

# Use of Dynamic Analysis Methods for Aircraft Seat Certification

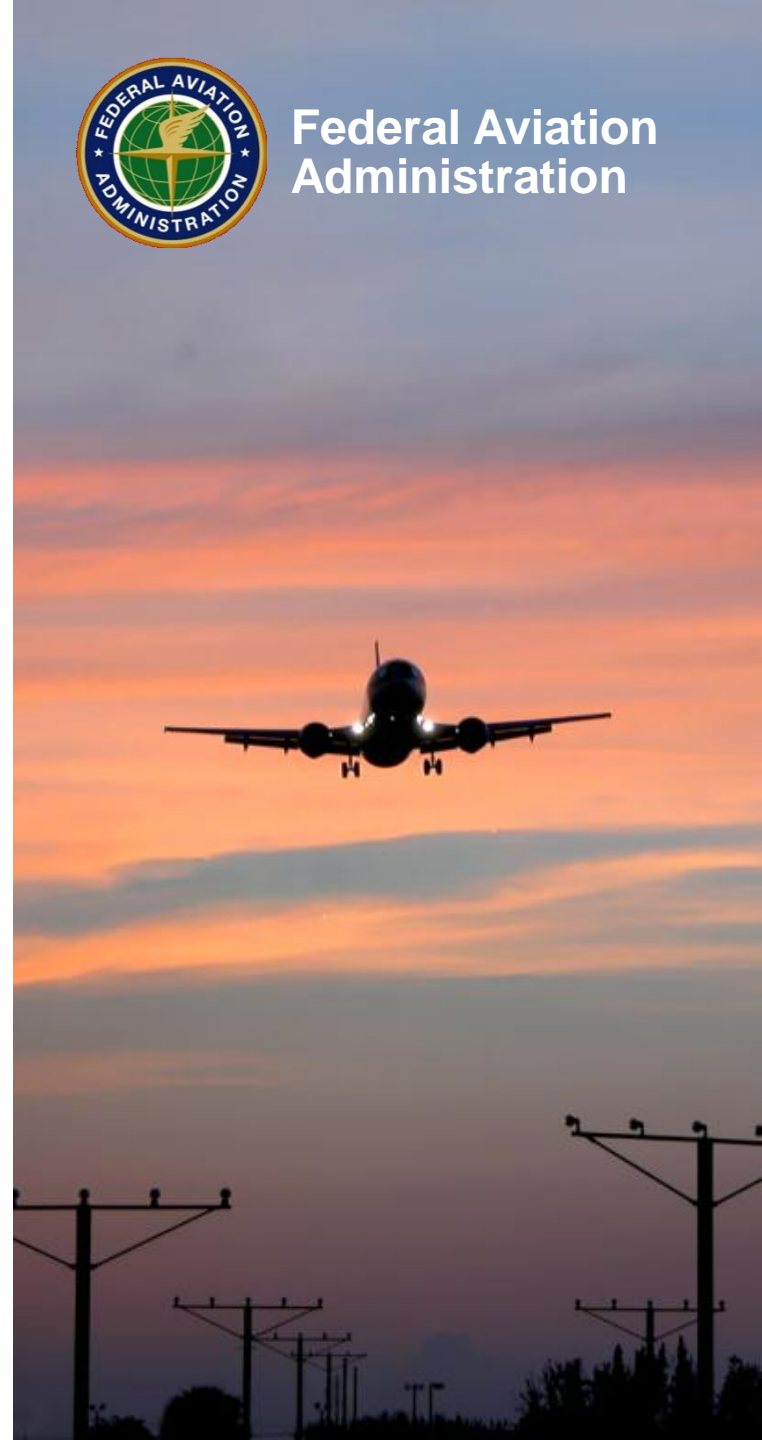
Presented to: CBA Workshop

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Federal Aviation  
Administration



# Purpose

- **To review the current state of Certification by Analysis for Aircraft Seats**
- **Review documentation: SAE ARP 5765 and AC 20-146**
- **Provide input to SAE ARP 5765**
- **Provide input to revise AC 20-146**
- **Review current state of the art**



# Background

- **§§ 25.562(b) states that “Each seat type design approved for crew or passenger occupancy during takeoff and landing must successfully complete dynamics tests or be demonstrated by rational analysis based on dynamic tests of a similar type seat...”**
- **Similar for other Parts**

# Seat Streamlining

- **Industry lobbied congress to pass HR 1000**
  - Sec 757: Streamlining seat and restraint system certification process and dynamic testing requirements
  - Mandated FAA to form working group with industry to reduce costs with seat certification
  - Administrator document report to congress on working group findings



# Seat Streamlining

- **“4 Part Plan”**
  - #4: Promote acceptance of alternate methods of compliance to reduce cost and/or enhance safety through application of new technologies
- **Issuance of AC 20-146 was one avenue**



# ROE

- **Consider open discussion**
- **Want feedback, what is good, what is not**
- **Fill out evaluation/comment forms**
  - Electronic copy emailed to those pre-registered
  - Can email now
  - Hard copies available



# Pre-Meeting Question Summaries

- **What has prevented CBA in certification?**
  - Knowledgeable in-house staff
    - This varies between companies
    - Who can run the simulations
    - What training is required
  - Requirement
    - Can successfully test – no pressing need



# Pre-Meeting Question Summaries

- **What has prevented CBA in certification?**
  - Lack of local knowledgeable authority
    - No direct process published, AC confusing?
    - This varies between different ACOs
    - Who can evaluate the proposals
    - Training and guidance necessary





# Pre-Meeting Question Summaries

- **What has prevented CBA in certification?**
  - Validation
    - How much data is needed
    - What can be validated



# Pre-Meeting Question Summaries

- **What is the documentation lacking?**
  - Sufficient details on process
  - Examples
  - Too conservative
    - HIC of 700

# Pre-Meeting Question Summaries

- **Training**

- Software vendors offer training on using their product
- Some have specific seat training and webinars available
- Currently no recurring FAA training
  - Special offering in the past
- Who should be trained
  - Not everyone needs to run/validate complex models
  - Introductory/familiarization training

# Outline Day 1

- **Introductions, announcements, and opening comments**
- **Overview of current AC 20-146**
- **Overview of SAE ARP 5765**
- **Summary of Model Validation Process**
- **Summary of Policy ANE-2006-33.94**
- **Model Validation at NASA**
- **FAA Perspective**
- **Software Industry capabilities**
- **NIAR Modeling Process**



# Day 1 Comments

- **The required test is a validation test, not a cert test, it can be a cert test**
  - Cert test will still be required
- **We should also be highlighting safety improvements and not just cost and schedule**
- **Software tools have changed significantly in the past few years and have incorporated process/model setup improvements**

# Day 1 Comments

- **Industry can have short lead time from design to product, 3 months**
- **M&S process can take 6 months**
- **New design vs. derivative**
  - Old data may not be usable for validation

# Day 1 Comments

- **Knowledge and experience in industry and FAA tends toward testing**
  - FAA has to get used to industry coming to it with M&S projects
  - DERs need training as well
  - Not a lot of demand and experience industry wide, don't want to hire new staff
  - If going to test anyway, why M&S?

# Outline Day 2

- **Review Day 1 and plan for Day 2**
- **Seat Industry Perspective**
  
- **Future Plans/Discussion**
  
  
- **FAA Only session**
- **ARP 5765 Analysis Meeting**





# Comments

- **HIC testing seems to be initial path forward**
- **Other ROI – modifications when you can't retest**
- **No requirement for M&S in Certification**
  - Most appropriate for development
  - Improves safety

# Future

- **Reminder, fill out questionnaires and turn in**
- **Will consolidate inputs and use to help in document revision/development**
- **Anyone who presented: distribution of slides?**
  - Will work on getting out in the near future

# Future

- **AC 20-146**
  - Will be looked at during FY13
- **ARP 5765**
  - Rev 1 in FY14

# Future

- **Future workshop/training**
  - Similar to this format?
  - Dedicated training, LAACO 2006?
  - Focused on ARP 5765?
  - Example problem review?
  - Location/Host?

# Afternoon

- **ARP 5765**
  - Prasanna Bhonge
  - Prepare for October meeting
  - Discuss System Validation
- **FAA**
  - Review other M&S
  - Discuss future options

