FY 2020 Core Flight Deck Human Factors Research Plan

Flight Deck/Maintenance/System Integration Human Factors

BLI A11.G

By: Kathy Abbott

To: REDAC Human Factors Subcommittee

Date: February 27-28, 2018

Federal Aviation Administration

Core: Advanced Vision Systems (A11G.HF.4)

Research Requirement

- Research is needed to characterize human factors/pilot performance considerations using Advanced Vision Systems, HUD, and HMD for new low visibility concepts of operation. This research will inform development of operational requirements, standards, conditions, limitations, mitigations, and authorizations for the use of these technologies.

Sponsor POC: T. King (AFS-410)

Research POC: R. Blondino (ANG-C1)

Sponsor Outcome

- Increase safety, access, efficiency, capacity, and throughput in low visibility conditions using advanced vision systems, head-up displays, and head-mounted displays. Expanding the use of these technologies will enable more flight operations to occur in low visibility conditions with less ground infrastructure while maintaining an appropriate level of safety during approach, landing, taxi, and takeoff operations.

Research Deliverables

- Experiment design and test plan, HITL results and complete final technical report on 4 SVGS research studies
- Literature review and industry/product review, research plan, experiment design and test plan, HITL results, and complete technical report on combined Vision System (CVS) operations in low visibility flight operations
- Literature review and industry/product review, research plan, experiment design and test plan, HITL results, and complete technical report on use of Head Up Displays (HUD) in low visibility flight operations
- Literature review and industry/product review, research plan, experiment design and test plan, HITL results, and complete technical report on use of Head Mounted Displays (HMD) in low visibility flight operations

Contract Funding ($K)

		Request	Request	Target
FY16	FY17	FY18	FY19	FY20
0	◆	◆	◆	◆

Fatigue Mitigation in Flight Operations (A11G.HF.8)

Research Requirement

- Continue to evaluate pilot fatigue data and the effectiveness of fatigue risk management approaches utilized by 121 certificate holders. Improve flightcrew member alertness through policy updates and educational materials associated with FRMP and FRMS. Continued analysis of the FAA FRMS database is needed to further understand pilot performance and fatigue under operational conditions associated with extended flight duty periods and flight times. Research is also needed to characterize human factors/pilot performance considerations in flight operations involving short haul multiple-segment workload and cumulative sleep loss across trip pairings. Additionally, research is needed to systematically evaluate the behavioral adaptation of pilots to multiple time zone shifts associated with long-haul and ultra long-range flight operations. This research will better inform development of operational requirements, standards, conditions, limitations, mitigations, and FRMS authorizations relevant to these flight operations issues.

Sponsor POC: D. Roberts (AFS-200)

Research POC: S. Chappell (ANG-C1)

Sponsor Outcome

- Reduced accident rate with pilot fatigue in flight operations as a causal or contributing factor. Flight Standards Service will be able to evaluate the effectiveness of fatigue risk management approaches utilized by certificate holders under CFR part 121 conducting operations under part 117 to mitigate fatigue and improve flightcrew member alertness. Possible revisions to various Advisory Circulars (e.g., AC 120-103 A) associated with the flightcrew member duty and rest regulations will be made as determined by the continuous monitoring and analysis of the FRMS database and research study results.

Research Deliverables

1. Continued relevant data collection and entry into the FRMS database and development of pertinent research questions that will improve the FAA's understanding of pilot fatigue during flight operations exceeding the limitations of the 14 CFR part 117 regulations.
2. Research study to characterize human factors/pilot performance considerations in flight operations involving short-haul multiple segment workload and cumulative sleep loss across trip pairings.
3. Research study to systematically evaluate the behavioral adaptation of pilots to multiple time zone shifts associated with long-haul and ultra long-range flight operations. This research will better inform development of operational requirements, standards, conditions, limitations, mitigations, and FRMS authorizations relevant to these flight operations issues.

Contract Funding ($K)

		Request	Request	Target
FY16	FY17	FY18	FY19	FY20
◆	0	0	◆	◆

FY16-FY20 Core Flight Deck Research Requirements Overview

	FY16	FY17	FY18	FY19	FY20
Pilot Training, Qualification, Procedures and Flight Operations (A11G.11 New)	NA	NA	NA	NA	-
Avionics & New Technologies (A11G.2)	-	-	◆	-	-
Advanced Vision Systems (EFVS, EVS, SVS, and CVS), Head Up Displays (HUD), Head Mounted Displays (HMD): Certification and Operational Approval Criteria (A11G.4)	-	◆	◆	◆	◆
Fatigue Mitigation in Flight Operations (A11G.8)	◆	-	-	◆	◆
Maintenance Human Factors to Support Risk-Based Decision Making and Maintenance Safety Culture (A11G.10)	NA	◆	-	◆	-
Human Factors R&D for Improved Rotorcraft Operational Safety (A11G.7)	◆	-	-	-	-
General Aviation Safety Improvement Research – A Multi-Method Approach to Accident Reduction (A11G.6)	-	-	-	-	-

◆ indicates years with actual or proposed funding