# NTSB – did we need to report?



# Practice, practice, practice..!!

- **Phil:**

  **“Nothing teaches like teaching.”**

-

# Practice, practice, practice..!!

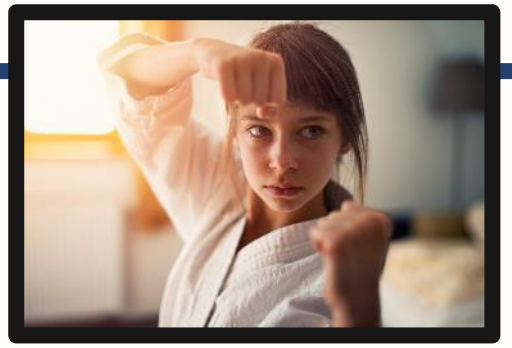
- Phil:

  “Nothing teaches like teaching.”

- **Aristotle:**
  **“Teaching is the highest form of understanding.”**

# Stress Response

- **Fight**



- **Flight**

# Stress Response

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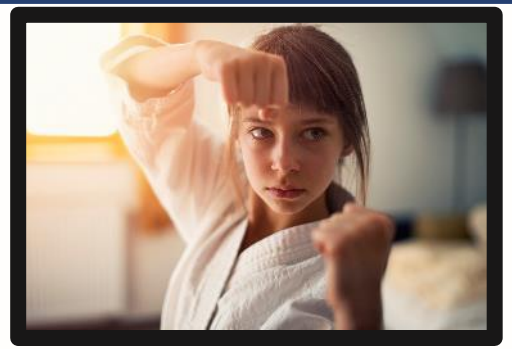
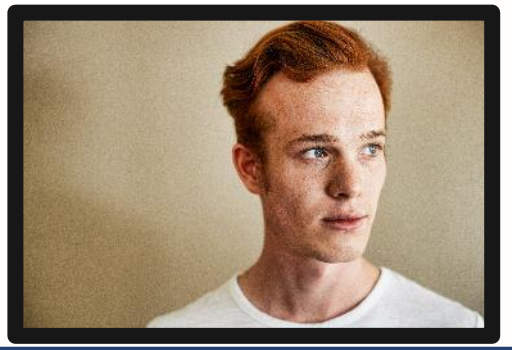
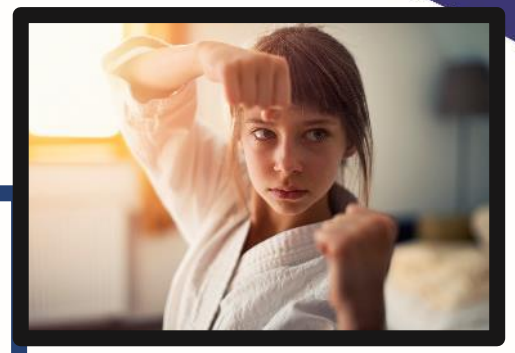


- **Flight**

- **Freeze**



# Stress Response: Fight



**If you assess the immediately menacing force as something you potentially have the power to defeat, you go into fight mode.**

**Trauma and the Freeze Response: Good, Bad, or Both?**
**Psychology Today – Posted Jul 08, 2015**

# Stress Response: Flight

**If you view the antagonistic force as too powerful to overcome, your impulse is to outrun it (and the faster the better). And this, of course, is the flight response…**

**Trauma and the Freeze Response: Good, Bad, or Both?**
**Psychology Today – Posted Jul 08, 2015**

# Stress Response: Freeze

**If you've concluded…that you can neither defeat the frighteningly dangerous opponent…nor safely bolt from it, [you might exhibit the freeze response].**

**Trauma and the Freeze Response: Good, Bad, or Both?**
**Psychology Today – Posted Jul 08, 2015**

# Brain Freeze

**Brain freeze, tunnel vision, and task fixation are potential reactions to stress and are only a small part of a broader stress-related syndrome known as “tunnel senses.”**

**BRAIN FREEZE: PART ONE**
**October 1, 2018, Kenneth Stahl MD, FACS,**
**AOPA Pilot Protection Services**

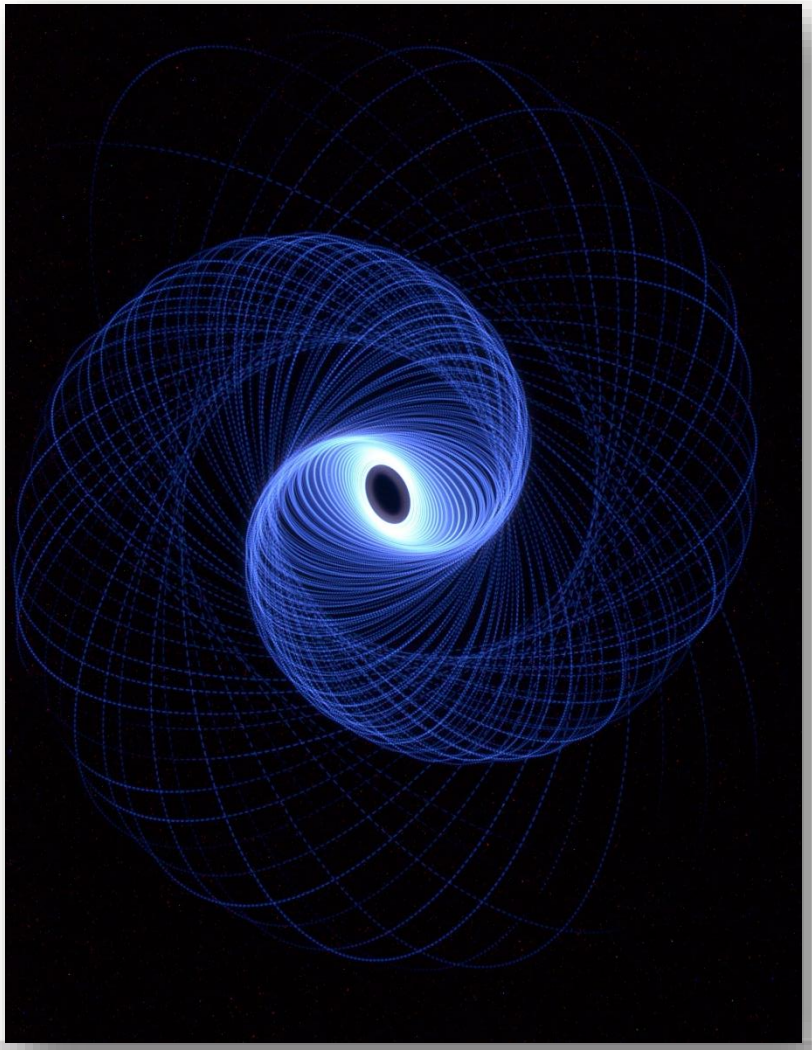
# Brain Freeze (cont'd)

**"These factors add up to the physiological definition of loss of situational awareness. When you are suffering from tunneled senses your situational awareness and big picture perception [are] pretty much *gone*…"**

**BRAIN FREEZE: PART ONE**
**October 1, 2018, Kenneth Stahl MD, FACS,**
**AOPA Pilot Protection Services**

The National FAA
Safety Team Presents

# The Startle Response



# Power loss on takeoff

- **Cessna-175B**
- **Partial power loss on takeoff**
- **Pilot said, “Oh no, this isn’t good.”**
- **Sharp right, turn to return to airport**
- **Stall, spin, crash**
- **One fatality, 3 injuries**

# Beechcraft Musketeer A23A

Stock photo (not subject airplane)

# Murphy's Law restated

***Murphy's law is wrong: "What can go wrong usually goes right,and then we draw the wrong conclusion: that it will go right again and again."***

# Beechcraft Musketeer – Exterior

# Beechcraft Musketeer

**Continental IO-346**

**4-cyl, 165 hp**

# Beechcraft Musketeer – Interior

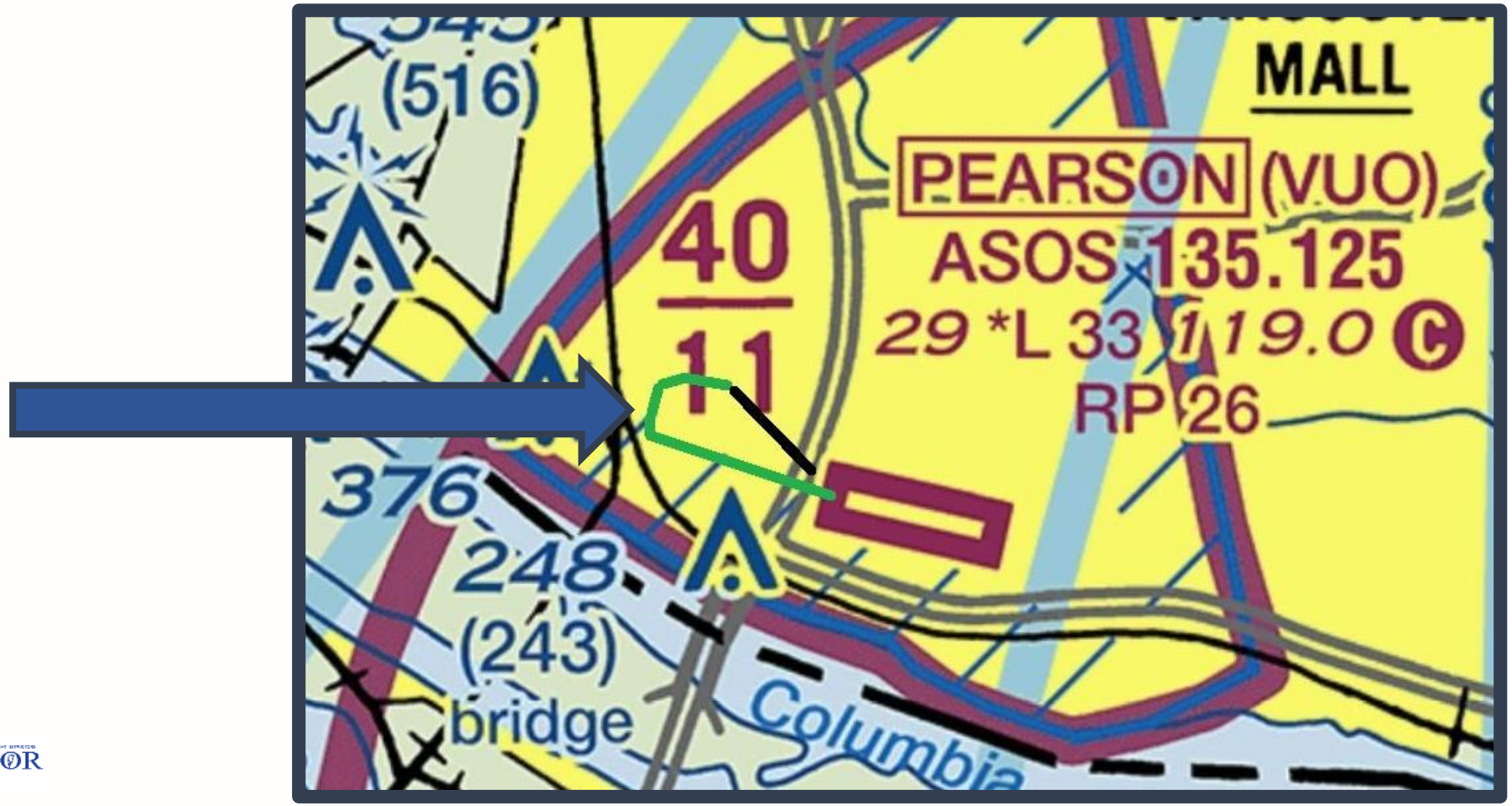
Stock photo

Manual flaps

# What will you see in the video?

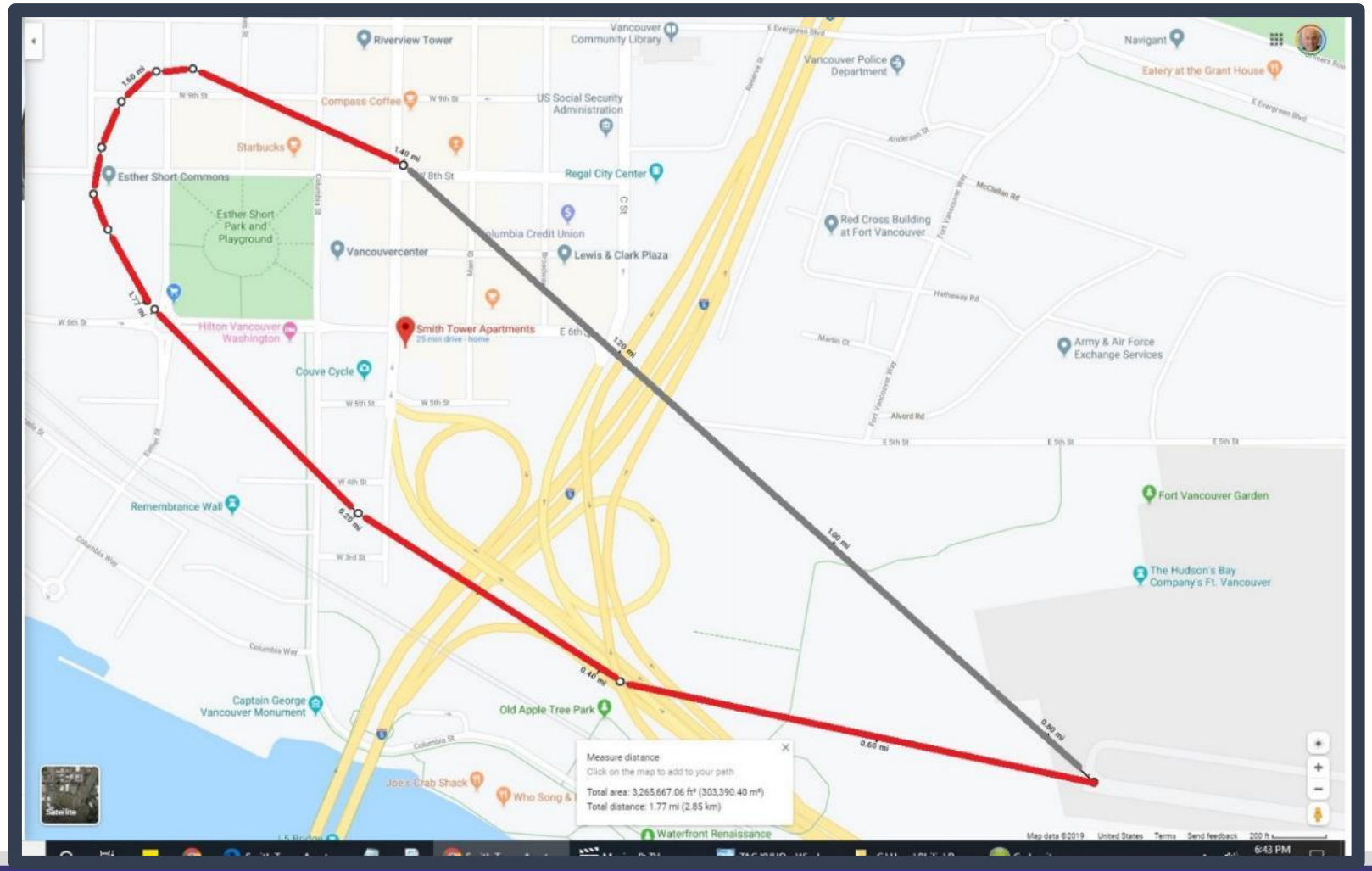
- **Aircraft taxis toward the hold line**
- **Aircraft takes the runway**
- **Takeoff and initial climb, stall buzzer busy**
- **Engine noise changes dramatically**
- **Aircraft turns sharply to the right, nose low**
- **Aircraft recovers and lands opposite direction on runway**

# Full flight path Sectional Chart



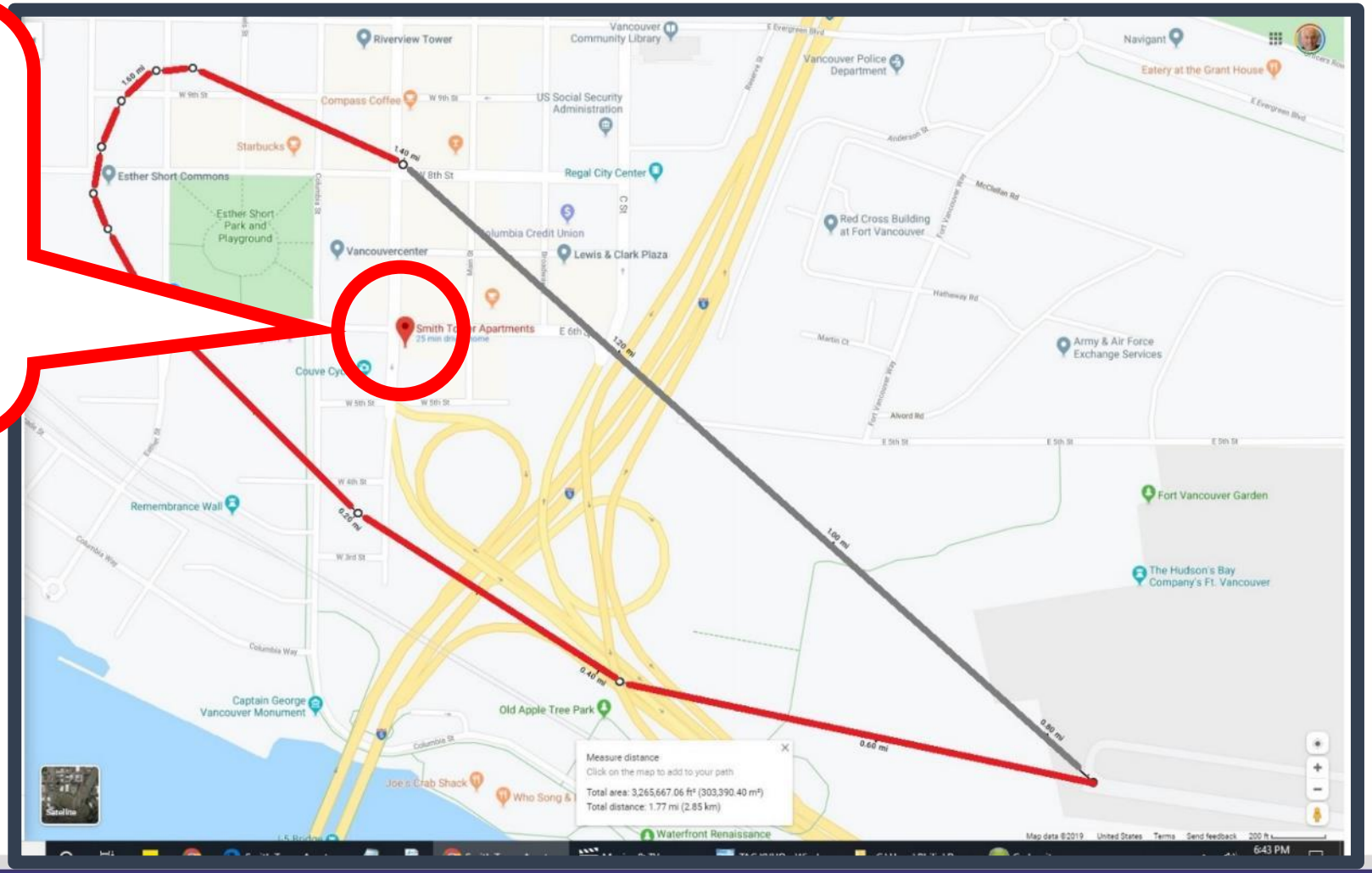
# Full flight path Google maps

**Approx. 2 min wheels up to wheels down**



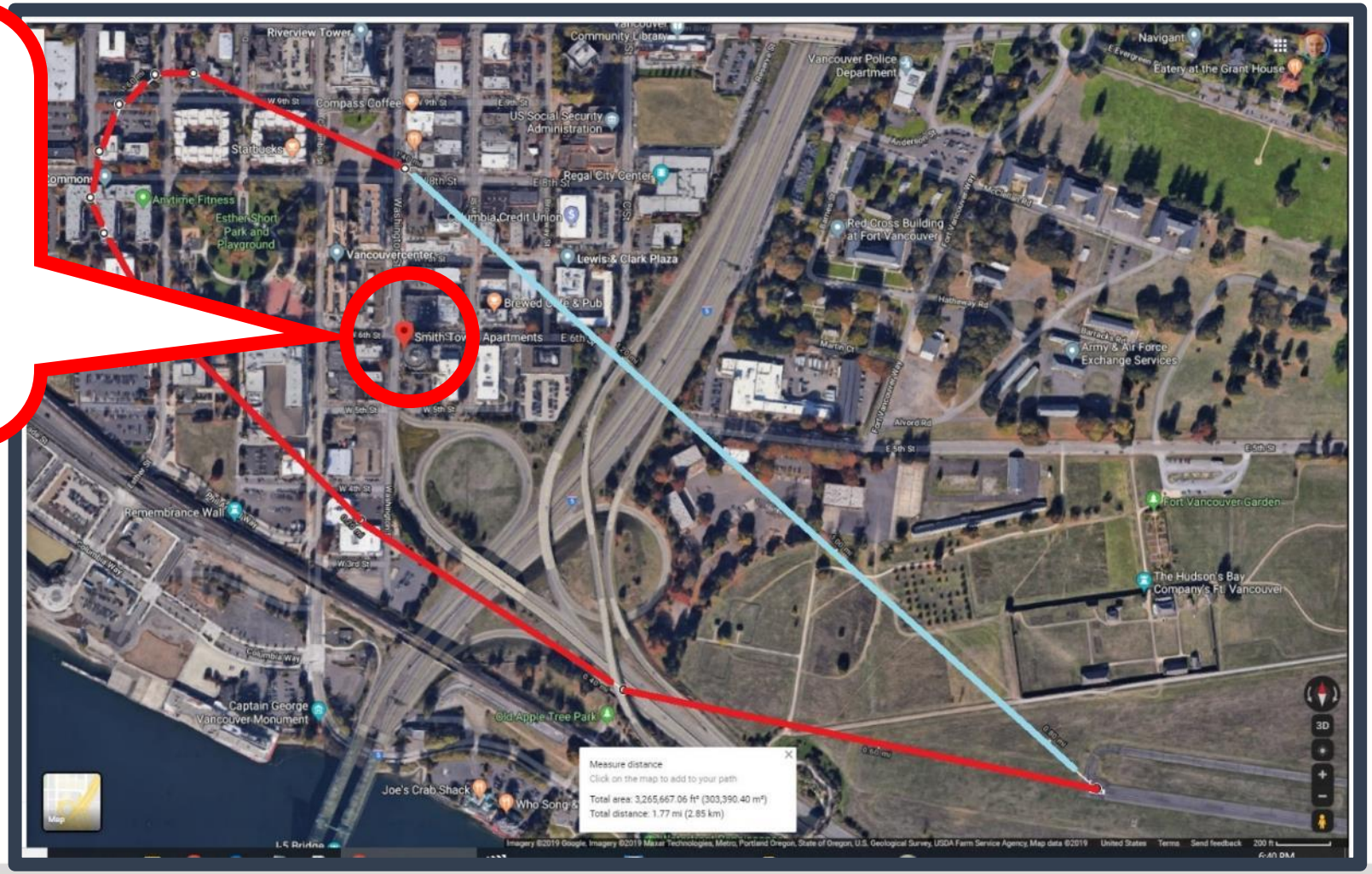
# Full flight path Google maps

**Smith Tower**



# Full flight path Google Earth

**Smith Tower**



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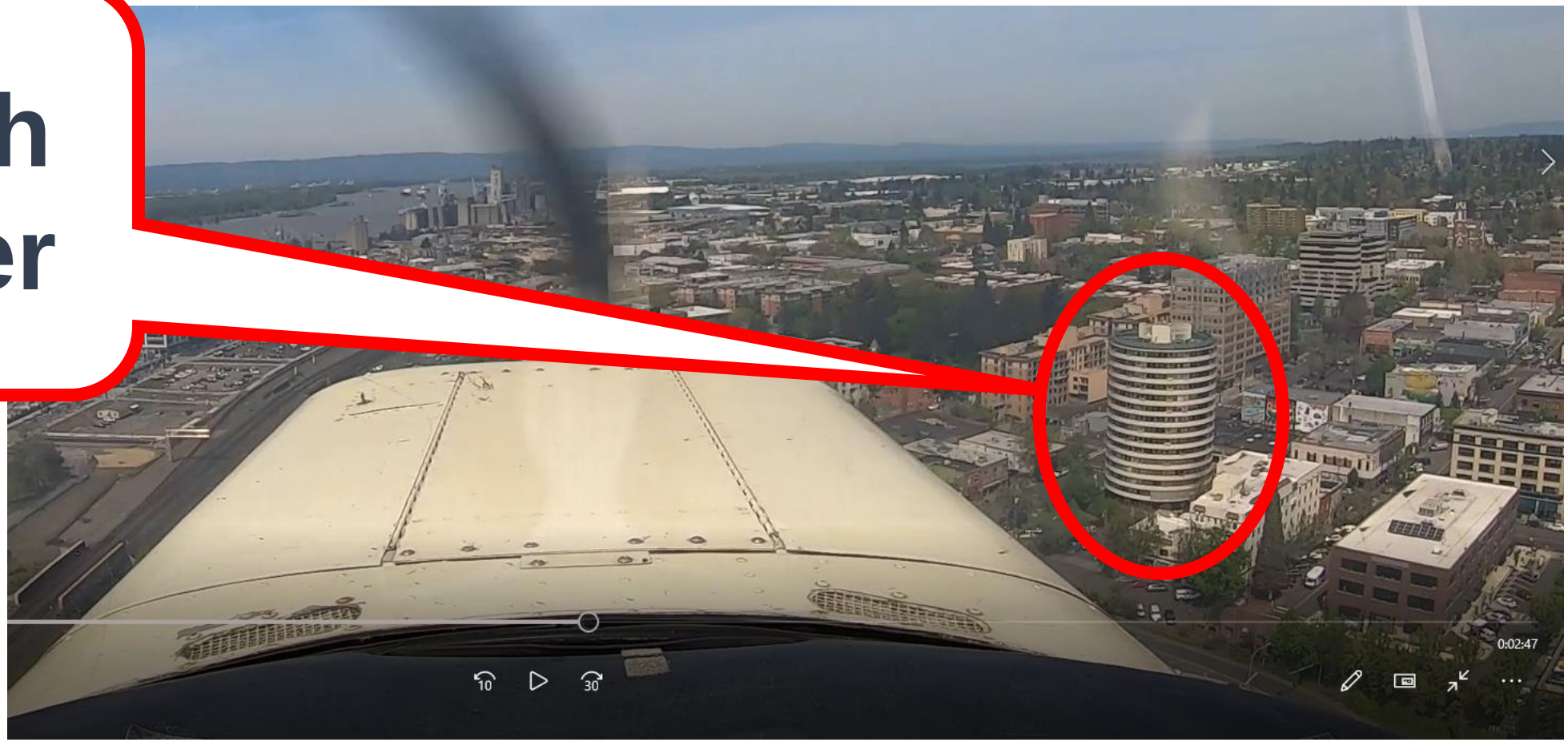
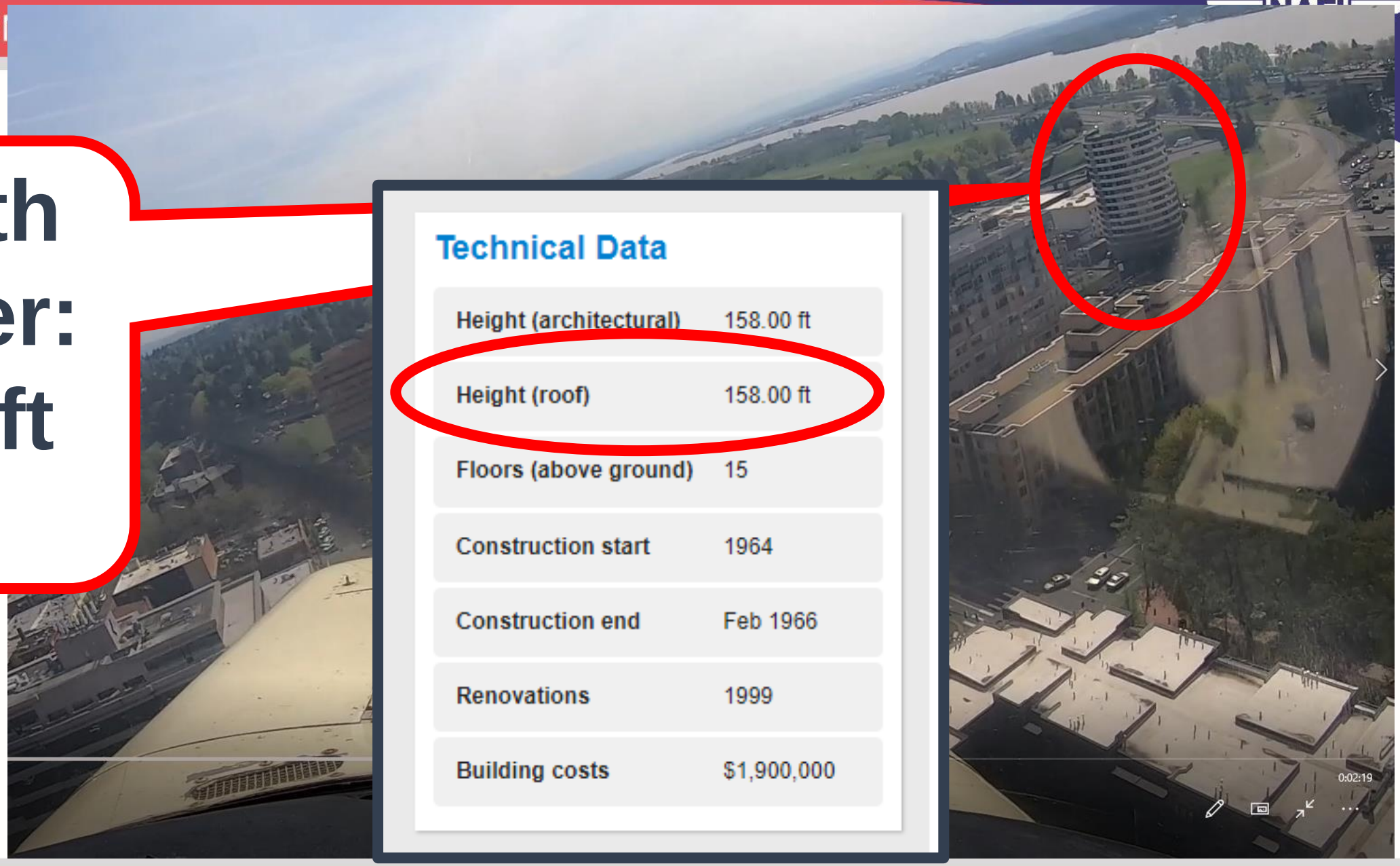


# Smith Tower

# Smith Tower: 158 ft tall




10
30
0:02:19

# 2 - full video raw

# 2 - full video raw

Whew…

# Cochlear Implant

"Over the ear"

# Cochlear Implant

**Micro-phones**

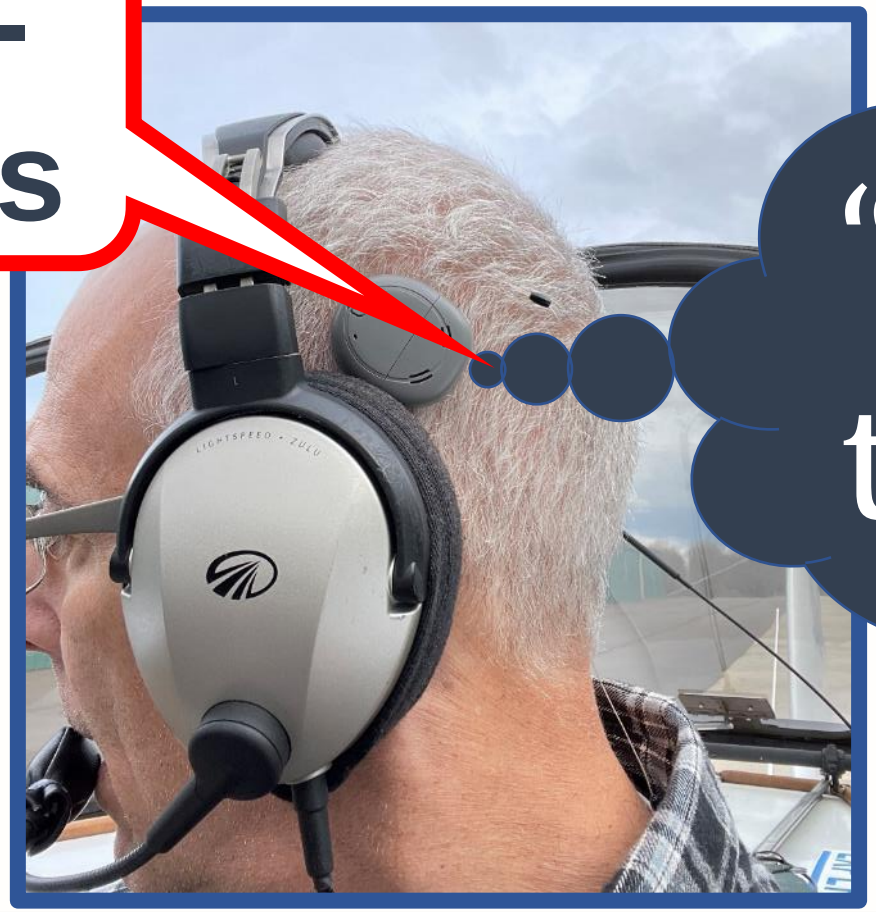
"Over the ear"

# Cochlear Implant

"Behind the ear"

# Cochlear Implant

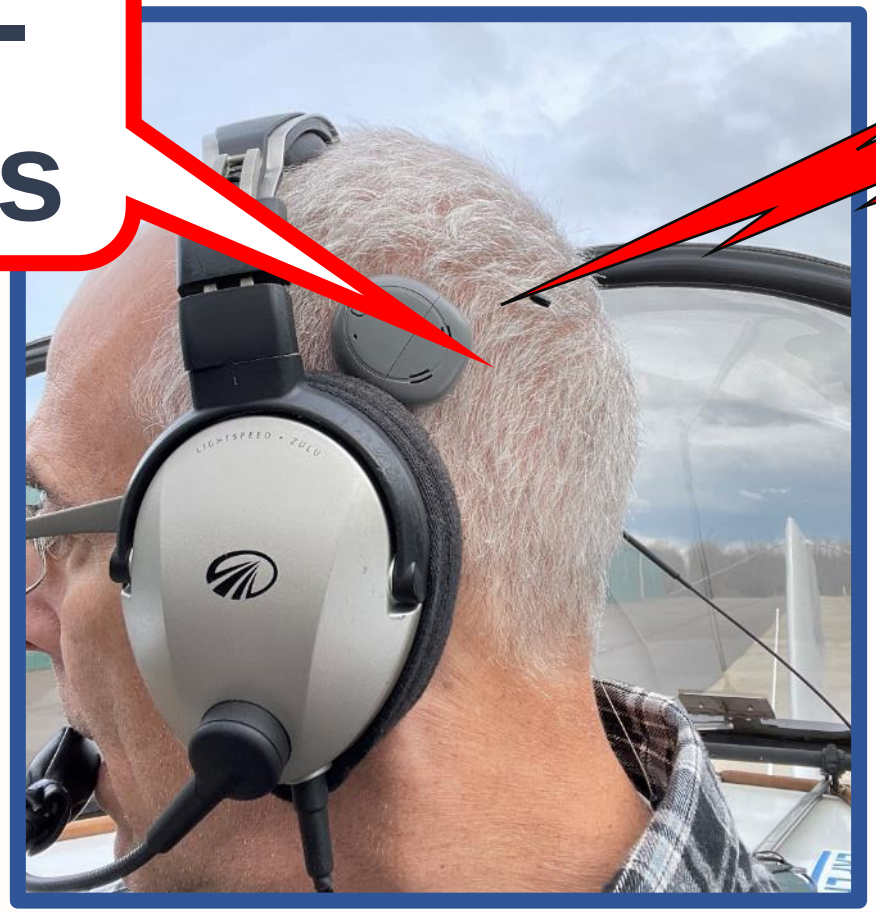
**Micro-phones**



"Behind the ear"

Mini-mic

Micro-phones



# ANC/ANR Headsets

**ANC Headset**

**ON: <u>Cannot</u> hear engine noise**

# Automatic Noise Canceling Headsets

**ANC Headset**

ON: Cannot hear engine noise

**OFF: <u>Can</u> hear engine noise**

# Accelerated Stall

**Under pressure, you don't rise to the occasion, you sink to the level of your training and RECENT practice**

# 1-G (unaccelerated) Stall

# Accelerated Stall

**70 to 60 mph IAS**


AIRSPEED
KNOTS
MPH
RPM MP 0.0/CH-H
Engine Information System
Oil-T/Oil-P GPH EGT-H
Next/Ack Previous Display
Set Limits
75 fpm

# 3 - Accelerated Stall video

**70 to 60 mph IAS**

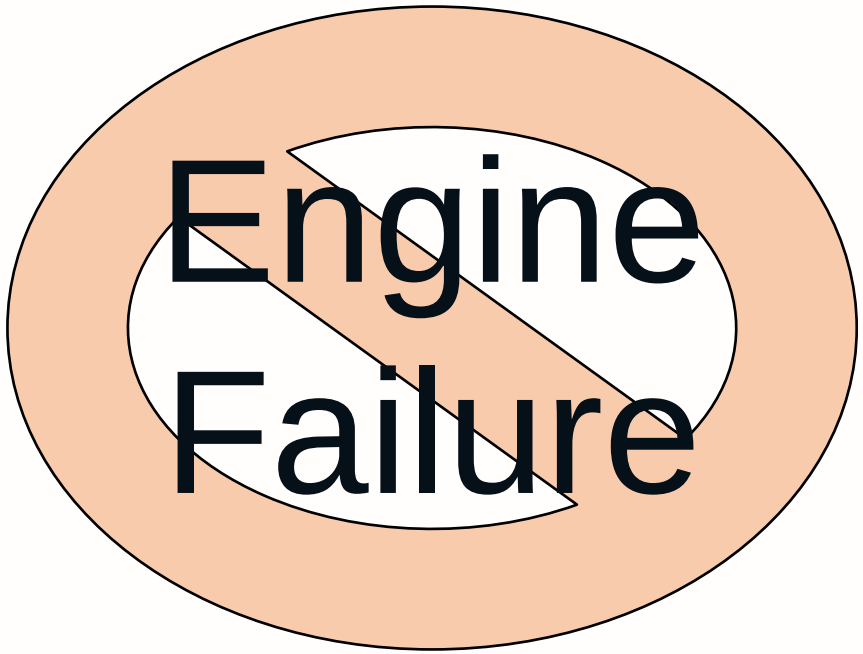
# Accelerated Stall: “mush”

FAA-H-8083-3B
Airplane Flying Handbook
GLOSSARY

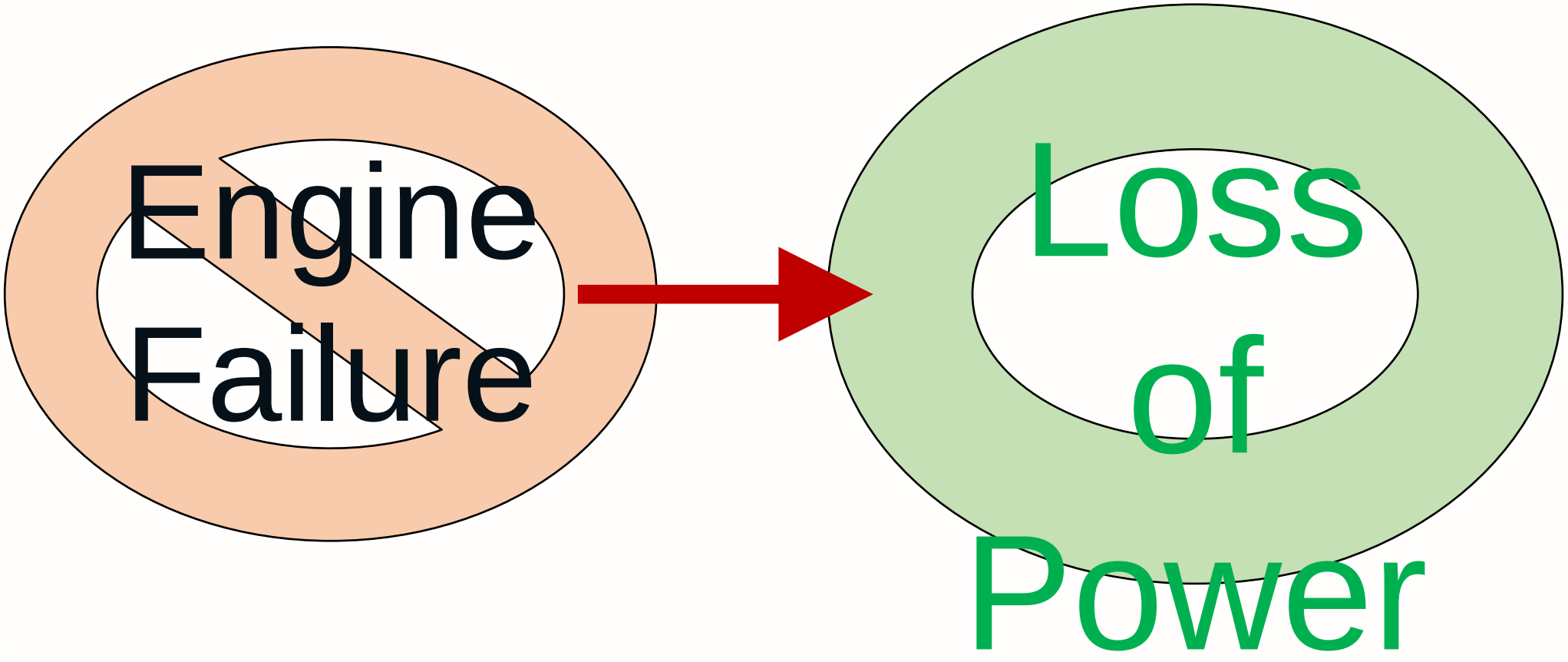
**Mushing.** A flight condition caused by slow speed where the control surfaces are marginally effective.

# Accelerated Stall: “mush”

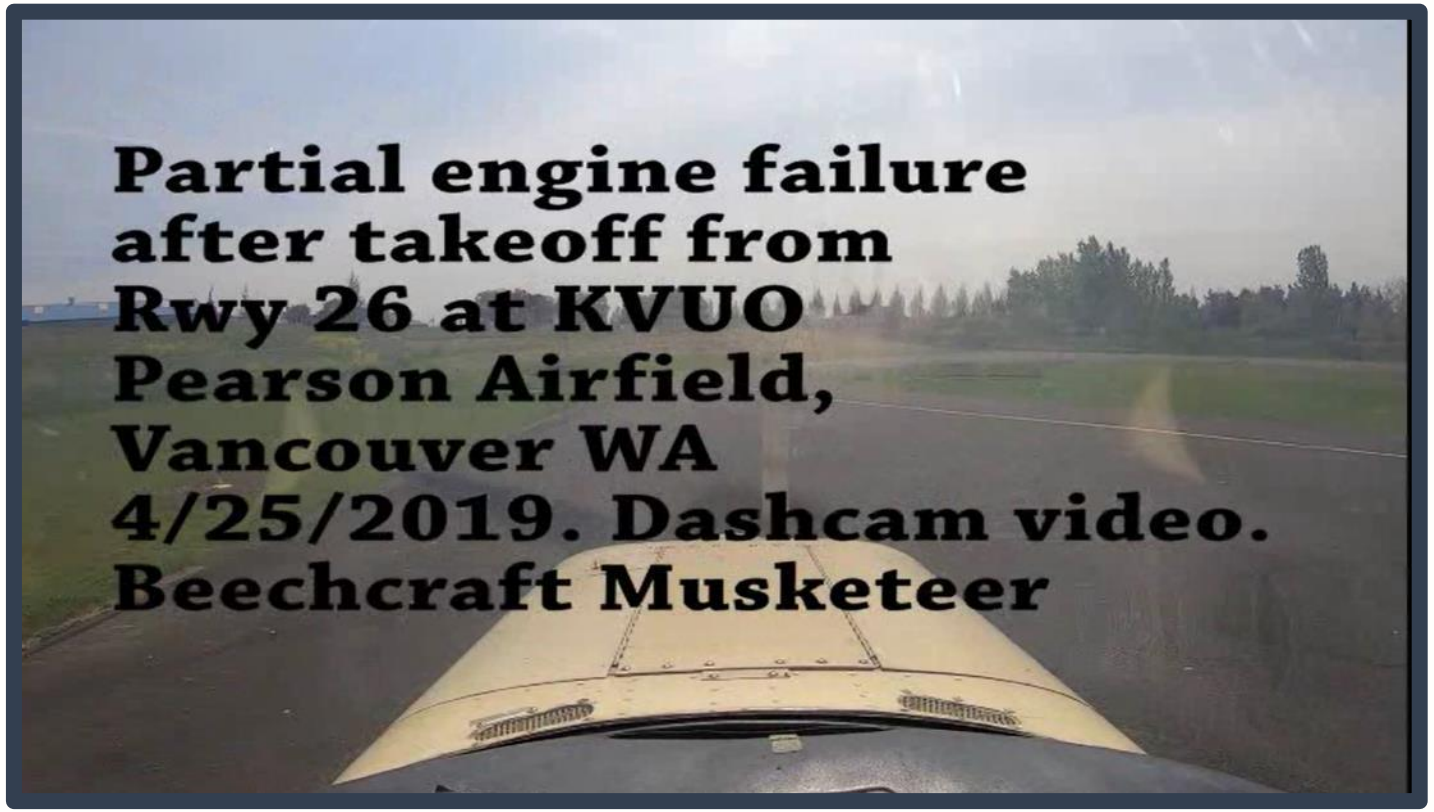
# Reframe “engine failure”



# Reframe “engine failure”



# 4 - full video with subtitles



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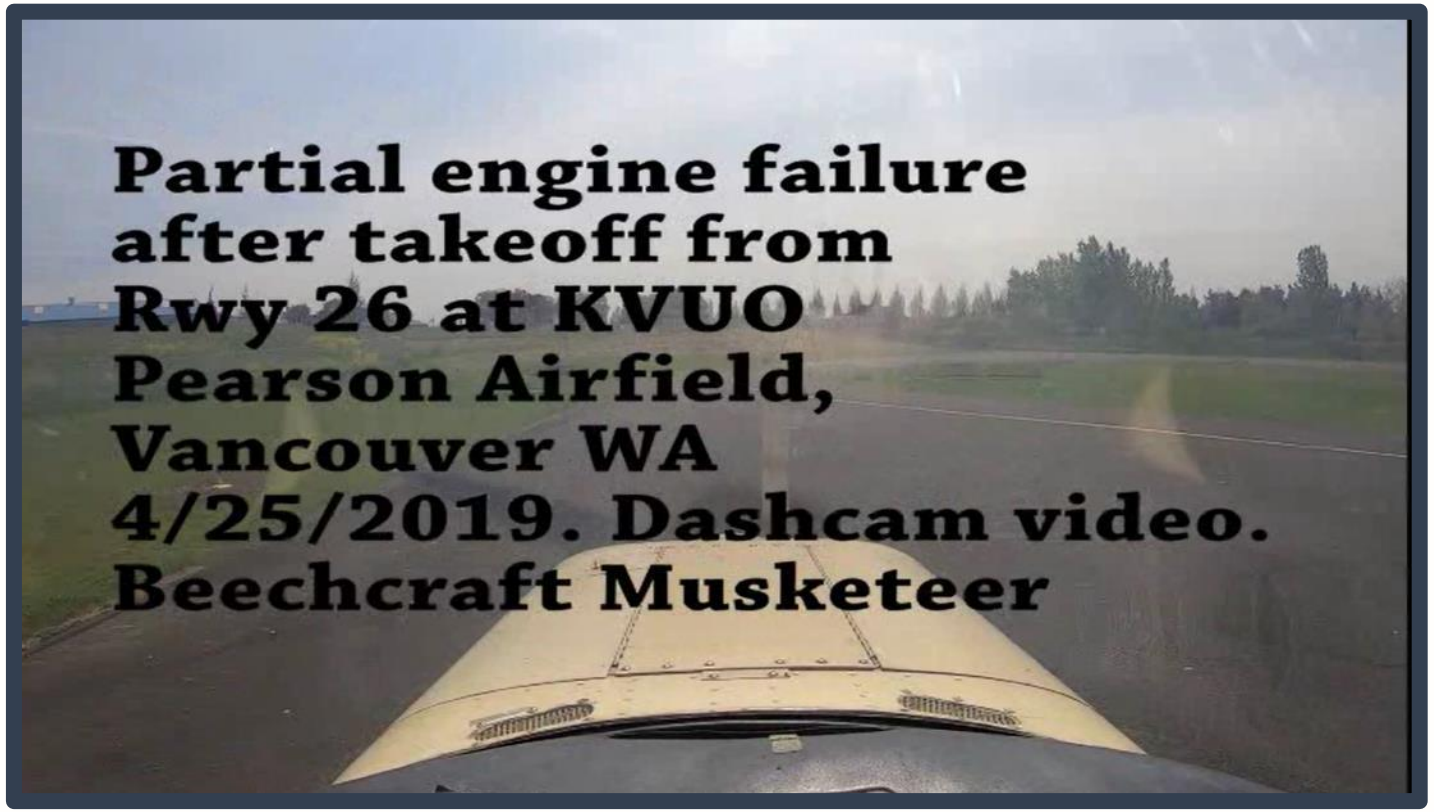


**Under pressure, you don't rise to the occasion, you sink to the level of your training and RECENT practice**

# Engine Failure/Power Loss Checklist – A, B, C, D, E

- **A –**
- **B –**
- **C –**
- **D –**
- **E –**

# Engine Failure/Power Loss Checklist – A, B, C, D, E

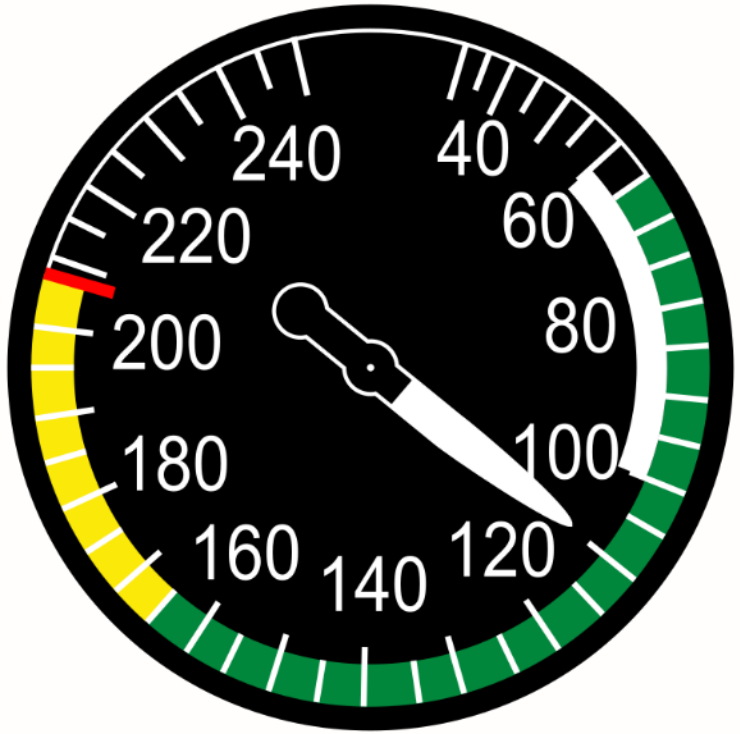
- **A –**

**Always satisfy your POH or AFM!**

- **E –**

# Airspeed or Attitude, B, C, D, E

- **A – Airspeed or Attitude**




# A, Begin…, C, D, E

- **A –** **Airspeed or Attitude**

- **B –** **Begin to head for a place to land (not necessarily “Best place to land”)**

# A, B, Cockpit check, D, E

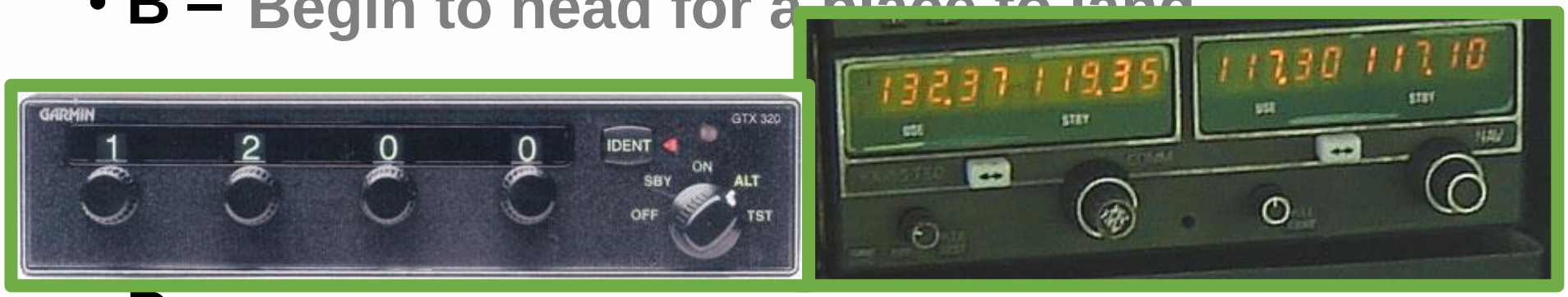
- **A –** **Airspeed or Attitude**
- **B –** **Begin to head for a place to land**
- **C –** **Cockpit check, if useful**
  **(use printed checklist IF YOU HAVE TIME)**

# A, B, Cockpit c

- **A –** Airspeed or Att
- **B –** Begin to head f
- **C –** Cockpi

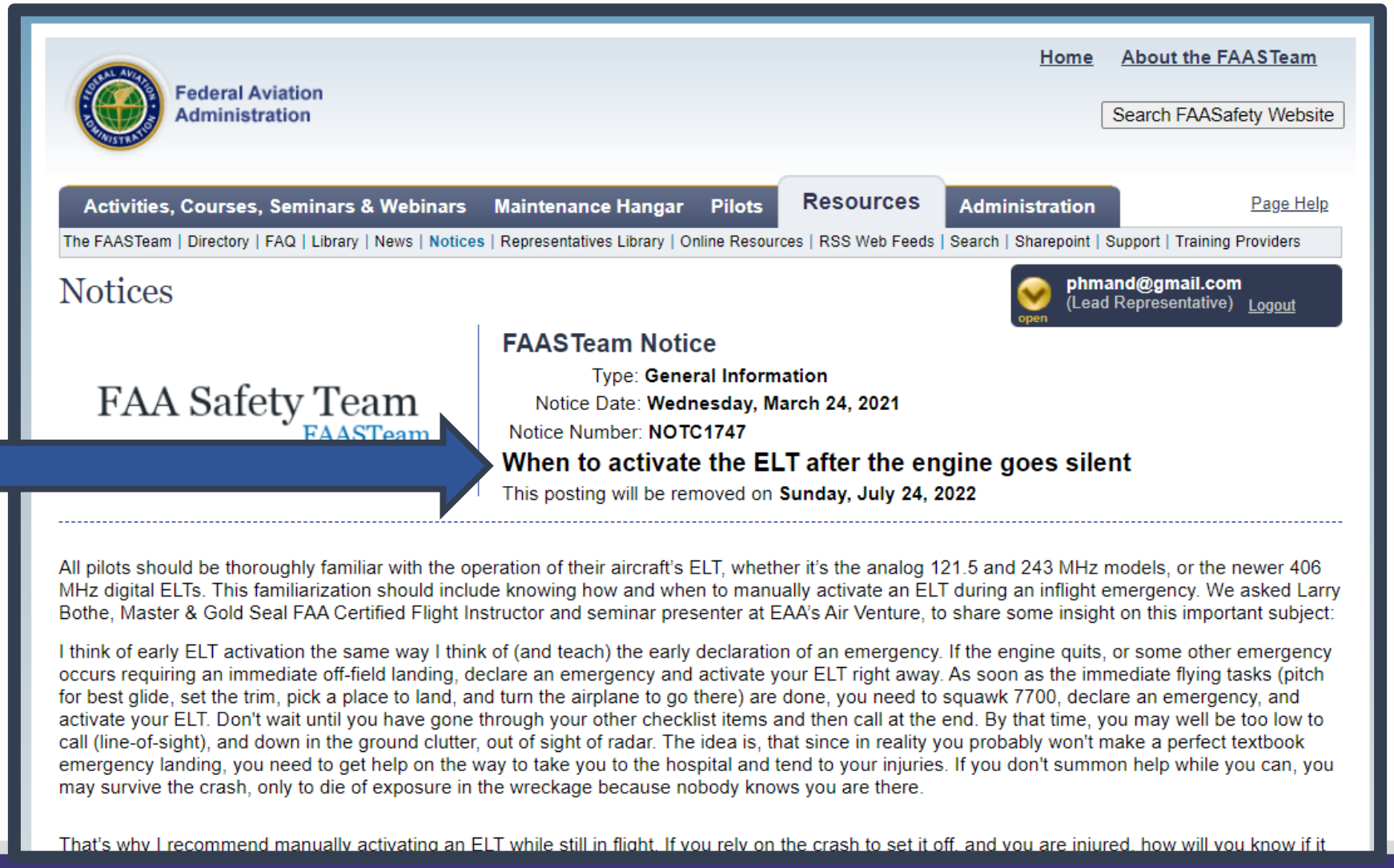
# A, B, C, Declare, E

- **A –** Airspeed or Attitude
- **B –** Begin to head for a place to land




- **D – Declare IF YOU HAVE TIME**
  **(Squawk 7700. Ctc ATC, FSS, or 121.5)**
  **…and…wait for it…**

# A, B, C, Declare, E



# A, B, C, Declare, E

That's why I recommend manually activating an ELT while still in flight. If you rely on the crash to set it off, and you are injured, how will you know if it activated or not? You want to be found, RIGHT AWAY! If you have remote activation capability, turn the darn thing on when you are squawking 7700 and declaring the emergency. Let people know you are in trouble. Make yourself easy to find and be rescued, for sure. All the modern 406 ELTs have panel mounted remote switches. **Just push the button**.

**"That's why I recommend manually activating an ELT while still in flight. If you rely on the crash to set it off, and you are injured, how will you know if it activated or not? You want to be found, RIGHT AWAY! If you have remote activation capability, turn the darn thing on when you are squawking 7700 and declaring the emergency. Let people know you are in trouble. Make yourself easy to find and be rescued, for sure. All the modern 406 ELTs have panel mounted remote switches. Just push the button."**

# A, B, C, D, Egress

- **A –** Airspeed or Attitude
- **B –** Begin to head for a place to land
- **C –** Cockpit check (use printed checklist IF YOU HAVE TIME)
- **D –** Declare IF YOU HAVE TIME (7700, ATC or FSS or 121.5)
- **E –** **Egress (i.e., prepare for egress/rescue)**

# A, B, C, D, Egress

- **Seat belts/shoulder harnesses: Secure**
- **Door(s): Unlatch and ?_Open_?**
- **Fuel valve: Off?**
- **Mags: Off?**
- **Master switch: Off?**
- **What else…?**
- **After landing: Ideas?**

# A, B, C, D, E, F…???

# What is “F” ??

# A, B, C, D, E, Fly The Plane!!!

**F: FLY THE PLANE**

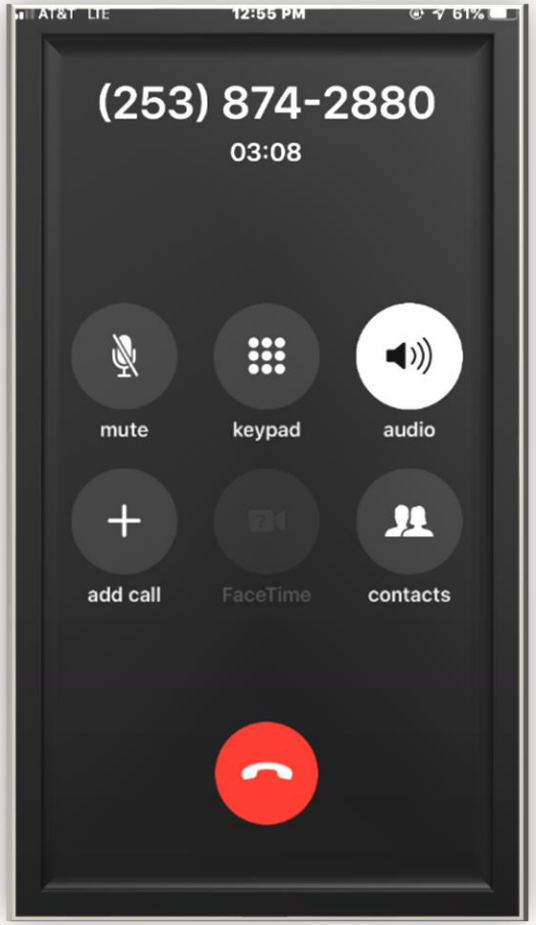
# Fly The Plane, *then:* A, B, C, D, E

## F – FLY THE PLANE

- **A – Airspeed or Attitude**
- **B – Begin to head for a place to land**
- **C – Cockpit check (use printed checklist IF YOU HAVE TIME)**
- **D – Declare IF YOU HAVE TIME (7700, ATC or FSS or 121.5)**
- **E – Egress (i.e., prepare for egress/rescue)**

# NTSB Part 830:

## NOTIFICATION AND REPORTING OF AIRCRAFT ACCIDENTS OR INCIDENTS AND OVERDUE AIRCRAFT, AND PRESERVATION OF AIRCRAFT WRECKAGE, MAIL, CARGO, AND RECORDS



# NTSB Part 830

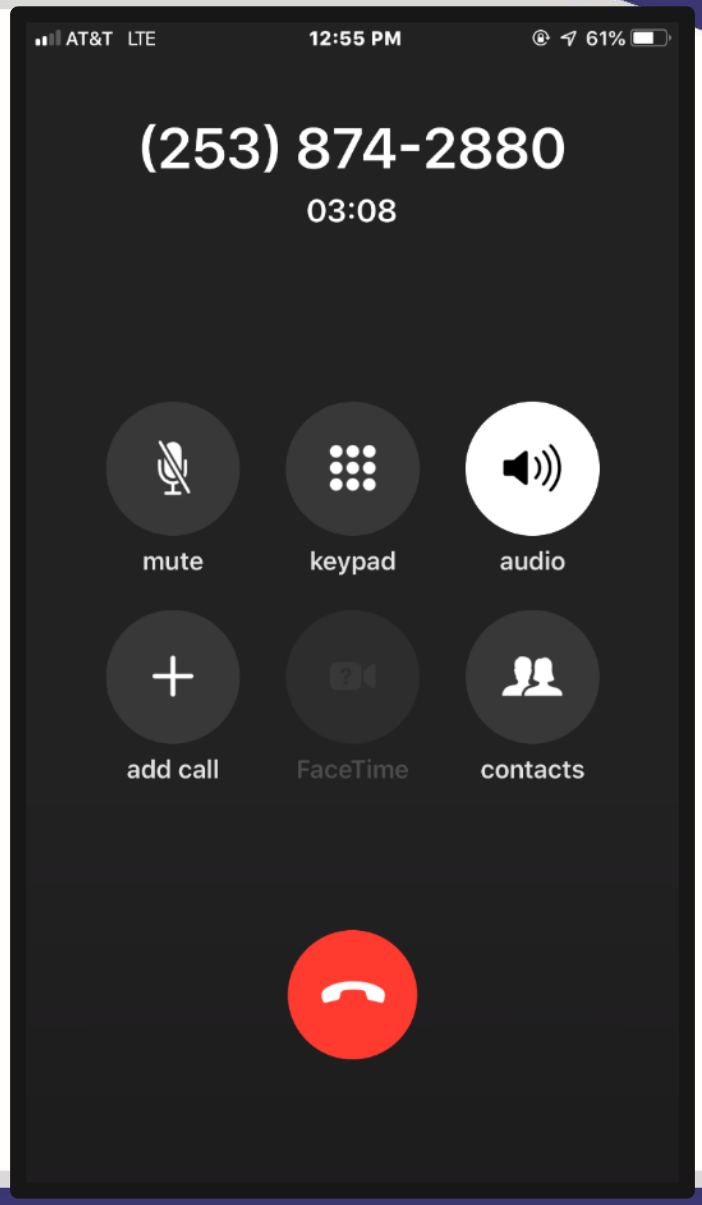
**§ 830.5 Immediate notification.**

**The operator of any civil aircraft…shall immediately…notify the nearest National Transportation Safety Board (NTSB) office, when:**

**(a) An aircraft accident or any of the following listed serious incidents occur:**

**(1) Flight control system malfunction or failure;**

**(2) …etc…**



# NTSB – did we need to report?

**Question:**

**Is engine failure / loss of power considered "Flight control system malfunction or failure?"**

# NTSB – did we need to report?

Question:

Is engine fail
consi

**Answer: NO**

# Review

**Under pressure, you don't rise to the occasion, you sink to the level of your training and RECENT practice**

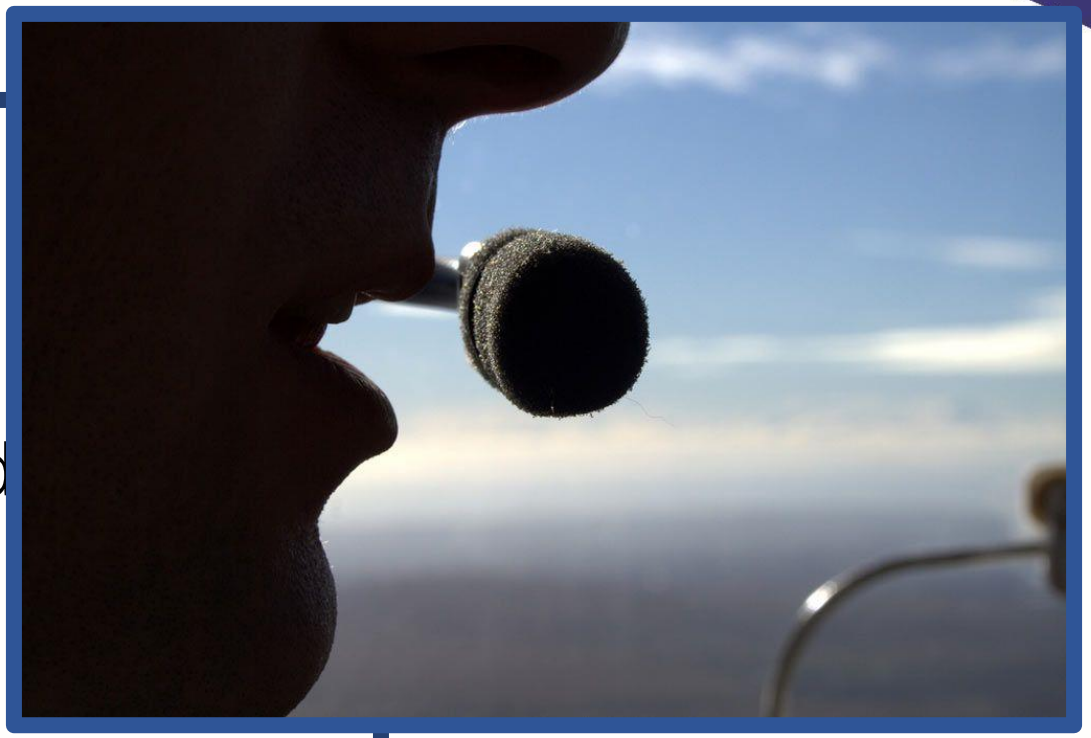
# What Went Wrong

# What Went Wrong

- Complacency, inattentiveness during critical phase of flight
- Auditory issues
  - SSD (single sided deafness)
  - ANC/ANR headsets
- Failure to have a plan in cas
  a continuous basis
- Turned toward buildings

# What Went Wrong

- Dismissed the strong odor too easily
- Failed to notice engine sound change
- Banked too steeply?? Maybe…
- Excessive back pressure: Accelerated
- Fuel valve: OFF after landing
- Flaps: UP after landing
- Did not cancel emergency…discuss…



# What Went Right

# What went right

- **Promptly took control of the aircraft**
  - ☑ **Positive Exchange of Flight Controls**

**Private Pilot – Airplane**

**Airman Certification Standards**

**Appendix 6: Safety of Flight**

**Positive Exchange of Flight Controls**

There must always be a clear understanding of who has control of the aircraft. Prior to flight, the pilots involved should conduct a briefing that includes reviewing the procedures for exchanging flight controls.

The FAA recommends a positive three-step process for exchanging flight controls between pilots:

- When one pilot seeks to have the other pilot take control of the aircraft, he or she will say, "You have the flight controls."
- The second pilot acknowledges immediately by saying, "I have the flight controls."
- The first pilot again says, "You have the flight controls," and visually confirms the exchange.

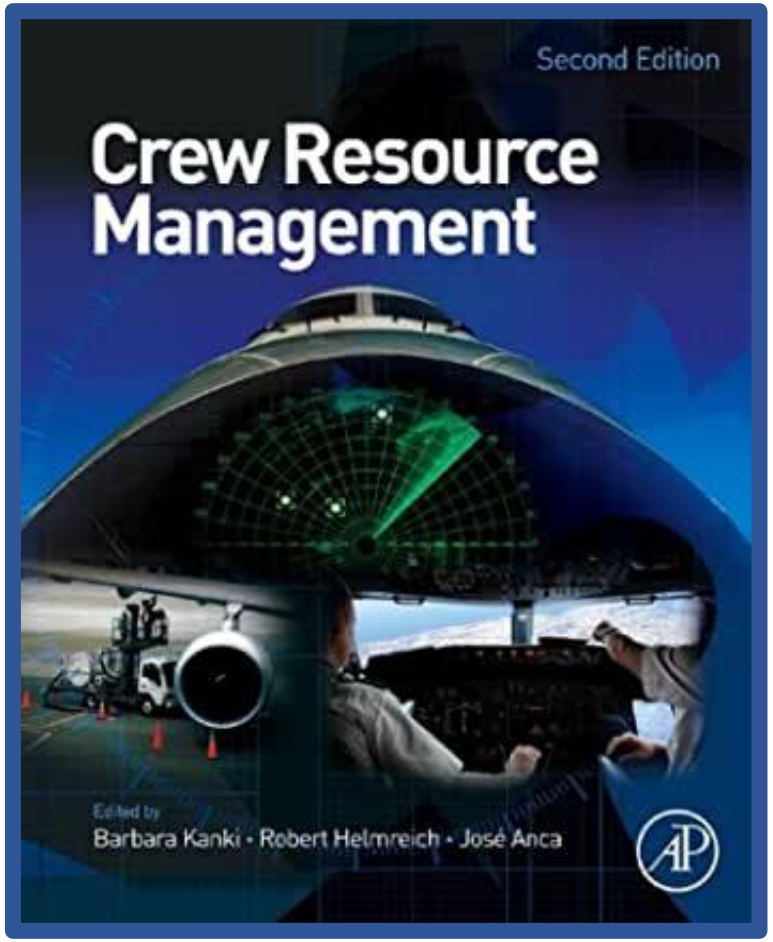
Pilots should follow this procedure during any exchange of flight controls, including any occurrence during the practical test. The FAA also recommends that both pilots use a visual check to verify that the exchange has occurred. There must never be any doubt as to who is flying the aircraft.

# What went right

- Assessed engine power – tried different throttle settings
  - Most, if not all, power loss emergency checklists say, “Throttle – Full Open”
  - Not all power losses are total engine failure
  - Consider trying different throttle and/or mixt settings
- Made a plan, then acted immediately

# What went right

- Recognized and recovered from the accelerated stall before it was too late
- FLEW THE PLANE
- Cockpit Resource Management (CRM)
  - Asked student to declare emergency
  - Asked student to unlatch door and open door and window
  - Asked student to add flaps
  - Both pilots released seat belts after landing

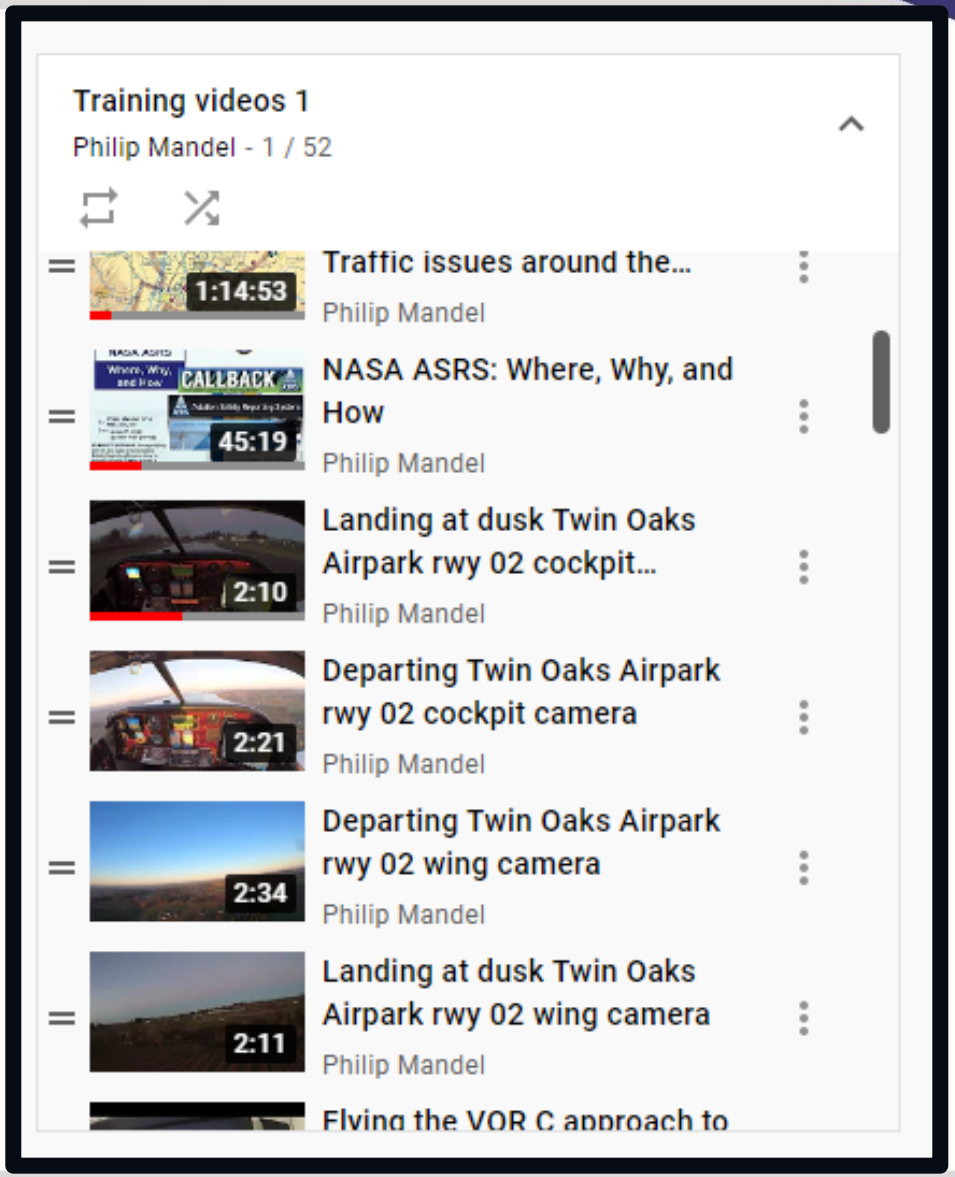


# Engine Failure/Power Loss Checklist – A, B, C, D, E, (F)

- **A –**
- **B –**
- **C –**
- **D –**
- **E –**
- **(F) –**

# YouTube channel

bit.ly/training-videos-1



# Discussion

# Thank you for attending

**You are vital members of our GA safety community**


**Thank you for attending**

**Philip Mandel, CFI**
**flyphil.INFO**
**phmand@gmail.com**

MENTOR LIVE

# *Power Loss at 300 Feet – What Went Wrong, What Went Right*

Presented by Philip Mandel, CFI-I, MEI, AGI, IGI

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