diplomatic or consular purposes, or for the official business of an international organization, is committed to the sole discretion of the Department of State. Such determinations are communicated by letter from OFM to the relevant state, county, municipal or territorial revenue authorities.

- All such letters will be signed by the Director of OFM's Office of Diplomatic Property, Tax, Services and Benefits (OFM/PTSB), or a successor office.
- Such letters serve as official notice to the relevant state, county, municipality, or territory that the described property or transaction is or is not entitled to an exemption from real estate taxes on the basis of the property's authorized use for diplomatic or consular purposes or for the official business of an international organization.
- States, counties, municipalities, and territories are prohibited from extending to a foreign mission or international organization an exemption from real estate taxes associated with a property on the basis of the property's authorized use for diplomatic or consular purposes or for the official business of the international organization, except on the basis of written authorization from OFM.
- Conversely, on the basis of a letter as described above, states, counties, municipalities, and territories are required to extend to a foreign mission or international organization an exemption from real estate taxes to which OFM determines a foreign mission or international organization is entitled. If a state, county, municipality or territory has concerns regarding the extension of such exemption benefits, it should raise the matter directly with OFM.
- Unless otherwise determined by OFM, the effective date of OFM's authorization of an exemption from real estate taxes is the date the property deed in question is signed or transferred.
- States, counties, municipalities, and territories may establish additional procedures to ensure the proper extension of such exemption benefits, provided that:

○ such procedures, including the establishment and use of any forms, serve only to facilitate the state, county, municipality, or territory's extension of exemption benefits to a foreign mission or international organization and not as a means to determine the foreign mission's or international organization's entitlement to the exemption benefit associated with a property on the basis of the property's authorized use for diplomatic or consular purposes or for the official business of the international organization, which determination is committed to the sole discretion of the Department of State; and

○ the state, county, municipality, or territory obtain written approval from the Director of OFM/PTSB confirming that the proposed procedural requirements do not violate or infringe on any benefits, privileges, or immunities enjoyed by foreign missions or international organizations.

Finally, I further determine that any state or local laws to the contrary are hereby preempted.

The exemption from real estate taxes provided by this designation and determination shall apply to taxes that have been or will be assessed against any foreign mission or international organization with respect to property subject to this determination and shall nullify any existing tax liens with respect to any covered property. This determination shall not require the refund of any taxes previously paid by any foreign mission or international organization regarding such property. These actions are not exclusive and are independent of alternative legal grounds that support the tax exemption afforded herein.

The actions taken in this Designation and Determination are necessary to facilitate relations between the United States and foreign states, protect the interests of the United States, adjust for costs and procedures of obtaining benefits for missions of the United States abroad, and carry out the policy set forth in 22 U.S.C. 4301(b).

This action supersedes the Designation and Determination under the Foreign Missions Act made by the Deputy Secretary of State for Management and Resources on June 23, 2009.

Dated: January 8, 2014.

Patrick F. Kennedy,

Under Secretary for Management.

[FR Doc. 2014–00735 Filed 1–15–14; 8:45 am]

BILLING CODE 4710–35–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Aviation Rulemaking Advisory Committee Meeting on Transport Airplane and Engine Issues

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of public meeting.

SUMMARY: This notice announces a public meeting via teleconference of the FAA's Aviation Rulemaking Advisory Committee (ARAC) Transport Airplane and Engine (TAE) Subcommittee to discuss TAE issues.

DATES: The teleconference is scheduled for Monday, February 10, 2014, starting at 8:00 a.m. PST/11:00 a.m. EST. The public must make arrangements by February 5, 2014, to present oral statements at the meeting.

ADDRESSES: N/A.

FOR FURTHER INFORMATION CONTACT: Ralen Gao, Office of Rulemaking, ARM–209, FAA, 800 Independence Avenue SW., Washington, DC 20591, Telephone (202) 267–3168, FAX (202) 267–5075, or email at *ralen.gao@faa.gov.*

SUPPLEMENTARY INFORMATION: Pursuant to Section 10(a)(2) of the Federal Advisory Committee Act (Pub. L. 92–463; 5 U.S.C. app. 2), notice is given of an ARAC Subcommittee meeting via teleconference to be held February 10, 2014.

The agenda for the meeting is as follows:

- Flight Controls Working Group Report

Participation is open to the public, but will be limited to the availability of teleconference lines.

To participate, please contact the person listed in **FOR FURTHER INFORMATION CONTACT** by email or phone for the teleconference call-in number and passcode. Please provide the following information: Full legal name, country of citizenship, and name of your industry association, or applicable affiliation. If you are participating as a public citizen, please indicate so. Anyone calling from outside the Arlington, VA, metropolitan area will be responsible for paying long-distance charges.

The public must make arrangements by February 5, 2014, to present oral or written statements at the meeting. Written statements may be presented to the Subcommittee by providing a copy to the person listed in the **FOR FURTHER INFORMATION CONTACT** section. Copies of the documents to be presented to the Subcommittee may be made available by contacting the person listed in the **FOR FURTHER INFORMATION CONTACT** section.

If you need assistance or require a reasonable accommodation for the meeting or meeting documents, please contact the person listed in the **FOR FURTHER INFORMATION CONTACT** section.

Issued in Washington, DC on January 10, 2014.

Lirio Liu,

Designated Federal Officer.

[FR Doc. 2014–00700 Filed 1–15–14; 8:45 am]

BILLING CODE 4910–13–P

Aviation Rulemaking Advisory Committee (ARAC)
Transport Airplane and Engine (TAE) Subcommittee

Meeting Minutes

Date: February 10, 2014
Time: 11:00 a.m. (EST)
Location: N/A

Call to Order /Administrative Reporting

Mr. Mike Kaszycki opened the meeting at 11:04 a.m.

Item	Wednesday October 17, 2012 Meeting Action Items	Status
1	Mr. Bolt to send May 2013 minutes to TAE.	
2	Mr. Kaszycki to research further into magnesium content in iPads and other tablets.	

Following the reading of the Opening Statement, Mr. Craig Bolt shared the agenda (Handout 1), which is to discuss the FTHWG Report in readiness for submission to ARAC.

FTHWG (See Handout 2)

Mr. Bob Park and Ms. Christine Thibaudat presented this report. The report resulted in a list of tasks /topics for further exploration, which the working group plans to complete in three years.

Mr. Kaszycki stated that, over the course of three years, certain tasks/topics may need to be reprioritized as new information becomes available. The FAA may request accelerated scheduling for these items. Mr. Park stated that the schedule can accommodate accelerations due to changed prioritization.

Mr. Kaszycki also stated, how and when would the results of tasks/topics be released? As each are completed, or as a whole document at the end? Mr. Park stated that the result of each task /topic would be released as soon as it is completed.

Mr. James Wilburn stated that, some meetings are scheduled for 5 days a week, so is the plan to travel on weekends and meet during the week and would that lead to any hardships and difficulty in attendance? Mr. Park stated that the working group has done this before, so it is not too much hardship.

Mr. Bolt called for vote to submit this report to ARAC at March 2014 meeting. None opposed. This report is approved to submit to ARAC.

The meeting was adjourned at 11:35 a.m.

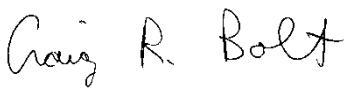
Action Item Review/ Any Other Business

Item	February 10, 2014 Meeting Action Items	Status
1.	N/A	

Future Transport Airplane and Engine Subcommittee Meetings:
The next subcommittee meeting will be held on November 13, 2014 at the Boeing Building in Arlington, VA.

Public Notification
The *Federal Register* published a notice of this meeting on January 16, 2014.

Approval
I certify the minutes are accurate.



Craig R. Bolt
Assistant Chair, ARAC

MEETING ATTENDEES

NAME	ORGANIZATION
Mike Kaszycki	FAA AIR
James Wilborn	FAA AIR
Joe Jacobsen	FAA AIR
Mary Schooley	FAA AIR
Ralen Gao	FAA ARM
Chuck Lanning	Transport Canada
Christine Thibaudat	Airbus
Ray Hollanda	NADA
Don Dillman	Airlines for America
Sarah Knife	GE
John Stift	Air Line Pilots Association
Bob Park	Boeing
Jill DeMarco	Boeing
Craig Bolt	Pratt & Whitney
Rolf Greiner	Airbus

FAA Aviation Rulemaking Advisory Committee

Flight Test Harmonization Working Group

Transport Airplane Performance and Handling Characteristics – New Task Recommendation Report

January 30, 2014

Revision A

Table of Contents

List of Abbreviations

AC	Advisory Circular
AFM	Airplane Flight Manual
ALPA	Airline Pilots Association
ANAC	Agência Nacional de Aviação Civil
AOA	Angle of Attack
APC	Airplane-Pilot Coupling
ARAC	Aviation Rulemaking Advisory Committee
CFR	Code of Federal Regulations
CRI	Certification Review Item
CS	Certification Specification
EASA	European Aviation Safety Agency
EFCS	Electronic Flight Control System
ELOS	Equivalent Level of Safety
EU OPS	European Union Operations
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FBW	Fly-by-Wire
FCHWG	Flight Controls Harmonization Working Group
FCTLS	Flight Controls
FTHWG	Flight Test Harmonization Working Group
FTG	Flight Test Guide
FWP	Flight Working Paper
HQ	Handling Qualities
HQRM	Handling Qualities Rating Method
HUD	Heads-Up Display
ICAO	International Civil Aviation Organization
IP	Issue Paper
JAA	Joint Airworthiness Authorities
NPA	Notice of Proposed Amendment
NPRM	Notice of Proposed Rulemaking
NTSB	National Transportation Safety Board
N_Z	Normal Load Factor
OEM	Original Equipment Manufacturer
PIL	Pilot in the Loop
PIO	Pilot Induced Oscillation
PFC	Porous Friction Course
SAIB	Safety Alert Information Bulletin
SAL	Steep Approach Landing
SC	Special Condition
SME	Subject Matter Expert
STPCM	Strategies for Protection against Thrust Control Malfunctions
TALPA ARC	Takeoff and Landing Performance Assessment Aviation Rulemaking Committee
TCCA	Transport Canada Civil Aviation
Vmin1g	Minimum steady flight speed for a given aeroplane configuration corrected to 1g with the high Angle of Attack Protection system operating
VSR	Reference Stall Speed
VSW	Stall Warning Speed

Executive Summary

The Flight Test Harmonization Working Group (FTHWG) was tasked via Federal Register Volume 78, No. 46 as published 8 March 2013 to consider several areas within the airplane performance and handling qualities requirements of the 14 CFR part 25 airworthiness standards and guidance for possible revision. The task includes prioritizing the list of topic areas, and developing work plans and schedules for those topics identified as high priorities for airworthiness standards development relative to new airplane designs. It is expected that these recommendations may result in subsequent ARAC taskings for standards recommendations in follow-on phases.

This report provides the results of the above task. The FTHWG has prioritized the list of topic areas provided by ARAC, including consideration of some additional areas as permitted by the tasking language. The rationale for the recommended priorities is discussed, and the topic areas considered high priority for airworthiness standards development relative to new airplane designs are identified. The report includes recommended work plans for the high priority focus areas and indicates items for which coordination with other working groups or experts outside the FTHWG may be necessary. Finally, the report includes a proposed schedule for accomplishment of the plan, including whether multiple topics can be worked simultaneously.

There were no dissenting opinions by any of the FTHWG members with regard to the recommendations.

Background Information

The FTHWG membership was reconstituted in early May 2013 in order to work a new Transport Airplane performance and handling qualities task published in the Federal Register on 8 March 2013. The membership included regulatory authority representatives from ANAC, EASA, FAA, and TCCA. The OEM members included representatives from Airbus, Boeing, Bombardier, Cessna, Dassault, Embraer, and Gulfstream. In addition there was representation from ALPA and American Airlines. The current US and European co-chairs from Airbus and Boeing were asked to continue in those roles for this task.

The FTHWG held a kickoff meeting (FTHWG-29) on 22-24 May, 2013 at the Boeing Longacres facilities in the Seattle area. During the initial meeting the members reviewed the topics listed in the tasking statement (see below), added some additional topics, established a prioritization methodology which was then used to order the thirty total topics, and identified the high priority focus areas. The working group also identified task teams to develop draft work plans and flow times for each of the high priority topics, and established action items to be completed prior to the second meeting. A final activity at this meeting was to develop an overall FTHWG work plan for this task which was subsequently provided to the Transport Airplane and Engine Subcommittee of ARAC for approval.

A second meeting of the FTHWG on this task (FTHWG-30) was held on 10-12 September 2013 at the Embraer facilities in Melbourne, Florida. The draft work plans were discussed in detail and updated. The FAA identified four of the high priority topics that they had decided between

meetings would not require any recommendations from ARAC prior to development of corresponding NPRMs. These topics were deferred pending further FAA action and two topics from the Medium priority list were combined and elevated to the final high priority list. At this meeting the members also worked to develop a recommended schedule. This was based on the use of several subgroups to work on the final set of twelve high priority topics.

A third scheduled meeting of the FTHWG on this topic was determined to not be necessary and action items from the second meeting were coordinated by email and through use of an FAA SharePoint.

Topic Areas Specified in Tasking Statement

Per the tasking statement the following subject areas were to be considered:

1. *Fly-by-wire (FBW) Flight Controls.*
Regulatory requirements and associated guidance material for airworthiness certification of airplane designs using FBW technology to obviate longstanding, repetitively used FBW special conditions. Specific areas include:

a. Applicability/adaptation of Amendment 25–121 airplane performance and handling characteristics in icing conditions requirements

b. Design maneuver requirements,*

c. Design dive speed,*

d. Side stick controls,*

e. Flight envelope protection, and *

f. Interaction of airplane systems and structures. *

* **Note:** These items should be considered for coordination with other working groups.

2. *Takeoff and Landing Performance.*
Regulatory requirements and associated guidance material for airworthiness certification in the following areas listed below. (Note: This topic area excludes items addressed by the Takeoff and Landing Performance Assessment Aviation Rulemaking Committee.)

a. Flight test methods used to determine maximum tailwind and crosswind capability. Additionally, for crosswind testing, better define intended operational use of demonstrated maximum steady and gusting crosswind performance.

b. Wet runway stopping performance. Recent runway excursions involving wet runways have raised questions regarding current wet runway stopping performance requirements and methods. Analyses indicate that the braking coefficient of friction in each case was significantly lower than expected for a wet runway (i.e., lower than the level specified in FAA regulations). Consideration should also be given to the scheduling of landing performance on wet porous friction course and grooved runway surfaces. Recommendations may include the need for additional data gathering, analysis, and possible rulemaking

c. Go-around performance, specifically height lost in executing a go-around. While airplanes may be able to demonstrate the climb gradient capability prescribed in 14 CFR/European

Aviation Safety Agency (EASA) Certification Specification (CS) 25.121, it may not be able to achieve it quickly enough, particularly when executing a go-around close to the ground.

d. Performance guidance regarding landing in abnormal configurations.

e. Guidance regarding the function and use of the amber band on airspeed tapes. Manufacturers' philosophies differ regarding the meaning of the amber band in an airspeed tape display, as do U.S. and European regulatory authorities' policies regarding acceptance of target airspeeds within the amber band.

f. Guidance on piloting procedures used to evaluate airplane tail clearance during certification flight tests for takeoff performance.

g. Landing distance performance for autoland and landing distance performance using heads-up-displays (HUD). Use of autoland or HUD may invalidate landing distance performance determined for compliance to 14 CFR/ CS 25.125.

h. Steep approach landing performance. Current airplane certification standards are not harmonized among the U.S., Canadian, Brazilian, and European airworthiness authorities.

i. Narrow runway operations. Current airplane certification standards do not identify minimum runway widths for which the standards apply.

j. Reduced and derated takeoff thrust procedures. Updates to existing guidance material may be appropriate to limit the number of derates permitted for a specific airframe/engine combination.

k. Guidance material for pressure error measurement during takeoff until out of ground effect to ensure proper data reduction for calculation of takeoff distance performance.

l. Guidance material addressing the adverse effects on stall speed in ground effect.

3. *Handling Characteristics.*

Regulatory requirements and associated guidance material for airworthiness certification in the following areas:

a. Guidance material for assessing handling qualities. Advisory Circular 25–7C, ''Flight Test Guide for Certification of Transport Category Airplanes,'' provides an FAA Handling Quality Rating Method (HQRM) that is intended to provide a systematic way of determining appropriate minimum handling qualities requirements and evaluating those handling qualities for failure conditions affecting an airplane's flying qualities. The FAA handling quality rating system is not universally accepted within industry, nor is it accepted by EASA.

b. Guidance for assessing susceptibility to pilot-induced oscillations/airplane-pilot coupling (PIO/APC). Guidance provided in AC 25–7C for evaluating PIO/APC is also not well accepted by airplane manufacturers, is not harmonized with EASA, and has been superseded to some extent in recent certification programs. Modified guidance is needed to both simplify and standardize the methods for evaluating an airplane's susceptibility to PIO/APC.

Topic Areas Added by FTHWG

Per the tasking statement it was permitted for the FTHWG to identify additional topic areas for consideration. The following additional topic areas were brought up by various FTHWG members (including regulatory authorities) who provided justification for their inclusion in the follow-on prioritization activity.

1. FBW – Lateral/directional/longitudinal stability
2. FBW – Control Surface Awareness and Mode Annunciation
3. Failure Case Assessment Methodology
4. Return to Land
5. Out of Trim Regulations for FBW aircraft
6. Sideslip Cues (Beta target) During OEI Takeoff
7. Anti-Icing and De-Icing Requirements
8. Auto-Slats Handling Requirements
9. Runway Excursion Hazard Classification
10. Yaw control below Vmcg speed on slippery runway (Swedish safety recommendation)

Prioritization

Following detailed discussions of the topic areas by the FTHWG members at the May 2013 meeting the next step was to prioritize the list of topic areas provided in the notice plus the additional topic areas noted above. According to the tasking notice the FTHWG was to establish the prioritization criteria, including consideration of harmonization of regulatory requirements and associated guidance material for airworthiness certification of airplane designs.

Prioritization Approach

The FTHWG developed a prioritization approach which included the awarding of points to reflect the level of importance of each topic item. This process included consideration of key parameters that included the need for harmonization, the anticipated ease or difficulty of harmonization, safety reasons for harmonization, and the benefits of harmonization. Each organization awarded each topic from zero to five points reflecting their assessment of the topic's importance based on the key parameters. Points were added up for each topic and the result was used to determine the priority order of the thirty topics from highest to lowest.

Following a detailed discussion including a "sanity review" this listing was further subdivided into High, Medium, and Low Priorities. In general the FTHWG members were quite satisfied with the results of the prioritization activity and there were no dissenting positions expressed relative to the end result.

Overall Topic Prioritization Order

The results of the prioritization exercise resulted in the topics being ordered from highest to lowest priority. The FTHWG then identified appropriate break points for High priority (Topics 1-15), Medium priority (Topics 16-25), and Low priority topics (Topics 26-30). In the listing below these ranges are color-coded, respectively, as green, red, and blue. Potentially interlinked fly-by-wire topics are indicated with an asterisk.

1. **Flight envelope protection***
2. **Adaptation for flight in icing (Amendment 25-121 requirements)***
3. **Design maneuver requirements***
4. **Design Dive Speed***
5. **Interaction of systems and structures***
6. **Lateral/directional/longitudinal stability***
7. **Side stick controls***
8. **Control surface awareness and mode annunciation***
9. **Wet runway stopping performance (non-TALPA)**
10. **Runway excursion hazard classification**
11. **Stall speed in ground effect**
12. **Steep approach**
13. **Out of Trim Characteristics***
14. **Tailwind/crosswind**
15. **Pilot induced oscillation/airplane pilot coupling (PIO/APC)**
16. **Handling Qualities Rating Method (HQRM)**
17. **Failure assessment methodology for classification HQ + Perf**
18. **Go-around performance**
19. **Use of amber band on airspeed tape**
20. **Return to land**
21. **Narrow runway operations**
22. **Reduced/derated thrust procedures**
23. **Tail clearance - piloting during cert tests**
24. **HUD/autoland landing distance**
25. **Anti-icing, de-icing fluids airworthiness requirements**
26. **Landing in abnormal configurations**
27. **Pressure error measurement during takeoff**
28. **Sideslip cues (Beta target) during OEI takeoff**
29. **Autoslats handling requirements**
30. **Yaw control below V_{mcg} speed on slippery runways (Swedish safety recommendation)**

Initial List of High Priority Topics

According to the tasking statement the work plans and schedules were to be developed for only the High priority topics. The top fifteen ranked topics were identified as High Priority by the FTHWG members. A careful review of these and the medium ranked topics was conducted to ensure that the members were satisfied that the correct list of topics had been placed in the high priority category. The listing below identifies these topics. There were no dissenting positions lodged relative to the initial list of high priority topic areas.

High Priority Topics Listing from May 2013 meeting
1. Flight envelope protection
2. Adaptation for flight in icing (Amendment 25-121 requirements)
3. Design maneuver requirements
4. Design dive speed
5. Interaction of systems and structures
6. Lateral/directional/longitudinal stability
7. Side stick controls
8. Control Surface Awareness and Mode Annunciation
9. Wet runway stopping performance (Non-TALPA)
10. Runway excursion hazard classification
11. Stall speed in ground effect
12. Steep approach
13. Out of trim characteristics
14. Tailwind/crosswind
15. Pilot-induced oscillation/Airplane-pilot coupling (PIO/APC)

Final List of High Priority Topics

At the September 2013 meeting of the FTHWG an FAA member identified four of the high priority items within the fly-by-wire focus area (Topics 3, 4, 5, and 8) where further activity by the FTHWG could be deferred. Following a discussion of the justification the FTHWG agreed. Details of the resulting recommendation and justification are discussed below:

The FTHWG recommends that work on the following subject areas within the Fly-By-Wire topic be put on hold:

- Design maneuver requirements
- Design dive speed
- Interaction of airplane systems and structure
- Control surface awareness and mode annunciation

Justification: EASA has recently addressed the first two of these topics as part of newly adopted amendment 13 of CS-25. The FAA is reviewing EASA's rule changes to determine whether harmonization can be accomplished. The FAA and EASA are currently well along in the process of publishing proposed rules to address the other two topics. Additional ARAC input at this time does not appear to be needed or appropriate. Therefore, the FTHWG recommends taking no further action on these topics until all of the already in progress rule proposals are published and comments received. At that time, a determination can be made as to whether tasking ARAC to provide further input is needed.

With this effective reduction in the number of high priority topics the FTHWG decided to combine medium priority topics 16 and 17 into a renamed topic 16 (Handling Qualities Compliance Finding for Non-Failure and Failed States), which was subsequently elevated to the high priority list. An additional justification for this decision was a potential interaction between this resulting topic and the PIO/APC topic that is next higher on the list. The final list of twelve high priority topics that is being recommended to ARAC is provided in the table below. Note that the deferred tasks are indicated via strikethrough.

High Priority Topics – Final List Recommended to ARAC
1. Flight envelope protection
2. Adaptation for flight in icing (Amendment 25-121 requirements)
~~3. Design maneuver requirements~~
~~4. Design dive speed~~
~~5. Interaction of systems and structures~~
6. Lateral/directional/longitudinal stability
7. Side stick controls
~~8. Control Surface Awareness and Mode Annunciation~~
9. Wet runway stopping performance (Non-TALPA)
10. Runway excursion hazard classification
11. Stall speed in ground effect
12. Steep approach
13. Out of trim characteristics
14. Tailwind/crosswind
15. Pilot-induced oscillation/Airplane-pilot coupling (PIO/APC)
16. Handling Qualities Compliance Finding for Non-Failure and Failed States

Recommended Work Plans

At the May 2013 meeting of the FTHWG a number of task teams were formed to develop draft work plans for each of the initial fifteen original high priority topics as required by the tasking statement. Most of the task teams consisted of between one and five of the OEM members. The

FAA volunteered to develop the work plans for four of the fly-by-wire tasks (3, 4, 5, and 8 in the list above) which they believed would primarily be worked by Structures Subject Matter Experts.

Work Plan Template

The FTHWG developed a template for the work plans based on a proposal by the FAA. The standard sections in the template are shown in the table below:

Work Plan – Name of Topic
1. What is the task?
2. Who will work the task?
3. Why is this task needed? (Background information)
4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)
5. Working method? (Number of face-to-face meeting days, other coordination means, overall length of time)
6. Preliminary schedule (Task length?)
7. Regulations/guidance affected
8. Additional information

Draft Work Plans

The various task teams completed development of the draft initial high priority topics work plans and provided them to the other members for comment prior to the September 2013 FTHWG meeting. At that meeting the task team leads presented their draft work plans and led a discussion which resulted in modifications of some of the draft work plans. Action Items were generated for further development of some of the work plans following the meeting.

Final Work Plans

As noted above, at the September 2013 meeting the FAA proposed deferring four of the original high priority tasks. As a result the four topics were removed from the high priority task list and no further work was scheduled on these work plans. An action item was established to create the work plan for the redefined high priority topic 16 (Handling Qualities Compliance Finding for Non-Failure and Failed States), and that was accomplished following the September meeting. An additional change was made to Topic 9 (Wet runway stopping performance -Non-TALPA). This was the proposed inclusion of a third subtask by EASA to include wet runway landing performance in CFR 14 Part 25 and CS-25 as is the case currently for wet runway takeoff performance. No objections to this recommendation were received from the FTHWG members and the Task 9 work plan has been updated accordingly. Also, due to the FAA publishing a final Policy on Runway Excursion Hazard Classification the question was raised whether Topic 10 should be removed from the final High Priority list. The FTHWG members were polled and all agreed that no change should be made. The final twelve recommended work plans are provided in Appendix A.

Recommended Subgroups and Schedule

During the September 2013 meeting the FTHWG members took the information provided in the draft work plans and went through a complex process to determine what subgroups (areas of expertise) would be necessary to accomplish the various topics, and how best to phase the meeting activities in order to accomplish all of the tasks within a set time period.

Proposed Subgroups

The members initially determined that a minimum of five subgroups (areas of expertise) would be needed in order to accomplish all of the twelve high priority tasks. The proposed subgroups and their corresponding focus topics are listed below:

1. FBW / FCTLS (Tasks 1, 2, 6, 7, 13)
2. Handling/Flight Test Techniques (Tasks 11,14, 15)
3. Performance (Task 9)
4. System Safety (Tasks 10, 16)
5. Steep Approach Landing (Task 12)

Note: See reduction in the number of proposed subgroups to four and the reassignment of Task 12 per Embraer alternative approach discussed later.

Topic Phasing

There was also discussion at the September 2013 meeting regarding when the subgroups would meet and whether topics could best be accomplished in parallel or in series. The consensus was for each of three FTHWG meetings per year to be scheduled for four and a half days. Each meeting would be broken into a FTHWG plenary first day, three days of subgroups meetings, and another FTHWG plenary final half day. The specific schedule for each subgroup would vary with their topics.

The initial target was to complete all tasks within a two year period. A phasing schedule was set up in an attempt to meet the two year schedule but this try was unsuccessful. Based on the number of meeting days required in the work plans and the number of meeting days available it would be necessary to reduce the number of high priority tasks, or it would be necessary to either increase the number of meetings per year or the number of years.

The consensus was to go ahead and work with all twelve high priority tasks, and to increase the number of years for the overall activity to three. The FTHWG was able to put together a phasing schedule based on a three year time limit. However, an attractive alternate version was suggested by Embraer following the September meeting and has been adopted as the FTHWG recommendation. The resulting recommended phasing schedule along with a discussion of the considerations for scheduling and phasing the tasks is provided in Appendix B. This approach reassigns the Steep Approach Landing Task 12 primarily to the Performance subgroup with help from the Handling/Flight Test Techniques subgroup, thus cutting the number of subgroups to four.

In addition, this phasing schedule permits multiple topics to be worked simultaneously and will likely require four meetings per year the last two years.

It is understood that the FAA will ultimately determine how they wish to adjust the number of topics tasked and the overall schedule, and the number of meetings per year will be a fall-out of these decisions.

Summary

The Flight Test Harmonization Working Group (FTHWG) was tasked via Federal Register Volume 78, No. 46 as published 8 March 2013 to consider several areas within the airplane performance and handling qualities requirements of the 14 CFR part 25 airworthiness standards and guidance for possible revision.

The task included prioritizing the list of topic areas, and developing work plans and schedules for those topics identified as high priorities for airworthiness standards development relative to new airplane design. The expectation is that these recommendations may result in subsequent ARAC taskings for standards recommendations in follow-on phases.

In support of this task the reconstituted FTHWG reviewed the list of topic areas provided by ARAC and also considered a number of additional topics as permitted by the tasking language. The members developed a practical methodology for prioritizing the resulting list of thirty topic areas and divided the list into high, medium, and low priority categories. Ultimately a list of twelve focus topics identified within this report was selected to be recommended to ARAC as high priorities for harmonization.

The FTHWG identified task teams and leader organizations to develop recommended work plans and schedules for each of the high priority topics. The work plans are included as Appendix A to this report. Each work plan describes the task, identifies what group(s) or outside experts are recommended to work the task, and explains why the task is necessary. In addition each work plan provides references for use in working the task, provides estimates of the number of meeting days needed, proposes the overall task length, identifies the regulations and/or guidance material likely to be affected, and provides additional information as appropriate.

Finally, the FTHWG developed a recommended phased schedule for the high priority tasks assuming completion within three years based on the activities of four subgroups. Information regarding the recommended subgroup areas of expertise and the phased schedule is provided in Appendix B to this report.

There were no dissenting positions recorded for any of the FTHWG members with regard to any of the recommendations contained in this report.

Appendix A – Recommended Work Plans

Work Plan – Envelope Protection

1. What is the task?
Recommend revisions to regulations and guidance material to include criteria to be used in the assessment of airplanes incorporating electronic flight control systems which include flight envelope protection features or functions which are harmonized across FAA/EASA/TCCA/ANAC.
2. Who will work the task?
The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task. Consideration will be given for consultation with SME's representing flight controls, propulsion, and loads/dynamics disciplines.
3. Why is this task needed? (Background information)
Many new transport category aircraft include control system designs which incorporate flight envelope protection (limiting) on a full time basis that will prevent the pilot from inadvertently or intentionally exceeding any of a number of flight envelope parameters. These limiting features may or may not be active in all normal and alternate flight control modes and may or may not be capable of being overridden by the pilot. Except for 14CFR 25.1329(h) there is no requirement in the regulations for these limiting features, nor do current requirements address these features. Features which have been incorporated in the past and which have received attention via Special Conditions or Issue Papers (CRI's) include: a) Normal load factor limiting b) Angle of attack limiting c) Speed limiting d) Pitch and roll attitude limiting In addition, the mode switching involved when these features become active has been addressed. EASA has included provisions for this feature in Nz limiting in their recently published CS25, Amendment 13. Harmonization of FAA, EASA, TCCA, and ANAC requirements should be addressed. FAA has expressed interest in considering a broad range of envelope parameter limiting schemes in the development of harmonized rulemaking.
4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)
FAA 14 CFR Part 25 Subpart B / EASA CS-25 A-13 a) 25.103 Stall Speed b) 25.107 Takeoff Speeds c) 25.121 Climb, One Engine Inoperative d) 25.125 Landing e) 25.143 General Controllability & Maneuverability f) 25.145 Longitudinal Control g) 25.147 Directional and Lateral Control h) 25.149 Minimum Control Speed

i) 25.161 Trim
j) 25.171 General [Stability]
k) 25.173 Static Longitudinal Stability
l) 25.175 Demonstration of Static Longitudinal Stability
m) 25.177 Static Lateral-Directional Stability
n) 25.181 Dynamic Stability
o) 25.201 Stall Demonstration
p) 25.203 Stall Characteristics
q) 25.207 Stall Warning
r) 25.253 High Speed Characteristics
s) 25.255 [Out of Trim Characteristics]
t) 25.335(b) Design Dive Speed
u) 25.671 [Control Systems] General
v) 25.672 Stability Augmentation and Automatic and Power-operated Systems
w) 25.1309 Equipment, Systems and Installations
x) 25.1323 Airspeed Indicating System
y) 25.1329 Flight Guidance System

FAA Special Conditions

a) FAA Final SC No. 25-316-SC Airbus A380-800
b) FAA Final SC No. 25-12-19, Embraer S. A., Model EMB-550 Airplane, Flight Envelope Protection, General Limiting Requirements
c) FAA Final SC No. 25-482-SC Embraer S. A., Model EMB-550 Airplane, Flight Envelope Protection, High Speed Limiting
d) FAA Final SC No. 25.486-SC Embraer S. A., Model EMB-550 Airplane, Flight Envelope Protection, Pitch and Roll Limiting Functions

EASA CRI's

a) CRI B-XX_Initial Draft Normal Load Factor Limiting System
b) CRI B-XX_Issue_Initial Draft Flight Envelope Protection
c) CRI B-XX Initial Draft Stalling & Scheduled Operating Speeds

ANAC Equivalent Level of Safety

ANAC Equivalent Level of Safety ELOS EV-35-EMB-550s4, Electronic Flight Control System, Mistrim Maneuvering
ANAC Equivalent Level of Safety ELOS EV-03-EMB-550s4, Flight Envelope Protection: Pitch and Roll and High Speed Limiting Functions
ANAC Equivalent Level of Safety ELOS EV-07-EMB-550s4, Flight Envelope Protection: Normal Load Factor (g) Limiting
ANAC Equivalent Level of Safety ELOS EV-25-EMB-550s4, Flight Envelope Protection: High Incidence Protection
ANAC Equivalent Level of Safety ELOS EV-37-EMB-550s4, Flight Envelope Protection: General Limiting Requirements

AC 25-7C Flight Test Guide for Certification of Transport Category Airplanes

EASA CS25 Book 2 (Advisory Material)

5. Working method

It is envisioned that 8-10 face-to-face meeting days over a period of 20-24 months will be needed to facilitate the discussion needed to complete these tasks. Telecons and electronic correspondence will be used to the maximum extent possible, in particular, between face-to face meetings to ensure that progress is maintained.

The working group should first consider the envelope(s) (parameter(s)) for limiting which will be considered applicable for this tasking (this will likely define a limitation on the applicability of any new regulation). This is likely to take the form of a list: e.g. AOA limiting, airspeed limiting, load factor limiting, sideslip limiting, etc.

Each parameter (or combination of parameters) which might be artificially limited may affect more than a single regulation. The work group should then produce a mapping of affected regulations to the parameters considered for limiting.

Following this mapping exercise, the work group will have a clear view of which regulations should be considered for modification based on the resulting mapping. The group should then consider appropriate requirement revisions to accommodate these or combinations of these envelope limiting features.

6. Preliminary schedule (How long?)

Provide recommendations to the ARAC Transport Airplanes and Engines Subcommittee within 24 months of the initiation of work on these tasks.

7. Regulations/guidance affected

Regulations noted in Section 4 above.

8. Additional information

This is a very broad and far-reaching task. The currently available issue papers/special conditions have been written in response to very specific system implementations. In contrast, the stated intent of this task is to generate one single visionary requirement set which will ensure safety and at the same time accommodate all potential envelope parameter limiting which might be considered, and presumably a large number of combinations and permutations of those. Within that intent, the task team will likely face the large challenge of generating a rational and defensible strategy for limiting the potential size of the pool of parameters and combinations of parameters under consideration.

Many referenced regulations are identified only because of the potential that reference speeds might need to be revised as a result of implementing envelope limiting.

Work Plan – Adaptation for Flight in Icing (Amendment 25-135)

1. What is the task?

- Recommend appropriate revisions to flight in icing regulatory and guidance material for airplanes with high incidence protection system (vs FAR 25-135 see 25.21g implementation history in Section 8 below)

- Review IPs/CRIs published for recent certifications (FAA, EASA, TCCA, ANAC…) and OEMs best practices based on their different designs of Flight control systems, Flight control laws and Flight envelope protections to adapt the current standard FAR 25. 135 for high Angle of Attack protected aircraft (overrideable and non-overrideable protections).

- The objective is to provide guidance to adapt new flight in icing requirements in order to reach an equivalence of safety level to conventional aircraft for any design that would be an acceptable candidate for it.

2. Who will work the task?

- The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task. The group should be supported as necessary by the FCHWG, or appropriate flight controls subject matter experts within the FTHWG, for clarification on Flight control system design aspects.

- Coordination within FTHWG is expected with other subteams established to work on "topic 1-Flight envelope protection" and topic 6-lateral/directional/longitudinal stability" as the "topic 2-adaptation for flight in icing" will update portions of the subpart B Requirements for icing conditions.

3. Why is this task needed? (Background information)

- Existing flight in icing standards & guidance do not adequately address airplane designs using fly-by-wire technology to protect against stall (it should address designs providing either overrideable and non-overrideable protections)

- The only available standard/material guidance is provided through existing CRIs and IPs that may be invalid for the likely range of high Angle of Attack protection designs for future models.

- The goal is to build a common standard & guidance for high Angle of Attack protected aircraft that would provide, regardless of the design, the main objectives that need to be satisfied to achieve an equivalent level of safety to conventional aircraft.

- The credit and equivalence of requirements applicable to conventional aircraft may depend on the flight control & protection system designs and characteristics.

- The activity will include the following topics:
  - Provide a definition of overrideable/non overridable Angle of Attack protection
  - Address in priority existing CRIs/IPs differences, e.g.:
    - Angle of Attack protection robustness check maneuver,
    - VSR vs. Vmin1g in icing demonstration,
    - Minimal operating speed factor (kVmin1g vs. kVSR in icing)

4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)

25.21g,25.105,25.107,25.121,25.123,25.125,25.143,25.145,25.201,25.203,25.207,25.1309,25.1323

A350 FAA IP F-5 and CRI B-01/B-09, Dassault Falcon SMS CRI B-01, TCCA IP Bombardier C-series, Embraer-550 EV-25 /EV-46, Sukhoï CRI B-06/B-09

TCCA &ANAC comments to A350 -900 Special Condition:


Brazilian_National_Civil_Aviation_Agency_-_


Transport_Canada[1].pdf


FAA-2012-1207-0001[1].pdf

5. Working method

It is envisioned that 4-5 face-to-face meeting days will be needed to facilitate the discussion needed to complete these tasks. Telecons and electronic correspondence will be used to the maximum extent possible.

6. Preliminary schedule (How long?)

Provide recommendations to the ARAC Transport Airplanes and Engines Subcommittee within 18 months of the initiation of work on these tasks.

7. Regulations/guidance affected

25.21g, 25.105, 25.107, 25.121, 25.123, 25.125, 25.143, 25.145, 25.201, 25.203, 25.207, 25.1309, 25.1323, AC 25-7C

8. Additional information

1) Implementation History: The Flight in icing (25.21g) has been introduced in several steps and relates only to app. C ice shapes:

- FAR 25 Amendment 121 (CS-25 Amendment 3) : introduce new 25.21g aiming at addressing icing conditions for all subpart B paragraphs except 25.121(a), 25.123(c), 25.143(b)(1) and (b)(2), 25.149, 25. 201 (c)(2), 207(c) and (d) and 25.251(b) through(e)

- FAR 25 Amendment 135 (CS-25 Amendment 6): 207(c) and 207(d) have been re-introduced to be considered in icing conditions for landing configuration only

- FAR 25 Amendment 129 (CS-25 Amendment 7): 25.1419 has been amended to ensure that flight crew are provided with a clear means to know when to activate the airframe Ice Protection System. As a consequence, minor conforming changes have been made to 25.143(j) and 207(h) to remove references to activating the Icing Protection System in response to the pilot seeing a specified ice accretion on a reference surface. Additional minor changes have been made to 25.207(h) to improve readability and a portion of existing 25.207(h)(2)(ii) has been moved to a new 207 (i).

Work Plan – Lateral/Directional/Longitudinal Stability

1. What is the task?
Recommend revisions to regulations and guidance material to include criteria, which are harmonized across FAA/EASA/TCCA/ANAC, to be used in the assessment of airplanes incorporating electronic flight control systems which may not exhibit explicit stability as defined in the current regulations.
2. Who will work the task?
The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task. Consideration will be given for consultation with SME's representing flight controls, propulsion, and loads/dynamics disciplines.
3. Why is this task needed? (Background information)
Many new transport category aircraft include control system designs which include stability and/or command augmentation and which may not exhibit stable characteristics in the same way that airplanes with conventional, mechanical control systems do. These augmentation systems are not required by the current regulatory requirements, nor are they accommodated by them. These many airplanes have been certificated using Special Conditions written against very specific systems implementations. It is the intent of FAA to generate regulations and associated guidance material which will appropriately address all envisioned implementations. Harmonization of FAA, EASA, TCCA, and ANAC requirements should be addressed.
4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)
FAA 14 CFR Part 25 Subpart B: a) 25.143 General Controllability & Maneuverability b) 25.145 Longitudinal Control c) 25.147 Directional and Lateral Control d) 25.171 General [Stability] e) 25.173 Static Longitudinal Stability f) 25.175 Demonstration of Static Longitudinal Stability g) 25.177 Static Lateral-Directional Stability h) 25.153 High Speed Characteristics i) 25.155 [Out of Trim Characteristics] j) 25.671 [Control Systems] General k) 25.672 Stability Augmentation and Automatic and Power-operated Systems l) 25.1309 Equipment, Systems and Installations

EASA CS-25 A-13:

a) 25.143 General Controllability & Maneuverability
b) 25.145 Longitudinal Control
c) 25.147 Directional and Lateral Control
d) 25.171 General [Stability]
e) 25.173 Static Longitudinal Stability
f) 25.175 Demonstration of Static Longitudinal Stability
g) 25.177 Static Lateral-Directional Stability
h) 25.153 High Speed Characteristics
i) 25.155 [Out of Trim Characteristics]
j) 25.671 [Control Systems] General
k) 25.672 Stability Augmentation and Automatic and Power-operated Systems
l) 25.1309 Equipment, Systems, and Installations

FAA Special Conditions

a) FAA Final SC No. 25-316-SC Airbus A380-800
b) FAA Final SC No. 25-479-SC Embraer S.A., Model EMB-550 Airplane, Limit Pilot Forces for stick shaker control
c) FAA Final SC No. 225-483-SC, Embraer S. A., Model EMB-550 Airplane, Electronic Flight Control System, Lateral-Directional and Longitudinal Stability and Low Energy Awareness

EASA CRIs

a) CRI B-XX Initial Draft Static Directional, Lateral, and Longitudinal Stability and Low Energy Awareness

ANAC Equivalent Levels of Safety

a) ANAC Equivalent Level of Safety ELOS EV-08-EMB-550s4, EFCS: Lateral-Directional and Longitudinal Stability and Low Energy Awareness

AC 25-7C Flight Test Guide for Certification of Transport Category Airplanes

EASA CS-25 Book 2 (Advisory Material)

5. Working method

It is envisioned that 6-8 face-to-face meeting days over a period of 12-16 months will be needed to facilitate the discussion needed to complete these tasks. Telecons and electronic correspondence will be used to the maximum extent possible, in particular, between face-to face meetings to ensure that progress is maintained.

6. Preliminary schedule (How long?)

Provide recommendations to the ARAC Transport Airplanes and Engines Subcommittee within 18 months of the initiation of work on these tasks.

7. Regulations/guidance affected

Regulations noted in Section 4 above.

8. Additional information

This is a very broad and far-reaching task. The currently available issue papers/special conditions have been written in response to very specific system implementations. In contrast, the stated intent of this task is to generate one single visionary requirement set which will ensure safety and at the same time accommodate all potential stability and/or command augmentation schemes. Within that intent, the task team will likely face the large challenge of generating a rational and defensible strategy for limiting the potential size of the pool of parameters and combinations of parameters under consideration.

The current regulations address stability in terms of static stability (as stick force / speed), maneuvering stability (as stick force / g), directional stability (as force and deflection / sideslip), lateral stability (as force and deflection / sideslip). New and proposed stability and command augmentation schemes may necessitate, e.g. separate evaluations of disturbance rejection and command response, cross-axis coupling or de-coupling, or even different stability measures (e.g. stability with respect to angle of attack). These should be considered.

Guidance for means of compliance will be very important to these topics, and should be given careful consideration.

One important reason for conventional stability has been to provide tactile feedback of flight condition (e.g. deviation from trim). For this reason, this task is closely related to the task considering flight envelope limiting. These two tasks may well be worked at the same time.

Work Plan – Side Stick Controls

1. What is the task?
Review current rules and guidance within 14 CFR Part 25 Subpart B pertaining to pilot-applied pitch and roll force limits and special conditions used for approval of side stick controllers on previous model certification programs. Based on this review, develop harmonized standards for temporary and maximum prolonged pilot-applied force levels for side stick controllers to be incorporated into a future revision of associated FAA rules and guidance. It is expected that at least the following requirements will need to be addressed: a) Pilot Short & Long Term Forces in 25.143(d) for pitch and roll b) Pilot force gradient guidance in AC 25-7 for 25.143(g) c) Pilot Short Term one-handed force requirement in 25.145(b) d) Maximum Pilot force in the landing configuration for accelerating from trim to 1.7Vsr and decelerating to V_{SW} in 25.175(d) e) Maximum pilot stick forces that limit stability demonstrations prescribed in 25.175(b)(1)-(3) f) Maximum Pilot force to recover to 1G flight when speed brakes are extended in 25.253(a)(5) g) Pilot pitch forces for out-of-trim recovery in 25.255(f) In addition to force limit requirements, certain aspects of pilot interactions for use of side stick controllers will also need to be evaluated. It is expected that at least the following characteristics will need to be addressed: h) Side stick controller coupling design i) Pilot-in-the-loop (PIL) characteristics, including operation in turbulence j) Pitch and roll control force and displacement sensitivity It is also expected that this task will include recommendations for further review and revision of regulations and guidance beyond Subpart B that may need to be addressed (i.e., 25.397). It should be noted that this task will focus on pilot-applied input force requirements and the pilot and system interface characteristics noted above. While industry experience to date has been with passive side stick controllers, consideration should also be given to emerging active side stick controller technologies. This task will not address lateral/directional/longitudinal stability requirements that are applicable for advanced flight control system designs that augment the inherent airframe stability.
2. Who will work the task?
The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task. The group should be supported as necessary by the FCHWG, or appropriate flight controls subject matter experts within the FTHWG, for clarification on Flight control system design aspects. Coordination within the FTHWG is expected with other subteams working “Stability” and “Envelope Protection” topics within this overall tasking.

3. Why is this task needed? (Background information)

Aircraft equipped with side stick controllers instead of conventional column and wheel control inceptors are designed for one-hand operation. The current pilot control force limits are based on two-handed effort and therefore are not adequate for aircraft type designs utilizing side stick controllers. In addition, given the difference in pilot arm and wrist positions and the associated difference in force and leverage capabilities with side stick controllers, the single-handed force requirements should also be reviewed for any potential revisions. Previous aircraft models with side stick controllers, such as the Airbus A320, A330, A340 & A380, Bombardier BD 500, Dassault Falcon 7X and Embraer EMB 550, have utilized Special Conditions and CRIs to address these unique requirements.

The applicable rules and guidance materials associated with pilot-applied pitch and roll force limits need to be reviewed and revisions proposed for 14 CFR Part 25 Subpart B that provide a harmonized standard addressing the use of side stick controllers.

This review and proposed revisions to rules and guidance material should also address pilot interface and system characteristics pertaining to the following items:

a) Pilot control authority to ensure the coupling design addresses corrective and /or overriding control inputs by either pilot. The coupling design should provide for reliable, unambiguous indications (e.g., aural, visual and/or tactile) indicating the side stick that is in command, not in command, and when combined inputs are being applied (if simultaneous inputs are allowed by the design).
b) Pilot control such that the side stick controllers do not produce unsuitable PIL control characteristics when considering precision path control / tasks and turbulence
c) Pitch and roll control force and displacement sensitivity compatibility to insure normal inputs on one control axis will not cause significant unintentional inputs on the other. These control harmony characteristics should also insure that precision control tasks are accomplished without exceptional piloting skill or alertness.

This review is also expected to provide recommendations for future revisions to any rules and guidance materials within CFR Part 25 outside of Subpart B that pertain to pilot applied control force limits or side stick controller system design and interaction characteristics such as 14 CFR 25.397c and CS-25A-13 25.777(i)

4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)

FAA 14 CFR Part 25 Subpart B:

a) Controllability & Maneuverability: 25.143(d), 25.143(g) and 25.145(b)
b) Stability: 25.175(d)
c) Miscellaneous Flight Requirements: 25.253(a)(5), 25.255(f)
d) Control System Limit Pilot Forces and Torques: 25.397(c)

EASA CS-25 A-13:

a) Controllability & Maneuverability: 25.143(k) and 25.145(b)
b) Stability: 25.175(d)
c) Miscellaneous Flight Requirements: 25.253(a)(5), 25.255(f)
d) Control System Limit Pilot Forces and Torques: 25.397 (d)
e) Cockpit Control Force and Displacement: 25.777(i)

FAA Special Conditions

a) FAA Final SC No. 25-316-SC Airbus A380-800
b) FAA Final SC No 25-477-SC Bombardier Aerospace Model BD-500-1A10 & 1A11 Airplanes: Side stick Controllers
c) FAA Final SC No. 25-479-SC Embraer S.A., Model EMB-550 Airplane, Limit Pilot Forces for stick shaker control
d) FAA Final SC No. 25-498-SC Embraer S.A., Model EMB-550 Airplanes; Sidestick Controllers

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5. Working method

It is envisioned that 3-4 face-to-face meeting days will be needed to facilitate the discussion needed to complete these tasks. Telecons and electronic correspondence will be used to the maximum extent possible.

6. Preliminary schedule (How long?)

Provide recommendations to the ARAC Transport Airplanes and Engines Subcommittee within 18 months of the initiation of work on these tasks.

7. Regulations/guidance affected

Regulations noted in Section 4 above

8. Additional information

Work Plan – Wet Runway Stopping Performance

1. What is the task?

There are three tasks:

1) In light of recent runway overrun accidents and incidents after landing on wet runways, recommend steps that should be taken to address this safety issue;

2) Recommend a harmonized means of determining wet runway landing performance for grooved and porous friction coarse runways, which, at the type certificate holder's option, can be provided in the Airplane Flight Manual for airplane operators' use in showing compliance with landing distance requirements set forth in the applicable operating rules; and

3) Consider whether to add a type certification standard in §/CS 25.125 requiring determination of wet runway landing distances for smooth, and at the option of the applicant, grooved/porous friction course runways.

2. Who will work the task?

The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task. The group should be augmented as necessary with subject matter experts in the areas of runway pavement friction (including effects of surface texture, grooving, and drainage), brakes and anti-skid systems, operational data analysis as well as representatives from airplane operators.

3. Why is this task needed? (Background information)

For task 1: Several recent accidents have raised questions regarding wet runway stopping performance. A few examples include:

- East Coast Jet Flight 81, a Hawker Beechcraft 125-800 at Owatonna, MN on July 31, 2008
- American Airlines Flight AA331, a Boeing 737-800 at Kingston, Jamaica on December 22, 2009
- Southwest Airlines Flight 1919, a Boeing 737-700 at Chicago Midway Airport, IL on April 26, 2011

Analyses indicate that the braking coefficient of friction in each case was significantly lower than expected for a wet runway (i.e., lower than the level specified in §/CS 25.109). The runway excursion at Midway Airport was especially troubling because it occurred on a grooved runway.

In connection with the landing overrun at Kingston, Jamaica identified above, Boeing analyzed data from other incidents, accidents, and from flight tests and normal operations. This analysis showed that a similar braking friction level, which was **about half** of the wet runway braking coefficient used in the §/CS 25.109 standard, had been experienced in a number of the previous accidents and incidents as well as during flight tests and normal operations. (Note: The reason that the friction level of the §/CS 25.109 standard is used for comparison is that it is thought to be an accurate representation of wet runway braking friction and is used not only for determining wet runway accelerate-stop distances, but also would be used in the landing data for time of arrival performance assessments as recommended by the Takeoff and Landing Performance Assessment Aviation Rulemaking Committee (TALPA ARC)).

Runway texture measurements and water drainage evaluations at a few of the runways exhibiting this performance did not indicate any specific deficiencies. The investigations considered issues

like rubber surface contamination or contaminated surface states (i.e., flooded or standing water), but concluded from the available evidence that these situations were not present. The investigations concluded these low friction values were not found to be caused by rubber contamination or water depths of 3mm or greater.

The above information indicates that this may be an industry-wide issue, not limited to specific airplane types or locations. The root cause has not been identified, and nothing, other than airplane braking system failures, has been ruled out. The deficient performance may be due to airplane issues (e.g., anti-skid performance), runway issues, or issues with our understanding or modeling of wet runway airplane stopping performance (e.g., erroneous relationship between macro texture and braking friction, unknown effect of active rainfall, differences between pavement types, etc.), or a combination of reasons.

It is envisioned for this task that experts in airplane stopping performance, airplane braking systems, wet runway friction, runway design, construction, and maintenance, and other stakeholders would share data and expertise to determine the cause of the observed performance shortfall and recommend actions to take, if any, to address the resulting safety concerns. Potential actions may include (but also are not limited to): further research, changes to airplane design standards (e.g., §/CS 25.109, AC 25-7C, braking or anti-system safety standards), runway design, construction, and/or maintenance standards, definitions of wet vs. contaminated runways, operating practices or procedures on wet runways, or other mitigations.

Note: The outcome of this task may influence the outcome of the other two tasks.

For task 2: FAA and EASA operating rules for certain types of operations require an additional 15% of landing distance when the runway is forecast to be wet on arrival. These operating rules also allow use of a shorter wet runway landing distance if, based on a showing of actual operational landing techniques on a wet runway, that shorter distance is approved and included in the airplane flight manual. This provision is typically used to allow the use of a shorter wet runway landing distance on grooved or porous friction course (PFC) runways.

FAA and EASA advisory material differs for determining wet runway operational landing distances for grooved or PFC runways. The methods are not equivalent and should be harmonized.

For task 3: Currently, the type certification rules of part 25 and CS-25 only require landing distances to be determined for dry runways. The effect of wet runways on landing performance is addressed in operating rules applicable to certain types of operations. For convenience, manufacturers of airplanes used primarily in those types of operations typically include in the airplane flight manual wet runway landing performance information that complies with the requirements of the associated operating rule.

Consideration should be given as to whether wet runway landing performance should be included in the part 25/CS-25 type certification requirements for two reasons: (1) As with takeoff performance, the effect of a wet runway on landing performance should be dependent on the type of airplane rather than the type of operation being conducted; and (2) It may be possible, if the

TALPA ARC recommendations are implemented, for an airplane to legally take off for a destination where the runway is forecast to be wet on arrival, but be unable to land there if the runway actually is wet on arrival.

Reason #2 above is due to fundamental differences in the methods for determining airplane landing performance on a wet runway between the operating rules and the TALPA ARC proposal for time of arrival landing performance assessments. (Note: This disparity could potentially also be addressed by simply changing the operating rule. In any case, if a wet runway landing distance requirement is added to the certification requirements, the operating rules would probably need to be revised accordingly.)

4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)
§ 25.109, § 25.125, AC 25-7C, CS-25, Owatonna Accident Report, Performance Study - 26 Apr 2011 737-700 Chicago Midway Overrun, JCAA News Release on AAL 737-800 Landing Overrun, AC 121.195(d)-1A, EASA smooth wet runway landing distance CRI, EASA grooved wet runway landing distance CRI, Draft Flight Working Paper on landing distances
5. Working method
It is envisioned that 8-10 face-to-face meeting days will be needed to facilitate the discussion needed to complete these tasks. Telecons and electronic correspondence will be used to the maximum extent possible.
6. Preliminary schedule (How long?)
Provide recommendations to the ARAC Transport Airplanes and Engines Subcommittee within 24 months of the initiation of work on these tasks.
7. Regulations/guidance affected
Potential effects on §/CS 25.109, §/CS 25.125, ACs 25-7C, 121.195(d)-1A, relevant airport runway design and maintenance standards, and TALPA ARC recommendations. Also, potential effects on §§ 91.1037(e), 121.195(d), 135.385(d), EU OPS 1.520(c).
8. Additional information

Work Plan – Runway Excursion Hazard Classification

1. What is the task?
Develop a harmonized guidance material for classification of runway excursion hazard levels following system failures during takeoff and landing: - Review the available existing guidance material, and - Review OEM's best practices, methodology and criteria (handling qualities & performance, environmental assumptions) used on past certifications for longitudinal and lateral runway excursion hazard classification assessment.
2. Who will work the task?
The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task. The group should be augmented as necessary with subject matter experts in the areas of safety specialists and /or airport aerodrome design
3. Why is this task needed? (Background information)
Service history of transport category airplanes indicates that runway excursions can be catastrophic. However, the service history also indicates that excursions at low speed and low thrust conditions usually result in no injuries or damage to the airplane. Current certification guidance material may not be adequate or not detailed enough (e.g., in terms of environmental conditions, e.g. wind/runway conditions, etc.) to assess hazard levels due to runway excursions and are not harmonized amongst authorities. Consequently airplane manufacturers have not consistently applied appropriate hazard classifications in the development of their safety assessment for runway excursions.
4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)
AC 25.1309-1A, EASA 25.1309-1A, AC 25-7C, AC 150/5300-13 Airport Design, FAA ANM-25-11 dated 11/13/13 and its associated disposition of public comments, A350 IP S-1, Embraer IP S-5, Bombardier S-12, EASA CRIs on biz jet.
5. Working method
It is envisioned that 4-5 face-to-face meeting days will be needed to facilitate the discussion needed to complete these tasks. Telecons and electronic correspondence will be used to the maximum extent possible.
6. Preliminary schedule (How long?)
Provide recommendations to the ARAC Transport Airplanes and Engines Subcommittee within 18 months of the initiation of work on these tasks.
7. Regulations/guidance affected
AC 25.1309-1A, AC 25-7C, 901 c) Uncontrollable High Engine Thrust
8. Additional information

Background:

The JAA Flight Study Group started discussing runway excursion hazard classification in support to the STPCM group for “Uncontrollable High Engine Thrust” subject in the years 2000.

At this occasion, OEMs like Airbus presented their methodologies. Airbus methodology is based on fleet in-service survey and runway excursion aircraft speed criterion (one parameter to support the safety assessment but not the only one), refer to FWP 699.

Later, the application to the A380 was presented to the JAA Flight Study Group (refer to FWP 749).

Work Plan – Stall in Ground Effect

1. What is the task?

Review current 14 CFR Part 25 Subpart B rules, associated guidance and airworthiness information pertaining to takeoff and landing speeds to ensure the effect of ground proximity on the aerodynamics of the airplane is sufficiently accounted for to prevent inadvertent stall during ground transition.

Recommend accurate and consistent industry guidelines (analysis, simulation, CFD, wind tunnel tests) for use in the development and verification of takeoff and landing speeds prior to the start of developmental and certification flight testing.

Provide recommendations for any proposed revisions or further technical information. Also provide recommendations for any EASA action to insure a harmonized approach is achieved.

2. Who will work the task?

The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task.

3. Why is this task needed? (Background information)

Inaccurate accounting of ground effect stall for takeoff speed schedule development may impact maximum performance flight tests such as Vmu and abused takeoff demonstrations and can result in any or all of the following events:

a) Reduced stall warning margins
b) Loss of artificial stall warning and stall definition (based on use of the out of ground effect lift curves)
c) Inaccurate margins as displayed to the pilot thru pitch limit indications
d) Inadvertent stall while in ground effect

4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)

FAA 14 CFR Part25 Subpart B:

a) Performance: 25.107 & 25.125

EASA CS-25 A-13:

a) Performance: 25.107 & 25.125

FAA Special Airworthiness Information Bulletin:

a) SAIB NM-13-12

AC 25-7C Flight Test Guide for Certification of Transport Category Airplanes

NTSB Accident Report

a) NTSB/AAR-12/02 PB2012-910402 Crash During Experimental Test Flight, Gulfstream Aerospace Corporation GVI (G650), N652GD. Roswell, New Mexico April 2,2011
5. Working method
It is envisioned that 3-4 face-to-face meeting days will be needed to facilitate the discussion needed to complete these tasks. Telecons and electronic correspondence will be used to the maximum extent possible.
6. Preliminary schedule (How long?)
Provide recommendations to the ARAC Transport Airplanes and Engines Subcommittee within 18 months of the initiation of work on these tasks.
7. Regulations/guidance affected
Regulations noted in Section 4 above
8. Additional information

Work Plan – Steep Approach

1. What is the task?
There are multiple tasks: 1) Harmonize and clarify the requirements from various agencies 2) Assess Means of Compliances or alternate Means of Compliances for - The 2 degrees abuse case - FAA go-around 3) Define criteria for expansion of flight test data including operations on wet grooved runways 4) Define the airplane testing required for approval of operation in icing conditions 5) Need for additional testing to cover Community noise requirements 6) Identify potential airports for SAL operations (minimum decision height, runway types) to assess if additional requirements are needed
2. Who will work the task?
The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task. The group will seek input from companies having airplane type approved for SAL operations for them to present the areas of high difficulties when approving SAL
3. Why is this task needed? (Background information)
Task 1: TCCA, FAA and EASA advisory material differs in some significant ways • FAA requires that "sufficient" glideslope control exist the 2 degrees abuse i.e. the engine is to be operating above idle for the test point • Screen height definition (different philosophe between EASA/TCCA and FAA) • Shaker activations for 2 degree abuse case (no implicit requirements for FAA/TCCA) Tasks 2 • Propose/develop alternate Means Of Compliance (Use of in-flight data demonstration of airplane capabilities, simulation tool for go-around below decision height) to minimize hazardous testing Tasks 3 • TCCA has the 1 degree abuse case to allow the extrapolation 3000 ft. above test altitude. No guidance from either EASA or FAA • How can the data gathered on SAL testing (dry smooth) be used for other surface types (wet grooved for instance)? Tasks 4 • Is there any adjustment to the FAR 25.1419 methodology for the test cases to consider? Tasks 5 • Not covered by FAR 36. Need for any additional requirements? Task 6: • To ensure that the special requirements of individual airports are covered in the certification material especially for other runway types

4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)
TCCA 1) AC 5009-6-525 Approval of Steep Approach Landing Capability of Transport Category Aeroplanes 2) IP: FT-06, Steep Approach Landing Capability – Special Conditions - Airworthiness (SCA) 3) TCCA Special Conditions-Airworthiness (SCA), SCA No.: 2007-01, Bombardier Model CL-600-2B16 (604 and 605 Variants) Approval of Steep Approach and Landing Capability **FAA** 1) AC 25-7C, Flight Test Guide For Certification Of Transport Category Airplane, Chapter 8 - Airworthiness: Miscellaneous Items, Section 231, Criteria For Approval Of Steep Approach To Landing. 2) ISSUE PAPER F-15, Steep Approach Certification **EASA** 1) CERTIFICATION REVIEW ITEM CRI B7, STEEP APPROACH LANDING CAPABILITY, Learjet 45 2) CS-25 Amendment 13, Appendix Q, Additional airworthiness requirements for approval of a Steep Approach Landing (SAL) capability
5. Working method
It is envisioned that 2 to 3 face-to-face meeting days will be needed to facilitate the discussion needed to complete these tasks. Telecons and electronic correspondence will be used to the maximum extent possible. Priority is tasks 2, 3 and 4.
6. Preliminary schedule (How long?)
Provide recommendations to the ARAC Transport Airplanes and Engines Subcommittee within 24 months of the initiation of work on these tasks.
7. Regulations/guidance affected
TCCA AC 5009-6-525 Approval of Steep Approach Landing Capability of Transport Category Aeroplanes **FAA** AC 25-7C, Flight Test Guide For Certification Of Transport Category Airplane, Chapter 8 - Airworthiness: Miscellaneous Items, Section 231, Criteria For Approval Of Steep Approach To Landing. **EASA** CS-25 Amendment 13, Appendix Q, Additional airworthiness requirements for approval of a Steep Approach Landing (SAL) capability
8. Additional information

Work Plan – Out of Trim Characteristics

1. What is the task?
To recommend a harmonized means of assessing out-of-trim characteristics for airplanes with auto-trim function and/or neutral/augmented stability functions incorporated into the flight control system, e.g. via closed loop fly-by-wire control laws.
2. Who will work the task?
The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task.
3. Why is this task needed? (Background information)
Current flight control system design often includes functions such as automatic stabilizer trim, neutral/augmented longitudinal static stability and/or elevator offload. As a consequence of these types of system architecture, in many circumstances the flight crew have no direct control over the horizontal stabilizer position. However, §25.255 and AC 25-7C require some flight tests to be executed with a pre-determined amount of mistrim. Moreover, the mistrim offset is supposed to be kept constant throughout each flight test point. In recent programs this conflict between the original means of compliance with §25.255 and the airplane system architecture has been addressed through AMOC or ELOS.
4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)
§ 25.255, AC 25-7C, ANAC Issue Paper EV-35 (Project: Embraer, EMB-550 program), TCCA Issue Paper CM FT-31 (Project: Bombardier Inc., C-Series program), FAA ELOS Memorandum TC6918SE-T-F-17 (Project: Boeing Company, Model 787-8 Program).
5. Working method
It is envisioned that at least 1 face-to-face meeting will be needed to facilitate the discussion needed to complete this task. Telecons and electronic correspondence will be used to the maximum extent possible.
6. Preliminary schedule (How long?)
Recommendations to Transport Airplanes and Engines Subcommittee within 6 months of the initiation of work on these tasks.
7. Regulations/guidance affected
§ 25.255, AC 25-7C
8. Additional information

Work Plan – Crosswind & Tailwind

1. What is the task?
There are three tasks: 1) Propose a compliance methodology for Crosswind and Tailwind A/C capability i.e. - Review current rules and standards for manual and automatic landing - Harmonize test analysis methodology - Assess means complementary to flight tests 2) Propose a way to present wind limitations in AFM according to operational practices. 3) If considered relevant, propose an adaptation of the standard ICAO practices applied by airports to communicate wind values to the crews
2. Who will work the task?
The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task. The group should be augmented as necessary with subject matter experts in the areas of trajectography, wind measurement, airport operations as well as representatives from airplane operators.
3. Why is this task needed? (Background information)
For sub-task 1): the group will have first to make a mapping of the existing requirements as far as wind limitations are concerned and will have to identify dis-harmonization at requirement level. Also, according to the manufacturers, there are differences of methods used to obtain the Cross-wind and Tail-wind demonstrated in flight test. The group will have to ensure that whatever method is used for wind determination, it will provide a result consistent with the wind effectively encountered at the time of the tests. The group will also have to evaluate methods for complementing the tests results for both Cross-wind and Tail-wind. More particularly, for Tail-wind, as acceptable means of compliance vary depending on the airworthiness authorities, collection of in-service experience of tail-wind operations is proposed to map any possible evolution of the requirements according to actual operations. For sub-task 2): the group will have to investigate if it is possible to propose a harmonized method for defining and presenting wind limitations in the AFM so as to make them compatible with airport practices as defined by ICAO (Annex 3 – Chapter 4) and airline operations. According to the investigation of the group, a proposed harmonization could be defined.

For sub-task 3): the group will investigate if recommendations to ICAO could be produced in order to further improve the consistency between A/C published wind limitations, airplane operations and airport operations.

4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)
AC 25-7C (FAA FTG) ; NPA 25B-335 (JAA FTG) ; 25.21(f) ; 25.237 ; CS AWO 131a)4); CS AWO 140d); CS AWO 181a); A350 CRI G-03 ; A350 IP F-17 ; AMOFSG/10-SN No. 14
5. Working method
It is considered that three to four meeting days will be needed to facilitate the discussion needed to complete these tasks. Telecons and electronic correspondence will also be used to the maximum extent possible.
6. Preliminary schedule (How long?)
Provide recommendations to the ARAC Transport Airplanes and Engines Subcommittee within 18 months of starting these tasks. Potential activities include: • Collection of wind determination in flight tests according to A/C manufacturers • Comparative assessment of methodologies including possible complementation of flight tests by other means • Proposal of a standard for defining wind limitations in AFM • Identify possible synergies with ICAO for evolution of crosswind and tailwind determination by airports and announcement to flight crews • Issue recommendations to Transport Airplanes and Engines Subcommittee
7. Regulations/guidance affected
25.237; AC 25-7C; CS AWO 131a)4); CS AWO 140d); CS AWO 181a)
8. Additional information
ICAO is currently working on Crosswind and Tailwind information to flight crews in a dedicated study group (refer to AMOFSG/10-SN No. 14 mentioned in §4. References).

Work Plan - Pilot-Induced Oscillations

1. What is the task?
To recommend a harmonized means of assessing susceptibility to pilot-induced oscillations (PIO).
2. Who will work the task?
The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task.
3. Why is this task needed? (Background information)
As a result of in-service occurrences of PIO, a policy was incorporated into FAA's Flight Test Guide, AC 25-7A, dated Mar/31/98. This policy was developed in the 1995 timeframe as a result of an accumulation of the knowledge on PIO among industry, authorities and research organizations. The policy was reviewed by foreign authorities and industry, and was not accepted as a method of compliance by the JAA. As a result of non-acceptance of the PIOs policy by the JAA and industry, there has been an effort to revise and harmonize the PIOs policy in the past several years. A Subgroup of the JAA Flight Study Group was formed for this purpose, although the work was not completed. Therefore, the policy provided in the current FAA guidance AC 25–7C for evaluating PIO is still not well accepted by airplane manufacturers, is not harmonized with EASA, and has been superseded to some extent in recent certification programs by Issue Papers. Modified guidance is needed to both simplify and standardize the methods for evaluating an airplane's susceptibility to PIO. Among the non-harmonized topics related to PIO is the use of the HQRM PIO criteria as a means to assess PIO tendencies. The FAA handling quality rating system is not universally accepted within industry, nor is it accepted by EASA. However, it is worth mentioning that the FAA Issue Papers raised so far state that the applicant may propose an acceptable alternative method.
4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)
§ 25.143 (a),(b), AC 25-7C, FAA Issue Paper F-13 (Project: Dassault Aviation, Falcon 7X program) and F-12 (Project: Airbus, A350 program), TCCA Issue Paper CM FT-25 (Project: Bombardier Inc., C-Series program), Flight Working Paper FWP 599-5C, NPA 25B-335.
5. Working method
It is envisioned that 5-6 one day face-to-face meeting days will be needed to facilitate the discussion needed to complete this task. Telecons and electronic correspondence will be used to the maximum extent possible.

6. Preliminary schedule (How long?)
Provide recommendations to the ARAC Transport Airplanes and Engines Subcommittee within 18 months of the initiation of work on these tasks.
7. Regulations/guidance affected
§ 25.143 (a),(b), AC 25-7C, NPA 25B-335
8. Additional information

Work Plan – Handling Qualities Compliance Finding for Non-Failure and Failed States

1. What is the task?
Recommend revisions to regulations and guidance material to include criteria to be used in the assessment of airplane handling qualities in non-failure states and systems failure conditions (including those with electronic flight control systems) which are harmonized across FAA/EASA/TCCA/ANAC.
2. Who will work the task?
The Flight Test Harmonization Working Group (FTHWG) will have primary responsibility for this task. Consideration will be given for consultation with SME's representing flight controls and propulsion.
3. Why is this task needed? (Background information)
Subparts B of 14CFR25 and CS25 have their origins in experience with mechanically controlled, naturally stable airplanes. These configurations enjoyed predictable relationships between e.g. stability and control response. Many new transport category aircraft include sophisticated control system designs in which many functions provide control response, rejection of disturbances and potentially a host of other enhancing features. Many of these new aircraft neither exhibit the dynamic relationships of mechanical "bare airframes" nor meet the detailed requirements derived for those previous airplanes. Further, the embodying systems can be very complex in their potential failure modes and are not at all straightforward in their evaluation. Nevertheless, these new configurations can be seen to be equivalently "safe" compared to airplanes which meet the requirements via natural stability and mechanical control power. These determinations have previously been accomplished via a large series of Issue Papers, CRI's, etc. each written against specific system implementations, and accompanied by many workarounds to accommodate regulatory differences. This task is to harmonize a single method to enable a rational, consistently applicable, and defensible, data-based evaluation of configurations not meeting the traditional stability and control requirements in a non-failed state and to harmonize a similarly rational, consistently applicable, and defensible data-based method of evaluating the various failure states of those configurations across FAA, EASA, TCCA and ANAC. This is essentially a means-of-compliance task, as many of the specific noncompliant "features" are being considered under other topics in this tasking.
4. References (existing regulatory and guidance material, including special conditions, CRIs, etc.)
FAA 14 CFR Part 25 Subpart B / EASA CS-25 A-13 a) 25.143-.255, Subpart B b) 25.671 [Control Systems] General c) 25.672 Stability Augmentation and Automatic and Power-operated Systems d) 25.1309 Equipment, Systems and Installations **FAA Special Conditions** a) FAA Final SC No. 25-316-SC Airbus A380-800 b) FAA Final SC No. 25-12-19, Embraer S. A., Model EMB-550 Airplane, Flight Envelope Protection, General Limiting Requirements

c) FAA Final SC No. 25-482-SC Embraer S. A., Model EMB-550 Airplane, Flight Envelope Protection, High Speed Limiting
d) FAA Final SC No. 25.486-SC Embraer S. A., Model EMB-550 Airplane, Flight Envelope Protection, Pitch and Roll Limiting Functions

EASA CRI's

a) CRI B-XX Initial Draft Normal Load Factor Limiting System
b) CRI B-XX_Issue_Initial Draft Flight Envelope Protection
c) CRI B-XX Initial Draft Stalling & Scheduled Operating Speeds

ANAC Equivalent Level of Safety

ANAC Equivalent Level of Safety ELOS EV-35-EMB-550s4, Electronic Flight Control System, Mistrim Maneuvering
ANAC Equivalent Level of Safety ELOS EV-03-EMB-550s4, Flight Envelope Protection: Pitch and Roll and High Speed Limiting Functions
ANAC Equivalent Level of Safety ELOS EV-07-EMB-550s4, Flight Envelope Protection: Normal Load Factor (g) Limiting
ANAC Equivalent Level of Safety ELOS EV-25-EMB-550s4, Flight Envelope Protection: High Incidence Protection
ANAC Equivalent Level of Safety ELOS EV-37-EMB-550s4, Flight Envelope Protection: General Limiting Requirements

AC 25-7C Flight Test Guide for Certification of Transport Category Airplanes

EASA CS25 Book 2 (Advisory Material)

JAA NPA B-335 JAA Flight Test Guide

Industry/Authority Working Papers

Flight Study Group Flight Working Papers:
FWP 639: FAA Handling Qualities Rating Method
FWP 654: JAA Certification Policy and Practices JAR 25.1309 and AMJ 25.1309
FWP 655: 25.1309 and HQRM
FWP 660: Airbus Methodology for Failure Case Assessment, FAA HQRM and AMJ 25.1309
FWP 687: Handling Qualities Rating Method (HQRM) – Proposed Changes/Improvements
FWP 707: FAA Draft Issue Paper on EFCS and HQRM
FWP 710: FAA HQRM (IP F-XYZ) Proposal: Airbus Comments
FWP 711: Proposal to Move Forward with HQRM
FWP 714/2: Harmonization Terms of Reference for HQRM
FWP 782: Assessment of Failure Cases Affecting Handling Qualities - Airbus Methodology
FWP 786: Proposed Revision to the Handling Qualities Rating Method (HQRM) Contained in Appendix 7, AC 25-7A

5. Working method

It is envisioned that 8-10 face-to-face meeting days over a period of 20-24 months will be needed to facilitate the discussion needed to complete these tasks. Telecons and electronic

correspondence will be used to the maximum extent possible, in particular, between face-to face meetings to ensure that progress is maintained.

Fundamental to the success of this topic will be first to agree a "criteria for criteria", seen as a set of key features which a harmonized means of compliance should contain; an agreed set of attributes against which any candidate harmonized MOC will be compared.

After this is agreed, the working group should hear from each of the four authorities details of how they approach (or wish to approach) certification of 1) configurations which do not meet the detailed requirements of current FAR/CS 25; and 2) failure modes for extremely sophisticated systems implementations.

The third step is to propose and agree a single method which 1) meets the agreed criteria for criteria, and 2) is agreeable to all involved (harmonized).

6. Preliminary schedule (How long?)

Provide recommendations to the ARAC Transport Airplanes and Engines Subcommittee within 36 months of the initiation of work on these tasks.

7. Regulations/guidance affected

Regulations noted in Section 4 above, although this is primarily a means of compliance issue.

8. Additional information

This is a very broad and far-reaching task. The currently available issue papers/special conditions have been written in response to very specific system implementations. In contrast, the stated intent of this task is to generate one single visionary means of compliance which will ensure safety and at the same time accommodate as many as possible potential system implementation features sets which might be considered, and presumably a large number of combinations and permutations of those.

Appendix B
Scheduling and Phasing Considerations

Considerations for Scheduling and Phasing the Tasks

a) Due to a lack of resources for some companies/regulators (i.e. number and availability of different SME's) and/or logistics (i.e. number of meeting rooms) and/or other economic reasons it is desired to minimize parallel meetings.

b) As a planning strategy the minimum required number of meeting days for each topic (as defined in the work plans) is being scheduled with a small buffer at the end. Therefore:

- Topic 1 - Flight envelope protection: 8-10 meeting days, scheduled 8 days
- Topic 2 - Adaptation for flight in icing: 4-5 meeting days, scheduled 4 days
- Topic 6 - Lateral/directional/longitudinal stability: 6-8 meeting days, scheduled 6 days
- Topic 7 - Side stick controls: 2-3 meeting days, scheduled 2 days
- Topic 9 - Wet runway stopping performance: 8-10 meeting days, scheduled 8 days
- Topic 10 - Runway excursion hazard classification: 4-5 meeting days, scheduled 4 days
- Topic 11 – Stall speed in ground effect: 3-4 meeting days, scheduled 3 days
- Topic 12 - Steep approach: 2-3 meeting days, scheduled 2 days
- Topic 13 - Out of trim: 1 meeting day, scheduled 1 day
- Topic 14 - Tailwind crosswind: 3-4 meeting days, scheduled 3 days
- Topic 15 – PIO/APC: 5-6 meeting days, scheduled 5 days
- Topic 16 – HQ compliance finding for non-failure and failed states: 8-10 meeting days, scheduled 8 days

c) Yellow topics primarily need Handling and Fly-by-Wire SME's while Green topics primarily need Handling and Flight Test SME's. Therefore it is appropriate to schedule Yellow and Green the same week.

d) Blue topics primarily need Performance and Runway SME's while Red topics primarily need Performance and Systems Safety SME's. Therefore it is appropriate to schedule Blue and Red the same week.

e) The topics are being scheduled in essentially the same priority sequence as was developed during FTHWG-29 (except steep approach, which was agreed to be accelerated).

f) Topics being discussed for at least two consecutive days are generally being set for either Monday-Tuesday or Thursday-Friday. Topics being discussed in a single meeting day during a given week are being scheduled on Wednesday.

g) The FAA's target tasking span is approximately 3 years starting in 2014.

h) The initial plan was to hold three meetings per year; however, the group should be prepared to increase this schedule after the first year to four per year.

i) For any given meeting week the group should be prepared to also discuss a topic pertaining to the next similar meeting (i.e. next Yellow/Green week or next Blue/Red week). This will allow use of an incidental vacant day.

j) Following receipt of formal tasking information this proposed schedule will be refined as appropriate to accommodate any changes in the overall topic list, to allow for any needed plenary sessions, and to optimize topic arrangement based on the actual subgroup compositions, progress, and meeting venues.

Recommended Meeting Schedule and Task Phasing

	day 1	day 2	day 3	day 4	day 5
meeting 1	topic 1	topic 1	topic 1	topic 6	topic 6
meeting 2	topic 2	topic 2	topic 1	topic 12	topic 12
meeting 3	topic 1	topic 1	topic 2	topic 6	topic 6
meeting 4	topic 6	topic 6	topic 13	topic 7	topic 7
meeting 5	topic 9	topic 9	topic 9	topic 10	topic 10
meeting 6	topic 1	topic 1	topic 2	topic 11	topic 11
meeting 7	topic 16	topic 16	topic 16	topic 9	topic 9
meeting 8	topic 16	topic 16	topic 9	topic 9	topic 9
meeting 9	topic 14	topic 14	topic 11	topic 15	topic 15
meeting 10	topic 10	topic 10	topic 16	topic 16	topic 16
meeting 11	topic 15	topic 15	topic 15	topic 14	buffer

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