

Federal Aviation Administration

Research, Engineering, and Development Advisory Committee Subcommittee on Human Factors Summer/Fall 2019

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HUMAN FACTORS SUBCOMMITTEE

Summer/Fall meeting was held at the JMA Offices in Washington D.C. August 27-28, 2019

- Winter/Spring Meeting will be held March 10-11, 2020 at NASA Ames Research Center in Mountain View, California.
- The subsequent Summer/Fall meeting will be held on August 18-19, 2020, location TBD.

HUMAN FACTORS S/F MEETING

- Objective was to provide strategic guidance to the FAA to develop the upcoming FY+3 research portfolio:
 - We reviewed past year activities/accomplishments
 - We reviewed proposed FY+3 focal areas
- Reviewed and collected inputs to update our Human Factors Emerging Issues List
 - Updated version will be reviewed at our W/S meeting
- Two Flight Operations Deep Dives
- Drafted three Findings and Recommendations

FLIGHT OPERATIONS DEEP DIVES

Captain David McKenney on ALPA's perspective on HF research needs. Topics included:

- Manual flight proficiency
- Regaining control/intervention when automation doesn't perform as expected
- Training and evaluation methods
- Pilot-ATC coordination
- Risk-based decision making

Captain Rich Louden on industry Human Factors RoundTable hosted by Alaska Airlines. Topics included:

- Leadership Command Mentoring for First Officers
- The Landing Decision

Finding 1: System Integration Research

- Research objectives and execution generally considers perspectives of the flight crew and the air traffic controllers separately.
- This separation of air and ground domains is primarily due to the FAA's budgeting structure within RE&D.
- Studying the domains separately will likely result in different products for each domain (flight crew/flight deck versus air traffic controllers).

Recommendation 1: System Integration Research

- Identify opportunities where research would benefit from integrated studies and be accomplished within the constraints of the current funding and available resources.
- Report out at next HF REDAC meeting the results of this and include any issues or barriers with executing this recommendation.

Consequences:

- Siloed research may inappropriately allocate tasks or procedures to one domain resulting in unnecessary workload and errors on the other domain.
- High potential to result in rework when the concepts get implemented due to inadequate integration across the domains.

Finding 2: Strategic inputs to the research prioritization process

- ANG-C1 has been doing an excellent job of addressing several important human factors issues of importance to the missions of ATO, AVS Tech Ops, NextGen and the FAA more generally.
- However, the subcommittee believes the current research prioritization process is dominated by reactive, shorter term pressures.
- While these shorter-term focus areas are important, there is a need to integrate broader strategic considerations into the research and development planning and prioritization process for determining the human factors research portfolio.

Recommendation 2: Strategic inputs to the research prioritization process

- Define a research proposal and prioritization process to include strategic guidance regarding the development and integration of emerging needs, current issues, and operational concepts so these issues can be addressed proactively.
- The strategic perspective should be driven by input from ATO, AVS, Tech Ops and NextGen as well as Industry to ensure the certification, regulatory and operational needs of the Agency are considered relative to emerging needs and operational concepts balanced with current needs.
- Establish guidance that defines how the consideration of emerging issues fits into an overall process to determine how to allocate research efforts to an appropriate mix of research needs.

Consequences:

• Focus on short term needs will restrict the agency's ability to integrate broader strategic considerations into the planning and prioritization process.

Finding 3: Urban Air Mobility (UAM) research

- The subcommittee has noted new entrants and operations associated with emerging markets, e.g. UAM, are expected to be realized within the next 5-10 years.
- The subcommittee previously recommended research on human factors issues involving the certification of new vehicles, integration of operations into the airspace, and safe introduction of increasingly autonomous systems be addressed within five years.
- However the subcommittee noted the research presented at the August 2019 meeting did not include any work in these areas and nor did it appear any such research is planned through FY22.

Recommendation 3: Urban Air Mobility (UAM) research

- The subcommittee recommends the FAA invest in human factors research related to increasingly automated operations as soon as possible.
- FY22 research guidance provided by both ANG and AVS should specifically identify the need to address UAM human factors issues.
- This research should include human-machine systems integration, pilot/operator training and certification, and airspace interoperability between traditional and UAM operations, as appropriate to the organization.

Consequences:

 The FAA will be unprepared to provide guidance and approvals for OEMs, Operators, and operations targeting an entry into service date prior to 2025.

HUMAN FACTORS EMERGING ISSUES (UPDATE IN WORK)

Urgent near term issues to be addressed within 5 years:

- Human Factors issues associated with implementation of UAS in the NAS
- Increasing complexity of the airspace, transition to trajectory based operations (TBO) and performance based navigation
- Information management, managing distraction, overload
- Training and qualification methods and technologies
- Increased automation and autonomy that enables operations with a reduced crew

Important longer term issues to be addressed in the next 5-10 years:

- Development and deployment of new and novel interfaces
- Cybersecurity and safe integration of new technologies
- Data collection and analysis to enable big data analytics, data fusion, real-time assessments