Cockpit Innovation: In Stealth Fighter Jets

Whitehead, Victoria (School: Holy Spirit Catholic High School)

Over the past decade the U.S. Military's fighter jets have improved in engine performance, aerodynamics, avionics, and overall aircraft structure, which enables the F-22 to reach speeds higher than ever before. These advancements are posing an even greater risk of G-LOC, which is a very common problem for aviators today. This condition is caused by excessive amounts of G-force along the -Gz to +Gz axis, (head to foot) from high speed maneuvers during flight. Design iterations, and a philosophy of G induced forces will be used to achieve a cockpit that reclines back as far as 45 degrees during flight to reduce G-LOC. A D/C linear actuator motor was placed below the mock-ups' floor to actuate in an upwards motion to recline the base to a tilt. Depending on the amount of Gs, the actuator will move the seat to various angles proven from research to reduce Gs experienced by the pilot. After building and testing the designs algorithm, the cockpit accomplished the goal of moving to angles best proven to reduce G-LOC. The results proved that using this cockpit design in the development of newer stealth aircraft, would in fact reduce the risk of G-LOC by two times the force of gravity when fully reclined. This will further ensure the safety of the pilot, reduce the risk of G-LOC, and reduce the risk of loosing lives and billions of tax dollars because of crashes caused by the condition of G-LOC.

Awards Won: