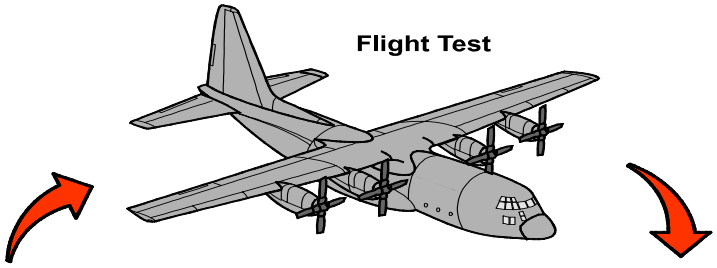
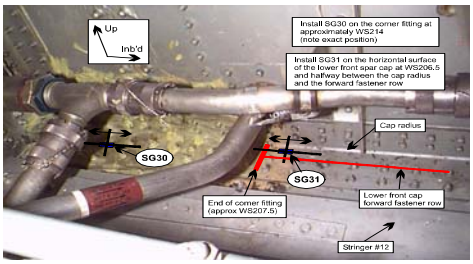
MARTEC™

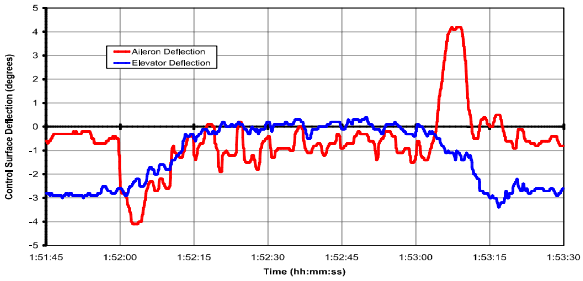
CC-130 STRUCTURAL RESPONSE VALIDATION FLIGHT TEST



Instrumentation Installation



Recorded Test Parameters



DESCRIPTION:

The Directorate of Technical Airworthiness (DTA) undertook the responsibility of providing the CC-130 aircraft fleet with an Operational Loads Monitoring (OLM) capability. The main purpose of the OLM program was to provide a rational method for a usage-based inspection scheduling, in order to reduce maintenance costs while ensuring safety of flight.

Under contract from DND, Martec Limited was assigned the responsibility for developing transfer functions, which are used to convert aircraft flight parameters into local stress sequences. The data used for validating the transfer functions were obtained from flight test. In cooperation with another partner, Martec was responsible for preparing an instrumentation plan as well as a list of measurements to be recorded during the flight test. The 72 channel instrumentation package included 54 strain gauges located at critical locations on the wing, 9 accelerometers spread along the wing and fuselage, and rate gyros for pitch and roll motions.

In addition to the instrumentation channels, data from the current OLM system were made available for validation. Martec was also responsible for providing DND with a flight test matrix detailing the appropriate maneuvers to be performed during 3 sorties of approximately 2 hours each. The 3 test matrices each included maneuvers to evaluate wing loading (symmetric pull-ups & rolling pull-outs), dynamic modes (control pulse inputs) and gust response (trimmed flight into turbulence), all performed at various airspeeds and altitudes. Because of the test program's relatively modest size, it was essential for Martec to include some amount of redundancy into the matrix in order to account for the possibility of corrupt data for one of the sorties.

Following completion of the flight test, the instrumentation data collected was used to validate the transfer functions, which received the recorded flight parameters as input.