

Human Factors Subcommittee Findings and Recommendations

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Over-arching Concern: How to Respond to Reduced Resources?

HF in Safety and Operations

| | FY 2013 | FY 2014 | FY 2015 | FY 2016 |
|--|---------|---------|---------|---------|
| Method for Facility-Level Analysis of ATSAP | ◆ | ◆ | ◇ | |
| HF Methods for Incident Investigation | ◆ | ◆ | ◇ | |
| Dynamic Comprehension: Time on Position and Controller Performance | ◆ | ◆ | ◆ | |
| Human Factors Safety and Risk Assessments | ◆ | ◆ | ◇ | ◇ |
| Human Factors Operational Performance Research | ◆ | ◆ | ◇ | ◇ |
| Top 5 Hazard Mitigation Human Factors Analysis | | ◆ | ◇ | ◇ |

ATC/TechOps Human Factors

Finding: ...funding will not support critical research beyond 2015... interim 2014-2015 activities do not have sufficient funding to [be effective]... Research [is limited] primarily to in-house researchers...

... significant risk areas ... include:

- Research for controller fatigue, even as the ATO is trying to startup a Fatigue Risk Management System (FRMS)
- Human Factors in Safety and Operations.
- A capability to incorporate human factors early in the acquisition process.
- Human-in-the-loop testing.
- Personnel selection, both in terms of ensuring validity of current selection practices, and for updating personnel selection in response to new developments. This research has been terminated within the research program, without being transitioned to other offices within the agency.

Recommendation: We recommend that the agency restore sufficient funding to address the risk areas identified in the findings; if not, the agency should describe how they will address these risks and their safety and operational implications.

NextGen Air Traffic Control/TechOps Human Factors Research plan

Finding: The subcommittee was very pleased...

Recommendation: Continue to pursue the NextGen ATC/Tech Ops research plan as presented. Where funding needs to be prioritized [use the plan to help].

NextGen ConOps

Finding: [key question]:

How can the FAA ensure sufficient human factors input during the development and validation of NextGen CONOPS, ...

...human factors research to inform definition and validation of a CONOPS over its lifecycle... ...ensure that the correct human factors research is being done to enable ... a CONOPS?

- **Recommendation:** Better integrate the development and implementation of NextGen CONOPS with human factors research findings and expertise. This includes not only using human factors expertise to better inform the CONOPS, but also ensuring that the human factors implications of the CONOPS development are linked back out to relevant research and development.

NextGen Human Factors:

It's not just 'information requirements'

Finding: Determining information requirements [is important BUT] a broader set human factors issues needs to be addressed...

new roles and responsibilities,
introduction of new procedures and
enabling automation, communication and
decision support technologies.

Recommendation: Map out the broader range of human factors issues that need to be addressed.

Hypothetical AVS Research Requirements

- Problem/need: Loss-of-control is the number-one cause of fatalities in the worldwide commercial jet fleet. Flight simulator improvements are needed to mitigate this number-one cause through better awareness, recognition, avoidance, as well as teaching appropriate recovery techniques if loss-of-control occurs.
- Outcome: Reduced accident rate due to loss of control, as well as reduced incident rate of stall warnings and unintended upset attitudes.
- Problem/need: Public Law 111-216 mandated training and checking for pilots in a number of new flight regimes, to include loss of control. In addition, the NTSB has asked for training rulemaking in the areas of Crew Resource Management (A-88-71), Line Oriented flight Training (A-94-191, 192, 193), training of flightcrews to respond to sudden, unusual or unexpected aircraft upsets (A-96-120), (Terrain Avoidance Advisory Systems (A-93-46), inflight fires (A-01-85) and flight attendant training (A-92-67, A-92-70, A-92-71, A-92-74, A-92-77), among others. The FAA needs to enhance its current training systems with upgrades to accommodate these and other requirements.
- Outcome: AVS would use this input to meet the requirements of 14 CFR Part 121, Subparts N, O & Y and to update 14 CFR Part 60. Additionally, this guidance would directly affect CFR 14 Parts 121, 135 & 142, Specific training and checking guidelines for Advanced Maneuvers Training in existing flight simulation devices.

Preparing Research Requirements for AVS

Finding: The sub-committee very much appreciates that a thorough and structured requirements generation and prioritization process has been put in place by AVS. However, as with any new process there needs to be on-going examination and refinement.

Recommendation: 1) clarify the inputs needed for the milestones and project phase template items, 2) include in the template a means to appropriately weight cross-cutting requirements and ways in which the current requirement builds upon previous work, and 3) consider surveying those who have written requirements concerning their experience of the process and areas where further guidance would be helpful.

AVS Research Rankings

Finding: ...significant variation year to year ...

While rankings three years in advance serve a valuable planning function, new knowledge and considerations may arise after the rankings are originally made.

We understand that AVS also considers 'pop-up' research needs on a shorter time-cycle, but note these pop-up research needs appear to be handled with a distinctly different process ... limited to year of execution.

Recommendation: Rather than viewing the rankings as fixed three years in advance, and then waiting until the year of execution for further evaluation, we recommend that the rankings be revisited in advance of the year of execution to take into account:

- New knowledge about the problem and potential solutions that may increase or decrease the importance and likely impact of the research requirement.
- New considerations in the broader aviation community may make specific research requirements more-or-less pressing.
- Emerging problems and potential solutions.

Not Briefed on UAS Research

Finding: The subcommittee was not briefing on the AVS research requirement for UAS Human Factors due to concerns about release of contracting-sensitive information, particularly where committee members may have inherent conflicts of interest.

However, this research area ... merits a review even if the review process must be modified to account for conflict of interest concerns.

Recommendation: [Open] up these research plans for proper review as soon as possible. This should involve experts without conflict of interest now, rather than waiting until the research plans are finalized ...