

# Task #6

## Wiring System HWG Report #2 October 24, 2001 Rev 2

October 24, 2001

# AGING TRANSPORT SYSTEMS RULEMAKING ADVISORY COMMITTEE (ATSRAC)

WS-11

**DATE: October 24, 2001**

<b>WORKING GROUP / TASK 6:</b>	<b>CO-CHAIRS: Jean-Luc BALLENGHIEN AIRBUS Vidmantas VARIAKOJIS BOEING</b>		
<b>MEMBERS:</b>	FAA Steve Slotte JAA/CAA Dave Tudor JAA/LBA Peter Teichert JAA/DGAC Jerome Bruel Airbus Christian Garros Airbus Dominique Mazzarino ALPA Ken Elias Boeing Ashok Bhattacharya Boeing Issa Ghoreishi Bombardier Petar Glamoclija	British Airways David Harrison Cessna Michael Richardson Dassault Aldo Pezzetta Delta Rob Lyon Kelowna Flightcraft Tony Fishlock SAE Dave Allen Thales Avionics Patrick Ryan Transport Canada Jean Cartier Tyco Electronics Walter Cinibulk	
<b>PAST MEETINGS:</b>	<u>DATE</u>	<u>LOCATION</u>	
	March 28, 2001 May 16-17, 2001 June 12-14, 2001 August 21-24, 2001	Seattle (ATSRAC) BAE Filton Bristol (ARAC ESHWG) Boeing, Long Beach (WSHWG) Airbus, Toulouse (ESHWG/WSHWG)	
<b>FUTURE MEETINGS:</b>	November 6-9, 2001 January , 2002 March, 2002 June, 2002	Boeing, Seattle (ESHWG/WSHWG) Dassault, Paris (ESHWG/WSHWG) Bombardier, Montreal (ESHWG/WSHWG) LBA, Berlin (ESHWG/WSHWG)	

## AGING TRANSPORT SYSTEMS RULEMAKING ADVISORY COMMITTEE (ATSRAC)

### OVERVIEW:

<u>SUB-TASK#</u>	<u>DESCRIPTION</u>	<u>ESTIMATED COMPLETION DATE</u>	<u>STATUS (RED/GREEN/YELLOW)</u>
TASK 6.1	Establish a Harmonization Working Group (HWG)	June 2001	Green/Done
TASK 6.2	Develop Coordination Process with ARAC	June 2001	Green/Done
TASK 6.3	Develop Coordination with other ATSRAC WG's	July 2001	Green/Done
TASK 6.4	Combine current FAR/JAR's		
	Start	June 2001	Green
	Technical agreement	August 2001	Yellow
	Final agreement	November 2002	Yellow
TASK 6.5	Address aging characteristics in new wire systems rule		
	Start	June 2001	Green
	Technical agreement	November 2001	Yellow → Green.
	Final agreement	January 2002	Yellow → Green.
TASK 6.6	Wire System Safety Assessment Requirements		
	Start	June 2001	Green
	Technical agreement	November 2001	Yellow
	Final agreement	January 2002	Yellow
TASK 6.7	Wire Separation Requirements		
	Start	June 2001	Green
	Technical agreement	November 2001	Yellow → Green
	Final agreement	January 2002	Yellow
TASK 6.8	Wire Identification Requirements		
	Start	June 2001	Green
	Technical agreement	November 2001	Yellow → Green
	Final agreement	January 2002	Yellow

## AGING TRANSPORT SYSTEMS RULEMAKING ADVISORY COMMITTEE (ATSRAC)

### TASK 6.9 Advisory Material for the new Wire Systems Rule

Start	August 2001	Green
Technical agreement	January 2002	Green
Final agreement	March 2002	Green
Final ATSRAC Report	June 29, 2002	Green

**Assumption:** If there is an applicable existing JAR/ACJ and there is **NOT** a FAR/AC, then we will adopt the JAR/ACJ.

**Assistance Needed:** 1. ATSRAC agreement on “Wire System”. How much of the different equipment devices and /or components are considered “Wire System”. We propose to include circuit breakers, terminals, shipside connectors, boxside connectors, and wires. Proposed definition was presented to ATSRAC on 9/21/01 and attached herewith as document WS-21-02.  
2. **ATSRAC acceptance of “Wire System” definition as proposed by the WG.**

**Comments:** 1. Not all the members will be able to support the WG this year due to travel restrictions and budget cuts. Impact on the schedule has not been determined as of this date.

## AGING TRANSPORT SYSTEMS RULEMAKING ADVISORY COMMITTEE (ATSRAC)

Working Group/Task : WSHWG #6

Co-Chairs: Jean-Luc Ballenghien

Vid Variakojs

Date: October 24, 2001

Sub-Task # 6.4	Description: Combine current wire system regulations into one sub-part
<b>Concept:</b> Review the existing FAR/JAR paragraphs, ATSRAC and ARAC recommendations related to wire systems. Combine the paragraphs as required. Make recommendations to the ATSRAC.	
<b>Work Plan:</b> The WSHWG will form a Task Group for this task. The Task Group will work (via e-mail, telecons, faxes, etc) on their assigned task) and bring the material to the WSHWG plenary meetings for discussion and acceptance. Coordinate the effort with the ARAC ESHWG by enlisting their members to participate in the task during the concurrently held meetings. Coordinate with the ATSRAC Task Groups 7, 8, and 9 by providing group meeting minutes and reports as required.	
<b>Deliverables:</b> Proposed changes and combined regulations to FAR/JAR will be recommended. The output will be a document in the ATSRAC Report format. A preliminary version suitable for preliminary legal and economic review will be delivered in December, 2001. The Final Report will be delivered in June 2002.	
<b>Status:</b> Task Group was established and Task Leader identified (Steve Slotte). The work was continued during the ESHWG/WSHWG concurrent meeting of August, 2001. Less progress accomplished than it was planned and expected. It was hoped to come to a technical agreement in August. This was not achieved. Some members feel that, since the requirements already exist within the FAR/JAR, therefore, collecting them into a single section is not very productive task. More progress was made via e-mail and we will try to finish it in November meeting.	
<b>Roadblocks:</b> 1. Definition on what is “Wire System”.	
<b>Assistance Needed:</b> 1 Further ATSRAC agreement on the “Wire System” definition. How much of the different equipment devices and /or components are considered “Wire System”. We propose to include circuit breakers, terminals, shipside connectors, boxside connectors, and wires as defined in WS-21-02. 2.. <b>Therefore, ATSRAC is requested to approve the WS-21-02 as submitted</b>	

## AGING TRANSPORT SYSTEMS RULEMAKING ADVISORY COMMITTEE (ATSRAC)

Working Group/Task: WSHWG #6

Co-Chairs: Jean-Luc Ballenghien  
Vid Variakojs

Date: October 24, 2001

Sub-Task #6.5	Description: Identify design requirements to mitigate problems of aging in wire systems
<b>Concept:</b> The WSHWG will identify requirements for the FAR 25/JAR 25 new wire system rule taking into account known mitigation procedures that will decrease problems due to aging. These requirements will be based on the ATSRAC recommendations contained in the Intrusive Inspection Report, Chapter 7, dated January 2001.	
<b>Work Plan:</b> The WSHWG will form a Task Group for this task. The Task Group will work (via e-mail, telecons, faxes, etc.) on their assigned task and bring the material to the WSHWG plenary meetings for discussion and acceptance. Coordinate with the ATSRAC Task Groups 7 and 9 by providing group meeting minutes and reports as required.	
<b>Deliverables:</b> New FAR/JAR regulations will be recommended. The output will be a document in the ATSRAC Report format. A preliminary version suitable for preliminary legal and economic review will be delivered in February, 2002. The Final Report will be delivered in June 2002.	
<b>Status:</b> Task Group was established and task leader was identified (Ashok Bhattacharia). Preliminary review of ATSRAC Intrusive Inspection Report Chapter 7 recommendations was accomplished. The relevant recommendations were identified and assigned to respective sections, other tasks, other ATSRAC working groups or deemed not applicable (e.g. R&D effort). To date, we did not receive any comments from other working groups, however, other WG's are being asked to give their inputs through the integration effort of Mike Nancarrow. We are proceeding to work the recommendations we accepted as ours. The work was continued during the WSHWG meeting of August, 2001 and via e-mail later.	
<b>Roadblocks:</b> None known at present time.	
<b>Assistance Needed:</b> None required at this time	

## AGING TRANSPORT SYSTEMS RULEMAKING ADVISORY COMMITTEE (ATSRAC)

Working Group/Task WSHWG #6

Co-Chairs: Jean-Luc Ballenghien

Vid Variakojs

Date: October 24, 2001

Sub-Task #6.6	Description: Identify requirements for wire systems safety assessments
<b>Concept:</b> The WSHWG will review FAR 25.1309, AC 25.1309-1A/B, and corresponding JAR-25 material and submit a recommendation on whether particular means of compliance with FAR 25.1309 should be included in the new wire systems rule.	
<b>Work Plan:</b> The WSHWG will form a Task Group for this task. The Task Group will work (via e-mail, telecons, faxes, etc) on their assigned task) and bring the material to the WSHWG plenary meetings for discussion and acceptance. Coordinate the effort with the ARAC ESHWG by enlisting their members to participate in the task during the concurrently held meetings. Coordinate with the ATSRAC Task Groups 7 and 9 by providing group meeting minutes and reports as required.	
<b>Deliverables:</b> Proposed changes and new FAR/JAR regulations will be recommended. The output will be a document in the ATSRAC Report format. A preliminary version suitable for preliminary legal and economic review will be delivered in February 2002. The Final Report will be delivered in June 2002.	
<b>Status:</b> Task Group was established and task leader was identified (Steve Slotte). The work was not discussed during the ESHWG/WSHWG concurrent meeting of August, 2001. Just ran out of time in a three and a half day meeting! Behind schedule.	
<b>Roadblocks:</b> None known at this time.	
<b>Assistance Needed:</b> None required at this time.	

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Working Group/Task: WSHWG #6

Co-Chairs: Jean-Luc Ballenghien  
Vid Variakojis

Date: October 24, 2001

Sub-Task #6.7	Description: Identify requirements for wire separation
<b>Concept:</b> The WSHWG will review existing FAR 25/JAR 25 requirements for wire separation and determine if a new comprehensive wire separation regulation (in addition to the existing 25.1353 requirement) should be included in the new wire system rule sub-part.	
<b>Work Plan:</b> The WSHWG will form a Task Group for this task. The Task Group will work (via e-mail, telecons, faxes, etc) on their assigned task) and bring the material to the WSHWG plenary meetings for discussion and acceptance. Coordinate the effort with the ARAC ESHWG by enlisting their members to participate in the task during the concurrently held meetings. Coordinate with the ATSRAC Task Groups 7 and 9 by providing group meeting minutes and reports as required.	
<b>Deliverables:</b> : Proposed changes and new FAR/JAR regulations will be recommended. The output will be a document in the ATSRAC Report format. A preliminary version suitable for preliminary legal and economic review will be delivered in February, 2002. The Final Report will be delivered in June 2002.	
<b>Status:</b> Task Group was established and task leader was identified (Issa Ghoreishi). Preliminary review of FAR/JAR paragraphs was accomplished. The relevant paragraphs were identified. The work was continued during the ESHWG/WSHWG concurrent meeting of August, 2001. Less progress than anticipated. Work continued via e-mail.	
<b>Roadblocks:</b> None known at present time.	
<b>Assistance Needed:</b> None at this time.	

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Working Group/Task: WSHWG #6

Co-Chairs: Jean-Luc Ballenghien

Vid Variakojs

Date: October 24, 2001

Sub-Task #6.8	Description: Identify requirements for wire identification
<b>Concept:</b> The WSHWG will examine the need for wire identification and provide a recommendation on effects due to system failure of any particular system whose wire is contained in a given wire the need for special wire and/or wire bundle identification. This is to be based on airplane level bundle.	
<b>Work Plan:</b> The WSHWG will form a Task Group for this task. The Task Group will work (via e-mail, telecons, faxes, etc.) on their assigned task) and bring the material to the WSHWG plenary meetings for discussion and acceptance. Coordinate with the ATSRAC Task Groups 7 and 9 by providing group meeting minutes and reports as required.	
<b>Deliverables:</b> New FAR/JAR regulations will be recommended. The output will be a document in the ATSRAC Report format. A preliminary version suitable for preliminary legal and economic review will be delivered in February, 2002. The Final Report will be delivered in June 2002.	
<b>Status:</b> Task Group was established and task leader was identified (Jean-Luc Ballenghien). The work was continued and discussed during the WSHWG meeting of August, 2001. Less progress achieved than required to keep the task on schedule. The group is split on identification requirements. There is a feeling that the task must establish identification requirements for <b>all wires</b> and not only for “special” wires and wire bundles depending on the system fault analysis results. Work continues via e-mail on a document revised from the August meeting inputs.	
<b>Roadblocks:</b> None known at this time.	
<b>Assistance Needed:</b> None required at this time.	

## AGING TRANSPORT SYSTEMS RULEMAKING ADVISORY COMMITTEE (ATSRAC)

Working Group/Task WSHWG #6

Co-Chairs: Jean-Luc Ballenghien  
Vid Variakojs

Date: October 24, 2001

<b>Sub-Task #6.9</b>	<b>Description:</b> Recommend advisory guidance material for the new wire systems FAR/JAR sub-part
<b>Concept:</b> The WSHWG will provide recommended means of compliance with the requirements established from tasks 6.4 through 6.8. Existing advisory material may already provide acceptable means of compliance. If so, the WSHWG will identify where this guidance exists. This will be accomplished through a review of existing advisory material, guidelines and policies regarding the design and installation of wiring systems, as well as related ARAC recommendations. Based on this review, a recommendation will be made to identify necessary changes considering the aging effects on wiring as noted in the previous recommendations submitted by ATSRAC, and in particular the Intrusive Inspection report	
<b>Work Plan:</b> The WSHWG will form a Task Group for this task. The Task Group will work (via e-mail, telecons, faxes, etc) on their assigned task) and bring the material to the WSHWG plenary meetings for discussion and acceptance. Coordinate the effort with the ARAC ESHWG by enlisting their members to participate in the task during the concurrently held meetings. Coordinate with the ATSRAC Task Groups 7 and 9 by providing group meeting minutes and reports as required.	
<b>Deliverables:</b> New AC/ACJ's will be recommended. The output will be a document in the ATSRAC Report format. A preliminary version suitable for preliminary legal and economic review will be delivered in April, 2002. The Final Report will be delivered in June 2002.	
<b>Status:</b> Task Group was established and Task Leader identified (Dave Tudor). The work was continued via e-mail and during the ESHWG/WSHWG concurrent meeting of August, 2001. The output of this task depends upon timely completion of tasks 6.4→6.8.	
<b>Roadblocks:</b> None known at this time.	
<b>Assistance Needed:</b> None required at this time.	

## AGING TRANSPORT SYSTEMS RULEMAKING ADVISORY COMMITTEE (ATSRAC)

### Wire System Definition Used to Guide the Wire System Harmonization Working Group WS-21-02

A Wire System is an electrical connection between two or more points including the associated termination (e.g., connectors, terminal block, splice, etc) devices (excluding the mating connection at the termination point of the wire on those devices that are excluded from this definition – see below) and the necessary means for its installation and identification. This includes:

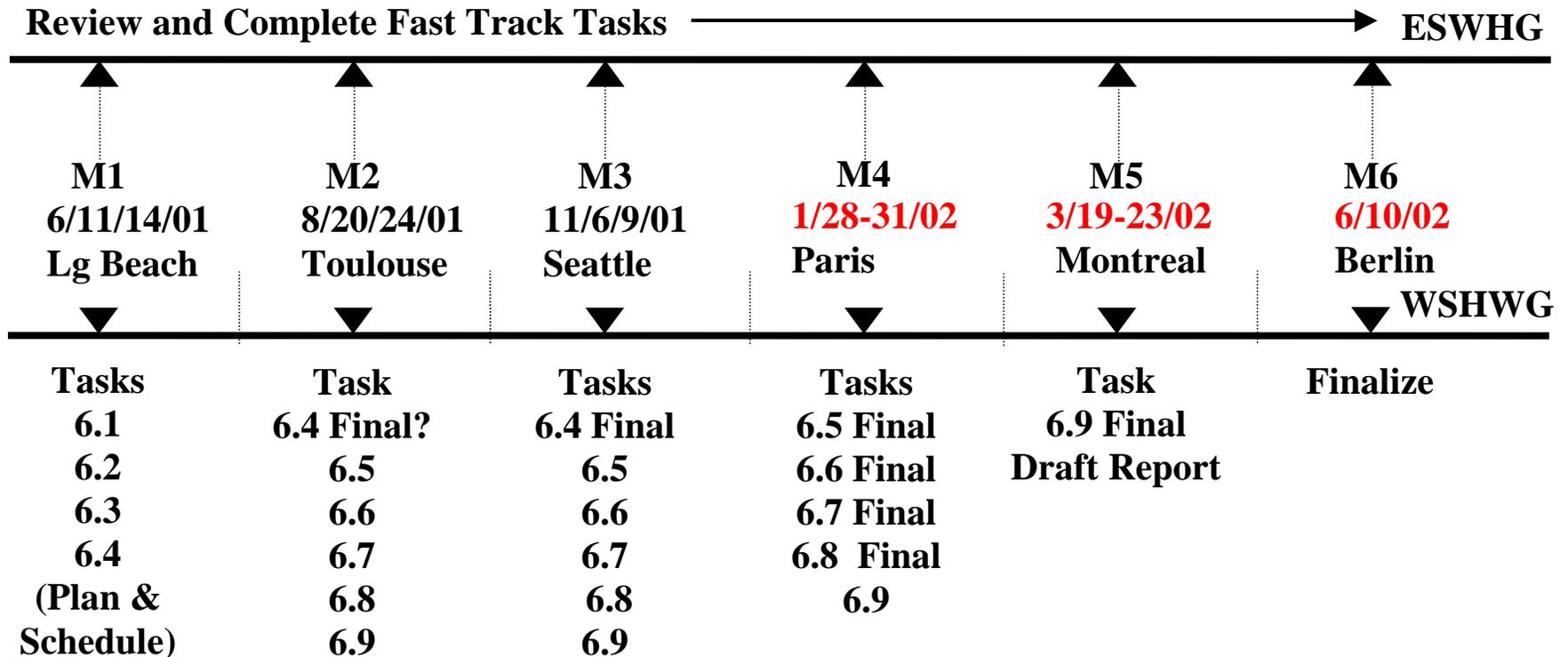
- Wires (e.g., wire, cable, coax, databus, feeders, ribbon cable, etc.)
- Bus bars
- Connection to electrical devices (e.g., relays, push button, interrupters, switches, contactors, terminal blocks, feed-through connectors, etc.)
- Circuit Breakers or other circuit protection devices (not performance)
- Electrical contacts
- Connector and accessories (e.g., backshell, sealing boot grommet sealing plugs.)
- Electrical grounding and bonding devices (e.g., modules, straps, studs, etc.)
- Electrical splices
- Shield or braids
- Conduits that have electrical termination
- Clamps and other devices used to route and support the wire bundle
- Cable tie devices
- Labels or other means of identification methods
- Pressure seals associated with wiring systems

Wiring inside shelves, panels, racks, junction boxes, distribution panels, back-planes of equipment racks (including circuit board back-planes), wire integration units, etc. answering to the upper definition, is included.

The following is excluded:

- Wiring inside avionics equipment (e.g., flight management system computer, flight data recorder, VHF radio, primary flight display, etc.),
- Equipment qualified to the standards of RTCA Document DO-160 or shown to be equivalent (other than those specifically included in this definition),
- Equipment qualified to a technical standard order (TSO),
- Portable, carry on, or otherwise non-permanently mounted (not part of the certification basis) electrical equipment.
- Fiber optics

# Timeline Summary



- Submit recommendations to FAA as they are completed
- All WSHWG reports must be ready by the July 2002 ATSRAC meeting