Using Chevron Wing Extenders to Stabilize Plank Style Flying Wings

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Plank style flying wings have many advantages over traditional aircraft, or traditional flying wings. As opposed to traditional aircraft, they are aerodynamically cleaner. No tail and no fuselage mean less drag, and vs. traditional flying wings, they have better lift per any given area since lift operates at the first quarter of the wing area. So that means a swept flying wing (traditional) will have to fly at higher angles of attack to achieve the same lift as a plank style flying wing. Plank style flying wings have one downfall though. They are unstable on the pitch, and yaw axis. How can we solve these problems? Traditional aircraft solve pitch and yaw problems in one solution - they increase lateral area. By pulling the horizontal stabilizer far back to the aircraft, they increase pitch stability (by way of increased lateral area), and since the more aft a vertical stabilizer is from the CoG, they place the vertical stabilizer back there as well. Taking a similar approach to the problem, I used something I like to call the "chevron wing extender" to extend the wing backwards and increase lateral area. To see which angle of these extenders were to help, and if they would help at all, I set up an experiment to test the extender. I set up extenders at 15, 30, and 45 degrees, and tested the following: Stability (Tested with an on-board raspberry pi collecting data from an ADXL345 accelerometer board) Flight time (Tested with amp draw at cruising speed, and total flight time) Fastest speed (tested with GPS) Slow/stall speed (also tested with GPS) The 45 degree sweep resulted in the best results all around. I believe that since the lateral area increased so much, and since the CoG was so easy to balance, the 45 deg sweep performed the best.

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