

ATSRAC Proposed Tasking

(These tasking statements are draft. Changes may occur following formal FAA Rulemaking Procedures and ATSRAC Tasking policy)

General

The method by which these proposed taskings will be accomplished, if accepted, can be found in the ATSRAC Operating Procedures. As with typical rulemaking projects the FAA will seek to obtain harmonization with the JAA and Transport Canada.

For these proposed taskings the desired intent of ATSRAC is to:

- (1) Gain public input early in the rulemaking and policy process.
- (2) Improve rules and policy by involving interested members of the public in their development.
- (3) Include the concerns and opinions of the public in the document thereby reducing the probability of non supportive public comments in response to rulemaking or policy document publication and issuance.
- (4) Move rules through the rulemaking process more quickly. (The Office of the Secretary of Transportation (OST) and the Office of Management and Budget (OMB) favor rulemaking developed with public input).
- (5) Avoid placing any unnecessary burden on the public because of a lack of information.

Completion of these proposed tasks will provide rulemaking advice and recommendations to the Administrator, through the Associate Administrator for Regulation and Certification

ATSRAC may accept or decline the tasks offered by the FAA. Once a task is accepted, ATSRAC may not modify the task without approval by the FAA. ATSRAC may recommend new tasks to the FAA; however, only tasks assigned or approved by the FAA may be undertaken. In the conduct of its activities, ATSRAC complies fully with administrative directives of the FAA pertaining to advisory committees.

ATSRAC is requested to provide their intent on acceptance of these proposed tasks at the next ATSRAC meeting on February 8, 2001. The tasks, as proposed below, are provided to allow sufficient review and coordination within your respective organizations. Please provide comments to Kent Hollinger, Chair and Chuck Huber, Executive Director with copy to all ATSRAC members.

The following guidelines for completion of the proposed taskings are as follows:

- All taskings will consider the conclusions and recommendations from the Intrusive Inspection Report
- All taskings will require submittal of a report and not drafting of rulemaking language or advisory material
- FAA will draft rules and ACs based on reports received from ATSRAC
- ATSRAC will be given opportunity to review the FAA drafted rules and ACs
- Reports should be delivered to the FAA by November 2001.

ATSRAC Tasks 1 through 5 have been completed. New taskings will be numbered sequentially beginning with Task 6. The information contained below address the technical concerns for the respective rulemaking and advisory circular tasks. Following this description of new tasking is a Proposed ATSRAC WG Report Format for submittal of the rulemaking tasks.

Task 6, Wire System Design Requirements and ICA

Comment:

Under the FAR-JAR 25 Harmonization Program carried out within ARAC, the Electrical Systems Harmonization Working Group recently completed its reports on regulatory paragraphs and/or advisory material related to electrical systems. We understand that the FAA is now drafting the related NPRM's and advisory material.

Also, harmonization work is in progress for FAR-JAR 25.1309, within the ARAC Systems Design and Analysis Harmonization Working Group.

We recommend that the ATSRAC Task 6 Statement clearly mention the need to review these groups' outputs and to organize coordination with them. We also recommend that FAA and JAA formally establish the Task 6 working group as a Harmonization Working Group. The changes that we are proposing to the Task 6 statement, below, reflect these recommendations.

To upgrade the FAA requirements in the areas of design and instructions for continued airworthiness of the wiring for transport airplanes, ATSRAC is requested to establish a working group to provide a report to the FAA that will include response and recommendations to the following tasking statements. This working group should be established as a FAR Part 25 / JAR-25 Harmonization Working Group, and be comprised of, as a minimum, representatives from type certificate and supplemental type certificate holders, operators and regulatory authorities. This group should establish working methods ensuring proper coordination with the ARAC Electrical Systems Harmonization Working Group and the Systems Design & Analysis Harmonization Working Group, whose Terms of Reference are addressing related subjects. Coordination means may include cross-membership, joint meetings, systematic exchange of documents, etc.

The FAA will use this report as the basis to develop a new FAR Part 25 regulation for wire systems, associated guidance material and improvement to the Instructions for Continued Airworthiness for wire systems.

Tasking Statements

- 1) Current requirements for the certification of wire systems are contained in various paragraphs throughout FAR Part 25. This reduces the visibility of the requirements and does not facilitate a comprehensive process for the design and certification of wire systems. Therefore, ATSRAC is tasked to
 - a) Review all CFR 14 Part 25 and JAR-25 paragraphs and ARAC recommendations related to wiring systems and
 - i) Submit recommendations for combining the existing paragraphs and creating a new paragraph covering wiring for all airplane systems
 - ii) Submit any necessary recommendations to these paragraphs to consider aging effects taking into account the conclusions and recommendations as contained in the ATSRAC recommendations from the Intrusive Inspection Report, January 2001.
 - b) Review the existing advisory material, guidelines and policies regarding the design and installation of wiring systems, as well as related ARAC recommendations, and
 - i) Submit recommendations for necessary changes as pertaining to the aging effects on wiring as noted in the previous recommendations submitted by ATSRAC, and in particular the Intrusive Inspection report..
 - ii)
 - c) Review FAR Part 25.1309, AC 25.1309-1A, corresponding JAR-25 material, related ARAC recommendations, JAA NPA 25F-281, and draft AC 25.1309-1B and
 - i) Submit discussion on the adequacy of coverage for common cause analysis and recommend any necessary changes for the applicability to wire systems. (Common Cause analysis includes zonal safety analysis, common mode analysis and particular risk analysis.)
 - ii) Submit recommendations for the inclusion in the proposed FAR 25 wire system requirement for specific compliance procedures to 25.1309 requirements
 - iii) Submit recommendation for inclusion of all potential wiring failures, including aging effects, for the System Safety Assessments performed in compliance to 25.1309.

- 2) Review existing FAA/JAA guidance, ARAC recommendations and industry documentation for wire separation requirements and guidance. Submit recommendations for revisions to existing wire separation requirements and guidance material. FAR Part 25.1353 contains wire separation requirements for high current carrying wires. The recommendations contained from this subtask should result in general requirements for all wire systems regarding wire separation.

Maintaining proper wire separation requires the need to adequately define the criticality of the functions contained in any given wire bundle. In addition, it may be prudent to allow more detailed inspections of wire bundles which contain wires associated with critical functions. Therefore ATSRAC is tasked to:

- i) consider and submit recommendations on the need to identify wire and/or wire bundles with critical functions, and
- ii) recommend the best means for making these identifications for both new and amended type designs and current type designs with airplanes in service.

Comment: It is proposed that Task 6 subtask 3 associated with Instructions for Continued Airworthiness would be better handled by the same WG that will address changes to maintenance criteria. That WG will be addressing enhanced maintenance programs that form part of the ICAs. It is considered unrealistic to expect design/certification specialists required to address Task 6 subtasks 1 and 2 to also have the background knowledge to review the ICAs. Task 6 membership could be increased to rectify this situation but it would seem more efficient to use the existing Task 9 WG to perform this task.

- ~~3) Previous recommendations from ATSRAC have shown that improper maintenance, repair, and modifications often accelerate the "aging" of wire systems. To properly maintain, repair and modify airplane wiring certain data must be available to the designer, engineer and installer. This data should be part of the Instructions for Continued Airworthiness as required in FAR Part 25.1529. Therefore, ATSRAC is tasked to provide comment and recommendation for inclusion of the following in Appendix H, FAR Part 25 Instructions for Continued Airworthiness:~~

- ~~i) Standard Wire Practices Manual, as reformatted improved under different ATSRAC tasking~~
 - ~~ii) Wire Separation Document~~
 - ~~iii) Identification of criticality~~
 - ~~iv) Electrical Load Analysis~~
 - ~~v) Enhanced Zonal Analysis Procedure (EZAP) data*~~
- ~~* The Enhanced Zonal Analysis Procedure (EZAP) logic can be used by type design holders or airplane operators to enhance the~~

~~maintenance programs of in-service type designs. This includes type designs currently being produced, and type designs that are no longer in production.~~

~~The EZAP logic can also be used during the development of maintenance programs for new aircraft type designs. The EZAP logic can also be applied to previously installed STCs, either by the STC holder or the airplane owner or operator.~~

~~The holder of a design approval, including either the type certificate or supplemental type certificate (STC) for an aircraft for which the application was made after January 28, 1981, should supplement the Instructions for Continued Airworthiness (ICA) based on the EZAP logic, and provide the current airplane owner or operator with those ICA's~~

~~The holder of a design approval, including either the type certificate or supplemental type certificate (STC), for an aircraft for which the application was made prior to January 28, 1981, should supplement any maintenance instructions provided with the issuance of the original STC based on the EZAP logic, and provide the current airplane owner or operator with those maintenance instructions.~~

Task 7, Standard Wire Practice Manual (SWPM) Format

The FAA is proposing to implement the ATSRAC Task Group 4 recommendations for a revised SWPM through this proposed tasking. For reference, the recommendations from Task Group 4 follow the tasking statements. As this is not a rulemaking project the recommendation to the FAA will not followed the Proposed ATSRAC WG Report Format. A working group consisting of, as a minimum, ATA, operators, aircraft and component manufacturers, and regulatory authorities shall define a standardized structure for the SWPM of major sections for standard practices dealing with wire, cable and other wiring components of the aircraft's electrical system for inclusion into ATA 100/i2200.

Tasking Statements

7. The SWPM structure shall allow for operators of different aircraft types from different manufacturers the ability to retrieve standard wiring repair and maintenance information from the maintenance manual or wiring diagram manual using an standard indexing scheme. Comment 1: A standard indexing system can only be decided by the ATA working groups. If manufacturers are compelled to use a standard indexing system, then we should consider (via ATA) whether the use of chapter 20 as the starting point (first two digits) is now superfluous for both A/C manufacturers because of the transfer of WDM ATA 20 data into a separate stand-alone manual (ESPM). This would give A/C manufacturers more flexibility in the assignment of material.

The information/data format shall be useable and readily retrievable, in either electronic format or hardcopy form, by field level technicians that are performing the maintenance and repairs.

Human factors considerations shall be taken into account when defining the structure such that the potential for human error has been minimized in interpreting wiring practices information.

The structure shall also allow inclusion of wiring repair and maintenance information supplied by component manufacturers (e.g. LRUs and other types of system equipment) such that wiring repair and maintenance information for entire wiring systems, including both aircraft wiring and system/subsystem wiring, can be readily retrievable. ~~The structure and indexing scheme shall be developed to facilitate classification of wiring systems related corrective action for reliability reporting. It is expected that manufacturers will develop or convert wiring system installation, maintenance, and repair procedures for new aircraft and existing aircraft using the standardized format developed by the working group in a timely manner.~~

Comment 2: Refers to the ATA 97 - Wire Reporting covered by ATA 100 Rev. Revision 37 (1999) which added new Chap 97 to cover wiring discrepancy reporting

The only question that must be asked is whether this "Chap 97" is accepted by the community, already there are other proposals on offer, so maybe the ATSRAC should ask ATA to revamp "Wire Reporting" in light of any ATSRAC findings.

2) The working group members shall develop a ~~standardized~~ and enhance the technical content for repair and maintenance of aircraft and component wiring systems for inclusion into the standardized ATA 100/i2200 format. The technical content shall utilize source data from ATA Spec 117 and applicable FAA Advisory Circulars, and address the following subjects as a minimum:

Comment 3: Technical content cannot by definition be "standardized". The technical content can be "enhanced" by the inclusion of ATA 117, Acs etc.

Cleaning Requirements and Methods: This task should describe and promote the "protect, clean as you go" philosophy. The task should provide recommended instructions and describe non-destructive methods for cleaning, dust, dirt, FOD, lavatory fluid, and other contaminants produced by an aircraft environment from wiring systems. When an accumulation of contaminants, both on the surface and/or imbedded in the wire bundle, cannot be safely removed without damaging the wire insulation, then wiring replacement should be accomplished. ~~Periodic wire cleaning to coincide with general visual inspections shall be developed. Periodic cleaning of the aircraft area, or zones, of contaminants that may accumulate on wire insulation in that area or zone should be prescribed.~~

Comment 4: Scheduled maintenance requirements shall be developed through application of the EZAP and inserted in the Maintenance Program. Requesting these requirements to be stated in the SWPM (or whatever) risks conflict with the Maintenance Program.

When performing maintenance, inspection, or repair, either on wiring systems or other aircraft systems, or structures, methods shall be employed to emphasize protection and minimize risk to wiring systems from accidental damage, or contamination.

Wire and Cable Identification. Requirements for wire and cable identification and marking should be specified to provide safety of operation, safety to maintenance personnel, and ease of maintenance.. Methods of direct wire marking should be specified. If hot stamping methods are to be specified, the proper limitations and precautions should be included since service history has shown problems associated with hot stamping due to insulation damage caused during the process. For indirect marking methods, tagging requirements shall be specified including minimum tag spacing and location requirements.

Wire and Cable Damage Limits. Limits shall be specified to positively identify the thresholds where damaged wire/cable replacement may be necessary and

where repairs can be safely accomplished. Limits shall be established for each applicable wire/cable type. Damage limits for terminals, studs, connectors, and other wiring system components should also be included, as necessary. Structural repair limits shall be specified or referenced for cases where electrical arcing can cause structural damage.

Installation Clamping and Routing Requirements. Specify the requirements for the installation of wiring systems with respect to physical attachment to the aircraft structure. The requirements shall be compatible with the different environments applicable to aircraft and aircraft systems. Specify applicable methods of clamping, support, termination, and routing to facilitate installation, repair and maintenance of wires, wire bundles, and cabling. Establish minimum bend radii for different types of wire and cable. Specify minimum clearance limits for minimum clearance between wiring and other aircraft systems and aircraft structure. Include the requirements for the installation of wiring conduit with respect to physical attachment, routing, bend radii, drain holes, and end coverings. Emphasize special wiring protective features associated with safety critical systems, such as spatial separation, segregation, or shielding, that are required to be maintained throughout the life of the aircraft.

Repair and Replacement Procedures. In addition to establishing damage limits as described above, methods shall be described to safely repair and/or replace wiring and wiring system components. Include types and maximum numbers of splice repairs for wiring. When splicing wire, environmental splices are highly recommended over non-environmental splices. ~~Inspection intervals should be established for permanent and temporary wire splices. These intervals should be as consistent as practical with existing airplane area or zonal general visual inspections. Temporary repairs may need to be inspected more often.~~ Guidance should be provided on how long a temporary splice may be left in the wire.

Comment 5: Inspection intervals are to be defined by maintenance program specialists. That activity should not be automatically overruled by the SWPM. Visible permanent repairs will be inspected during the scheduled zonal inspection. If the repair is not considered sufficiently robust to reach that inspection without showing signs of degradation then it should be identified as a temporary repair. Temporary repairs should be eliminated at the next suitable downtime (e.g. C-check). It is thus not relevant to identify periodic inspections.

-Procedures for the repair, replacement, and maintenance of connectors, terminals, modular terminal blocks, and other wiring components shall be specified.

Inspection Methods. Wiring inspection methods shall include a stand-alone

Comment 6: Inspection methods from EZAP will include GVI and DET. GVIs may be standalone or performed as part of zonal inspections. There is no need for the tasking statement to refer to 'standalone'.

general visual inspection (GVI), or a detailed visual inspection, as determined by the EZAP. Established and emerging new technology non-destructive test methods shall be specified, as applicable, to complement the visual inspection process. Inspection methods shall be able to detect wiring problems such as heat damage, chafing, cracked insulation, arcing, insulation delamination, corrosion, broken wire or terminal, loose terminals, bend radii, contamination, and deteriorated repairs without compromising the integrity of the installation.

Comment 7: This repeats previous Task 3 WG activity but ignores their conclusion that it is impracticable, today, to call for periodic checks using NDT. Perhaps the whole paragraph should be limited to non-scheduled inspections. ie, those where a deterioration is witnessed or where a repair leads to greater susceptibility to deterioration. The proposed wording change is intended to reflect the importance of identifying new technology that does not require disconnection of wiring or application of liquids on the wiring both of which are assessed to lead to more deterioration than they would identify.

- 3) The working group members shall establish minimum requirements for recurrent training of maintenance technicians to include Chapter 20 extract with particular focus on aging and degradation of wiring systems. Human factors considerations shall be taken into account when developing training requirements such that the potential for human error has been minimized in interpreting wiring practices training materials. The training requirements shall utilize source data from ATA Spec 117 and applicable FAA Advisory Circulars, and include as a minimum:

Safety- Stress the importance of proper installation, repair, and maintenance of wiring systems by describing the various consequences of wiring systems faults such as overheat, arcing damage, smoke, fire, and loss of systems. Consider the inclusion of actual service history events, incidents, and accidents.

Degradation of Wire Installations- Review the major factors influencing wire systems degradation, including improper installation, vibration, moisture, heat, contamination, and indirect damage from proximate systems.

Corrosion of Components- Describe the causes and effects of wiring system corrosion including electrolysis, oxidation, and other forms of corrosion. Specify inspection methods and limits associated with visual or electrical corrosion detection.

Chemical Contamination- Describe types and effects of chemical contamination such as hydraulic fluids, fuels, solvents, cleaning fluids, and other caustic materials/fluids on wiring system components.

Accumulation of Dust, Lint, and Debris- Review the effects of dust, lint, and other debris material on wiring systems. Stress the importance of the effects on wiring insulation flammability characteristics that dust, lint, and other contaminants may pose. Emphasize the destructive effects that can occur on wire bundles that have been contaminated with aluminum shavings.

Damage Prevention and Cleaning- Highlight prevention as number one and “protect; clean as you go” philosophies to reduce potential for damage to wiring systems due to contamination. Review non-destructive methods of safely cleaning wiring systems from dust, dirt, FOD, lavatory fluids, and other contaminants typical of an aircraft environment. Discuss limits where heavy accumulation of contaminants cannot be safely removed, such that wire replacement is necessary. Emphasize the importance of periodic cleaning ~~when performing wiring general visual inspections~~ identified in post EZAP maintenance program.

Comment 8: If SWPMs call for periodic cleaning during GVI performance then there is no value in that part of the EZAP logic that addresses the development of cleaning tasks. The EZAP logic targets particular areas based on several factors – the idea being to limit the task to those areas where most benefit will be gained. There should not be a recommendation to clean every time a wiring GVI is performed. Firstly it is impractical and secondly, if enforced, it will cause intervals to be extended due to the added burden.

- 4) ATSRAC should consider and recommend to the FAA on the need to update SWPMs already in use under existing airline and repair station programs. ATSRAC is also tasked to provide adequate justification to their decision. If ATSRAC determines that existing manuals should be updated a proposed method and compliance schedule should be included in the recommendation.

Comment9: We must ensure the “methods and compliance schedule” are acceptable, but this could be difficult. See also my comments concerning “standard” content and “standard” indexing above.

ATSRAC TaskGroup 4 Recommendations

1) Aircraft and component manufacturers should provide standard practices for care and maintenance of wiring systems. Some examples to be included as a minimum content are:

- Cleaning requirements & methods
- Wire & cable identification
- Damage limits by wire/cable type
- Installation limits/ requirements dealing with clamping/support, bundle clearances, routing, etc.
- Inspection methods
- Repair/replacement procedures
- Wire & cable replacement alternates, noting effectivity limits
- General maintenance practices in the aircraft maintenance, structural repair & component manuals to prevent damage to wire & cable during accomplishment of servicing, inspection or repairs
- Types and number of splice repairs including time and location limitations for their replacement

2) Add requirements in ATA 100/i2200 for standard practices for wiring systems. The ATA working group should define a structure of major sections for standard practices dealing with wire, cable and other components of the aircraft's electrical system in ATA 100/i2200. These may be included as a new chapter (19) within the aircraft maintenance manual or remain as chapter 20 within the Wiring Diagram Manual. The structure should also make provisions for use by component manufacturers and lend itself to the classification of corrective action for reliability reporting by operators. Manufacturers would provide detail and content for the subsections.

3) Included in Chapter 20 SWPM any standard practices that may be required to support any revised maintenance programs coming out of Task Group 3.

4) Assess changes in standard practices for wiring systems which are brought about by recommendations in final report from the Intrusive Inspections.

5) Establish the requirement for recurrent qualification training of maintenance technicians to include WDM Ch 20 extract, with particular attention to aging concerns including:

- Safety
- Degradation of wire insulation
- Corrosion of components
- Contamination due to chemically active material
- Accumulation of dust, lint, debris
- Damage prevention and cleaning

6) Encourage all applicable training programs to highlight prevention as number one and “clean as you go” approaches to reduce potential for compromising nearby wiring installation.

7) WDM Chapter 20 standards and supporting documentation including ATA Spec 117 and applicable FAA advisory circulars should be included as source data to create a training program.

8) Highlight the “human factors” element during training for all disciplines to assure that standard practices are followed.

Task 8, Enhanced Maintenance and Training Program for Systems

Previous tasking to ATSRAC resulted in recommendations regarding enhanced maintenance and training program development. Maintenance procedures currently in use in the air transport industry may not adequately or proactively address aging non-structural systems. Therefore, there is a need to define general criteria for maintenance and inspection activities which maintenance programs should exhibit to address aging systems issues. The previous ATSRAC task was to improve general maintenance criteria for airplane systems to assure aging systems related problems are identified and corrected. This was done by developing enhancements to the maintenance planning procedures, maintenance procedures, inspection procedures, inspection criteria, procedures for protection of systems during maintenance, and maintenance training programs to ensure that aging systems issues are adequately addressed. These enhancements, when applied to a specific airplane type should lead to development of an airplane model specific maintenance program which adequately addresses aging systems issues.

To assist the FAA in formulating appropriate rulemaking and guidance pertaining to aircraft wiring maintenance and training, ATSRAC is tasked to identify and appoint a working group to assist the FAA in the development of a draft advisory circular (AC) and possible rulemaking actions. The AC should provide a basis for a “generic wiring maintenance and training program” establishing a training program that addresses wiring issues. This AC shall be

Comment 1: In order to clarify tasking, it is proposed that Task 8 addresses all Training issues and Task 9 addresses all enhancements to Maintenance issues. The term 'generic wiring maintenance and training program' is confusing. This Task will provide guidelines to enhance maintenance training in wiring issues. The word 'generic' is questionable in this context. The AC will not suggest a 'generic' training program. It will simply provide the guidelines on how to establish these. An OEM may subsequently develop a generic training program.

directed toward those CFR 14 Part 25 Transport Category aircraft currently being used in part(s) 91, 121, 125, 129 and 145 operations. It should be understood that all potential users of this AC do not have maintenance or inspection programs developed under the auspices of a Maintenance Review Board (MRB) using the ATA MSG-3 process. Some users will be operating aircraft that have maintenance or inspection programs developed using MSG-1, and MSG-2 process using earlier methodologies.

Comment 2: The reference to MSG-1 and -2 is fully understood. However, by writing this there is then an understanding that 'pre MSG' aircraft are not concerned. It was understood that all CFR 14 Part 25 Transport Cat aircraft are concerned.

The resultant AC should be applicable to air carrier operations, repair station programs, and other operators of these aircraft.

Selected ATSRAC participants should have expertise in ~~maintenance program development, wiring/avionics maintenance, and training program development.~~

Comment 3: Since it is proposed to transfer all Maintenance issues, including maintenance program enhancements, to Task 9 there is no longer a requirement for Task 8 WG to include specialists in maintenance program development.

Tasking Statement:

- 1) ~~Review-Utilize~~ recommendations from the previous ATSRAC working group reports, along with existing instructions for continued airworthiness and 'lessons learned' from aircraft surveys performed by type design holders and airlines, with respect to wiring maintenance, training and modification best practices on transport airplanes. ~~and "lessons learned" from type design holders and airlines, with respect to wiring maintenance, training and alteration best practices on transport airplanes.~~

Comment 4: No need to review recommendations already agreed by ATSRAC. They now need to be used. Clarify that 'lessons learned' refers to the summary presented to ATSRAC by OEMs.

- 2) Recommend to the FAA which models of transport airplanes the following rulemaking and advisory circular would apply.
- 3) Based on the review in item 1) identify those items which should be included in guidance material for development of a an enhanced maintenance, and training program for systems. The FAA will provide an outline of the draft AC to the working group. The working group will develop a report that will allow the FAA to draft the associated advisory circular.
- ~~4) ATSRAC shall also identify and recommend, in the report required by item 3), any necessary maintenance practices that should be mandatory.~~

Comment 5: Subtask 4 in the FAA proposed tasking is proposed to be transferred to Task 9.

- ~~5) 5) Develop a process for coordination between Working Group 8 and 9 since the training must reflect the enhanced maintenance requirements. for working group coordination between the Enhanced Maintenance and Training Program for Systems WG and the EZAP WG. As both of these working groups are~~

~~developing advisory material for maintenance program enhancements close
coordination will be necessary.~~

*Comment 6: In the revised proposal, Task 8 is working training issues and
Task 9 maintenance issues.*

Task 9, Enhanced Maintenance Practices for Systems Zonal Analysis Procedure

Comment 1: The introduction to this task should be expanded to clarify the revised scope of Task 9. The original FAA proposal was to limit Task 9 to EZAP. In addition to this, Task 9 WG should address:

- 1) other changes to maintenance practices recommended by Task 3 WG (e.g. GVI/DET definitions, expectations of a Zonal Inspection, handling of SEDLP and housekeeping culture issues. These are not addressed by application of EZAP. It was not clear whether FAA had expected these to be covered by Task 8 but, if that was the case, that does not seem to be the appropriate WG.
- 2) the need to examine changes to Part 25.1529 Appendix H 'Instructions for Continued Airworthiness'. This was originally allocated to Task 6 but the specialists for this subject will be in Task 9.

As a result of the initial ATSRAC tasking, the Maintenance Practices working group identified a logical means that could be applied to in-service aircraft and new designs to ensure that adequate consideration is given to potential deterioration of system installations. The target was to develop a common process for old and new designs. The outcome was an enhanced zonal analysis procedure.

Unlike existing zonal analysis methodology, application of the enhanced procedure leads to the identification of Restoration (e.g, cleaning) tasks, Detailed Inspections and stand-alone GVIs as well as Zonal Inspections. Consequently the revised zonal analysis methodology leads to more than just a list of GVI tasks to be included in an operator's Zonal Inspection Program.

The enhanced part of the Zonal Analysis Procedure is performed on zones that contain wiring. It consists of:

- an assessment of the potential sources of combustible material within the zone either occurring due to contamination (e.g, dust/lint or fuel vapor leaks) as a result of design (e.g, fuel vapor in tanks)
- identification of effective tasks that would minimize the build-up of combustible contaminants (e.g, cleaning to remove dust/lint) or minimize the occurrence of combustible contaminants (e.g, DET of a particular pipe running alongside a harness)
- an assessment of the potential for a localized wiring fire (in a zone with no combustible materials) to disable adjacent flight control systems such that continued safe flight and landing might be jeopardized
- definition of the most appropriate restoration task and determination of a suitable repeat interval
- definition of appropriate inspection level for wiring in zones that may be subject to combustible material

- determination of suitable intervals for the defined inspections

An applicable rating system has to be developed to allow the definition of the inspection level for installed wiring and also a rating system for the definition of a task interval .

Application of the enhanced zonal analysis procedure will permit appropriate attention to be given to wiring installations. It will be possible to select stand-alone visual inspections (either General or Detailed) and tasks to minimize the presence of combustible material. The outcome of the enhanced zonal analysis procedure (EZAP) logic will be a model-specific ~~Enhanced Zonal Inspection Program (EZIP) for those type designs that have zonal inspection programs, or an enhanced maintenance program for other type designs.~~ Enhanced System program. In addition, for those type designs that today do not have a MSG-3 derived zonal inspection program, the outcome will include a new or enhanced zonal inspection program.

Comment 2: There still seems to be confusion on the impact EZAP on existing programs. To clarify:

On Post MSG-3 aircraft, EZAP will result in an enhanced Systems/Powerplant program.

On Pre MSG-3 aircraft with an approved Zonal Program, EZAP will result in an enhanced Systems/Powerplant program plus, most likely, an enhanced Zonal Inspection Program (EZIP).

On Pre MSG-3 aircraft with no approved Zonal Program, EZAP will result in an enhanced Systems/Powerplant program plus a Zonal Inspection Program (ZIP).

The term 'EZIP' is thus valid for only one of the three scenarios.

Tasking Statement:

To assist the FAA in formulating appropriate guidelines for future rulemaking pertaining to enhanced zonal inspections of transport aircraft, ATSRAC will:

Comment 3. The word zonal is deleted since this is too limiting (see Comment 3) Most of the enhancements will come from standalone GVIs and Detailed Inspections, not zonal inspections.

- 1) Identify and appoint an ATSRAC working group to assist the FAA in the development of a draft Special Federal Aviation Regulation (SFAR) and Advisory Circular (AC) to develop an enhanced maintenance and inspection program ~~Enhanced Zonal Inspection Program (EZIP) based on the EZAP logic for those type designs that have a zonal inspection program, or an enhanced maintenance program for other type designs.~~ . Selected ATSRAC participants should have expertise in design, maintenance program development and, wiring/avionics maintenance.

The proposed SFAR will likely apply to the holders of type certificates, and supplemental type certificates that install wire bundles or significantly ~~effect~~ affect the installation of existing wiring. Under the proposed SFAR, each type certificate (TC) holder, or supplemental type certificate (STC) holder of a modification affecting the airplane wiring systems, will be required to develop an EZIP enhanced maintenance and inspection program based on the EZAP logic ~~for those type designs that have a zonal inspection program, or an enhanced maintenance program for other type designs, as applicable.~~ STC holders will likely be required to augment the Instructions for Continued Airworthiness or maintenance instructions based on the EZAP logic.

Comment 4. Both paragraphs reworded to avoid the use of EZIP. Application of EZAP generates enhancements primarily to the Systems/Powerplant Program, not the ZIP. See comment 1. For this task it is not necessary to have anyone with training expertise.

- 2) Review pertinent recommendations of the ATSRAC Maintenance Practices (Task 3) working group, particularly its final report's "zonal analysis procedure" methodology, and recommend proposed contents of a draft SFAR to require enhancement of existing ~~zonal maintenance and inspection programs based on the EZAP logic, or an enhanced maintenance program for those type designs that do not have a zonal inspection program.~~ The working group is requested to recommend to the FAA appropriate SFAR timelines for aircraft type design holders to complete their application for the EZAP logic respective EZIP or other maintenance actions based on EZAP logic for each aircraft.

Comment 5: Modified to reflect previous comments.

- 4) Develop a process for ~~working group coordination between the Enhanced Maintenance and Training Program for Systems WG and the EZIP WG. As both of these working groups are developing advisory material for maintenance program enhancements close coordination will be necessary for coordination between WG 6, 8 and 9. In particular, changes proposed to 25.1529 Appendix H shall be harmonized between FAA and JAA according to the same ARAC procedures that are proposed to be followed by Task 6.~~

Comment 6: Modified to reflect need for coordination with Task 6 WG and to remove statement that infers that Task 8 will address maintenance issues.

- 5) Task 9 shall also identify and recommend any necessary maintenance practices that should be mandatory.

Comment 7: The following subtask has been transferred from Task 8 since it has nothing to do with Training.

Comment 8: The following task was originally identified as Task 6 subtask 3. It is proposed that Task 9 WG are better suited to reviewing necessary enhancements to 25.1529 Appendix H Instructions for Continued Airworthiness.

- 6) Previous recommendations from ATSRAC have shown that improper maintenance, repair, and modifications often accelerate the “aging” of wire systems. To properly maintain, repair and modify airplane wiring certain data must be available to the designer, engineer and installer. This data should be part of the Instructions for Continued Airworthiness as required in FAR Part 25.1529. Therefore, ATSRAC is tasked to provide comment and recommendation for inclusion of the following in Appendix H, FAR Part 25 Instructions for Continued Airworthiness:

- i) Standard Wire Practices Manual, as improved under different ATSRAC tasking
Comment 9 “Reformatted does not mean the document will be improved”
- ii) Wire Separation Document
- iii) Identification of criticality
- iv) Electrical Load Analysis
- v) Enhanced Zonal Analysis Procedure
(EZAP) data*

Comment 10: Outside ATSRAC several other FAA/JAA WGs are proposing changes to 25.1529 Appendix H. While ATSRAC may define new wording to address its specific concerns, FAA should identify the responsible group to bring together the requirements of the 25.1309/AC25-19 ARAC activity, the SFAR/Fuel Tank Systems WG, the Lightning/HIRF WG and the Aging Structures WG (plus others?), all of whom have recommended changes be made to 25.1529.

* The Enhanced Zonal Analysis Procedure (EZAP) logic can be used by type design holders or airplane operators to enhance the maintenance programs of in-service type designs. This includes type designs currently being produced, and type designs that are no longer in production.

The EZAP logic can also be used during the development of maintenance programs for new aircraft type designs
The EZAP logic can also be applied to previously installed STCs, either by the STC holder or the airplane owner or operator .

The holder of a design approval, including either the type certificate or supplemental type certificate (STC) for an aircraft for which the application was made after January 28, 1981, should supplement the Instructions for Continued Airworthiness (ICA)

based on the EZAP logic, and provide the current airplane owner or operator with those ICA's

The holder of a design approval, including either the type certificate or supplemental type certificate (STC), for an aircraft for which the application was made prior to January 28, 1981, should supplement any maintenance instructions provided with the issuance of the original TC or STC based on the EZAP logic, and provide the current airplane owner or operator with those maintenance instructions.

Comment 11: The TC holder may also have issued some maintenance instructions that now need updating.

General comment

We consider it important to avoid the term EZIP in an AC/SFAR that will be applicable to all CDR Part 25 aircraft. This term is causing unnecessary concern to a lot of people in the industry. A zonal inspection is a GVI and it remains a GVI after the application of EZAP. We may have enhanced the GVIs in some airlines eyes (revised definition) but that has nothing to do with EZAP. For the majority of in-service aircraft the main impact will be the need to add some detailed inspections, some standalone GVIs and some cleaning task to the Systems/Powerplant program. For a minority of aircraft a more formal zonal inspection program will be required. It is recognized that most of the 8 aircraft selected by ATSRAC fall into this latter category. If the AC/SFAR were to apply only to them then it may be justified to clarify that ZIPs may need to be created/enhanced before the enhanced zonal analysis is applied.