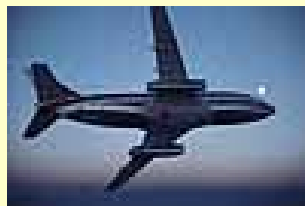
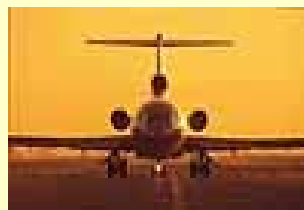
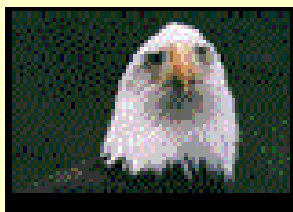


# Supplemental Structural Inspection Document (SSID) Standardization Public Meeting

Hardcopy of this presentation will be available at:  
<http://www.faa.gov/certification/aircraft/transport.htm>



# Introduction

- **Why are we here today?**
  - We have asked for your attendance because the FAA wants your input on the future direction of the Supplemental Structural Inspection Document (SSID) Programs for aging airplanes
  - Airlines continue to use airplanes longer; some airplanes are approaching 2 times their design service objective



# Introduction

- Public expectation is that aging airplanes are receiving increased attention to maintain safety, including airworthiness of repairs, alterations, and modifications (RAMs). The Aging Aircraft Safety Act (AASA) was issued to address this expectation. The SSID Airworthiness Directives (ADs) are a means to implement the Act
- We are sensitive to the post-9/11 aviation environment, and want to maximize the benefits of this program



# Background

- After the 727/737 SSID ADs were issued in 1998, there was a concern that the McDonnell Douglas Supplemental Inspection Document (SID) ADs and other SSID ADs were not standardized with regard to RAMs
- Operators of Boeing and McDonnell Douglas airplanes essentially had to work two different programs with regards to RAMs
- The issue was brought up during Model Structures Task Group (STG) meetings and by Flight Standards



# Background

- Therefore, in April of 2000, the Transport Airplane Directorate (TAD) chartered a team, known as the SID Team
- The SID Team did make recommendations that the TAD has been working to implement
- During the discussion of mandating superseded SID/SSID ADs, it was determined that there was a need for a public meeting to obtain input on the SSID Standardization process.



# Background

- While the TAD has been working on these SID/SSID standardization issues, the Aging Airplane Safety Interim Final Rule has been issued. The discussion from this public meeting will be captured in this Docket.



# Meeting Objectives

- Present the plan for standardization of SID/SSID ADs
- Present SID Team findings, conclusions and recommendations
- Present TAD vision for how SID/SSID ADs may support compliance to the Aging Airplane Safety Interim Final Rule
- Obtain input from operators regarding addressing RAMs in SSID ADs



# Agenda

- **727/737 SSID ADs (Lessons Learned) - Patrick Safarian**
- **SID Team Charter, Conclusions and Recommendations and Consensus Approach to Address Recommendations - Maureen Moreland and Brent Bandley**
- **Addressing RAMs in future SSID ADs (open forum) - Rick Kawaguchi**
- **Summary**





# Agenda

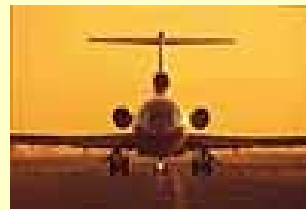
- **Industry Presentations**

- AAWG Presentation - Aubrey Carter
- ATA Presentation - Don Collier

- **Closing Remarks**



# Boeing 727/737 Supplemental Structural Inspection Document (SSID) Programs (Lessons Learned)



# Lessons Learned -- Boeing 727/737 SSID Programs

- **Review of Boeing 727/737 SSID Programs**
  - Objectives
  - Highlights of Programs
  - Roles and Responsibilities
  - Compliance Issues



# Lessons Learned -- Boeing 727/737 SSID Programs

- **ADs 98-11-03 R1 and 98-11-04 R1 have mandated these programs for 727 and 737 models, respectively, and have been effective since June 23, 1998**
- **The goals of the SSID Program ADs were to:**
  - Ensure safe operation of these airplanes with high number of flight cycles in accordance with FAA AC 91-56
  - Provide operators with damage tolerance based inspections of their structures as a supplement to their existing structural inspection program



# Lessons Learned -- Boeing 727/737 SSID Programs

- **Ensure safe operation of aging airplanes by:**
  - Inspecting structurally significant items (SSI) to detect fatigue cracking of any SSI that has no history of such cracking in-service
  - SSIs are structural elements or assemblies which contribute significantly to carrying flight, ground, pressure or control loads and whose failure could affect the structural integrity necessary for the safety of the airplane



# Lessons Learned -- Boeing 727/737 SSID Programs

- **Ensure safe operation of aging airplanes by (cont.):**
  - Addressing structural details with discovered fatigue problems by having Boeing issue separate service bulletins (SBs)
    - Mandating these SBs as separate ADs. Once mandated, the structural details are removed from the SSID



# Lessons Learned -- Boeing 727/737 SSID Programs

## Highlights of the 727/737 SSID ADs:

	<b>727</b>	<b>737</b>
<b>Boeing SSID ref.</b>	<b>D6-48040-1, Rev. H</b>	<b>D6-37089, Rev. D</b>
<b>Airworthiness Directive (AD)</b>	<b>98-11-03 R1 (Effective 6/23/1998)</b>	<b>98-11-04 R1 (Effective 6/23/1998)</b>
<b>AD Applicability</b>	<b>All 727 models</b>	<b>All 737-100 and 737-200 models</b>
<b>Design Service Goal (DSG)</b>	<b>60,000 flight cycles /50,000 flight hours</b>	<b>75,000 flight cycles /51,000 flight hours</b>
<b>Inspection areas</b>	<b>Wing, Fuselage and Empennage</b>	<b>Wing, Fuselage and Empennage</b>



# Lessons Learned -- Boeing 727/737 SSID Programs

## Repairs, Alterations & Modifications (RAMs) are:

### ■ Repairs

- Restoration of strength to meet type design requirements
- Example: Lap splice cutout and reinforcement

### ■ Alterations/Modifications

- Typically a change in the original type design to enhance the airplane's operating capabilities
- Examples: Changes to operation specifications, installation of winglets, antennae, hushkits, etc.





# Lessons Learned -- Boeing 727/737 SSID Programs

## For RAMs, the 727/737 SSID ADs mandate the following:

- **For SSI created or affected by Supplemental Type Certificate (STC) modification prior to the AD effective date:** Assess the Damage Tolerance (DT) characteristics of each SSI created. If necessary, supplement the existing SSID inspection with DTA-based and SACO-approved inspections within 48 months after the AD effective date
- **AD requirements for SSI created or affected by repair or modification (other than STC modification) prior to the AD effective date:** Within 12 months of identification, if necessary, supplement the SSID inspection with SACO-approved DTA based inspections
- **AD requirements for SSI created or affected by repair or modification (including STC modification) after the AD effective date:** Within 12 months of RAM installation, if necessary, supplement the SSID inspection with SACO-approved DTA based inspections



# Lessons Learned -- Boeing 727/737 SSID Programs

## Operator's Compliance Responsibilities:

- For baseline structure, inspect SSIs at AD threshold and repeat at intervals in accordance with the SSID
- For RAMs, within the compliance time of the AD, perform DTA to assess the effectiveness of the applicable SSID inspections. If the inspections are insufficient, revise the existing FAA-approved inspection program to include new inspections.
- For submittals, provide the revision to SACO for approval of new inspections through their PMIs. Upon approval, operators shall revise their existing FAA-approved maintenance program to include the new inspections.
- Airworthiness of the airplane is ultimately up to the operator



# Lessons Learned -- Boeing 727/737 SSID Programs

## FAA Compliance Responsibilities:

- PMI: Review operator's DTA submittal and add comments if necessary. Then, send it to the manager of SACO for approval. Upon incorporation of the SACO-approved supplemental inspections into the existing maintenance program by the operator, continue to monitor for AD compliance.
- SACO: Review DTA submittal and approve supplemental inspections forwarded by the PMI. Note: Submittal sent directly to SACO by the operator or their consultants is not acceptable; the PMI is charged to oversee the operator's maintenance program.



# Lessons Learned -- Boeing 727/737 SSID Programs

## STC Holder Compliance Responsibilities:

- Per 14 CFR 21.50, STC holder is responsible for preparing Instructions for Continued Airworthiness (ICAW) in accordance with Appendix H of 14 CFR 25 that are acceptable to the FAA Administrator.
- If an operator did not receive the ICAW, contact the STC holder and/or the cognizant ACO where the STC was issued



# Lessons Learned -- Boeing 727/737 SSID Programs

## Compliance Issues with the 727/737 SSID ADs:

- For a number of reasons, there was misunderstanding regarding the requirements of the SSID ADs in areas such as compliance times and compliance procedures
- Because of misunderstandings, there were a large number of “11th Hour” submittals to SACO
  - Several operators, PMIs and STC holders were unsure about their responsibilities
- Misunderstandings on the required contents of Damage Tolerance Assessment (DTA) submittals



# Lessons Learned -- Boeing 727/737 SSID Programs

## Compliance issues with the 727/737 SSID ADs (cont.):

- Misunderstandings existed on definitions of “existing SSI,” “altered/affected SSI” and “SSI created”
- Difficulties in implementing AD for SRM repairs
- Submittal of numerous non-SSI DTA packages requesting Methods of Compliance approval were received by the SACO
  - No program changes were actually needed



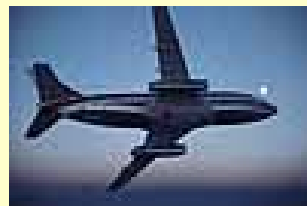
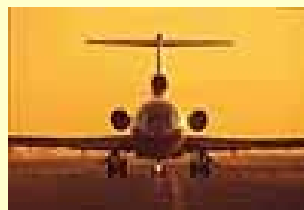
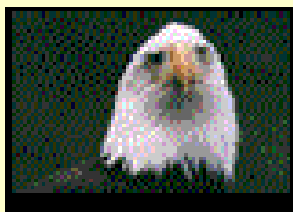
# Lessons Learned -- Boeing 727/737 SSID Programs

## Summary

- One of the purposes of this meeting is to avoid such compliance issues in the future



# SSID Team, Recommendations, and Consensus Approach to Address Recommendations





# Overview

## ■ SSID Team

- Charter (Phase I and Phase II)
- Conclusions/Observations
- Recommendations

## ■ TAD Integration of Recommendations Considering:

- Repair Assessment Operational Rule
- Aging Airplane Safety Interim Final Rule



# SSID Team Charter

## ■ Issue:

Differences in treatment of repairs and modifications installed both before and after the effective dates of the ADs for the 727/737 models, as compared to the DC-8, DC-9, and DC-10 model airplanes



# SSID Team Charter

- The SSID AD Review Team was chartered in April 2000 by the Transport Airplane Directorate (TAD) Standards Staff and the Aging Airplane Program Manager



# SSID Team Charter

- The Team was chartered to make recommendations to address the differences in requirements between the aging airplane models for damage tolerance assessment and inspection of RAMs



# SSID Team Charter

- **Phase I-** Evaluation and Recommendations to address differences in treatment of RAMs in Boeing and McDonnell Douglas SSID/SID ADs
- **Phase II-** Evaluation and Recommendations to address differences in the SSID/SID ADs of other affected aging airplane models



# SSID Team Charter

## Team Membership

- TAD Standards Staff, ANM-110  
Bob Breneman
- Seattle ACO Airframe Branch, ANM-120S  
Patrick Safarian
- Los Angeles ACO Airframe Branch, ANM-120L  
Maureen Moreland



# SSID Team Process

- Interviews with applicable FAA engineers, National Resource Specialists, aging airplane program manager, aircraft evaluation group, and legal counsel and with engineers from Boeing North, Boeing South, and an airline operator



# SSID Team Process

- Comparison of the 727/737 ADs and MD-80 draft NPRM
- Identifications of advantages and disadvantages of the differences
- Formulation of recommendations





# SSID Team Recommendations

## Phase I Recommendations

- The SSID Team presented their conclusions, observations and recommendations to SACO, LAACO and the aging airplane program manager

## Phase II Recommendations

- All of the Phase I recommendations were found to be applicable to the airplane models covered by Phase II
- An additional recommendation was made that the FAA mandate the latest revision of the SSID for the airplanes covered by the Phase II effort



# SSID Team Recommendations

## After the SSID Team presented the Phase I Recommendations:

- The SSID Team worked with SACO, LAACO and the aging airplane program manager to reach consensus on the future direction of the SSID programs, and the following are the results



# SSID Team Recommendations

## Recommendation 1

Add a requirement to perform a damage tolerance assessment for RAMs accomplished after the effective date of the ADs using a standardized compliance time of 18 months after installation

**TAD proposes to adopt Rec. 1**



# SSID Team Recommendations

## Recommendation 2a

Standardize to a 3-step damage tolerance assessment process for new RAMs

**TAD proposes for new RAMs that affect an existing SSI or per the criteria are new SSIs:**

- **Within 18 months after return to service, establish an inspection threshold and submit to ACO**
- **Prior to reaching 3/4 of threshold, submit inspection method & intervals to ACO**
- **Prior to threshold, incorporate inspection method and intervals into maintenance program**



# SSID Team Recommendations

## **Recommendation 2b**

Provide a standardized description of an acceptable damage tolerance assessment methodology, similar to Note 6 of the 727 AD, by referencing Advisory Circular 91-56

**TAD proposes to incorporate Rec. 2b into the standardized SSID ADs**



# SSID Team Recommendations

## Recommendation 3

FAA should:

- a) Eliminate the term “SSI created,” as used in the 727/737 ADs
- b) Develop standardized criteria for determining which RAMs require damage tolerance based special inspections



# SSID Team Recommendations

- **TAD proposes to use the definition of a SSI as found in AC 25.571-1C:**
  - **The structure that contributes significantly to the carrying of flight, ground or pressurization loads, and;**
  - **The integrity of the structure is essential in maintaining the overall integrity of the airplane**
- **We will open up discussion on this subject later on in the presentation**



# SSID Team Recommendations

## Recommendation 4

For the various SSID ADs, standardize the compliance time for DTA of repairs and non-STC design changes accomplished before the effective date of the ADs

**TAD proposes to incorporate Rec. 4 into the standardized SSID ADs**





# SSID Team Recommendations

## Recommendation 5

Provide a description in the SSID ADs detailing the information to be included in the operator's FAA approved maintenance or inspection program

**TAD proposes to incorporate Rec. 5 into the standardized SSID ADs**



# SSID Team Recommendations

## Recommendation 6

Standardize the acceptance of Repair Assessment Guidelines (RAG), where applicable, as a method of compliance to SSID requirements for a DTA of repairs

**TAD proposes to incorporate Rec. 6 into the standardized SSID ADs**



# SSID Team Recommendations

## Recommendation 7

- a) Standardize the compliance time to perform a DTA for STCs installed before the effective date of the SSID ADs
- b) Include a note similar to note 7 in the 727/737 ADs, which provides FAA expectations for the contents of the compliance plans specified in the AD



# SSID Team Recommendations

- a) TAD proposes to incorporate Rec. 7a into the standardized SSID ADs
- b) TAD is considering to not incorporate a requirement for compliance plans to be submitted to the ACO. The TAD would like to get your input on compliance plans.
  - Do you think that compliance plans should be a requirement in the standardized SID/SSID ADs?
  - If a compliance plan is not required, then by what method will operators accomplish compliance planning in a timely manner?



# SSID Team Recommendations

**The following slides are the TAD proposals to address SSID Team Recommendations 4 and 7a to standardize compliance times for RAMs accomplished prior to the effective date of the AD**



# Repair Assessment Operational Rules

- The Repair Assessment operational rules require a damage tolerance assessment of fuselage pressure boundary repairs (fuselage skins, door skins and bulkhead webs) for 11 aging aircraft models:
  - The final rule was published in the FR on April 25, 2000 and was effective May 25, 2000
  - Applicable new rules: §§ 91.410, 121.370, 125.248 and 129.32
  - AC 120-73 entitled “Damage Tolerance Assessment of Repairs to Pressurized Fuselages” was issued on December 14, 2000



# Repair Assessment Operational Rules

- No operator may fly their airplanes beyond the applicable flight cycle implementation time (3/4 DSG-listed in rule) or May 25, 2001, whichever occurs later, unless its operations specifications have been revised to reference repair assessment guidelines (RAGs)
  - Applicable airplanes: Airbus A300 (excluding -600 series), BAC 1-11, Boeing 707, 720, 727, 737, 747, DC-9/MD-80, DC-10, Lockheed L-1011, Fokker F-28
  - All manufacturers have issued RAGs that have been FAA approved and the SRMs have been revised



# Aging Airplane Safety NPRM

- The NPRM (99-02) was developed to comply with the Aging Aircraft Safety Act of 1991 and was issued April 2, 1999 and the comment period closed October 18, 1999
  - Records reviews and inspections would be required after the 14th year in service
  - Damage Tolerance (DT) based Supplemental Structural Inspection Program (SSIP) would be required 4 years after the effective date of the proposed rule with certain exceptions for airplanes mandated to AC 91-60 or for airplanes whose design life goals has been listed in the provided tables in the proposed rule





# Aging Airplane Safety NPRM

- DT based inspections include baseline structure, repairs, alterations and modifications (RAMs). Baseline structure means the airplane configuration defined by the original type design.



# Aging Airplane Safety Interim Final Rule

- An Interim Final Rule was published December 6, 2002 and is effective December 8, 2003. The FAA accepts comments to the final rule and three ACs (120-XX, 91-56B and 91-60A) until May 5, 2003.
  - Applicable to all airplanes operated in part 121, all US registered multiengine airplanes in part 129 and all multiengine airplanes used in scheduled operations under part 135
  - Operations within the state of Alaska are exempt
  - Repair Assessment Program is an acceptable alternative method of compliance to the final rule for repairs to the fuselage pressure boundary



# Aging Airplane Safety Interim Final Rule

- For US registered multiengine airplanes initially certificated for operation with 10 or more passengers: All Part 121 and 129; and Part 135 used in scheduled service.
  - By December 5, 2007, airplanes must be operated with a maintenance program that includes DT based SSIPs
  - After December 5, 2007, airplanes may operate without DT based SSIPs only if they have not reached their design life goals as published in the rule
  - After December 20, 2010, no airplanes may operate without DT based SSIPs (includes airplanes that originally had AD mandated service history based SSIPs - DC-3, DC-6 and Convair 340/440)



# Do operators currently comply?

- Good Question! Some probably do and some probably do not
  - Affected operators must have DT based SSIP by December 5, 2007 for the whole airplane that includes baseline structure and RAMs
  - For most airplanes the baseline structure is covered by SID/SSID ADs, however there are exceptions like the MD-80, 747 and 737-300 thru -900



# Do operators currently comply ?

- Good Question! Some probably do and some probably do not
  - What about RAMs? The Boeing 727 and 737-100 and -200 SSID ADs address RAMs. The rest of the SID/SSID ADs do not adequately address RAMs. Also the SID/SSID ADs are not standardized with regard to RAMs.
  - For the 11 aging models the Repair Assessment Program covers repairs to the fuselage pressure boundary and is an acceptable means of compliance.



# What is TAD doing to help the operators comply?

- Good Question!
  - The timeframe to address RAMs would be in line with the Repair Assessment operational rules with a threshold set at 3/4 of the DSG
  - The TAD will mandate new SID/SSID ADs for baseline structure so that there is coverage for all affected transport airplanes (i.e., MD-80, 747 and 737-300 thru -900)



# What is TAD doing to help the operators comply?

- Good Question!
  - It is the intent of the TAD that the SID/SSID ADs be superseded to contain standard language to address RAMs
  - The TAD will ensure that the Repair Assessment Program is approved as an acceptable means of compliance to the SID/SSID ADs



# Summary

- The SSID Team, SACO, LAACO and the Aging Airplane Program Manager are proposing an approach to incorporate the SSID Team recommendations
- Repair Assessment is a final rule, the RAGs have been FAA approved and operators have incorporated the RAGs into their maintenance or inspection programs



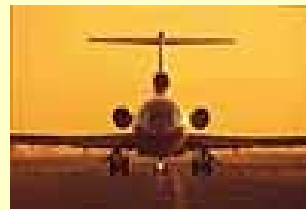
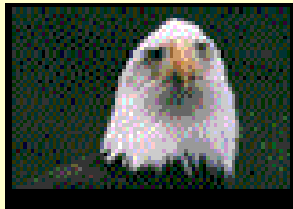


# Summary

- Aging Airplane Safety Interim Final Rule has been issued and the comment period is still open. The comments from the public will have to be dispositioned before the effective date of December 8, 2003.
- TAD proposes to supersede existing SID/SSID ADs to include standardized language regarding RAMs with compliance times in line with the Repair Assessment Operational Rules.



# Addressing Repairs, Alterations and Modifications (RAMs) in Future Airworthiness Directives



# RAMs in Future ADs

- Public expectation is that aging airplanes are receiving increased attention to maintain safety, including airworthiness of RAMs. The Aging Aircraft Safety Act (AASA) was issued to address this expectation. The SSID Programs are a means to implement the Act.
- There have been problems in addressing RAMs in previous ADs
- The FAA would like to incorporate lessons learned from the 727/737 ADs



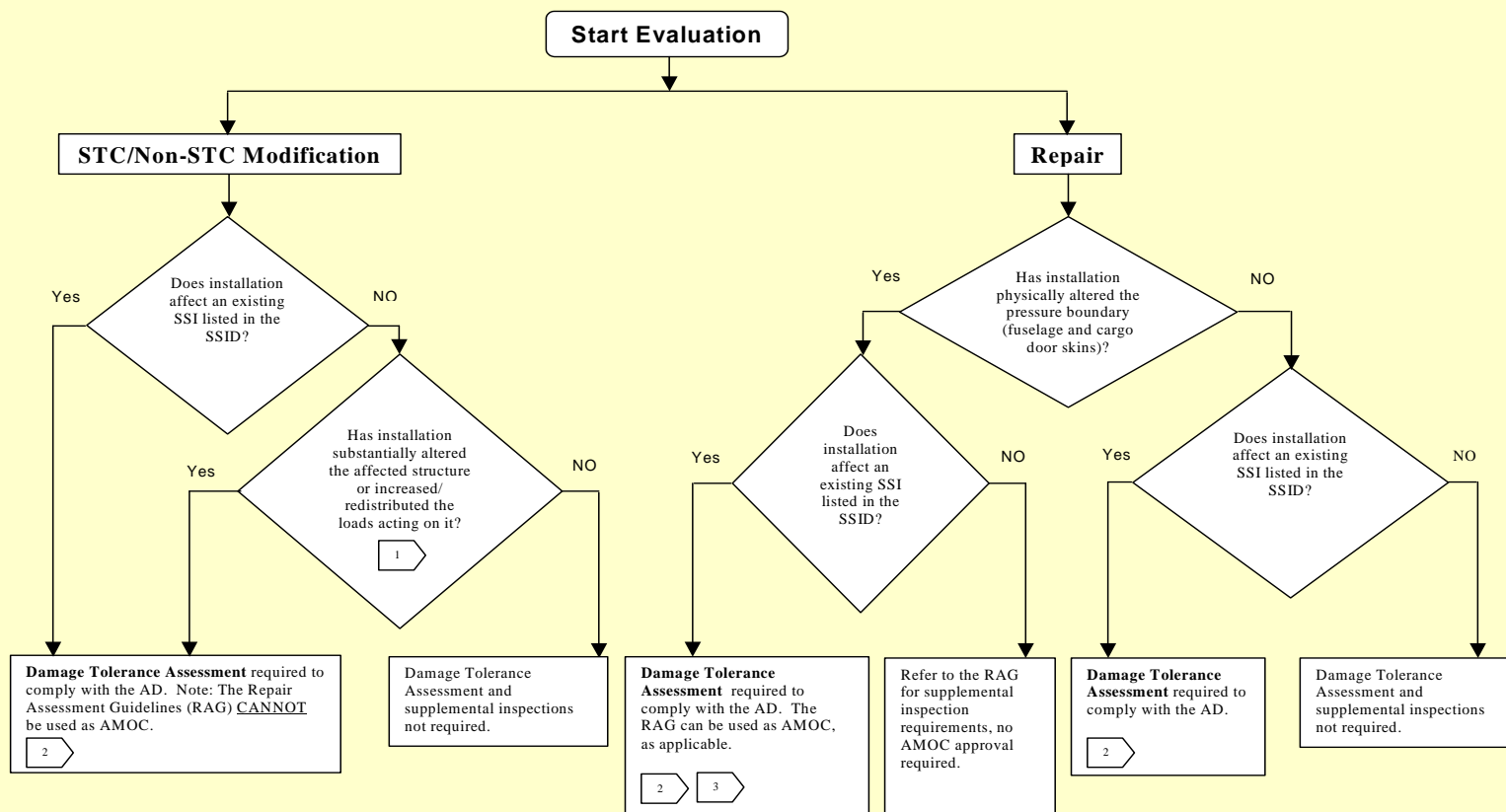
# RAMs in Future ADs

- Operators have had difficulty in determining if a new Primary Structural Element (PSE)/Structurally Significant Item (SSI) has been created after installation of a RAM.
  - FAA has developed a “flowchart” to assist in making this determination for the 727/737 SSID programs



# Boeing 727/737 DTA Flowchart

## 727/737 DTA Logic

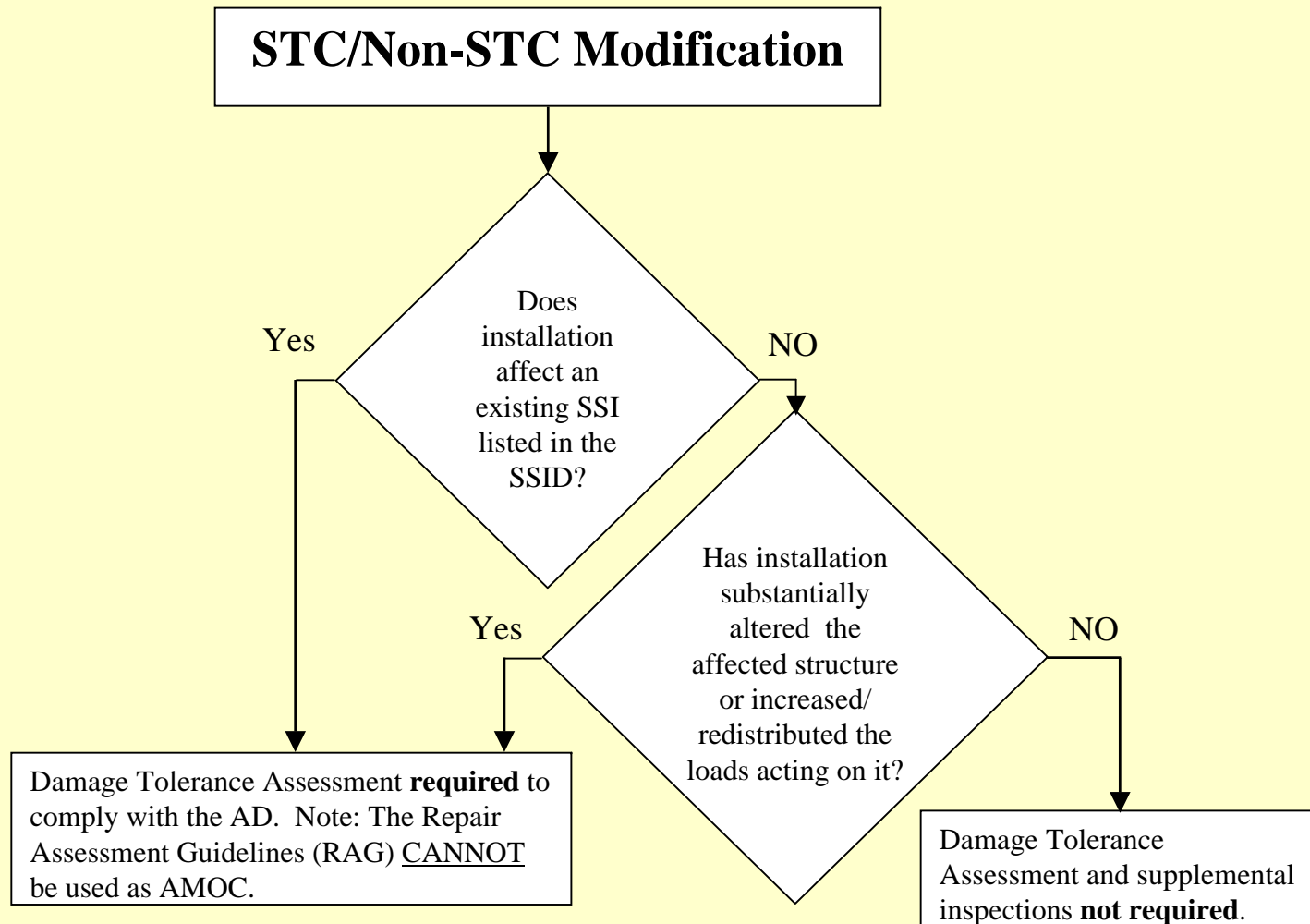


Note: The Structural Significant Items (SSI) referenced in this flow chart are special SSIs listed in the Boeing Supplemental Structural Inspection Documents (SSID), which requires supplemental inspections using the DTR check forms included in the document.

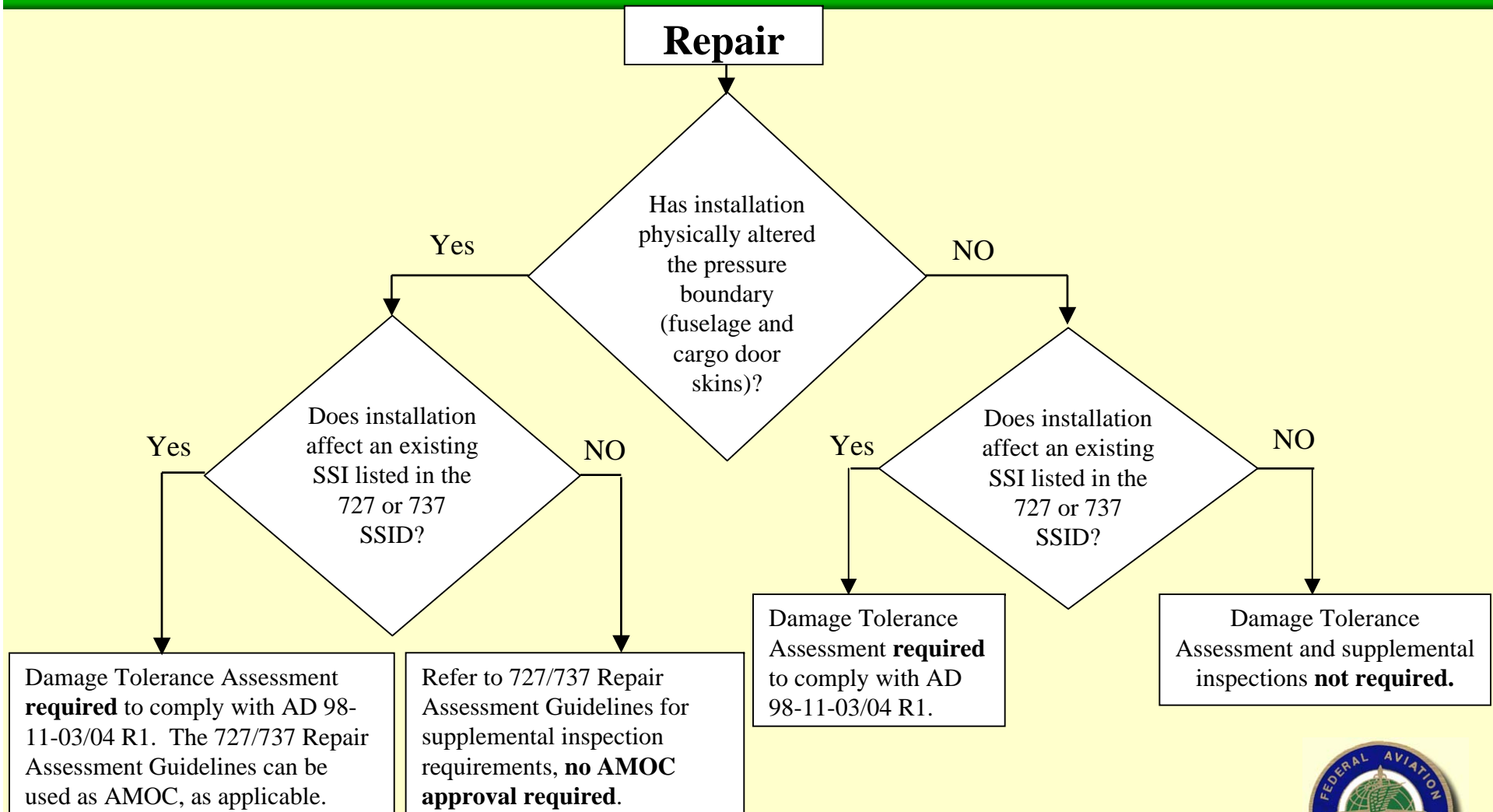
- 1 For example, installation of a cargo door would be considered as substantial, but small antenna installation would not (i.e. one that do not induce additional aerodynamic loads to the fuselage skin and affect an area of the skin less than 12" long and more than 10" away from any existing skin cutout and more than 3" away from another modification or repair to the skin). See FAR 21.50 for guidelines.
- 2 See attached "Selection Process Flow Chart" for general assessment guidelines and "DTA Guidelines" developed by SACO for detailed instructions.
- 3 For certain SSI's, the FAA has approved the inspection methods and compliance times outlined in the RAG be used as AMOC.



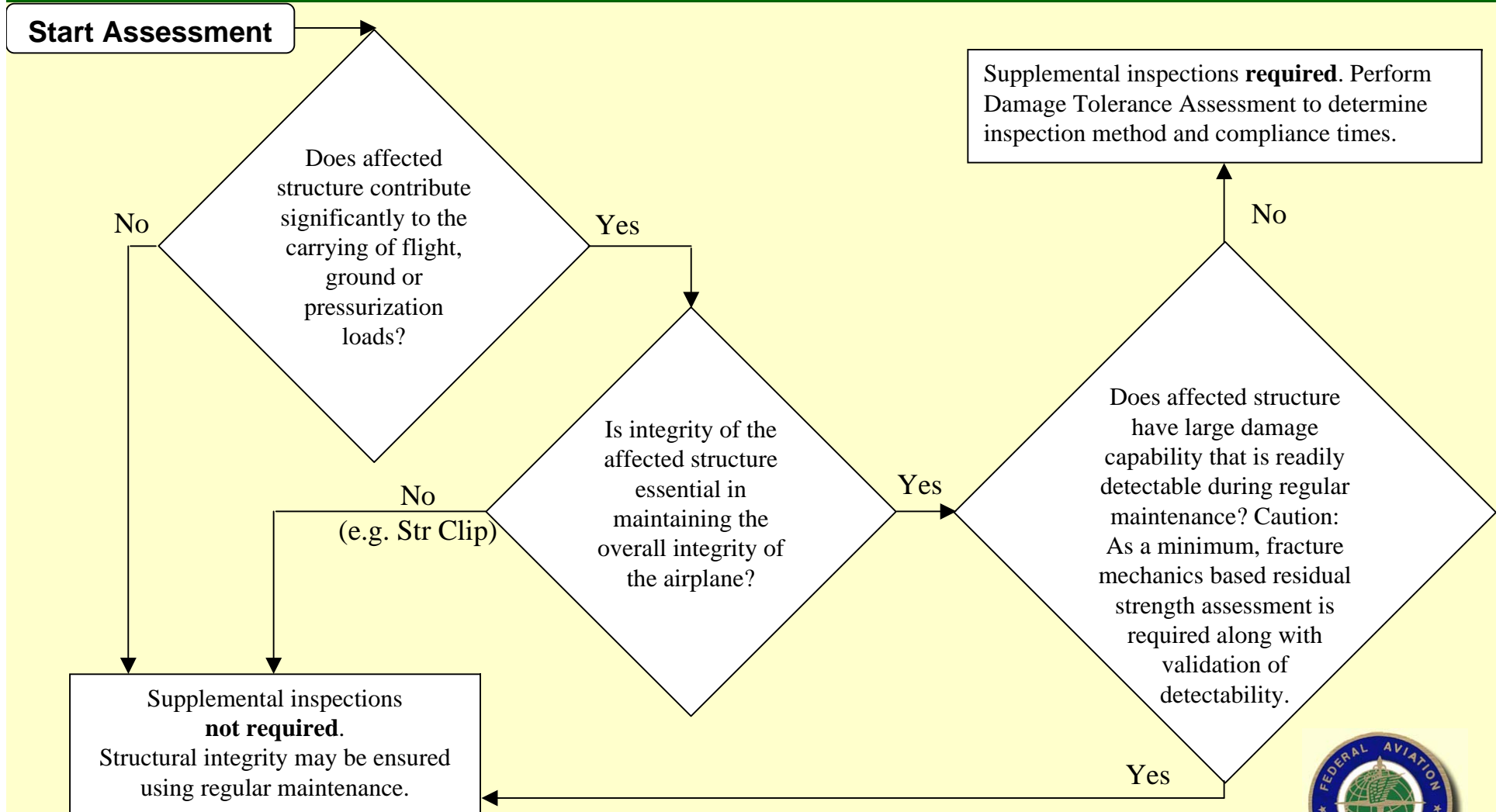
# Boeing 727/737 DTA Flowchart



# Boeing 727/737 DTA Flowchart



# Boeing 727/737 DTA Flowchart



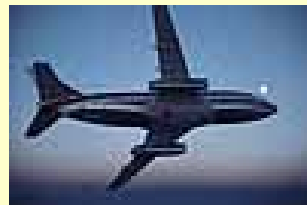


# RAMs in Future ADs

- The FAA would like operator input on our proposal for addressing RAMs in the future SSID ADs
- Open forum



# Summary



# Summary

- As expressed in the Aging Airplane Safety Rule, the FAA has determined that our aging airplane program must address RAMs
- ADs that address RAMs may provide a specific method and process for complying with the general requirements of the Aging Airplane Safety Rule
- The AD process, and the process for implementing ADs are well understood by both the FAA and operators



# Summary

- For problems with past ADs addressing RAMs, we can learn lessons and solve or minimize those problems
- If industry can identify better ways to accomplish the objective, we want to know what they are

