Abstract Submitted
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A Method to Control Compliance of Blades and Flaps[1] JULIA COSSE, MORTEZA GHARIB, California Institute of Technology — Compliant plates experience lower drag forces than rigid plates primarily due to reconfiguration. From this concept it follows that through modifying the compliance of a plate, the aerodynamic forces can be controlled. To achieve this control, the concept of hydroskeletons – which are fluid filled cavities that resist deformation through the pressure of an internal fluid – were used. Using this notion a compliant structure with an internal chamber was developed. Shape change was detected when filling the chamber with fluid and controlling the pressure. Preliminary testing involved simple internal geometries filled with water and pressurized up to 20 psi. Using this method a plate was built with several internal chambers, each with individual pressure control. The plate was attached to a force balance perpendicularly in a wind tunnel. Drag and lift forces were modified through changing the internal pressure both globally and locally.

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Julia Cosse
California Institute of Technology

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