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Innovative Hydrofoil Approach for Very Light Seaplane

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Retractable hydrofoils may enhance performances of seaplane during take-off and landing runs by lowering the speed when the hull is leaving or touching water surface. Hydrofoils are designed to complement airlift with additional hydrodynamic lift elevating the hull above the water at a speed lower than take-off speed; this minimizes slamming phenomenon on the hull, improving seakeeping capability of the seaplane, since water impacts are minimized compared to conventional configuration and, as a consequence, forces and accelerations on airframe, crew and passengers are reduced. This is of foremost importance on ultralight seaplanes, where wave forces acting on the relatively small aircraft mass provide high accelerations and significant roll, pitch and yaw forces that are higher on light aircraft compared to heavy seaplanes. As matter of facts, clear advantage of this configuration is the increase of sea state when a light seaplane can safely fly, providing additional useful days along the year. Important benefit is the improvement of seaplane performances during take-off and landing, reducing duration of the most critical flight phases, increasing overall safety and reducing pilot workload. Further benefits are envisioned, with optimization of wing, empennage and fuselage to minimize aero-drag and, as snow-ball effect, mission fuel consumption and energy power requirements. Life-cycle cost receives benefits too, since less water spray is ingested by engine and less water droplets impinge on fast revolving propeller, thus reducing expensive power plant maintenance cost over the entire service life.

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