ACS AREA VII — EMERGENCY OPERATIONS

Sessions 73–78

Instrument flying tolerates failure poorly. In visual conditions a lost instrument or a failed radio is an inconvenience; in the clouds, the same failure removes a sense the pilot has been relying on completely, often without warning and always at an inconvenient moment. Area VII is where the rating confronts that reality directly. These six sessions are not about flying the system when it works — the preceding areas covered that — but about recognizing when something has broken, isolating what is still trustworthy, and continuing to a safe landing on whatever remains.

The area moves through the failures an instrument pilot must be ready for. Session 73 covers lost communications — the §91.185 procedures for route, altitude, and timing when the radios go silent in IMC. Sessions 74 and 75 address the instrument failures themselves: the pitot-static system and unreliable airspeed and altitude, then the vacuum or gyroscopic failure that takes the attitude indicator and heading indicator. Session 76 brings these together in the hardest case — flying an approach after losing primary flight instruments, on partial panel, in actual conditions. Session 77 covers in-flight icing, the structural and induction threat that degrades the aircraft itself rather than its instruments. Session 78 closes the area with engine and electrical emergencies and systems failures in IMC.

Two principles run through all of it. First, detection precedes recovery: an undetected failure — a slowly failing vacuum pump, a blocked pitot tube — is far more dangerous than an obvious one, because the pilot keeps trusting a lie. The cross-check exists precisely so that one instrument's disagreement with the others is caught early. Second, the aircraft keeps flying: power plus pitch produces a known performance, the magnetic compass still points, and a methodical pilot with partial information can still navigate, communicate, and land. Aviate, navigate, communicate is never more literal than here.

Work these sessions imagining the failure is real and you are in cloud. Identify what you would lose, what you would keep, and what you would do in the first ten seconds. Return to Chapter 12 wherever a procedure or a failure mode does not come with certainty.

SESSION 73: EMERGENCIES — LOSS OF COMMUNICATIONS: FULL SCENARIO DEBRIEF

1. Your first recognition that you have lost communications should prompt you to:

A. Immediately squawk 7700

B. Climb to the MEA

C. Attempt to troubleshoot and confirm the radio failure (volume, frequency, headset, alternate radio)

D. Begin the approach

2. Common troubleshooting steps for a suspected radio failure include checking the:

A. Transponder code only

B. Volume, squelch, frequency selection, audio panel, headset/mic, and trying the second radio

C. Pitot heat

D. Vacuum gauge

3. Confirming you have lost two-way communications, you set the transponder to:

A. 7600

B. 7700

C. 7500

D. 1200

4. The transponder code 7600 signals to ATC:

A. A hijacking

B. An emergency

C. A loss of radio communications

D. VFR

5. While lost comm, you should continue to attempt contact by:

A. Squawking 7500

B. Landing immediately

C. Climbing above the clouds

D. Trying other frequencies, navaid voice features, or relaying through other aircraft/FSS

6. Under §91.185, if you are in VFR conditions when the failure occurs (or encounter VFR), you should:

A. Continue IFR to the destination

B. Climb to the MEA

C. Squawk 7700

D. Continue VFR and land as soon as practicable

7. Because you are in continuous IMC, you must fly the §91.185 IFR lost-comm procedures. The route to fly is determined by the priority:

A. Vectors, then expected, then filed

B. Filed, then assigned, then expected

C. Assigned, then vectored, then expected, then filed (the "AVEF" priority)

D. Expected, then filed, then assigned

8. The "A" in the route priority (AVEF) stands for the route:

A. Assigned in your last ATC clearance

B. Always the filed route

C. Any available route

D. Above the MEA

9. If you were being radar vectored when communications failed, you should:

A. Proceed direct from the point of radio failure to the fix, route, or airway specified in the vector clearance

B. Continue the last heading indefinitely

C. Climb to the MEA and hold

D. Squawk 7700

10. If no route was assigned and none was expected, you fly the route:

A. Of the last vector

B. Above the MEA

C. To the alternate

D. You filed in your flight plan

11. The altitude to fly under §91.185 is the highest of three values for each route segment. These are the:

A. Filed, expected, and assigned altitudes

B. MEA, MOCA, and MRA

C. Cruise, alternate, and approach altitudes

D. Minimum altitude (MEA) for the segment, the altitude ATC assigned, and the altitude ATC told you to expect

12. "Highest of" the three altitude values means that, for each segment, you fly:

A. The lowest of the three

B. The filed altitude only

C. Whichever of the assigned, expected, or minimum-IFR altitude is highest

D. The MEA always

13. As you proceed on the assigned route, when you reach a fix where a higher minimum altitude (e.g., a higher MEA) begins, you:

A. Climb to comply with the higher minimum altitude beginning at that fix

B. Descend

C. Maintain the previous altitude

D. Squawk 7700

14. ATC, seeing your 7600 code, will:

A. Ignore you

B. Clear the airspace and route along your expected lost-comm routing, anticipating your procedures

C. Cancel your flight plan

D. Vector other traffic into you

15. Regarding when to begin the approach at the destination, §91.185 says to commence the descent/approach as close as possible to the:

A. MEA

B. Expect-further-clearance (EFC) time if one was received, or your ETA based on the filed/amended flight plan

C. Filed departure time

D. Sunset

16. If you were issued an EFC time, you should leave the holding fix or begin the approach:

A. Immediately upon arrival

B. After 30 minutes

C. At the EFC time

D. At your discretion

17. Upon arriving at the destination, you should:

A. Complete a charted approach and land, then notify ATC of your arrival by phone if able

B. Hold indefinitely

C. Divert to the alternate

D. Climb above the clouds

18. The intent of the §91.185 procedures is to make your flight path:

A. Random so ATC can find you

B. As fast as possible

C. Predictable to ATC so they can protect your route and altitude

D. Direct to the alternate

19. A pilot who deviates from the lost-comm procedures unpredictably:

A. Helps ATC

B. Creates uncertainty for ATC and risks conflict with other traffic

C. Is following §91.185

D. Lowers the MEA

20. If you have a partial communications failure (you can receive but not transmit), you should:

A. Squawk 7500

B. Comply with received instructions, acknowledge by squawking ident or other means, and continue

C. Squawk 7700 and land

D. Disregard ATC

21. Throughout the lost-comm event, your overriding priority remains to:

A. Aviate (fly the aircraft and maintain control in IMC), then navigate and follow the procedures

B. Transmit continuously

C. Squawk 7700

D. Descend below the clouds

22. §91.3 gives you, as PIC, the authority to:

A. Ignore all regulations

B. Deviate from any rule to the extent required to meet an emergency

C. Cancel IFR

D. Change your destination without limit

23. If continuing the flight under lost-comm procedures would be unsafe (e.g., deteriorating weather or another emergency), you may:

A. Continue regardless

B. Squawk 7600 only

C. Hold indefinitely

D. Exercise emergency authority and take the safest course of action

24. A pilot squawking 7600 who later regains communications should:

A. Continue squawking 7600

B. Squawk 7700

C. Land immediately

D. Re-establish contact, advise ATC, and reset the transponder as instructed

25. The fundamental principle of a loss-of-communications event in IMC is that the pilot must:

A. Land as soon as possible regardless of conditions

B. Maintain aircraft control, squawk 7600, fly the §91.185 route and altitude rules predictably, time the arrival to the EFC/ETA, and exercise PIC judgment for safety

C. Continue the filed route at the filed altitude regardless

D. Climb above the clouds and proceed VFR

ANSWER KEY & EXPLANATIONS — SESSION 73

1. C. Troubleshoot/confirm — The first recognition should prompt troubleshooting and confirming the failure (volume, frequency, headset, alternate radio).

2. B. Volume/freq/audio/second radio — Troubleshooting includes checking volume, squelch, frequency, audio panel, headset/mic, and trying the second radio.

3. A. 7600 — Confirming lost two-way communications, the pilot sets the transponder to 7600.

4. C. Lost communications — Code 7600 signals a loss of radio communications.

5. D. Other freqs/relays — While lost comm, the pilot continues to attempt contact via other frequencies, navaid voice features, or relays through other aircraft/FSS.

6. D. Continue VFR/land — In VFR conditions (or upon encountering VFR), the pilot continues VFR and lands as soon as practicable.

7. C. AVEF — The route priority is assigned, then vectored, then expected, then filed (AVEF).

8. A. Assigned route — The "A" stands for the route assigned in the last ATC clearance.

9. A. Direct to the vector fix — If being radar vectored, the pilot proceeds direct from the point of failure to the fix, route, or airway specified in the vector clearance.

10. D. Filed route — With no assigned and no expected route, the pilot flies the filed route.

11. D. MEA/assigned/expected — The altitude is the highest of the minimum altitude (MEA) for the segment, the assigned altitude, and the expect altitude.

12. C. Highest of the three — For each segment, the pilot flies whichever of the assigned, expected, or minimum-IFR altitude is highest.

13. A. Climb to higher minimum — At a fix where a higher minimum altitude begins, the pilot climbs to comply with it beginning at that fix.

14. B. Protect the routing — Seeing 7600, ATC clears the airspace and route along the expected lost-comm routing, anticipating the pilot's procedures.

15. B. EFC or ETA — The approach is commenced as close as possible to the EFC time if received, or the ETA based on the filed/amended flight plan.

16. C. At the EFC — With an EFC time issued, the pilot leaves the holding fix or begins the approach at the EFC time.

17. A. Complete approach/notify — At the destination, the pilot completes a charted approach and lands, then notifies ATC of the arrival if able.

18. C. Predictable to ATC — The intent of §91.185 is to make the flight path predictable to ATC so they can protect the route and altitude.

19. B. Creates uncertainty — Deviating unpredictably creates uncertainty for ATC and risks conflict with other traffic.

20. B. Comply/acknowledge — With a receive-only failure, the pilot complies with received instructions, acknowledges by squawking ident or other means, and continues.

21. A. Aviate first — The overriding priority is to aviate (fly the aircraft and maintain control in IMC), then navigate and follow the procedures.

22. B. Deviate for emergency — §91.3 gives the PIC authority to deviate from any rule to the extent required to meet an emergency.

23. D. Emergency authority — If continuing the procedures would be unsafe, the pilot may exercise emergency authority and take the safest course of action.

24. D. Re-establish/reset — Regaining communications, the pilot re-establishes contact, advises ATC, and resets the transponder as instructed.

25. B. Control/7600/AVEF/time/judgment — The fundamental principle is to maintain aircraft control, squawk 7600, fly the §91.185 route and altitude rules predictably, time the arrival to the EFC/ETA, and exercise PIC judgment for safety.