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Obtaining FAA authorization for the commercial operation of aerial robots

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On September 25th, 2014 the Federal Aviation Administration (FAA) granted Section 333 exemptions to six aerial cinematography production companies permitting the film and television industry the commercial use of unmanned aircraft systems (UAS). The exemption process, which is performed on a case-by-case basis, provides operators safe and legal authorization for the first time in history. These companies worked with the FAA to develop confidential operating manuals and maintenance procedures. Upon granting the exemptions, the FAA publicly released a list of "Conditions and Limitations" but kept the operating manuals proprietary. The absence of formal regulations led to confusion for other companies seeking exemptions for the numerous applications utilizing aerial robotics. Review of the FAA's grant of petitions revealed that the procedure is written in commercial aviation regulatory language. The author researched the granted petitions and operating manuals for commercial manned air carrier operators in order to understand and meet the FAA requirements. The findings of this research have been used to assist more than a dozen companies receive their exemptions. The data collected and methodology performed has proven that knowledge of commercial aviation is essential for obtaining an exemption and by extension important for the safe operation of commercial aerial robots.

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Finite element analysis of linear magneto-rheological damper

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In this paper, a linear MR damper model is designed using COMSOL finite element simulation software. In conventional finite element MR damper modeling, selecting the MR fluid property is a big challenge, which has been resolved entirely in this COMSOL MR damper modeling. The overall design procedure of the damper model is discussed briefly in this work. This dynamic simulation clearly illustrates the magnetic flux generation around the piston coil. By this COMSOL simulation the induced magnetic flux density, magnetic field intensity, applied current density, temperature gradient, etc., are analyzed. The design optimization has done only for piston design variation for analyzing the vibration controlling force. According to the previous finite element analysis, all researchers have used ANSYS software where the MR fluid property selection is the big challenge. For solving this problem, in this study, an MR damper model is designed and COMSOL Multiphysics software is used for finite element analysis. Finally, the analytical study is compared with experimental results for the proposed model's validation.

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