Status Report : 1st Quarter - 2000

Including TAEIG Working Group Activity Report

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HF-HWG
Human Factors-Harmonization Working Group
Flight Crew Error / Flight Crew Performance Considerations in the
Flight Deck Certification Process
Federal Aviation Administration – USA
Joint Aviation Authorities – Europe

Working Group		
Working Group Name	Flight Crew Error / Flight Crew Performance Considerations in the Flight Deck Certification Process (also known as Human Factors-Harmonization Working Group; HF-HWG)	
ARAC issue	Transport Airplanes and Engines	
Expected product(s)	NPRM ❑ AC ❑ Other ❑ To be decided	
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For contact details and information on how to obtain previous or future copies please refer to section 9.1.
This Status Report is part of a quarterly briefing to non-HF-HWG members.
This Status Report includes the information required in the TAEIG-Working Group Activity Report

Executive Summary

The Human Factors – Harmonization Working Group (HF-HWG) was established in 1999 following the ARAC[1]/JAA[2] tasking (FAA[3] Register Announcement 39553**,** Vol. 64, No. 140, July 22, 1999 / Notices). Previous initiatives have identified the importance of Human Factors of the Flight Deck Design in relation to Aircraft Safety.

The HF-HWG has 45 members. The aim of the HF-HWG is to provide ARAC and the JAA with advice and recommendations on the following harmonization task: *Flight Crew Error/Flight Crew Performance Considerations in the Flight Deck Certification Process*.

The 36-month task involves:

- reviewing existing material (FAR/JAR 25 regulations, advisory material, policy, and related references) and
- making recommendations about what regulatory standards and/or advisory material should be updated or developed to consistently address design-related flight crew performance vulnerabilities, and prevention and management (detection, tolerance, and recovery) of flight crew error.

Up until mid-April, 2000, three meetings have taken place:

Meeting 1: Oct 6-9, 1999, Seattle/Renton, Washington (hosted by Boeing)
Membership:

- *Types of organizations represented: 2 regulatory agencies; 8 Aircraft manufacturers ; 5 Avionics manufacturers; 2 Two Research/consultant organizations*
- *Mix of experience/skills/knowledge (some people in more than one category): Human Factors – 24; Certification – 25; Operations – 22; Supplemental Type Certification – 9; Pilots – 17; Designers – 22; Training – 4; Rule making – 7.*

Team processes were established

- *We will set goals for each meeting and measure our performance against them*
- *We will communicate between meetings via email and a dedicated website (http://www.researchintegrations.com/hf-hwg/, which was demonstrated during the meeting).*

Background briefings were provided

- *Current and planned human factors activities within the US and European regulatory agencies*
- *The FAA rulemaking process: ARAC history, purpose, and procedures.*
- *The components of a HF-HWG work plan*

The Tasking of the HF-HWG was reviewed and discussed. Relevant issues for each task were documented.
A draft Statement of Work was reviewed. Subgroups were formed to identify concerns and opportunities for the HF-HWG. There was a preliminary discussion of working process for the HF-HWG.
Subteams were formed for:

- Definition of terms
- Communications processes

Meeting 2: January 11-13, 2000, Toulouse, France (hosted by Airbus)
Membership (broadened, compared to first meeting):

- *Types of organizations represented: 4 regulatory agencies; 9 Aircraft manufacturers ; 6 Avionics manufacturers; 5 Research/consultant organizations; 2 pilot unions.*

[1] Aviation Rulemaking Advisory Committee
[2] Joint Aviation Authorities - Europe
[3] Federal Aviation Administration - USA

There was a detailed discussion of the HF-HWG tasking with respect to the Statement of Work.
Temporary subgroups were formed to formulate ideas on HF-HWG work:

- *The processes we will use to perform Task 1*
- *The scope of the review process*

There was a briefing on the JAA rulemaking process
Four new subgroups were formed, balanced by skill, background, and N. America vs. Europe, to discuss and provide proposals for the following four subject areas:

- *Subgroup A: Identify regulatory/guidance materials to be reviewed*
- *Subgroup B: Develop and test (validate) a set of theory-based processes and topics*
- *Subgroup C: Develop and test (validate) a set of experience-based processes and topics*
- *Subgroup D: Develop a set of criteria for the future success to apply to the content of the Preliminary Report.*

Meeting 3: April 4-6, 2000, Phoenix, Arizona (hosted by Honeywell)
Most of the meeting was spent in subgroup working sessions and their reports.
Subgroup A: Identify regulatory/guidance materials to be reviewed

- *FARs and Advisory Circulars were reviewed for relevance*
- *Preliminary lists generated; to be finalized prior to next meeting*

Subgroup B: Develop and test (validate) a set of theory-based processes and topics

- *This top-down approach systematically reviews all regulations identified by Subgroup A.*
- *A set of key human factors concepts (e.g. input, response, control, environment) are evaluated against each regulation.*
- *This process is intended to identify where the rules fail to deal with the key concepts.*

Subgroup C: Develop and test (validate) a set of experience-based processes and topics

- *This bottom-up approach reviews accident/incident data to identify human factors problems*
- *The relevant regulations and advisory material are then reviewed to assess coverage of the human factors problems*
- *This process is intended to identify where the rules fail to prevent problematic designs*

Subgroup D: Develop a set of criteria for the future success to apply to the content of the Preliminary Report.

- *This group developed three high-level categories of criteria (aviation safety, effects on industry, industry/authority acceptance); these will be developed in more detail*
- *These criteria will be incorporated into a process by which the work of subgroups B and C can be evaluated.*
- *The criteria and process should be imbedded into the subgroups B and C processes*

The following agreements were reached:

- *Subgroup A would be dissolved when the review list is complete (prior to next meeting)*
- *Subgroup D would be dissolved when the process and criteria details are completed (prior to next meeting), but would reconvene to deal with any subsequent process or criteria issues.*
- *The concept-based and experience-based process (from Subgroups B and C) would be run in parallel. The differences in the approaches are likely to yield different and complementary insights.*

This first status report provides some background, the tasking, the workplan, the processes developed, and information on progress, bottlenecks and future plans. The status reports will be published quarterly, for distribution to all relevant stakeholders.

Definitions of terms and abbreviations

FAA	Federal Aviation Administration – USA
HF-HWG	Human Factors – Harmonization Working Group
JAA	Joint Aviation Authorities – Europe
ARAC	Aviation Rulemaking Advisory Committee
TAEIG	Transport Airplane and Engine Issues Group
DRG	Document Review Group

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1 Introduction

1.1 Brief history and background

The Human Factors – Harmonization Working Group (HF-HWG) was established in 1999 following the ARAC[4]/JAA[5] tasking (FAA[6] Register Announcement 39553**,** Vol. 64, No. 140, July 22, 1999 / Notices). Previous initiatives have identified the importance of Human Factors of the Flight Deck Design in relation to Aircraft Safety. For example, the FAA/JAA Human Factors Team (Abbott et al, 1996) investigated and confirmed this relation and included 4 recommendations on Human Factors in Regulatory Standards and Certifications.

The FAA has established an Aviation Rulemaking Advisory Committee (ARAC) to provide advice and recommendations to the FAA Administrator, through the Associate Administrator for Regulation and Certification, on the full range of the FAA's rulemaking activities with respect to aviation-related issues. This includes obtaining advice and recommendations on the FAA's commitment to harmonize its Federal Aviation Regulations (FAR) and practices with its trading partners in Europe and Canada.

One area ARAC deals with is Transport Airplane and Engine Issues. These issues involve the airworthiness standards for transport category airplanes and engines in 14 CFR parts 25, 33, and 35 and parallel provisions in 14 CFR parts 121 and 135

The FAA requests that ARAC draft appropriate regulatory documents with supporting economic and other required analyses, and any other related guidance material or collateral documents to support its recommendations. If the resulting recommendation is one or more notices of proposed rulemaking (NPRM) published by the FAA, the FAA may ask ARAC to recommend disposition of any substantive comments the FAA receives.

An interim report responding to the first three steps is required within 18 months. The entire project shall be completed within 36 months of tasking.

The JAA supports this initiative and will consider the finding of the HF-HWG with respect to its implication for the JARs related to the above and the associated regulatory material.

1.2 Aim

To provide ARAC and the JAA with advice and recommendations on the following harmonization task:
Flight Crew Error/Flight Crew Performance Considerations in the Flight Deck Certification Process (see task description below; section 1.3).

1.3 The task

Task 1. Review relevant existing material (FAR/JAR 25 regulations, advisory material, policy, and related references) and make recommendations about what regulatory standards and/or advisory material should be updated or developed to consistently address design-related flight crew performance vulnerabilities, and prevention and management (detection, tolerance, and recovery) of flight crew error. This review should be accomplished in the context of both the Type Certification and Supplemental type Certification processes.

Task 2. Based on results of the Task 1 review, recommend new advisory material to address design-related vulnerabilities of flight crew performance and the management of flight crew error.

Task 3. Recommend (or plan for the development of) new regulatory material to address design-related vulnerabilities of flight crew performance and the management of flight crew error. If rulemaking is not recommended, provide reasons and propose non-rulemaking alternatives.

Task 4. Recommend an implementation plan for products of Tasks 1–3, and develop Terms of Reference for fulfilling the plan.

Task 5. During accomplishment of these tasks, identify implications for qualification and operations for communication to appropriate groups.

1.4 Structure and organization of the working group

The Human Factors Harmonization Working Group is composed of 45 technical experts having an interest in the assigned task. The co-chairs and FAA & JAA focal points have taken special care to ensure to maintain a balance among members:

- Industry representatives (28) and representatives from the Regulatory Authorities (17)
- 28 have an expertise in Human Factors
- 18 Pilots
- 23 have an expertise in aircraft certification
- 24 have an expertise in cockpit design
- N. American (23) and European and other representatives (22)

All members have been made aware that they are representing their organization or company and need to disseminate and check information with their organization or company.

A full list of members is provided in appendix A.

Mr. R. C. Graeber (Boeing) and Mr. D. Ronceray (Airbus Industrie) are the co-chairs of the HF-HWG. The United States co-chair shall make periodic progress reports to TAE.

Mrs. S. Hecht (FAA, ANM-111) is the FAA focal point and Mrs. H. Courteney (UK-CAA) is the JAA focal point. Mr. S. Boyd (FAA, ANM-111) is the secretary of the HF-HWG. The FAA focal point will assist the United States co-chair in preparation of material in a form for submittal to ARAC. The JAA representative will be responsible for coordination with relevant JAA Study Groups, Steering Groups and Committees.

The Human Factors Harmonization Working Group will make use of a resource web site to document its work. Research Integrations, Inc. in the United States will host this site. There will be a public area for public information site, e.g.:

- Quarterly status reports
- Names of members
- Publicly available information about our tasks (Federal Register Announcement)
- Points of contact information

[4] Aviation Rulemaking Advisory Committee
[5] Joint Aviation Authorities - Europe
[6] Federal Aviation Administration - USA

The rest of the web-site will be password protected for use by the HF-HWG members only.

The Human Factors Harmonization Working Group meets alternately between Europe and the North America to the greatest extent practicable (2 meetings in the N. America, and 2 meetings in Europe per year).

The Human Factors Harmonization Working Group will comply with the procedures adopted by ARAC (Operating Procedures for the Aviation Rulemaking Advisory Committee, October 1997 Revision) and the harmonization procedures adopted by the JAA and FAA. As part of the procedures, the working group is expected to:

1. Recommend a work plan for completion of the task, including the rationale supporting such a plan, for consideration at the meeting of ARAC to consider transport airplane and engine issues held following publication of this notice.
2. Give a detailed conceptual presentation of the proposed recommendations, prior to proceeding with the work stated in task 3.
3. Draft recommendations for appropriate regulatory action with supporting economic and other required analyses, and/or any other related guidance material or collateral documents the working group determines to be appropriate; or, if new or revised requirements or compliance methods are not recommended, a draft report stating the rationale for not making such recommendations. If the resulting recommendation is one or more notices of proposed rulemaking (NPRM) published by the FAA, the FAA may ask ARAC to recommend disposition of any substantive comments the FAA receives.
4. Provide a status report at each meeting of ARAC held to consider transport airplane and engine issues.

2 Schedule

2.1 HF-HWG major task schedule

The following schedule is proposed for the major task activities. The working group will develop a detailed schedule to ensure that the tasks will be completed on time.

Date	Milestone
January 2000	• Define preliminary process for working group tasks • Select preliminary regulatory material for review
April 2000	• Determine if other material should be defined for review • Finalized list of regulatory material for review • Finalize the processes for working group tasks
July 2000	• Complete the preliminary review of regulatory material complete • Final adjustment and approval of processes
October 2000	• Prepare the outline of first report
January 2001	• Draft report complete
April 2001	• Finalize first report (on tasks 1-2-3)
July 2001	• Draft Terms of Reference for follow-on activity
July 2002	• Work complete

2.2 TAEIG Working Group Activity table

	FAA Team	Working Group	TAEIG
1) Publication of the Federal Register Notice	July 22, 1999		
2) Work Plan Approval		Dec 15, 1999	Feb 8, 2000
3) Concept Approval			
4) Preliminary T/W and Legal Support			
5) Technical Approval in HWG			
6) Economic Evaluation			
7) Formal T/W and Legal Review			
8) Technical Agreement			
9) Recommendation to FAA			

3 Workplan

Task 1. Review relevant existing material (FAR/JAR 25 regulations, advisory material, policy, and related references) and make recommendations about what regulatory standards and/or advisory material should be updated to consistently address design-related flight crew performance vulnerabilities, and prevention and management (detection, tolerance, and recovery) of flight crew error. This review should be accomplished in the context of both the Type Certification and Supplemental Type Certification processes.

Subtask 1.a This task "should be accomplished in the context of both the Type Certification and Supplemental Type Certification processes".

- Understand relevant aspects of current and anticipated FAA and JAA Type Certification processes, including FAR/JAR 21 processes.
- Understand relevant aspects of current and anticipated FAA and JAA Supplemental Type Certification processes
- Determine whether to address TSOs and Field Approvals (to TAE)

Subtask 1.b The activity should "consistently address design-related flight crew performance vulnerabilities, and prevention and management (detection, tolerance, and recovery) of flight crew error".

- Define "design-related flight crew performance vulnerabilities"
- Define "prevention and management (detection, tolerance, and recovery) of design-related flight crew error"

Subtask 1.c Develop a review process methodology and preliminary adequacy criteria.

Subtask 1.d "Review relevant existing material"

- Identify and review the following existing and developing material relevant to Part 25 type certification:
    - Regulations
    - Policies
    - Advisory circulars
    - Industry standards

Subtask 1.e Critically evaluate reviewed materials for adequacy.

Subtask 1.f "Make recommendations about what regulatory standards and/or advisory material should be updated".

- Define criteria for determining the need for updated or new material
- Apply criteria to pertinent material
- List regulatory standards that should be updated or developed, including explanation/justification.
- List advisory material that should be updated or developed, including explanation/justification.

Task 2. Based on results of the Task 1 review, recommend new advisory material to address design-related vulnerabilities of flight crew performance and the management of flight crew error.

- Develop recommendations for new advisory material if required
- Consider the need for generic recommendations
- Consider the need for recommendations related to specific rules.
- Develop discussion paper to describe why advisory material is not recommended if necessary

Task 3. Recommend (or plan for the development of) new regulatory material to address design-related vulnerabilities of flight crew performance and the management of flight crew error. If rulemaking is not recommended, provide reasons and propose non-rulemaking alternatives.

- Develop recommendations for new regulatory material if required
- Consider the need for generic recommendations
- Consider the need for recommendations related to specific rules.
- Return to Task 2 to develop associated advisory material.
- Develop discussion paper to describe why regulatory material is not recommended if necessary

Task 4. Recommend an implementation plan for products of Tasks 1-3, and develop Terms of Reference for fulfilling the plan.

- Define tasks required for implementing recommendations
- Develop Terms of Reference for each task

Task 5. During accomplishment of these tasks, identify implications for qualification and operations for communication to appropriate groups.

- Develop a coordination plan
- Identify groups with whom coordination would be beneficial
- Develop points of contact for coordination
- Identify means for communicating with other groups
- Provide opportunities for other groups to present information
- Provide relevant information to other groups

4 Status against workplan

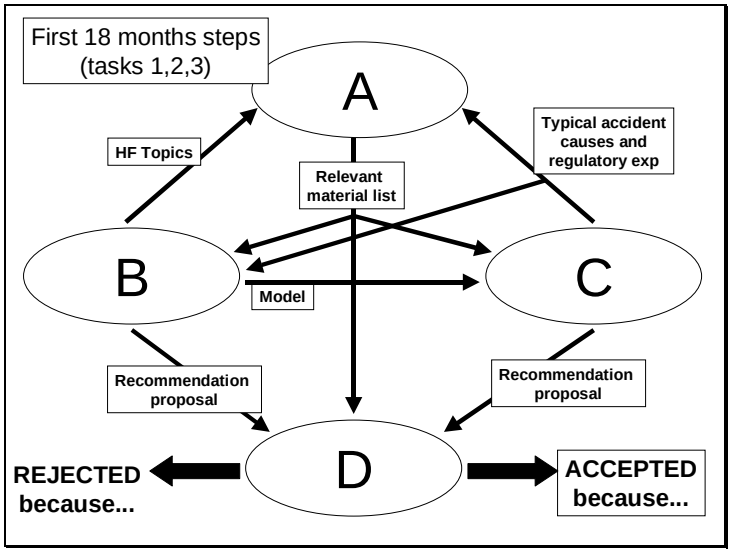
4.1 Introduction to Status 1st Quarter-2000

Up until the end of the 1st quarter of 2000, the HF-HWG has mainly concentrated on:

- Setting-up the working group
- Familiarization with the task and processes (including communication plan and the web-site)
- Development of workplan.

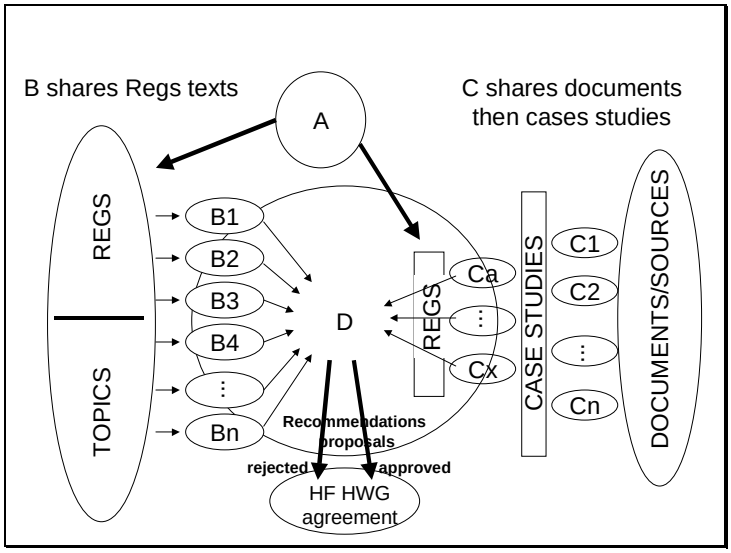
With respect to the workplan (up until the end of the 1st quarter of 2000) the HF-HWG has mainly concentrated on Task 1[7] and the development of a process for reviewing the regulatory material. To work effectively, the HF-HWG was split into 4 sub-groups (A, B, C and D) to address aspects of task 1 (also taking into account the other four HF-HWG tasks described in section 1.3):

- Sub-group A: Materials to be reviewed
- Sub-group B: Top-down/Concept-based process for reviewing the regulatory material
- Sub-group C: Bottom-up/Case-based process for reviewing the regulatory material
- Sub-group D: Criteria to assessing success of the product(s) of the working group



Initial model of task 1, 2 and 3 and the four processes developed by sub-group A, B, C and D.

[7] Review relevant existing material (FAR/JAR 25 regulations, advisory material, policy, and related references) and make recommendations about what regulatory standards and/or advisory material should be updated to consistently address design-related flight crew performance vulnerabilities, and prevention and management (detection, tolerance, and recovery) of flight crew error.



Further development of the model of task 1, 2 and 3 and the four processes developed by sub-group A, B, C and D

In addition, two further small working groups are working on organizational issues:

- Communication strategy and process sub-group
- Definitions sub-group

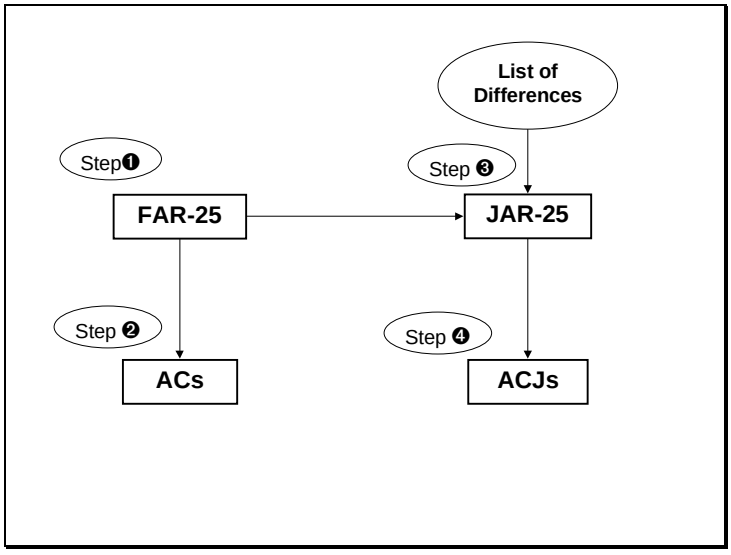
Members of these sub-groups also take part in sub-group A, B, C or D.

The activities and status of each sub-group will be described in more detail below.

4.2 Description of status by sub-group/process

4.2.1 Sub-group A: Materials to be reviews

Sub-group A is in the process of identifying the relevant regulatory materials which need to be reviewed by the HF-HWG using the processes developed by sub-group B and C. The main scope focuses on both FAR 25 and JAR 25 and associated advisory material. A four-step plan for reviewing both the FARs and JARs has been developed (see diagram below).

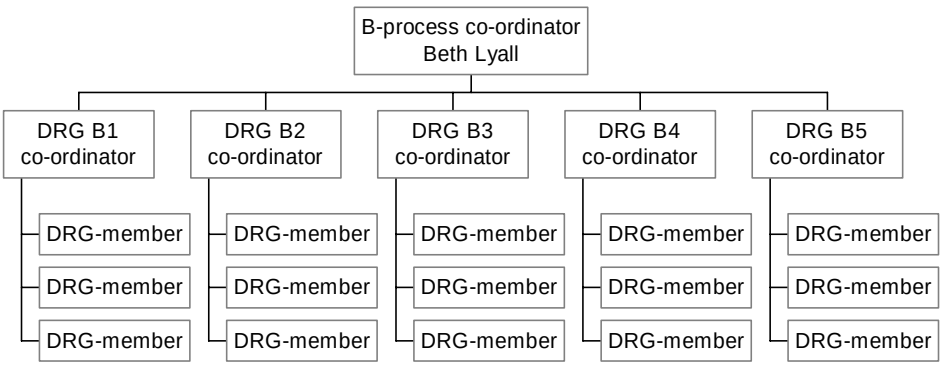


Proposals for amendments and historical information to establish the rationale for the original rules are also being considered. Sub-group A has also investigated ways of filtering the regulations for non-relevant sections by excluding parts that do not contain certain *'Human Factors Considerations'* key-words. However, the rest of the HF-HWG prefers to work on the whole unfiltered material because there may be implicit Human Factors implications that would not be detected by filtering on keywords. The preliminary list for starting the review work will be completed by the end of April. It has been acknowledged that the list of relevant regulatory materials may need to be updated and the sub-group will remain in place, while members can also take part in the FAR/JAR review process itself (sub-group B or C).

4.2.2 Sub-group B: Top-down/Concept-based process for reviewing the regulatory material

Sub-group B has developed a Top-down/Concept-based process for reviewing the regulatory material. The aim of this process is to perform a review against a list of key Human Factors/Human Error topics derived from a conceptual model of human information processing in a complex environment. This approach is complementary to the Bottom-up/Case-based process for reviewing the regulatory material as developed by sub-group C, ensuring a comprehensive review.

The Top-down/Concept-based process for reviewing the regulatory material has been completed and will start in April using five Document Review Groups (DRGs). Each DRG will review a fifth of the regulatory material identified by sub-group A. Each DRG will consist of a balanced mix of industry representatives and representatives from the regulatory authorities; Human Factors specialists and non-HF specialists; Pilots and non-pilots, US and non-US representatives. Internal cross-checking and co-ordination and comparison between DRGs aims to ensure a consistent approach during the review.



Organizational structure for using the Top-down/Concept-based process for reviewing the regulatory material

The results will be captured in an electronic database (probably an EXCEL spreadsheet).

The aim is to complete a significant part of the review work before the next meeting in Montreal (last week of June) and to review and compare the outcome with:

- the other DRGs who used the Top-down/Concept-based process and
- sub-group C who used the Bottom-up/Case-based process for reviewing the regulatory material.

Brief description of Top-down/Concept-based process for reviewing the regulatory material

1. Divide regulatory and advisory material provided by sub-group A in five 'chunks' taking into account the size of the chunk and logical relationships between parts of the regulatory material which need to be reviewed together.

2. Set-up five Document Review Groups with the right mix of skill, background, role and nationality and assign a 'chunk' of re regulatory and advisory to the group.

By section or paragraph (as appropriate) review the 'chunk' of regulatory and advisory material for coverage of HF topics and quote the paragraph. A distinction can be made between:

- Explicitly addressed and adequate
- Explicitly addressed and inadequate
- Implicitly addressed and adequate
- Implicitly addressed and inadequate
- Not addressed and should be addressed
- Not addressed and adequate

3. By HF topic, analyze if each is adequately covered in the overall regulatory and advisory material.

Criteria for adequacy are:

- Completeness (width and depth)
- Consistency between regulations
- Verifiability
- Consistency of interpretation
- Clarity
- Is it harmonized?
- Is it defined up to a minimum standard

4.2.3 Sub-group C: Bottom-up/Case-based process for reviewing the regulatory material

Sub-group C has developed a Bottom-up/Case-based process for reviewing the regulatory material. The aim of this process is to identify if the regulation addresses the Human Factors/Human Error issues that have been highlighted by:

- incidents,

- accidents,
- in-service experience,
- safety studies,
- certification experience and
- research.

This approach is complementary to the Top-down/Concept-based process for reviewing the regulatory material as developed by sub-group B, ensuring a comprehensive review.

The aim is to complete a significant part of the review work before the next meeting in Montreal (last week of June) and to review and compare the outcome:

- within sub-group C (because many different sources were used in the Bottom-up/Case-based process) and
- sub-group B who used the Top-down/Concept-based process for reviewing the regulatory material.

Brief description of Bottom-up/Case-based process for reviewing the regulatory material

Step 1: Compile a list of Documents

- Summary reports: Accidents/Incidents
- In service experience (ASRS, Crew)
- Safety studies (e.g., Team Report)
- Regulatory experience
- Research (e.g., FANS)

Step 1 Filter:

- Part 25 issue
- Time/ Date (Is the problem/ issue a current certification problem? Or is it only an accident/incident of an issue on old out of production airplanes (design not being certified any more).

Step 2: Identify general topics, issues, or risk areas

- Take the document(s) to be reviewed, read them, and identify the general topics, issues, or risk areas

Examples of a topic, issue, or risk:

Example of a system that a regulator thought was unsafe and should not be approved (ex. Terrain Awareness Warning System installation in the pedestal).

Another example is a specific contributing factor (that may have caused) an accident: (ex. lack of a moving map display, or the fact that the waypoint list did not come in order of proximity to the aircraft).

A third example would be a more general item, like a general risk area (ex. lack of situation awareness). Some of these general issues that will come from things like Flight Safety Foundation reports (which contain summary data from the analysis reports of multiple accidents).

These examples could be flight deck features that could have contributed.

- Identify general topics, issues, or risk areas that- potential to lead to accidents
- Find specific case studies to support each risk area or topic.
- Cross check with subgroup B

Step 2 Filter

- Flight deck, pilot interaction, Human Factors (flight crew performance)
- Time/date (modern aircraft only?)
- Safety issue
- Design related (in a broad sense)
- Is another group working this specific issue?
- Modern design covers the issue?
- Part 25 (type operation)
- Cross check within team in Montreal
- Cross check with group B
- Begin step 3 in Montreal

Step 3: Development of Scenario

- Describe Scenario
- Document Source
- Assumptions
- Type of Information
- Safety Risks
- Compare to Group B Model
- Describe Aircraft/ Flight Deck/ System

Step 4: Identify the Specific Human Factors Safety Issues

- Compare to group B model
- Use model to cross check

Step 5: Run Scenarios against Regulatory/ Advisory Material

- Group A provides a full list of documents
- Pick from regulatory/ advisory material
- Identify "holes"
- Identify misunderstandings

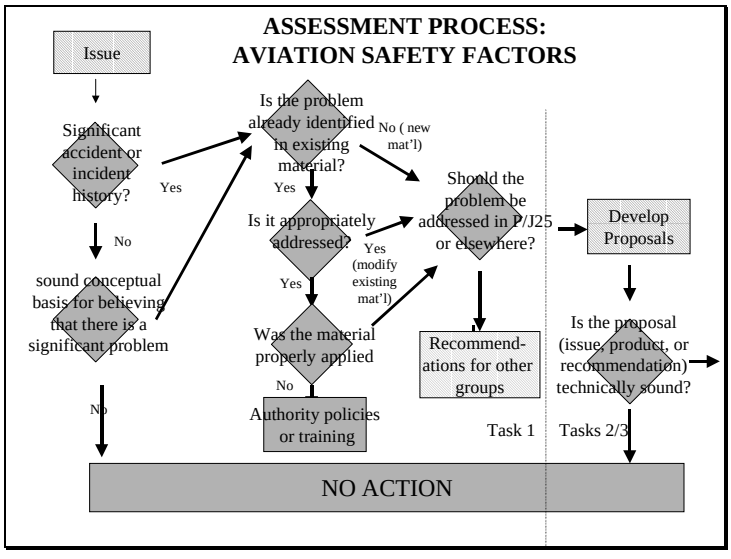
Step 6: Products/ Output

- Specific holes in the regulatory/ advisory material
- General issue that is not covered

4.2.4 Sub-group D: Criteria to assessing success of the product(s) of the working group

Sub-group D has developed a series of critical questions and success criteria and opertionalised these into a decision flow-chart. This will enable to HF-HWG to assess their final product(s) and provide rationale for inclusion or rejection of recommendations and advice to ARAC and the JAA. Another aim is to include some of the criteria into the review processes being developed by sub-group B and C.

The preliminary decision flow-chart will be completed prior to the Montreal meeting but work will continue. It has been acknowledged that the criteria and decision flow-chart may need to be updated and sub-group D will remain in place, while members can also take part in the FAR/JAR review process itself (sub-group B or C).



Initial version of the flow-chart developed by sub-group D

4.2.5 Organizational sub-groups

In addition, two further small working groups have been working on organizational issues:

Communication strategy and process sub-group
The communication strategy and process sub-group has developed:

- Communication Plan: Strategy and Process for internal and external communication
- A web-site strategy (with assistance from Jennifer Wilson at Research Integration)
- Standardization of versions of software tools used
- A template for HF-HWG documents
- Development of this Status Report for external communication to relevant stakeholders.

Definitions sub-group
The definitions sub-group has developed:

- A process for developing and approving definitions
- A preliminary list of definitions
- A template form for proposing or changing definitions

5 Bottlenecks

At this stage no major bottlenecks/concerns have been identified. In future status reports, consideration will be given to bottlenecks. For example:

- Information availability (Materials to be reviewed, Internet access for members,…)
- Co-ordination with other working groups/organization
- Human resources required and available effort
- Scoping of the task
- Technical/Scientific bottlenecks

Through regular process checks at the meetings the co-chairs are capturing, addressing and monitoring the bottlenecks/concerns. A list of issues is logged by the HF-HWG secretary.

6 Actions

6.1 Request for TAEIG action

- TAEIG has determined that TSOs and Field Approvals are not within the current scope.
- No requests for TAEIG action at this stage.

6.2 Next actions for HF-HWG

A complete action list is available for the HF-HWG members. For the purpose of this Status Report the main/relevant actions have been repeated here.

Action	Assigned to	Date assigned	Due date	Status
• Give electronic access to the JAR materials to be reviewed	Hazel Courteney, JAA/UK-CAA	10/99	5/2000	Pending
• Define content of interim report	Co-Chairs	01/00	06/00	Pending

7 Meetings

7.1 Meetings to date

The following meetings were held to date:

Purpose	Date	Location	Participation
Introduction and education of the HF-HWG	6-7 Oct 1999	Boeing –Seattle US	25 HF-HWG members
Definition of working methods, review process and scope, and adequacy criteria	11-13 Jan 2000	Airbus – Toulouse FR	38 HF-HWG members
Finalization of HWG methods and processes, task sharing.	4-6 Apr 2000	Honeywell – Phoenix US	31 HF-HWG members

7.2 Future meetings

Purpose	Date	Location	Participation
	27-29 Jun 2000	Bombardier - Montreal	
	3-5 Oct 2000	NLR – Amsterdam	

8 Lessons Learned

This section is to be completed at the end of the task. Some initial lessons learned can already be reported and will be explained in more detail at a later date, namely:

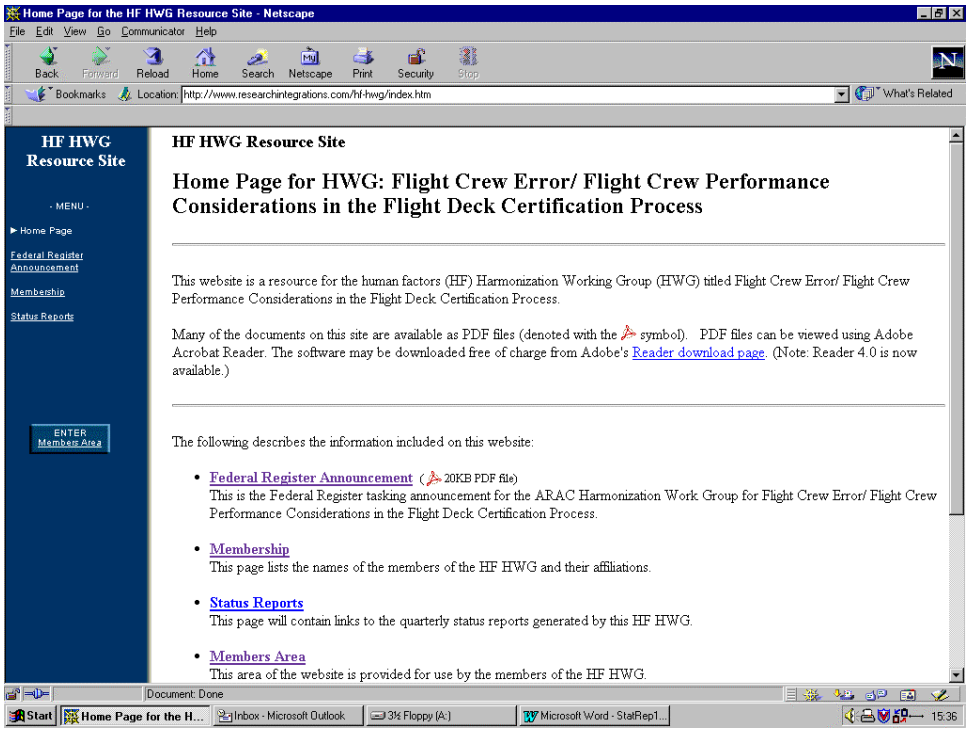
1. Composition of the working group: a good balance of expertise, backgrounds, nationalities was achieved (see section 1.4).
2. Processes for internal and external communication: Lessons will be learned regarding the use of a communication plan (incl. the use of the Web-site and a Status Report for external communication). The effectiveness of the plan is currently under review. See section 4.2.5.
3. Development of regulation review approaches. Lessons will be learned regarding the two approaches developed for reviewing the regulations (see section 4.2.2 and 4.2.3).
4. Definition of terms; Lessons will be learned regarding the use of a definition sub-group and a definitions process (see section 4.2.5).
5. In this group, two quite different kind of members are present: HF specialists and aviaton sector professionals (design, certification, operations). If the subject involved is common, the approach and the words used are quite different leading to lack of mutual understanding. Time is needed for them to develop a "common language" for useful dialogue.
6. For about a third of our members, the native language is not English. As we need them to participate effectively, precautions have to be taken by the speakers to speak clearly, and slowly enough, and by the co-chairs to ensure that these members can effectively follow and take part in the discussions.

9 Further information

9.1 Point of contact

- Previous issues of the Status Report can be obtained from the HF-HWG Web-site:

  www.researchintegrations.com/hf-hwg/index.htm.



- To receive a the Status Report by email every quarter, please send an email to:

  Jennifer.Wilson@ResearchIntegrations.com

- For any questions or comments please send an email to HF-HWG central email address:

  9-ANM-111-HUMAN-FACTORS@faa.gov

  or write to:

  Mr. Steve Boyd, HF-HWG Secretary
  FAA – Transport Airplane Directorate
  ANM-111
  1601 Lind Ave, SW
  Renton, WA 98045
  United States of America

9.2 References

Abbott, K. et al (1996) FAA Human Factors Team Report on: The interfaces between flight crews and modern flight deck systems. Published on 18 June 1996.

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Appendix A: HF-HWG members and affiliations

Name	Company & Organization
1. Abbott, Kathy	FAA, Flight Deck Human Factors NRS
2. Armstrong, Don (alternate: Guy Thiel)	FAA, ANM160L
3. Mike Landy	BFGoodrich, Airframe Services Division
4. Beaujard, Florence	Aerospatiale-Matra Airbus
5. Birowo, Imam	Dornier Luftfahrt
6. Bousquié, Jean-François	Airbus Industrie
7. Boyd, Steve **(Secretary)**	FAA, ANM-111
8. Bresley, Bill (alternate: Ann Berner)	Universal Avionics
9. Carr, Tom	Raytheon
10. Courteney, Hazel **(JAA focal point)**	CAA SRG D&PSD Human Factors
11.	
12. Delesalle, Eric	Sogerma Co. Aerospatiale Matra
13. Donovan, Colleen	FAA, AIR-130
14. Fabre, François	DGAC Flight Test Certification
15. Gagnon, Pierre	Bombardier Aerospace
16. Garloch, Julie	Rockwell Collins Air Transport Sys.
17. Glover, Howard (alternate: Daryal Kuntman)	Honeywell (Allied Signal)
18. Graeber, Curt **(Co-Chair)**	Boeing Commercial Airplane Group
19. Harris, Don	Cranfield University
20. Hecht, Sharon **(FAA focal point)**	FAA, ANM-111 Transport Airplane Directorate
21. Hicks, Mark	Systems Engineering &; Assessment Ltd
22. Hollop, Christine	Boeing Commercial Airplane Group
23. Imrich, Tom	FAA, Flight Operations NRS
24. Jorna, Peter	NLR Amsterdam
25. Deharvengt, Stéphane (alternate: Rémi Jouty)	DGAC
26. Julie, Marc	Dassault Aviation
27. Kelly, Brian (alternate : Jean Crane)	Boeing Commercial Airplane Group
28. Kimball, Ken	Cessna Aircraft Co.
29. Lawrence, Simon (alternate: Bill Best)	ALPA (US Airways)
30. Leard, Tom (alternate: Dave Pepitone)	Honeywell Inc., Commercial Flight Systems
31. Lyall, Beth	Research Integrations, Inc,
32. May, Doug (alternate: Eric Fiore)	Bombardier Aerospace – Lear
33. Newman, Terry	CAA Flight Test
34. Nibbelke, René (alternate: Paul Emmerson)	BAE SYSTEMS Advanced Technology Centres - Sowerby
35. Price, Alan	Delta Airlines Air Transport Association (ATA)
36. Proust, Jean Michel	Air France
37. Rebender, Georges	JAA
38. Svenja Reinhold)	Dornier Luftfahrt
39. Reuzeau, Florence	Aerospatiale Matra
40. Riley, Vic	Honeywell Inc., Systems & Research Center
41. Ronceray, Didier **(Co-Chair)**	Airbus Industrie
42. Shamo, Marcia	Avionitek
43. Singer, Gideon	SAAB
44. Starr, Alison	Smiths Industries
45. Strilesky, Paula	IFALPA (Air Canada)
46. Stephen, Don	Transport Canada