

## **Subcommittee on Human Factors WINTER/SPRING 2016 | MINUTES**

---

**Meeting date** | *March 29-31, 2016*

**Meeting location** | *Mike Monroney Aeronautical Center (HQ-Building 1 Rm 352)- 6500 S. MacArthur Blvd. Oklahoma City, OK 73169*

**Purpose:** Review the R&D portfolio developed based on their strategic guidance from fall meeting and UAS focus.

### **Tuesday, March 29, 2016 (Subcommittee Meeting on Human Factors)**

Jack Blackhurst and Sherry Chappell welcomed the Subcommittee members and thanked CAMI for hosting.

Jack briefed that this meeting will be UAS-focused. Need to have assessments and not necessarily findings on UAS.

Introductions around the room and on the phone.

Shelley Yak, Director of William J. Hughes Technical Center and REDAC Co-Chair since January 2016.

- Participating in all the REDAC Subcommittee meetings to see what is working or not.
- Use NARP as communication to congress. NARP will put the vision forward.

Jack briefed that HF is fragmented across FAA so the story isn't getting to higher levels. People have trouble advocating for HF. The subcommittee is here to be advocates to tell the story to the FAA, OMB, etc.

---

**Presentation** HF Budget Impact and Implications | **Presenter** *Mike Gallivan, RE&D Financial Manager & Mark Orr, AVS R&D Manager*

Mike Gallivan, Manager of RE&D Financial Management, reviewed the FY16-FY18 RE&D budget status and portfolio and out year targets.

- Current Authorization extended through Mar 31, 2016 - expect another extension
- Budget future – funding levels after FY17 are unclear, sequestration may resume.

Mark Orr, AVS R&D Manager, presented A11G HF funding history FY13-FY16.

- In FY 15 congress got in the mix and flight deck core research went from 5.2 to 2.1 & in FY16 from 6.1 to 1.0 (\$967K)
- Congress came in FY15 & FY16. Spread A11L for UAS A11G control account to fill in the gap
- Have high priority programs that are not being funded because the total already hit the Mendoza line.

---

**Presentation** Review of HF activities/Emerging Issues | **Presenter** *Nick Lento, ANG-CI Acting Division Manager*

Nick Lento introduced himself.

Working with Jason Demagalski and Mark Orr to get their tasks completed in a timely manner and also get them funded appropriately.

- Reviewed current programs against subcommittee list of priorities
- There are currently four BLIs (8BA000, 8AA000, 1A07A0 and 111110). FY17 has only three (8BA000, 8AA000, and 111110)

---

**Presentation** Human Factors Aspects of Manned Commercial Space Transportation | **Presenter** *Dr. Melchor Antunano, Director of CAMI*

Dr. Antunano presented on the Aerospace Transportation Technologies and Human Support Technologies.

- The FAA is licensing the operation and not the spacecraft.
- Commercial space is pushing flexibility of space access
- We want to promote the development of space travel and the safety of space travel

---

**Presentation** FY18 Requirements ATC/Tech Ops & ATC/Tech Ops Strategic R&D Plan | **Presenter** *Jason Demagalski, AJI Human Performance*

Jason Demagalski reviewed Human Performance definition and four process areas:

1. ATO Human Performance Strategic Activities
2. External Human Performance Leadership
3. ATO Operations Optimization
4. Operational Human Performance Education & Training

Jason presented response to F&R Winter 2015\_#5.

Held roundtable with active sponsors – pilot meeting on Feb 16, 2016

The subcommittee agreed that Jason give update at next meeting and address the system engineering aspect. Close current F&R and open a new action item.

---

**Presentation** HF work focusing on design, adaption, and implementation of PBN procedures for PBN - F&R Winter 2015 | **Presenter** *Stephanie Kreseen, ANG-CI*

- Discussion about reduction in HF flight deck core money – need to explore why we’ve been ‘downgraded’ by congress – we’re taking the biggest hit in the shift to UAS
- We are using antiquated training methods and approaches for measuring the effectiveness of the training – no one is addressing the human performance aspect

Subcommittee agreed to close F&R #4 but the recommendation has not been satisfied.

Subcommittee agreed to close Action #7 - Summer 2015\_05 and #8 - Summer 2015\_06.

---

**Presentation** Updates on NASA’s Program for Data Mining of Operational Data and Identification of unique anomalies | **Presenter** *Jessica Nowinski, NASA Ames*

Action Item #4 - Summer 2015\_02

#### NASA Data Mining Efforts:

- Anomaly detection
  - Current methods of identifying issues rely on exceedance-based methods. You don't need to have background knowledge of standard operations to be able to identify the anomalies. Can't identify unknown anomalies.
  - Have low false positive rate (miss anomalies), but also high false negative rate (not really of interest)
- Precursor identification
  - E.g., precursors of go-around. The unstable approach that leads to go-around. Precursor index to predict go-around.
  - Look at combination of variables for a number of anomalous flights
  - By comparing many records of go-around, the most common preceding events /precursors are unique. They make sure it is not common to many flights. Looking at precursor, you need a number of records.
- Text mining

---

#### **Wrap up – Homework Assignments – Review of Action Items**

Reviewed presented briefings and asked for subcommittee further feedback.

Meeting adjourned 4:13pm

---

#### **Wednesday, March 30, 2016**

#### **Review of Previous Day – Findings and Recommendations Discussion**

The Subcommittee reviewed the findings and recommendations from the previous day's presentation.

Jack reviewed drafted F&Rs:

- HF priorities and research and application investment
- HF research budget changes in FY16 and FY17, specific impacts of FY17 budget reductions

Alan reviewed draft F&R and action item:

- Progress of Human Performance efforts and roundtable process at next meeting

Drafted F&R hard copies were distributed to attendees for further review and edits.

---

**Presentation** Review of FY18 Flight Deck Core & NextGen| **Presenter** *Kathy Abbott, Chief Scientific and Technical Scientific Advisor, Flight Deck Human Factors*

Reviewed the FY18 NextGen Flight Deck Research Program

- NextGen HF Guidelines for Advanced Instrument Procedure Design and Use (A12B.HFNG.2):
- NextGen Procedures, tasks, Skills and Training for NextGen Air Carrier Pilots and Dispatchers (A12B.HFNG.3):
- NextGen FD Systems – Flight crew Interfaces, Installation, Integration, and Operations (A12B.HFNG.4):
- NextGen: DataComm HF R&D (A12B.HFNG.5)
- NextGen Human Error and Complex Systems (A12B.HFNG.6)

Reviewed the Flight Deck Core FY18 Plan

- Avionics & New Technologies (A11G.HF.2)
- Advanced Vision Systems – EFVS, EVS, SVS, and DVS, HUD-Certification and Operational Approval Criteria (A11G.HF.4)
- Maintenance HF to Support Risk-Based Decision Making (RBDM) and Maintenance Safety Culture (A11G.HF.10)
- FY15-FY18 Core FD Research Requirements Overview

---

**Discussion** Remote Towers / Q&A | **Presenter** Jerome Lard

- Look at organization and facilities and take into account set of requirements.
- Recognize a research need on a broad spectrum.

---

**Presentation** Air Force Human Factors Research Program-How it relates to UAS & Operational FAA Issues | **Presenter** Mark Draper & Jessica Bartik, Air Force Research Lab

Action Item #5

Four technical competencies

1. Decision Making
2. Training
3. Bioeffects
4. Human-Centered Intelligence, Surveillance, and Reconnaissance

---

**Presentation** FAA UAS HF Program Research Requirements | **Presenter** Stephan Plishka, Human Factors Engineer

Stephen Plishka presented UAS Human Factors Research Requirements for FY18.

- UAS HF Control Station Design Standards (A11L.UAS.24)
- High Visual Contrast for UAS (A11L.UAS.31)
- NextGen Minimum Detect and Avoid (DAA) Display and Flight Path Information (A12B.UASNG.1)
- NextGen UAS Automation/Autonomy (A12B.UASNG.2)

FY16-FY19 UAS HF Research Requirements overview

- A11L – Core
- A12B – NextGen – funding not yet determined

---

**Presentation** UAS HF Research Roadmap Activities | **Presenter** *Carla Hackworth, Division Manager*

- Driven by resources and urgent need.
- Get SMEs together regarding UAS HF work and develop research roadmap near term and long term. Various groups represented in November 2015 at CAMI.
- Purpose – engage stakeholders from science, industry, and regulatory agency, review by the unique stakeholders.
- Created breakout groups with categories to come up with the issues that are presented. Each individual responsible for a category was asked for a description of what was discussed.
- Post-summit assignments – gather the issues and all participants were asked to provide feedback on the urgency and impact and importance of the issues.
- Top research issues – In the process of developing a proceeding report and findings in the breakout groups. Provide overall summary of items rated most important. In addition, look at breakout groups of their top issues.
- Provide report to Chris Swider and all attending members. This will become a way for his office and TCRG to know what work is priority that needs to be done.

---

**Presentation** FAA UAS Research Expo | **Presenter** *Tom Prevot, NASA and Sheryl Chappell, DFO*

- The concept from the expo is to bring all the REDAC subcommittee members to spend time going through what's going on. The new structure was introduced with Earl Lawrence and their vision. Talked about working with other efforts like RTCA and how things are going with Section 333, and the pathfinder programs were reviewed. John Hansman brought out a lot of good concerns for REDAC in general.

---

**Presentation** UAS Detect & Avoid Research | **Presenter** *Kevin Williams, CAMI and Carolina Zingale, Tech Center*

Kevin Williams – AAM-510 presented Detect and Avoid (DAA) Traffic Display Minimum Information Requirements:

- Looking at the following independent variables
  - Display Symbology
  - Control Station Interface
  - Pilot Experience
    - UAS experience
    - Instrument-rated manned aircraft experience only
- There are 3 types of DAA information: suggestive, directive, & basic traffic info
- MOPS will cover flight in Class D transiting to Class A
  - Because of the flight in Class D the MOPS have to cover non-cooperative intruders
- Traffic avoidance – divided into two diff phases. Close up– collision avoidance and separation – includes negotiations between ATC, UAS pilot and other traffic to coordinate a maneuver.

- Research is part of RTCA SC-228 – work on the separation phase, no interest in collision avoidance. And interested in negotiation with ATC.
- Looked at four different traffic displays. There are different types of info to the pilots. Suggestive or Basic information. Directive is a particular maneuver. Suggestive is a range of maneuvers. Also, could be in between suggestive or directive. There has to be a pilot thought process.

---

**Presentation** UAS Center of Excellence HF Research | **Presenter** *Ellen Bass, Drexel University*

Ellen Bass is the HF lead and on the ASSURE COE executive board. In this COE, the HF work is well represented.

- Studying function allocation between the automation and the pilot
- Studying control station design
- Studying pilot training and certification requirements
- Studying visual observer training and certification requirements.

---

**Presentation** NASA UAS HF Research | **Presenter** *Jay Shively & Lisa Fern, NASA Ames*

Jay Shively – UAS in the NAS. Presented series of UAS DAA experiments:

- Goal – provide data on the effect of various detect and avoid (DAA) display features with respect to pilot performance of the self-separation function.
- Three types of displays – informative, suggestive, directive
- Approach - Conduct a series of iterative human-in-the-loop (HITL) experiments, in a representative simulation environment, with different display configurations to objectively measure pilot performance on maintaining well clear.
  - Key metrics: pilot response time, losses of well clear, severity of losses of well clear
  - Three stimulations have been conducted
  - Two Mini-HITLs have been conducted
- Draft RTCA MOPS Alerting Structure
- Consistent advantage between basic & advanced info with remaining well clear
- Saw effect of control station ease of entering maneuver info

---

**UAS Discussion – What the subcommittee has learned about the program & what we recommend for future research**

- Jack – Will draft the UAS F&R

---

**Findings and Recommendations and Action Item Discussion**

The Subcommittee reviewed the findings and recommendations from the day’s presentations.

Meeting adjourned 5:00pm

---

**Thursday, March 31, 2016**

**Presentation** Review of Homework Assignments from Previous Day/F&R Discussion |  
**Presenter** *All*

Reviewed last meeting Fall/Summer 2015 F&R FAA responses.

Reviewed draft F&Rs from Wednesday's meeting.

Thanks were given for the time and support of all the members of the Subcommittee and participants attending the meeting.

The FAA DFO adjourned the meeting at 10:02 am on Thursday, March 31, 2016.

A tour of the CAMI research facilities followed.

The next meeting date is September 07-09, 2016 in Washington, DC.

---

**Committee Operations Discussion**

- Fall/Summer 2016 - The Subcommittee identified week of September 6-9, 2016 for next the Human Factors Subcommittee meeting. The location TBA (Washington DC).
- Winter/Spring 2017 – The Subcommittee identified week of March 28-30, 2017 for next year's Human Factors Subcommittee meeting. The location is NASA Ames Research Center (Moffett Field, CA).

| <b>Action items</b>   | <b>Person responsible</b> | <b>Deadline</b>  |
|---|---------------------------|------------------|
| Provide a more detailed description of the research plan for maintenance human factors to the REDAC Human Factors Subcommittee at the next meeting and invite the CSTA for Maintenance Human Factors to the meeting to discuss the overall plan.  | TBD                       | Fall/Summer 2016 |
| Provide a status briefing to the REDAC Human Factors Subcommittee on progress of the Air Traffic Organization's Human Performance efforts and specifically on the roundtable process at the next meeting.   | Jason Demagalski          | Fall/Summer 2016 |
| Provide a status briefing to the REDAC Human Factors Subcommittee on the status and progress of UAS recommendations at the next subcommittee meeting.   | TBD                       | Fall/Summer 2016 |
| There are two areas that the REDAC Human Factors subcommittee feels the FAA should initiate research on. First, distance learning is already in the requirements, but funding has not been initiated. The FAA should provide a briefing to the REDAC Human Factors Subcommittee at the next meeting on how funding for this research will be incorporated in the portfolio. | TBD                       | Fall/Summer 2016 |
| The subcommittee recommends the FAA initiate research on training methodologies (including required knowledge and skills) required for current and future NextGen systems. Provide a briefing to the REDAC Human Factors Subcommittee at the next meeting on their progress and how this research will be incorporated in the portfolio and funded.                         | TBD                       | Fall/Summer 2016 |
| Provide a status briefing on the Administrator's initiative on risk based decision making.  | TBD                       | Fall/Summer 2016 |

## Meeting Attendance

### Members

Jack Blackhurst (Subcommittee Chair)  
Chris Desenti  
Alan Jacobsen

David McKenney  
Tom Prevot  
Phil Smith

### Other Attendees

Shelley Yak, FAA Director of WJHTC  
REDAC Co-chair

Chinita Roundtree-Coleman, FAA  
REDAC

Sheryl Chappell, FAA  
HF REDAC Subcommittee DFO

Ashley Awwad, FAA  
Carla Hackworth, FAA-CAMI  
Charlie Tang, FAA  
Kathy Abbott, FAA  
Mark Orr, FAA  
Michelle Yeh, FAA  
Dan Herschler, FAA  
Dan Brock, FAA  
Jason Demagalski, FAA  
Jay Shively – NASA AMES  
Jessica Bartik, Air Force Research Lab  
Joey Jaworski, Engility Corp.  
Katrina Avers, FAA-CAMI  
Kenneth Allendoerfer, FAA  
Kevin Williams, FAA-CAMI  
Mark Draper, Air Force Research Lab  
Melchor Antunano, FAA-CAMI  
Regina Bolinger, FAA  
Phi Anh Nguyen, JMA  
Stella Mollman, FAA  
Stephanie Kreseen, FAA  
Stephen Plishka, FAA

### Phone Attendees

Bill Kaliardos, FAA  
Carolina Zingale, FAA  
Devon Kelley, FAA  
Chris Swider, FAA Ellen Bass, Drexel  
Jimmy Bruno, FAA  
Jessica Knowinski, NASA  
John Crowley  
Lisa Fern, NASA AMES  
Mike Gallivan, FAA  
Kerin Olson  
Rachel Seely, FAA  
Sehchang Hah, FAA  
Todd Truitt, FAA  
Vicki Ahlstrom, FAA

**DAY 1 – Tuesday 29, March 2016**

| <b>Time</b>         | <b>Topic</b>   | <b>Presenter</b>   |
|---------------------|--|--|
| 8:00am-8:30am       | Pick up visitor badge/register vehicle at CAMI facility  |  |
| 8:30am-9:00am       | Welcome  | <b>Shelley Yak</b> , FAA Director of William J. Hughes Technical Center, REDAC Co-Chair          |
| 9:00 am – 9:15 am   | Welcome / Opening comments / Introductions   | <b>Sherry Chappell</b> , DFO<br><b>Jack Blackhurst</b> , HF Subcommittee Chair                   |
| 9:15 am – 9:45 am   | Budget Update  | <b>Mike Gallivan</b> , Manager, R,E&D Financial Management                                       |
| 9:45 am – 10:00 am  | HF Budget Impact/Implications  | <b>Mike Gallivan</b> , Manager RE&D Financial Management<br><b>Mark Orr</b> , AVS R&D Manager    |
| 10:00 am – 10:30 am | Review of HF activities/Emerging Issues  | <b>Nick Lento</b> , ANG-C1 Acting Division Manager   |
| 10:30 am – 10:45 am | Morning Break  |  |
| 10:45 am – 12:00 pm | Human Factors Aspects of Manned Commercial Space Transportation  | <b>Melchor Antunano</b> , Director of CAMI   |
| 12:00pm-1:00pm      | Lunch  |  |
| 1:00pm-1:30pm       | FY18 Requirements ATC/TechOps  | <b>Jason Demagalski</b> , AJI Human Performance  |
| 1:30pm-2:00pm       | ATC/Tech Ops Strategic R&D Plan<br><i>F&amp;R Winter 2015 Finding #5</i>   | <b>Jason Demagalski</b> , AJI Human Performance<br><b>Jerome Lard</b> , ANG-C1 Program Manager   |
| 2:00pm-2:30pm       | Findings and Recommendations Discussion  | <b>All</b>   |
| 2:30pm-2:45pm       | Afternoon Break  |  |
| 2:45pm-3:15pm       | HF work focusing on the design, adoption, and implementation of PBN procedures for PBN<br><i>F&amp;R Winter 2015 Finding #4 Action Item #7 &amp; 8</i> | <b>Stephanie Kreseen</b> , ANG-C1 Program Manager<br><b>Jerome Lard</b> , ANG-C1 Program Manager |
| 3:15pm-3:45pm       | Updates on NASA's Program for Data Mining of Operational Data and Identification of unique anomalies<br><i>Action Item #4</i>                          | <b>Jessica Nowinski</b> , NASA Ames  |
| 3:45pm-4:45pm       | Wrap up – Homework Assignments – Review of Action Items  | <b>All</b>   |
| Evening             | Networking with AP-15/Group Dinner- Toby Keith's Bar & Grill   |  |

**DAY 2 - Wednesday 30, March 2016**

| <b>Time</b>         | <b>Topic</b>  | <b>Presenter</b>   |
|---------------------|---|--|
| 8:30 am – 9:00 am   | Review of Homework Assignments from Previous Day / Findings and Recommendations Discussion  | <b>All</b>   |
| 9:00 am – 10:00 am  | FY18 Flight Deck Core & NextGen   | <b>Kathy Abbott</b> , Chief Scientific and Technical Scientific Advisor, Flight Deck Human Factors |
| 10:00 am – 10:30 am | Q&A/Finding and Recommendation Discussion   | <b>All</b>   |
| 10:30 am – 10:45 am | Morning Break   |  |
| 10:45 am – 11:45 pm | Air Force Human Factors Research Program- How it relates to UAS & operational FAA issues<br><i>Action Item #5</i>                                   | <b>Mark Draper</b> , Air Force Research Lab  |
| 11:45 am – 12:45 pm | Lunch   |  |
| 12:45 pm-1:15pm     | FAA UAS HF Program Research Requirements  | <b>Stephen Plishka</b> , Human Factors Engineer  |
| 1:15pm-1:30pm       | UAS HF Research Roadmap Activities  | <b>Carla Hackworth</b> , Division Manager  |
| 1:30pm-1:45pm       | FAA UAS Research Expo   | <b>Tom Prevot</b> , NASA<br><b>Sherry Chappell</b> , DFO   |
| 1:45 pm -2:15pm     | UAS Detect & Avoid Research   | <b>Kevin Williams</b> , CAMI<br><b>Carolina Zingale</b> , Tech Center                              |
| 2:15pm-2:45pm       | UAS Center of Excellence HF Research  | <b>Ellen Bass</b> , Drexel University  |
| 2:45pm-3:00pm       | Afternoon Break   |  |
| 3:00pm-3:30pm       | NASA UAS HF Research  | <b>Jay Shively &amp; Lisa Fern</b> , NASA Ames   |
| 3:30pm-4:30pm       | UAS Discussion. Prepare a summary of UAS HF Research – What the subcommittee has learned about the program & what we recommend for further research | <b>All</b>   |
| 4:30pm-4:45pm       | Q&A/Findings and Recommendations Discussion/Wrap up-Homework Assignments- Review of action Items  | <b>All</b>   |
| EVENING             | Dinner-TBD  |  |

**DAY 3 - Thursday 31, March 2016**

| <b>Time</b>     | <b>Topic</b>  | <b>Presenter</b>   |
|-----------------|---|--|
| 8:00am-9:45am   | Review of Homework Assignments from Previous Day /Findings and Recommendations Discussion | <b>All</b>   |
| 9:45am-10:00am  | Morning Break   |  |
| 10:00am-10:15am | AAM-003 Meet & Greet  | <b>Melchor J. Antunano</b> , Director of CAMI                      |
| 10:15am-10:30am | AAM-500 VLJ   | <b>Kevin Williams</b> , AAM-510 Research Psychologists             |
| 10:30am-10:45am | AAM-500 AGARS/BGARS   | <b>Kevin Williams</b> , AAM-510 Research Psychologists             |
| 10:45am-11:00am | AAM-500 ATCARS  | <b>Jerry Crutchfield</b> , AAM-520 Research Psychologists          |
| 11:00am-11:20am | AAM-600 FlexSim   | <b>David Weed</b> , AAM-600 HF Research Specialist                 |
| 11:20am-11:40am | AAM-600 Impact Sled   | <b>Rick DeWeese</b> , AAM-630 Research Biomedical Engineer         |
| 11:40am-12:00pm | NVG Demonstration   | <b>Eric Simson</b> , AAM-400 Training Inst (AV Physiol & Survival) |
| 12:00pm         | AAM-003 Closing   | <b>Melchor J. Antunano</b> , Director of CAMI                      |