The Effect of Wing Posture on Gust Rejection During Emulated Gliding Flight in Starlings

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Wing morphing is the act of moving or deforming a wing in any way. When wings morph they react to gust rejections differently. The purpose of this project is to identify the difference in gust rejections for outstretched and swept back wings. Gust rejection tests were performed in a wind tunnel by recording the forces experienced by dried, spread European starling wings. Eight Extended and 8 flexed wings experienced two programs. The first program recorded the forces experienced by the wings as they transition from angles of attack. The second program recorded the forces experienced by wings mounted at 10 degrees as they received 5 consecutive gusts. The data was analyzed by inputting samples of forces into a spreadsheet to calculate variables such as the average lift, average drag, and average lift to drag ratio. Results showed that the absolute forces experienced by the extended wings were larger than those of the swept back wings, however, the relative forces experienced were larger for the swept back wings. These results show that the shock experienced by the swept back wings is larger. Further testing will need to be done to examine if the relative forces are more important than absolute.

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