

Human Factors in the Maintenance of UAVs

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Aviation human factors researchers have traditionally focused on the pilot or operator. However, there is an increasing recognition that the performance of aviation maintenance personnel is impacted by a unique set of human factors. Current users of the National Airspace System (NAS) such as the airlines and general aviation have recognized that maintenance error is a significant, but sometimes hidden, factor in accidents and incidents. If UAVs are to operate safely in the NAS, it will be necessary to understand the unique challenges of maintaining unmanned systems.

At present, there have been no published studies of UAV maintenance human factors. The aim of the current study was to broadly identify the challenges facing UAV maintenance personnel, with a focus on areas where UAV maintenance tasks differ from those involved in the maintenance of manned aircraft.

Thirty structured interviews were conducted with personnel experienced in the operation of small to medium sized UAVs. Information was gathered on critical UAV maintenance tasks including tasks unique to UAV operations, and the facilities and personnel involved in maintenance.

The issues identified were grouped into three categories: hardware, procedure/tasks; and personnel issues. Hardware issues included the frequent assembly and disassembly of systems, and a lack of information on component failure patterns that would enable maintenance personnel to plan maintenance effectively. Procedure/task issues included the need to maintain computer systems, difficulties associated with absent or poor maintenance documentation and the need to make decisions about salvage of components. Personnel issues included the skill requirements for maintenance personnel and potential differences between the culture of mainstream aviation maintenance and the hobbyist culture from which some UAV maintenance personnel are recruited.