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Detailed Pressure Distribution Measurements Obtained on Several Configurations of an Aspect-Ratio-7 Variable Twist Wing

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Summary

Detailed pressure distribution measurements were made for 11 configurations of a unique, multisegmented wing model operating at a lift coefficient of 0.6 and a wing-chord Reynolds number of 1×10^6 in the Langley 4- by 7-Meter Tunnel. The untapered aspect-ratio-7 model generated a wide range of span-load distributions by the application of wing twist along the span to 72 independently rotatable wing segments. The tested configurations encompassed span loads ranging from that of an untwisted wing to simple flapped wings both with and without upper-surface spoilers attached.

For each of the wing twist configurations, electronic scanning pressure transducers were used to obtain 580 surface pressure measurements on the wing in about 0.1 sec. Integrated pressure distribution measurements compared favorably with force-balance measurements of lift on the model when the model centerbody lift was included. Complete plots and tabulations of the pressure distribution data for each model configuration are provided.

Introduction

Wake vortex studies were conducted in a wind tunnel by using a unique, pressure-instrumented wing model that was capable of controlled variations in span load. Part of the test results included detailed wing load distribution measurements obtained for several model configurations at a nominal lift coefficient of 0.6 and wing-chord Reynolds number of 1×10^6. These data were required to correlate with wake vortex development and decay. As first noted by Betz in 1933 (ref. 1), the wing span-load distribution plays a major role in the reorganization of its bound circulation field into the downstream pair of counterrotating vortices that make up its wake. Later theoretical and experimental work (see refs. 2 and 3) highlighted this concept, but a lack of detailed load distribution measurements for a range of span loads inhibited the investigation of the transformation from wing flow to wake flow.

The untapered aspect-ratio-7 wing used in this investigation was capable of generating a wide range of span-load distributions via wing twist applied along the span of the wing to 72 independently rotatable wing segments. Detailed load distribution data were obtained from over 550 pressure-orifice measurements on a semispan for each of 11 model configurations. These configurations represented span loads ranging from that of a simple untwisted wing through several twisted wings to part-span-flap wings. One of the part-span-flap configurations had upper-surface spoilers attached to evaluate a vortex-alleviation concept. The results are plotted and tabulated in this report as chordwise pressure coefficient distributions and spanwise section lift distributions. Integrated pressure distribution measurements are also compared with force-balance measurements of lift.

Symbols

C_L	lift coefficient, $\frac{\text{Lift}}{q_\infty S}$
$C_{L,\text{CB}}$	centerbody lift coefficient, $\alpha \frac{dC_{L,\text{CB}}}{d\alpha}$
$C_{L,p}$	lift coefficient derived from integrated right-wing c_p data, $\frac{1}{s}\int_0^s c_\ell \, dy$
c	wing chord, m
c_ℓ	section lift coefficient, $c_n \cos(\alpha + \Delta\alpha)$
c_n	section normal-force coefficient integrated from chordwise c_p data
c_p	static pressure coefficient, $\frac{p - p_\infty}{q_\infty}$
p	local static pressure, Pa
p_∞	free-stream static pressure, Pa
q_∞	free-stream dynamic pressure, Pa
S	wing reference area, m^2
s	wing semispan, m
X, Y, Z	right-hand Cartesian coordinate system originating at centerline of wing leading edge, with X aligned to wind-tunnel longitudinal centerline, Y aligned horizontally out the right wing and perpendicular to X, and Z aligned vertically upward
x, y, z	longitudinal, lateral, and vertical dimensions along the X, Y, Z Cartesian coordinate system, respectively, m
α	geometric angle of attack of wing centerline chord, deg
$\Delta\alpha$	wing-segment twist angle relative to wing centerline chord (wing-segment leading edge up is positive), deg

Abbreviation:

VTW	variable twist wing

Model Description

The variable twist wing (VTW) model, shown in figure 1, was mounted atop a faired support strut that attached to the centerbody for installation in the wind-tunnel test section. The model, shown schematically in figure 2, had a metal wing with a taper ratio of 1, an aspect ratio of 7, a span of 2.489 m, and an NACA 0012 airfoil section. The wing consisted of

72 segments (each 2.96 cm wide and independently rotatable about its quarter chord), with 36 installed on each side of a wing center panel of 35.56-cm span fixed to the centerbody. A body-of-revolution wingtip cap was fitted to each wing tip and twisted in unison with the final outboard wing segment. Spoilers or drag plates (shown in fig. 3) were added to two VTW configurations to alter the span-load distribution and/or the turbulence distribution shed into the wing wake. These devices were centered at $y/s = \pm 0.607$ with the drag plates mounted aft of the trailing edge at about $x/c = 1.43$.

The VTW model had 580 pressure taps for the measurement of spanwise and chordwise pressure distributions. Pressure coefficient data were obtained along 19 spanwise locations on the right wing and 1 symmetrically matching location just left of the wing centerline. Each spanwise location and the corresponding chordwise locations of the pressure orifices are given in table I. Right-wing segments were hollowed to accept either pressure-orifice tubing or electronic scanning pressure transducers and associated wiring. Generally, alternate segments contained the pressure transducers that accepted the pressure-orifice inputs from the adjacent segment through openings in each side of the segment. These openings were sized and located to accommodate up to 15° twist between adjacent segments without unsealing the openings to the free stream. Pressure data were taken under computer control with all 580 orifices electronically scanned and recorded in 0.1 sec.

The VTW design thus allowed the span-load distribution to be tailored via wing-segment twist, and the pressure instrumentation permitted accurate monitoring of the pressure distribution over the wing. Eleven VTW configurations, differing in either wing twist distribution or wing-device installations, were tested for this investigation. The configurations, shown in figure 4, are categorized into three groups—continuous span-load distributions, part-span-flap span-load distributions, and alleviated wake vortex configurations. In terms of the wake vortex investigation, this grouping system differentiates between the configurations of group I, which produced one predominant vortex per semispan, and those of group II, which shed multiple semispan vortices; configurations of group III were tested to examine the mechanism of spoiler-produced wake vortex alleviation. The configurations are given designations and are described in table II. These groupings and configuration designations will be utilized throughout the remainder of this report. Details of the VTW twist distributions are given in table III.

Test Conditions and Accuracy

The Langley 4- by 7-Meter Tunnel was utilized for this investigation, the test section of which has a height of 4.42 m, a width of 6.63 m, and a length of 15.24 m. The VTW was blade mounted atop a sting within the forward portion of the test section, near the entrance cone, and maintained at the test-section centerline during the test runs. The angle of attack was determined from an accelerometer mounted in the fuselage. A six-component strain-gauge balance was used to determine lift, drag, and pitching moment on the wing and centerbody combination. Blockage and jet-boundary corrections were applied to the wind-tunnel data according to the methods of references 4 and 5, respectively; however, these corrections were essentially negligible. The test was conducted at a Reynolds number of about 1×10^6, based on wing chord, requiring free-stream values of dynamic pressure and velocity of 1005 Pa and 40.52 m/sec, respectively. A high value of C_L was desirable for the downstream wake surveys that were performed as part of the wake vortex investigation, but C_L had to be sufficiently low to avoid wing stall over any twisted portion of the VTW. Local regions of separated flow would have introduced unwanted turbulence into the wake and invalidated comparisons with simple analytical span-load predictions. To meet these requirements, a value of C_L of about 0.6 (as determined with the internal force balance) was utilized for all VTW pressure distribution measurements.

Values of C_L, obtained with the force balance, are cited only for comparison with the values of $C_{L,p}$, obtained by integration of the pressure distribution measurements. Each C_L measurement corresponded to the average of 50 points, taken by sampling 10 points per second for 5 sec from a 0.1-Hz low-pass-filtered data signal. Maximum force-balance errors in normal and axial forces were 22 N and 11 N, respectively. At a Reynolds number of 1×10^6 with the VTW set at $\alpha = 12.5°$, these errors correspond to a possible ± 0.027 error in C_L, or about ± 4.5 percent of the nominal $C_L = 0.6$.

Pressure distribution measurements were taken on all VTW configurations in table II. As noted previously, electronic scanning pressure transducers were incorporated within VTW wing segments to allow a computer-controlled recording of all 580 pressure-orifice values in about 0.1 sec. The accuracy of the scanning pressure transducers was specified as ± 96 Pa, with about 80 percent of the transducers having an error of no more than ± 46 Pa. If the transducer errors were randomly distributed over the wing, the integrated c_n values should be correct within ± 0.02 and the integrated $C_{L,p}$ should be correct within ± 0.006 (± 1 percent of the nominal $C_L = 0.6$). An additional source of c_n and $C_{L,p}$ error was due to ignoring the local chordwise (or axial) forces in the integrations. Examination of the chordwise contribution to both high- and low-drag VTW configurations at wing segments with small and large c_l values, and at wing segments with the spoilers installed, revealed a resultant error typically in the range of ±1 percent, but not more than ±3 percent. Thus, the overall error in the $C_{L,p}$ values can be expected to be typically ±2 percent, but not more than ±4 percent. These error ranges are with respect to lift on the wing alone and do not account for neglecting the centerbody lift, which was a function of angle of attack and thus varied for each VTW configuration.

Each lift distribution was derived from the pressure distribution data by cosine transformation of each chordwise-integrated c_n through its local angle of attack $(\alpha + \Delta\alpha)$ to get local c_l values. Each chordwise c_n was arrived at by chordwise trapezoidal integration of the 29 measurements of c_p at that spanwise station by utilizing a trailing-edge c_p value assigned as the mean of the most aft upper- and lower-surface c_p measurements. The c_l values attained for the right wing were then integrated by using a cubic spline fit of the 19 spanwise c_l measurements, along with the centerline c_l set equal to the measured c_l at $y/s = 0.0612$ and the wing-tip c_l set equal to 0. Thus, this integration of $C_{L,p}$ assumed no lift on the body-of-revolution wing-tip caps, no modification due to the presence of the body, and equal lift on the right and left wings. The latter assumption was justified by the measurement of negligible rolling moment on the VTW during the test runs. Since no pressure distribution measurements were made on the centerbody or along the wing centerline, the effect of the centerbody was not included in the $C_{L,p}$ integration. The c_l measured at $y/s = -0.0612$ was ignored in the $C_{L,p}$ integration since a small right-to-left wing lateral-flow angularity caused the centerbody to affect the left-wing lower-surface flow at this location, resulting in a locally reduced c_l left of the wing centerline.

Table IV compares the force-balance-measured and pressure-integrated lift for a nominal $C_L = 0.6$ for all VTW configurations. Failure to incorporate the centerbody lift results in a significant negative error, as seen in the fourth column of table IV. Extrapolation of centerbody lift from experimental measurements of cylindrical bodies alone (refs. 6 and 7) cannot account for the lift deficit shown. To account for the influence of the wing on the centerbody, a potential flow, panel method code (ref. 8) was used to model the VTW wing and centerbody combination. Runs were made at $\alpha = 0°$ and $8°$, and the predicted centerbody lift contribution at both angles of attack was used to determine $dC_{L,\mathrm{CB}}/d\alpha$ for VTW1 (the untwisted wing configuration), which was then applied to the proper α for each VTW configuration to approximate $C_{L,\mathrm{CB}}$. The resulting $dC_{L,\mathrm{CB}}/d\alpha$ (about 0.002 per degree based on the VTW reference area) is substantially above experimental body-alone measurements, and its inclusion into the comparison of $C_{L,p}$ with C_L brings the errors well within the envelope of pressure instrumentation and force-balance accuracy.

Presentation of Results

Results are plotted and tabulated for the wing twist configurations by group numbers I, II, and III. (See table II.) The applicable figure and table numbers are as follows:

Measurement	Plotted in figure—	Listed in table—
Group I: VTW1, VTW2, VTW3, VTW4		
C_L and $C_{L,p}$		IV, V
c_l versus y/s	5	V
c_n versus y/s		V
c_p versus x/c	6	V
Group II: VTW5, VTW6, VTW7		
C_L and $C_{L,p}$		IV, VI
c_l versus y/s	7	VI
c_n versus y/s		VI
c_p versus x/c	8	VI
Group III: VTW7S$_0$, VTW7S$_1$, VTW7S$_3$, VTW7S$_3$P		
C_L and $C_{L,p}$		IV, VII
c_l versus y/s	9	VII
c_n versus y/s		VII
c_p versus x/c	10	VII

Concluding Remarks

Detailed pressure distribution measurements were made for 11 configurations of a unique, multisegmented wing model operating at a lift coefficient of 0.6 and a wing-chord Reynolds number of 1×10^6 in the Langley 4- by 7-Meter Tunnel. The untapered aspect-ratio-7 model generated a wide range of span-load distributions by the application of wing twist along the span to 72 independently rotatable wing segments. The tested configurations encompassed span loads ranging from that of an untwisted wing to simple flapped wings both with and without upper-surface spoilers attached.

For each of the wing twist configurations, electronic scanning pressure transducers were used to obtain 580 surface pressure measurements on the wing in about 0.1 sec. Pressure coefficient data were obtained along 19 spanwise locations on the right wing and 1 symmetrically matching location just left of the wing centerline; however, a small right-to-left wing lateral-flow angularity caused the model centerbody to affect the left-wing measurements. Integrated right-wing pressure distribution measurements compared favorably with force-balance measurements of lift when the model centerbody lift was included. Complete plots and tabulations of the pressure distribution data for each model configuration are provided.

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TABLE I. VTW PRESSURE-ORIFICE LOCATIONS

Span location		Chord location	
Wing segment	y/s	x/c	$\pm z/c$
0-L[a]	−0.0612	0	0
0-R[a]	.0612	.0125	.01894
1	.1560	.0250	.02615
3	.2037	.0500	.03555
5	.2513	.1000	.04683
7	.2989	.1500	.05345
9	.3465	.2000	.05738
13	.4418	.3000	.06001
15	.4894	.4000	.05803
17	.5370	.5000	.05294
19	.5846	.6000	.04563
21	.6322	.7000	.03664
23	.6798	.8000	.02623
25	.7275	.9000	.01448
27	.7751	.9800	.00403
29	.8227		
31	.8703		
33	.9179		
35	.9656		
36	.9894		

[a]Left (0-L) and right (0-R) side of wing center-panel section.

TABLE II. VTW CONFIGURATIONS

Group	Wing twist configuration	Configuration description
I	VTW1	Untwisted wing
	VTW2	Approximately rectangular loading
	VTW3	Maximum loading at midsemispan
	VTW4	Tapered loading, maximum at centerline
II	VTW5	40-percent flapped wing
	VTW6	60-percent flapped wing
	VTW7	80-percent flapped wing
III	$VTW7S_0$	80-percent flapped wing with spoilers
	$VTW7S_1$	Wing twisted to approximately match span loading of $VTW7S_0$
	$VTW7S_3$	Wing twisted to approximately match span loading of $VTW7S_0$ (alternate of $VTW7S_1$)
	$VTW7S_3P$	$VTW7S_3$ with drag plates

TABLE III. VTW TWIST DISTRIBUTIONS

[$\Delta\alpha$ is given with respect to wing center panel; wing-segment leading edge up is positive]

Wing segment	Inboard edge y/s	$\Delta\alpha$, deg, for wing configurations—										
		VTW1	VTW2	VTW3	VTW4	VTW5	VTW6	VTW7	$VTW7S_0$	$VTW7S_1$	$VTW7S_3$	$VTW7S_3P$
Centerline	0	0	0	0	0	0	0	0	0	0	0	0
1	.1429			2	-1							
2	.1667				-1							
3	.1905				-2							
4	.2143				-2							
5	.2381				-3							
6	.2619				-3							
7	.2857			4	-4							
8	.3095				-4							
9	.3333				-5							
10	.3571		.5		-5	-2						
11	.3810				-5	-4						
12	.4048				-6	-6						
13	.4286			6		-7						
14	.4524											
15	.4762		1.0									
16	.5000											
17	.5238									-15	-15.00	-15.00
18	.5476											
19	.5714			4								
20	.5952		1.5		-7		-2.0					
21	.6190						-4.0					
22	.6429						-6.0					
23	.6667										-11.25	-11.25
24	.6905									0	-7.50	-7.50
25	.7143		2.0	2	-8						-3.75	-3.75
26	.7381										0	0
27	.7619										-3.00	-3.00
28	.7857							-6	-6	-6	-6.00	-6.00
29	.8095											
30	.8333		2.5		-9							
31	.8571			0	-9							
32	.8810				-10							
33	.9048				-11		-5.5					
34	.9286				-11		-5.0					
35	.9524		3.0		-12		-4.5					
36	.9762		3.0		-12		-4.0					
Other devices									Spoilers			Drag plates

TABLE IV. COMPARISON OF FORCE-BALANCE-MEASURED AND PRESSURE-INTEGRATED LIFT FOR A NOMINAL $C_L = 0.6$

Wing twist configuration	C_L	$C_{L,p}$	$\frac{C_{L,p} - C_L}{C_L}$	$\frac{(C_{L,p} + C_{L,CB}) - C_L}{C_L}$
VTW1	0.614	0.580	−0.055	−0.030
VTW2	.601	.575	−.043	−.021
VTW3	.602	.592	−.017	.000
VTW4	.628	.577	−.081	−.041
VTW5	0.615	0.597	−0.029	+0.008
VTW6	.620	.591	−.047	−.017
VTW7	.596	.571	−.042	−.014
VTW7S_0	0.591	0.555	−0.061	−0.023
VTW7S_1	.607	.575	−.053	−.015
VTW7S_3	.583	.564	−.033	+.007
VTW7S_3P	.606	.591	−.025	+.015

TABLE V. PRESSURE DISTRIBUTION MEASUREMENTS FOR GROUP I VTW CONFIGURATIONS

(a) Wing twist configuration VTW1. $\alpha = 7.50°$; $C_L = 0.614$; $C_{L,p} = 0.580$

x/c	z/c	VALUES OF c_p FOR y/s =									
		-.06122	.06122	.15604	.20366	.25128	.29889	.34651	[illegible]	[illegible]	.53699
0.0000	0.00000	-.54376	-.91647	-1.09351	-1.02829	-.97704	-.95840	-.85591	-.70582	[illegible]	-.58569
.0125	.01894	-2.37005	-2.66356	-2.59834	-2.71015	-2.62163	-2.55641	-2.58902	-2.43062	[illegible]	-2.30017
.0250	.02615	-2.00200	-2.36073	-3.03627	-2.49584	-2.28153	-2.03461	-1.82496	[illegible]	-2.11381	-2.01132
.0500	.03555	-1.57804	-1.63860	-1.90416	-1.85291	-1.85757	-1.82962	-1.80632	[illegible]	[illegible]	-1.05258
.1000	.04683	-1.10749	-1.26123	-1.34043	-1.33577	-1.33577	-1.30316	-1.28453	-1.25657	[illegible]	-1.18203
.1500	.05345	-.91182	-1.03761	-1.11681	-1.11215	-1.10749	-1.08885	-1.08419	-1.04692	[illegible]	-1.01431
.2000	.05738	-.77205	-.89784	-.95375	-.94909	-.93977	-.92579	-.93045	-.89784	-.88386	-.86989
.3000	.06001	-.58103	-.68819	-.71148	-.71614	-.70216	-.71148	-.69751	-.68819	-.67421	-.65558
.4000	.05803	-.42729	-.52979	-.53444	-.55308	-.54376	-.53910	-.53444	-.51115	-.51581	-.49717
.5000	.05294	-.30150	-.40400	-.39002	-.40865	-.40865	-.39468	-.39934	-.39468	-.38536	-.36672
.6000	.04563	-.18969	-.29218	-.28286	-.28752	-.28286	-.27820	-.28286	-.27355	-.27355	-.26423
.7000	.03664	-.09651	-.19900	-.18037	-.18503	-.18037	-.18037	-.18037	-.17971	-.18037	-.16173
.8000	.02623	.00133	-.09651	-.08719	-.09651	-.07321	-.06855	-.06855	-.07321	-.06390	-.05924
.9000	.01448	.11314	.00133	.02462	.03394	.03860	.05258	.04326	.04792	.05258	.05724
.9800	.00403	.22030	.10848	.12246	.12712	.15041	.15507	.12712	.15041	.11314	.15973
.0125	-.01894	.86323	.97504	.97038	.96572	.97038	.96572	.96572	.97504	.98902	.98902
.0250	-.02615	.97038	.96106	.83061	.90981	.90516	.90050	.88652	.86788	.85391	.83993
.0500	-.03555	.81664	.76073	.65397	.64426	.64426	.63028	.62562	.60233	.59301	.56506
.1000	-.04683	.55108	.49051	.40199	.38336	.37870	.36472	.35541	.29950	.33677	.34609
.1500	-.05345	.39734	.33211	.25757	.25291	.24825	.24359	.23427	.22030	.21098	.19700
.2000	-.05738	.29484	.22030	.16905	.18303	.17371	.15507	.15507	.14575	.13178	.13178
.3000	-.06001	.17371	.09451	.09917	.08519	.08519	.07121	.07567	.07121	.04326	.05724
.4000	-.05803	.12246	.04326	.05724	.05258	.05258	.04792	.05258	.05258	.04326	.02928
.5000	-.05294	.10382	.00599	.03394	.03860	.03860	.03860	.03860	.04326	.02462	.02462
.6000	-.04563	.06655	-.01731	.02462	.02928	.03394	.03860	.04326	.04326	.03394	.03394
.7000	-.03664	.04326	-.04992	.02462	.03394	.04326	.04792	.04326	.04326	.04326	.04326
.8000	-.02623	.07121	-.02197	.03860	.05724	.06189	.06655	.06655	.07121	.06189	.06655
.9000	-.01448	.13178	.02928	.08053	.09451	.08519	.09451	.10382	.09917	.09917	.09451
.9800	-.00403	.21098	.08519	.10848	.12712	.13178	.14110	.14110	.13644	.14575	.12712
INTEGRATED c_n		.6329	.6652	.7036	.7021	.6892	.6735	.6700	.6484	.6406	.6173
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
$\alpha+\Delta\alpha$, (DEG)		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500
RESULTANT c_l		.6275	.6595	.6976	.6961	.6833	.6678	.6643	.6429	.6352	.6120

x/c	z/c	VALUES OF c_p FOR y/s =									
		.58461	.63223	.67985	.72747	.77509	.82270	.87032	.91794	.96556	.98937
0.0000	0.00000	-.59502	-.51581	-.39934	-.35741	-.20366	-.11514	-.00333	.12712	[illegible]	.56040
.0125	.01894	-2.25824	-2.09052	-2.10919	-1.99768	-1.95075	-1.79701	-1.68053	-1.49418	-1.20067	-.93045
.0250	.02615	-2.06722	-1.93211	-1.86273	-1.79701	-1.76439	-1.58270	-1.39168	-1.39168	-1.27987	-.85591
.0500	.03555	-1.60599	-1.58736	-1.55940	-1.48952	-1.43361	-1.36839	-1.27987	-1.17737	-.97238	-.78137
.1000	.04683	-1.17271	-1.18203	-1.14942	-1.12612	-1.10283	-1.06556	-.99569	-.91182	-.74409	-.59967
.1500	.05345	-1.00033	-.98170	-.96772	-.93977	-.89318	-.84193	-.79068	-.74409	-.60899	-.49251
.2000	.05738	-.86057	-.83727	-.84659	-.90000	-.76739	-.72546	-.67887	-.60899	-.34809	-.40865
.3000	.06001	-.65092	-.63694	-.63694	-.60433	-.57172	-.54842	-.51581	-.45058	-.35741	-.31548
.4000	.05803	-.49251	-.48320	-.48786	-.46456	-.44127	-.41797	-.37138	-.33877	-.27355	-.23627
.5000	.05294	-.35741	-.35741	-.35275	-.33411	-.32013	-.29684	-.28752	-.24559	-.20832	-.17571
.6000	.04563	-.25491	-.25025	-.25025	-.24093	-.22730	-.20832	-.20832	-.18037	-.14776	-.16173
.7000	.03664	-.15707	-.14776	-.13844	-.14310	-.13378	-.11514	-.11514	-.09651	-.16583	-.18969
.8000	.02623	-.05924	-.04992	-.06855	-.04992	-.03128	-.03594	-.02662	-.03594	-.04992	-.35275
.9000	.01448	.05724	.05724	.05258	.06189	.07121	.06189	.06189	.05724	-.00333	-.57172
.9800	.00403	.15973	.16905	.15041	.15973	.16905	.17371	.15973	.15507	.09917	-.48786
.0125	-.01894	.99833	.99833	.98902	.98962	.97038	.96106	.93311	.89118	.80732	.73278
.0250	-.02615	.82130	.81198	.80266	.78848	.76073	.74209	.69085	.65823	.56971	.46256
.0500	-.03555	.56506	.54642	.53244	.50915	.49051	.45790	.42929	.37870	.29018	.21098
.1000	-.04683	.30882	.30416	.27620	.25757	.23893	.22962	.18769	.15507	.08053	.03860
.1500	-.05345	.19234	.17837	.15507	.14575	.12712	.09917	.09451	.05724	.01531	-.02197
.2000	-.05738	.11314	.10848	.09917	.08053	.06655	.04326	.03860	-.01265	-.05458	-.05924
.3000	-.06001	.03860	.04326	.02462	.01996	-.00333	-.01265	-.04526	-.04526	-.08253	-.09651
.4000	-.05803	.01996	.01531	-.00799	.00133	-.01265	-.04526	-.04060	-.07321	-.08719	-.13844
.5000	-.05294	.01996	.00599	-.03128	.00133	-.01731	-.02662	-.03594	-.07321	-.08719	-.10117
.6000	-.04563	.01996	.00599	-.00333	.00133	.00133	-.00799	-.02662	-.04526	-.05924	-.08719
.7000	-.03664	.04792	.02928	.02978	.02462	.01065	.00133	-.00333	-.02662	-.04992	-.08719
.8000	-.02623	.05258	.06655	.05258	.05258	.03860	.02928	.02462	.01065	-.02197	-.07321
.9000	-.01448	.10382	.09451	.07587	.08519	.06655	.08053	.06189	.06189	.01996	-.04526
.9800	-.00403	.15041	.13178	.14575	.13178	.14110	.14110	.14575	.13178	.09917	-.04992
INTEGRATED c_n		.6036	.5838	.5670	.5445	.5094	.4720	.4318	.3733	.2791	.3183
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
$\alpha+\Delta\alpha$, (DEG)		7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500	7.500
RESULTANT c_l		.5985	.5788	.5622	.5399	.5041	.4679	.4281	.3702	.2767	.3156

TABLE V. Continued

(b) Wing twist configuration VTW2. $\alpha = 6.50°$; $C_L = 0.601$; $C_{L,p} = 0.575$

x/c	z/c	VALUES OF c_p FOR y/s =									
		-.06122	.06122	.15604	.20366	.25128	.29889	.34651	.44175	.48937	.53699
0.0000	0.00000	-.29349	-.47602	-.62580	-.57899	-.54155	-.54155	-.48070	-.48538	-.56027	-.53687
.0125	.01894	-2.17032	-2.27329	-2.22181	-2.33882	-2.25925	-2.20309	-2.28733	-2.22649	-2.28733	-2.24053
.0250	.02615	-1.85206	-3.26086	-3.25618	-2.43711	-1.99715	-1.80057	-1.62740	-1.91524	-2.17969	-2.43243
.0500	.03555	-1.51975	-1.59932	-1.64144	-1.65548	-1.62272	-1.58528	-1.62272	-1.60400	-1.59932	-1.59932
.1000	.04683	-1.07979	-1.13128	-1.17808	-1.19212	-1.17340	-1.16872	-1.16404	-1.16404	-1.17808	-1.13128
.1500	.05345	-.92066	-.94406	-1.01895	-1.01895	-1.00959	-.9[illegible]619	-.99087	-.98151	-.99087	-.97214
.2000	.05738	-.79429	-.81301	-.86918	-.86450	-.85981	-.84109	-.85981	-.85045	-.85045	-.83173
.3000	.06001	-.61175	-.63048	-.65956	-.64920	-.64452	-.63984	-.64452	-.63516	-.64452	-.63048
.4000	.05803	-.46198	-.48070	-.49006	-.52283	-.49474	-.48070	-.50411	-.48070	-.48538	-.46666
.5000	.05294	-.34965	-.36369	-.36837	-.37305	-.35901	-.34965	-.36369	-.31689	-.35433	-.34497
.6000	.04563	-.24668	-.26541	-.26541	-.26072	-.25136	-.24200	-.25604	-.23732	-.24668	-.22328
.7000	.03664	-.15308	-.17180	-.16244	-.16244	-.15776	-.13903	-.14840	-.12967	-.12499	-.12031
.8000	.02623	-.06415	-.07819	-.06415	-.04075	-.05679	-.03607	-.04075	-.02671	-.03139	-.02202
.9000	.01448	.03414	.03414	.04818	.05286	.05754	.07626	.07158	.08562	.07158	.08094
.9800	.00403	.15583	.13711	.14647	.16051	.17923	.17923	.17455	.18859	.13243	.18391
.0125	-.01894	.92341	.94682	.96554	.96554	.97490	.97490	.97490	.97022	.96554	.97022
.0250	-.02615	.81108	.92809	.79236	.86257	.85789	.85789	.84385	.84853	.86725	.86257
.0500	-.03555	.69876	.70812	.61451	.59579	.59579	.58643	.572[illegible]8	.59111	.60047	.60047
.1000	-.04683	.43197	.44133	.35241	.32900	.33837	.35241	.32900	.30560	.33837	.34305
.1500	-.05345	.28220	.27752	.22136	.21199	.22136	.21199	.20731	.21668	.20731	.22604
.2000	-.05738	.18391	.18391	.16987	.14179	.13711	.16051	.13711	.15583	.13711	.15583
.3000	-.06001	.08094	.07626	.08094	.08094	.05754	.05286	.06690	.08094	.05286	.06690
.4000	-.05803	.03414	.03414	.04818	.02946	.04350	.04350	.04350	.04818	.03882	.06222
.5000	-.05294	.01074	-.00798	.03414	.02478	.04818	.04818	.04818	.04818	.03414	.04818
.6000	-.04563	-.01266	-.00330	.03414	.03414	.04818	.05754	.03882	.06222	.05286	.06222
.7000	-.03664	-.03607	-.03139	.04350	.03882	.04818	.06222	.06222	.07626	.06222	.07158
.8000	-.02623	.00606	-.00330	.06272	.06222	.07626	.08562	.08562	.09498	.08094	.09030
.9000	-.01448	.06690	.05286	.09498	.09967	.12307	.12307	.12307	.13243	.11371	.12775
.9800	-.00403	.13711	.11839	.14647	.15115	.16519	.18391	.17455	.16519	.18391	.15583
INTEGRATED c_n		.5800	.6260	.6522	.6324	.6227	.6103	.6137	.6103	.6186	.6170
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	.500	1.000	1.000
$\alpha+\Delta\alpha$, (DEG)		6.500	6.500	6.500	6.500	6.500	6.500	6.500	7.000	7.500	7.500
RESULTANT c_l		.5762	.6220	.6481	.6283	.6187	.6063	.6097	[illegible]	.6133	.6118

x/c	z/c	VALUES OF c_p FOR y/s =									
		.58461	.63223	.67985	.72747	.77509	.82270	.87032	.91794	.96556	.98937
0.0000	0.00000	-.60707	-.64452	-.56963	-.63984	-.49942	-.37773	-.33093	-.17180	.09030	.35241
.0125	.01894	-2.27797	-2.26861	-2.24989	-2.18905	-2.17500	-2.04395	-1.95035	-1.77249	-1.49167	-1.15468
.0250	.02615	-2.67581	-1.97843	-1.90822	-1.64144	-1.81461	-1.77015	-1.67888	-1.70697	-1.60868	-1.00257
.0500	.03555	-1.61804	-1.62740	-1.61336	-1.57591	-1.53379	-1.49635	-1.41710	-1.29977	-1.06575	-.85045
.1000	.04683	-1.14064	-1.15936	-1.15468	-1.12660	-1.09851	-1.06107	-1.00023	-.94974	-.78961	-.64452
.1500	.05345	-.99087	-.96746	-.97214	-.93470	-.93470	-.88322	-.82705	-.76153	-.59303	-.48538
.2000	.05738	-.83173	-.82705	-.82705	-.78493	-.78961	-.74281	-.68664	-.62580	-.34497	-.40582
.3000	.06001	-.63516	-.62580	-.61643	-.59303	-.58367	-.55091	-.50411	-.45262	-.35433	-.30285
.4000	.05803	-.47602	-.47134	-.46198	-.44326	-.42494	-.40582	-.36837	-.34029	-.27009	-.24668
.5000	.05294	-.34965	-.33093	-.34497	-.31689	-.30285	-.28413	-.25604	-.22796	-.18116	-.19520
.6000	.04563	-.22796	-.22328	-.22796	-.19988	-.19988	-.19052	-.14372	-.15308	-.13903	-.20456
.7000	.03664	-.13435	-.12031	-.10627	-.11095	-.11095	-.08755	-.07819	-.06883	-.07351	-.29817
.8000	.02623	-.02202	-.03139	-.01266	-.00798	-.01734	-.01734	.00606	-.01266	-.04543	-.47602
.9000	.01448	.08562	.08562	.08562	.09967	.08094	.09030	.11371	.08094	.00138	-.68664
.9800	.00403	.18859	.18391	.18859	.19795	.18859	.19795	.18391	.17455	.10435	-.50411
.0125	-.01894	.98894	.97022	.97022	.96086	.97490	.98426	.98894	.97958	.94214	.85789
.0250	-.02615	.84385	.86257	.85789	.87661	.85371	.81577	.82045	.76428	.70344	.58643
.0500	-.03555	.59111	.61919	.58643	.59579	.58643	.56770	.54430	.49750	.42729	.32432
.1000	-.04683	.34305	.35709	.34305	.33837	.32900	.31964	.30092	.25412	.22136	.12307
.1500	-.05345	.22136	.23072	.21668	.21668	.21199	.18859	.18391	.13243	.19795	.03414
.2000	-.05738	.16519	.16051	.14647	.14179	.12307	.11371	.08562	.05754	.10435	-.02671
.3000	-.06001	.08562	.07158	.07626	.09498	.06722	.05286	.07478	.00606	.01074	-.05947
.4000	-.05803	.03882	.03882	.03414	.04350	.03414	.02946	.01074	-.00798	-.02202	-.07819
.5000	-.05294	.04350	.06690	.02478	.04350	.03414	.05286	.01074	-.00330	-.01734	-.10627
.6000	-.04563	.05754	.06222	.03882	.03414	.03882	.02010	.02010	-.00330	-.02671	-.08287
.7000	-.03664	.07158	.06690	.05754	.05754	.06222	.04350	.03882	.01542	-.01734	-.07819
.8000	-.02623	.10903	.09498	.09498	.08094	.07626	.07158	.06690	.03882	.00606	-.05947
.9000	-.01448	.12775	.12775	.12307	.11839	.11371	.11839	.10435	.08562	.05754	-.00330
.9800	-.00403	.15583	.19327	.16987	.17923	.16051	.18859	.17923	.16519	.12307	-.02671
INTEGRATED c_n		.6278	.6143	.5958	.5740	.5646	.5355	.4835	.4365	.3614	.4055
$\Delta\alpha$, (DEG)		1.000	1.500	1.500	2.000	2.000	2.000	2.500	2.500	3.000	3.000
$\alpha+\Delta\alpha$, (DEG)		7.500	8.000	8.000	8.500	8.500	8.500	9.000	9.000	9.500	9.500
RESULTANT c_l		.6224	.6084	.5900	.5677	.5584	.5296	.4775	.4311	.3565	.3999

TABLE V. Continued

(c) Wing twist configuration VTW3. $\alpha = 4.80°$; $C_L = 0.602$; $C_{L,p} = 0.592$

x/c	z/c	VALUES OF c_p FOR y/s =									
		-.06122	.06122	.15604	.20366	.25128	.29889	.34651	.44175	.48937	.53699
0.0000	0.00000	-.08850	-.24178	-.78985	-.77127	-.79914	-1.22645	-1.17536	-1.53765	-1.51443	-1.44940
.0125	.01894	-1.97890	-2.09037	-2.30403	-2.51758	-2.50839	-2.68954	-2.84746	-2.97751	-3.04253	-2.94035
.0250	.02615	-1.73273	-3.84607	-3.06576	-2.83352	-2.19255	-2.07644	-2.35976	-2.37692	-2.81959	-3.16794
.0500	.03555	-1.44475	-1.49120	-1.69557	-1.75131	-1.80240	-1.76524	-1.87207	-1.77453	-1.83956	-1.84420
.1000	.04683	-1.12891	-1.12427	-1.22181	-1.26826	-1.30541	-1.37399	-1.36115	-1.40295	-1.41689	-1.36115
.1500	.05345	-.91990	-.94777	-1.05924	-1.06853	-1.09640	-1.10569	-1.11963	-1.13356	-1.13820	-1.12427
.2000	.05738	-.81772	-.83630	-.89668	-.92455	-.91990	-.93848	-.95706	-.96171	-.95242	-.93848
.3000	.06001	-.65515	-.66444	-.67838	-.71089	-.69696	-.71554	-.71089	-.71089	-.70160	-.69231
.4000	.05803	-.50188	-.51117	-.52510	-.53504	-.53439	-.52975	-.54368	-.53439	-.52510	-.51581
.5000	.05274	-.39041	-.39970	-.39970	-.39970	-.39970	-.39505	-.39505	-.37647	-.39041	-.37647
.6000	.04563	-.29751	-.30216	-.28358	-.28358	-.27893	-.28358	-.25107	-.26500	-.26500	-.26035
.7000	.03664	-.20462	-.20462	-.18604	-.18139	-.17211	-.17675	-.16746	-.14424	-.14424	-.14888
.8000	.02623	-.11637	-.11637	-.08386	-.06992	-.07921	-.06528	-.06063	-.04205	-.03741	-.04205
.9000	.01448	.00439	-.01418	.02297	.03691	.03691	.05084	.05084	.06942	.06013	.06478
.9800	.00403	.11122	.11122	.12516	.13445	.15302	.13909	.13445	.13909	.10193	.15302
.0125	-.01894	.97978	.97978	.97514	.97514	.96585	.95191	.95191	.95656	.93334	.95191
.0250	-.02615	.66394	.85902	.79399	.87760	.88224	.93798	.94727	.96585	.98443	.95656
.0500	-.03555	.59427	.62214	.61750	.60821	.61750	.67788	.69181	.74290	.73826	.72432
.1000	-.04683	.33417	.35739	.35275	.34810	.35739	.38990	.43635	.40848	.4647	.45029
.1500	-.05345	.19947	.21805	.21341	.22270	.23198	.25985	.27843	.33881	[illegible]	.30166
.2000	-.05738	.11122	.12516	.14374	.14838	.14374	.13445	.19018	.22270	.22270	.20412
.3000	-.06001	.02297	.04155	.05084	.06013	.08335	.06942	.09264	.12051	[illegible]	.11587
.4000	-.05803	-.01418	-.00490	.02762	.02762	.05549	.05549	.06478	.08335	.08800	.07871
.5000	-.05294	-.03276	-.01418	.00904	.02297	.02297	.03226	.04620	.07406	.06013	.05549
.6000	-.04563	-.05134	-.03741	.00439	.01833	.03691	.04620	.04620	.05084	.06478	.05549
.7000	-.03664	-.06992	-.06063	.01833	.02762	.02762	.05549	.06013	.06478	.06013	.06478
.8000	-.02623	-.03741	-.02812	.02762	.05034	.06013	.06942	.07406	.07871	.08335	.07871
.9000	-.01448	.02297	.02297	.06942	.08800	.08335	.09729	.09729	.09729	.11587	.09729
.9800	-.00403	.10658	.10193	.12516	.12516	.14374	.13909	.14838	.14374	.15302	.13445
INTEGRATED c_n		.5569	.6227	.6541	.6709	.6696	.6816	.7076	.7165	.7306	.7203
$\Delta\alpha$, (DEG)		0.000	0.000	2.000	2.000	2.000	4.000	4.000	6.000	6.000	6.000
$\alpha+\Delta\alpha$, (DEG)		4.800	4.800	6.800	6.800	6.800	8.800	8.800	10.800	10.800	10.800
RESULTANT c_l		.5550	.6205	.6495	.6662	.6649	.6736	.6992	.7038	.7177	.7075

x/c	z/c	VALUES OF c_p FOR y/s =									
		.58461	.63223	.67985	.72747	.77509	.82270	.87032	.91794	.96556	.98937
0.0000	0.00000	-1.05924	-.93848	-.76198	-.32538	-.13030	.00904	.37597	.49209	.69181	.77542
.0125	.01894	-2.69883	-2.56413	-2.41085	-2.03463	-1.88600	-1.68164	-1.34257	-1.14749	-.87346	-.66444
.0250	.02615	-3.13078	-2.18326	-1.94174	-1.61196	-1.60268	-1.48888	-1.23110	-1.23110	-1.14749	-.65748
.0500	.03555	-1.89994	-1.80704	-1.71415	-1.54229	-1.41224	-1.29612	-1.15214	-.99886	-.80379	-.65051
.1000	.04683	-1.32864	-1.28683	-1.22181	-1.17536	-1.09176	-1.03138	-.92919	-.81307	-.65051	-.53439
.1500	.05345	-1.10569	-1.06389	-1.02204	-.96171	-.89203	-.80843	-.78985	-.70150	-.54833	-.44614
.2000	.05738	-.92919	-.90132	-.88739	-.82701	-.77592	-.72018	-.65980	-.59942	-.32074	-.38112
.3000	.06001	-.69231	-.66909	-.65980	-.67264	-.58548	-.56226	-.51117	-.45079	-.34396	-.28822
.4000	.05803	-.51581	-.50188	-.50652	-.48330	-.45079	-.42292	-.38576	-.33931	-.26500	[illegible]
.5000	.05294	-.37647	-.36254	-.36718	-.35325	-.32538	-.31145	-.28822	-.25107	-.18604	[illegible]
.6000	.04563	-.26035	-.26035	-.25571	-.25107	-.22320	-.22784	-.21391	-.17675	-.13959	-.13959
.7000	.03664	-.14424	-.14888	-.14424	-.13959	-.13495	-.13495	-.13495	-.10708	-.08386	-.13495
.8000	.02623	-.04205	-.05599	-.07921	-.05134	-.04205	-.04670	-.04205	-.04670	-.04205	-.16282
.9000	.01448	.06478	.06013	.04620	.05549	.07406	.06013	.04155	.05084	.02762	-.26964
.9800	.00403	.15302	.16231	.13445	.15302	.17160	.16231	.14374	.15302	.12051	-.21855
.0125	-.01894	.97049	.96120	.97978	.98443	.97514	.94262	.87651	.78006	.69646	.61285
.0250	-.02615	.91011	.89153	.85902	.78006	.75684	.71039	.58963	.52440	.43171	.34346
.0500	-.03555	.65930	.64072	.61285	.51996	.47815	.43171	.32488	.25985	.18089	.11587
.1000	-.04683	.43171	.37597	.34346	.28308	.23643	.19947	.12051	.06942	.00904	-.01883
.1500	-.05345	.26914	.24592	.20876	.15767	.13445	.08800	.04155	-.01419	-.05599	-.07457
.2000	-.05738	.18554	.15767	.13909	.09729	.06013	.02297	-.02347	-.06063	-.09314	-.09779
.3000	-.06001	.09264	.06942	.05084	.05084	.01833	-.01418	-.05599	-.08386	-.08850	-.11172
.4000	-.05803	.05549	.04620	.04155	.00439	-.01883	-.01418	-.06063	-.08386	-.09314	-.12101
.5000	-.05294	.03691	.13909	-.00025	-.00490	-.00490	.01833	-.04670	-.08386	-.05134	-.08850
.6000	-.04563	.06013	.02762	.01368	.01368	.00904	-.01418	-.03741	-.05134	-.06063	-.08386
.7000	-.03664	.06013	.04620	.03691	.03691	.02297	.00439	-.00954	-.02347	-.04205	-.06992
.8000	-.02623	.08800	.07406	.06478	.05084	.06013	.03226	.02297	.00904	-.00954	-.04670
.9000	-.01448	.10658	.10193	.08800	.08800	.08335	.07871	.07406	.05084	.06013	-.02347
.9800	-.00403	.15767	.14838	.15767	.15302	.15767	.16696	.14838	.14374	.11587	.00439
INTEGRATED c_n		.7044	.6647	.6258	.5663	.5163	.4747	.4004	.3281	.2350	.2228
$\Delta\alpha$, (DEG)		4.000	4.000	4.000	2.000	2.000	2.000	0.000	0.000	0.000	0.000
$\alpha+\Delta\alpha$, (DEG)		8.800	8.800	8.800	6.800	6.800	6.800	4.800	4.800	4.800	4.800
RESULTANT c_l		.6961	.6569	.6185	.5623	.5127	.4713	.3990	.3769	.2342	.2220

TABLE V. Concluded

(d) Wing twist configuration VTW4. $\alpha = 12.50°$; $C_L = 0.628$; $C_{L,p} = 0.577$

x/c	z/c	VALUES OF c_p FOR y/s =									
		-.06122	.06122	.15604	.20366	.25128	.29889	.34651	.44175	.48937	.53699
0.0000	0.00000	-2.49102	-2.84879	-2.84414	-2.36558	-1.92883	-1.55248	-1.11573	-.60929	-.49778	-.37233
.0125	.01894	-3.87561	-4.08933	-3.89884	-3.67117	-3.34593	-3.02999	-2.87091	-2.33770	-2.22154	-2.09609
.0250	.02615	-2.89525	-2.94376	-3.30417	-3.26230	-2.90456	-2.61647	-2.38416	-2.02175	-1.94277	-1.84984
.0500	.03555	-2.14720	-2.17973	-2.34699	-2.19631	-2.02175	-1.93812	-1.94741	-1.67328	-1.59430	-1.51996
.1000	.04683	-1.52925	-1.55713	-1.67793	-1.61288	-1.54319	-1.44562	-1.37592	-1.21795	-1.18078	-1.11109
.1500	.05345	-1.20066	-1.22724	-1.31088	-1.29694	-1.24583	-1.18543	-1.13897	-1.03210	-.98099	-.94847
.2000	.05738	-1.00887	-1.02746	-1.09250	-1.06927	-1.03210	-.99029	-.95776	-.88342	-.85554	-.80908
.3000	.06001	-.73939	-.74868	-.76727	-.78120	-.74868	-.75333	-.71616	-.67434	-.64182	-.61394
.4000	.05803	-.55818	-.55354	-.56748	-.58606	-.57212	-.56748	-.54425	-.50243	-.48384	-.46061
.5000	.05294	-.40021	-.39557	-.40950	-.41880	-.41880	-.40021	-.39557	-.38163	-.35840	-.34910
.6000	.04563	-.27941	-.27941	-.27012	-.27941	-.27941	-.27476	-.28406	-.26082	-.26082	-.23759
.7000	.03664	-.16325	-.16325	-.16325	-.15861	-.16325	-.15861	-.17255	-.16325	-.16325	-.14931
.8000	.02623	-.05639	-.06104	-.05174	-.07497	-.04710	-.06104	-.06104	-.04710	-.06104	-.04710
.9000	.01448	.05512	.03189	.05047	.05047	.05977	.05512	.05512	.05977	.05977	.06441
.9800	.00403	.12017	.09694	.12481	.12481	.14805	.15734	.14340	.16663	.11552	.17128
.0125	-.01894	.86357	.82175	.99831	.98437	.96114	.95649	.95185	.97508	1.00296	1.00296
.0250	-.02615	.96114	.97508	.95185	.98437	1.00296	.97043	.93376	.87286	.84498	.81246
.0500	-.03555	.95649	.97043	.84963	.83104	.78458	.73812	.67772	.60338	.58015	.54298
.1000	-.04683	.73347	.75206	.61267	.56156	.51975	.47328	.41288	.31066	.32925	.32925
.1500	-.05345	.55692	.56621	.45470	.42217	.38036	.33854	.30137	.21309	.20380	.19451
.2000	-.05738	.41753	.43611	.343[illegible]9	.32925	.29673	.24097	.21774	.16663	.14340	.12481
.3000	-.06001	.24562	.26420	.23168	.20380	.18986	.18986	.13411	.09694	.05977	.06906
.4000	-.05803	.14805	.17128	.16663	.14340	.12481	.11088	.09694	.04118	.03654	.03189
.5000	-.05294	.09229	.11088	.11552	.11088	.10158	.08764	.07835	.07371	.04583	.03654
.6000	-.04563	.04118	.05977	.08300	.07835	.06906	.07371	.05977	.05512	.04583	.04118
.7000	-.03664	-.00993	.00866	.05047	.07371	.08300	.07371	.06441	.06441	.05512	.05047
.8000	-.02623	.00866	.01330	.05977	.07835	.08300	.08764	.07835	.08764	.07835	.07835
.9000	-.01448	.04583	.04118	.08300	.10158	.09229	.11088	.12481	.11552	.09694	.10623
.9800	-.00403	.08764	.09229	.08764	.12017	.13411	.13875	.14805	.15734	.14805	.13875
INTEGRATED c_n		.8245	.8498	.8645	.8527	.8055	.7689	.7316	.6472	.6172	.5833
$\Delta\alpha$, (DEG)		0.000	0.000	-1.000	-2.000	-3.000	-4.000	-5.000	-6.000	-6.000	-6.000
$\alpha+\Delta\alpha$, (DEG)		12.500	12.500	11.500	10.500	9.500	8.500	7.500	6.500	6.500	6.500
RESULTANT c_l		.8049	.8297	.8471	.8384	.7945	.7604	.7253	.6431	.6132	.5795

x/c	z/c	VALUES OF c_p FOR y/s =									
		.58461	.63223	.67985	.72747	.77509	.82270	.87032	.91794	.96556	.98937
0.0000	0.00000	-.34910	-.08891	.05047	.25956	.39430	.49187	.66843	.86821	.97043	.99366
.0125	.01894	-1.98458	-1.75692	-1.65935	-1.40380	-1.31088	-1.11573	-.90665	-.59535	-.33516	-.23295
.0250	.02615	-1.73369	-1.61753	-1.51531	-1.36663	-1.23654	-1.13432	-.89271	-.67434	-.47920	-.37233
.0500	.03555	-1.42703	-1.35734	-1.32482	-1.17614	-1.07392	-.97635	-.84161	-.70222	-.53031	-.42344
.1000	.04683	-1.08786	-1.07392	-1.01816	-.94847	-.88342	-.80444	-.70686	-.61394	-.46384	-.37233
.1500	.05345	-.91130	-.86484	-.84161	-.80444	-.75333	-.69293	-.61394	-.53031	-.43738	-.33981
.2000	.05738	-.78585	-.74403	-.74868	-.66505	-.62323	-.59071	-.53960	-.46991	-.27012	-.30264
.3000	.06001	-.59535	-.56748	-.56748	-.52566	-.48849	-.45132	-.41880	-.36769	-.29799	-.23295
.4000	.05803	-.45132	-.43738	-.44203	-.39557	-.37698	-.34910	-.31193	-.27476	-.21436	-.16325
.5000	.05294	-.33052	-.31658	-.31193	-.29335	-.27941	-.25418	-.24224	-.20042	-.15861	-.12144
.6000	.04563	-.24224	-.21901	-.22830	-.20042	-.20042	-.19113	-.18184	-.14931	-.10750	-.08427
.7000	.03664	-.14931	-.13073	-.12144	-.12144	-.11214	-.09821	-.09821	-.08427	-.06568	-.04710
.8000	.02623	-.05174	-.03316	-.05174	-.02387	-.02387	-.01922	-.02387	-.01922	-.00528	-.01922
.9000	.01448	.06906	.07835	.06441	.07371	.07835	.06906	.07835	.07835	.05512	.04118
.9800	.00403	.16198	.18572	.17128	.19451	.18986	.18057	.17128	.17128	.14805	.09229
.0125	-.01894	.99366	.97043	.91932	.86821	.83104	.80781	.71953	.54762	.39894	.36642
.0250	-.02615	.79387	.73812	.70095	.64055	.58944	.54762	.44076	.30137	.17592	.12481
.0500	-.03555	.51510	.43147	.43147	.37571	.32975	.27814	.18986	.08764	-.01457	-.04710
.1000	-.04683	.24562	.19915	.19915	.14805	.11088	.07835	.00866	-.05174	-.12608	-.12144
.1500	-.05345	.15734	.13411	.08300	.03906	.02760	-.00993	.05639	-.10750	-.14002	-.13538
.2000	-.05738	.08764	.07835	.06441	.01330	-.00993	-.04710	-.10750	-.12608	-.14931	-.13073
.3000	-.06001	.01795	.01330	-.01457	-.01457	-.05174	-.07497	-.08427	-.12144	-.12144	-.11679
.4000	-.05803	.00866	-.00063	-.04710	-.02991	-.04245	-.05174	-.08427	-.10285	-.10750	-.10285
.5000	-.05294	.03169	.01330	-.07033	-.01457	-.02851	-.10750	-.06568	-.09821	-.07962	-.03780
.6000	-.04563	.01795	.00401	-.01457	-.00528	-.00063	-.02387	-.03316	-.04710	-.05174	-.04245
.7000	-.03664	.05047	.04118	.01795	.02260	.00401	-.00063	-.00063	-.00993	-.00993	-.02387
.8000	-.02623	.04118	.06906	.05512	.05512	.04583	.03189	.03654	.03189	.02724	.00866
.9000	-.01448	.10158	.10623	.08300	.10623	.09229	.09694	.09694	.09229	.05512	.03654
.9800	-.00403	.14805	.16198	.17592	.17128	.18522	.17128	.17128	.17128	.14340	.08300
INTEGRATED c_n		.5436	.5089	.4741	.4326	.3897	.3373	.2861	.2132	.1330	.1010
$\Delta\alpha$, (DEG)		-6.000	-7.000	-7.000	-8.000	-8.000	-8.000	-9.000	-11.000	-12.000	-12.000
$\alpha+\Delta\alpha$, (DEG)		6.500	5.500	5.500	4.500	4.500	4.500	3.500	1.500	.500	.500
RESULTANT c_l		.5401	.5065	.4720	.4312	.3885	.3363	.2856	.2132	.1330	.1010

TABLE VI. PRESSURE DISTRIBUTION MEASUREMENTS FOR GROUP II VTW CONFIGURATIONS

(a) Wing twist configuration VTW5. $\alpha = 11.50°$; $C_L = 0.615$; $C_{L,p} = 0.597$

x/c	z/c	VALUES OF c_p FOR y/s =									
		-.06122	.06122	.15604	.20366	.25128	.29889	.34651	.44175	.48937	.53699
0.0000	0.00000	-2.32428	-2.63607	-2.89201	-2.72914	-2.50577	-2.36151	-2.00319	-.22554	-.09990	.02109
.0125	.01894	-3.79945	-3.89717	-3.94371	-3.88786	-3.71568	-3.46439	-3.21310	-2.02180	-1.89150	-1.70536
.0250	.02615	-3.09676	-4.95817	-4.10658	-4.27876	-3.30152	-2.78498	-2.60349	-1.51922	-1.83566	-1.98923
.0500	.03555	-2.13349	-2.11487	-2.31032	-2.30101	-2.13814	-2.06368	-1.91942	-1.52853	-1.34239	-1.33308
.1000	.04683	-1.52387	-1.56110	-1.62625	-1.64021	-1.59833	-1.54714	-1.38892	-1.21674	-1.10971	-1.03525
.1500	.05345	-1.20743	-1.24001	-1.37962	-1.34239	-1.28189	-1.22605	-1.08644	-.97941	-.90961	-.87238
.2000	.05738	-1.02129	-1.03060	-1.11902	-1.08644	-1.05852	-1.03060	-.97941	-.86307	-.82119	-.77000
.3000	.06001	-.75139	-.76070	-.82585	-.77931	-.79793	-.65832	-.71416	-.64436	-.61178	-.59782
.4000	.05803	-.55129	-.55594	-.61644	-.58386	-.53267	-.41634	-.56060	-.52802	-.50475	-.46287
.5000	.05294	-.40703	-.41634	-.42564	-.43030	-.37445	-.38376	-.40703	-.25812	-.36980	-.35119
.6000	.04563	-.27208	-.27673	-.32327	-.29534	-.29069	-.28604	-.25346	-.25812	-.25812	-.25346
.7000	.03664	-.15574	-.17435	-.22089	-.17435	-.18831	-.16970	-.15574	-.15109	-.06267	-.11851
.8000	.02623	-.05802	-.08128	-.09524	.03506	-.07198	-.05336	-.05336	-.03940	-.00217	.00713
.9000	.01448	.04436	.06298	.02575	.03040	.04436	.06298	.04436	.04902	.05832	.08159
.9800	.00403	.14209	.10496	.07694	.14674	.14209	.14209	.14674	.14674	.10951	.17931
.0125	-.01894	.94249	.87734	.97972	.99368	1.00299	.97972	.95180	.99368	.93318	.95645
.0250	-.02615	.96809	.97041	.95645	.96111	.97507	.98437	.97041	.77031	.81219	.75170
.0500	-.03555	.99368	.97507	.94715	.88665	.86804	.83081	.82150	.55625	.51437	.48645
.1000	-.04683	.75635	.74239	.65397	.59348	[illegible]7952	.63536	.62605	.27238	.26308	.30729
.1500	-.05345	.57952	.58882	.44457	.42595	[illegible]734	.37942	.36546	.27704	.19327	.12813
.2000	-.05738	.43526	.42130	.41664	.33753	.30031	.30496	.28635	.13278	.09555	.05832
.3000	-.06001	.27238	.25377	.19793	.26773	.19793	.20258	.13278	.05832	-.00683	.02575
.4000	-.05803	.17931	.17931	.17001	.12813	.17001	.14674	.11882	.08624	.03971	.03506
.5000	-.05294	.12813	.10951	.10951	.11882	.10951	.12347	.09090	.03040	.02575	.02109
.6000	-.04563	.07228	.07228	.08159	.11417	.17347	.13743	.08159	.08624	.06298	.03506
.7000	-.03664	.02575	.02[illegible]75	.16535	.08624	.07694	.09090	.11417	.09090	.04902	.09555
.8000	-.02623	.03971	.04436	.12347	.09555	.11882	.15139	.11882	.09090	.11417	.09555
.9000	-.01448	.07228	.05367	.10020	.09090	.14674	.12813	.11417	.14209	.15605	.13743
.9800	-.00403	.12347	.11882	.21654	.15139	.15605	.19327	.16535	.17931	.22120	.17931
INTEGRATED c_n		.8576	.8964	.9475	.8946	.9617	.8141	.7769	.5976	.5566	.5320
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	-7.000	-7.000	-7.000
$\alpha+\Delta\alpha$, (DEG)		11.500	11.500	11.500	11.500	11.500	11.500	11.500	4.500	4.500	4.500
RESULTANT c_l		.8404	.8784	.9285	.8766	.8444	.7778	.7613	.5957	.5549	.5303

x/c	z/c	VALUES OF c_p FOR y/s =									
		.58461	.63223	.67985	.72747	.77509	.82270	.87032	.91794	.96556	.98937
0.0000	0.00000	.03971	.17931	.20258	.28635	.39803	.46783	.56556	.64467	.79358	.83081
.0125	.01894	-1.66813	-1.56576	-1.52387	-1.37031	-1.26328	-1.15625	-1.03060	-.96080	-.73743	-.55129
.0250	.02615	-1.97527	-1.41684	-1.40754	-1.19347	-1.12367	-.96080	-1.08179	-1.01664	-.85842	-.52337
.0500	.03555	-1.28654	-1.23070	-1.26793	-1.05387	-1.05852	-1.00733	-.94684	-.80723	-.64436	-.54198
.1000	.04683	-1.00268	-.97941	-.98407	-.91426	-.81654	-.81654	-.76535	-.67693	-.54198	-.47218
.1500	.05345	-.85842	-.81189	-.85842	-.72347	-.75604	-.71882	-.64901	-.59782	-.43495	-.37911
.2000	.05738	-.66763	-.68159	-.74208	-.63505	-.63040	-.60248	-.54663	-.47218	-.22089	-.33257
.3000	.06001	-.57921	-.56060	-.56525	-.50010	-.48149	-.47218	-.39307	-.36980	-.29069	-.23485
.4000	.05803	-.45822	-.41168	-.46753	-.38376	-.36515	-.36049	-.31396	-.28138	-.23485	-.21158
.5000	.05294	-.35584	-.29534	-.32792	-.30000	-.23950	-.25346	-.18366	-.19762	-.10920	-.15574
.6000	.04563	-.23485	-.20693	-.23020	-.17901	-.15574	-.16970	-.04405	-.10455	-.08128	-.12782
.7000	.03664	-.09524	-.11851	-.13247	-.10455	-.06732	-.09990	-.04871	-.03475	-.01148	-.07663
.8000	.02623	.02575	-.03940	-.09524	-.00683	-.00683	.05367	.02575	.03506	.01179	.01179
.9000	.01448	.11882	.10020	.04436	.08624	.10020	.12813	.13743	.10951	.09555	-.02544
.9800	.00403	.25377	.21189	.15605	.20258	.20258	.19793	.23050	.18862	.16070	-.07663
.0125	-.01894	.90992	.93784	.85873	.87734	.87734	.82615	.80754	.74239	.72843	.60278
.0250	-.02615	.69586	.70051	.64467	.63536	.62140	.54229	.59348	.46318	.40734	.31892
.0500	-.03555	.43526	.48179	.37011	.37942	.35615	.30961	.30961	.22120	.17931	.09090
.1000	-.04683	.31892	.20724	.16070	.15605	.18397	.11882	.11882	.05367	.01644	-.00683
.1500	-.05345	.11417	.10486	.05367	.05832	.08624	.05367	.02575	-.02079	-.02544	-.09059
.2000	-.05738	.14674	.03971	.02575	.00713	.02575	-.03009	-.07198	-.07198	-.08128	-.09990
.3000	-.06001	.11417	.00713	-.06732	-.02544	-.01613	-.04405	-.03009	-.08128	-.06732	-.09059
.4000	-.05803	.01179	.01644	-.07663	-.02544	-.03009	-.03940	-.04871	-.06267	-.05802	-.07663
.5000	-.05294	.00713	.02575	-.09524	-.02544	-.01148	-.01148	-.02544	-.01148	.00713	-.05802
.6000	-.04563	.07228	.09555	-.02544	.00713	.00713	-.01613	-.00217	-.03475	-.00683	-.07198
.7000	-.03664	.05832	.05832	.01644	.03971	.07228	.03040	.02575	.00248	.01179	-.03940
.8000	-.02623	.20724	.08159	.05367	.05832	.10951	.07694	.06763	.04436	.02575	-.01613
.9000	-.01448	.16070	.11882	.08624	.10486	.18397	.11882	.12813	.08159	.15139	.06763
.9800	-.00403	.24912	.25377	.17931	.21189	.20258	.18397	.20724	.20258	.19793	.08159
INTEGRATED c_n		.5294	.4777	.4460	.3991	.3959	.3499	.2998	.2556	.1965	.1653
$\Delta\alpha$, (DEG)		-7.000	-7.000	-7.000	-7.000	-7.000	-7.000	-7.000	-7.000	-7.000	-7.000
$\alpha+\Delta\alpha$, (DEG)		4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500
RESULTANT c_l		.5278	.4762	.4446	.3978	.3947	.3489	.2989	.2548	.1959	.1648

TABLE VI. Continued

(b) Wing twist configuration VTW6. $\alpha = 9.10°$; $C_L = 0.620$; $C_{L,p} = 0.591$

x/c	z/c	VALUES OF c_p FOR y/s =									
		-.06122	.06122	.15604	.20366	.25128	.29889	.34651	.44175	.48937	.53699
0.0000	0.00000	-1.42899	-1.68841	-1.95246	-1.86907	-1.75789	-1.73010	-1.56796	-1.30392	-1.17421	-1.01671
.0125	.01894	-3.10130	-3.23564	-3.23101	-3.31439	-3.22637	-3.12909	-3.13372	-2.90674	-2.80019	-2.62416
.0250	.02615	-2.71217	-2.47129	-4.06947	-2.73997	-2.75387	-2.57320	-2.41107	-2.30452	-2.16092	-1.97562
.0500	.03555	-1.83201	-1.84591	-1.95246	-1.95709	-1.90613	-1.91540	-1.91540	-1.88760	-1.87834	-1.83201
.1000	.04683	-1.39193	-1.41973	-1.52164	-1.52627	-1.50774	-1.48458	-1.44289	-1.40583	-1.34098	-1.25296
.1500	.05345	-1.13715	-1.14641	-1.26222	-1.25296	-1.22053	-1.21590	-1.16494	-1.13715	-1.09546	-1.04913
.2000	.05738	-.96112	-.97965	-1.04913	-1.04450	-1.01207	-1.01671	-1.00744	-.95648	-.92406	-.89163
.3000	.06001	-.73413	-.74803	-.77119	-.780[illegible]	-.74339	-.74339	-.73413	-.69707	-.68780	-.65532
.4000	.05803	-.56736	-.54883	-.57199	-.58[illegible]	-.[illegible]9346	-.54420	-.56736	-.53493	-.51177	-.50251
.5000	.05294	-.41912	-.42376	-.42376	-.42839	-.40523	-.40986	-.40059	-.35890	-.38206	-.36353
.6000	.04563	-.30331	-.29868	-.29405	-.29868	-.28478	-.28941	-.25699	-.26625	-.26625	-.26162
.7000	.03664	-.19213	-.19677	-.18287	-.18287	-.17360	-.17824	-.16434	-.15044	-.11802	-.14581
.8000	.02623	-.09022	-.09485	-.07632	-.04853	-.06706	-.06243	-.06243	-.05779	-.03000	-.03463
.9000	.01448	.02559	.00706	.03022	.03949	.04875	.05802	.04875	.05802	.06265	.07655
.9800	.00403	.12287	.10897	.11361	.13677	.15530	.14140	.14140	.13677	.11361	.16456
.0125	-.01894	.98913	.9[illegible]940	.96134	.95[illegible]	.95208	.94281	.94281	.93818	.90112	.94281
.0250	-.02615	.83626	.98430	.92428	.99840	1.00303	.99840	.99377	.95208	.96597	.92428
.0500	-.03555	.85406	.87332	.80847	.78994	.78068	.75751	.76678	.72509	.71119	.67413
.1000	-.04683	.60464	.61391	.53979	.50736	.49810	.48420	.51663	.40082	.42398	.39155
.1500	-.05345	.43788	.44714	.37302	.35912	.34986	.34523	.33133	.35912	.29427	.26184
.2000	-.05738	.31280	.32207	.31280	.27574	.24795	.28037	.24[illegible]31	.21552	.20162	.16920
.3000	-.06001	.16920	.17383	.16456	.15530	.15067	.13677	.13677	.13214	.06728	.08581
.4000	-.05803	.09508	.11361	.11824	.10897	.12287	.10897	.10434	.11824	.07655	.07191
.5000	-.05294	.05338	.05338	.08118	.08581	.07655	.08118	.07655	.06265	.06265	.04875
.6000	-.04563	.01633	.02096	.06265	.07191	.09044	.08581	.07191	.07191	.06728	.04875
.7000	-.03664	-.02073	-.01610	.07655	.06728	.06728	.08118	.09044	.08118	.06265	.06728
.8000	-.02623	.03243	.00243	.07191	.08581	.09[illegible]08	.09044	.09971	.09044	.09044	.08581
.9000	-.01448	.04875	.04412	.09508	.10897	.11824	.12287	.11361	.11824	.12750	.11361
.9800	-.00403	.11361	.10434	.15993	.14603	.15067	.15530	.16456	.15993	.17383	.14140
INTEGRATED c_n		.7559	.7669	.8334	.8036	.7850	.7788	.7647	.7282	.6946	.6590
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
$\alpha+\Delta\alpha$, (DEG)		9.100	9.100	9.100	9.100	9.100	9.100	9.100	9.100	9.100	9.100
RESULTANT c_l		.7464	.7572	.8229	.7935	.7751	.7690	.7551	.7190	.6858	.6507

x/c	z/c	VALUES OF c_p FOR y/s =									
		.55461	.63223	.67985	.72747	.77509	.82270	.87032	.91794	.96556	.98937
0.0000	0.00000	-.93795	-.04853	.33133	.42861	.54905	.61854	.68339	.72045	.80384	.81773
.0125	.01894	-2.40180	-1.66988	-1.41046	-1.24369	-1.14178	-1.00744	-.90090	-.85920	-.73413	-.58126
.0250	.02615	-2.04974	-1.62355	-1.29928	-1.37804	-1.12788	-.97038	-.86384	-.80825	-.66001	-.68317
.0500	.03555	-1.69767	-1.39656	-1.16031	-1.06766	-1.00744	-.94259	-.88700	-.[illegible]1288	-.68317	-.55346
.1000	.04683	-1.16958	-1.13252	-.99354	-.90553	-.82578	-.78972	-.74339	-.67854	-.56736	-.47934
.1500	.05345	-.97965	-.91016	-.84531	-.74803	-.73876	-.67854	-.64148	-.59979	-.44692	-.37743
.2000	.05738	-.83141	-.79898	-.70170	-.67391	-.64611	-.60442	-.56736	-.51177	-.25236	-.32647
.3000	.06001	-.64148	-.62295	-.53493	-.52104	-.48398	-.47008	-.42376	-.37743	-.28015	-.22919
.4000	.05803	-.49324	-.47471	-.43302	-.42839	-.38206	-.35890	-.37743	-.28015	-.21993	-.18287
.5000	.05294	-.37743	-.35890	-.34037	-.31258	-.26625	-.26162	-.22456	-.19677	-.11338	-.11338
.6000	.04563	-.25699	-.25699	-.23846	-.21993	-.18750	-.18750	-.13191	-.13191	-.09022	-.06243
.7000	.03664	-.12728	-.15507	-.13654	-.12265	-.10412	-.10412	-.08559	-.06706	-.02073	-.04853
.8000	.02623	-.03000	-.06706	-.05316	-.03926	-.02537	-.02073	-.00220	-.01147	.01169	-.04390
.9000	.01448	.05118	.05338	.06265	.07191	.09508	.08581	.08118	.08581	.08118	-.13191
.9800	.00403	.17383	.15067	.15993	.18309	.19236	.19699	.19236	.18309	.15993	-.13654
.0125	-.01894	.96597	.97987	.85943	.82700	.81773	.7667[illegible]	.70656	.69266	.69266	.61854
.0250	-.02615	.90575	.72972	.60928	.58611	.55369	.49347	.48420	.42861	.39618	.34523
.0500	-.03555	.63707	.48883	.36376	.32670	.29427	.23868	.21089	.16920	.15993	.11824
.1000	-.04683	.43324	.23405	.15067	.14140	.11824	.06728	.03949	.02096	-.00220	-.01147
.1500	-.05345	.22478	.13677	.07655	.04875	.08118	-.00684	-.03000	-.03000	-.03000	-.08096
.2000	-.05738	.15993	.07191	.01169	-.07632	-.00684	-.05316	-.06243	-.02073	-.12728	-.08559
.3000	-.06001	.09508	.01169	.01633	-.05316	-.02537	-.05316	-.11802	-.10412	-.08559	-.09022
.4000	-.05803	.03485	-.00220	.02559	-.03000	-.04853	-.03000	-.08096	-.07632	-.07169	-.09022
.5000	-.05294	.01169	.01169	.02559	-.02537	-.02537	-.01610	-.03926	-.04853	-.01610	-.07169
.6000	-.04563	.05338	.01169	.01633	.00243	.00706	-.00684	-.03000	-.03926	-.03000	-.06243
.7000	-.03664	.05338	.02096	.03022	.03485	.05338	.02559	.00706	-.00684	-.01610	-.02537
.8000	-.02623	.11361	.06265	.06265	.07191	.09508	.06265	.05338	.03022	.03022	.00706
.9000	-.01448	.11361	.09044	.10434	.10434	.12287	.12287	.10897	.06728	.12750	.03485
.9800	-.00403	.17846	.15993	.18773	.20162	.18309	.19236	.18773	.18309	.16456	.07655
INTEGRATED c_n		.6311	.5364	.4662	.4129	.3867	.3471	.2949	.2558	.1820	.1740
$\Delta\alpha$, (DEG)		0.000	-4.000	-6.000	-6.000	-6.000	-6.000	-6.000	-5.500	-4.500	-4.000
$\alpha+\Delta\alpha$, (DEG)		9.100	5.100	3.100	3.100	3.100	3.100	3.100	3.600	4.600	5.100
RESULTANT c_l		.6232	.5343	.4656	.4123	.3861	.3466	.2945	.2553	.1814	.1733

TABLE VI. Concluded

(c) Wing twist configuration VTW7. $\alpha = 8.50°$; $C_L = 0.596$; $C_{L,p} = 0.571$

x/c	z/c	VALUES OF c_p FOR y/s =									
		-.06122	.06122	.15604	.20366	.25128	.29889	.34651	.44175	.48937	.53699
0.0000	0.00000	-.73210	-1.13002	-1.43539	-1.33360	-1.25494	-1.22718	-1.10226	-.91718	-.85703	-.76912
.0125	.01894	-2.55047	-2.82346	-2.86048	-2.94376	-2.85172	-2.75406	-2.79107	-2.59674	-2.55973	-2.43943
.0250	.02615	-2.13405	-2.34226	-2.44868	-2.47644	-2.44868	-2.36540	-2.43017	-2.27286	-2.15719	-2.04152
.0500	.03555	-1.50017	-1.64360	-1.94435	-1.87495	-1.87957	-1.91196	-1.90271	-1.83793	-1.78704	-1.74539
.1000	.04683	-1.13002	-1.31047	-1.39838	-1.41226	-1.38912	-1.37062	-1.33823	-1.30584	-1.30121	-1.21793
.1500	.05345	-.89867	-1.07449	-1.17166	-1.16241	-1.14390	-1.13002	-1.10226	-1.07449	-1.06987	-1.03285
.2000	.05738	-.75061	-1.00046	-.99121	-.98196	-.96808	-.95420	-.94957	-.91255	-.91255	-.87554
.3000	.06001	-.54240	-.70434	-.73673	-.73673	-.72285	-.69972	-.70434	-.69509	-.68584	-.65807
.4000	.05803	-.36658	-.53315	-.55628	-.58404	-.54703	-.51464	-.53778	-.52389	-.53315	-.50076
.5000	.05294	-.29091	-.41285	-.41285	-.41748	-.39434	-.39897	-.39434	-.36658	-.38509	-.36658
.6000	.04563	-.14449	-.29255	-.30180	-.29255	-.28792	-.27404	-.28330	-.26479	-.26479	-.25553
.7000	.03664	-.04732	-.19076	-.19538	-.18613	-.17688	-.16762	-.16762	-.15374	-.14912	-.14449
.8000	.02623	.04984	-.09822	-.08434	-.06583	-.07046	-.06583	-.05658	-.04732	-.05658	-.04270
.9000	.01448	.17014	.01745	.02208	.03133	.04059	.04984	.05909	.05447	.05447	.07760
.9800	.00403	.28119	.11924	.11924	.14238	.14238	.14238	.15626	.15626	.10999	.17014
.0125	-.01894	.80402	.97059	.96134	.95671	.95208	.95208	.94746	.95208	.94746	.96597
.0250	-.02615	.87805	.99373	.87343	.95208	.94746	.94283	.93820	.91044	.90582	.88731
.0500	-.03555	.94283	.80865	.72074	.71611	.69761	.68372	.66984	.66059	.63746	.62358
.1000	-.04683	.66522	.54029	.44775	.43387	.43387	.43387	.42462	.34133	.37372	.42925
.1500	-.05345	.51253	.37372	.29507	.28581	.29044	.27656	.29969	.26269	.24417	.23029
.2000	-.05738	.39223	.25805	.24417	.21641	.21178	.21178	.19790	.17939	.15626	.15626
.3000	-.06001	.26730	.13312	.11924	.13312	.10074	.16551	.09611	.09611	.06372	.08223
.4000	-.05803	.20715	.08223	.08223	.06835	.08686	.07297	.07760	.04984	.05909	.05909
.5000	-.05294	.18865	.03133	.04521	.04521	.06372	.06372	.06835	.04059	.04059	.03596
.6000	-.04563	.14238	.00357	.04059	.04984	.06372	.06835	.05447	.07297	.05447	.04521
.7000	-.03664	.11924	-.02419	.05447	.04521	.05909	.06372	.07297	.06372	.04984	.06372
.8000	-.02623	.14701	-.00106	.05909	.06372	.08223	.08686	.09148	.08686	.08223	.08223
.9000	-.01448	.20253	.04059	.07760	.09148	.12387	.11462	.12387	.12387	.11462	.11462
.9800	-.00403	.27656	.10536	.13775	.13775	.15163	.15163	.16089	.15626	.16089	.13312
INTEGRATED c_n		.6761	.7084	.7431	.7389	.7328	.7242	.7173	.6813	.6723	.6444
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
$\alpha+\Delta\alpha$, (DEG)		8.500	8.500	8.500	8.500	8.500	8.500	8.500	8.500	8.500	8.500
RESULTANT c_l		.6687	.7006	.7349	.7307	.7248	.7163	.7094	.6738	.6649	.6373

x/c	z/c	VALUES OF c_p FOR y/s =									
		.58461	.63223	.67985	.72747	.77509	.82270	.87032	.91794	.96556	.98937
0.0000	0.00000	-.77837	-.63957	-.48225	-.36195	-.10747	.66984	.77626	.83641	.92432	.94283
.0125	.01894	-2.40241	-2.25435	-2.17570	-1.97211	-1.67599	-.95882	-.50151	-.67196	-.49151	-.36195
.0250	.02615	-2.01375	-1.98137	-1.92584	-1.77316	-1.45853	-1.11151	-.85703	-.71360	-.57942	-.54703
.0500	.03555	-1.68987	-1.63435	-1.60659	-1.41688	-1.20405	-.94957	-.82927	-.72748	-.58867	-.48688
.1000	.04683	-1.19479	-1.18091	-1.14853	-1.06987	-.93106	-.82464	-.71360	-.63494	-.51927	-.42210
.1500	.05345	-1.02360	-.98196	-.97733	-.88479	-.81539	-.72748	-.63494	-.57016	-.45449	-.38046
.2000	.05738	-.85240	-.82464	-.84778	-.74599	-.71360	-.64882	-.55628	-.49151	-.27867	-.33419
.3000	.06001	-.64882	-.63031	-.63494	-.57016	-.55166	-.50539	-.44061	-.39434	-.29718	-.25553
.4000	.05803	-.49151	-.47300	-.48225	-.44524	-.44061	-.39434	-.27867	-.28792	-.23703	-.20001
.5000	.05294	-.37121	-.33882	-.35270	-.33419	-.33419	-.29255	-.24628	-.21852	-.16762	-.14912
.6000	.04563	-.25553	-.23703	-.25091	-.22315	-.24628	-.20927	-.16762	-.16762	-.12135	-.11210
.7000	.03664	-.13986	-.14449	-.13524	-.12135	-.14912	-.12598	-.10285	-.08897	-.05658	-.07509
.8000	.02623	-.04270	-.05658	-.07046	-.03807	-.06121	-.04732	-.02419	-.02419	-.00568	-.02882
.9000	.01448	.05909	.06835	.05447	.05447	.01745	.05447	.07760	.07297	.04984	.00820
.9800	.00403	.17014	.17939	.15626	.17014	.12387	.16551	.17939	.17014	.14701	.03596
.0125	-.01894	.98910	.97522	.99835	1.00298	.98910	.70686	.65596	.58193	.50328	.44775
.0250	-.02615	.85955	.85029	.81328	.80402	.75776	.43387	.39223	.30895	.23954	.16551
.0500	-.03555	.60044	.59119	.54492	.52178	.45701	.20715	.15626	.08686	.02671	-.01956
.1000	-.04683	.35984	.33671	.29507	.27193	.19790	.04521	-.00568	-.05658	-.10747	-.10747
.1500	-.05345	.22104	.19790	.16089	.14701	.07297	-.03344	-.07046	-.11210	-.13061	-.13524
.2000	-.05738	.15163	.12387	.10999	.07297	.01283	-.06583	-.11210	-.13524	-.14449	-.14449
.3000	-.06001	.07297	.05909	-.00568	.00820	-.02419	-.08897	-.11210	-.12598	-.12598	-.13061
.4000	-.05803	.03133	.03133	-.03344	.00357	-.04732	-.11210	-.09959	-.11210	-.11210	-.08434
.5000	-.05294	.03133	.03133	-.05658	-.00106	-.03807	-.06583	-.06583	-.07046	-.07046	-.12135
.6000	-.04563	.04059	.03133	-.01031	-.00106	-.02882	-.04732	-.04270	-.06121	-.06121	-.07509
.7000	-.03664	.04984	.04521	.03133	.02671	.00357	-.02419	-.01031	-.03344	-.03807	-.04732
.8000	-.02623	.08686	.07297	.06372	.04984	.03596	.00820	.02671	.00820	.01283	-.01956
.9000	-.01448	.10999	.10536	.08223	.08223	.07297	.07760	.09148	.07297	.07760	.02671
.9800	-.00403	.14238	.15626	.13775	.15163	.14238	.16089	.17477	.16551	.14238	.06835
INTEGRATED c_n		.6269	.6003	.5658	.5218	.4669	.3361	.2686	.2189	.1467	.1189
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	-6.000	-6.000	-6.000	-6.000	-6.000
$\alpha+\Delta\alpha$, (DEG)		8.500	8.500	8.500	8.500	8.500	2.500	2.500	2.500	2.500	2.500
RESULTANT c_l		.6200	.5937	.5596	.5160	.4618	.3358	.2683	.2187	.1466	.1188

TABLE VII. PRESSURE DISTRIBUTION MEASUREMENTS FOR GROUP III VTW CONFIGURATIONS

(a) Wing twist configuration VTW7S_0. $\alpha = 11.60°$; $C_L = 0.591$; $C_{L,p} = 0.555$

x/c	z/c	VALUES OF c_p FOR y/s =									
		-.06122	.06122	.15604	.20366	.25128	.29889	.34651	.44175	.48937	.53699
0.0000	0.00000	-1.91706	-2.24605	-2.57967	-2.37579	-2.16264	-2.03290	-1.70854	-1.03203	-.65670	-.30454
.0125	.01894	-3.46934	-3.65005	-3.67322	-3.63615	-3.46470	-3.26082	-3.13108	-2.45920	-2.04217	-1.58343
.0250	.02615	-3.10791	-3.07084	-2.61211	-3.22839	-3.03377	-2.84379	-2.76039	-2.06997	-1.71318	-1.31932
.0500	.03555	-1.99583	-2.02827	-2.19508	-2.17191	-2.01437	-1.94486	-1.85682	-1.45613	-1.21274	-.92082
.1000	.04683	-1.46296	-1.50003	-1.60660	-1.59270	-1.52783	-1.47686	-1.36565	-1.04593	-.73084	-.31844
.1500	.05345	-1.18031	-1.20347	-1.30541	-1.29151	-1.23128	-1.17567	-1.08300	-.78181	-.42038	.14029
.2000	.05738	-.98569	-.93472	-1.06910	-1.06446	-1.01813	-.97179	-.93472	-.61500	-.21650	.20053
.3000	.06001	-.73547	-.75864	-.79571	-.78181	-.74937	-.70304	-.66133	-.39258	-.37868	.38588
.4000	.05803	-.56866	-.55476	-.58256	-.60573	-.55476	-.50842	-.50842	-.36941	-.45745	-.35551
.5000	.05294	-.42502	-.42965	-.42038	-.43428	-.39772	-.39258	-.37868	-.37868	-.39258	-.37868
.6000	.04563	-.28601	-.29527	-.31844	-.29991	-.29064	-.28137	-.28601	-.50379	-.44819	-.43428
.7000	.03664	-.17943	-.19333	-.19797	-.17943	-.18407	-.17480	-.19333	-.43892	-.41575	-.45745
.8000	.02623	-.07749	-.09139	-.06359	-.04047	-.07749	-.07286	-.11919	-.42502	-.51306	-.48062
.9000	.01448	.02908	.02445	.01982	.01518	.02445	.01518	-.04506	-.44819	-.50842	-.44355
.9800	.00403	.14029	.10785	.09395	.12176	.13102	.09395	.03372	-.33234	-.38331	-.36478
.0125	-.01894	.99289	.93265	.98825	.96972	.95582	.95582	.93728	.93728	.90948	.96972
.0250	-.02615	.84461	.96045	.97898	.96972	.96977	.97898	.99752	.95582	.92801	.87704
.0500	-.03555	.94192	.93265	.87241	.84461	.83997	.80754	.77510	.73340	.68706	.63146
.1000	-.04683	.68704	.70096	.59439	.56659	.56659	.56195	.54342	.40441	.41831	.37197
.1500	-.05345	.52025	.52952	.43221	.41368	.40441	.38124	.39051	.33954	.28393	.25150
.2000	-.05738	.38124	.39051	.36271	.29320	.30710	.24687	.26308	.23760	.18663	.17273
.3000	-.06001	.22370	.22370	.21443	.21443	.19589	.17736	.13566	.13566	.04298	.08932
.4000	-.05803	.13102	.14029	.14492	.12176	.14492	.12176	.10322	.08469	.04762	.03372
.5000	-.05294	.09395	.08932	.10785	.09395	.09859	.08469	.07542	.01982	.01055	-.00335
.6000	-.04563	.02908	.04298	.08932	.07547	.10322	.08469	.05225	.02908	.00591	-.01725
.7000	-.03664	-.00799	-.00335	.08005	.07079	.06152	.06152	.05688	.00128	-.04969	-.05432
.8000	-.02623	.01982	.01055	.07079	.06615	.08005	.06152	.04762	-.03116	-.05432	-.08676
.9000	-.01448	.06152	.04298	.08932	.08469	.11712	.07542	.04762	-.06359	-.12383	-.14236
.9800	-.00403	.11249	.10322	.14956	.12639	.14029	.12176	.05225	-.17480	-.25820	-.23504
INTEGRATED c_n		.8132	.8245	.8630	.8498	.8262	.7784	.7504	.6926	.5826	.3713
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
$\alpha+\Delta\alpha$, (DEG)		11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600	11.600
RESULTANT c_l		.7766	.8077	.8454	.8324	.8094	.7626	.7351	.6784	.5707	.3637

x/c	z/c	VALUES OF c_p FOR y/s =									
		.58461	.63223	.67985	.72747	.77509	.82270	.87032	.91794	.96556	.98937
0.0000	0.00000	-.16090	-.06359	-.10066	-.23504	-.22577	.49708	.55732	.62693	.75657	.82144
.0125	.01894	-1.34712	-1.27761	-1.40277	-1.58343	-1.62514	-1.12007	-1.05056	-.95789	-.76791	-.58256
.0250	.02615	-1.11543	-1.00423	-1.12470	-1.32395	-1.36102	-1.24054	-1.07373	-.94862	-.77718	-.80498
.0500	.03555	-.76328	-.77718	-.88838	-1.05520	-1.10617	-.97642	-.93935	-.96985	-.71230	-.59183
.1000	.04683	-.14236	-.13310	-.30918	-.59183	-.72157	-.79108	-.76328	-.68914	-.59183	-.47599
.1500	.05345	.26077	.27930	.12639	-.34624	-.60110	-.67987	-.64280	-.60573	-.48989	-.40185
.2000	.05738	.37661	.36734	.29320	-.15626	-.48959	-.57329	-.55476	-.49916	-.29064	-.34161
.3000	.06001	.63146	.49245	.60829	-.33234	-.35088	-.43892	-.47502	-.38331	-.30918	-.25820
.4000	.05803	-.37868	-.43892	-.43892	-.53159	-.27674	-.36478	-.32771	-.29064	-.24894	-.19797
.5000	.05294	-.40648	-.44819	-.47599	-.45282	-.29527	-.29527	-.24430	-.21650	-.16090	-.14236
.6000	.04563	-.46209	-.49452	-.51306	-.48989	-.32308	-.23967	-.16090	-.16553	-.11919	-.11456
.7000	.03664	-.51306	-.53623	-.53159	-.50379	-.33698	-.20260	-.12846	-.09603	-.05432	-.08213
.8000	.02623	-.50379	-.58256	-.59646	-.53159	-.29527	-.14700	-.05437	-.07652	-.02189	-.04042
.9000	.01448	-.46709	-.50842	-.60110	-.47599	-.23504	-.03116	.05225	.06152	.03372	-.04042
.9800	.00403	-.34161	-.43892	-.53159	-.35088	-.10993	.10322	.15419	.15883	.13102	-.05896
.0125	-.01894	1.00215	.99289	.99752	.98825	.97898	.82607	.79364	.74267	.67316	.60366
.0250	-.02615	.82607	.81217	.82607	.83534	.92607	.56195	.55269	.48318	.39978	.32564
.0500	-.03555	.59902	.58976	.57122	.56659	.54805	.33027	.28393	.22833	.15863	.09859
.1000	-.04683	.36734	.33490	.31637	.31437	.27467	.13566	.09395	.03835	.00128	-.04506
.1500	-.05345	.22833	.20053	.19589	.19199	.13102	.03372	.00128	-.04042	-.06822	-.08676
.2000	-.05738	.17273	.12639	.12639	.10322	.05225	-.01725	-.04506	-.07286	-.09139	-.10066
.3000	-.06001	.07542	.04298	.01982	.00128	-.03579	-.04969	-.07286	-.09139	-.10066	-.10529
.4000	-.05803	.00591	-.00799	-.01262	-.00799	-.05432	-.10529	-.08676	-.09603	-.09603	-.09139
.5000	-.05294	-.02652	-.01725	-.03116	-.03579	-.06822	-.13773	-.06359	-.06822	-.06822	-.09603
.6000	-.04563	-.02652	-.04042	-.04969	-.04506	-.05896	-.08676	-.05432	-.06359	-.05896	-.07749
.7000	-.03664	-.07286	-.07286	-.08213	-.05437	-.03579	-.05896	-.03579	-.04042	-.04506	-.06359
.8000	-.02623	-.06822	-.11919	-.09603	-.05896	-.04969	-.04042	-.00335	-.00799	-.01725	-.03115
.9000	-.01448	-.14700	-.17017	-.15626	-.10066	-.04042	.00128	.03835	.03835	.05225	.00591
.9800	-.00403	-.25820	-.28601	-.32308	-.17480	-.04969	.09395	.14029	.14956	.14492	.04298
INTEGRATED c_n		.3101	.3327	.3638	.5317	.4410	.3543	.3132	.2645	.1937	.1637
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	-6.000	-6.000	-6.000	-6.000	-6.000
$\alpha+\Delta\alpha$, (DEG)		11.600	11.600	11.600	11.600	11.600	5.600	5.600	5.600	5.600	5.600
RESULTANT c_l		.3038	.3259	.3564	.5208	.4320	.3526	.3118	.2632	.1927	.1629

TABLE VII. Continued

(b) Wing twist configuration VTW7S$_1$. $\alpha = 11.40°$; $C_L = 0.607$; $C_{L,p} = 0.575$

x/c	z/c	VALUES OF c_p FOR y/s =									
		-.06122	.06122	.15604	.20366	.25128	.29889	.34651	.44175	.48937	.53699
0.0000	0.00000	-2.18358	-2.45417	-2.76675	-2.58013	-2.40285	-2.32354	-2.06695	-1.52111	-1.14321	.94685
.0125	.01894	-3.69981	-3.83044	-3.84444	-3.80712	-3.65782	-3.50853	-3.43389	-3.01401	-2.66411	-.60204
.0250	.02615	-3.24261	-3.14464	-3.27527	-3.42922	-3.25661	-3.12131	-3.00468	-2.57547	-2.23957	-.89129
.0500	.03555	-2.12293	-2.11827	-2.31421	-2.27222	-2.16959	-2.09494	-2.05295	-1.79636	-1.66573	-1.15721
.1000	.04683	-1.54443	-1.54910	-1.67973	-1.67040	-1.62374	-1.58176	-1.53510	-1.39048	-1.24119	-1.00326
.1500	.05345	-1.25052	-1.24119	-1.33916	-1.33449	-1.30650	-1.27384	-1.25052	-1.12922	-1.01259	-.90528
.2000	.05738	-1.05457	-1.02192	-1.11522	-1.10589	-1.06857	-1.05457	-1.03591	-.93794	-.87263	-.83997
.3000	.06001	-.79332	-.77932	-.80731	-.80731	-.77932	-.78398	-.75599	-.70934	-.70467	-.69534
.4000	.05803	-.61137	-.57871	-.59737	-.61137	-.59271	-.56938	-.56938	-.53672	-.56938	-.51340
.5000	.05294	-.42942	-.43409	-.43875	-.42942	-.42475	-.41542	-.41076	-.41076	-.44342	-.39210
.6000	.04563	-.33145	-.30812	-.32212	-.30346	-.28946	-.29413	-.30346	-.29413	-.33611	-.28013
.7000	.03664	-.21482	-.19149	-.20082	-.18216	-.17283	-.17283	-.17749	-.18682	-.23348	-.17749
.8000	.02623	-.10751	-.08885	-.08885	-.09818	-.05619	-.06086	-.06086	-.08885	-.14017	-.09352
.9000	.01448	.00446	.00912	.02778	.03245	.05111	.04644	.04644	.02778	-.04686	-.00021
.9800	.00403	.08377	.09776	.11176	.11642	.14908	.13975	.12575	.13508	.04178	.09310
.0125	-.01894	.90486	.89553	.99817	.99817	.98417	.97484	.96085	.94685	.96085	.54563
.0250	-.02615	.97951	.96551	.95618	.97484	.97951	.98417	.99350	.97951	.93752	.34036
.0500	-.03555	.90953	.94685	.83488	.84421	.83488	.80689	.78823	.74624	.68093	.17241
.1000	-.04683	.67160	.70892	.57829	.57362	.56896	.54563	.50831	.40547	.41034	.08843
.1500	-.05345	.49898	.52697	.42900	.42433	.41034	.38235	.37302	.28904	.30770	-.00488
.2000	-.05738	.35902	.39168	.32636	.32170	.31237	.31237	.27971	.21906	.13975	-.05153
.3000	-.06001	.20040	.23306	.20040	.20040	.19107	.17241	.15841	.11176	.00912	-.12617
.4000	-.05803	.10709	.13975	.14908	.13508	.15375	.13042	.11642	.07443	.00446	-.15417
.5000	-.05294	.05111	.08377	.10709	.10243	.11176	.09776	.09310	.05111	.00912	-.15883
.6000	-.04563	.00446	.04178	.06510	.07910	.09310	.09310	.06977	.06044	.00912	-.15883
.7000	-.03664	-.03753	.00446	.04178	.06977	.07910	.08377	.06977	.05577	.01845	-.14950
.8000	-.02623	-.02354	.00446	.05111	.07443	.09310	.09310	.08377	.06977	.03245	-.11218
.9000	-.01448	.01379	.04178	.07910	.09310	.11642	.10709	.11176	.10709	.06510	-.03753
.9800	-.00403	.06510	.09310	.08843	.11176	.14908	.14441	.14441	.14441	.11176	.06977
INTEGRATED c_n		.8332	.8495	.8774	.8808	.8583	.8355	.8118	.7312	.6816	.3708
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-15.000
$\alpha+\Delta\alpha$, (DEG)		11.400	11.400	11.400	11.400	11.400	11.400	11.400	11.400	11.400	-3.600
RESULTANT c_l		.8168	.8327	.8601	.8634	.8414	.8191	.7958	.7168	.6682	.3701

x/c	z/c	VALUES OF c_p FOR y/s =									
		.58461	.63223	.67985	.72747	.77509	.82270	.87032	.91794	.96556	.98937
0.0000	0.00000	.91886	.94219	.99817	-.58338	-.51340	.32636	.41967	.50831	.67160	.76490
.0125	.01894	-.57405	-.49007	-.39210	-2.04829	-1.97364	-1.36715	-1.24119	-1.09656	-.87263	-.67202
.0250	.02615	-.71867	-.66269	-.74666	-1.76370	-1.69640	-1.31583	-1.19920	-1.06857	-.89129	-.73733
.0500	.03555	-.76999	-.72334	-1.10123	-1.44646	-1.36715	-1.14788	-1.04991	-.96127	-.79332	-.64869
.1000	.04683	-.75599	-.71400	-.94727	-.96593	-.97060	-.93328	-.84463	-.76066	-.63936	-.51340
.1500	.05345	-.71400	-.67668	-.89129	-.80731	-.80265	-.78865	-.71400	-.65336	-.53672	-.45275
.2000	.05738	-.66735	-.62070	-.80731	-.67202	-.68135	-.64869	-.58804	-.53672	-.31745	-.36411
.3000	.06001	-.55538	-.51806	-.60204	-.50873	-.50873	-.50407	-.45741	-.40143	-.32212	-.26613
.4000	.05803	-.42942	-.41942	-.42942	-.40609	-.39676	-.37810	-.35944	-.29879	-.24281	-.21482
.5000	.05294	-.33611	-.30346	-.30346	-.30346	-.29413	-.27546	-.24747	-.21482	-.17283	-.16350
.6000	.04563	-.25214	-.22415	-.21482	-.20082	-.19615	-.18682	-.16350	-.15883	-.12151	-.12617
.7000	.03664	-.18216	-.14484	-.12151	-.11218	-.12151	-.10285	-.09352	-.07019	-.07019	-.07952
.8000	.02623	-.09352	-.07486	-.06552	-.03287	-.02354	-.03287	-.00954	-.01421	-.01887	-.07019
.9000	.01448	.01845	.03245	.02778	.05111	.06044	.06510	.08377	.07910	.02778	-.08419
.9800	.00403	.13975	.16308	.12575	.15841	.14908	.18174	.18174	.17241	.13508	-.11684
.0125	-.01894	.47565	.46632	.41034	.98417	.98417	.85354	.83488	.78356	.69492	.62961
.0250	-.02615	.22373	.18640	.23306	.85354	.85354	.60628	.57362	.52231	.43833	.34502
.0500	-.03555	.04178	.00912	.09310	.55963	.55963	.34502	.30770	.26105	.18174	.12109
.1000	-.04683	-.08419	-.08419	-.00488	.27038	.26571	.13508	.10709	.06977	.00446	-.02820
.1500	-.05345	-.09818	-.11684	-.07486	.13042	.12109	.03245	.01845	-.01887	-.05619	-.07486
.2000	-.05738	-.11684	-.12151	-.08885	.05111	.05111	-.00954	-.02820	-.06552	-.07486	-.10285
.3000	-.06001	-.11218	-.11684	-.20082	-.01421	-.01887	-.05153	-.05153	-.07952	-.09352	-.10285
.4000	-.05803	-.11218	-.10751	-.23814	-.02820	-.02820	-.06552	-.06552	-.09352	-.09818	-.11218
.5000	-.05294	-.09352	-.11218	-.21015	-.01887	-.01887	-.06552	-.05153	-.05619	-.07952	-.10751
.6000	-.04563	-.08419	-.07486	-.14950	-.00954	-.00954	-.04220	-.03287	-.04686	-.06086	-.07952
.7000	-.03664	-.06086	-.04686	-.09352	.02312	.00912	-.01421	-.00954	-.02820	-.03287	-.06086
.8000	-.02623	-.03753	-.00021	-.03287	.05111	.03711	.01379	.02778	.00912	-.00488	-.03753
.9000	-.01448	.03245	.06977	.01845	.08377	.06510	.06510	.06977	.06044	.03245	-.00488
.9800	-.00403	.13042	.13375	.12109	.13975	.15375	.16774	.17707	.16308	.13042	.02778
INTEGRATED c_n		.3026	.2774	.2952	.4837	.4708	.3869	.3495	.2919	.2135	.1845
$\Delta\alpha$, (DEG)		-15.000	-15.000	-15.000	0.000	0.000	-6.000	-6.000	-6.000	-6.000	-6.000
$\alpha+\Delta\alpha$, (DEG)		-3.600	-3.600	-3.600	11.400	11.400	5.400	5.400	5.400	5.400	5.400
RESULTANT c_l		.3020	.2769	.2946	.4741	.4615	.3852	.3479	.2906	.2125	.1837

TABLE VII. Continued

(c) Wing twist configuration VTW7S$_3$. $\alpha = 11.90°$; $C_L = 0.583$; $C_{L,p} = 0.564$

x/c	z/c	VALUES OF c_p FOR y/s =									
		-.06122	.06122	.15604	.20366	.25128	.29889	.34651	.44175	.48937	.53699
0.0000	0.00000	-2.20565	-2.56889	-2.88090	-2.66066	-2.51301	-2.39659	-2.12649	-1.53040	-1.12525	.94241
.0125	.01894	-3.70517	-3.92405	-3.95665	-3.89145	-3.74709	-3.57478	-3.48164	-3.03458	-2.64340	-.60834
.0250	.02615	-3.22086	-3.10443	-3.18360	-3.53287	-3.35591	-3.18826	-3.02992	-2.62943	-2.22894	-.88775
.0500	.03555	-2.11717	-2.14977	-2.36399	-2.31276	-2.22894	-2.13114	-2.07992	-1.81447	-1.66080	-1.14854
.1000	.04683	-1.53040	-1.56766	-1.69805	-1.68408	-1.66545	-1.60491	-1.54903	-1.39535	-1.23702	-1.00418
.1500	.05345	-1.23236	-1.25565	-1.36276	-1.35344	-1.33016	-1.29290	-1.25565	-1.12991	-1.01349	-.89707
.2000	.05738	-1.04143	-1.06006	-1.12991	-1.12525	-1.09266	-1.07403	-1.04143	-.95295	-.87844	-.84118
.3000	.06001	-.77599	-.79462	-.80859	-.82256	-.79927	-.80393	-.76202	-.71079	-.70148	-.70148
.4000	.05803	-.58506	-.58040	-.59903	-.61300	-.60368	-.59437	-.57574	-.52917	-.57108	-.52452
.5000	.05294	-.44535	-.43603	-.43138	-.43138	-.43138	-.41741	-.41275	-.41741	-.44069	-.39878
.6000	.04563	-.31496	-.31030	-.29633	-.30564	-.30098	-.30098	-.27770	-.29633	-.33358	-.29167
.7000	.03664	-.20319	-.19853	-.17991	-.17991	-.17991	-.17525	-.17059	-.19388	-.24510	-.19853
.8000	.02623	-.09608	-.09142	-.06814	-.09608	-.06348	-.06348	-.06348	-.08677	-.14731	-.10540
.9000	.01448	.01103	.00637	.02965	.03897	.04363	.04828	.05294	.02965	-.05417	-.01226
.9800	.00403	.09951	.09019	.10882	.11814	.13211	.12745	.12745	.12279	.04828	.08554
.0125	-.01894	.91446	.87721	.99363	1.00295	.98897	.98432	.96569	.94706	.95638	.53260
.0250	-.02615	.98897	.97500	.96103	.97035	.97966	.98897	.98432	.97966	.93775	.32304
.0500	-.03555	.92843	.94706	.86324	.85392	.83995	.82598	.80736	.74216	.68162	.15073
.1000	-.04683	.69093	.70956	.60711	.57451	.56520	.53726	.52329	.40221	.40686	.08088
.1500	-.05345	.51863	.53260	.44877	.43480	.41152	.39289	.37892	.30441	.29510	-.01691
.2000	-.05738	.37892	.40221	.34632	.33235	.32304	.33235	.28113	.22059	.13676	-.06814
.3000	-.06001	.22059	.23456	.21593	.18799	.18333	.16470	.16936	.10416	.01103	-.12868
.4000	-.05803	.12745	.14608	.15073	.13676	.13676	.12745	.11348	.04363	.00171	-.17991
.5000	-.05294	.06691	.08088	.10882	.10416	.09951	.09485	.08554	.02965	.00171	-.17525
.6000	-.04563	.02965	.04363	.07622	.07157	.08088	.08088	.07157	.04363	.00637	-.17059
.7000	-.03664	-.02157	-.00294	.05760	.06691	.07157	.08088	.07157	.04363	.01103	-.17059
.8000	-.02623	-.00760	-.00294	.05294	.07622	.07622	.08088	.08088	.06691	.03431	-.12402
.9000	-.01448	.02965	.03431	.07622	.09485	.09019	.10416	.10416	.09019	.06225	-.04951
.9800	-.00403	.08088	.09485	.09951	.10882	.12745	.14142	.14142	.13676	.11348	.05294
INTEGRATED c_n		.8413	.8603	.8864	.8907	.8679	.8482	.8153	.7264	.6810	.3450
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-15.000
$\alpha+\Delta\alpha$, (DEG)		11.900	11.900	11.900	11.900	11.900	11.900	11.900	11.900	11.900	-3.100
RESULTANT c_l		.8232	.8418	.8673	.8716	.8493	.8300	.7978	.7108	.6663	.3445

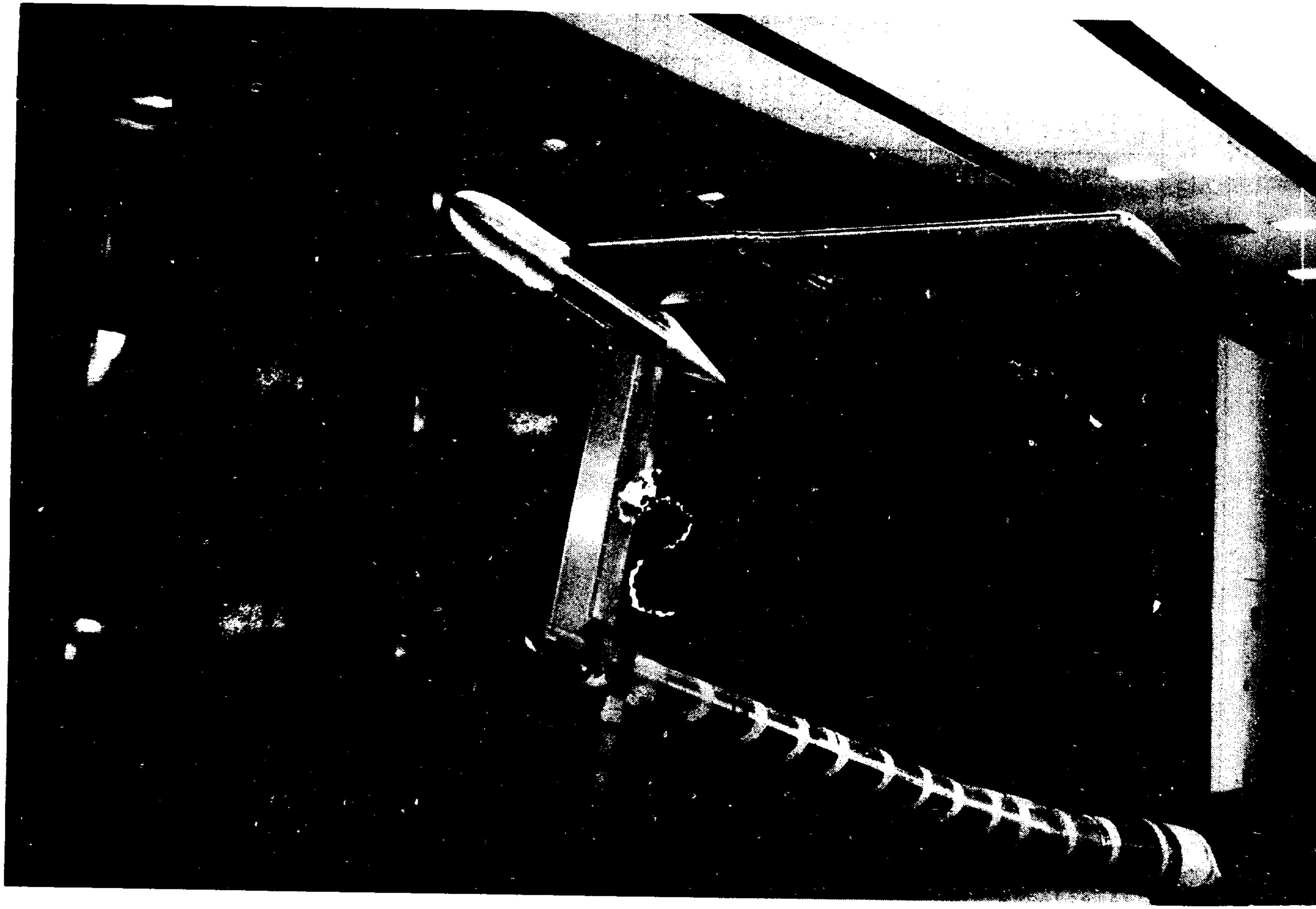
x/c	z/c	VALUES OF c_p FOR y/s =									
		.58461	.63223	.67985	.72747	.77509	.82270	.87032	.91794	.96556	.98937
0.0000	0.00000	.93775	.97035	.99829	.09485	.04363	.40686	.47672	.54657	.70025	.78407
.0125	.01894	-.53849	-.42672	-.46398	-1.53506	-1.63286	-1.26962	-1.18114	-1.05074	-.83187	-.64559
.0250	.02615	-.66422	-.60834	-.69216	-1.43261	-1.46055	-1.24168	-1.12525	-1.03677	-.86447	-.68751
.0500	.03555	-.73873	-.67819	-.79927	-1.19045	-1.20908	-1.08800	-1.01349	-.93898	-.78064	-.63628
.1000	.04683	-.72942	-.67819	-.77133	-.90638	-.94364	-.88775	-.81790	-.75736	-.62231	-.51055
.1500	.05345	-.69682	-.63628	-.72942	-.75270	-.74805	-.74339	-.69682	-.63628	-.52452	-.43603
.2000	.05738	-.65025	-.59437	-.67819	-.64559	-.64559	-.61765	-.58508	-.54314	-.31030	-.36152
.3000	.06001	-.54780	-.49657	-.54314	-.50123	-.48260	-.48260	-.45466	-.39878	-.31961	-.26373
.4000	.05803	-.42672	-.39878	-.41275	-.38947	-.38015	-.36152	-.31961	-.29633	-.24045	-.20319
.5000	.05294	-.33824	-.30098	-.29167	-.28701	-.26839	-.26373	-.24510	-.21250	-.17059	-.14265
.6000	.04563	-.24976	-.22182	-.21250	-.20785	-.19388	-.18456	-.17525	-.15662	-.11471	-.10540
.7000	.03664	-.17059	-.14731	-.11937	-.11471	-.10540	-.09142	-.08677	-.07280	-.06348	-.07280
.8000	.02623	-.08677	-.07745	-.07745	-.03554	-.00760	-.02157	-.01226	-.01691	-.01691	-.05417
.9000	.01448	.01568	.02965	.02034	.05294	.08088	.06691	.07622	.08088	.03897	-.05883
.9800	.00403	.13676	.16005	.11348	.14608	.16470	.18333	.17868	.17402	.14142	-.07745
.0125	-.01894	.46275	.43015	.36961	.92378	.93775	.83064	.80270	.75613	.67696	.60711
.0250	-.02615	.20662	.15539	.16936	.69093	.70956	.56985	.53726	.50000	.42083	.33701
.0500	-.03555	.02965	-.02623	.02965	.40221	.42549	.30907	.28113	.22990	.16936	.10416
.1000	-.04683	-.08211	-.11005	-.06348	.14608	.16470	.11348	.07157	.04363	-.00294	-.03089
.1500	-.05345	-.10540	-.12868	-.11005	.02500	.05294	.00171	-.00760	-.04486	-.06814	-.07745
.2000	-.05738	-.12868	-.13799	-.12868	-.03554	-.00294	-.03089	-.06348	-.07745	-.10540	-.10540
.3000	-.06001	-.14265	-.11937	-.14265	-.09608	-.05883	-.07280	-.07745	-.09608	-.11005	-.11471
.4000	-.05803	-.11937	-.11005	-.13799	-.08677	-.05883	-.01226	-.08211	-.08211	-.10074	-.11005
.5000	-.05294	-.09608	-.10540	-.14731	-.07280	-.04020	-.07280	-.05883	-.09142	-.07745	-.08677
.6000	-.04563	-.08211	-.06814	-.09142	-.04486	-.01691	-.04486	-.04486	-.05417	-.06348	-.07745
.7000	-.03664	-.05883	-.02623	-.04486	-.01226	-.01226	-.01691	-.01691	-.03554	-.04020	-.05883
.8000	-.02623	-.03089	.02500	-.00760	.01568	.03431	.01568	.02034	.00171	-.01691	-.03554
.9000	-.01448	.05294	.07622	.04828	.07157	.06225	.08554	.08088	.06225	.04828	-.00294
.9800	-.00403	.13211	.16005	.14142	.15073	.16005	.16470	.16470	.15073	.12745	.04363
INTEGRATED c_n		.2756	.2516	.2668	.3884	.4004	.3573	.3189	.2709	.1955	.1672
$\Delta\alpha$, (DEG)		-15.000	-15.000	-11.250	-3.750	-3.000	-6.000	-6.000	-6.000	-6.000	-6.000
$\alpha+\Delta\alpha$, (DEG)		-3.100	-3.100	.650	8.150	8.900	5.900	5.900	5.900	5.900	5.900
RESULTANT c_l		.2752	.2513	.2667	.3845	.3956	.3554	.3173	.2694	.1944	.1663

TABLE VII. Concluded

(d) Wing twist configuration VTW7S$_3$P. $\alpha = 12.20°$; $C_L = 0.606$; $C_{L,p} = 0.591$

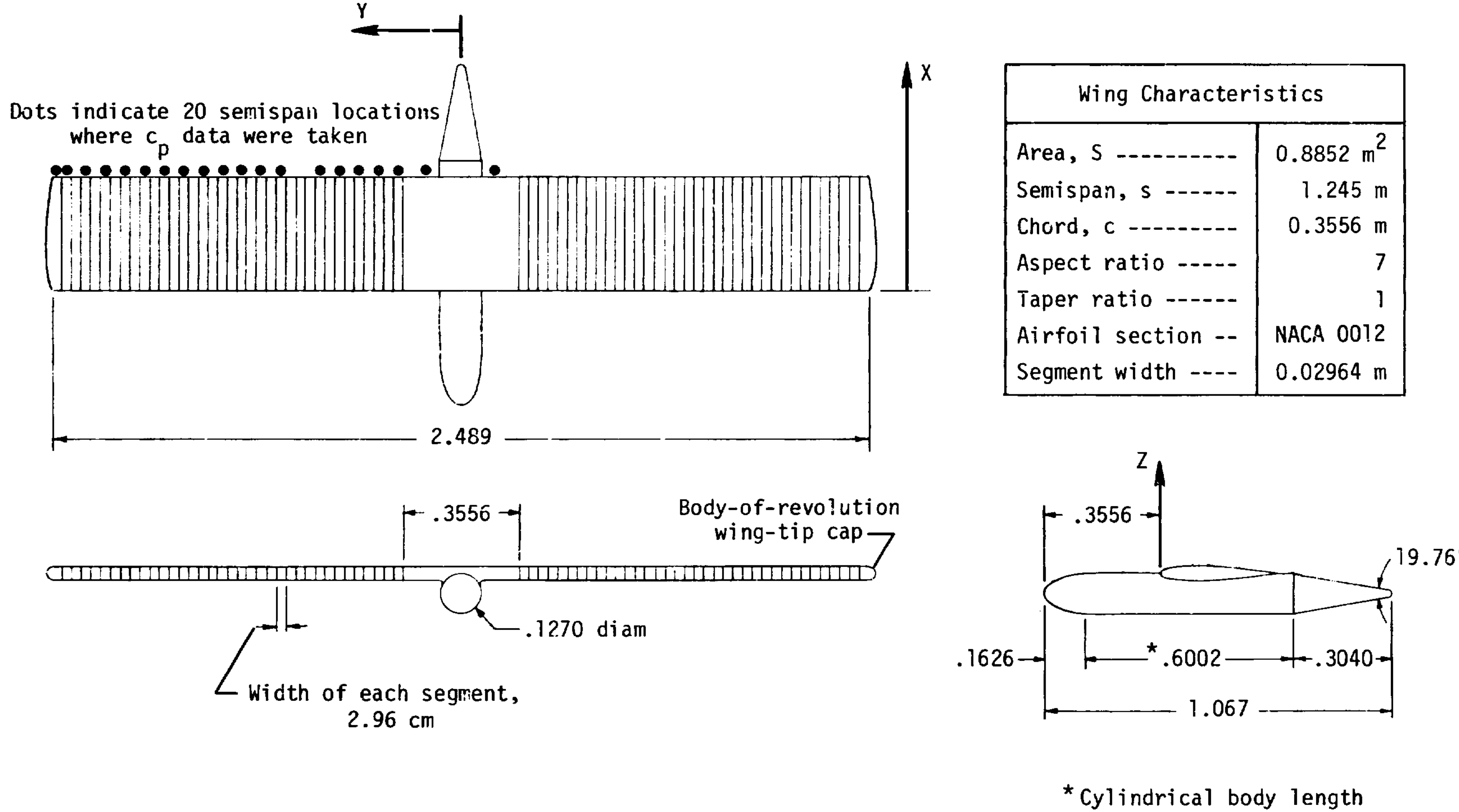
x/c	z/c	VALUES OF c_p FOR y/s =									
		-.06122	.06122	.15604	.20366	.25128	.29889	.34651	.44175	.48937	.53699
0.0000	0.00000	-2.54153	-2.90058	-3.17570	-3.05912	-2.85861	-2.76069	-2.42962	-1.78613	-1.34315	.89508
.0125	.01894	-3.97773	-4.15492	-4.22486	-4.11762	-3.97773	-3.77722	-3.65598	-3.17103	-2.76535	-.66702
.0250	.02615	-3.24098	-5.02223	-5.97814	-4.45335	-3.61868	-2.88659	-2.91923	-2.52754	-2.36434	-1.41309
.0500	.03555	-2.28040	-2.24776	-2.46692	-2.41563	-2.32237	-2.24776	-2.18248	-1.88405	-1.59028	-1.21725
.1000	.04683	-1.66489	-1.62759	-1.75349	-1.73950	-1.70686	-1.65557	-1.58096	-1.42242	-1.23590	-1.02140
.1500	.05345	-1.34781	-1.29185	-1.41309	-1.38978	-1.35714	-1.31983	-1.23590	-1.13331	-1.01208	-.92814
.2000	.05738	-1.14730	-1.08202	-1.16129	-1.14730	-1.11000	-1.09135	-1.06337	-.94213	-.86752	-.89550
.3000	.06001	-.87219	-.80690	-.84421	-.83488	-.80690	-.77893	-.75561	-.69033	-.66702	-.69033
.4000	.05803	-.68567	-.60173	-.62039	-.62971	-.59241	-.54578	-.56443	-.53179	-.52713	-.50381
.5000	.05294	-.52713	-.44786	-.45252	-.45252	-.42920	-.41055	-.41055	-.34527	-.39656	-.35926
.6000	.04563	-.39656	-.31263	-.32196	-.30330	-.30330	-.29864	-.25667	-.25667	-.27999	-.23802
.7000	.03664	-.27533	-.20538	-.21004	-.19139	-.18673	-.17274	-.15875	-.15875	-.13544	-.10280
.8000	.02623	-.17274	-.09813	-.09347	-.04218	-.07948	-.06549	-.05150	-.06083	-.07482	.05108
.9000	.01448	-.06549	-.00021	.00912	.01844	.03243	.04176	.04176	.03709	-.00954	.18165
.9800	.00403	.02310	.06973	.07440	.11170	.12103	.12103	.13035	.13502	.09305	.30288
.0125	-.01894	.80648	.81581	.95104	.96969	.98834	1.00233	.98368	.96036	.90441	.59199
.0250	-.02615	.84146	.98368	.95570	.96036	.96969	.97435	.96969	.97435	.98368	.37749
.0500	-.03555	.87643	.96503	.90441	.89042	.87177	.84379	.85778	.76918	.72255	.21429
.1000	-.04683	.64794	.73654	.63395	.61064	.59665	.58732	.61064	.43811	.42878	.12569
.1500	-.05345	.47075	.56401	.46142	.45210	.43345	.41946	.40547	.39614	.27957	.01844
.2000	-.05738	.32620	.41946	.37749	.34951	.32620	.31687	.31687	.23294	.16766	-.03285
.3000	-.06001	.15367	.24693	.21429	.23294	.19563	.19097	.15833	.13502	.02777	-.10280
.4000	-.05803	.06041	.15367	.16299	.14434	.16299	.14900	.13968	.10238	.05575	-.13077
.5000	-.05294	-.00487	.08839	.11170	.11170	.10704	.10704	.09771	.06041	.04176	-.13544
.6000	-.04563	-.04684	.04642	.07906	.09305	.10704	.09771	.08372	.07440	.05575	-.13077
.7000	-.03664	-.10280	-.00954	.08839	.07906	.07440	.08372	.09305	.07906	.05108	-.09347
.8000	-.02623	-.09347	-.00954	.05575	.08372	.08839	.09771	.10238	.08372	.08839	-.00954
.9000	-.01448	-.04684	.01844	.06507	.07440	.09771	.10238	.10704	.12103	.12103	.11170
.9800	-.00403	-.00021	.06973	.10704	.10238	.12103	.12569	.15367	.16299	.18165	.24693
INTEGRATED c_n		.8614	.9189	.9812	.9349	.8990	.8578	.8339	.7408	.6768	.3659
$\Delta\alpha$, (DEG)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-15.000
$\alpha+\Delta\alpha$, (DEG)		12.200	12.200	12.200	12.200	12.200	12.200	12.200	12.200	12.200	-2.800
RESULTANT c_l		.8420	.8981	.9591	.9137	.8787	.8385	.8151	.7241	.6615	.3655

x/c	z/c	VALUES OF c_p FOR y/s =									
		.58461	.63223	.67985	.72747	.77509	.82270	.87032	.91794	.96556	.98937
0.0000	0.00000	.88575	.95570	.95104	-.01886	-.07948	.30755	.37749	.47541	.65727	.73188
.0125	.01894	-.62971	-.44319	-.55044	-1.61826	-1.71152	-1.35714	-1.24989	-1.14730	-.91415	-.70898
.0250	.02615	-1.51568	-.64836	-.67634	-1.27320	-1.50169	-1.24056	-1.15663	-1.33382	-1.38045	-.67401
.0500	.03555	-.77893	-.71831	-.80224	-1.17062	-1.24989	-1.12399	-1.06337	-.96078	-.78359	-.63904
.1000	.04683	-.73696	-.69499	-.77893	-.89550	-.88618	-.90483	-.84887	-.76494	-.62971	-.53179
.1500	.05345	-.69966	-.63437	-.69966	-.70898	-.76027	-.76027	-.71365	-.65303	-.51314	-.42920
.2000	.05738	-.62971	-.58774	-.61572	-.62971	-.64836	-.62039	-.58774	-.54112	-.27999	-.36859
.3000	.06001	-.53179	-.47583	-.48050	-.47583	-.46651	-.47583	-.43853	-.41521	-.31729	-.27066
.4000	.05803	-.38724	-.37325	-.36392	-.36392	-.34061	-.34527	-.35460	-.29864	-.24268	-.21471
.5000	.05294	-.30330	-.25667	-.26134	-.25667	-.21937	-.24268	-.21004	-.21004	-.14943	-.15875
.6000	.04563	-.18673	-.16341	-.14476	-.14943	-.13077	-.15409	-.11212	-.13544	-.11212	-.11678
.7000	.03664	-.06549	-.06083	-.06083	-.06083	-.05150	-.07482	-.07015	-.06083	-.05150	-.09347
.8000	.02623	.06041	.03243	.05575	.03709	.01378	.01378	-.00021	-.00487	-.00954	-.05617
.9000	.01448	.20030	.18631	.15833	.11636	.12103	.10704	.09771	.08372	.05575	-.08881
.9800	.00403	.33552	.32620	.30288	.20496	.18631	.19097	.20030	.16766	.13502	-.11678
.0125	-.01894	.52204	.50329	.45210	.93705	.99767	.87177	.83446	.79716	.75053	.64328
.0250	-.02615	.27491	.22361	.23760	.72255	.75985	.61530	[illegible]	.53603	.45676	.37283
.0500	-.03555	.07906	.06041	.06507	.44744	.46609	.34951	.32620	.26558	.20962	.13035
.1000	-.04683	.04176	-.07015	-.02353	.19097	.23760	.14434	.12103	.07440	.02777	-.00954
.1500	-.05345	-.06549	-.09813	-.07015	.06041	.12569	.05108	.02310	-.01420	-.03285	-.07482
.2000	-.05738	-.04684	-.10746	-.08881	-.00487	.04642	-.01420	.00912	-.05617	-.07948	-.09347
.3000	-.06001	-.03285	-.08881	-.07482	-.03751	-.04218	-.03751	-.05617	-.08414	-.08414	-.10746
.4000	-.05803	-.06549	-.06549	-.06083	-.05150	-.04684	-.00487	-.07015	-.08414	-.07948	-.09347
.5000	-.05294	-.05617	-.00487	-.04218	-.03751	-.02819	-.04684	-.04218	-.07948	-.04218	-.08414
.6000	-.04563	.00445	.02310	-.01886	-.00487	-.00954	-.02353	-.03751	-.05150	-.06549	-.08414
.7000	-.03664	.02310	.04176	.01378	.03243	.04642	.01378	-.01420	-.02353	-.04218	-.06083
.8000	-.02623	.14434	.12569	.06041	.05575	.08839	.04642	.02777	.00445	-.00954	-.04218
.9000	-.01448	.19097	.20496	.18165	.12103	.14434	.10238	.07906	.04176	.07906	-.00487
.9800	-.00403	.32620	.34465	.29356	[illegible]	.17698	.16766	.16766	.14900	.13502	.04642
INTEGRATED c_n		.3177	.2711	.2740	.3873	.4103	.3689	.3298	.2849	.2174	.1851
$\Delta\alpha$, (DEG)		-15.000	-15.000	-11.250	-3.750	-3.000	-6.000	-6.000	-6.000	-6.000	-6.000
$\alpha+\Delta\alpha$, (DEG)		-2.800	-2.800	.950	8.450	9.200	6.200	6.200	6.200	6.200	6.200
RESULTANT c_l		.3174	.2708	.2739	.3831	.4050	.3667	.3279	.2833	.2161	.1840



L-77-8375

Figure 1. Variable twist wing (VTW) model blade mounted in test section of the Langley 4- by 7-Meter Tunnel.



Wing Characteristics	
Area, S ----------	0.8852 m^2
Semispan, s ------	1.245 m
Chord, c ---------	0.3556 m
Aspect ratio -----	7
Taper ratio ------	1
Airfoil section --	NACA 0012
Segment width ----	0.02964 m

Figure 2. Three-view sketch of VTW model with no wing twist applied. All dimensions are in meters unless otherwise specified.

Device	Front-face position, x/c
Spoiler	0.30
Drag plate	1.43

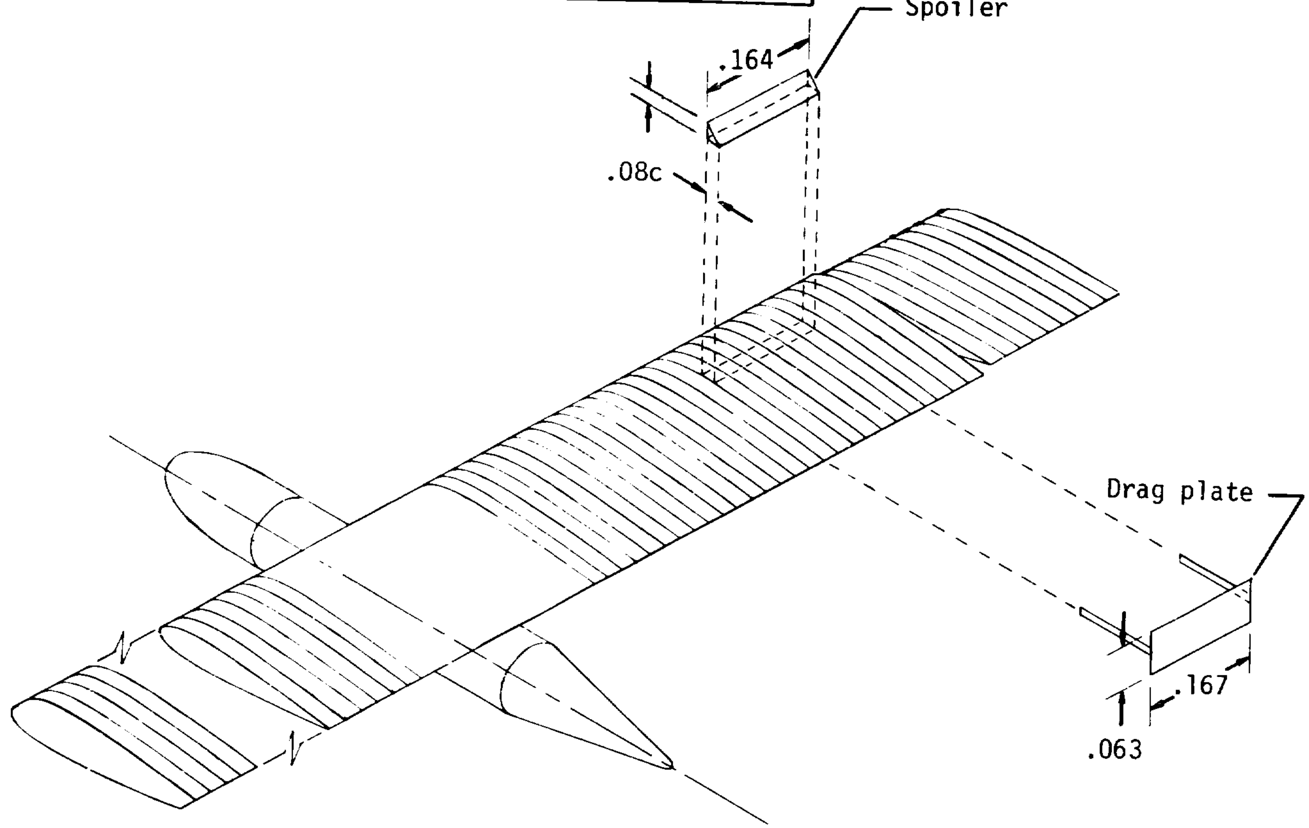


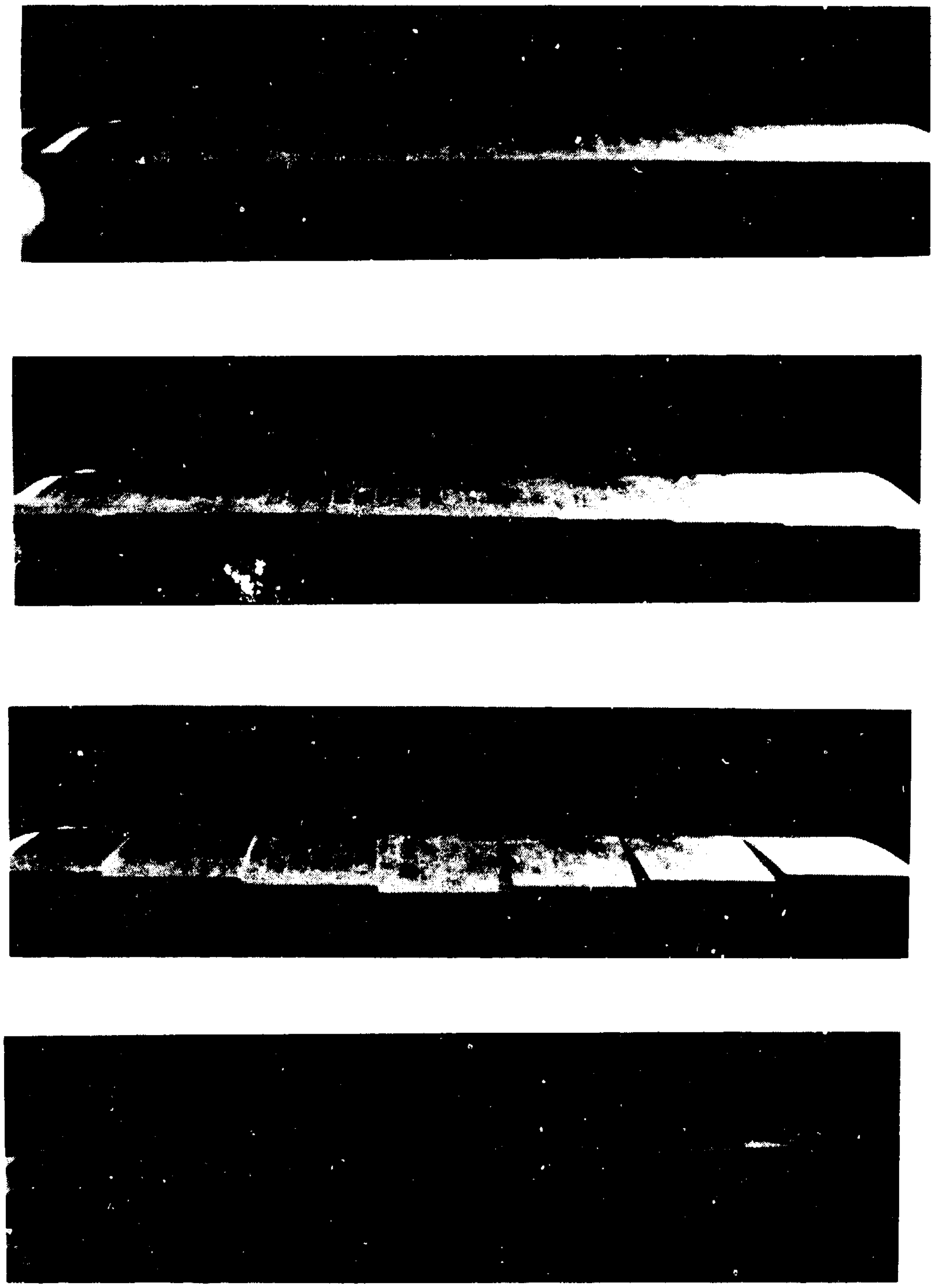
Figure 3. Installation of spoilers and drag plates on the VTW. Each device was centered at $y/s = \pm 0.607$ and tested independently, with the spoilers installed on $VTW7S_0$ and the drag plates installed on $VTW7S_3P$. Unless noted, all dimensions are normalized by the VTW semispan.

VTW1

VTW2

VTW3

VTW4



L-84-10,699

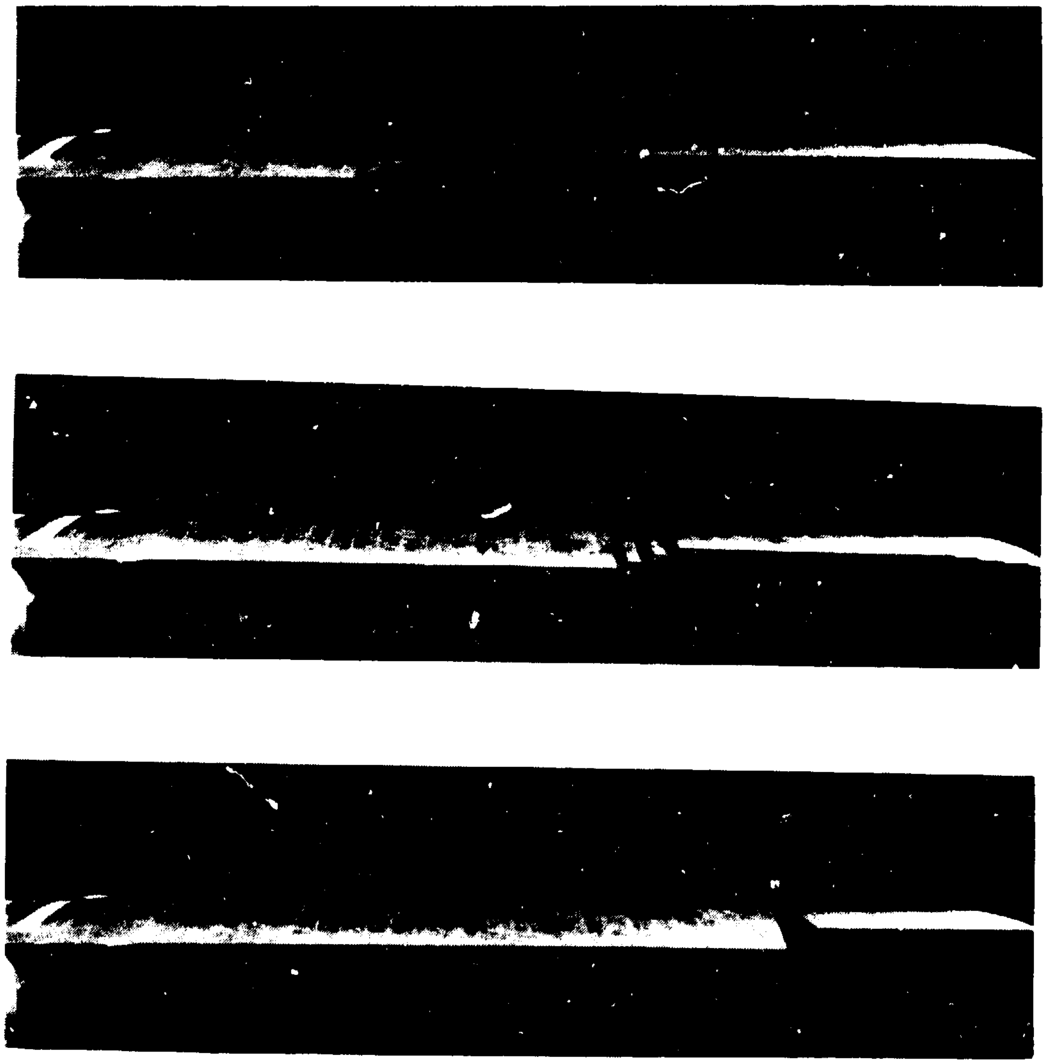
(a) Group I—continuous span-load distributions.

Figure 4. VTW group photographs.

VTW5

VTW6

VTW7



L-84-10,700

(b) Group II—part-span-flap span-load distributions.

Figure 4. Continued.

VTW7S_0

VTW7S_1

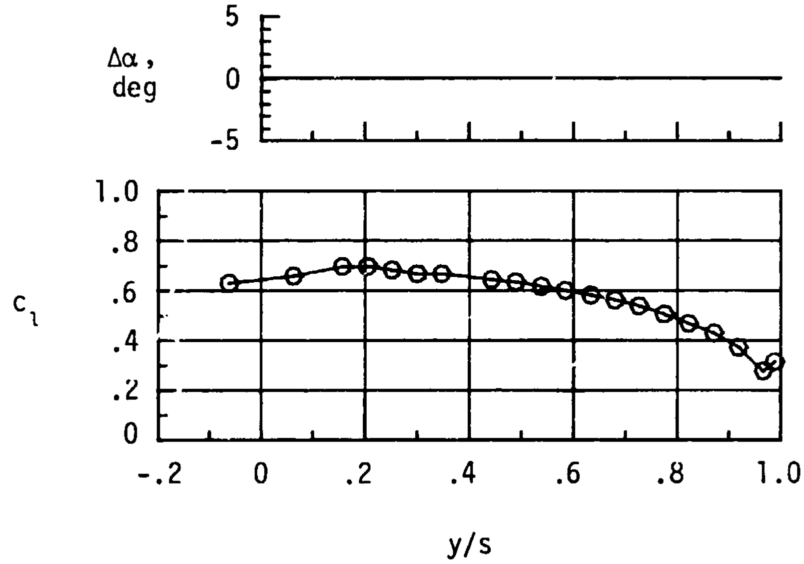
VTW7S_3

VTW7S_3P

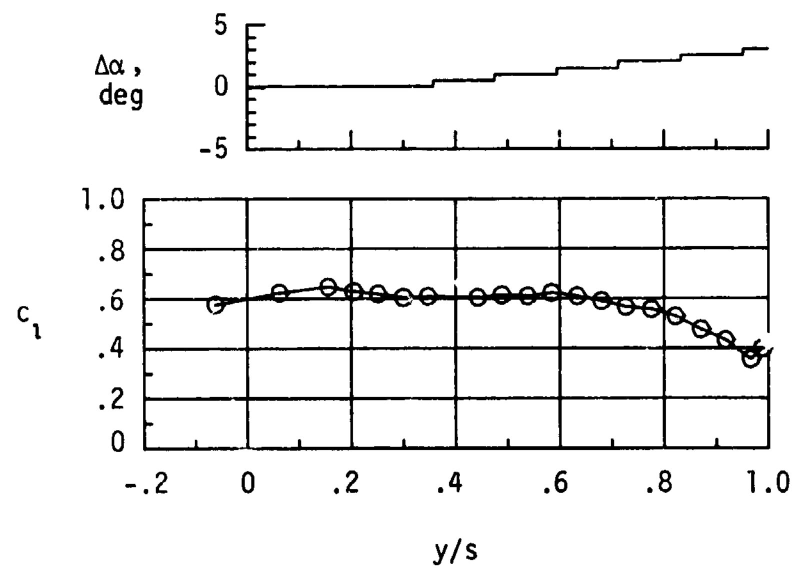
L-84-12,901

(c) Group III—alleviated wake vortex configurations.

Figure 4. Concluded.

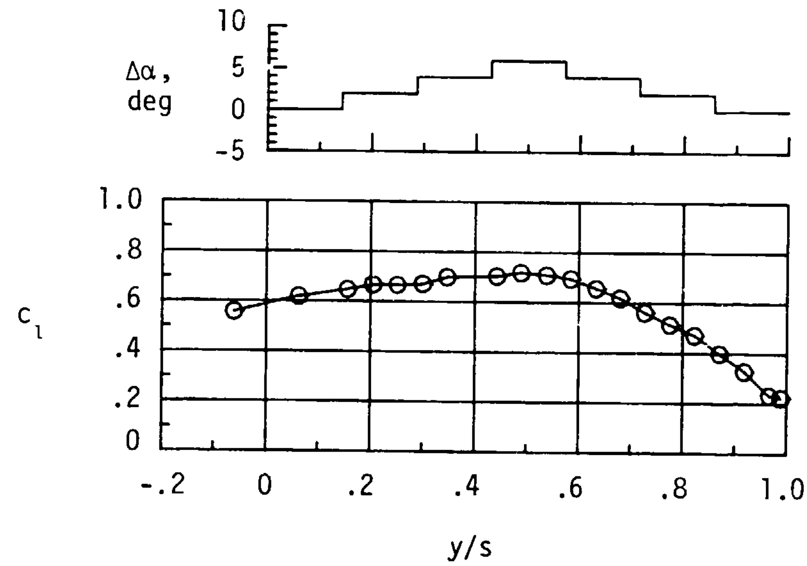


(a) VTW1 configuration. $\alpha = 7.50°$.

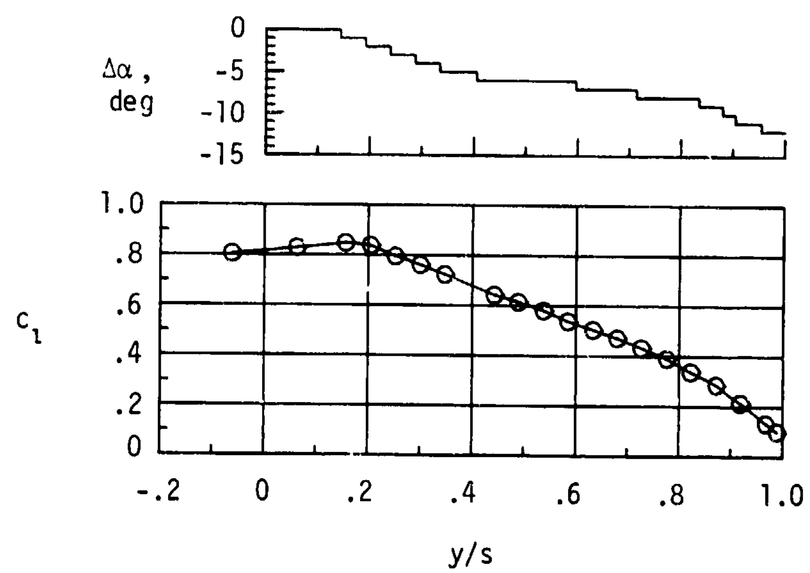


(b) VTW2 configuration. $\alpha = 6.50°$.

Figure 5. Wing twist distributions and measured span-load distributions for group I VTW configurations at a nominal $C_L = 0.6$.

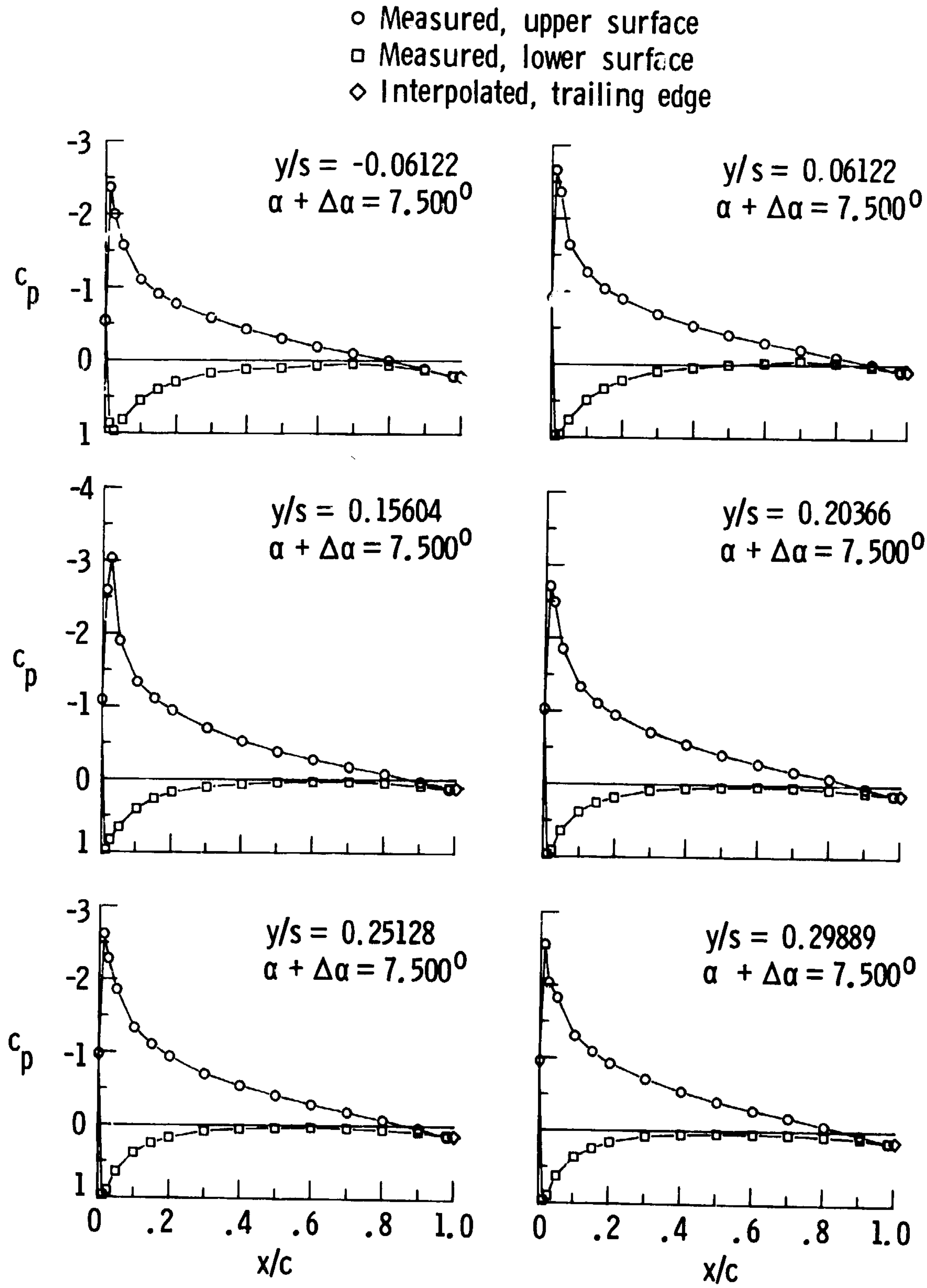


(c) VTW3 configuration. $\alpha = 4.80°$.



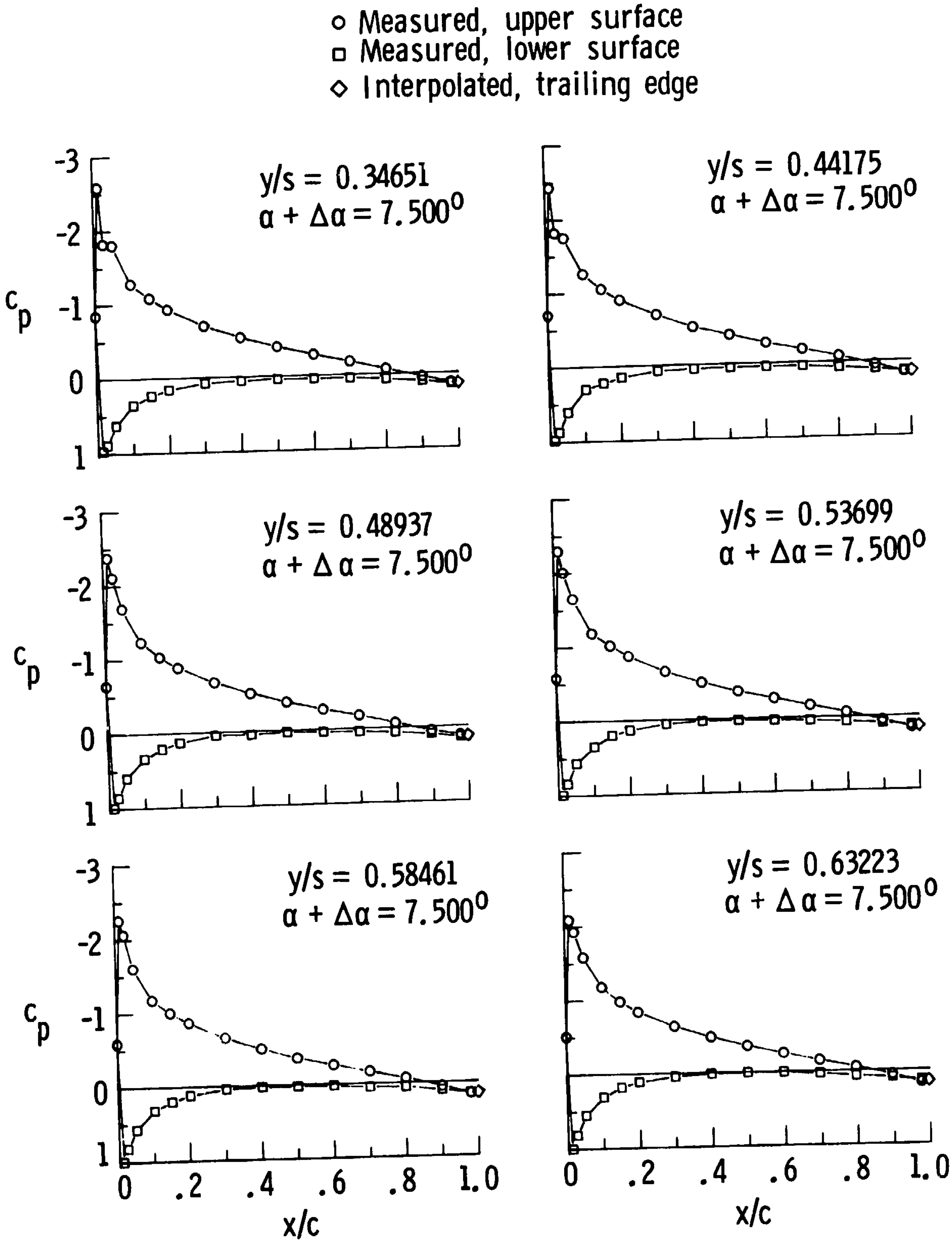
(d) VTW4 configuration. $\alpha = 12.50°$.

Figure 5. Concluded.



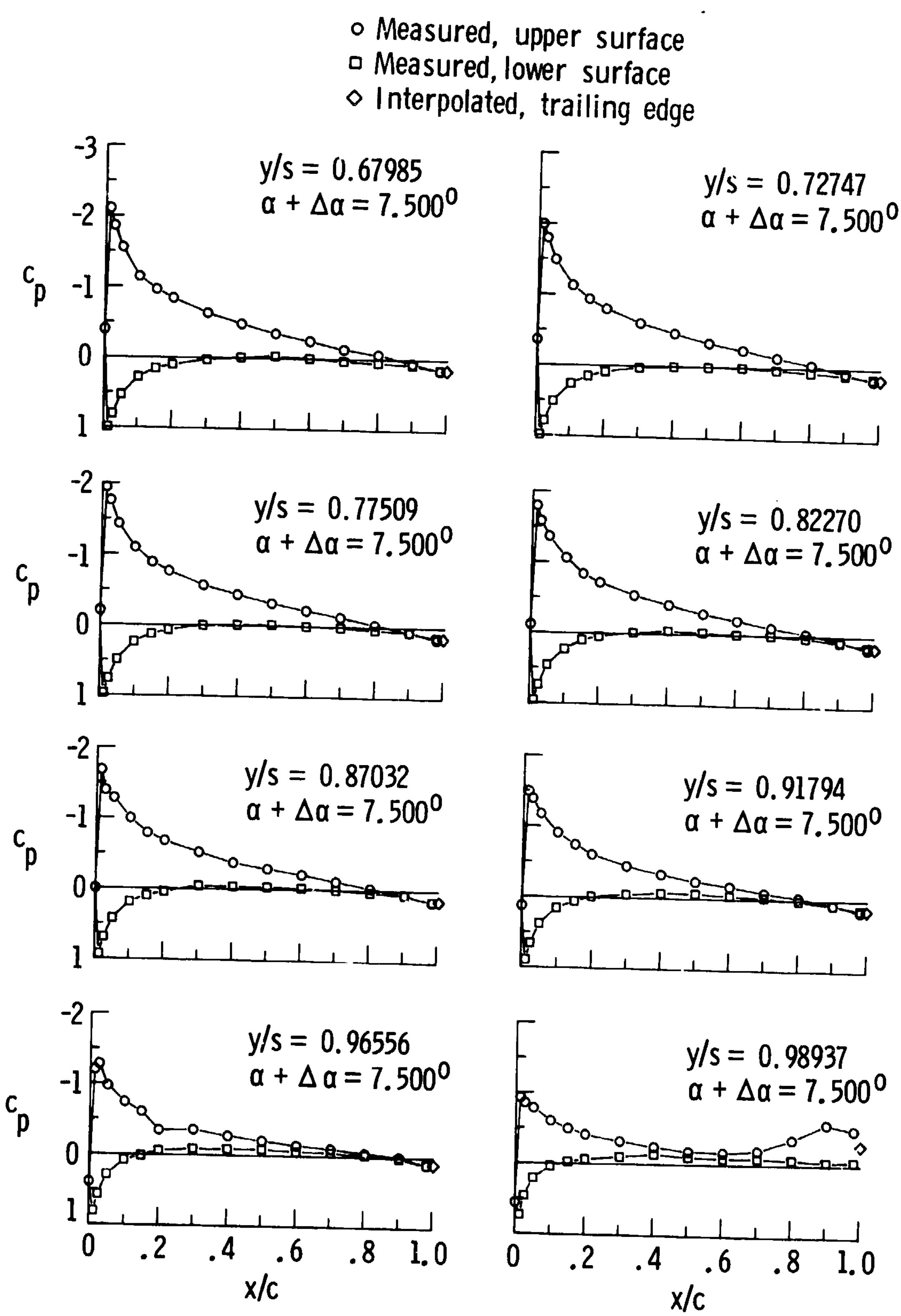
(a) VTW1 configuration.

Figure 6. Pressure distribution measurements for group I VTW configurations.



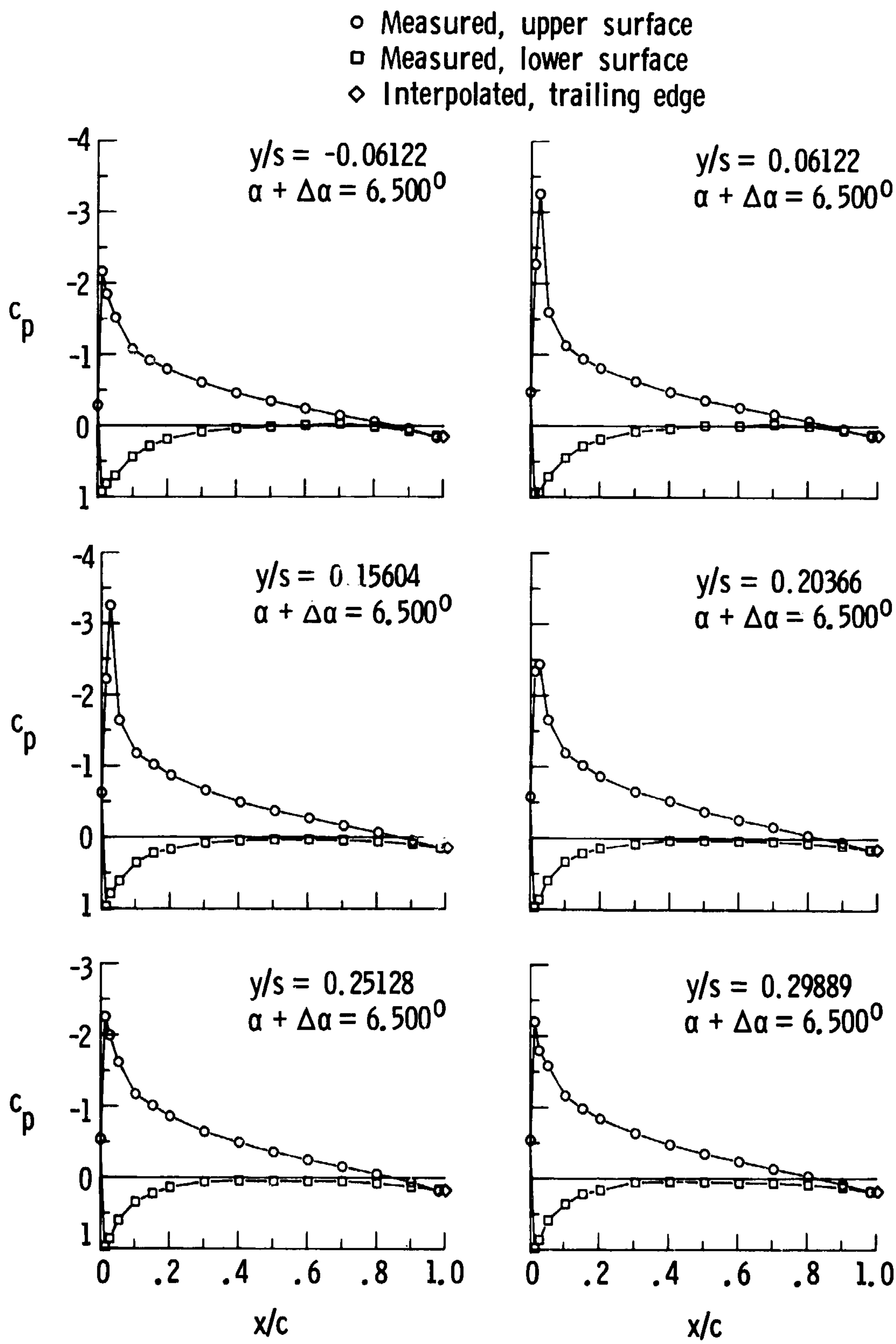
(a) Continued.

Figure 6. Continued.



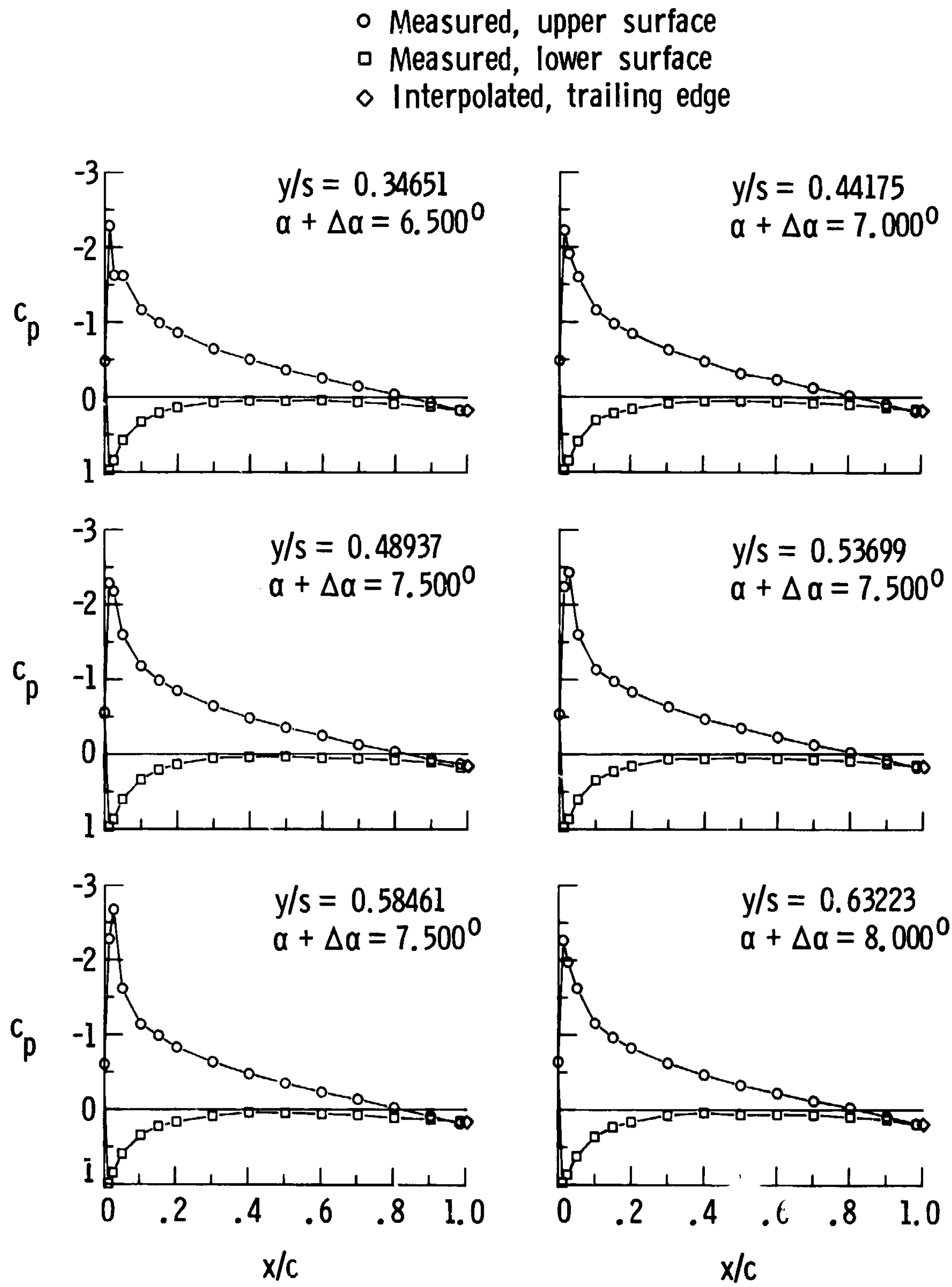
(a) Concluded.

Figure 6. Continued.



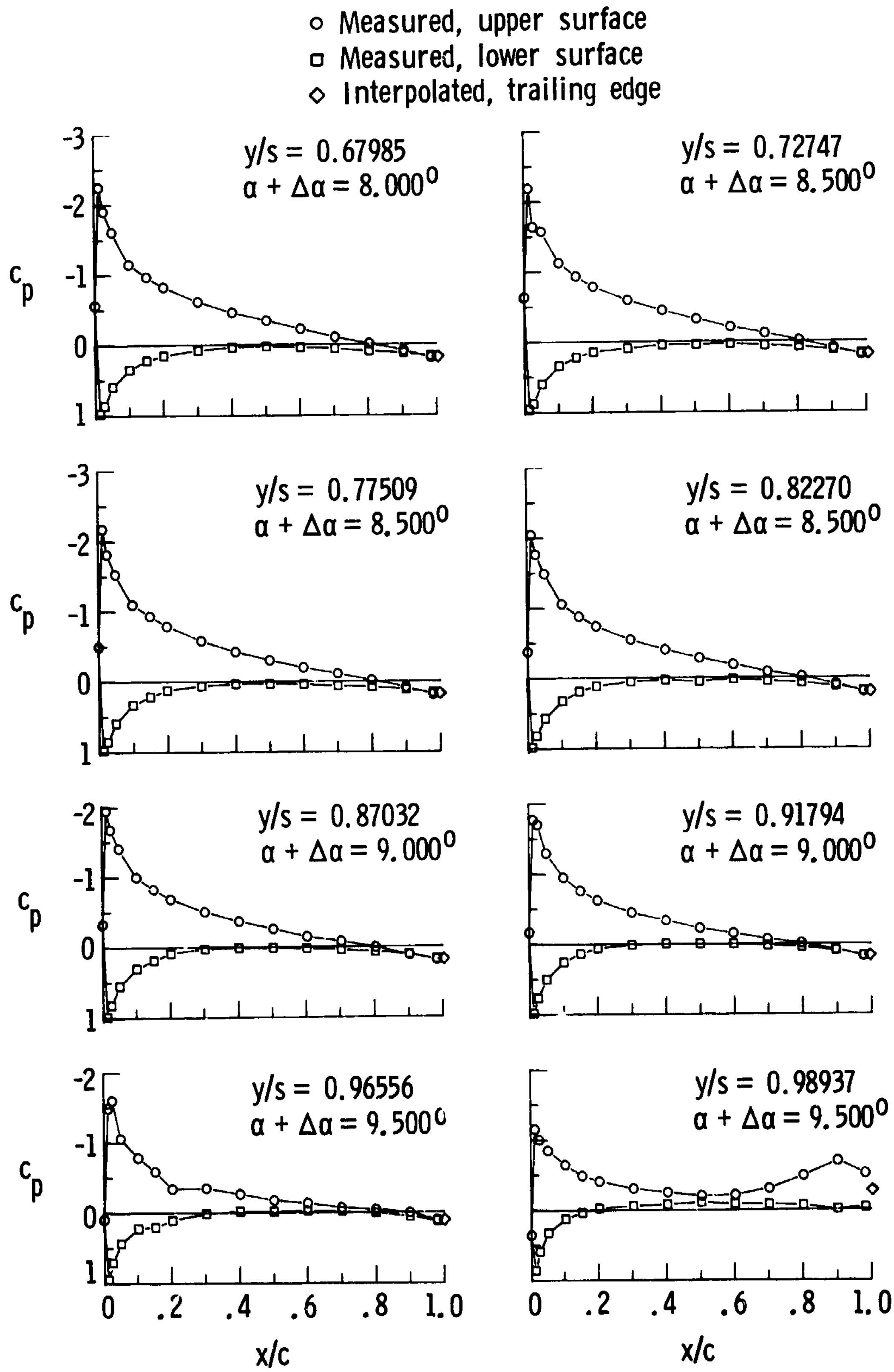
(b) VTW2 configuration.

Figure 6. Continued.



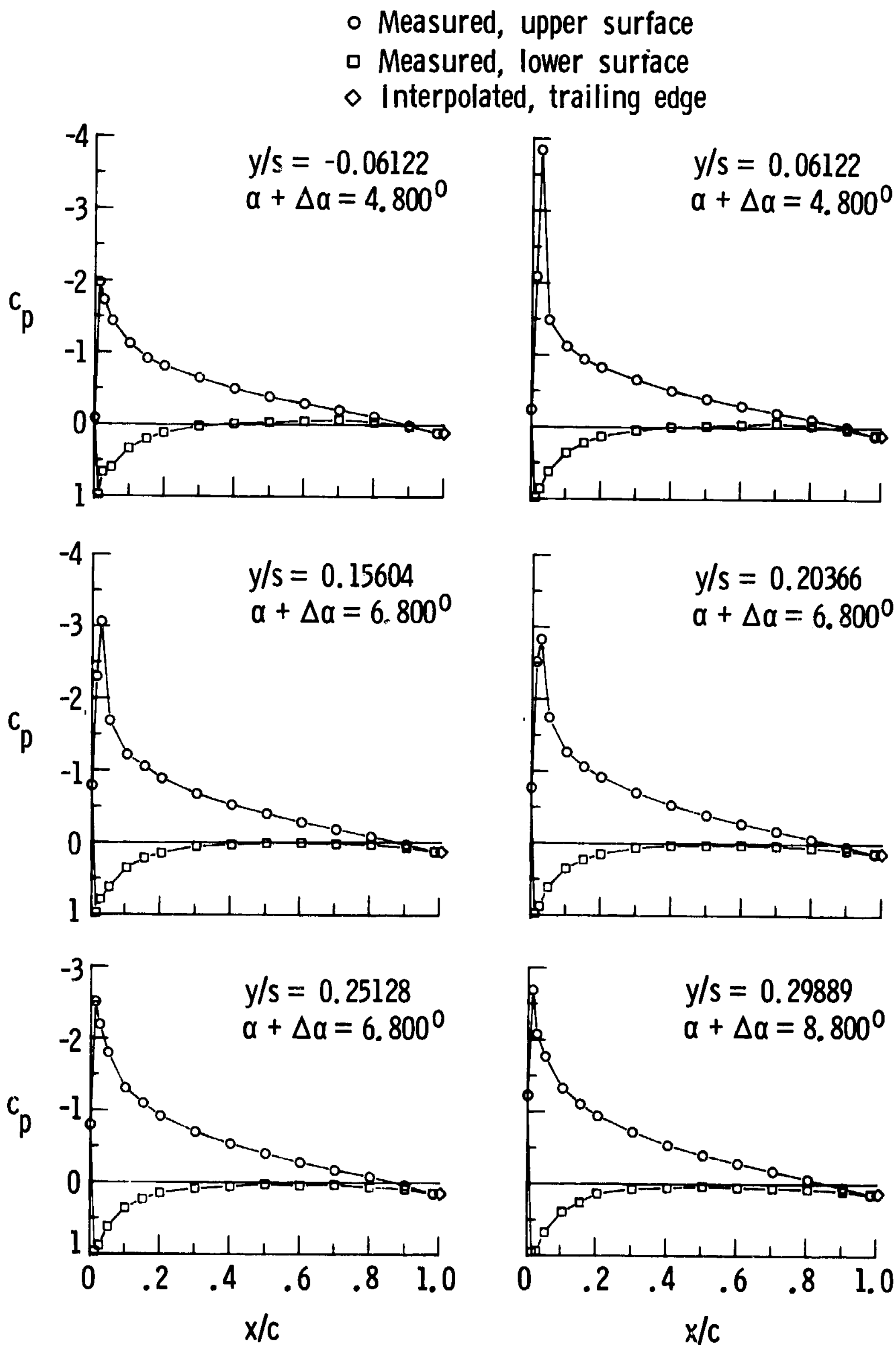
(b) Continued.

Figure 6. Continued.



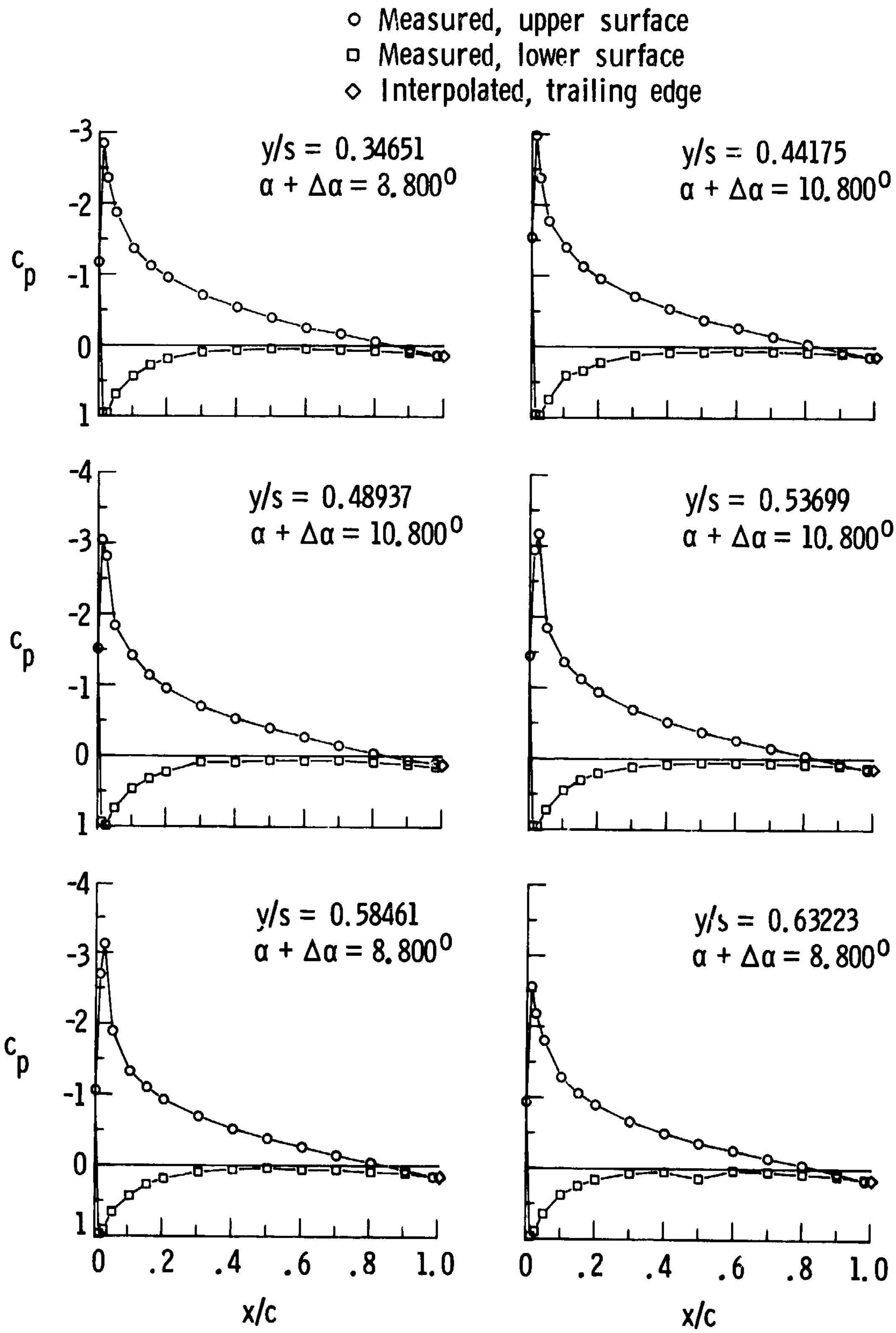
(b) Concluded.

Figure 6. Continued.



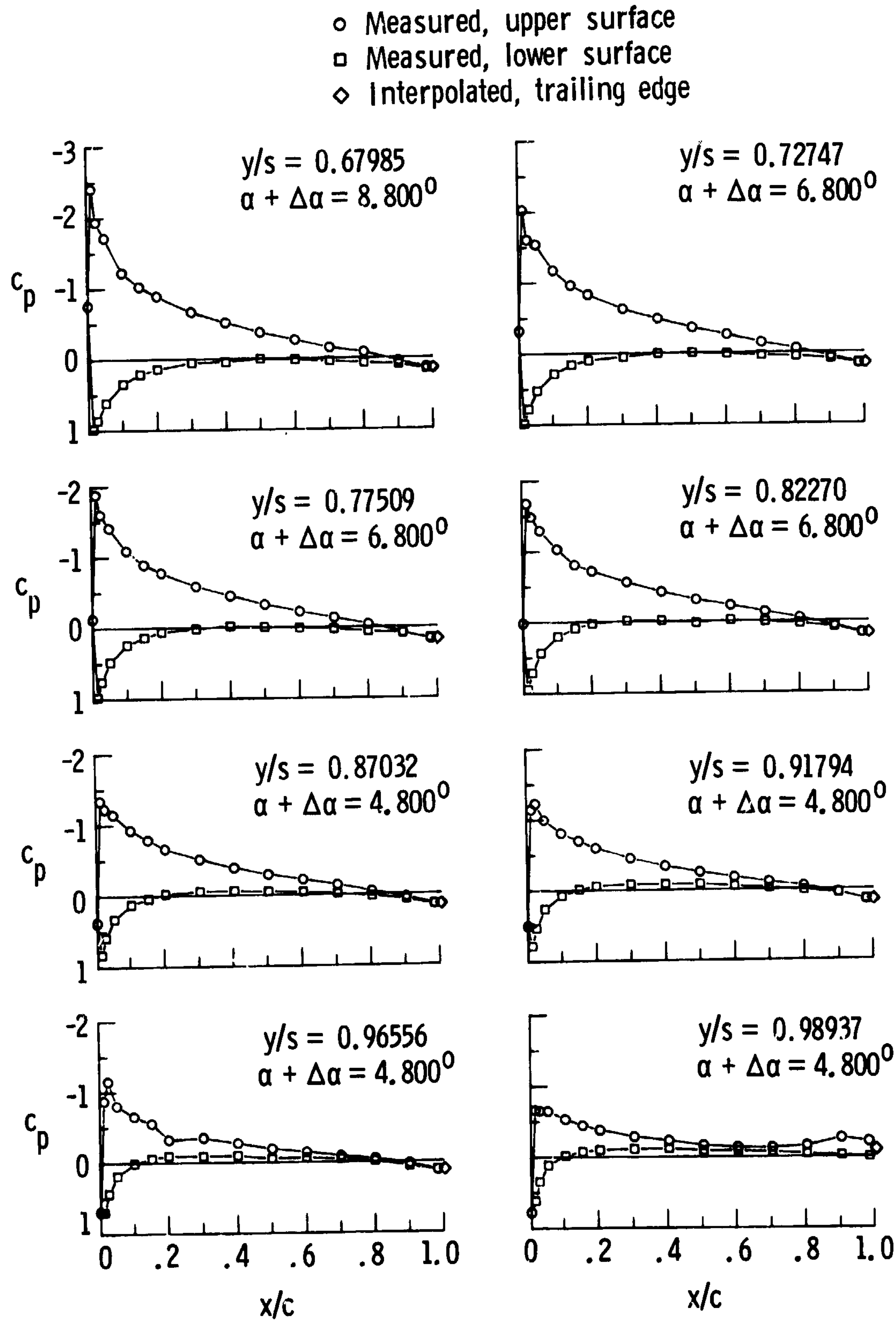
(c) VTW3 configuration.

Figure 6. Continued.



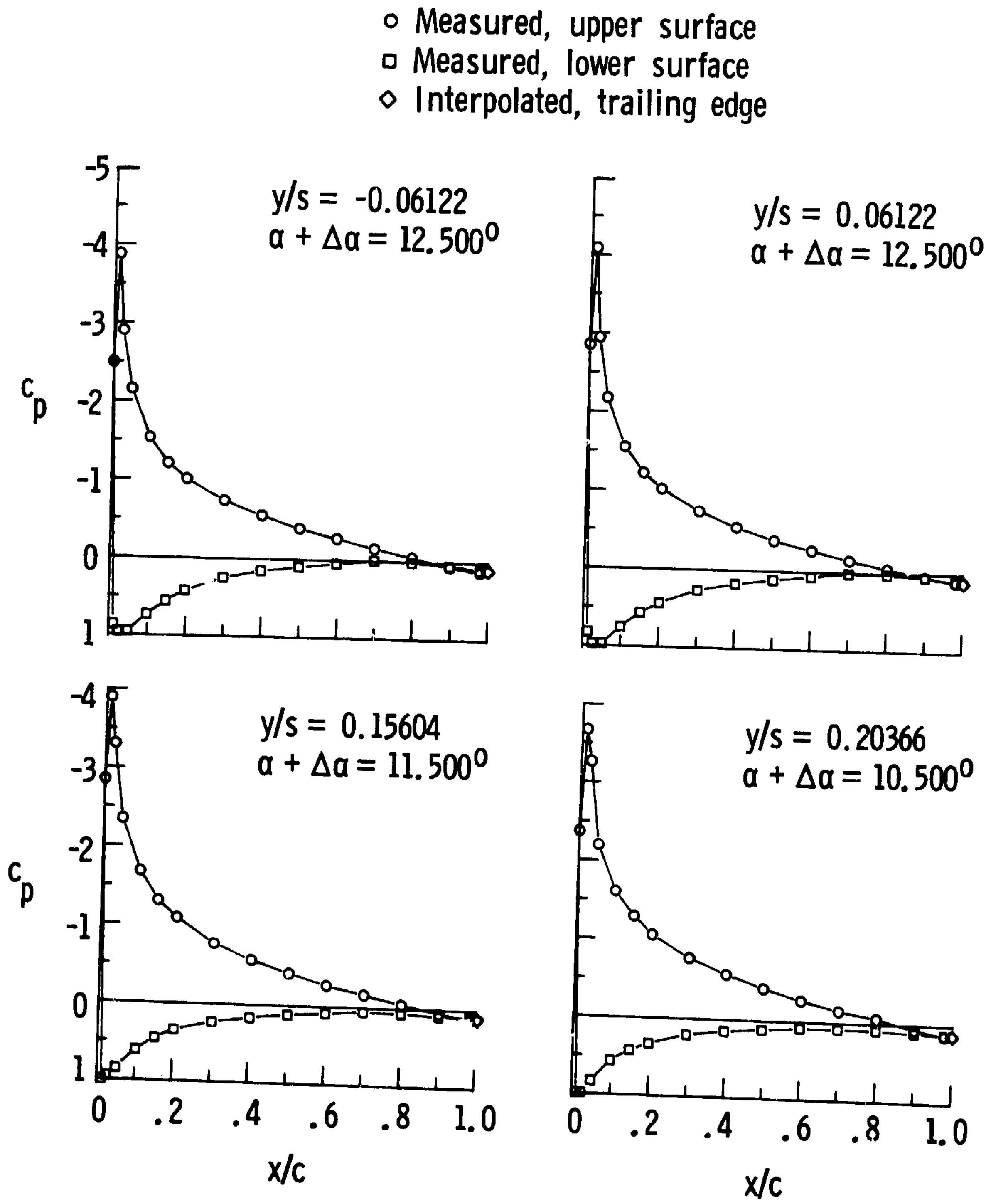
(c) Continued.

Figure 6. Continued.



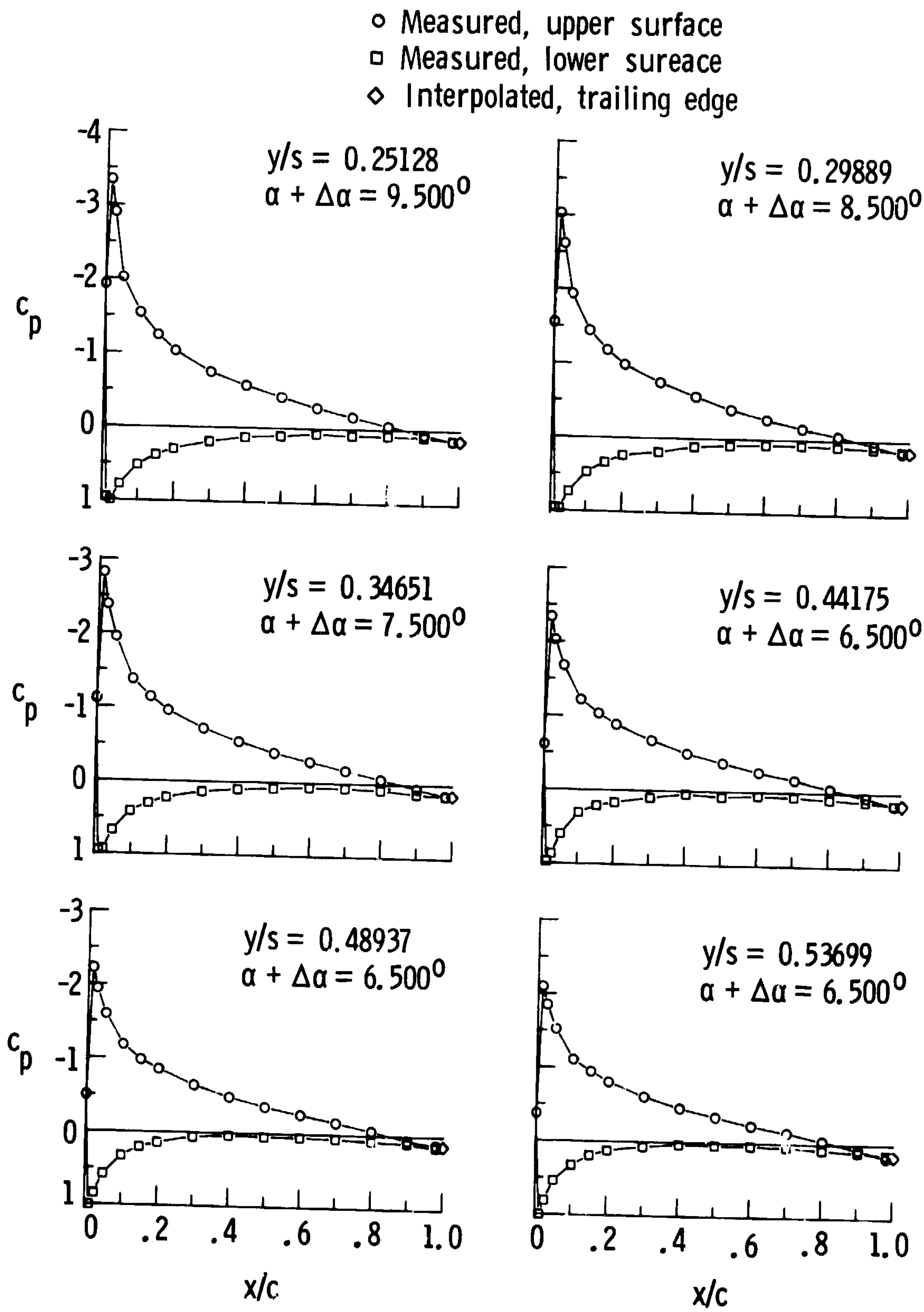
(c) Concluded.

Figure 6. Continued.



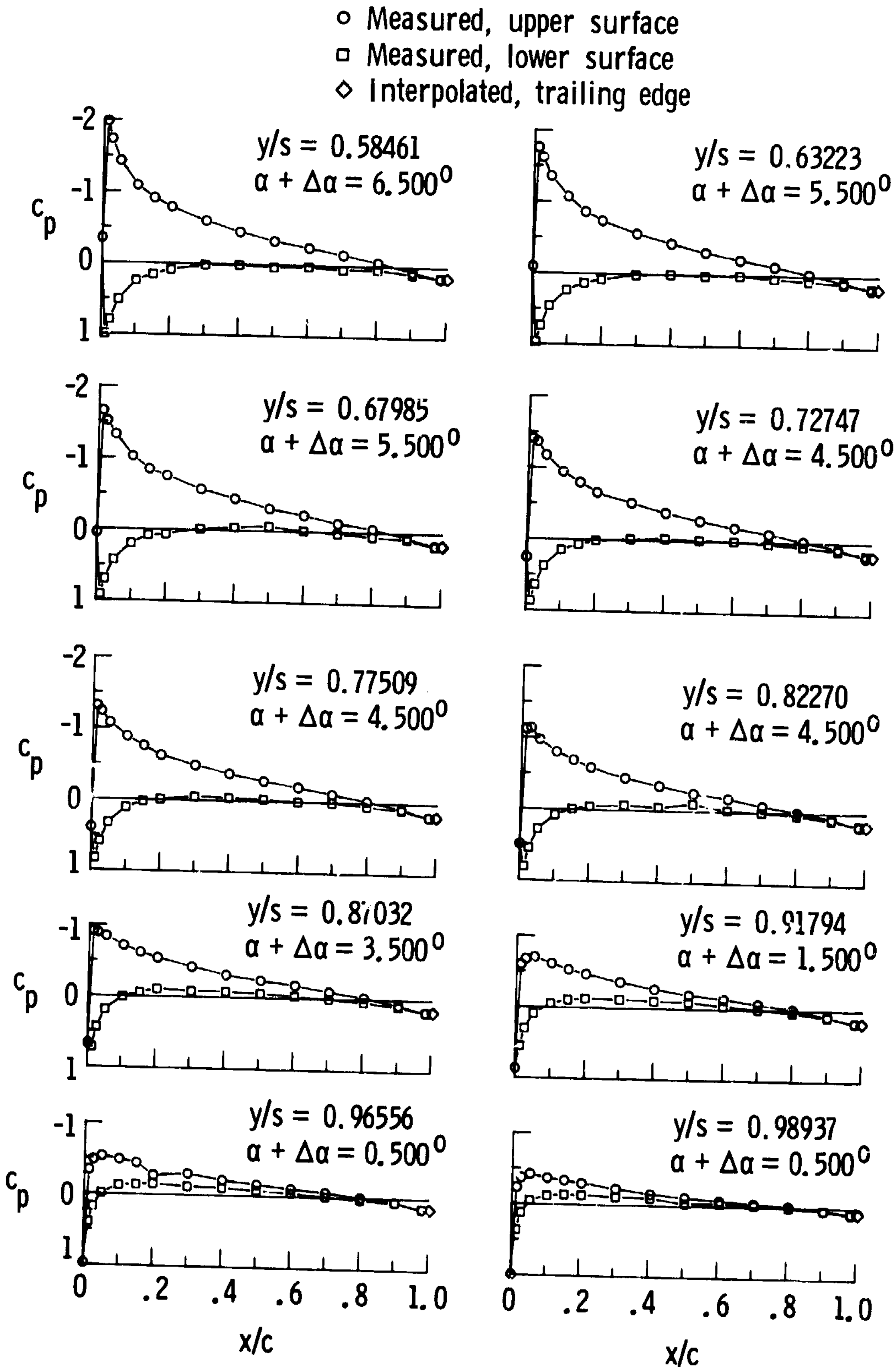
(d) VTW4 configuration.

Figure 6. Continued.



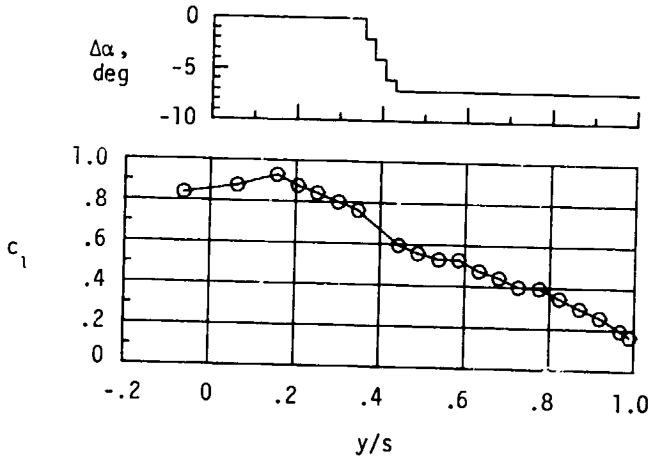
(d) Continued.

Figure 6. Continued.

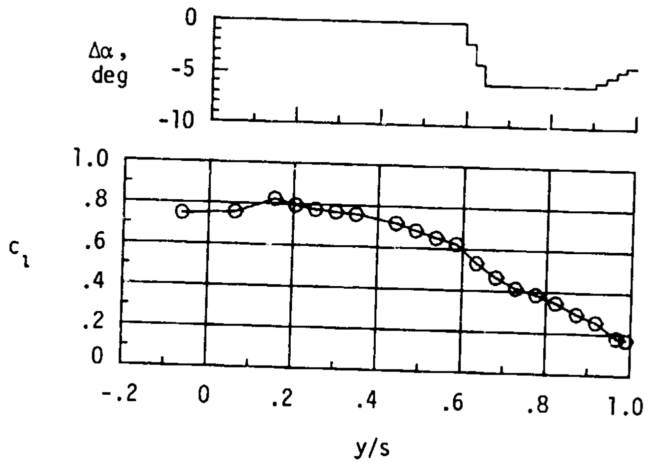


(d) Concluded.

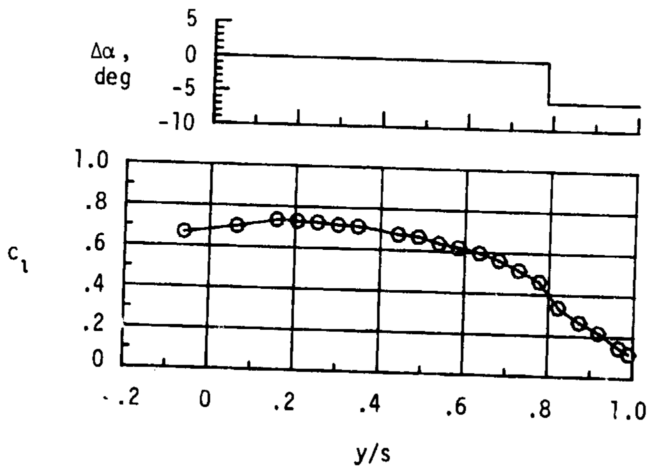
Figure 6. Concluded.



(a) VTW5 configuration. $\alpha = 11.50°$.

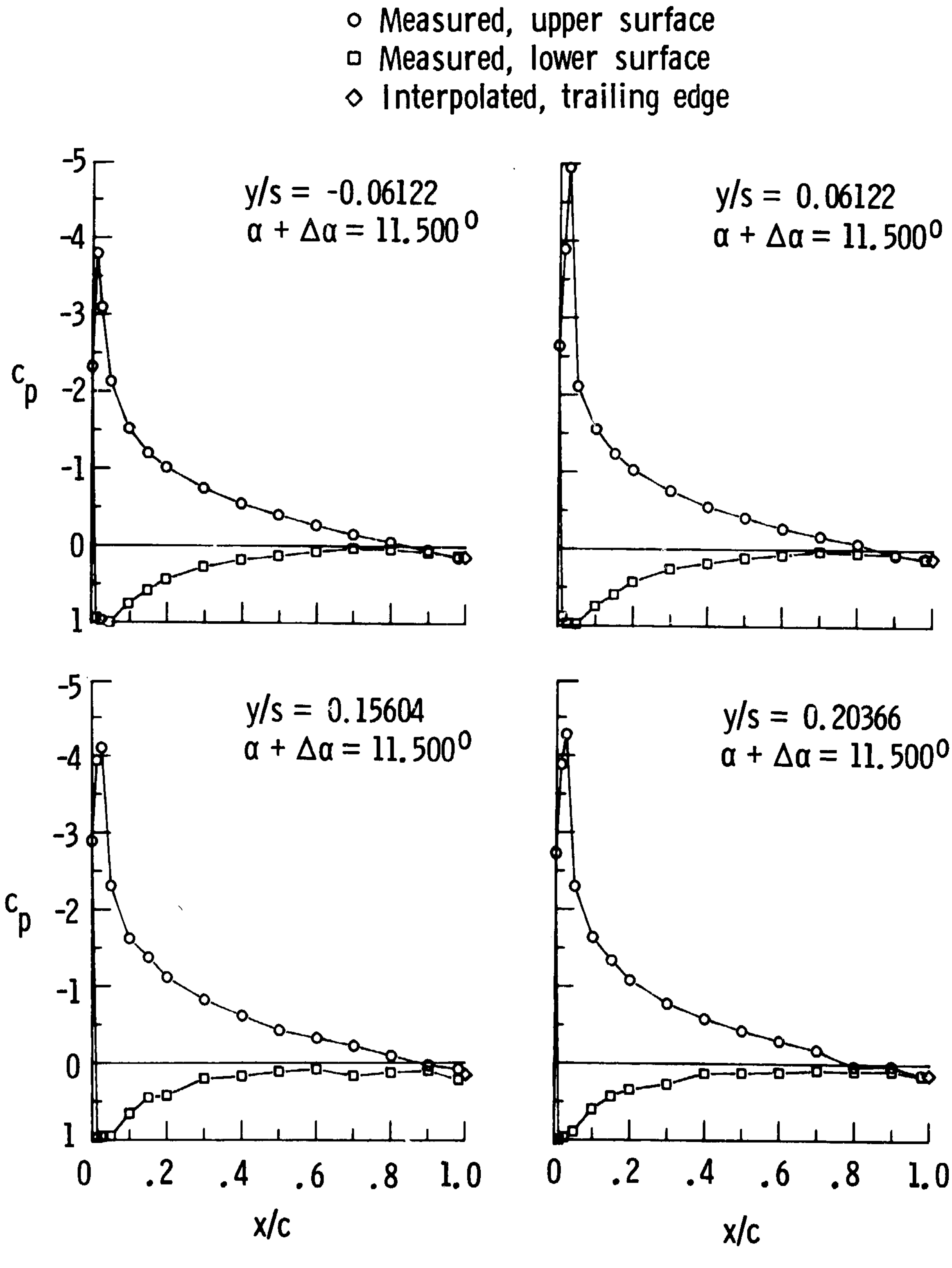


(b) VTW6 configuration. $\alpha = 9.10°$.



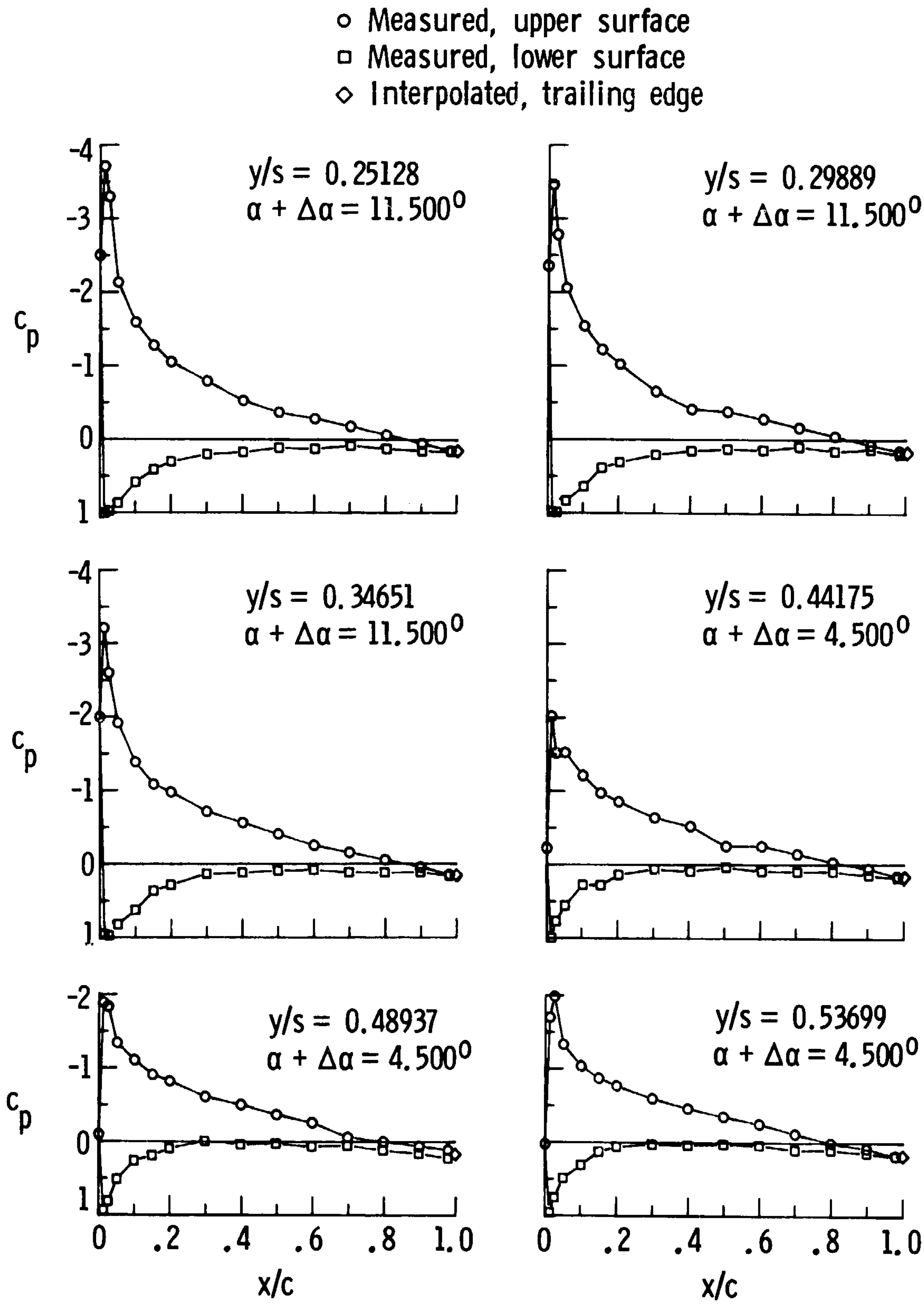
(c) VTW7 configuration. $\alpha = 8.50°$.

Figure 7. Wing twist distributions and measured span-load distributions for group II VTW configurations at a nominal $C_L = 0.6$.



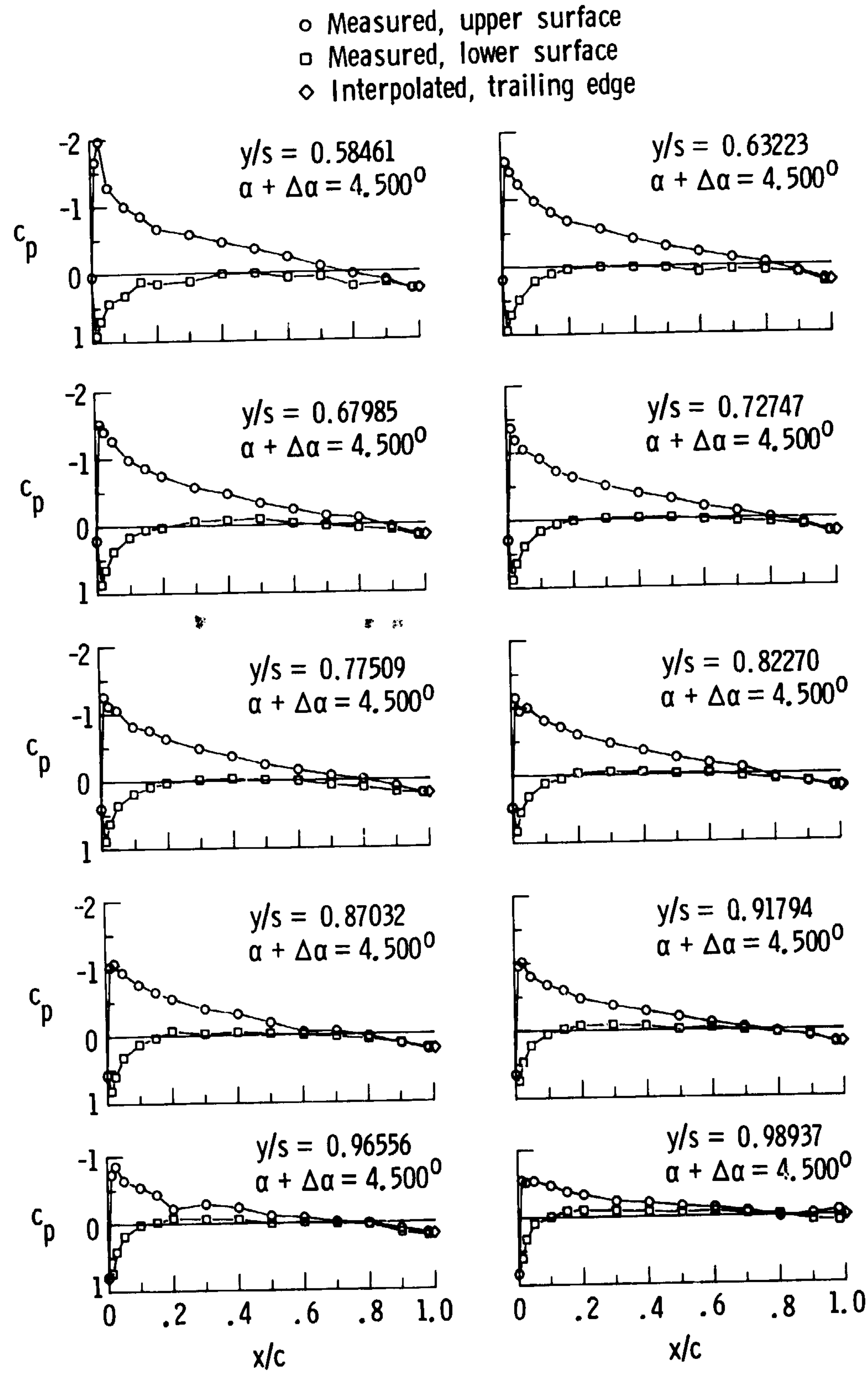
(a) VTW5 configuration.

Figure 8. Pressure distribution measurements for group II VTW configurations.



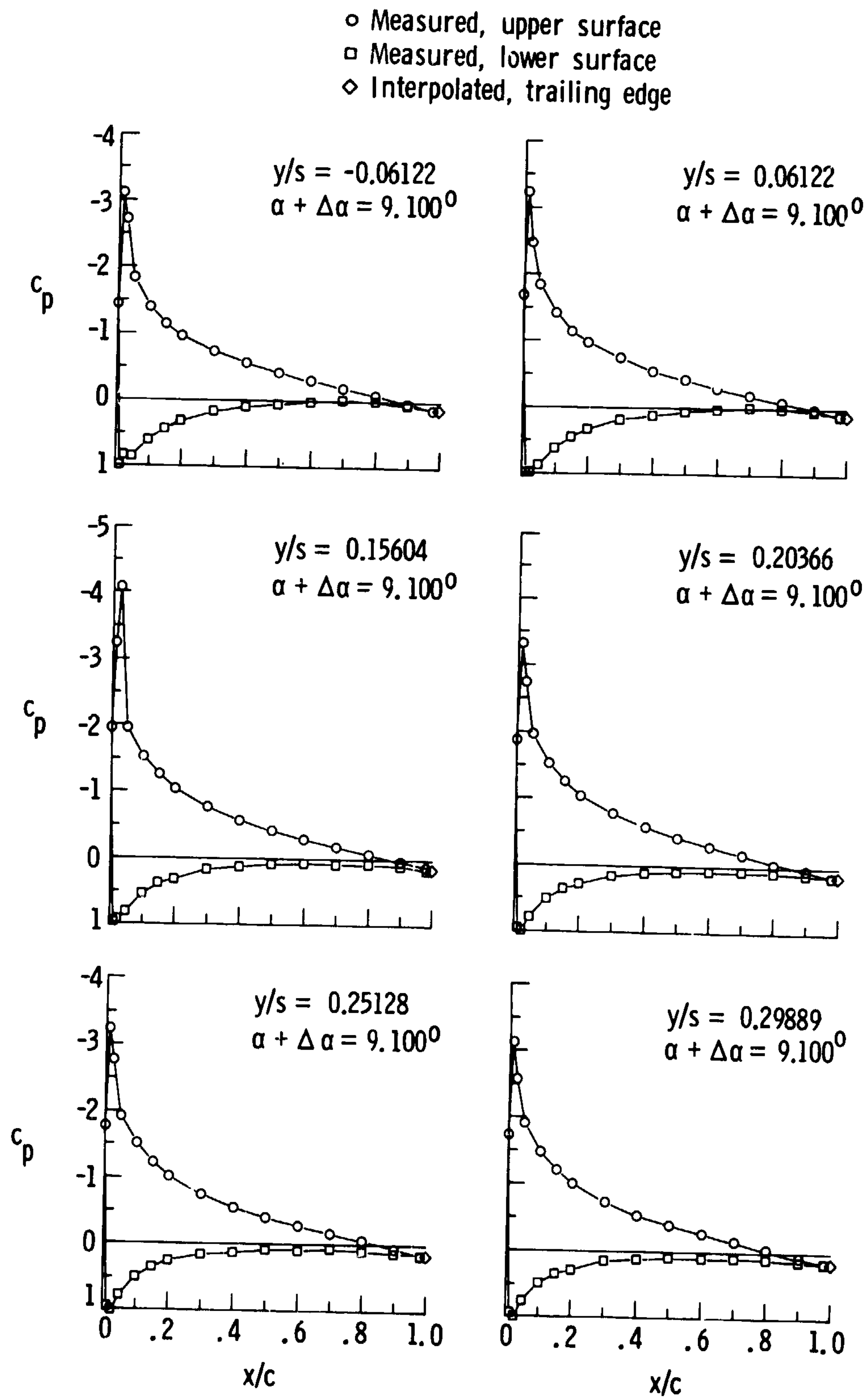
(a) Continued.

Figure 8. Continued.



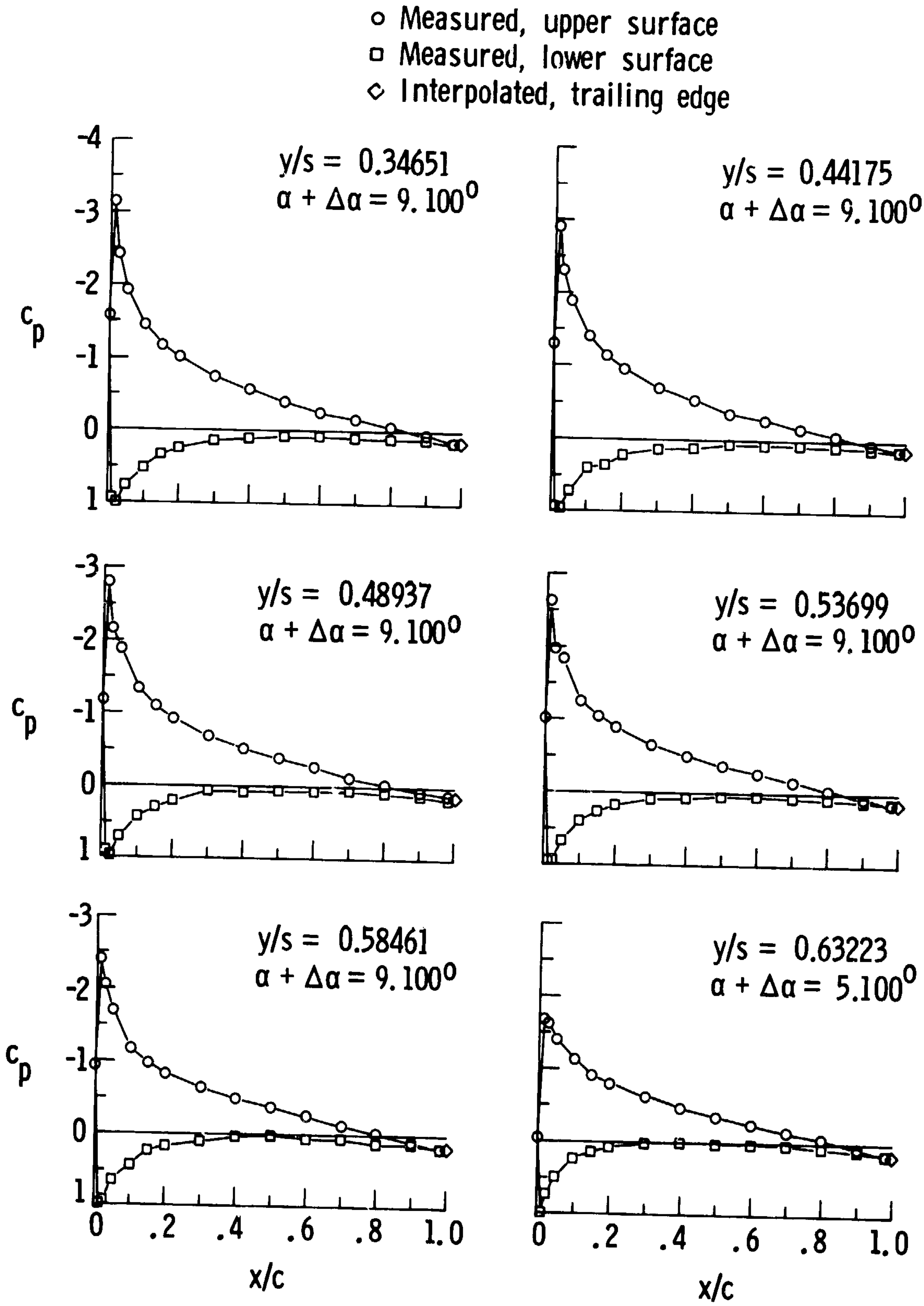
(a) Concluded.

Figure 8. Continued.



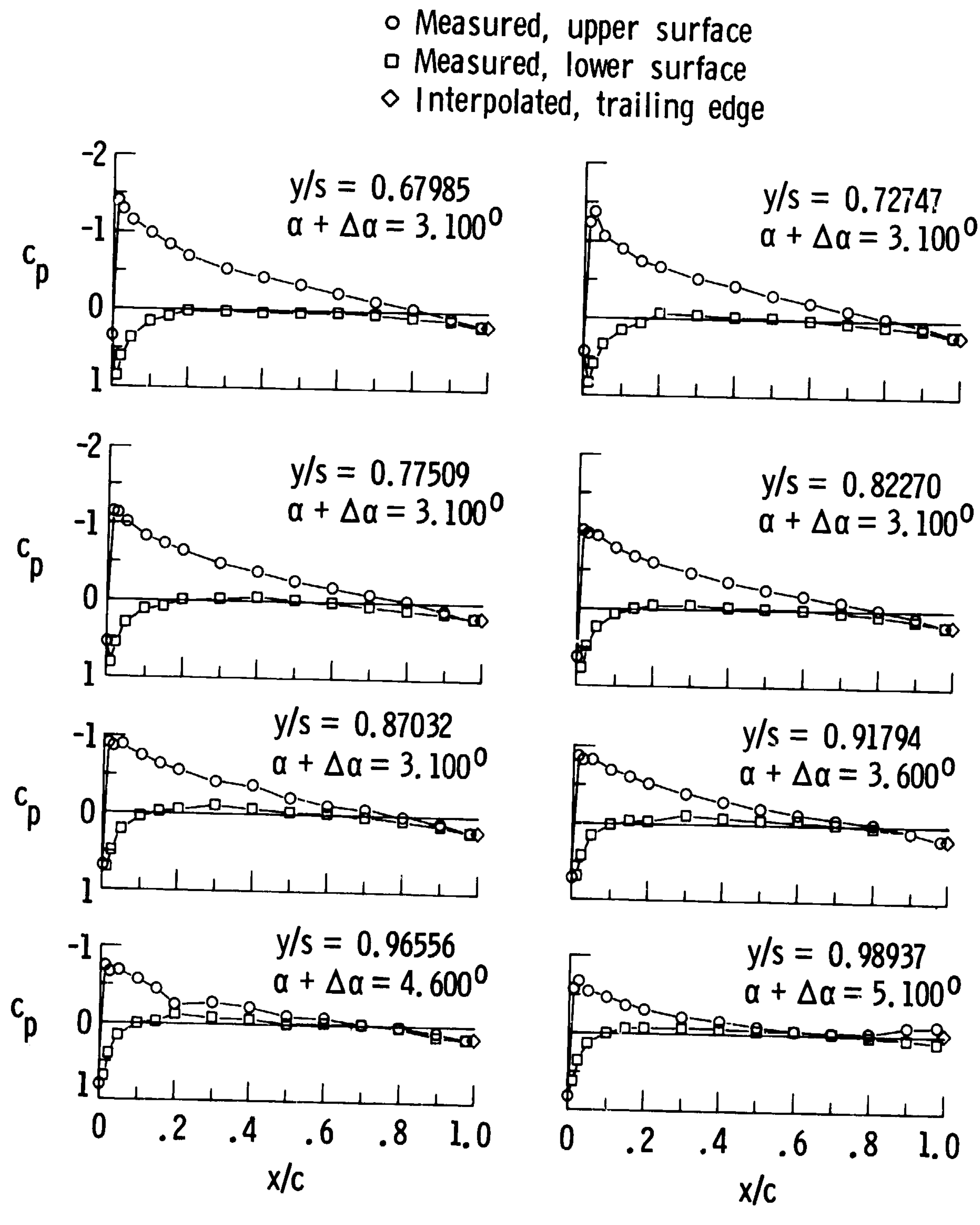
(b) VTW6 configuration.

Figure 8. Continued.



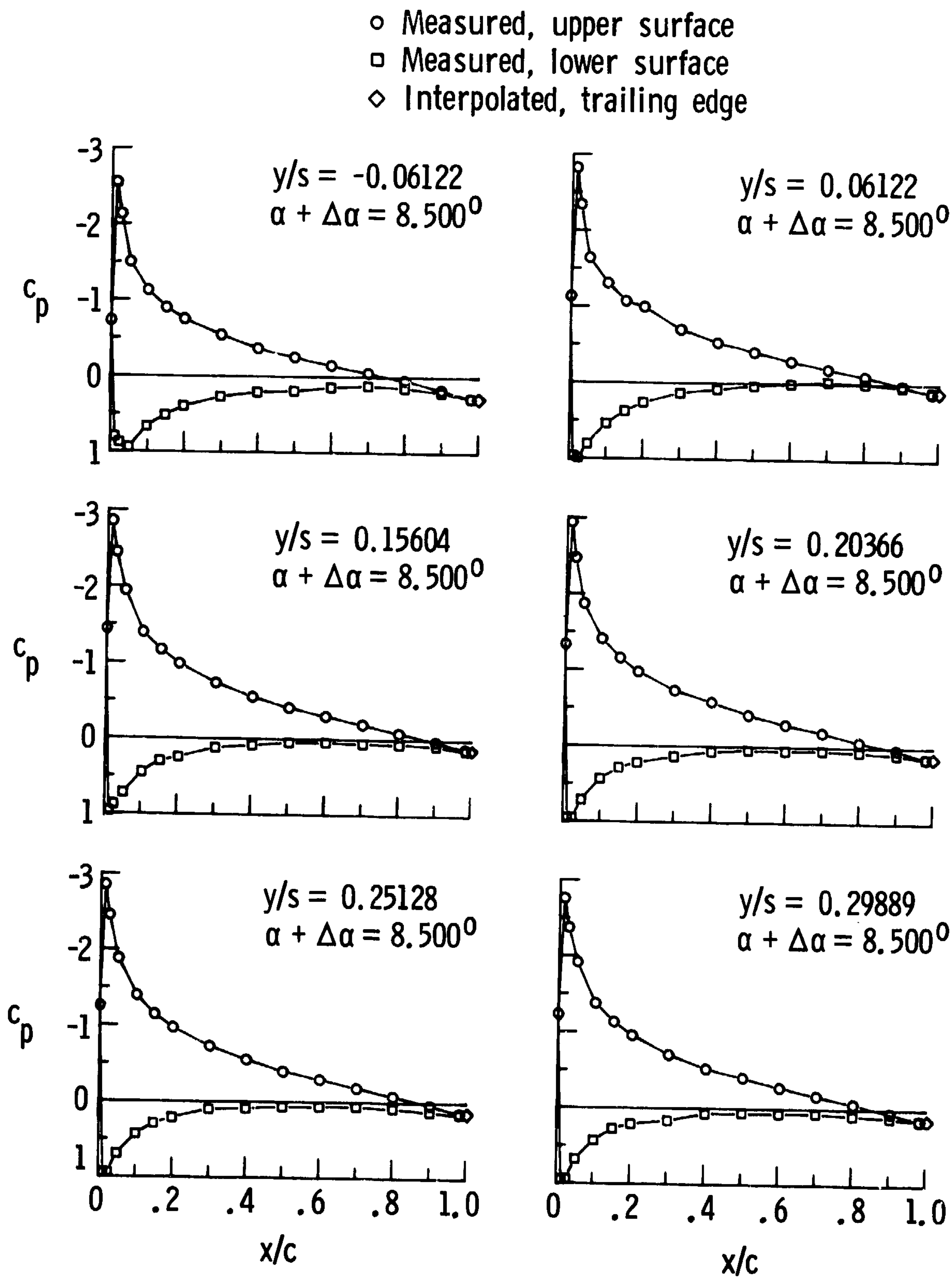
(b) Continued.

Figure 8. Continued.



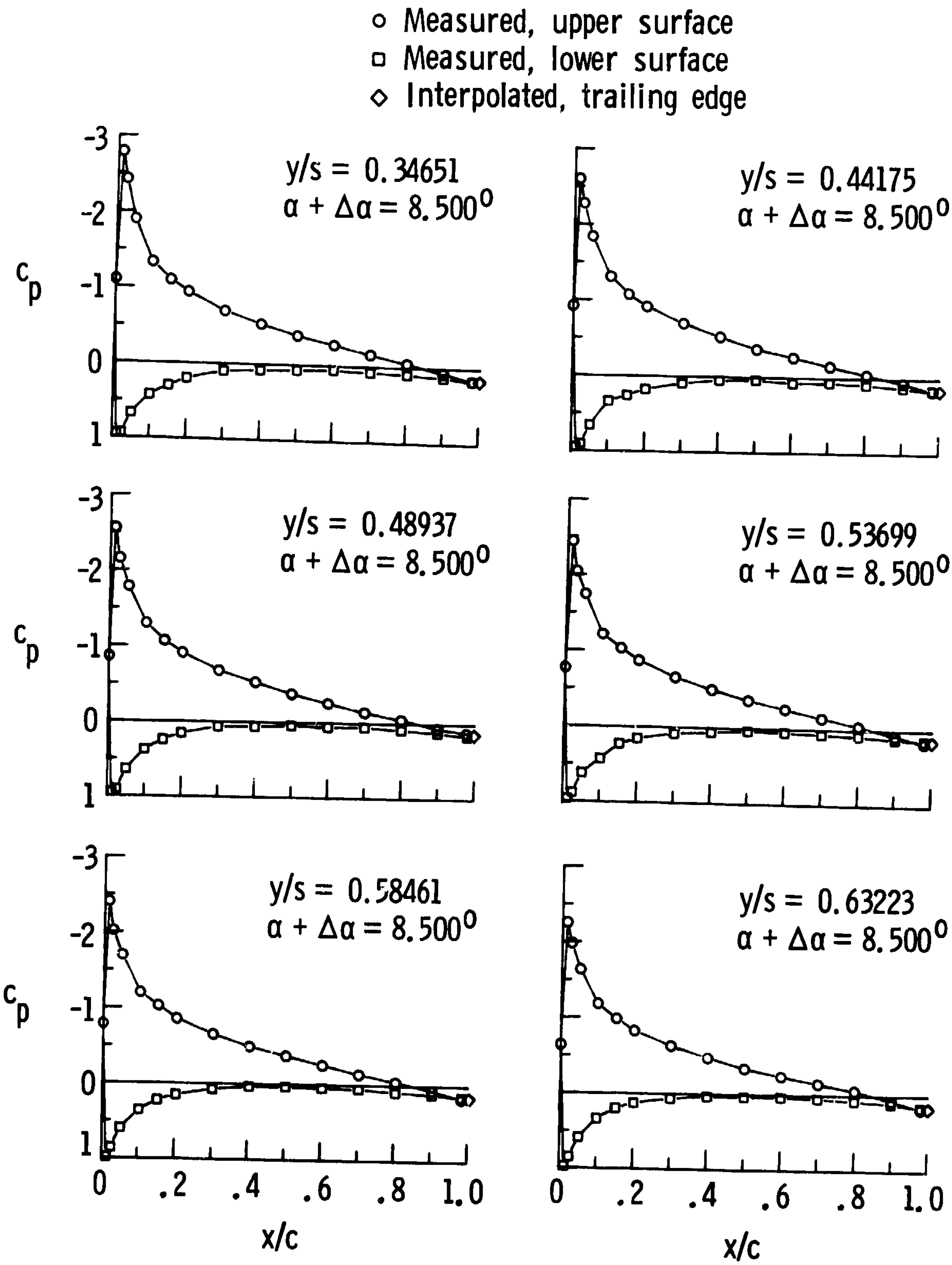
(b) Concluded.

Figure 8. Continued.



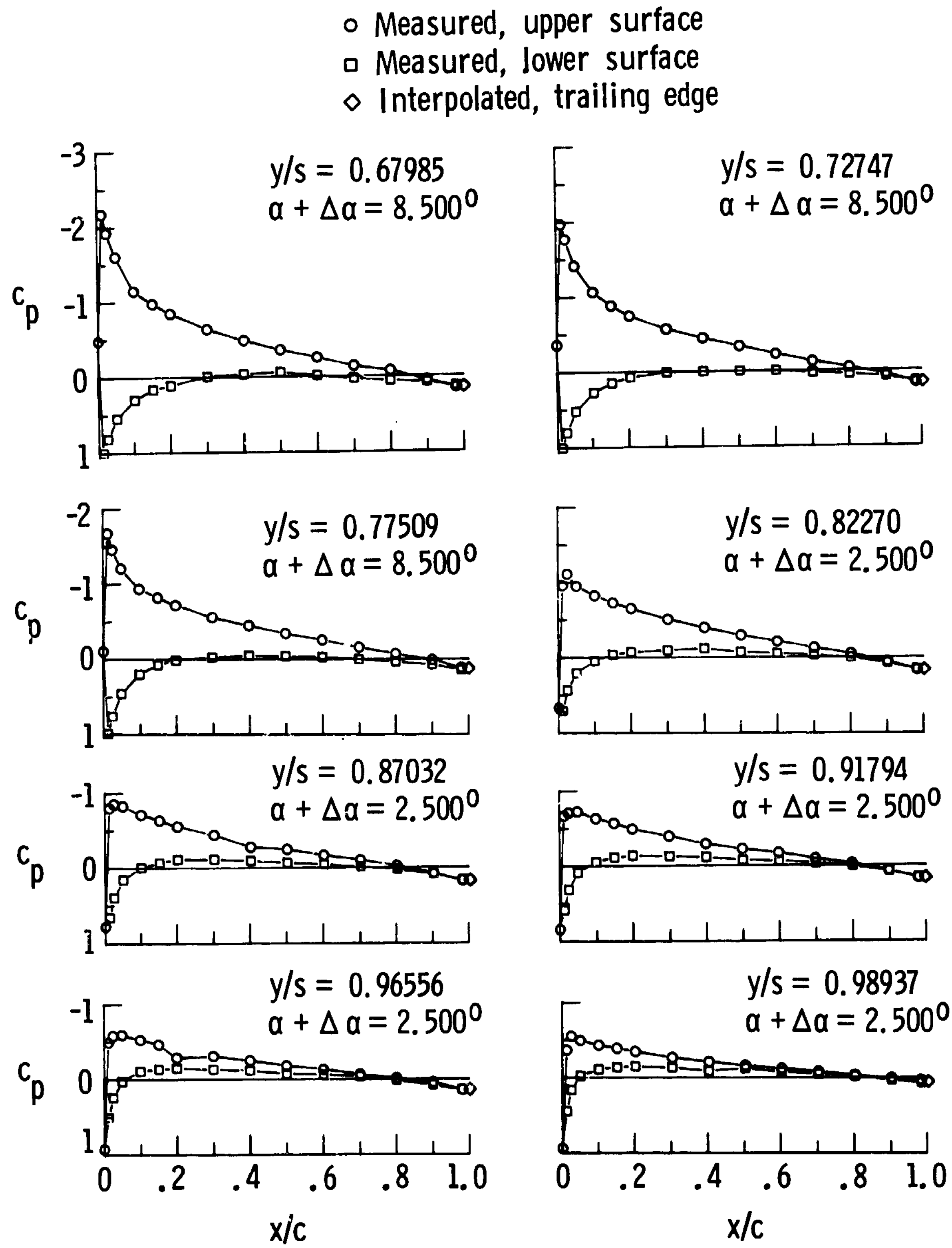
(c) VTW7 configuration.

Figure 8. Continued.



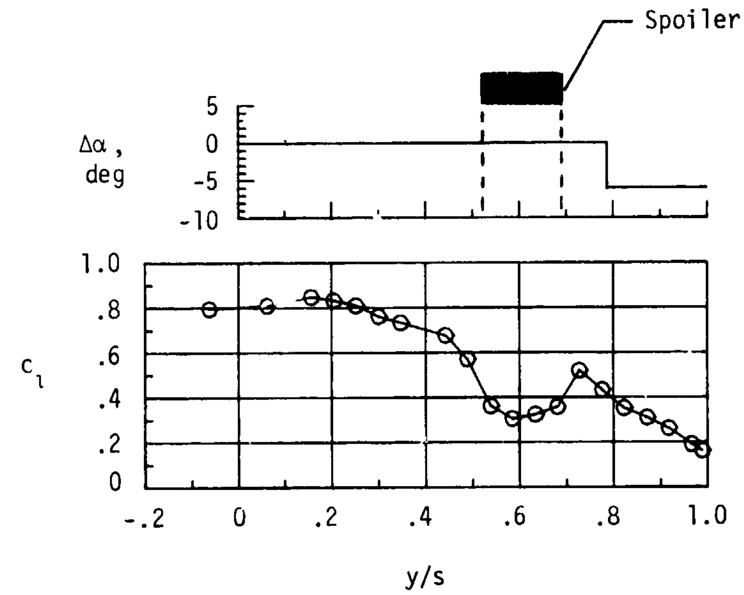
(c) Continued.

Figure 8. Continued.

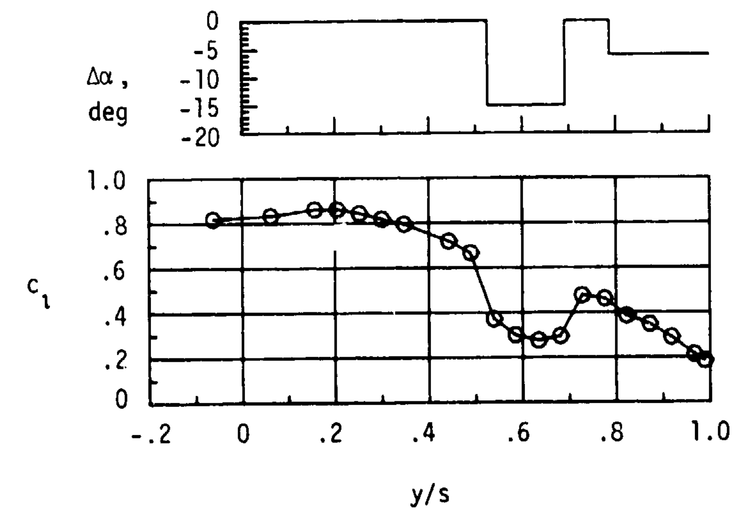


(c) Concluded.

Figure 8. Concluded.

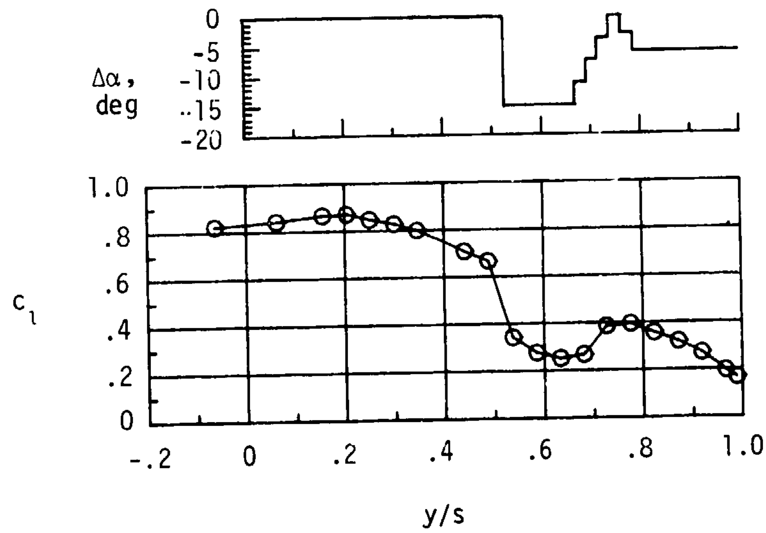


(a) VTW7S_0 configuration. $\alpha = 11.60°$.

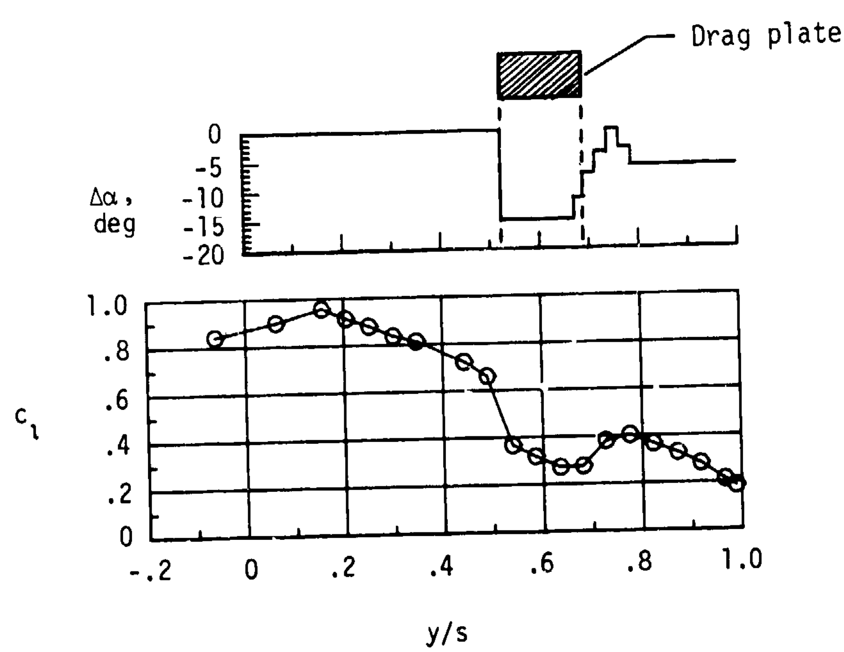


(b) VTW7S_1 configuration. $\alpha = 11.40°$.

Figure 9. Wing twist distributions and measured span-load distributions for group III VTW configurations at a nominal $C_L = 0.6$.

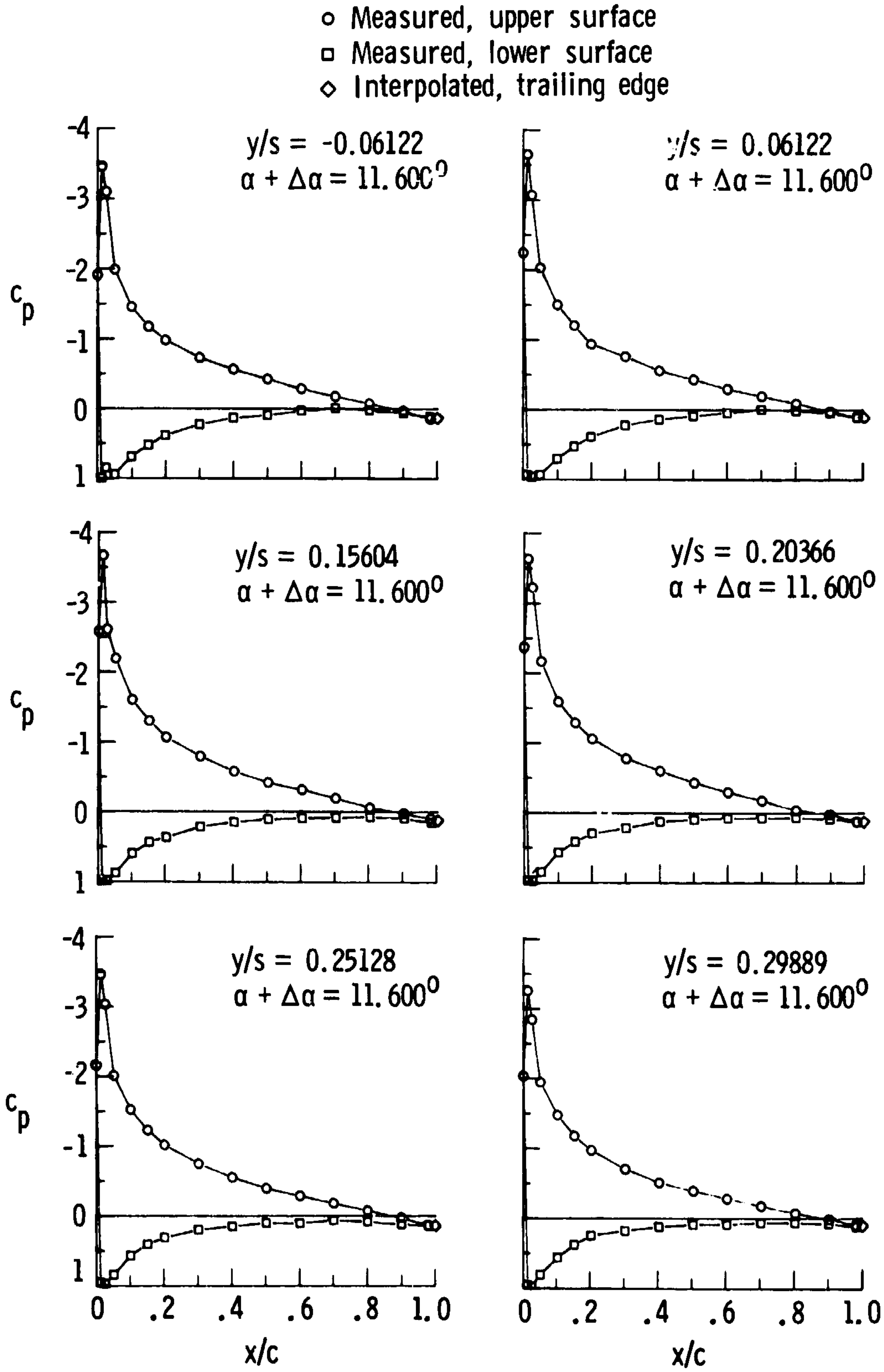


(c) VTW7S_3 configuration. $\alpha = 11.90°$.



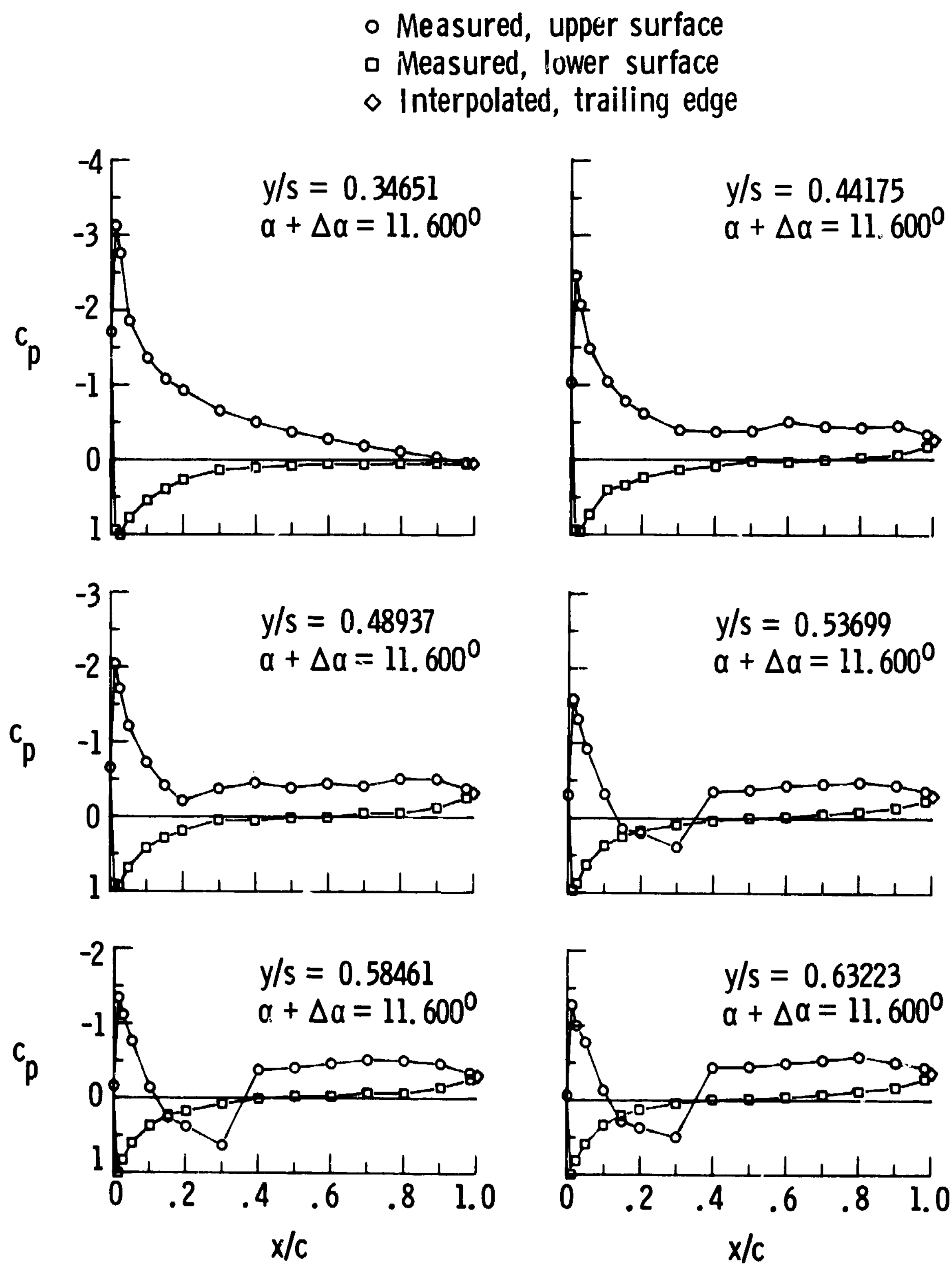
(d) VTW7S_3P configuration. $\alpha = 12.20°$.

Figure 9. Concluded.



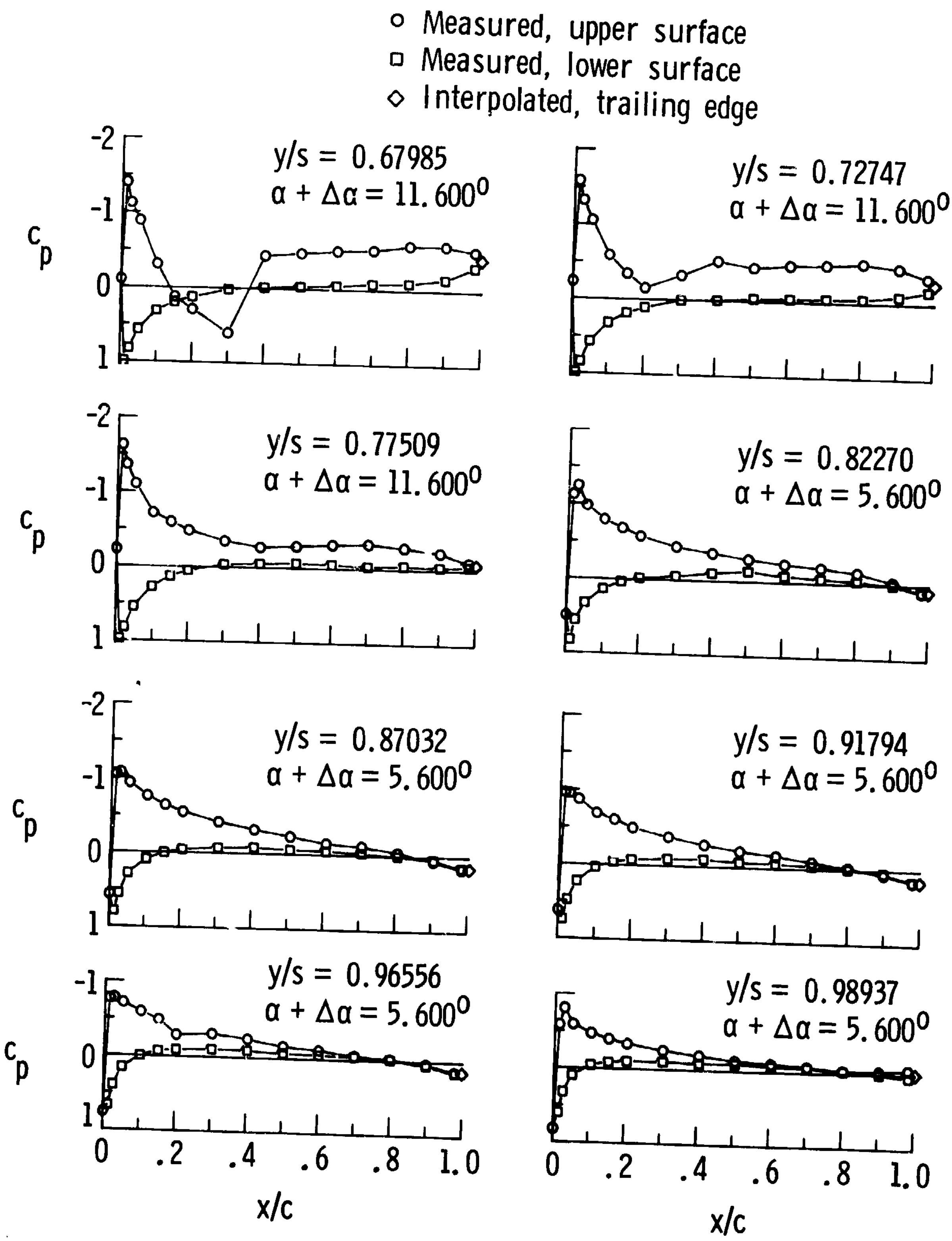
(a) VTW7S$_0$ configuration.

Figure 10. Pressure distribution measurements for group III VTW configurations.



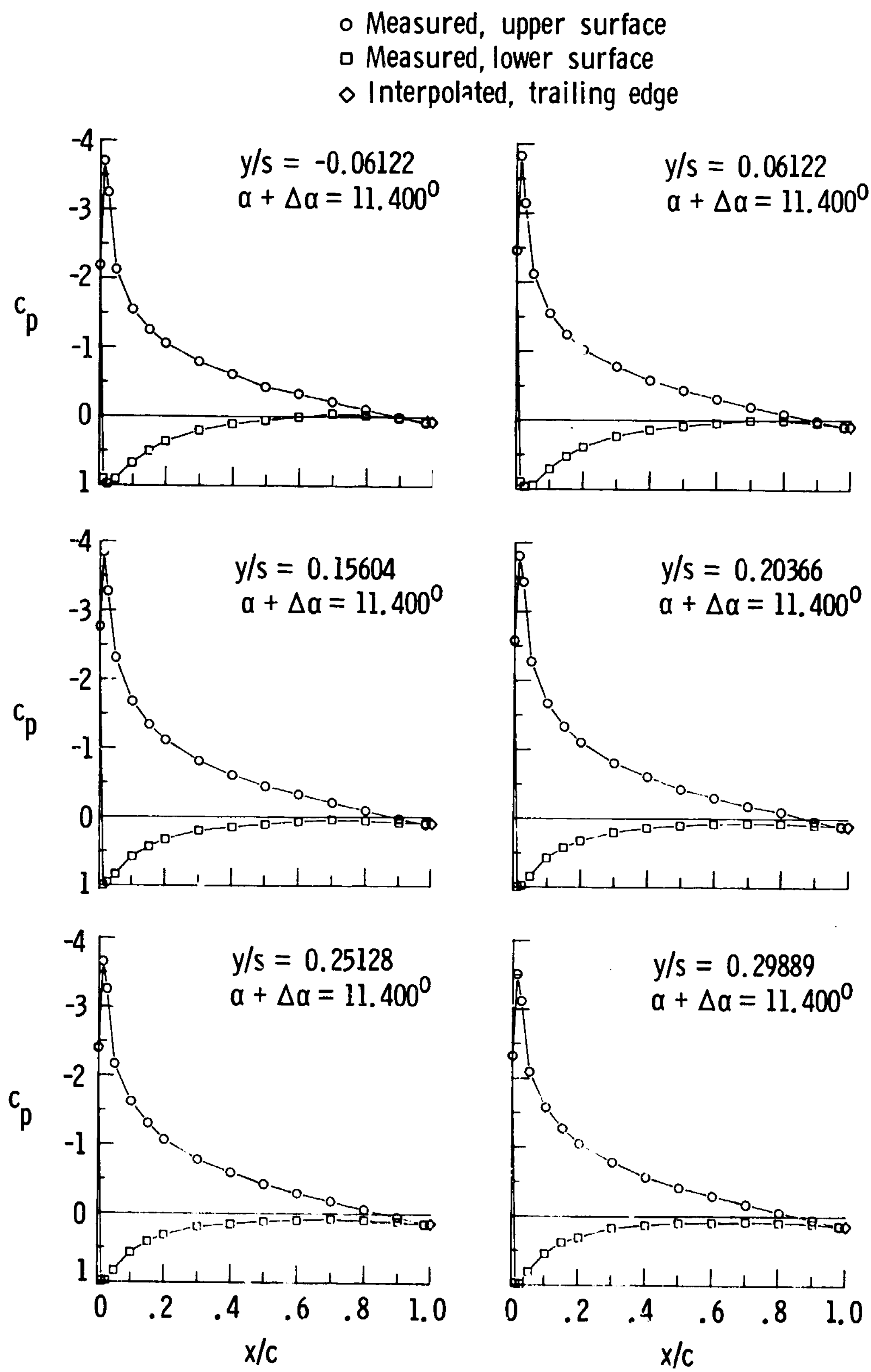
(a) Continued.

Figure 10. Continued.



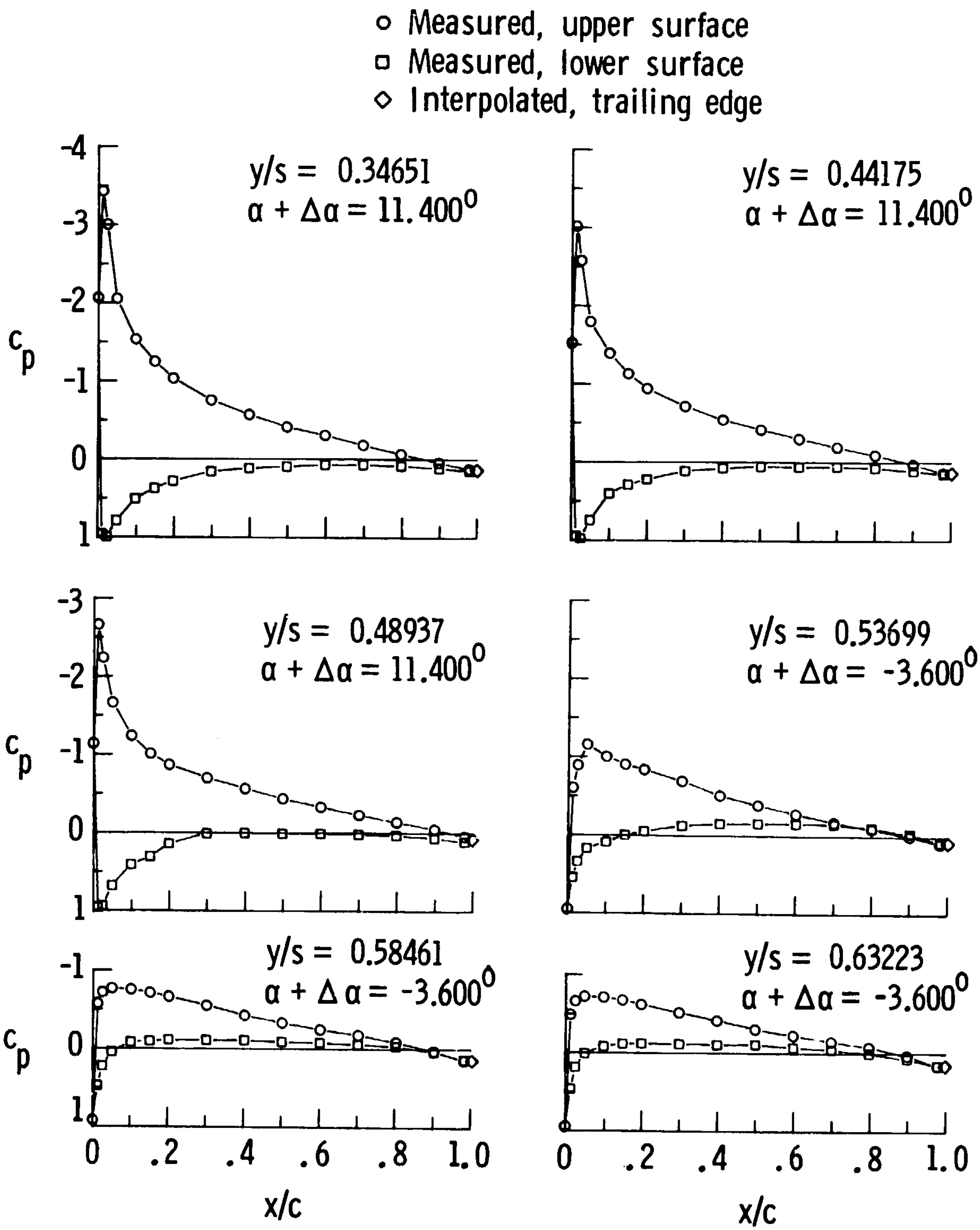
(a) Concluded.

Figure 10. Continued.



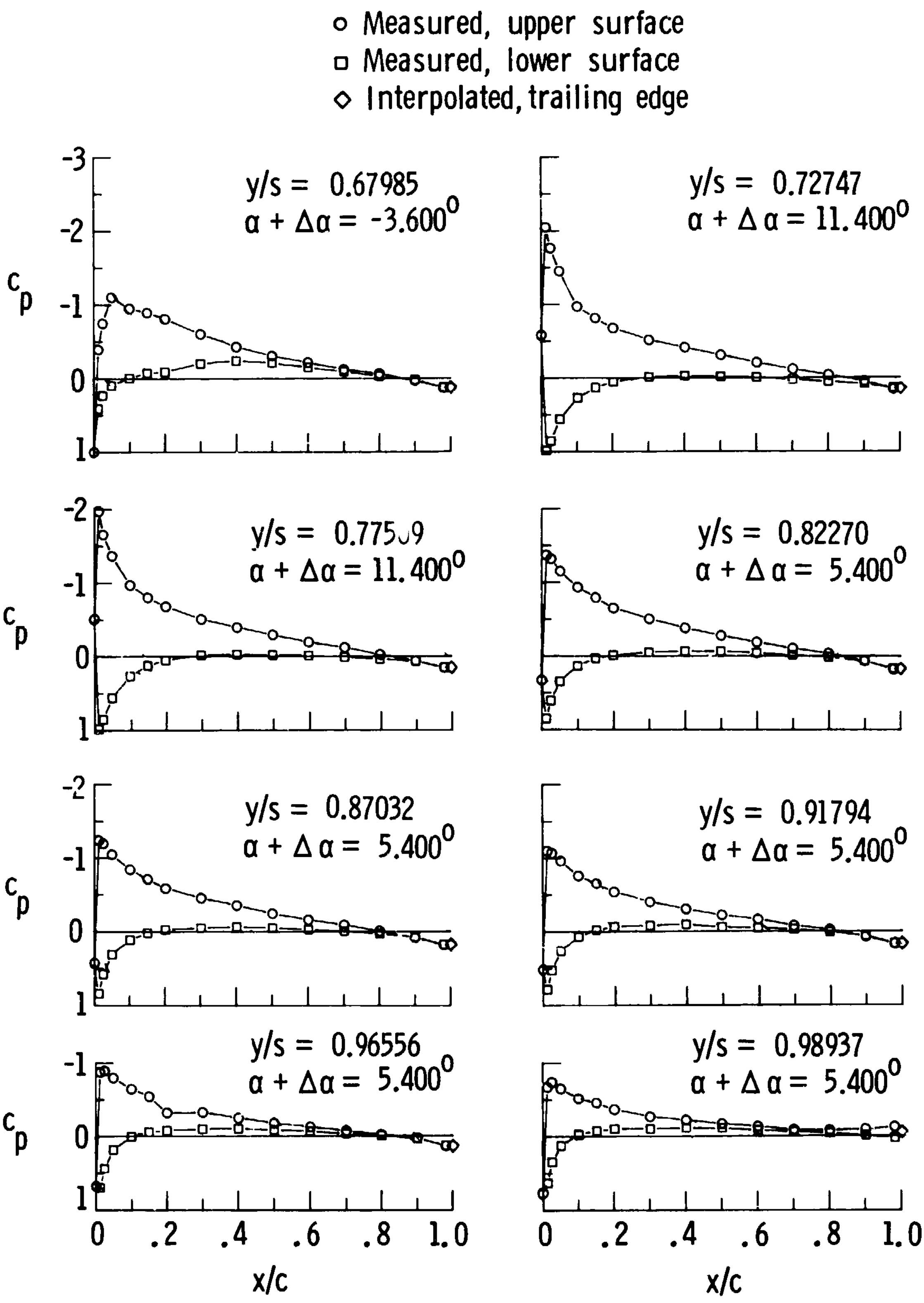
(b) VTW7S$_1$ configuration.

Figure 10. Continued.



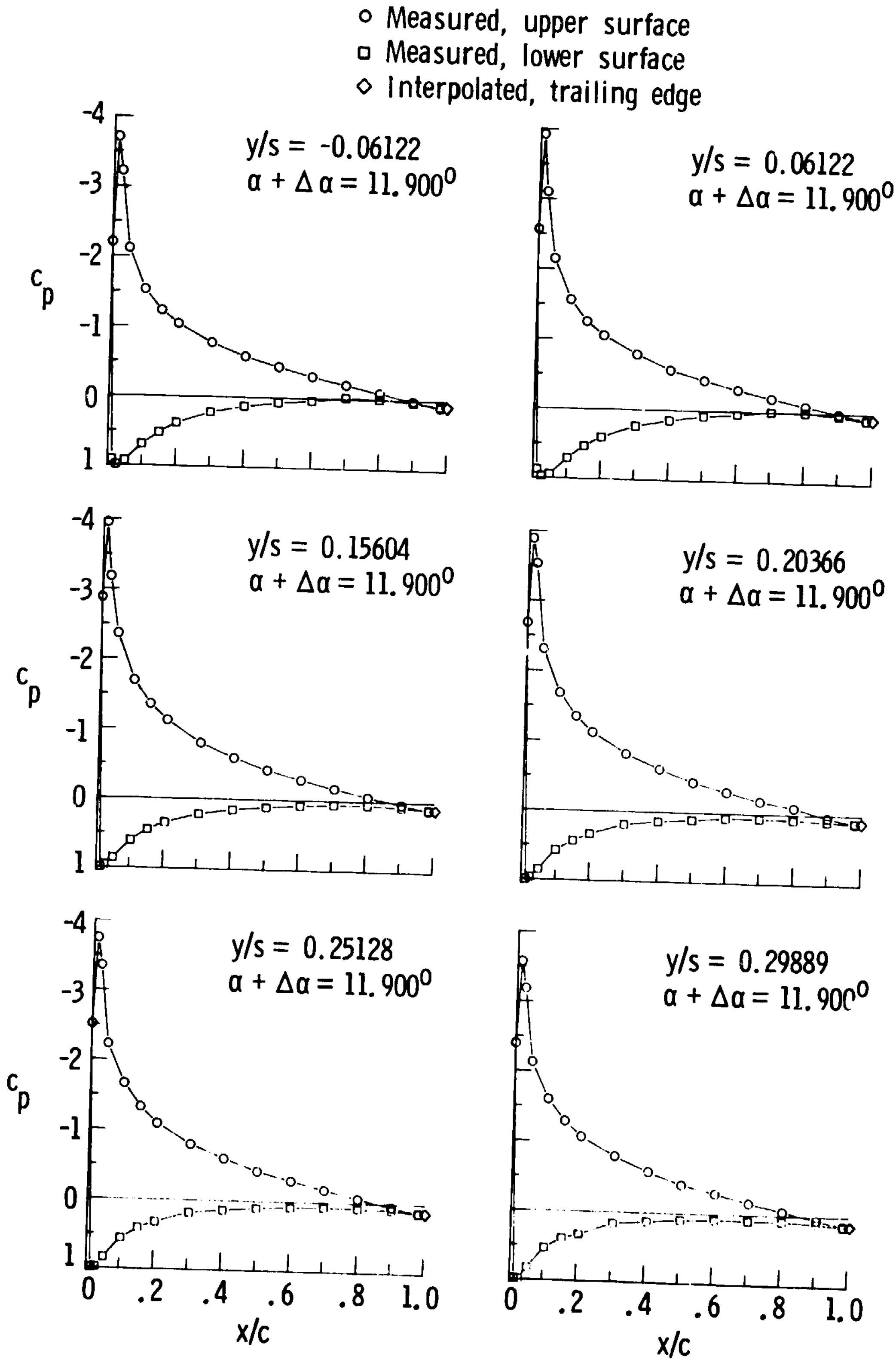
(b) Continued.

Figure 10. Continued.



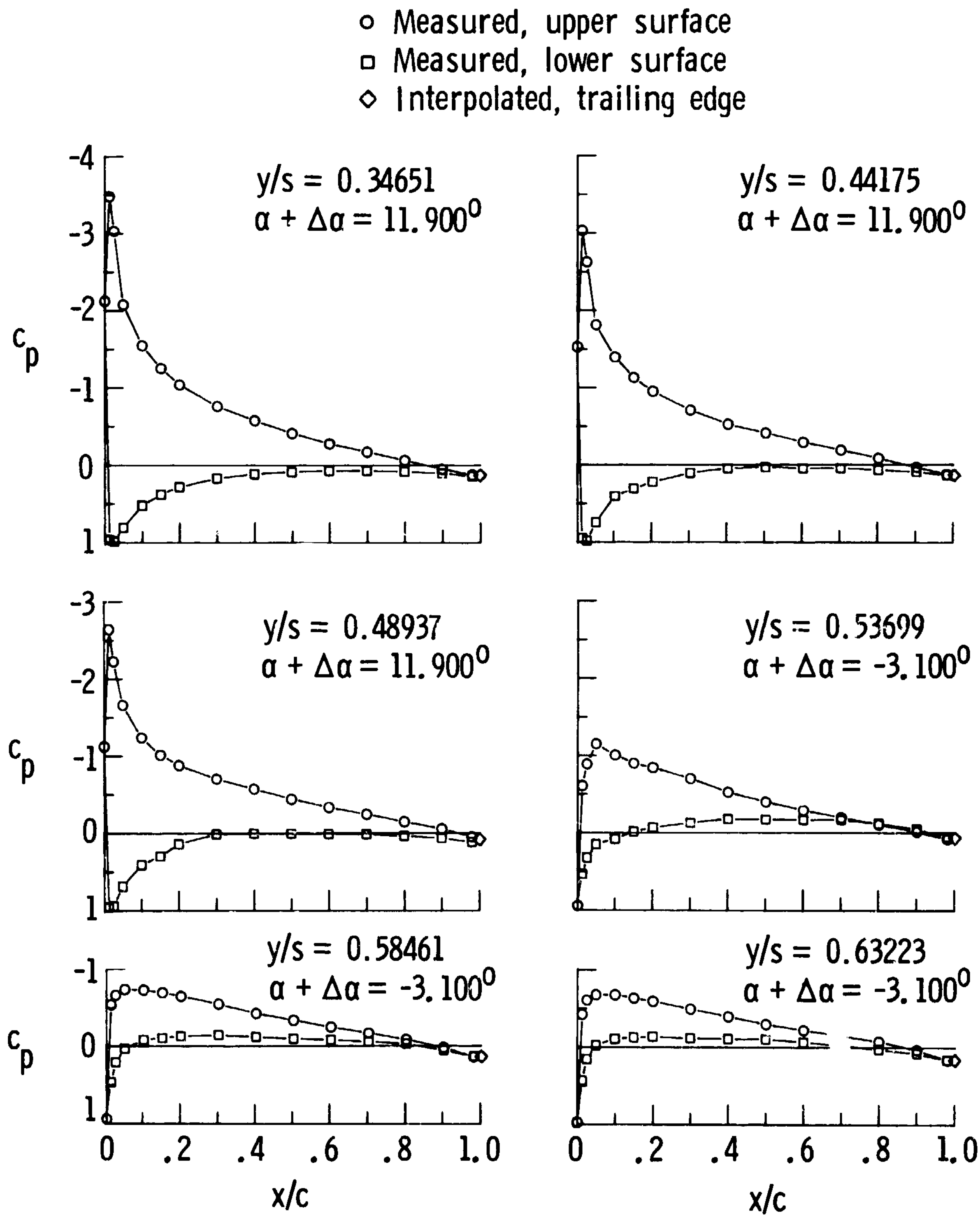
(b) Concluded.

Figure 10. Continued.



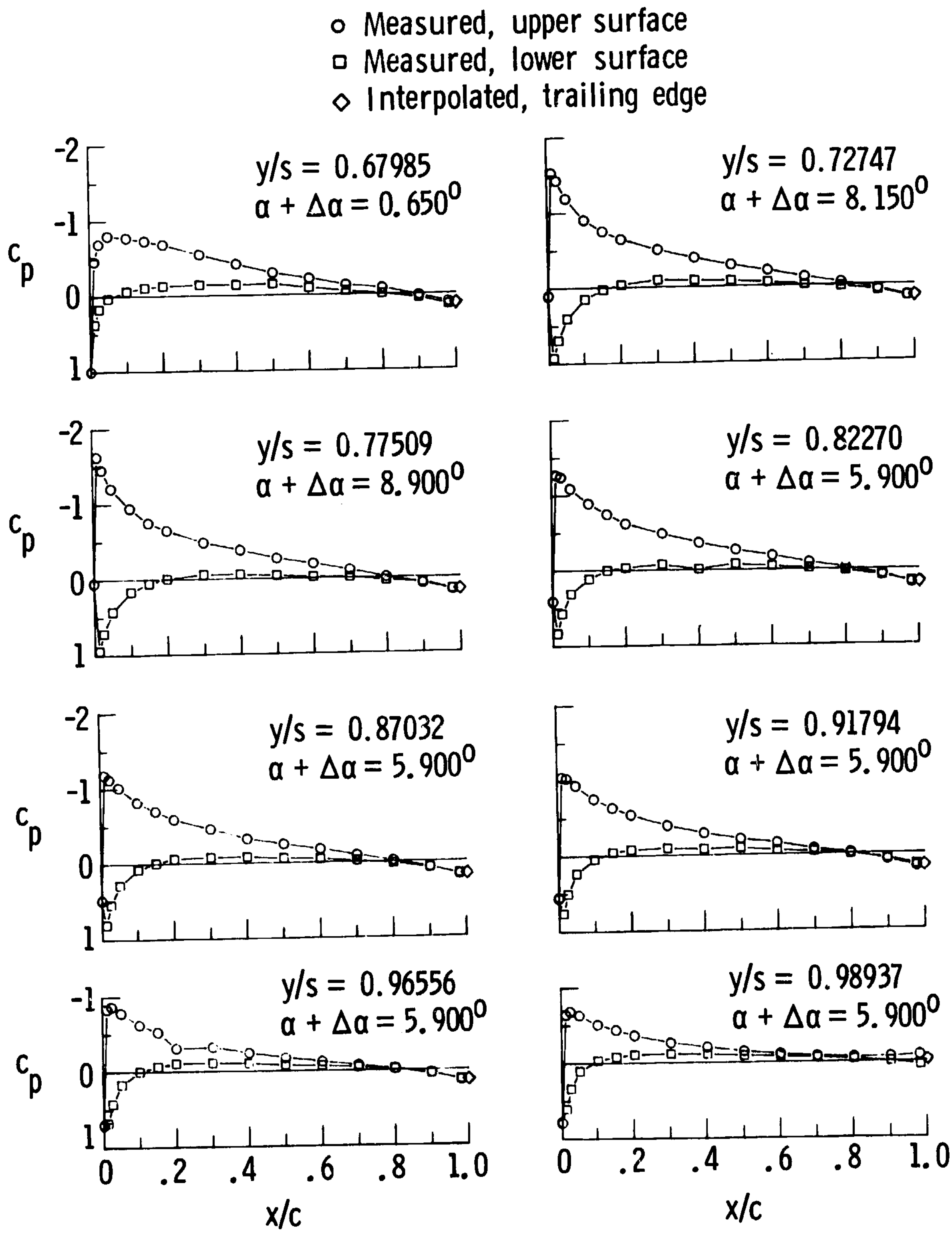
(c) $VTW7S_3$ configuration.

Figure 10. Continued.



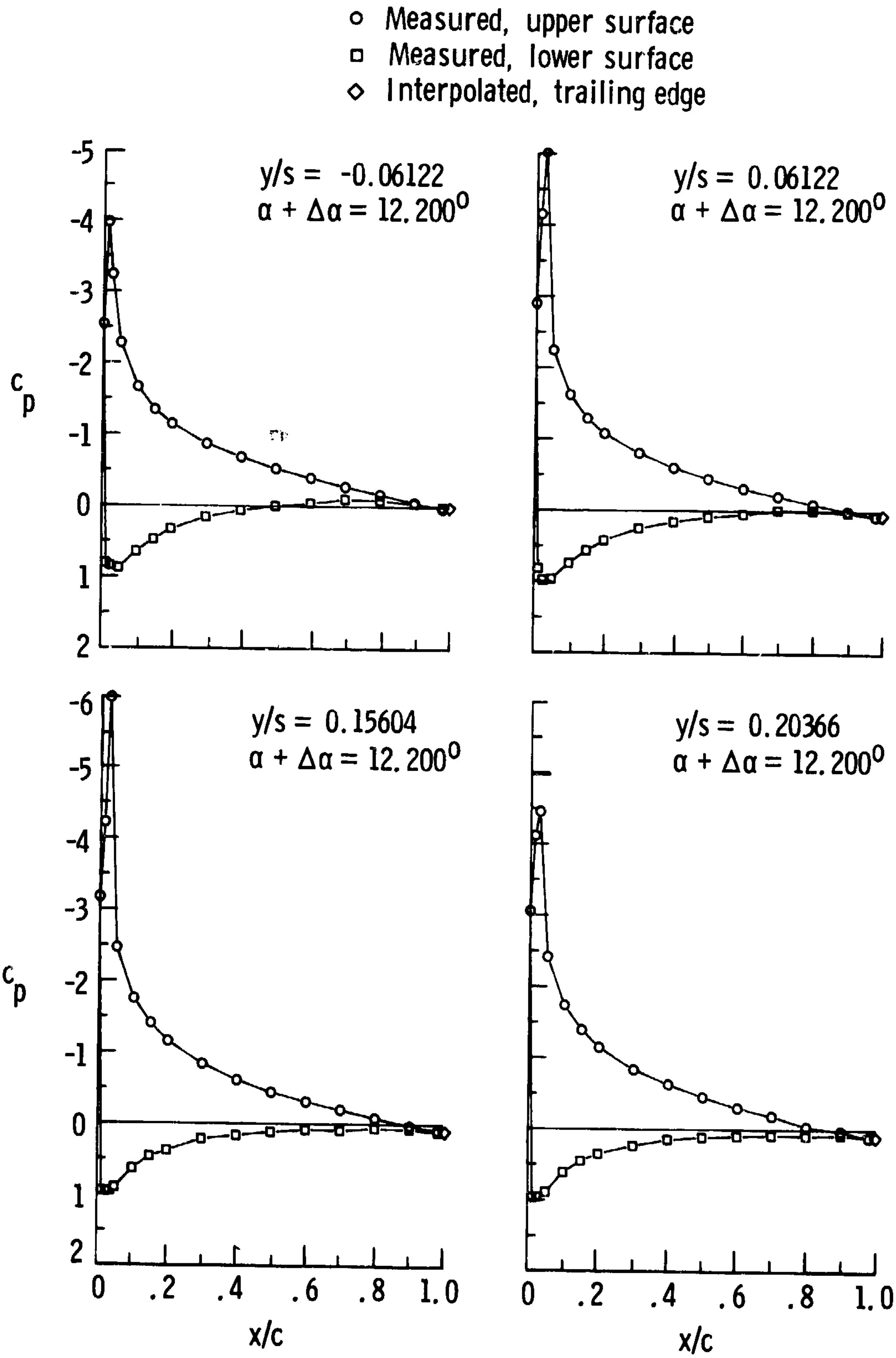
(c) Continued.

Figure 10. Continued.



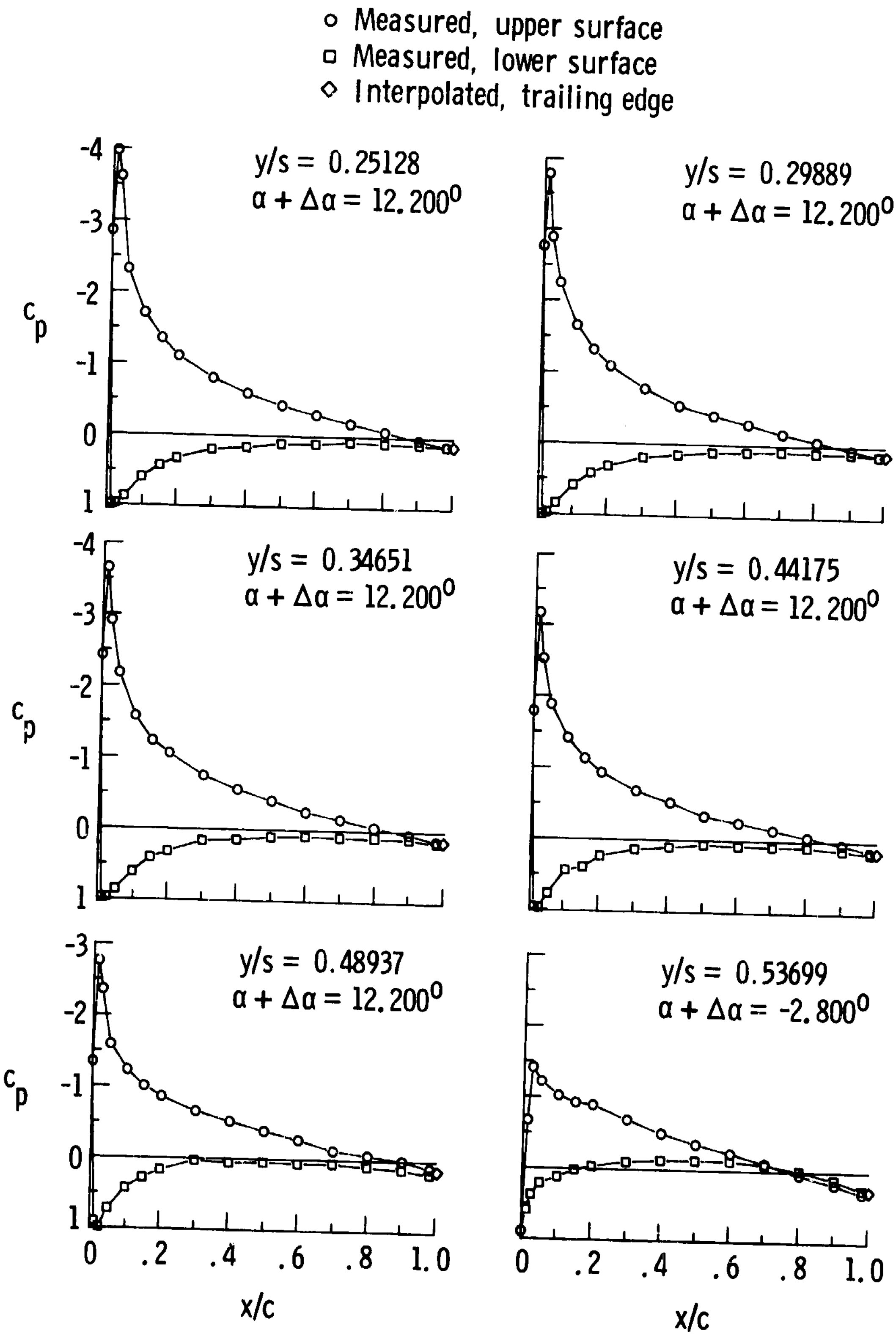
(c) Concluded.

Figure 10. Continued.



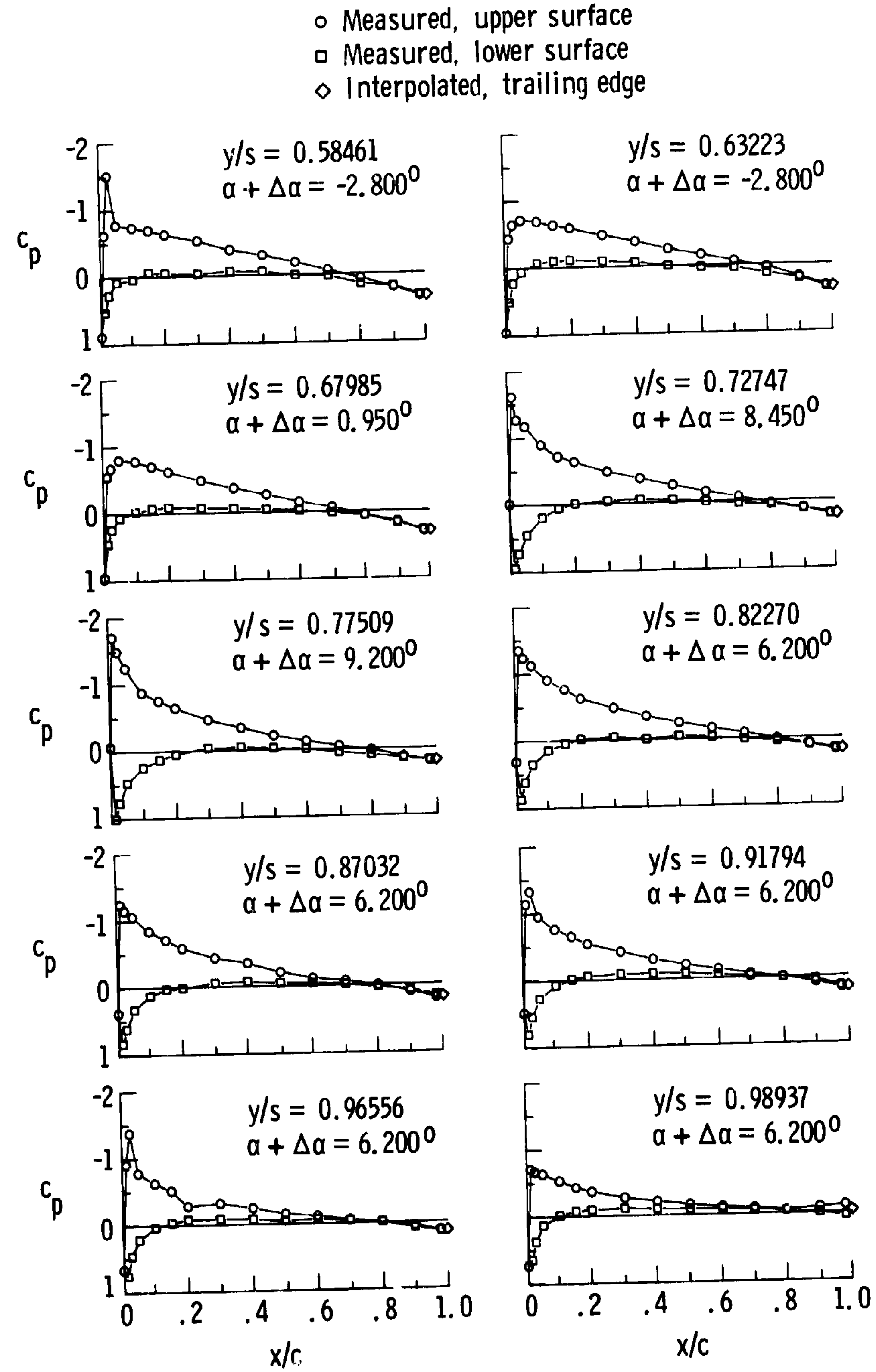
(d) $VTW7S_3P$ configuration.

Figure 10. Continued.



(d) Continued.

Figure 10. Continued.



(d) Concluded.

Figure 10. Concluded.