First Look: Report of the National Academies’ Committee on Assessing the Risks of Unmanned Aircraft Systems Integration

Provides conclusions and recommendations for the Federal Aviation Agency to improve its safety risk assessment approach for drones to effectively integrate into the Nation’s Airspace.

Updated last June 15, 2018 for the 06/11/2018 version of the report.

WHAT IT DOES

In response to a request by the Federal Aviation Administration (FAA), the National Academies of Sciences, Engineering, and Medicine (NASEM) issued a summary report of its study of the risks inherent to the integration and certification of unmanned aircraft systems (UAS) into the National Airspace System. The NASEM committee, comprised of leaders from industry and academia, assessed how various stakeholders define and apply the concept of risk to draw the following conclusions for the FAA:

- Assessments of UAS risk to the public must be understood in comparison to the public’s current risk assessments of other means of transportation prior to establishing UAS safety guidelines;
- Safety risks brought about by UAS should be considered in light of the safety benefits provided by the use of UAS;
- Risk assessment responsibilities can be delegated to industry partners and/or industry partners can be required to insure against UAS risks;
- Data collection and analysis will be imperative to inform risk assessments of UAS as the technology evolves; and
- Safety management as well as risk and performance-based approval processes of the FAA must be streamlined and made more consistent.

Considering these conclusions, the NASEM committee provided the FAA with the following 11 recommendations to improve the agency’s assessment and mitigation of UAS-related risks:

1. FAA’s consideration of requests for UAS certification and operation should be time bound and approval-oriented, providing applicants with specific suggestions for improvement in the event an application is denied;
2. The FAA should pursue a more holistic view of quantitative risk assessment for UAS including known risks for maintenance and emergency response tasks that would be mitigated by the approval of drones;
3. Within the next year, the FAA should publish guidelines for certifying UAS operations while considering probabilistic risk assessments provided by UAS applicants;
4. The FAA should pursue assessing the risks of UAS in comparison to other forms of risk to society and publish its findings and mitigation strategies;
5. The FAA should improve the Safety Risk Management Policies described in Order 8040.4B to rely on more quantitative assessments of UAS risks provided by UAS operation applicants;
6. The FAA should commit to providing timely feedback to UAS operation applicants and create an incentivization program to measure, promote, and reward the participation of UAS stakeholders assisting with UAS risk assessment;
7. The FAA should reorganize its management of UAS risk assessment to provide clear lines of authority, responsibility, and accountability. Technical training for risk assessment should also be provided to FAA decision makers;
8. The FAA should provide baseline levels of risk for categories of UAS operation and a means of requiring insurance in lieu of a separate risk assessment where the operation of a UAS deviates from its assigned category but the added risk is expected to be...
Within six months, the FAA should collaborate with industry partners and the Drone Advisory Committee to establish minimum requirements for UAS safety datasets that can be voluntarily provided to the FAA for the Agency to distribute; where standards are not yet developed for new categories of UAS operation, the FAA should provide a standard set of requirements for operation that can be tailored to fit new needs and allow operation and data collection until standards can be set for the new UAS operation; and

The FAA should partner with national and international stakeholders in industry, academia, and the government to research methods and the interpretations of probabilistic risk analyses encouraged to be used in UAS risk assessment.

RELEVANT SCIENCE

An unmanned aircraft system is an aircraft system that operates without a human pilot on board. Depending on the available control system, UAS can either be pre-programmed to function under supervisory control or remote controlled by a human pilot on ground. As such, the UAS is comprised of the aircraft, also referred to as a drone, the ground control station, and the communication link between the aircraft and the control station.

The US Government Accountability Office (GAO) reports that UAS technology has undergone rapid expansion in recent years. This expansion is primarily due to the increased compactness of UAS technology. Smaller and more compact forms of technology allow for increased speed, maneuverability, and discreetness in UAS operations. The GAO further states that, with increased functionality, UAS technology is now serving advanced applications in military, law enforcement, industry surveillance, environmental monitoring, and recreational use.

STATUS

This report of the National Academies of Science, Engineering, and Medicine is the result of three meetings convened by the National Academies between Fall of 2017 and Winter 2018. It was published to the Federal Aviation Agency and made public on June 11, 2018.

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