

Human Factors Coordinating Team Meeting
Fort Worth, Texas Oct. 30th – Nov 1st, 2000

On October 30 the AIR Human Factors coordinating team met in Fort Worth Texas. The meeting was two days in duration and focused on reviewing draft human factors policy/notices/advisory circulars as well as big picture planning for how to identify and address human factors needs in Aircraft Certification. The meeting was a significant improvement over previous meetings, partly attributable to the advance work done in preparation of the meeting, most notably by Sharon Hecht and the meeting host Lorry Faber, particularly in preparing an agenda to meet the needs of the meeting participants. It was noted that this up front work is critical to the success of the meetings. It was also noted that it is important to follow up on action items to keep the team moving forward. The following action items were assigned:

Person	Action	Status
Frank	Send out the latest draft of HF small airplane directorate policy to all members of the team	
Sharon	Copy of comments on CAA ANPA. & also the ANPA.	Done
Sharon/Colleen	Pass back to the Avionics harmonization that they need to look at AC 23.1311 & AC 25-11, AMJ 25.1322; AC 23.1322. Need to be aware of discrepancies in different AC's & AMJs related to use of red, amber/yellow, green, white- cautions, warnings, & advisories	
Jeff	Find out who the requirements drafting committee for avionics requirements for Capstone avionics	
Jeff	Find out if AAR-100 has any focal point for the capstone program	
Kathy	Send out AC 25.1329 & FAR 25.1329. Pay special attention to sections 7 & 9 (alerts & characteristics of specific modes) and also appendix B (list of questions). Next meeting Nov. 13- 15.	
Kathy	Send out AFS HF plan. Comments back by December 1. Kathy would like help on the resource recommendations for HF specialists. Right now her report recommended 5.	
Colleen	Send group information about active checklist approval in LVA (Germans)	
Steve	Send Colleen issue paper(s) and/or special conditions on active electronic checklist.	
Steve	Send Epicguid.doc to Colleen and Sharon to help make sure these issues are addressed in Avionics HWG. Also send it to Gene Bollin and Dave Gollings so they can use it for Atlanta ACO cert project with Electronic Flight Bag.	
Lorry	Coordinate dates for next meeting (work with Jeff, Frank, & Kathy)	
Jeff	In charge of the next meeting- drafting & coordinating the agenda for this meeting & figuring out how & when to integrate a Wichita flight test pilot (perhaps a few hours on one day). Connect up with Lorry, Sharon, & Colleen to discuss this.	
Sharon & Colleen	Feed back to the HWG- need to update the FARs- 25.777 to take into account new shorter pilots not just 5'2"-6'3" And the FAR- 25.773 (or 25.771- about vision)- Lorry noted that pilots are getting older and we can't assume pilots vision is as good as it used to be.	

Dates of travel/ meetings

- Meeting starts Tuesday, February 20, 2001 at 1 pm & finishes Thursday, February 22 at 11:30AM. Meeting in Wichita (*Jeff Host. Note: Lorry will take notes)
- Fly on May 7th. Meeting May 8-10th in Washington D.C. (AVR part of one day)
- August 14-15 Seattle

Other planning

OSU meeting- March 5th- Aviation Psychology Symposium
 January SAE G10- at the Raddison on the beach

HCI Aero 2001 Aug 5th – 10th New Orleans
July SAE G10
Oshkosh 25th- 31st of July
October 19th RTCA TFIV- implementation/ TSO/ Field approval

At the end of the meeting participants discussed their individual as well as organizational needs and also ideas for improving future meetings. Suggestions for future meeting included:

1. All material to be reviewed at the meeting should be emailed to all meeting participants in advance of the meeting. Obviously the earlier the better, but even emailing it out one day in advance is helpful.
2. Hard copies of all material to be reviewed should be provided at the meeting. This should material should be provided by the author.
3. Each person on the agenda (policy to be reviewed or presentation) should indicate:
 - What they want from the group (e.x. FYI only, comments requested, word smithing requested, conceptual discussion, agreement/consensus, etc.)
4. The group agreed that in the future our team should not attempt to review documents on the screen only. It is not efficient, people can't process the material "live" (without having reviewed it prior to the meeting), and folks get stuck in the weeds
5. Participants reflected that they would like clearly identified chair of each meeting. The group agreed that it would be beneficial to have the host of the meeting act as the coordinator and chair for that meeting. The roles of the meeting host are as follows:
 - Solicit and coordinate suggested agenda items
 - Finalize the agenda
 - "bug" people to complete each action item previously assigned in advance of the next meeting.
 - Make logistical arrangements (schedule meeting room, get copies made, get in focus projector, send out directions, meeting reminders, hotel recommendations etc.)
 - Run the meeting (keeping to the agreed upon agenda and times)
 - Notifying and inviting appropriate parties for the next meeting dates and time each person is requested to be present (ex. test pilot(s) if test pilot issues are to be discussed, AAR-100 staff if HF research is to be discussed, etc.). Note: It is important to notify the guest participants of the specific date(s) and times that we need them in order to make sure that part of the agenda is focused on their issues and minimize the potential for wasting anyones time.

(Note: the next meeting is scheduled for Wichita, thus Jeff will be responsible for the above meeting items in preparation for that meeting)

6. At each meeting, the person scheduled to be the next host is responsible for:
 - Document meeting notes & action items
 - Documenting lessons learned and suggestions for improvements for future meetings
 - Distributing meeting notes & action items

(Note: the next meeting is scheduled to be in Wichita, followed by one in Washington DC. Thus, Colleen will take the minutes at the Wichita meeting.)
7. Idea related to guest participants- focus a specific part of the agenda on that person(s) issues and needs. Work to understand what the needs are and what we can do to address those needs. It was noted that so far we haven't done a very good job at addressing the needs of the test pilot community as a whole. Since each office, and even each individual within each office, has different needs, it was suggested that we switch from having a single test pilot as a representative in our group, to rotating through a variety of test pilots, gathering needs and working with them individually when we were in their vicinity. The local host would be responsible for setting up the part of the agenda to address the local needs. It was noted that a "user needs" analysis approach is one key role of human factors and we need to do a better job at working this into a specific section of the agenda. This approach would also enable us to invite in for a part of the time (ex. one part of one day) project managers or systems

engineers so we might better understand the needs of the field offices we are supposed to be supporting.

8. Each meeting we need to spend some time on group project(s) and strategy- what do we need to do as a group. Need to work on focus on where we need to go next. Ideas for group projects that we could all work is the IVT and providing a job aid for the human factors aspects of field approvals (suggested by Don)
9. We need to do a better job communicating the goals of the group (vision) and the goals of each part of each the meetings
10. Need a new date: Last week in January 31st-Feb 2nd.

Agenda for the Fort Worth Meeting

October 30, 2000

<u>Time</u>	<u>Agenda Item</u>
1:00	Welcome
1:05-1:45	Round room brief discussion of current cert. project work and policy
	AC 27/29 1322 re-write (Lorry Faber)
	Capstone update (Jeff Holland)
	Part 25 Policy efforts/HWG
	Homework/reading assignment review for Tuesday (i.e., read AIR-130 draft Notice on addressing the HF aspects of avionics submitted for TSO)
5:30 PM	Adjourn

Tuesday October 31st (Happy Halloween!)

<u>Time</u>	<u>Agenda Item</u>
8 AM	Flight guidance system Harmonization Working Group (Kathy Abbott)
	AFS Human Factors Plan update (Kathy Abbott)
	AC 25.1329 discussion
	Primus Epic status (Steve Boyd)
	Sustained engine vibration (i.e., blade out windmilling) (Steve Boyd)
	AIR-130 Human Factors TSO Notice (draft Notice review: Colleen Donovan)
	Part 25 Human Factors ARAC Harmonization Working Group (Sharon Hecht)
5 PM	Big picture discussion: what are the user needs, what should we be focused on developing in the short term and long term

Wednesday November 1st

<u>Time</u>	<u>Agenda Item</u>
8:00 AM	Means of Compliance- draft policy memo review (Steve Boyd)
	RTCA Task Force 4: TSO re-write (Don Armstrong)
	Big picture discussion continued- user needs, how can we do a better job at identifying them and addressing them
	Meeting feedback- what did we do well, what did we do not so well, what can we do to improve our next meeting?
10:45 AM	Adjourn

Agenda item: round room brief description of current cert. project work & policy

(Note: problem noted with this agenda item is that we didn't give participants enough guidance on what we wanted reported. The intent was to cover only the heavy hitter, big items that each person

was working, not a full listing of all activities. Thus, some people took two minutes, others took 20 minutes. This explains the different level of detail under each person)

1. Lorry
 - Policy work: Lorry briefed on her role as the Rotorcraft Directorate as the overall AC technical coordinator for AC's 27 & 29. In this capacity she serves as the focal point for all changes and additions to the rotorcraft advisory circulars.
 - Project work:
 - Bell 609- What happens to this system during transition is critical. The design is not necessarily well thought out- may need more FAA help on this project. Need fly by wire experts as part of cert. team. HF issues: they modeled the CAS after the B 747 and B 777. Use of warning, caution, and advisory systems include key issues.
 - Primary flight instruments- 1303. More up to date information. How to conduct an evaluation.
2. Colleen
 - Policy work:
 - Moving Map MOPS- out and published as RTCA DO-257. TSO needs to be published this year. The final time for input is when the TSO is distributed for comment.
 - AIR-130 Notice (addressing the HF issues as part of the TSO process)- needs to be put out this year. The latest draft was distributed and discussed at this meeting and was part of the homework for Monday night to be prepared to talk about it for Tuesday. This is associated with an AIR-130 Business plan item)
 - CDTI- Lots of trouble getting decent policy out of RTCA industry consensus group. We may need to pull the policy work back inside to an FAA group, working it as a revision to the TSO for low end TCAS type systems (TSO C-147). The RTCA group does not seem capable of producing an FAA usable product. If this is the way to go, we all need to help out on this. It would be a good candidate for a team project where Colleen could be the focal and gather input from several key people.
 - Task force IV implementation of TSO fix- recommendation 5-3 This is the team chaired by Don Armstrong. One aspect of this involves Colleen's AIR-130 Notice. Another is revising the TSO order. This is an AIR Business plan item.
 - Project work:
 - CDTI UPSAT project- many issues, STC is out.
3. Steve
 - Policy work:
 - JSAT- Loss of control. Has taken about 30% of his time. This should be over soon.
 - Methods of Compliance
 - Three issue papers:
 - Cursor control devices
 - Active electronic checklist
 - Control labeling
 - Project work: Mostly 2002 programs
 - A3XX- is heating up. They want all issue papers by the end of the year. Can't write the issue paper for the flight deck since the only briefing/charts/info. is now a year old. They have an on board information network- connected through a fire wall to the avionics suite.
 - A340- 500 & 600 program- big increase in gross weight. Surface area increase in wing. Take-off & landing speeds go way up. 60-70% increase in thrust. Probably should have been a new type certificate.
 - Dassault program: Falcon Enhanced Avionics Program- may be first second generation FMS
 - Dornier 728- Primus Epic- integration of utility systems. Point and click to change states of the systems

- Embrier M70- new 70 seat airplane Flight control system is in the integrated avionics system. All data is intermixed. Flight control computers hosted in same cabinets instead of being separate. _Note: New and novel features paper by
4. Jeff
- General comment from Jeff: He thinks it would be worthwhile for all of us (HF specialists) to take a look at the GAMA document final print, review, and provide help to fix it, refine it, & republish it.
 - Project Work
 - KMD 550- color moving map display Bendix King/Allied Signal/Honeywell/GE. He did some night light evaluations. The way they have to change the lights is clunky. They are going to re-write curve algorithms. This is going to be done as part of the installation . Big issue at the ACO's is night lighting.
 - Garmin: New stuff
 - Gulfstream- issue papers with Steve. Next evaluations in December. CCD- grip- Steve wants to see how they would use it in manual flight.
 - Eclips: small jet- provided a draft HF cert plan.
 - Primus Epic – going in an Embrier 170
 - Ratheyon Hawker 4000
 - Bell 609 with Rotorcraft Directorate
 - Policy
 - Small airplane directorate policy- Jeff has reviewed Franks Small Airplane draft stuff.
 - Issue papers on the projects above
 - Paper work for a new HF person
 - Capstone
 - RTCA TF4: TSO fix it group
 - Input to the Part 25 Harmonization Working Group
5. Kathy
- Kathy had a slide on her work
 - She requested any inputs for presentations she has around the country for different forums
6. Sharon
- Policy Work:
 - Part 25 Human Factors Harmonization Working Group
 - Avionics ARAC Harmonization Working Group
 - Job Aid- no workshops this year
 - Policy- development- responses to ANM Policy Memo. Sharon noted that you can get inputs from industry- you just can't get industry consensus though, since that violates Federal Advisory Committee Act (FACA)
 - JAA Human Factors steering group- new participants Gretchen is really good- NATS (National Air Traffic System). Patrick Hudson hosted the meeting & helped behind the scenes. Next meeting is in Brussels.
 - Projects:
 - ANM Human Factors Web site:
 - Bombardier – observer seat was not certifiable.
 - Boeing 777X and 747X
 - General note: the new ANM-111 acting manager is Gregg Dun. Sharon thinks he is very good.

Agenda item: Capstone (Jeff Holland)

- UAT
- Runway incursion- focuses on airplanes nearest you- regardless of where you are going. Turns runway red. Doesn't catch someone crossing runway. Not a lot of FAA test involvement before it is installed in the aircraft.

Big avionics workshops:

- NBAA, Avionics, AOPA,

Tuesday morning

- AC 25.1329 discussion
- Definitions section would be helpful for AIR-130 policy. Including definition of failures.

Primus Epic Agenda Item:

CCD discussion

- Vibration- track balls loosen up and process
- Liquid sensitivity
- Track impact of dual CCD failures
- Suggestion by Lorry- why do you focus on worst case scenario? Should be the range of scenarios (worst case, typical abnormal, & normal)
- Don suggests that the worst case is defined in the AFM.
- Special condition- is in the public forum- it would be nice to move some of these issues into the public forum so we could use it as the basis.

Dornier is working active checklist (2002)

Suggestion on AIR-130 policy

1. Steve suggests beefing up part II to include guidance to the reader on how they are supposed to deal with discrepancies. What are they supposed to do if they meet some of the requirements in a section, but not others.
 - Focus on the Project Specific Plans part of the CPI document- time line-phasing of the program. Emphasis on certification planning.
 - Get rid of the CPI process stuff altogether (note this is in conflict with the first recommendation) Reference (early & continuous process)- Get rid of the process from the AIR-130 notice and refer to the CPI web site.
 - Put Beth's timeline in the AIR-130 policy and supplement that

Two approaches- could do concurrently:

1. Approach from the timeline.
2. Formalize with the CPI process.

Focus on incentives- HF components= Good ways to reduce risk.

If you don't do this redesign is possible.

- This supports the CPI process, if you are using. If you are using it – it already helps set up for that process.
- Take the check boxes & expand on them- independent of the CPI phases. Identify issues & concerns. Expand check marks. Add:
 - Identify user or OP requirements
 - Know when to get HF aid or assistance- due to lack of knowledge or confirmation of knowledge
 - Evaluation types-
- Beef up the resolution- how to resolve issues-
 - Pro-active- 1) appear to be non-compliant & need to be fixed. 2) Concerns – don't know enough to categorize them. 3) Nice to have
 - Applicants job is to resolve the issues once identified- don't get hung up on providing stuff for ACO's to resolving issues for the applicants- that is not the FAA job.
 - Timeline- applicants take a pass at resolving – discuss potential resolutions- determine if the proposed resolutions are acceptable

- Intended function- must be specified by the applicant. AIR-130 notice could provide guidance on how the FAA ACO can evaluate the statement of intended function - needs to be clearly specified.
- Encourage applicants document design assumptions
- Installation issues- not clear how much to get into.
- New & Novel technologies- extra functionality- this is where focus should be- can't change TSO system- but can supplement parts that would have to be caught in the STC.

Brainstorm about other process ideas not addressed in AIR-130 policy:

- Application should delineate three types of information:
 - Get applicant to communicate: Intended function- conceptual explanation- detailed level
 - Get applicant to communicate: Concept of operations- they need to do this.
 - Operational requirements- fall out of intended function
- Some things that require evaluation tools- bench test. Lights, etc. identify those things that require tools.
- Define evaluations- bring in idea of a MEOT- not correct to go on one or two opinions for issues
- Placement limitation-
- Understanding full functionality (not just that identified by the TSO)
- Failure tree- analysis- who failure modes and effects analysis
- Interactive stuff to learn about design concept
- Get pilots guide
- Informal meetings with design/ aspects of system functionality
- Share opinions
- Offer suggestions to change to make more userfriendly
- Cheat sheet- what your going to look at. Could provide assistance by preparing system review data sheets
- Concisely define Operational Concept- Mission needs statement- Human Engineer MIL H 46855- High level analysis- over DID Data Item Document. Boeing document - how to do this process for an avionics system.
- What we need to get from the applicant before the FAA evaluation
- Need to start off the section by explaining what we want to do in this section: Systematize and standardize evaluation process. Give them objective criteria- & where you can't we need to standardize the evaluation.
- When should he talk to a human factors person- call in. Like the software notice- when you should call in a human factors person.
- Institutionalize review process (ex. that used by Steve Boyd. Jose Flores, Chip, George- audience) to do this we should identify users and do a needs evaluation
- HF people can help by develop test scenarios- test design- evaluate someone else's test design.
- PART II- Need to expand- what the applicant is supposed to do with it.
- Not clear how to use Part II- clarify that at the beginning of Part II-

Big picture stuff- what are the needs of the user/ issues that need work:

- Field approval issues: defining issues that need to be coordinated with the ACO. Perhaps a job aid guidance document for field approvals. Get something to inspectors
- Flight manual supplement content- almost unwritten guidelines about what should be in one for a single field approval
- Don has a document out that establishes a working relationship between ACO and Regional office- Western Pacific- Memo of understanding
- IVT Human Factors training that was on the slate for last year.