INCREASING STABILITY WITH LOWER APPROACH SPEEDS

A unique approach in combining flap and aileron arrangement results in increased aileron authority and a reduction in stall speed in a cost effective manner.

This application allows a decrease in aileron size due to increased laminar airflow over the control allowing the aileron to continue to fly following complete stall of the wing. (Figure 1)

This application allows more effective lateral placement of the ailerons, providing a greater moment arm, because of reduction of wing tip vortex as a result of the slotted outboard flap. With present day understanding of wing tip vortices the conventional ailerons are moved further inboard to make them more effective. (Figure 1)

This application allows the size of the inboard flap to be increased as a result smaller more efficient ailerons as indicates above. The size of the flaps in the majority of aircraft is controlled by the size and location of the ailerons. (Figure 2)

This application allows an outboard flap again increasing the total flap area. Further increasing the total lift at slower speeds without sacrificing aileron authority. (Figure 3)
The control mechanism of the bipartite flap/aileron mechanism is the use of torque tubes or conventional cable/pulley systems to extend both sections of flap. The travel of the inboard section is 30 degrees and the outboard section 22 degrees. (Figure 4)

The Control of the aileron is provided by two each flexible push pull tubes, (one is tension and one in compression) with a downward displacement of ___ degrees and an upward displacement of ___ degrees. (Figure 4)

This system is presently operational in an experimental turboprop aircraft with a gross wt. of 8000 lbs and a stall speed of 53 kts. In a fully stalled condition symmetrical, controlled Dutch rolls can be performed without aggravation of the stall. The basic configuration of the aircraft is represented in Figures 5 and 6. The aircraft has now been flown two hundred hours without incident. The owner of the aircraft is seeking research grants and assistance in further flight testing and system evaluation. (Figure 5 & 6)

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