

Overview of UAS Human Factors at the FAA:

AIR, AFS, and Research (CAMI)

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In response to the current and anticipated demand for routine UAS (unmanned aircraft systems) in the National Airspace System (NAS), the FAA is involved in many UAS efforts, including the recent organization of a UAS Program Office. The FAA recognizes the importance of human factors in the successful integration of UAS into the NAS, and is dedicating resources towards this. This presentation will provide an overview of human factors work at the FAA by organizing the discussion from the perspectives of three human factors specialists in their respective FAA organizations: Aircraft Certification Service (AIR), Flight Standards Service (AFS), and the Civil Aerospace Medical Institute (CAMI).

AIR

The AIR human factors efforts have centered on the work being performed in RTCA SC-203, which will produce, among other documents, a UAS “MASPS” (Minimum Aviation System Performance Standards). As part of the MASPS development, the FAA is currently leading the SC-203 Human Factors group to help analyze function allocation consequences, control station requirements, and other related human factors aspects of the system. A key effort of the Human Factors group is to construct a consistent human factors methodology that can be applied to the analysis of pilot/system functions, of which there are many. This methodology is intended to provide a consistent way to identify human factors concerns, which will in turn be used to identify “gaps” in current regulations and standards. The human factors methodology will be described, along with its application to an example function.

AFS

The AFS human factors effort is focused on developing Recommended Practices for Pilot and Observer Qualification and Training. The FAA is currently leading the UAS work through the Society of Automotive Engineers’ (SAE) Aerospace and Behavioral Engineering Technology Committee’s (G-10) UAS subcommittee. The UAS subcommittee has limited its work to the development of Pilot/Observer Training Recommended Practices for sample civil applications anticipated in the near term (next 5-10 years). These recommendations are being generated by a joint FAA-industry-university membership. Sample recommendations are being developed for a variety of Unmanned Aircraft, Civil Operations, and both populated and unpopulated areas. Both the syllabus for these requirements and the detailed requirements will be discussed.

CAMI

This CAMI human factors presentation is a summary of efforts undertaken to establish unmanned aircraft pilot medical and airmen certification requirements, and to develop a taxonomy of pilot control interfaces for unmanned aircraft. Both regulatory and safety considerations affected the establishment of medical certification requirement recommendations. The control interface taxonomy is based on the concept of “levels of control” that was developed for manned aircraft. Three types of aircraft control are described; horizontal; vertical; and speed. The taxonomy was applied to describe 15 unmanned aircraft systems, which represent a wide range of aircraft weights and sizes. Results are presented, along with a discussion of questions about the establishment of standards for control architectures of unmanned aircraft, research issues that arise regarding levels of control, and the implementation of degrees of autonomous behavior for these aircraft.