



Overview of FAA Small UAS Operations Over People

MOTIVATION: Operating a small UAS under FAA jurisdiction not only requires a pilot certificate but also compliance with the requirements outlined in Part 107 of the Final Rule. The requirements cover a wide range of conditions, including **Operations Over People**, which was introduced to allow for expanded operation of small UAS (sUA) without applying for a waiver (a lengthy and potentially costly process with additional limitations).

REQUIREMENTS: After consulting with industry and operators, the FAA set out requirements for sUAS Operations Over People and published these in the Final Rule: Title 14 of the Code of Federal Regulation, Part 107 (14 CFR Part 107). The Final Rule includes Subpart B “Operating Rules” (§107.39) which stipulates that operations over people is only allowed if the people are protected or are directly involved with operating the aircraft. Alternatively, one can comply with the requirements of Subpart D “Operations Over Human Beings” which is a *performance-based* requirement assessing the impact response of the sUA against an instrumented crash test dummy head and neck (see photo). Separate impact requirements are provided for each of the four assigned groups of sUA corresponding with aircraft weight, impact performance, operating limits, and airworthiness. These are labelled as Categories 1, 2, 3 and 4.



Category 1 (see table) is typically represented by recreational drones, are less than 0.55 lb, and do NOT have any human impact performance requirements. In contrast, Categories 2 and 3 are typically represented by enterprise level drones, have a higher weight limit of 55 lb, and MUST meet human impact requirements. Category 2 allows for a lower impact severity than Category 3 but has less operational restrictions. Category 4 does NOT have impact performance requirements but MUST have airworthiness certification with related management processes.

UAV Category, Weight Limit	Flight Over People Allowed? 	Flight Over Vehicles? 	Exposed Parts Causing Laceration?	Air-Worthiness Certificate Required?
Category 1 ($< 0.55\text{lb}$)	Yes , but no sustained flight unless equipped with Remote ID.	Yes , only in a restricted site with notified occupants, not sustained.	No	No
Category 2 ($0.55\text{lb} - 55\text{lb}$)	Yes , if head/neck impact responses stay below that obtained with a rigid mass at low energy (i.e. 11 ft-lb) no sustained flight without Remote ID. Requires a DoC.	Yes , only in a restricted site with notified occupants, not sustained.	No	No , must not contain safety defects.
Category 3 ($0.55\text{lb} - 55\text{lb}$)	Yes , if head/neck impact responses stay below that obtained with a rigid mass at moderate energy (i.e. 25 ft-lb), no flight over open-air assemblies, over people allowed in a restricted site with notification, no sustained flight over anyone unless they are a sUA operator or in a shelter/vehicle. Requires a DoC.	Yes , only in a restricted site with notified occupants, not sustained.	No	No , must not contain safety defects.
Category 4	Yes , within operating limits of Flight Manual or otherwise stated by FAA or where prohibited, no sustained flight without Remote ID.	Yes , within operating limits of Flight Manual or otherwise stated by FAA or where prohibited.	N/A	Yes

(Adapted from: https://www.faa.gov/uas/commercial_operators/operations_over_people)s

SAFETY COMPLIANCE: Compliance to Part 107, Subpart D for Operations over People must be demonstrated by the operator of the sUA by submitting a **Declaration of Compliance (DoC)** which contains, among other things, demonstration that the impact requirements of either, or both, Category 2: § 107.120(a) or Category 3: § 107.130(a) were met using an approved **Means of Compliance (MoC)** or test methodology. The Final Rule and DoC requirements are illustrated in the figure below. Furthermore, the DoC must demonstrate that there are no safety defects and product support and notification services are provided. Once accepted by the FAA, the sUA details are registered in a database and operators are required to affix a label to their aircraft such as that depicted to the right (details in § 107.120(b), § 107.130(b)).

TEST METHOD: The MoC is a document that addresses the test setup, methodology, data collection and analysis, reporting, calibration and uncertainty involved in carrying out the tests. The test report provides an assessment as to whether the small UAS complies with Category 2 or Category 3 and is included in the DoC package as justification. The MoC is developed by the test laboratory (e.g. Biokinetics) and is reviewed by the FAA who, upon acceptance, publishes a notice in the Federal Register. Since the FAA does not provide a specific test method for the MoC, it recognizes industry based test methods, such as the ASTM F3389-21 “Standard Test Method for Assessing the Safety of Small Unmanned Aircraft Impacts” which Biokinetics has implemented.

SUMMARY: To allow sUA operations over people, the operators is responsible for submitting a DoC to the FAA which includes an MoC that has been submitted and approved by the test lab. Biokinetics’ **Drone Safety Lab (DSL)** has developed a MoC (pending FAA acceptance) to help manufacturers, aftermarket suppliers and operators assess compliance to FAA Category 2 and/or 3 requirements allowing for operations over people. Biokinetics has leveraged its decades of expertise in injury biomechanics and crash testing to develop a rigorous MoC with a focus on repeatability, traceability and confidence of the impact response measurements. An innovative horizontal, computer-controlled drone accelerator sled was developed to exceed these exacting requirements ensuring repeatable sUA impacts in any impact configuration with minimal damage from secondary impacts. With the industry’s first ISO 17025 accreditation, let Biokinetics’ **Drone Safety Lab** assist you with your compliance, research and engineering evaluation needs to either industry standards or custom programs.

