



RIAC Success Story

RIAC Performs First Flight Control Loads Study

www.theRIAC.org

Customer:	US Air Force T-38 Program Office
Challenge:	<p>In 2008, a United States Air Force T-38 Talon crashed because of a failure in the flight control system, taking the lives of two Air Force pilots. Results of the investigation revealed over 150 similar “Single Points of Failure” (SPF) that could possibly cause the same result if they failed. The T-38 Program Office lacked the data that could determine what loads the flight control system experienced in flight or safe operating limits for these components. In order to develop the needed data, USAF engineers contacted the RIAC to develop the necessary testing, analysis and databases to improve safety and reliability for the T-38 fleet.</p>
Approach:	<p>The RIAC developed a fatigue analysis plan for the T-38 fleet. This was the first legacy aircraft system to consider in-flight loading of mechanical components as a critical concern. Next, with support from the T-38 Program Office, the RIAC submitted their test plan. After approval, the RIAC installed 41 strain gauges on the flight control components in six Talon aircraft provided by the USAF’s Air Education Training Command. These aircraft were then put back into service, flying 1000 hours on an accelerated flying schedule, encompassing almost every training flight profile used by the fleet. With this first ever in-flight data for the T-38, RIAC engineers and Subject Matter Experts developed finite element models of all the critical flight control components and used actual loads in these models.</p>

	<p>These finite element analyses were then used to produce actual flight loading spectrums for each component in the flight control system for the six aircraft.</p>
Value:	<p>These load spectrums provided the necessary in-flight data that was used to modify the maintenance practices used on the T-38 aircraft. Additionally, the RIAC was able to identify several design-level flaws in the T-38 and make material recommendations to ensure the entire fleet is capable to meet the demands of the USAF.</p> <p>As a result of the success of this effort, the T-38 Program Office has expanded their desire to understand in-flight loads on other aircraft systems. This has resulted in two additional projects to gather data on the brakes, landing gear, secondary flight controls, and canopy systems. The RIAC currently has a total of 14 T-38 aircraft instrumented and flying. The data obtained from the monitored systems in these aircraft will provide a more detailed database to insure an even more reliable, affordable, and sustainable aircraft fleet to meet future pilot training requirements of the USAF.</p>

RIAC is operated by a team led by Wyle under contract HC1047-05-D-4005.