EXFA on the Fly: Testing the In-Air Performance of the EXtended Flaps and Airbrakes (EXFA) System

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A crucial part of an aircraft's flight is the landing. The most common mechanisms used to assist with landings are flaps, spoilers, and airbrakes. These mechanisms work together during landing approaches to reduce the aircraft's speed and increase the approach angle. Currently, these mechanisms are not in the most effective configuration. My Extended Flaps and Airbrakes (EXFA) System is designed to increase the efficiency of the flap, spoiler, and airbrake while combining these functions into one system. By positioning the flap and spoiler control surfaces on top of each other, the size of both control surfaces can be increased. The current project tested the EXFA System's effect on the in-air acceleration and drag of an RC aircraft. The EXFA airbrake position was found to be the most effective, reducing the in-air acceleration by 13-30% and increasing the drag coefficient at small angles of attack by 50-330%, even when compared to simulated normal flaps and spoilers. The results suggest that, by reducing the in-air acceleration and increasing the drag coefficient of an aircraft, the EXFA System will allow aircraft to approach at steeper descent angles without increasing their acceleration, resulting in a shorter landing distance. If installed on full-scale aircraft, the EXFA System could improve their landing characteristics, which would benefit both commercial and military aircraft as well as other areas of aviation.

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