Part 1

FAA HF Research Managed by ANG-C1

Current and Planned

Flight Deck HF Research

(These will be presented to REDAC HF on Day 1)

1. Human Factors Considerations for Electronic Data-Driven Charts
2. Validation of CDTI Display Features in a Metered and Non-Metered Environment – Dependent Staggered Approaches (DSA)
3. Human Factors Evaluation of Low Energy Alerting and Awareness Technologies
4. Human Factors Aspects of Emerging Head-Mounted Display (HMD) Applications – Small Aircraft
5. Human-System Safety / Human Factors Risk Analysis Method Alternatives
6. Enhanced Helicopter Vision System (EHVS) Technologies
7. Human Factors Considerations for Multi-Modal Controls (Combined Controls) – Fixed Wing
8. Evaluate the Impact of Current and Planned National Airspace System (NAS) Procedures to Flight Deck Operations in the Northeast Corridor (NEC)
9. Pilot Response to Unexpected Events
10. Manual Flight Ops – Low Altitude Terminal Operations
11. Cognitive Skill Degradation – Verification and Validation
12. EFVS Visual Advantage Operational Data Collection
13. Low Visibility Operations Using Synthetic Vision Guidance System (SVGS) Information on HMDs
14. Combined Vision Systems (CVS)
15. Flight Deck Information Management – Phase 1 Baseline Assessment (Planned)
16. Impact of Clearance Complexity and Flight Deck Procedures to Pilot Error in North Atlantic Flight Operations (Planned)
17. Techniques to Evaluate Monitoring Training and Monitoring Performance (Planned)
18. Human Factors Considerations for Multi-Modal Controls (Voice Controls) – Rotorcraft (Planned)
19. Quantifying the contribution of HUD to Pilot Performance on Approaches Where HUD is Used, But Not Required, to Transition to Landing (visual segment of SA CAT I approach)
20. Evaluation of HF & Crew Coordination Aspects of Dual HUD CAT III Operations Compared to Single HUD CAT III Operations. Evaluate Whether Active Monitoring Improves Crew Performance Over a Baseline Condition
21. Pilot Performance Using HUD, SVGS, and Flight Director During the Instrument Segment of an Approach
22. Pilot Performance and Operational Impacts Associated with using a HUD to Conduct CAT II and CAT III Approaches Using Other than ALSF I or ALSF II Approach Lighting Systems

23. Pilot Performance and Human Factors Considerations using SVGS on an SA CAT I Approach with Less than a MALSR Approach Lighting System
24. Training the Emerging Pilot Workforce
25. Modern Training Practices: Methods and Assessment in the Air Carrier Industry (Distance Learning)
26. Crew Resource Management (CRM) Human Factors Reference Document (HFRD)
27. Maintenance Human Factors - Safety Culture
28. Maintenance Human Factors – Failure to Follow Procedures
29. Scenario-Based Training (SBT) for Improved Rotorcraft Operational Safety
30. Fatigue Mitigation in Flight Operations Research
31. Electronic Flight Bag Survey and Additional Survey Data Analysis
32. General Guidance Document Update, Version 3.0
33. Visual Scanning Techniques in Transport Category Aircraft

Air Traffic Control (ATC) HF Research (current and planned)

(These will be presented to REDAC HF on Day 1.)

1. TBO Impact on the TMU
2. Human Factors of Highly Automated Vehicles
3. Regional TMU Coordination Practices
4. TBO Training Model
5. Human Factors Impacts of Large ATC Displays
6. ATC Alarms and Alerts Handbook
7. Updates to Human Factors Design Standard
8. Update the Human Factors Job Aid and Develop Web-based Training for HF Practitioners
9. ATC Display Color Standard, Updated Color Palette Implementation
10. Job Analysis Methodology Development
11. Improved Safety, Reduced Hazards, And Error Mitigation In ATC
12. Automation Effects And Controller Performance
13. Improved Design And Operation Of ATC Systems
14. Improved Controller Selection And Training
15. Controller And Technical Operations Workforce Optimization

Part 2

Other HF and HF-Related Research

(approximate, for "big picture" context)

Continued Airworthiness - Systems

1. A Systems Approach to Automated Flight Decks
2. Transfer of New Technologies for Enhancement of GA Safety
3. Strategies for Adoption and Certification of Intelligent Systems
4. Certification Gaps for Automated Systems
5. Reduced crew operations

UAS – Current/Planned

1. UAS High Visual Contrast
    a. Computer-based study of the variables 1) day/night, 2) light intensity, 3) light flash rate
2. UAS Air Carrier Ops
    a. Crew Requirements for UAS Air Carrier Operations
    b. Knowledge, Skills, and Abilities Requirements for UAS Air Carrier Operations
    c. Fatigue-Related Considerations for UAS Air Carrier Operations
3. UAS Automation and Intelligent Systems
4. UAS Pilot Proficiency Requirements
    a. HF limitations to monitoring multiple UAS
5. Investigate Key Differences Between Commercial Air Carrier Ops and Unmanned Transport Ops
6. From Manned Cargo to UAS Cargo Ops: Integration into the NAS
7. Validation of Visual Operation Standards for Small UAS
8. UAS Well Clear Definition in "under flight" conditions
9. Integrating Expanded and Non-Segregated UAS Ops into the NAS

UAS – Past

1. Maintenance HF Considerations
2. Control Station – Pilot sensing/information deficiency effects
3. Visual Observer and visual detection/estimation
4. Review of UAS pilot interfaces
5. HF Review of UAS Accidents and Incidents

6. UAS control latencies
7. Review of Pilot Training for manned aircraft and UAS
8. UAS Minimum Detect-and-Avoid (DAA) Display Info
9. Integrating Collision Avoidance and Detect and Avoid
10. UAS Human Factors Control Station Design Standards (plus function allocation, training, and visual observers)
11. HF Considerations of UAS Procedures and Control Stations
12. ATC Exploration of lost link definition, lost link behavior, lost link codes/interfaces
13. Multiple demos and operational assessments/impacts
14. Joint Test with DoD – contingency ops
15. Terminal Contingency Ops – Technology and Procedure requirements
16. Enroute Contingency Ops – Technology and Procedure requirements

Center of Excellence – Technical Training and Human Factors

1. Applied Game Theory to Enhance ATC Training
2. ATC Visual Search Patterns
3. Effective Training and Checking Methods for the Emerging Pilot Workforce
4. Employee Footprint: 21st Century Approach Towards Employee Development
5. Optimize Simulation
    a. Benefits and return on investment for simulation and recommendations when and how to optimize simulation for use in training
6. Part 141 Pilot School Model Feasibility Study
7. Training of Pilots and Air Traffic Controllers in Weather-Related Decision Making
8. Universal Design for Learning and Multi-Modal Training:
    a. Recommended training methods for air traffic controller trainees

Weather Technology in the Cockpit (WTIC)

Part 91 Cockpit Applications

1. MET Standardization
2. Active Reminder (reminder of time/distance to reduced visibility and convective activity)
3. General Aviation (GA) Notification Function (low latency weather notification)
4. GA MET Information Optimization
5. Transition from VFR to IMC (accident/incident causal factors and pilot risk assessments)
6. Handheld Study (portable weather presentations)
7. ADS-B/FIS-B CIP/FIP/SLD (Flight simulation investigation of Current Icing Product, Forecast Icing Product, and Supercooled Large info during in-flight operations)

Part 121/135 Cockpit Applications

1. Cloud Top Height (CTH) and Convective Diagnosis Oceanic (CDO) Human-Over-the-Loop (HOTL) demonstration
2. Tactical Turbulence Notification Human-Over-the-Loop (HOTL) Demonstration

Part 91 Training

1. Weather Information Latency Demonstrator (vary NEXRAD latency vs. out-the-window view)
2. NEXRAD Training Module
3. Pilot Weather Knowledge Assessment
4. Augmented Reality (for weather-related education)
5. Experiential Education is learning by "doing"
6. VFR Not Recommended Phase 1
7. Crowdsourcing / Cloud Technology Phase I

Current Research Activities

1. Comparing written test scores with pilot flight performance
2. Voice-Enabled User Interface
3. VNR Phase 2
4. PIREPs
5. Gap Analysis of Special Operations GA (accident analysis related to special GA and helicopter ops, and MET product assessment)
6. Crowdsourcing Ceiling & Visibility (Phase II)