



HWG-13 Final Report to ATSRAC

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Presentation Outline

- HWG-13 Member / Participants
- Federal Register Tasking
- Task 1 Review
- Task 2 Review
- Task 3 Review
- STA Industry Proactive Efforts
- Recommendations to ATSRAC

HWG-13 Member / Participants

Name	Organization	Name	Organization
Jon Haag US Co-Chair	ALCS, Inc.	Gunnar Janke European Co-Chair	Jet Aviation - Basle
Jerome Buel	JAA/DGAC	Wilfrid Cote	Transport Canada
Bryan Easterwood	FAA	Glenn White	FAA
Dan Withers	FAA	Ric Peri	AEA
Ken Elias	ALPA	Mike Sevigny	Bombardier Aerospace
Mike Richardson	Cessna Aircraft	Dominique Bellon	Dassault Aviation (Retired)
Jean-Claude Laugeois	Dassault Aviation	Michel Larhantec	DFS Service Center
Jeff Derf	Gulfstream Aerospace	Rosita Green	Gulfstream Aerospace

HWG-13 Member / Participants

Name	Organization	Name	Organization
Keith Clevenger	Health South	Norm Hunt	Midcoast Aviation
Eli Cotti	NBAA	Frank Keefer	Raytheon Aircraft
Jeff Kouba	Southern Company	Harry van Soestbergen	Garrett Aviation



Federal Register Tasking

- Task 1 – Review existing STA OEMs wiring inspection procedures
- Task 2 – Identify and prepare, as necessary, criteria for upgrading and developing enhanced procedures for inspection, cleaning, reduction of combustible material, reduction of potential ignition sources, and maintenance of the EWIS on STA
- Task 3 – Develop and recommend compliance means to adopt the criteria referenced in Task 2 and incorporate the enhanced wiring inspection procedures in operators' maintenance programs

Task 1 Review

OEM ICA Review Methodology

- Make and Model Selection
 - Two (2) different aircraft make and/or models
 - One (1) older generation
 - One (1) newer generation
- Review of Current ICA requirements in regards to EWIS
- Perform a zone-by-zone review for ICAs that are specific to EWIS
- Perform a zone-by-zone review of current ICAs that include EWIS
- Develop a Chart or Matrix listing current ICAs by:
 - Aircraft Zone
 - ATA Chapter
 - Task Number
 - Task Description
 - Frequency of ICA (Calendar, Hours, Landings)
 - Pass/Fail Criteria availability (Yes/No)
- Determine the type of analysis process used to determine the need for the ICA
- Assess the effectiveness of the ICA based on the findings during HWG-10 aircraft evaluations
- Determine the percentage of total aircraft EWIS currently being inspected
- Develop a report for the members of HWG-13



Task 1 Aircraft Model Selection

- 10 Aircraft Models
- 5 Aircraft Manufacturers
 - 5 Older Generation (TC January 1970)
 - 5 Newer Generation (TC December 2003)



Task 1 Documents Reviewed for EWIS

- Instructions for Continuing Airworthiness (ICAs)
- Aircraft Maintenance Manual (AMMs)
- Standard Practice Manual (SPMs)

- AC 43.13-1B Chapter 11 (HWG-13 Additional Review)



ICA Development – Older Generation

- Engineering Analysis
 - Corrosion
 - Fatigue
 - MTBR
 - MTBF
 - Structural
- Internal Maintenance Review Board
- Maintenance Steering Group – 2 (MSG-2)
- Past product performance history
- System Safety Analysis



ICA Development - Newer Generation

- Engineering Analysis
- Internal Maintenance Review Board
- Maintenance Steering Group - 3 (MSG-3)
- Past product performance history
- Structure damage tolerance
- System Safety Analysis



ICA Development

- The only significant change between “older” and “newer” generation ICA development
 - Two (2) out of the five (5) newer generation models were using MSG-3 analysis

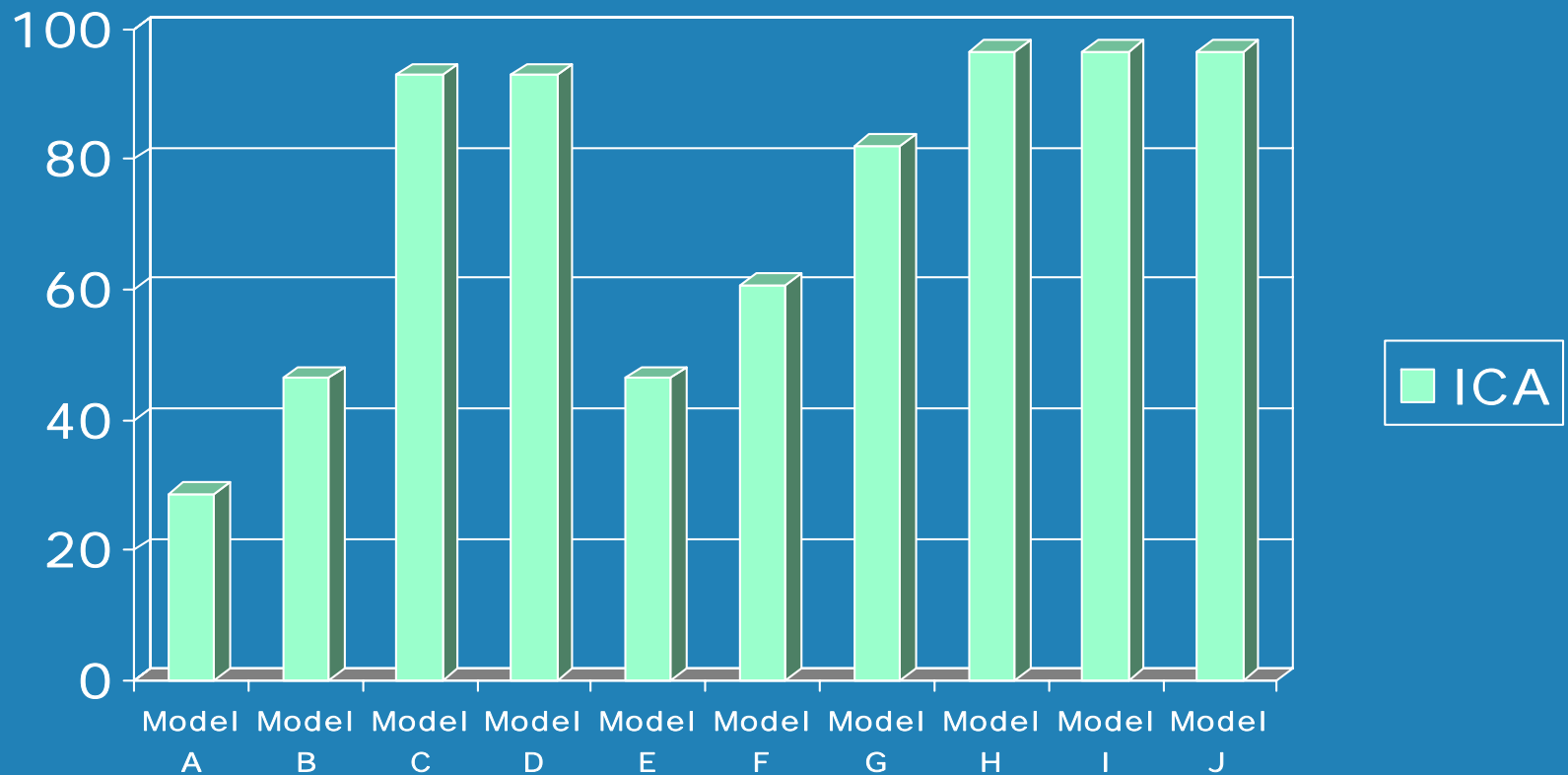
The future aircraft models going forward appear to be using the latest revision of MSG-3 with EZAP as part of the process.



Indications from the ICA Review

- All of the aircraft models reviewed had EWIS items currently in their respective ICAs
- Not all of the EWIS definition was covered by the different aircraft models
- Four (4) aircraft models had inspection requirements similar to the proposed EWIS definition
 - Two (2) aircraft models did not have the “cleanliness” portion (HWG-10 aircraft evaluations indicated 7 findings of 311 total sampling findings 2.25%)
 - Two (2) aircraft models did not have the EWIS “previous repair” portion (HWG-10 aircraft evaluations indicated 0 findings of 214 total sampling findings 0%)

OEM EWIS Percentages from the ICA Review





Overall EWIS Averages during ICA Review

- The overall OEM EWIS coverage average is approximately 73%
 - Currently Covered in existing ICA's



HWG-13 Concerns

- 2 areas of concern found during review
 - Inadequate Clearance to Structure
 - 39% of total sample findings
 - 38% of total significant findings
 - 70% of the OEMs currently include in ICAs
 - Clamp Condition/Sizing/Spacing
 - 20% of total sample findings
 - 80% of the OEMs currently include in ICA
- These two (2) issues account for approximately 60% (or 832) of total aircraft evaluation findings from HWG-10 Report



HWG-13 Concerns

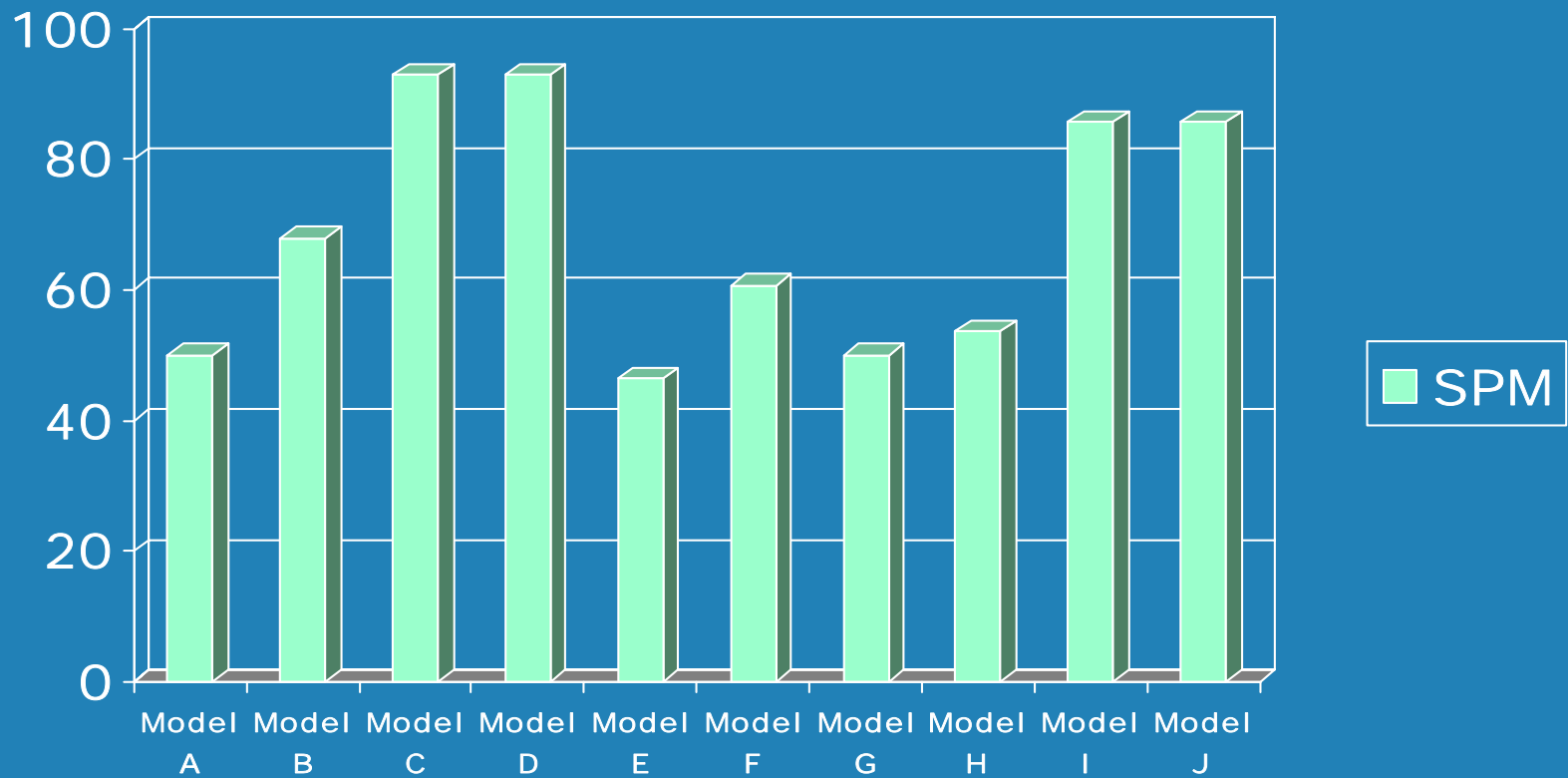
- ICAs are available to Inspectors and Technicians from all OEMs
 - Awareness and Training Issue
- Approximately 85% (excluding the "OTHER" category) of the sample findings were covered by current ICAs



Indications from SPM Review

- All of the aircraft models reviewed had EWIS items currently in their respective SPMs
- Not all of the EWIS definition was covered by the different aircraft models
- Findings were very similar to the ICA review

OEM EWIS Percentages from the SPM Review





Overall EWIS Averages during SPM Review

- The overall OEM EWIS coverage average is approximately 69%
 - Currently Covered in existing SPMs



HWG-13 Concerns

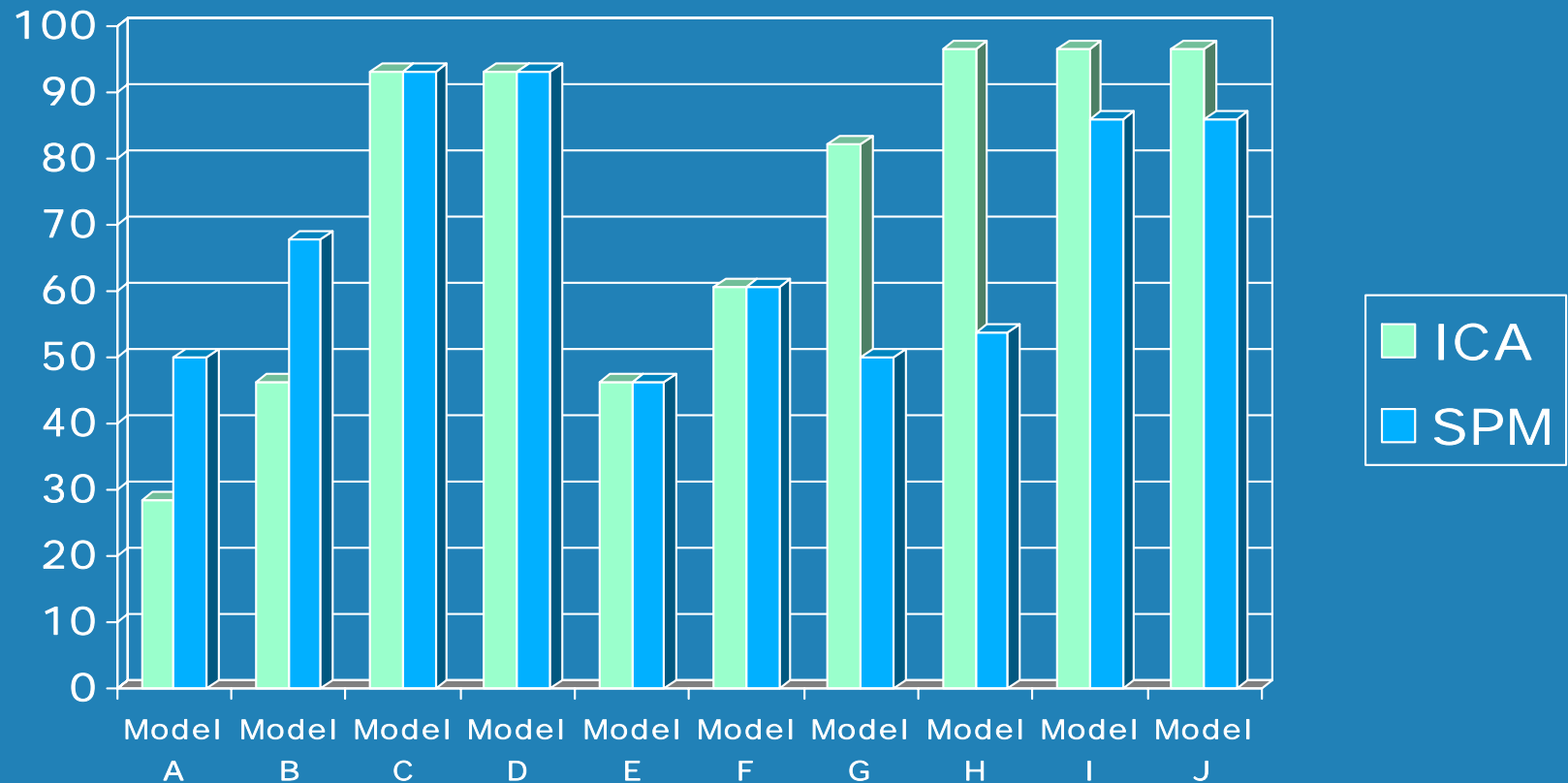
- 2 areas of concern found during review
 - Inadequate Clearance to Structure
 - 39% of total sample findings
 - 38% of total significant findings
 - 90% of the OEMs currently include in SPMs
 - Clamp Condition/Sizing/Spacing
 - 20% of total sample findings
 - 80% of the OEMs currently include in SPMs
- These two (2) issues account for approximately 60% (or 832) of total aircraft evaluation findings from HWG-10 Report



HWG-13 Concerns

- SPMs are available to Inspectors and Technicians from all OEMs
 - Awareness and Training Issue

OEM EWIS Percentages from the ICA & SPM Review





AC 43.13-1B Chapter 11 Review

- The AC currently incorporates 13 of the 14 (93%) items listed in the proposed EWIS definition
- There is no criteria for “pressure seals associated with EWIS”
- The criteria for connectors had shortfalls in comparison with requirements of the HWG-10 aircraft evaluation matrix



STA AC Chapter 11 Effectiveness

- Using the AC in conjunction with HWG-10 aircraft evaluation matrix – approximately 85% of the issues could have been captured

STA AC Chapter 11

Effectiveness

- Items not covered by AC
 - Contact Arcing/Fretting – total findings = 0
 - Missing Dummy Contacts / Seal Plugs – total findings = 1
 - Missing / Damaged Backshell – total findings = 10
 - Missing / Deteriorated Pressure Seals – total findings = 3
- Approximate effectiveness to HWG-10 findings = 99%



LTA AC Chapter 11 Effectiveness

- Using the AC in conjunction with HWG-10 aircraft evaluation matrix – approximately 85% of the issues could have been captured

LTA AC Chapter 11

Effectiveness

- Items not covered by AC
 - Contact Arcing/Fretting – total findings = 4
 - Missing Dummy Contacts / Seal Plugs – total findings = 23
 - Missing / Damaged Backshell – total findings = 51
 - Missing / Deteriorated Pressure Seals – total findings = 6
- Approximate effectiveness to HWG-1 & -2 findings = 97%



Task 1 Facts

- The aircraft evaluation findings from HWG-10 were validated during HWG-13 ICA, SPM, and AC 43.13-1B Chapter 11 review
- OEMs that currently captured more than 85% of the proposed EWIS definition in their ICAs and SPMs did not realize a substantial drop in the number of HWG-10 aircraft evaluation findings
 - The average findings per aircraft model were 258 findings
 - Model C findings were 311
 - Model I and J findings were 214
- Data is currently available for Inspectors and Technicians in regards to EWIS concepts



Task 2

Identify and prepare, as necessary, criteria for upgrading and developing enhanced procedures for inspection, cleaning, reduction of combustible material, reduction of potential ignition sources, and maintenance of the EWIS on STA



Task 2

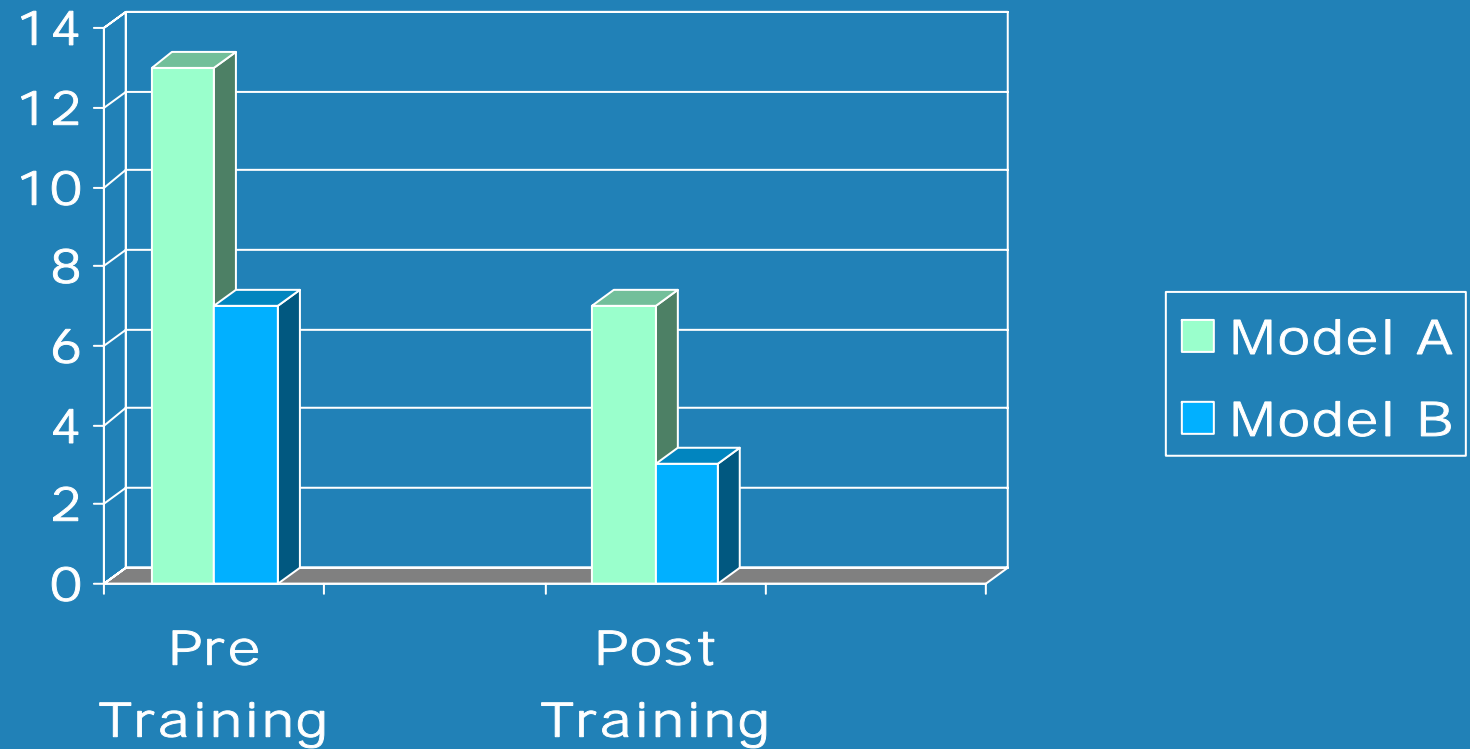
- HWG-13 determined that enhanced EWIS procedures can be easily incorporated into ICAs and SPMs through normal OEM revision processes
- Incorporating enhanced EWIS procedures into ICAs and SPMs is not the total “fix” of the problem
- Industry Awareness and Training must be enhanced



Awareness and Training Example

- One of the OEM's has incorporated an EWIS training program into their modification center
- They have tracked EWIS related discrepancies over several years
 - The next graph shows the two (2) aircraft models that training was performed

EWIS Training Matrix





STA OEMs Own the Inspection Program

- STA owners / operators operate under FAR 91 and 135 and do not develop their own inspection programs
- The OEMs are relied on by STA owners / operators
- FAR § 43.13 requires owners / operators to adhere to the instructions of continuous airworthiness and maintenance manuals provided by the OEMs



AC 43.13-1B Chapter 11

- When EWIS guidance from the OEM is not available – HWG-13 has determined that the AC is very effective in the inspection and maintenance of EWIS



Task 3

Develop and recommend compliance means to adopt the criteria referenced in Task 2 and incorporate the enhanced wiring inspection procedures in operators' maintenance programs



Current ICA Regulations

- FAR § 21.50 – Instructions for Continued Airworthiness and Manufacturer's Maintenance Manuals having Airworthiness Limitation Sections
- FAR § 25.1529 – Instructions for Continued Airworthiness
- FAR § 25 Appendix H – Instructions for Continued Airworthiness



Current ICA Regulations

- Regulations are available to the TC and STC holders in regards to developing ICAs
- The regulations do not specifically address EWIS at this time, there is a regulatory path for incorporating current and future EWIS requirements into ICAs as necessary



Aircraft Maintenance Regulation

- FAR § 43.13 (a) – Performance Rules (General)

Each person performing maintenance...on an aircraft...shall use methods, techniques, and practices prescribed in the current manufacturer's maintenance manual or Instructions of Continuous Airworthiness...



Operational Regulations

- FAR § 91.409 (f) – Inspections
 - ...The registered owner or operator...must select, identify in the aircraft maintenance records, and use one of the following programs...
 - 1. A continuous airworthiness inspection program...
 - 2. An approved aircraft inspection program...
 - 3. A current inspection program recommended by the manufacturer.
 - 4. Any other inspection program established by the registered owner or operator...and approved by the Administrator

Operational Regulations

- FAR § 135.411 (a) – Applicability

This subpart prescribes rules...for the maintenance, preventative maintenance, and alterations for each certificate holder as follows:

1. Aircraft that are type certificated...nine seats or less, shall be maintained under parts 91 and 43...An approved aircraft inspection program...
2. Aircraft that are type certificated...10 seats or more shall be maintained under a maintenance program FAR § 135.415, .416, .417, .422, and .424 through .443 (**CAMP**)



STA Regulation Facts

- ICA Regulations are currently available
- Aircraft Maintenance Regulation is very specific to what documentation is required to be used to maintain the aircraft



STA Regulation Facts

- Operational Regulations are in place to ensure aircraft are maintained
 - 91 owner/operators follow OEM inspection programs
 - 135 owner/operators use approved inspection programs either AAIP or CAMP
 - These programs are based on the OEM ICAs
 - Revisions made to the OEM ICAs are captured
 - Regulatory oversight is available for both STA regulations

STA Industry Proactive Efforts

- Continued periodic publication information
- NBAA/AEA sponsored EWIS presentation and roundtable discussion – NBAA Convention 2004 with
 - Aircraft Manufacturer Representatives
 - Maintenance Repair Organization Representatives
- OEM EWIS presentations to Owner/Operators during Maintenance and Operation conferences
- Ongoing EWIS Awareness and Training
 - AEA seminars around the world to:
 - Authorized OEM Service Centers
 - Inspector Authorization Renewal Seminars
 - Inspectors/Technicians
 - Maintenance Repair Organizations
 - Regulatory Agencies
 - OEM internal production and completion EWIS training
 - NBAA Regional forums, conferences, and dedicated I.A. renewal workshops
- EWIS training materials provided to CASSD-Miter for posting on the ATSRAC web page
- HWG-10 final report and articles posted to NBAA Technical Committee web page
- EWIS discussed during NBAA model specific Technical Committee meetings



HWG-13 Recommendations to ATSRAC

1. FAA recommendations:
 - a. "EWIS training" as part of the training requirements for Part 145 repair stations.
 - b. Incorporating EWIS training as part of FAA Safety Training Programs (I.A. renewal) maintenance seminars & conferences.
2. STA OEMs should voluntarily:
 - a. Resolve "GAP" EWIS concepts and/or definitions found during their review of their Instructions of Continuous Airworthiness and Standard Practice Manuals
 - b. Enhance the ICAs with EWIS information as needed.
 - c. Include EWIS training (i.e. ICA and SPM) into initial and recurrent factory approved training curriculums.
3. Industry continues its awareness and training programs in regards to EWIS.



HWG-13 Additional Recommendations to ATSRAC

- FAA to revise AC 43.13-1B Chapter 11 to include the "gap" items from the proposed EWIS definition:
 - Currently there is a working group developed to review this AC and incorporate revisions as necessarily.
 - This group is based on Part 23 aircraft however, as the review process has shown it should be expanded to Part 25 aircraft.



Question