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WB-57 Gross Weight Increase Program

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Case Study

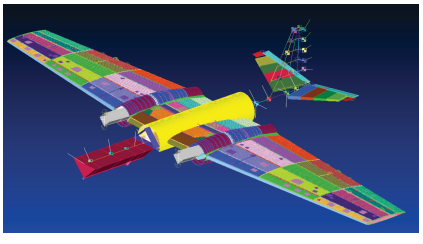
OVERVIEW

NASA operates three WB-57F Canberra aircraft for high-altitude research and development missions. Recognizing an opportunity to greatly increase the utility of these aircraft, NASA contracted ATA Engineering to provide support for a gross weight increase program. Rather than perform a time-intensive complete recertification effort involving detailed stress analysis of the entire airframe, ATA developed a series of flight envelope restrictions to allow the aircraft to be operated at increased weights without exceeding the original design loads of the aircraft. These aircraft now operate at gross weights up to 14% higher than the previous limits, allowing for numerous combinations of increased payloads, longer loiter times, and longer ranges.

TASKS PERFORMED & KEY OUTCOMES

- Performed detailed configuration audit of the aircraft, including maintenance review.
- Developed system-level finite element models.
- Performed ground vibration and static testing to fully characterize the structure.
- Correlated structural models to ground-measured modes.
- Performed aeroelastic analyses, including flutter, discrete gust, random turbulence, and static and dynamic maneuver analysis.
- Developed flight envelope restrictions for increased gross weight operations.
- Supported flight flutter testing with instrumentation, data acquisition, planning, and in-flight and post-flight data reduction and analysis. ATA also provided an FAA-qualified designated engineering representative for additional oversight.
- Generated all relevant substantiation documentation.

WB-57 undergoing ground vibration testing



System-level finite element model of the aircraft