

FY 2018 UAS Human Factors Research Requirements

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To: REDAC Human Factors Subcommittee

Date: March 30, 2016



**Federal Aviation
Administration**



UAS Human Factors Control Station Design Standards (A11L.UAS.24)

Research Requirement

- Address UAS human factors safety concerns related to control stations in four specific areas:
 1. Control Station Standards and Guidelines
 2. Control Station Ergonomics, Safety, and Security
 3. Crewmember Training and Certification
 4. UAS Pilot & Crewmember Procedures and Operational Requirements

Sponsor POC: S. Plishka, AFS-86
Research POC: S. Chappell, ANG-C1

Sponsor Outcome

- Establish minimum primary flight display layout, crew station layout, and crew training minimum standards
- Achieving this outcome would permit UAS pilots to transition from one control station to another with a sense of familiarity and help prevent negative habit transfer.

Critical Milestones

- Report with research data to support development of control station standards and ergonomic guidelines.
- Research plan to address UAS crewmember training and certification requirements.
- Research plan to support recommendations for UAS crewmember procedures and operational requirements.

Contract Funding (\$K)

Request	Request	Planned	Target	Target
FY16	FY17	FY18	FY19	FY20
\$900*	\$1,200	\$1,500	\$200	

*Previously the program title was "UAS Human Factors Considerations"

Source: FY15 – Appropriated Funds; FY16: AVS – FY16 AVS Briefing Matrix posted on the AVS RE&D Management System KSN site. FY17-19, AVS approved funding levels and out-year cost estimates.



High Visual Contrast for UAS (A11L.UAS.31)

Research Requirement

- Explore ways to increase the visibility of UAS for pilots of manned aircraft and people on the ground.
- Identify paint schemes, colors, and anti-collision/position lighting needed to increase UAS visibility.

Sponsor POC: S. Plishka, AFS-86

Research POC: S. Chappell, ANG-C1

Sponsor Outcome

This research supports development of human factors regulatory and guidance material for UAS visibility using paint schemes, colors, anti-collision/position lighting and other methods.

Critical Milestones

- Phase 1: Completion of literature review, industry survey, and preliminary research plan
- Phase 2: Conduct and complete one or more experiments evaluating the proposed visual contrast prototype schemes
- Phase 3: Complete technical report

Contract Funding (\$K)

Request	Request	Planned	Target	Target
FY16	FY17	FY18	FY19	FY20
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Source: FY15 – Appropriated Funds; FY16: AVS – FY16 AVS Briefing Matrix posted on the AVS RE&D Management System KSN site. FY17-19, AVS approved funding levels and out-year cost estimates.



NextGen Minimum Detect and Avoid (DAA) Display and Flight Path Information (A12B.UASNG.1)

Research Requirement

- This research is needed to determine the minimum DAA display information required for a UAS pilot to execute a maneuver for the aircraft to remain well clear.

Sponsor POC: S. Plishka, AFS-86

Research POC: S. Chappell, ANG-C1

Sponsor Outcome

- Establish minimum information requirements for DAA displays (e.g., new RTCA SC-228 document)

Critical Milestones

- Phase 1: Conduct industry survey to identify proposed DAA displays and develop research plan
- Phase 2: Conduct two studies examining use of proposed DAA display
 - Study 1: Lab environment
 - Study 2: Operational environment
- Phase 3: Draft final report.

Contract Funding (\$K)

Request	Request	Planned	Target	Target
FY16	FY17	FY18	FY19	FY19

Source: FY15 – Appropriated Funds; FY16: AVS – FY16 AVS Briefing Matrix posted on the AVS RE&D Management System KSN site. FY17-19, AVS approved funding levels and out-year cost estimates.



NextGen UAS Automation/Autonomy (A12B.UASNG.2)

Research Requirement

Automation can reduce UAS pilot awareness of the underlying conditions of the aircraft, its position in space, and impact the coordination with air traffic control.

Specific research questions address:

1. What HF characteristics are necessary for the UAS pilot to maintain awareness of aircraft system state?
2. What HF characteristics are necessary to manage the aircraft's flight path with automated navigation?
3. What HF characteristics are necessary for the UAS pilot to comply with ATC instructions and clearances?

Sponsor POC: S. Plishka, AFS-86

Research POC: S. Chappell, ANG-C1

Sponsor Outcome

- Automation strategies based on this research will be used to help develop design standards and guidance such as advisory circulars.

Critical Milestones

- Phase 1: Completion of literature review addressing UAS automation/autonomy and preliminary research plan
- Phase 2: Conduct and completion of one or more studies addressing each of the research questions above
- Phase 3: Complete technical report

Contract Funding (\$K)

Request	Request	Planned	Target	Target
FY16	FY17	FY18	FY19	FY19
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Source: FY15 – Appropriated Funds; FY16: AVS – FY16 AVS Briefing Matrix posted on the AVS RE&D Management System KSN site. FY17-19, AVS approved funding levels and out-year cost estimates.

FY16-FY19 UAS Human Factors Research Requirements Overview

A11L

	FY 2016	FY 2017	FY 2018	FY 2019
Unmanned Aircraft Systems (UAS) Human Factors Considerations	◆	--	--	--
UAS Human Factors Control Station Design Standards	--	◆	◆	◆
High Visual Contrast for UAS	--	--	◆	◆

A12B

	FY 2016	FY 2017	FY 2018	FY 2019
Minimum Information Requirements for UAS CDTI Displays and Alerting (Minimum Detect and Avoid (DAA) Display and Flight Path Information)	◆	◆	◆	◆
UAS Automation/Autonomy	--	--	--	◆