LANN WING DESIGN

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The LANN wing is the result of a joint effort between Lockheed, the Air Force, NASA, and the Netherlands to measure unsteady pressures at transonic speeds. It is a moderate-aspect-ratio (8) transport wing configuration. The wing was machined from NITRONIC 40 and has 12-percent-thick supercritical airfoil sections. The wing has a semispan 1 m in length, a root chord of 0.361 m, a tip chord of 0.144 m, and a planform area of 0.25 m^2. The wing has a 1/4-chord sweep angle of 25^0 and a linear twist from root to tip of 4.8^0.

Static and oscillatory pressures were measured on the LANN wing in the high-speed tunnel at NLR (the national aerospace research organization) in the Netherlands in December 1981 using the NLR-developed "Matched Tubing Technique." Measurements were made for M_∞ from 0.62 to 0.95 at angles of attack from -0.4^0 to $+6^0$. The design condition for the wing is for a C_l of 0.53 at a Mach number of 0.82. The data from these tests will be used in defining the test boundary in the NTF. The instrumentation used at NLR is not appropriate for the NTF tests and will be completely replaced after the wing has been received at Langley.

The data from this wing will be the first unsteady wind tunnel measurements made at realistic Reynolds numbers, and the primary objective of the tests will be to determine, which as much precision as possible, what the effects of Reynolds number are on the unsteady pressure of a wing ocsillating in pitch.

LANN WING

Oscillating Unsteady Pressure Wing

CONFIGURATION VARIABLES

- o Aileron deflection
- o Engine nacelle
- o Wing-tip fins

TEST VARIABLES

- o M = .6, .7, .76, .82, .85, .95
- o C_L = .3, .5, .7
- o Re = 6 x 10^6 -- 60 x 10^6
- o Reduced frequency 0 to .2
- o B. L. transition fixing

MEASUREMENTS

- o 5 Component strain gage balance
- o Unsteady wing pressures (200)
- o Wing temperatures (15)
- o Wing accelerometers (9)
- o Wing root buffet gage
- o Static deformation

CONFIGURATION

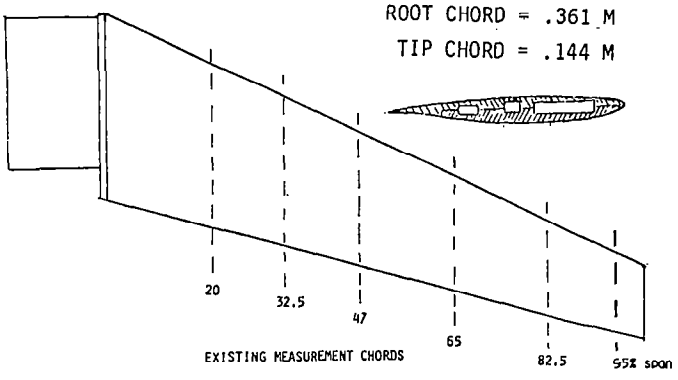
t/c = 0.12

$\Lambda_{\frac{c}{4}} = 25^o$

SEMISPAN = 1 m

ROOT CHORD = .361 M

TIP CHORD = .144 M



TEST OBJECTIVES

- o Reynolds No. effects on in-phase and out-of-phase aerodynamic forces and moments
- o Shock travel, flow separation, and buffet
- o NTF-NLR HST-Lockheed CFF data comparison