

# FY 2018 Flight Deck NextGen Human Factors

## Flight Deck Air/Ground Integration Human Factors BLI A12.B

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To: REDAC Human Factors Subcommittee

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Federal Aviation  
Administration



# NextGen: Human Factors Guidelines for Advanced Instrument Procedure Design and Use (A12B.HFNG.2)

## Research Requirement

- Pilot errors in flying new performance-based instrument procedures in the National Airspace can lead to loss of separation and other safety consequences. In addition, such errors can limit capacity and operational effectiveness.
- Address design, depiction, usability, and fly-ability of instrument procedures and associated charts from a flight deck perspective

Sponsor POC: J. Swigart, AFS-400 and K. Abbott, CSTA

Research POC: S. Chappell, ANG-C1

## Sponsor Outcome

- Support updates to FAA Orders in the 8260 series, FAA Order 8900.1, AC 120-76, and others to mitigate complexity and challenges to flightcrew compliance with PBN procedures.
- Reduce modifications of new airspace procedures based on operational issues

## Critical Milestones

- Human Factors Considerations for Procedure Designers
- Pilot performance effects of procedure complexity
- Pilot training implications
- Charting standards

## Contract Funding (\$K)

Request	Request	Planned	Target	Target
FY16	FY17	FY18	FY19	FY20
\$1,000	\$403	\$1,000	TBD	TBD

Source: FY16 – FY16 AVS Briefing Matrix posted on the AVS RE&D Management System KSN; FY17 – President's Budget Submission; FY18-20 – AVS programmed funding levels and out-year cost estimates.



# NextGen Procedures, Tasks, Skills and Training for NextGen Air Carrier Pilots and Dispatchers (A12B.HFNG.3)

## Research Requirement

- Research is needed to develop operational and training guidance for understanding:
  - flight path management,
  - manual flight operations,
  - pilot monitoring,
  - pilot decision making, and
  - attention management.

Sponsor POC: D. Farrow, AFS-280 and K. Abbott, CSTA

Research POC: S. Chappell, ANG-C1

## Sponsor Outcome

- Develop human factors criteria for Flight Standards inspectors when evaluating air carrier training programs to ensure conformance with FAA regulatory and guidance material (14 CFR Parts 65, 119, 121, 135, 142; FAA Order 8900.1).

## Critical Milestones

- Research data to support rules and guidance for pilot training and checking in the NextGen NAS for flight path management.
- Research plan for examining pilot attention management
- Report documenting human factors considerations for air carrier training

## Contract Funding (\$K)

Request	Request	Planned	Target	Target
FY16	FY17	FY18	FY19	FY20
\$1,000	\$0	\$1,500	TBD	TBD

Source: FY16 – FY16 AVS Briefing Matrix posted on the AVS RE&D Management System KSN; FY17 – President's Budget Submission; FY18-20 – AVS programmed funding levels and out-year cost estimates.



# NextGen Flight Deck Systems-Flightcrew Interfaces, Installation, Integration, and Operations (A12B.HFNG.4)

## Research Requirement

- Existing policy does not address proliferation of new functions, equipment, and procedures required to implement NextGen (e.g., EVS/SVS, ADS-B, TCAS integrated with ADS-B, EFB, surface movement technologies, low visibility operations).
- On-going research is needed to provide evaluation criteria, minimum requirements, and recommendations related to human factors/pilot interface issues.

Sponsor POC: C. Swider, AIR-134, and T. King, AFS-430  
Research POC: R. Bolinger, ANG-C1

## Sponsor Outcome

- Develop and/or update regulatory and guidance material, including but not limited to:
  - AC 20-175, Controls for Flight Deck Systems
  - AC 120-76X, Electronic Flight Bags
  - Order 8900.1 and the EFB/Airport Moving Map Job Aid
- Provide data to support operational credit for advanced vision systems (EFVS, CVS, SVGS)

## Critical Milestones

- Reports documenting human factors/pilot interface issues with NextGen flight deck systems that should be investigated during the AIR & AFS evaluation and approval processes. Reports will include recommendations for guidance on compliance with human factors related regulations (e.g., 25.1302, 2X.777, 2X.1523, 2X.1309)

## Contract Funding (\$K)

Request	Request	Planned	Target	Target
FY16	FY17	FY18	FY19	FY20
\$3,270	\$3332	\$3,000	TBD	TBD

Source: FY16 – FY16 AVS Briefing Matrix posted on the AVS RE&D Management System KSN; FY17 – President's Budget Submission; FY18-20 – AVS programmed funding levels and out-year cost estimates.



# NextGen: DataComm Human Factors R&D (A12B.HFNG.5)

## Research Requirement

- Identify and address human factors issues to enable DataComm implementation.
- Provide data to address safety and usability and support international coordination and enhancement of the CPDLC message set.
- Address flight crew procedures and performance, message set, and air/ground aspects.

Sponsor POC: Mark Patterson, AFS-470 and Tom Kraft, CSTA

Research POC: S. Chappell, ANG-C1

## Sponsor Outcomes

- Enable successful implementation of data communications in the NAS and the dependent NextGen operational capabilities, resulting in reduced controller workload and greater efficiency.
- Develop and update regulatory and guidance material for operational approval of flightcrew procedures and training, as well as recommended practices/guidance for operators.
- Internationally harmonized data communications message set and operational procedures.

## Critical Milestones

- Report on human performance aspects of baseline communication performance measures.
- Data to support updates to AC 120-70B/C, 90-[PBCS], RTCA SC-214/WG-78, ICAO standards, recommended practices, manuals and other documents.

## Contract Funding (\$K)

Request	Request	Planned	Target	Target
FY16	FY17	FY18	FY19	FY20
\$707	\$710	\$1,500	TBD	TBD

Source: FY16 – FY16 AVS Briefing Matrix posted on the AVS RE&D Management System KSN; FY17 – President's Budget Submission; FY18-20 – AVS programmed funding levels and out-year cost estimates.



# NextGen Human Error and Complex Systems (A12B.HFNG.6)

## Research Requirement

- 66% - 75% of all accidents have pilot error as a primary factor.
- Research needs to examine changing roles and responsibilities in human-system coordination and potential cognitive (knowledge) and manual skill loss.
- Address the impact and role of information automation on flightcrew operations and awareness.

Sponsor POC: D. Farrow, AFS-280; K. Abbott, CSTA; and C. Swider, AIR-134

Research POC: R. Bolinger, ANG-C1

## Sponsor Outcome

- Provide recommendations and guidelines for operational procedures and flight deck design related to flightcrew task management
- Provide data to support guidance on compliance with human factors related regulations (e.g., 14 CFR § 121 Subparts N&O; 14 CFR § 121 Subpart Y; 14 CFR §§ 2X.1301, 25.1302, 2X.1329)

## Critical Milestones

- Task management: Report documenting human factors considerations related to task management.
- Data updating the PARC/CAST Automation Working Group Final Report accident analysis.
- Report documenting human factors considerations for system complexity.
- Report with data and recommendations for mitigating the effects of cognitive and motor skill loss.

## Contract Funding (\$K)

Request	Request	Planned	Target	Target
FY16	FY17	FY18	FY19	FY20
\$3,530	\$3950	\$1,500	TBD	TBD

Source: FY16 – FY16 AVS Briefing Matrix posted on the AVS RE&D Management System KSN; FY17 – President's Budget Submission; FY18-20 – AVS programmed funding levels and out-year cost estimates.



# FY16-FY20 NextGen Flight Deck Research Requirements Overview

	FY16	FY17	FY18	FY19	FY20
NextGen Human Factors Guidelines for Advanced Instrument Procedure Design and Use	◆	◆	◆	◆	◆
NextGen Procedures, Tasks, Skills and Training for NextGen Air Carrier Pilots and Dispatchers	◆		◆	◆	◆
NextGen Flight Deck Systems-Flightcrew Interfaces, Installation, Integration, and Operations	◆	◆	◆	◆	◆
NextGen DataComm Human Factors R&D	◆	◆	◆	◆	◆
NextGen Human Error and Complex Systems	◆	◆	◆	◆	◆