CP252209A

DATE: July 1976

PUBLICATION CHANGE

THE FOLLOWING CHANGES APPLY TO PUBLICATION: Space Shuttle Data Report

TITLE: HIGH SUPERSONIC STABILITY AND CONTROL CHARACTERISTICS OF A 0.015-SCALE (REMOTELY CONTROLLED ELEVON) MODEL 49-0 OF THE SPACE SHUTTLE ORBITER TESTED IN THE NASA/LaRC 4-FOOT UPWT (LEG 2) (LA63B)

NUMBER: DMS-DR-2279 DATE: MAY 1976 BRANCH: DATAMAN

NASA series number and DMS-DR-number on page 12 for Langley Research Center Low Turbulence Wind Tunnel is changed to read as follows:

N76-27338

LA61B, DMS-DR-2300

Prepared by: Maurice Moser, Jr.

Reviewed by: G. G. McDonald

Approved: J. L. Glynn, Manager
Data Operations

Concurrence: N. D. Kemp, Manager
Data Management Services

PAGE 1 OF 1

DISTRIBUTION SAME AS FOR ABOVE PUBLICATION

DATA MANagement services

SPACE DIVISION CHRYSLER CORPORATION

NOMENCLATURE (Concluded)

SYMBOL	PLOT SYMBOL	DEFINITION
ΔC_m	DLTCLM	incremental pitching moment coefficient due to a change from baseline condition
ΔC_y	DLTCY	incremental sideforce coefficient due to a change from baseline condition
ΔC_n	DLTCYN	incremental yawing moment coefficient due to a change from baseline condition
ΔC_ℓ	DLTCBL	incremental rolling moment coefficient due to a change from baseline condition
$C_{y_{\delta_a}}$	DCYDA	side force coefficient derivative as a function of aileron deflection
$C_{n_{\delta_a}}$	DCYNDA	yawing moment coefficient derivative as a function of aileron deflection
$C_{\ell_{\delta_a}}$	DCBLDA	rolling moment coefficient as a function of aileron deflection
$C_{m_{\delta_e}}$	DCLMDE	pitching moment coefficient as a derivative of elevon deflection
CL_{δ_e}	DCLDE	lift coefficient as a derivative of elevon deflection
CS_{δ_e}	DCDDE	drag coefficient as a derivative of elevon deflection
A_{sc}		sting cavity area, m^2, ft^2
ℓ_B		body length, m, ft.
C_{Y_β}	DCY/DB	derivative of side force coefficient with respect to beta, 1/deg.
C_{n_β}	DCYNDB	derivative of yawing moment coefficient with respect to beta, 1/deg.
C_{ℓ_β}	DCBLDB	derivative of rolling moment coefficient with respect to beta, 1/deg.
$\Delta\beta$	DLTBTA	incremental angle of sideslip, difference between two or more test runs, degrees

INTRODUCTION

The NASA is continuing experimental and analytical development of an aerodynamically sound and effective Space Shuttle vehicle. Extensive wind tunnel support has been devoted to this vehicle, especially the Orbiter Configuration, which is at present fixed in basic design. Several areas of concern have recently been noted from analysis of experimental data obtained in the numerous tests in various facilities which are: the existence of regions of nonlinear aerodynamic characteristics significant enough to cause concern to control designers and in some cases, disagreement between data obtained in the various facilities across the country.

Therefore, the Langley Research Center, in cooperation with Johnson Space Center and Rockwell International, has undertaken an experimental program to determine in detail the aerodynamic characteristics of a model of the Space Shuttle Orbiter. Attention will be given to conditions which have in past investigations shown regions of nonlinearity, since detailed definitions in these regions are particularly important in the development of longitudinal and lateral control characteristics to be used in the vehicle control logic. In addition, in order to minimize to effects of configuration differences which may contribute to uncertainties, a single model will be tested in the following selected facilities:

<u>Langley Research Center</u>

8-Ft. Transonic Pressure Tunnel (LA62)(DMS-DR-2264)
Low Turbulence Pressure Tunnel (LA61B), DMS-DR-2300)
Unitary Plan Wind Tunnels No. 1 and 2 (LA63A/B)(DMS-DR-2270/2279)

<u>Ames Research Center</u>

12-Ft. Transonic Pressure Tunnel (LA66)(DMS-DR-2281)