AC 25-7C FLIGHT TEST GUIDE FOR CERTIFICATION OF TRANSPORT CATEGORY AIRPLANES

DISPOSITION OF INTERDIRECTORATE COMMENTS

MASTER TABLE

Comment	Requested Change	Disposition
Commenter: AIR-130/Larrow		
Page 2. Section 4.a . Includes a statement that AC 25-7 has been revised four times (AC 25-7A, AC 25-7A ch1, AC 25-7B, and AC 25-7C). RGL shows also a change 1 to the original AC 25-7.	Change statement to indicate this is the fifth revision to the document.	To avoid issues with this statement in the future, the reference to the number of revisions has been changed to "several."
Commenter: Borton, ACE-117W, x4166		
Page 5. Section 1, (3) 1 f 3—Simulation Criteria, good discussion. Would recommend to also add specific words for HQ simulation that an engineering simulator may be needed. Because of time delays often introduced by emphasis on visuals, commercial (Level D) simulators may not have the flight control fidelity needed to accurately evaluate HQ for certification.	Add some words to make sure any HQ tests investigate the fidelity of the simulator for specific handling tasks. An engineering simulator (without extensive visual displays) may provide the best platform.	A separate paragraph on using an appropriate type and fidelity simulation has been added to address this comment.
Commenter: J. Regimbal, ANM-140S, x6506		
Page 5. Paragraph 3.a.(1)(f)2.(bb) The implication that compliance with the demonstration requirements for crosswind conditions could be addressed by simulations rather than test is not appropriate. The effect of these conditions cannot be modeled accurately at the limits of an airplane's handling capability. In	Eliminate the example reference to crosswind demonstration. Provide a different, appropriate example if an example is required.	It is not the intent of the section to imply that basic tests, such as demonstrating basic crosswind capability, could be done by simulation. The crosswind example was intended to refer to validation of system safety analyses failure cases involving high crosswinds, development of crosswind guidance for slippery runway

Comment	Requested Change	Disposition
addition, the engine capability in crosswinds cannot be modeled accurately enough to determine the limits of its capability. Actual flight tests demonstrating crosswind capability should continue to be required.		operations, etc. The example has been re-written for clarity.
Commenter: AIR-130/Larrow		
Page 5 and 6, Section 1, 3.a.(1).(f).3.(aa).(ii). The statement in parenthesis is 'unless it is determined that the simulation is conservative, the closer the case is to being non-compliant, the higher the required quality of simulation'. The statement does not need the qualifier of 'unless it is determined that the simulation is conservative'. Even with a conservative simulation approach, the closer the case is to being non-compliant, the higher the quality we would want to see of the simulation.	Recommend removing 'unless it is determined that the simulation is conservative,'	The recommended change has been made.
Commenter: J. Regimbal		
Page 15. Paragraph 3.a.(9)(b)2.(aa) This paragraph says that both all engine and one engine inoperative takeoffs should be demonstrated. Is the intent to require demonstration of a three engine ferry flight on a four engine airplane, for example, or to demonstrate a takeoff in which the	Revise the wording to more clearly state what is intended by an "engine inoperative takeoff."	The text has been clarified.

Comment	Requested Change	Disposition
critical engine fails at the critical point? I suspect the latter is intended.		
Commenter: Roell, ACE-117W, x4146		
Page 15. Section 3.a.(9)(b)2(cc)—"TWAS" is incorrect acronym.	Change "TWAS" to "TAWS".	This typo has been corrected.
Commenter: J. Regimbal		
Page 17. Paragraph 7.b. This paragraph says the strength of supporting structures for removable ballast should be evaluated to make sure they don't fail under the test conditions. In addition to this, these structures should also be required to be shown to comply with the strength requirements of part 25 as part of the pre-TIA structural substantiation report required to comply with § 21.35(a)(1).	Add a sentence stating applicants should show ballast support and retention structures meet the strength requirements of part 25 as part of the structural compliance substantiation required prior to FAA flight testing by § 21.35(a)(1).	The requested change has been made.
Commenter: Borton, ACE-117W, x4166		
Page 23. Section 10, (b) 7—Vmu. As flight control systems become more advanced and software dependent, it is very important for the test team to understand any control law transitions based on sensed weight on wheels. There were some good lessons learned from Bombardier CRJ-1000 in the recent Vmu testing briefed at SETP Central Session in June 2011. This same comment may be	Add some words to ensure test team understands flight control law logic, especially as it relates to transitions based on weight on wheels.	The suggested addition has been made.

Comment	Requested Change	Disposition
relevant to other areas of subpart B flight testing but this was a specific example where it became an issue.		
Commenter: Borton, ACE-117W, x4166		
pp 88-96. Another general comment for this section is I would try to blend the information from pages 88-96 (thru Figure 20-3), as it would be more complete and easier to reference. Perhaps move the entire PIO discussion and related task examples to Appendix 5? After all, the purpose of all the guidance in these sections is to determine compliance thru use of complementary flight test techniques.		Like the appendix on the FAA Handling Qualities Rating Method (see the disposition for the next comment, we plan to undertake a broader review and harmonization of the material on pilot induced oscillations (PIO) with the European Aviation Safety Agency in the next revision to this AC.
Commenter: Borton, ACE-117W, x4166		
Page 89. Section 20 (d), and related material in Appendix 5—Pilot Induced Oscillations. Comments were provided in for the 2009 review and are included again with some revision. Comments put into Requested Change section. Recommend a dedicated review of FAA policy for handling qualities testing for certification compliance. This may involve a conference or meeting between the flight test branches at various ACO's as well as directorates. I think this is more relevant	Have any of the ACO's used the tracking tasks during certification programs? What maneuvers and techniques worked? We would be interested to see other ACO's experience (with Boeing, Airbus, Gulfstream or Dassault projects). During my time here, none of our applicants in Wichita have explicitly proposed using HQ tracking tasks in a certification program. We get general HQ evaluations by default doing various other tests (flying behind tanker for icing, mistrim/upset recoveries,	The referenced appendix is for the FAA Handling Qualities Rating Method, not for Pilot Induced Oscillations. Although there is a need for a broad review and re-write of this appendix, this will be done in conjunction with harmonization of this material with the European Aviation Safety Agency. This harmonization effort will be the major thrust of the next general revision of AC 25-7. The revisions to this material in AC 25-7C are only intended to include relatively minor changes to

Comment	Requested Change	Disposition
now more than ever as the flight control systems in many Part 25 (and possibly Part 23) aircraft will require evaluation methods outside the scope of the present rules and guidance material. This is well-stated in the introduction to Appendix 5.	crosswind certification, etc). By the time we get exposure to the airplane, if there are any remaining HQ discrepancies, the applicants are usually reluctant to change the aircraft design...we usually take the road of training the pilot to compensate for deficiencies. Cessna is developing a fly-by-wire or highly augmented flight control system for its Citations so Wichita ACO will see more need for dedicated HQ tasks to determine compliance for 25.143.	improve clarity and readability.
Commenter: Borton, ACE-117W, x4166		
p. 94, Figure 20-1, sample pitch tracking task: while interesting data, I think one of the most important areas to stress on the flight test techniques for determining PIO susceptibility is that the "data" is more qualitative in nature (i.e., pilot comments and ratings) than quantitative. The control inputs shown here really tell me nothing about the aircraft's handling characteristics and PIO susceptibility. I don't need ANY instrumentation to conduct these sorts of evaluations for PIO susceptibility (it's useful, but definitely not required). One of the biggest training areas we had to teach the students at USAF TPS was to not depend on an instrumentation trace to tell		Figure 20-1 shows a sample of targeted high gain inputs to be used in evaluating PIO susceptibility. There is no need for an special airplane instrumentation (over and above the normal attitude indictor) or data output to conduct this particular evaluation. It is simply an example of a high gain pitch tracking task that is likely to excite any PIO tendencies of the airplane in the pitch axis, and can therefore be useful for evaluating PIO susceptibility.

Comment	Requested Change	Disposition
if an airplane PIO'd...the pilots know it. That's because the PIO may be incipient in nature and the pilot may back off the gains, and thus not get to the point where the pilot is making the sort of "bang-bang" inputs displayed on this chart.		
Commenter: Borton, ACE-117W, x4166		
p. 95: Figure 20-2, PIO rating criteria (and background discussion). a fundamental question: Why does the FAA need its own HQ rating scale? I think it would be better if the FAA used criteria from the Cooper Harper or PIO Rating Scales as they are industry accepted standards. Then determine what is acceptable or not based on these ratings (and of course the pilot comments). Additionally, on p. 94, paragraph 6 (b) it says, "Figure 20-2 provides the FAA handling qualities (HQ) rating descriptions of airplane motions that may be seen during the conduct of specific PIO tasks or during tests throughout the entire certification flight test program." I would emphasize the point the ratings themselves are to be used exclusively for a specific task...they are not assigned as a general description of "an airplane." By completing enough handling qualities		The FAA HQRM was first developed as a tool to address certification of unique handling qualities aspects of the first fly-by-wire commercial jet transport, the A320. It is a simplified form of the Cooper Harper scale suitable for its intended use. Note, however, that as stated in paragraph 2c of appendix 5, the Cooper Harper rating scale can be used in conjunction with figure 2 in that appendix to come up with the equivalent HQRM rating. There is no intent expressed in the guidance to assign a handling qualities rating as a general description of an airplane.

Comment	Requested Change	Disposition
evaluations, one can come up with a suitability or certification finding. That point should be emphasized here.		
Commenter: Roell, ACE-117W, x4146		
Page 95, Figure 20-2, "ADQ" row, "PIO Characteristics Description" column—Removal of parentheses around "unpredictability or over control" changes original meaning.	Reinstate parentheses around "unpredictability or over control", similar to "(overshoots)" in the previous row.	Corrected.
Commenter: Borton, ACE-117W, x4166		
Page 111, Chapter 3, Section 23 (b) 3 – Vmcg. Good addition of information regarding fuel cuts and crosswinds. Also include runway surface condition items such as reverted rubber deposits, grooved/non-grooved (for any wet runway tests), and crown effects.	Add for consideration during Vmcg testing runway surface condition effects to include reverted rubber deposits, grooved/non grooved (for any wet runway tests), and crown effects.	Guidance has been added to address runway crown effects and runway grooving/porous friction course. It is unclear what guidance can be added for rubber deposits (not reverted rubber). It is anticipated that most V_{MCG} testing would not be conducted in areas of the runway covered by rubber deposits. It is also unclear what effect rubber deposits would have since the testing is normally conducted on a dry runway where the effect of rubber deposits on controllability should not be significant.
Commenter: Borton, ACE-117W, x4166		
Page 115, Section 26 a (2)—Static longitudinal stability demonstration. Consideration should also be given to accomplishing this via accel/decel method	Include option for accel-decel method as described in AC 23-8B, Section 72.	This option has been added.

Comment	Requested Change	Disposition
at near constant altitude. This method is especially beneficial during high thrust/weight conditions, as the stabilized method is difficult to accomplish within a small altitude band. Thrust effects must be understood to plot both stabilized and accel/decel data together. This method is also described in AC-23-8B, Section 72.		
Commenter: Borton, ACE-117W, x4166		
Page 126, Section 29 d (3)—procedures for stall speeds/characteristics testing. Additional words are somewhat awkward and would recommend simplify the statement.	Include words that "excessive" use of rudder should be avoided during entry to stall and recovery. Depending on the specific flight control design (such as automatic turn coordination), use of the rudder during these tests could be considered an unusual piloting technique.	The test has been clarified as suggested by the commenter.
Commenter: Karl Garman		
Page 142. Section 7. 30. e (2) (c) This states: *"(c)Test data. Crosswind data may be obtained from a flight test wind measurement station, from an airfield wind reporting device, or from any other method acceptable to the FAA."* What is meant by "any other method acceptable to the FAA?"	Is there an ascertainable standard through which "any other method" can be considered an acceptable one? This statement is very vague, and can open up a whole "can of worms." I detail the following as an example situation which may occur (since the measurement is apparently convenient), and to show the complexity of relying on such a potential "other method":	Guidance is provided in the sub-paragraphs following that paragraph relative to other methods that may be acceptable to the FAA. No changes needed.

Comment	Requested Change	Disposition
	For example, could the aircraft's own FMS functionality be utilized to compute the crosswind for a given crosswind landing? If so, does the FMS software need to be Black Label, or could it be done on an uncertified software load? What if the system is degraded (ex. GPSs out, but INS operating in free gyro mode)? What are the allowable levels of uncertainty? The phrase (as it is currently written) seems so open-ended that it could lead to misapplication outside of the intent of the AC.	
Commenter: James Sutherland, ANM-120S, x6533		
Page 189. Unclear why the removal of guidance for 25.905 – Propellers was done. With the current drive for better fuel efficiencies, propellers may be used in the future. Thus the guidance should not be removed unless the guidance was determined to be incorrect.	If the information is still valid in revision B, then it should be left in the document.	The information is still valid. However, this information provides compliance guidance for the engine isolation requirement of § 25.903, so it has been moved to paragraph 90 (which deals with § 25.903)
Page 210. Paragraph 130 covers cooling tests, but is placed in section 6 "Induction System" rather than section 5 "Cooling."	Move paragraph 130 to section 5.	This inadvertent error has been fixed.

AC 25-7C FLIGHT TEST GUIDE FOR CERTIFICATION OF TRANSPORT CATEGORY AIRPLANES

DISPOSITION OF INTERDIRECTORATE COMMENTS

MASTER TABLE

Comment	Requested Change	Disposition
Commenter: J. Regimbal		
Page 210. Paragraph 130.a.(3) discusses the need for a means to record the time and temperature of a component temperature excursion into a time-limited temperature band, and the need for a warning to the pilot if that band is exceeded. It is not clear whether this is intended to be a design requirement for the airplane or an instrumentation requirement for the test activity only.	Revise the wording of this paragraph to be clear as to whether additional temperature indications are required in the airplane design or just for the certification test activity.	The wording in this paragraph is already considered to be sufficiently clear in that it requires a means to warn the pilot when the temperature limit has been exceeded. It would make no sense if this means was only provided for certification test activities.
Commenter: J. Regimbal		
Page 211. 130.b.(3)(e) states that a simulated engine-out climb should be performed until temperatures stabilize or to the maximum operating altitude. The airplane typically will not be able to climb to the maximum operating altitude, but instead will reach a point where the climb rate is very low. Typically the applicant will set a minimum climb rate threshold (i.e., 200 ft/min) and will continue the engine-out cooling simulation at an MCT cruise condition when the climb rate falls below the threshold. Temperatures are then allowed to stabilize at MCT, representing an MCT engine-out diversion condition. After stabilization is reached,	Revise this paragraph, possibly dividing it into two paragraphs, to describe that both engine out conditions and all engine operating conditions are typically examined as part of the cooling climb conditions.	The paragraph has been revised to read as follows: "Perform simulated one-engine-inoperative and all-engines-operating climbs, operating the test engine at maximum continuous power or thrust until the engine temperatures stabilize or the airplane reaches maximum operating altitude (or until the airplane is essentially unable to climb further as indicated by a very low climb rate, e.g., 200 feet/minute)."

Comment	Requested Change	Disposition
an MCT climb profile representative of a maximum gross weight all engines operative condition will be flown until temperature stabilization or a minimum climb rate threshold is reached. The transition to cruise phase testing then occurs. Alternatively, the applicant can perform separate demonstrations of adequate cooling under engine out and all engine operative climb conditions.		
Commenter: J. Regimbal		
Page 212. 130.b.(8) restates the rule, "Section 25.1043(b) requires establishing a maximum ambient atmospheric temperature corresponding to sea level conditions of at least 38° C (100° F) (except for winterization installations - see paragraph 130b(12)." The rule wording is somewhat ambiguous, and this is an opportunity to clarify that the intent is that transport airplanes be shown to have acceptable powerplant cooling characteristics under sea level temperature conditions of at least 100°F. This is intended to be a minimum performance standard for transport airplanes.	Revise the first sentence to read something like "Section 25.1043(b) requires applicants to show that the airplane design maintains all powerplant systems, components, and structure below their established temperature limits under sea level atmospheric conditions of at least 38° C (100° F) (except for winterization installations - see paragraph 130b(12)."	The first sentence of paragraph 130b(8) has been replaced by, "Section 25.1043(b) establishes 100° F (38° C) at sea level as a lower limit for cooling tests, except for winterization installations. (See paragraph 130b(12) for guidance on certifying winterization equipment.) Applicants may establish a higher temperature limit if desired. In accordance with § 25.1041, applicants must show that cooling provisions can maintain the temperatures of powerplant components, engine fluids, and auxiliary power unit components and fluids within the established temperature limit."

AC 25-7C FLIGHT TEST GUIDE FOR CERTIFICATION OF TRANSPORT CATEGORY AIRPLANES

DISPOSITION OF INTERDIRECTORATE COMMENTS

MASTER TABLE

Comment	Requested Change	Disposition
Commenter: Cathy Swider, AIR-120		
Page 218, Para 131.c.(5) Not clear if you wanted repeated phrasing of "power or thrust" in: (5) Test Procedures. The tests should be conducted with the appropriate power or thrust or power or thrust setting.	Change to: (5) Test Procedures. The tests should be conducted with the appropriate power or thrust setting. **Or** clarify why you need to distinguish between "power or thrust" and the "power or thrust setting."	The requested change has been made.
Commenter: AIR-130/Larrow		
Page 224, Section 1, 170.a.(3) Document cites AC 25-10 for guidance of misc non-required electrical equipment. This AC has been cancelled by AC 20-168.	Refer to AC 20-168.	The requested change has been made.
Commenter: AIR-130/Larrow		
Page 228-229, 170.b.(4)-(6) The way these paragraphs are laid out could cause confusion.	ACARS is a application that could run over POA (VDLm0), but doesn't have to. It could run over VDLm2, SATCOM, or HFDL. FANS1/A or ATNb1, as applications, could also run over any of those radios. I recommend reorganizing these paragraphs to test data link communications over all of the radios installed (VDLm0, VDLm2, SATCOM, or HFDL) separately while performing routine voice comm to ensure no interference. Then, check the performance of whatever applications (ACARS, FANS, ATN) are installed over each data link. See AC 20-140A for more info on data	This comment is outside the scope of the proposed changes to the AC. This section will be noted as an area that will be updated in the next complete revision of the AC.

AC 25-7C FLIGHT TEST GUIDE FOR CERTIFICATION OF TRANSPORT CATEGORY AIRPLANES

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Comment	Requested Change	Disposition
	link approvals and AC 20-150 for flight test requirements for Satcom.	
Commenter: AIR-130/Larrow		
Page 236, c. (6).(b) The standard DME service volume for altitudes from 14,500 to 18,000ft has a radius of 100 NM (reference DME MOPS and Order 6050.32C). This paragraph needs to reflect this 100 NM distance.	Update the 80 NM number to 100 NM for DME testing at 18,000ft.	The requested change has been made.
Commenter: AIR-130/Larrow		
Page 236, c. (6).(c) Same comment as before on service volume.	Update the 80 NM number to 100 NM for DME testing at 18,000ft.	The requested change has been made.
Commenter: AIR-130/Larrow		
Page 240, c.(9).(a). AC 25-4 was cancelled by AC 20-138B.	Cite AC 20-138B.	The requested change has been made.
Commenter: AIR-130/Larrow		
Page 244, c.(10). AC 20-129 was cancelled by AC 20-138B.	Cite AC 20-138B.	The requested change has been made.
Commenter: AIR-130/Larrow		
Page 244, c.(12). Recommend updating this paragraph to account for ICAO PBN terminology.	Leave the first sentence under Area Navigation. Then insert a new paragraph for Performance Based Navigation. Sub paragraphs under this would include RNAV 1 and 2 – airworthiness criteria in AC 20-138B and operational criteria in AC 90-100A, RNP 2, 1 and Approach –	This comment is outside the scope of the proposed changes to the AC. This section will be noted as an area that will be updated in the next complete revision of the AC.

Comment	Requested Change	Disposition
	airworthiness criteria in AC 20-138B and operational criteria in AC 90-105, RNP AR – Airworthiness criteria in AC 20-138B and operational criteria in AC 90-101A, RNP 10 – Airworthiness and ops criteria in Order 8400.12B, and RNP 4 – Airworthiness and ops criteria in Order 8400.33.	
Commenter: AIR-130/Larrow		
Page 244, c.(13). AC 20-130A was cancelled by AC 20-138B.	Cite AC 20-138B.	The requested change has been made.
Commenter: AIR-130/Larrow		
Page 244, c.(16). AC 20-138A was cancelled by AC 20-138B.	Cite AC 20-138B.	The requested change has been made.
Commenter: Robert Chupka, ACE-119		
Page 246	Replace 2 incidences of DO-160F with DO-160 (latest revision). These were the only times DO-160 was found in the document. DO-160 is currently at revision G.	The requested change has been made.
Commenter: AIR-130/Larrow		
Page 259, 174.b.(5) These requirements are now handled under 25.1310	Put in new paragraph to capture new regulation number	The text has been changed in line with the comment.

AC 25-7C FLIGHT TEST GUIDE FOR CERTIFICATION OF TRANSPORT CATEGORY AIRPLANES

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Commenter: AIR-130/Larrow		
Page 263 181.a.(1) Because we have had numerous requests for HUD operational approval on PBN applications (specifically RNP AR) recommend including a note under this paragraph.	After this paragraph, recommend including a note stating that it is recommended that an applicant considering type certification of a HUD systems characterize the FTE during certification testing. This data will be required if the applicant chooses to seek operational credit for advanced PBN applications.	The requested change has been made.
Commenter: Roell, ACE-117W, x4146		
Page 271, Section 181.b.(3)(s)—"type insertion report" is incorrect.	Change "type insertion report" to "type inspection report."	Typo corrected.
Commenter: Roell, ACE-117W, x4146		
Page 278, Section 181.b.(8)(b)1(aa)—"In the high lift devices retracted configuration" is awkward.	Change "In the high lift devices retracted configuration" to "With all high-lift devices retracted."	The suggested wording improvement has been made.
Commenter: Robert Chupka, ACE-119		
Page 291, Paragraph 192(b),	Replace "landing gear lights" with "landing lights."	The requested change has been made.
Commenter: John Strasburger AIR-120		
Page 293. Para 208. b.(1) – Interference due to interactions between different communications and navigation equipment should not result in any deviation to the flight path when in a coupled navigation mode. I have observed adverse effects from a communication transmitter's	Change second sentence to the following: "Momentary deflection or flicker could be permitted if it does not result in any deviation to the aircraft flight path when flying a coupled navigation mode."	The requested change has been made.

Comment	Requested Change	Disposition
harmonics interfering with a ILS receiver resulting in deviation to the coupled flight path.		
Commenter: John Strasburger AIR-120		
Page 293. Para 208 b. (2) – Not sure how an electrical power supply transient can be simulated to verify that essential loads remain operative. Depending on how the transient is induced it could be of a relatively small magnitude with no effect or a large magnitude with an adverse effect.	Recommend providing additional guidance on how to induce transients of sufficient magnitude to verify compliance.	Additional guidance added.
Commenter: Roell, ACE-117W, x4146		
Page 294, Section 216.a.(1), 3rd line—too many commas.	Delete 2nd comma after "hand".	The extra comma has been removed.
Commenter: AIR-130/Volchansky		
Page 303, section 231 b(1) states, "Airworthiness Approval. The standard approach angle assumed as part of the type certification of transport category airplanes is 3 degrees, which coincides with the nominal ILS approach angle. Those evaluations are considered adequate to address approach angles of less than 4.5 degrees." Is it assumed normal evaluations are adequate for approaches up to 4.5°? For example, if the steepest approach angle	Clarify that AFM approval for approach angle will be to the value demonstrated.	As stated in the quoted paragraph, the approach angle used during typical type certification landing test of approximately 3 degrees are considered adequate to address approach angles up to 4.5 degrees. If the steepest approach angle demonstrated was 3.3 degrees, operations could be conducted at approach angles up to 4.5 degrees.

Comment	Requested Change	Disposition
demonstrated was 3.3°, would this criteria allow for approval up to 4.5°?		
Commenter: AIR-130/Volchansky		
Page 304, section 231 c(2)(a) states, "In lieu of the wind limits specified in paragraph 3a(3)(b)2 of this AC, the wind for steep approach landing performance tests should not exceed 5 knots along the runway, measured at a height of 6 feet above the runway." Is there any direction associated with the 5 knot wind (e.g., HW, TW component)?	Clarify headwind or tailwind component of wind.	The quoted sentence already states that the wind direction is "along the runway," meaning it is a headwind or tailwind component.
Commenter: AIR-130/Volchansky		
Page 306, section 231.f. Airplane Flight Manual. Where is the approach category stated for the aircraft? (I did not see this listed in the latest AC 25.1581, either.) Background: Past discussion has involved operators wanting to use lower approach categories if they flew within correspondingly lower approach speed. I am used to seeing the approach category included in the AFM.	Include a reference source for the approach category of the aircraft (based on approach speed).	The referenced paragraph only addresses the additional information that needs to be provided in the Airplane Flight Manual if the airplane is approved for steep approaches. Guidance for including the airplane's approach category has been added to AC 25.1581-1 (Airplane Flight Manual) in response to a similar comment from this commenter on the proposed revisions to that AC that were made as part of this project to update AC 25-7.
Commenter: J. Regimbal		
Page 312. Paragraph 235.a. states that a design change to incorporate external spare	Change "minor" to "major" in the first sentence of 235.a.	Identifying spare engine carriage as a minor change was an inadvertent mistake.

Comment	Requested Change	Disposition
engine carriage capability is a minor change. It is clearly a major change, as evidenced by the types of evaluations subsequently called for by this section. The author has verbally indicated this was an inadvertent error in the previous revision.		The text has been changed to indicate it would be considered a major change.
Commenter: Roell, ACE-117W, x4146		
Page A1-1—Definition for ADI may be inconsistent throughout FAA documents. For example, the Instrument Flying Handbook, FAA-H-8083-15A, uses "attitude director indicator" and "attitude direction indicator" interchangeably.	Ensure correct definition is used.	An attitude direction indicator and an attitude director indicator refer to two different instruments. The guidance in AC 25-7C should apply to any attitude indicator. Therefore, the reference to the attitude director indicator (ADI) has been replaced by a reference to the attitude indicator. The acronym ADI has been removed since it is no longer used within the AC.
Commenter: Roell, ACE-117W, x4146		
Pages A1-2 & A1-4—The following are symbols and should not be interspersed within the Acronyms and Abbreviations list: Δ, δ, and μ_{max}	Place these symbols at the beginning or end of the Acronyms and Abbreviations list.	Appendix reorganized for symbols and acronyms/abbreviations.
Commenter: Roell, ACE-117W, x4146		
Page A1-3—"HIS horizontal situation indicator" is not correct.	Delete. The acronym "HSI horizontal situation indicator" is presented later.	The incorrect acronym reference has been removed.

AC 25-7C FLIGHT TEST GUIDE FOR CERTIFICATION OF TRANSPORT CATEGORY AIRPLANES

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Comment	Requested Change	Disposition
Commenter: Roell, ACE-117W, x4146		
Page A1-3—"HSI" is not in alphabetical order.	Place "HSI" after "HQRM".	The ordering has been fixed.
Commenter: Roell, ACE-117W, x4146		
Page A1-4—Multiple "M" acronyms not in alphabetical order.	Re-sort "M" acronyms.	The ordering has been fixed.
Commenter: Roell, ACE-117W, x4146		
Page A1-4—"MW" and "MWS" are repeated.	Delete 2nd occurrence.	The acronym MW has been removed throughout the document.
Commenter: Roell, ACE-117W, x4146		
Page A1-4—"min." and "Min." are listed separately.	List together, similar to "rpm" and "RPM".	The "Min." abbreviation is not used in the document and has therefore been removed from this appendix of abbreviations.
Commenter: Roell, ACE-117W, x4146		
Page A1-5—For "RNP", "navigation" is spelled incorrectly.	Correct spelling.	The spelling has been fixed.
Commenter: AIR-130/Larrow		
Page A1-5 Remove SAAAR acronym. We no longer use it. In AC 90-101A we renamed it AR to harmonize with ICAO. AC No: 90-101A Approval Guidance for RNP Procedures with AR Required Navigation Performance (RNP) Authorization Required (AR),	Change to AC No. 90-101A	The requested change has been made.

AC 25-7C FLIGHT TEST GUIDE FOR CERTIFICATION OF TRANSPORT CATEGORY AIRPLANES

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Commenter: Roell, ACE-117W, x4146		
Page A1-5—For "SAT", "...handling qualities rating system" was not previously used.	Change to "...handling qualities rating method."	The requested change was made.
Commenter: Roell, ACE-117W, x4146		
Page A1-5—"S/F" is not in alphabetical order.	Place "S/F" after "SELCAL."	The ordering was fixed.
Page A1-5—"T/W" is not in alphabetical order.	Place "T/W" after "TSO."	The ordering was fixed.
Commenter: Roell, ACE-117W, x4146		
Page A1-6—"TOW" is "takeoff warning."	Delete "system."	The requested change was made.
Commenter: Roell, ACE-117W, x4146		
Page A1-6—For "V_1", "accelerate stop" is not hyphenated.	Hyphenate.	The requested change was made.
Commenter: ANM-160L		
A3-Page 1. What happened to Appendix 5 of AC 25-7B, "Historical Development Of Accelerate-Stop Time Delays?" It appeared to have been deleted.	Rationale for deletion would be appreciated.	Appendix 5 of AC 25-7B has been moved to Appendix 3 in AC 25-7C.
Commenter: Borton, ACE-117W, x4166		
--Appendix 5, general comment regarding Figures 1, 4, and 5 thru 9: why does the FAA use probability aspects of atmospheric and failure state occurrences? It implies a quantitative input into a HQ evaluation that at its heart is a qualitative assessment. I concur that these affects		The probability aspects of atmospheric characteristics and failure states are part of the overall HQRM, and are used to determine acceptable handling qualities ratings for failure conditions of fly-by-wire airplanes.

Comment	Requested Change	Disposition
must be considered but the guidance implies some "formula" to determine compliance. If so, this must be justified and explained much better or deleted. I'm not sure many of us know how to use the guidance as it's presented in these figures.		It is recognized that there is not universal acceptance and use of the HQRM throughout the FAA, nor by EASA. Harmonization of handling qualities assessments will be one of the major topics that we plan to address in the next revision of this AC.
Commenter: Roell, ACE-117W, x4146		
Appendix 5—Figures are separate from text.	Suggest placing figures directly following their corresponding text. For example, place Figure 1 between sections 2.a. and 2.b.	Text placed with figures.
Commenter: Roell, ACE-117W, x4146		
Appendix 5, page A5-3, Figure 2—When correctly used, CHRs between 3 & 4, 6 & 7, and 9 & 10 are not possible.	Change "CHR*" column values to "1-3", "4-6", and "7-8".	The proposed change was made.
Commenter: Borton, ACE-117W, x4166		
--Figure 2 on p. A5-3 discusses "half ratings" for CHR. This is a big no-no in the areas between Satisfactory HQ (CHR 1-3), Adequate HQ (CHR 4-6), and Marginal/Unsat HQ (CHR 7-10). In general half ratings should not be given at all but especially NOT between major levels of handling qualities. The chart itself, while attempting to provide a cross-reference to other ratings, begs the question (again) of why unique HQ	See above, -Include Unsat, CHR 9-10 with definition?	References to "half ratings" for the Cooper-Harper scale have been removed. There is no need to include "UNSAT" as a rating since it would never be an acceptable rating. Only the ratings that indicate certifiable handling qualities need to be defined.

Comment	Requested Change	Disposition
ratings/descriptors for FAA certification? For completeness, Figure 2 should also include areas which would be clearly "unsat" (ie, CHR 9 and 10).		
Commenter: Borton, ACE-117W, x4166		
--Figure 3 p. A5-4 to A5-5: --It should be stressed that any task for HQ assessment should have relevant performance criteria, and should take into account any pilot learning curve associated with the aircraft. This is especially important for FAA pilots who often come into these evaluations without a lot of prior time in the aircraft. --Be careful on which "operational" tasks are included as examples "open loop" maneuvering (sub area "B"). I would consider many of these tasks labeled as "open loop" to have elements of closed loop control (takeoff/landing with crosswind, windshear escape, etc).		Although there is a need for a broad review and re-write of this appendix, this will be done in conjunction with harmonization of this material with the European Aviation Safety Agency. This harmonization effort will be the major thrust of the next general revision of AC 25-7. The revisions to this material in AC 25-7C are only intended to include relatively minor changes to improve clarity and readability.
Commenter: Borton, ACE-117W, x4166		
--Figures 5 thru 8, p. A5-7 thru A5-10: Would say again that the use of these Figures is not common knowledge in the FAA and should be explained more fully or deleted. Figures 5 and 6 ("web of		Although there is a need for a broad review and re-write of this appendix, this will be done in conjunction with harmonization of this material with the European Aviation Safety Agency. This harmonization effort

Comment	Requested Change	Disposition
death") and Figures 7/8 get into too many of the variables in my opinion. The key for compliance that should be emphasized is to compare the "open loop" response of the airplane (many of the subpart B flying qualities stability requirements) to the "closed loop" response of the airplane. If the closed loop response throughout the normal envelope (with some room for excursions) is acceptable (via representative HQ tasks) then the airplane is potentially certifiable. It may require an exemption or ELOS to document that it's certifiable, but there is solid ground to stand on. At least that is my opinion.		will be the major thrust of the next general revision of AC 25-7. The revisions to this material in AC 25-7C are only intended to include relatively minor changes to improve clarity and readability.
Commenter: Steve O'Neal		
A5-p10.	Appendix 5, page 10, with regard to HQRM: The chart on this page is missing a line. Above the dotted line, there is supposed to be another line that extends from the origin, and passes through the intersection of the $X_c - 10^{-3}$ intersection that is currently depicted as just sitting in space. The same error exists in AC 25-7B. Refer to page 12 in appendix 7 of AC 25-7A (3/31/98) for the correct version of the	The chart has been corrected both in 25-7C and 25-7B Change 1.

Comment	Requested Change	Disposition
	chart. AC 25-7B should also be corrected.	
Commenter: Borton, ACE-117W, x4166		
--Figure 9, p. A5-11, if this Figure is retained (as it's not explained well in the guidance text), assume the blank fields represent areas that are normally not evaluated? If so, should state "Not Applicable" or similar.		The blank areas represent areas that would not need to be considered for probability reasons if you work through the method. Cross hatching has been added to indicate they will not be used.