



## Six-degree of freedom mathematical dynamic model of a light sport aircraft

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### ***Abstract***

The paper presents six-degree of freedom mathematical model of a light sport aircraft and analytically reveals aircraft dynamic response both longitudinal and lateral-directional stability. The model includes both the aircraft equations of motion and the equations for aerodynamic forces and moments, known as the aerodynamic model equations. Simulation results show responses of the perturbed dynamic system at trim condition, indicates dynamic stability of both short-period pitching oscillation and phugoid in longitudinal axes. The spiral, roll subsidence, and dutch roll modes in lateral-directional axes are also dynamical stable as well. These are essential to understand and evaluate the dynamic behavior, stability, safety and other aspects of the designed aircraft through mathematical model before conducting operational flight test.

***Keywords:*** mathematical model, dynamic stability, light sport aircraft