

During the design process for a drone, tests are performed to ensure that the drone is structurally stable and performs its assigned tasks successfully. Ensuring the safety of anyone in the vicinity of the drone is especially critical during the various phases of design testing. Preliminary testing of individual components prior to assembly is prudent from the viewpoint of both efficiency and safety. Components should be appropriately strong and flexible, with motors and moving parts functioning properly. Strong connections, heat generation, and vibrations require attention. Next, the propellers are added and observed for their correct rotational direction. If the motors all uniformly rotate in the same direction, then the drone cannot create lift. Improper balancing of the motors and payload can result in erratic behavior and possible injury during subsequent testing. More advanced flight tests should then be conducted in a controlled environment. For our work, a purpose-built 930 m² netted scientific facility, M-AIR, was used to successively test at progressively higher lifts and longer motions at greater speeds. Only necessary personnel should enter the environment as needed and should wear protective glasses because breaking parts and unpredictable flight are significant factors in this testing stage. Parts at the highest risk for breakage and loss in an accident include propellers, bolts, and batteries. When sharing a fly space with others, situational awareness should be maintained, whether flying the aircraft or searching for debris. Attention to safety during drone design and pre-flight testing sets a good attitude for missions using the final drone design while increasing drone longevity.