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Vortex Generation for Control of the Air Flow along the Surface of an Airfoil

The University of Toledo is seeking companies and research organizations interested in licensing technology relating to vortex generation for the control of flow separation. This invention relates to the controlling of the air flow along a surface to decrease the tendency of the air flow from separating from the surface. This technology incorporates a series of pressure active regions which include valves connected to a source of a low level suction. The control can simply be operated in an open-loop manner, or a feedback controller can be added to activate the valves in response to the pressure sensed by the sensors. Once the valves are activated a desired disturbance is imparted on the flow to induce vortices which reattach airflow to the surface, thereby decreasing the amount and tendency of flow separation.

Application: This invention is applicable to any style air vehicles, ships, cars, trucks, and in general is applicable to managing fluid flow for reducing drag, alleviating wake induced vibration, reducing noise, and attenuating flow oscillation in the wake.

Advantages:

1. Allows for flow reattachment that is equivalent to that produced by large mechanical vortex generators, which imposes large drag to a vehicle during cruising.
2. Only a low-power source such as a small pump is needed.
3. This system is simple to implement, and allows for feedback to be sent to the controller for continual response to differing air pressures.
4. The control power automatically goes up with flow speed and does not require unrealistically high energy inputs at high speeds.

Protected by issued patent: 6,302,360

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