

Subcommittee on Human Factors | MINUTES

Meeting date | *July 30 – August 1, 2013*

Meeting location *US DOT Volpe Center, Cambridge, MA*

Purpose: Human Factors Guidance for FY 2016 Research Portfolio

July 30, 2013

Dr. Amy Pritchett, Subcommittee Chair welcomed the Subcommittee and introduced Mr. David McKenney (ALPA) who joined the Subcommittee.

Presentation REDAC Vision | **Presenter** *Dennis Filler*

Mr. Dennis Filler welcomed the Human Factors Subcommittee and described his goals for the Subcommittee. Mr. Filler encouraged the Subcommittee to consider the future needs of the FAA and identify the research opportunities to address key human centered problems that will affect NextGen implementation. The Subcommittee should look carefully at the human factors portfolio and propose the necessary course changes so that the FAA can obtain the largest results from our constrained resources.

Presentation Welcome | **Presenter** *Bob Johns*

Mr. Bob Johns, the Director of the US DOT Volpe Center, provided a few words of welcome to the Subcommittee and provided a brief history of the Volpe Center.

Presentation Roles and Responsibilities/Working group Update | **Presenter** *Cathy Bigelow*

Dr. Cathy Bigelow reviewed the Subcommittee roles and responsibilities to set the tone and framework for the meeting. One of the purposes of the Fall meeting is for the Human Factors Subcommittee to provide guidance to the FAA to develop the FY 2016 research requirements. To help the Subcommittee in this task, Dr. Bigelow provided information on the AVS prioritization process.

Presentation Budget Update | **Presenter** *Mike Gallivan*

Mike Gallivan reviewed the RE&D FY 2013 budget status and future budget requests and out year targets. The FAA is operating on a year-long continuing resolution. The current FAA authorization runs through FY 2015.

Presentation Flight Deck FY2016 Strategic Requirements Briefing: NextGen Program | **Presenter** *Kathy Abbott*

Dr. Kathy Abbott, the head of the Aviation Safety Organization (AVS) Human Factors Technical Community Research Group (TCRG), reviewed the NextGen Air-Ground Interaction Human Factors research requirements ongoing in FY 2013 and identified focal areas for research from FY 2014 – FY 2016.

The Subcommittee discussed the following:

- The research requirement titled “NextGen: Complex Systems and Human Error” is evolving from its current focus on information automation to more broadly address complex systems.
- The Subcommittee discussion noted that it is important to understand what is explicitly assumed to change in NextGen and to identify the NextGen requirements, particularly when addressing new procedures, tasks, skills, and training. In addition, when discussing NextGen, it is important to identify the timeframe and when the changes are expected.
- The Subcommittee noted that some of the research requirements seem to be reactive rather than proactive.

Action items	Person responsible	Deadline
Update tasking for “NextGen: Complex Systems and Human Error” so that it reflects the flight deck-air traffic control (ATC) interaction/negotiation as stated in the research requirement	ANG-C1	Spring 2014 meeting

Presentation MIT Lincoln Labs Deep Dive: NextGen TCAS Research | **Presenter** *Wes Olson*
 Dr. Wes Olson provided an overview of the NextGen research project he is coordinating addressing collision avoidance. He reviewed the human factors needs, provided an overview of Airborne Collision Avoidance System (ACAS X), and discussed the Traffic Alert and Collision Avoidance System (TCAS) research that is being conducted at Georgia Institute of Technology.

Presentation Flight Deck FY2016 Strategic Requirements Briefing: Core Program (Flightdeck/Maintenance/System Integration Human Factors) | **Presenter** *Kathy Abbott*
 Dr. Kathy Abbott reviewed the Core Human Factors Flight Deck Program research requirements ongoing in FY 2013 and identified focal areas for research from FY 2014 – FY 2016. The Subcommittee then conducted an exercise to provide input and feedback to AVS sponsors on their research requirements. This opportunity provided the Subcommittee insight into the experience that requirement writers have in responding to the current research requirement format.

Action items	Person responsible	Deadline
Provide a briefing on how the different FRMS domains are being addressed, coordinated, leveraged (flight operations, maintenance, and ATC)	ANG-C1	Spring 2014 meeting
Distribute to the committee the UAS research requirements immediately upon its public availability and/or address concerns with conflict of interest so as to enable a review of the proposed requirement.	ANG-C1	Spring 2014 meeting

Presentation MIT Lincoln Labs Deep Dive: Loss of Control (LOC) Research | **Presenter** *Tom Teller*

Tom Teller described the research project MIT Lincoln Labs is leading addressing loss of control – inflight (LOC-I). In Phase 1, MIT Lincoln Labs completed a literature review of existing LOC-I studies including causal and contributing factors. In Phase 2, which is ongoing, MIT Lincoln Labs is developing objectives and outcomes for training to mitigate LOC-I with initial emphasis on air carrier operations.

Action items	Person responsible	Deadline
The Subcommittee suggests that the learning objectives of LOC training be more explicitly defined and delineated.	MIT Lincoln Labs	Spring 2014 meeting

Presentation Volpe Deep Dive: Instrument Procedures | **Presenter** *Divya Chandra*

Dr. Divya Chandra described the research addressing instrument procedures. She provided background on Instrument Flight Rules (IFR) charts and procedures and performance based navigation (PBN), including area navigation (RNAV) and required navigation performance (RNP). She reviewed a recently completed research project on visual complexity and provided an overview of her research plans.

July 31, 2013

Review of Homework Assignments from Previous Day – Findings and Recommendations Discussion

- The Subcommittee discussed input to be provided to MIT Lincoln Labs relative to the LOC Deep Dive.
- The Subcommittee began to discuss how flight deck research can influence the development of concept of operations.
- Flight Deck FY2016 Strategic Requirements Briefing: Core Program: The Subcommittee felt that all research areas proposed within human factors looked important and would like to emphasize the need for research in two areas:
 - Loss of control/jet upset recovery
 - UAS research, e.g., ground station design
- The Subcommittee discussed the AVS research requirement process. The Subcommittee felt that it is a thorough, robust, and structured process.
- Subcommittee Discussion of Open Recommendations: The Subcommittee reviewed the findings and recommendations from the Fall 2012 meeting related to the flight deck. The following recommendations were closed:
 - Fall_2012_22: This finding and recommendation proposed that AVS should continue with planning the FY 2015 flight deck research requirements as presented to the

Subcommittee. Consistent with the FAA response to the REDAC recommendation, these research requirements were voted on in accordance with the AVS R&D Prioritization Process.

- Fall_2012_23 Issues 1 and 3: The research questions noted in Issue 1 involved potential human factors issues associated with use of personal/consumer electronics in the cockpit, mixed levels of criticality for flight deck systems, and management of information stemming from multiple sources and presented across multiple flight deck displays. These issues are being addressed as part of several FY 2013 and FY 2015 research requirements. For Issue 3, ANG-C1 is coordinating with AIR technical sponsors to provide input to the SAE G-10A Digital NOTAMs Subcommittee. Consistent with the FAA response to the REDAC recommendation, the FAA is supporting implementation of digital Notices to Airmen and predeparture clearances through standards development activities, and, at present, has not identified specific research questions for these functions.
- Fall_2012_24: Following the REDAC recommendation supporting the FY 2015 research requirement called “NextGen: Human Factors Considerations of Complex Systems,” AVS withdrew the requirement for FY 2015. AVS is planning to submit a related research requirement in FY 2016 titled “NextGen: Complex Systems and Human Error” and briefed the Subcommittee on this proposed research during the meeting.

Presentation FY 2016 Strategic ATC/Technical Operations Core Research Directions |

Presenter *Dino Piccione/Jason Demagalski*

Mr. Piccione reviewed the FY 2013 research and discussed the structure of the ATC program leading to FY 2016. Emphasis was placed on linkage between the evolution of the research program in accordance with the strategic plan and the research areas that are at risk due to funding reductions. Mr. Jason Demagalski then reviewed the research on safety, operations, and training from FY 2013 – FY 2016. He provided some detail about new initiatives that will provide research support to the ATC operational community and direct research support for the Top 5 ATC safety topics.

The Subcommittee discussed the following:

- The Subcommittee was generally concerned that the ATC / TechOps Human Factors could not adequately support critical research given budget reductions and discussed the specific risks that would result.
- The Subcommittee expressed some reservations regarding the exclusive use of FAA laboratory personnel to execute research requirements. Skills available in the labs may not match those needed to perform some portions of the sponsor requirements leading to some research not being done.
- For example, research on personnel selection is necessary for the maintenance of current selection process, particularly as new systems are being fielded. The Subcommittee reviewed their Spring 2013 finding and recommendation and decided to submit a new finding and recommendation that is broader and highlights the consequences of cutting this research area.

- The Subcommittee also raised the issue of research gaps that may not be addressed due to the lack of resources (e.g., fatigue, safety and operations, better integration of human factors in the acquisition process)
- Safety research such as the development of effective training methods to recover from loss of separation incidents would be limited by available resources and may not be sufficient for the timely completion of a useful product. Important improvements to the FAA Acquisition Management System to enhance the status of Human System Integration through all phases of the acquisition life cycle may be limited in terms of the pace of improvements as well as the number of areas that can be updated.

Action items	Person responsible	Deadline
Request a briefing from ATO Safety so the Subcommittee can gain a better understanding of how fatigue is being addressed	ANG-C1	Spring 2014 meeting

Presentation FY 2016 NextGen Strategic ATC Controller Efficiency Research Directions |
Presenter *Rachel Seely*

Dr. Rachel Seely presented the research focal areas for FY 2013 – FY 2016 under the NextGen Human Factors ATC program. The NextGen program is intended to support specific NextGen operational improvements (OIs). Dr. Seely also described the implications and next steps for the Human Systems Integration Roadmap, which will be used to convey the evolution of NAS actors with NextGen in the NAS Enterprise Architecture (EA). The Subcommittee discussed the following:

- En route/TRACON merger: There is a bigger picture that the HF research needs to focus on addressing the fact that this is a new operational concept, so changes in controller jobs, /tasks, and procedures would need to be considered.
- For both flight deck and air traffic control domains, research needs to inform the concept of operations, and this need extends beyond human factors.
- Coordination between ATC and flight deck NextGen human factors research is needed. A change within one environment (e.g., flight deck or ATC) will have implications for interaction within the NAS. Human factors research needs to ensure there is adequate integration across the two domains during the execution of the research.
- Human Factors for UAS in ATC: (1) the Subcommittee noted that the focus should consider UAS requirements for operating in the NAS rather than NAS requirements to accommodate UAS. (2) Deliverables need to identify the intended impact and target user. (3) The flight deck and ATC UAS research should be coordinated.

Action items	Person responsible	Deadline
Coordinate research related to air-ground integration between ATC and flight deck NextGen human factors programs	ANG-C1	Provide update at Spring 2014 meeting

Action items	Person responsible	Deadline
Further elaborate on details of the individual research activities, and clarify the prioritization of their execution as the plan matures and is resourced. Present this material at a future meeting	ANG-C1	Provide update at Spring 2014 meeting
For Human Factors for UAS Ground Control Stations, the Subcommittee would like a better understanding of (1) whether the focus is on UAS requirements for operating in the NAS or NAS requirements for accommodating UAS's; (2) how the outputs and deliverables will be used; and (3) specific areas of research related to ground control stations.	ANG-C1	Provide update at Spring 2014 meeting

Presentation Volpe Human Factors Division Overview | **Presenter** *Maura Lohrenz*

Ms. Maura Lohrenz presented an overview of the current human factors projects funded by ANG-C1 being conducted at the Volpe Center.

August 1, 2013

The Subcommittee reviewed the draft findings and recommendations.

Action items	Person responsible	Deadline
Ensure an integrated approach to human factors research by coordinating efforts examining the flight deck, ATC and TechOps. This requires careful definition of the research requirements for work funded as flight deck research, ATC research, or TechOps research. Equally important, it requires careful attention to the definition and execution of the specific research tasks and associated deliverables to ensure that such an integrated perspective isn't lost as the research transitions to implementation. Finally, it requires deliberate coordination across the programs responsible for these three focus areas. Specifically, the subcommittee would like a briefing on this. We believe that developing this briefing will also be useful for presentation by the FAA in other contexts than just our little subcommittee world.	ANG-C1 to coordinate	Spring 2014 meeting

Presentation Volpe Deep Dive: LVO/SMGCS | **Presenter** *Maura Lohrenz*

Ms. Maura Lohrenz described an ongoing symbology study to support the development of symbol recommendations for use on Low Visibility Operations (LVO)/Surface Movement Guidance and Control System (SMGCS) charts.

Presentation Volpe Deep Dive: ADS-B research | **Presenter** *Kim Cardosi*

Dr. Kim Cardosi provided an overview of the Automatic Dependent Surveillance – Broadcast (ADS-B) research being conducted at the US DOT Volpe Center. She focused on six projects:

- Cockpit Display of Traffic Information (CDTI) Industry Survey,
- CDTI symbology research,
- Use of color on airport moving maps and CDTIs,
- Flight Interval Management (FIM) Literature Review
- CDTI Operational Evaluation for Merging & Spacing (M&S)
- Support for the In-Trail Procedure

The meeting adjourned at noon.

Attendance

Members

Chris DeSenti
Bill Edmunds
John Hansman
Alan Jacobsen
Jim Mangie (Subcommittee on Aircraft Safety)

David McKenney
Amy Pritchett
Bill Rankin
Bill Rogers
Phil Smith

Other Attendees

Kathy Abbott, FAA
Katrina Avers, FAA
Cathy Bigelow, FAA
Daniel Brock, FAA
Kim Cardosi, US DOT Volpe Center
Divya Chandra, US DOT Volpe Center
Tom Chidester, FAA
Kevin Comstock, ALPA
Jason Demagalski, FAA
Caroline Donohoe, US DOT Volpe Center
Colleen Donovan, FAA
Gloria Dunderman, FAA
Doug Farrow, FAA
Dennis Filler, FAA
Mike Gallivan, FAA
Rebecca Grayhem, US DOT Volpe Center
Carla Hackworth, FAA
Dan Herschler, FAA
Young Jin Jo, US DOT Volpe Center
Richard John, US DOT Volpe Center
Bob Johns, US DOT Volpe Center

Paul Krois, FAA
Tracy Lennertz, UT DOT Volpe Center
Maura Lohrenz, Volpe
Katarina Morowsky, US DOT Volpe Center
Tom McCloy, FAA
Tom Nesthus, FAA
Wes Olson, MIT Lincoln Labs
Rob Pappas, FAA
Dino Piccione, FAA
Stephen Plishka, FAA
Dale Roberts, FAA
Andrea Schandler, FAA
Rachel Seely, FAA
Gary Serfoss, JMA
Eddie Sierra, FAA
Andrea Sparko, US DOT Volpe Center
Cathy Swider, FAA
Tom Teller, MIT Lincoln Labs
Michelle Yeh, FAA

Federal Aviation Administration
REDAC Human Factors Subcommittee
US DOT Volpe Center, Cambridge, MA, Building 1, 12th floor MIC Conference Room

Meeting Agenda, July 30, 31, & August 1, 2013

Call-in number: 1-877-336-1828, access code 5769486

<https://www.connectmeeting.att.com>

Day 1 (Tuesday, July 30)

8:30 – 8:40	Welcome/Opening comments/Introductions	Amy Pritchett/Michelle Yeh/Paul Krois/ Bob Johns
8:40 – 9:00	REDAC Vision	Dennis Filler
9:00 – 9:30	Roles and Responsibilities/Working group update	Cathy Bigelow
9:30 – 10:00	Budget Update	Mike Gallivan
10:00 – 10:15	Break	
10:15 – 11:00	Flight Deck FY2016 Strategic Requirements Briefing: NextGen Program	Kathy Abbott
11:00 – 11:30	MIT Lincoln Labs Deep Dive: TCAS Research	Wes Olson
11:30 – 12:45	Lunch	
12:45 – 1:45	Flight Deck FY2016 Strategic Requirements Briefing: Core Program (Flightdeck/Maintenance/System Integration Human Factors)	Kathy Abbott
1:45 – 2:45	Findings and Recommendations Discussion: Feedback/recommendations on FY2016 Research Requirements	All
2:45 – 3:00	Break	
3:00 – 3:45	Findings and Recommendations Discussion: Feedback/recommendations on FY2016 Research Requirements (continued)	All
3:45 – 4:15	MIT Lincoln Labs Deep Dive: LOC Research	Tom Teller
4:15 – 4:45	Volpe Deep Dive: Instrument Procedures	Divya Chandra
4:45 – 5:00	Wrap up – Homework Assignments - Review of Action Items	All

Day 2 (Wednesday, July 31)

8:30 – 9:30	Review of Homework Assignments from Previous Day – Findings and Recommendations Discussion	All
9:30 – 10:30	FY 2016 Strategic ATC/Technical Operations Core Research Directions	Dino Piccione/Jason Demagalski
10:30 – 10:45	Break	
10:45 – 11:45	Findings and Recommendations Discussion	All
11:45 – 1:00	Lunch	
1:00 – 2:00	FY 2016 NextGen Strategic ATC Controller Efficiency Research Directions	Dino Piccione/ Rachel Seely
2:00 – 2:45	Findings and Recommendations Discussion	All
2:45 – 3:00	Break	
3:00 – 3:30	Volpe Human Factors Division Overview	Maura Lohrenz
3:30 – 4:45	Findings and Recommendation Discussion Review of Previous F&Rs and Action Items	
4:45 – 5:00	Wrap up – Homework Assignments - Review of Action Items	All

Day 3 (Thursday, August 1)

8:30 – 10:00	Review of Homework Assignments from Previous Day – Findings and Recommendations Discussion	All
10:00 – 10:30	Volpe Deep Dive: LVO/SMGCS	Maura Lohrenz
10:30 – 10:45	Break	
10:45 – 11:30	Volpe Deep Dive: ADS-B research	Kim Cardosi
11:30 – 12:00	Findings and Recommendation Discussion	
12:00 – 12:15	Wrap-up – Adjourn <ul style="list-style-type: none">- Review of Action Item- Agenda – date/location, what will be included for the next meeting	
1:00 – 2:30	Volpe lab tour	