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Effect of Sweep Angle on the Hydrodynamic Characteristics of a Blended Wing Autonomous Underwater Glider using CFD VIJAYAKUMAR RAJAGOPALAN[1], MUKESH GUGGILLA[2], Indian Institute of Technology Madras — Underwater Gliders are unique buoyancy propelled oceanographic profiling vehicles. Their speed and endurance in longitudinal motion is affected by the symmetry, sweep, dihedral angle and span of the control surfaces. In low-velocity regime, these parameters can be varied to examine the flow around the glider. They also affect the lift-to-drag ratio (L/D) essential for the maneuvering path in longitudinal and transverse motions. In this paper, sweep angle (10^o to 60^o in steps of 5^o) of the main wing is varied for a blended wing autonomous underwater glider and numerically simulated in the commercial software, STARCCM+. The main wing is a tapered NACA0018 section (as per the general arrangement requirement) with 1.5m chord at the root and 0.1m at the tip. The numerical model is validated using CFD results of NACA0012 airfoil from Sun.C et.al., 2015. The hydrodynamic forces are obtained by varying the angle of attack and side slip angles of the body from -20^o to 20^o, for flow velocity of 0.4m/s. The lift-to-drag ratios, flow physics around the wing are analyzed and the trajectories are simulated (using in-house code) to arrive at an optimum L/D for increased endurance.

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