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COLLECTED DATA FOR TESTS ON A NACA 0015 AEROFOIL WITH CHORD OF LENGTH 0.275m.

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Herein is presented the collected data for tests in which a NACA 0015 aerofoil with chord of length 0.275m, was subjected to a variety of displacements in pitch about the quarter-chord location at low Reynolds numbers.

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SHORTENED NACA 0015

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NOMENCLATURE

c	chord
C_m	pitching-moment coefficient
C_n	normal force coefficient
C_p	pressure coefficient
C_t	"thrust" force coefficient
D.P.	dynamic pressure ($\rho V^2/2$)
k	reduced frequency ($\omega c/2V$)
r	reduced pitch-rate ($(c/2V)d\alpha/dt$)
Re	Reynolds number
TSR	tip speed ratio
V	velocity
x/c	chordwise dimension
α	angle of attack
ω	rotational velocity

1 INTRODUCTION

The phenomenon of dynamic stall, the onset of which is largely controlled by the behaviour of the viscous boundary layer on the aerofoil surface, plays an important role in the successful design of the helicopter rotor. During high speed forward flight conditions, the blades on the retreating side of the rotor disc encounter a reduced dynamic pressure, and hence rotor trim requirements dictate a high aerofoil lift coefficient. These high lift coefficients are generated through large angles of incidence, often exceeding the maximum static stall value and so take advantage of the dynamic effects on the stalling process. Aerofoil dynamic stall is imprecisely understood and is currently the subject of extensive experimental and theoretical investigation by, amongst others, **Beddoes**[1]. As has been shown by **Harris and Pruyn**[2], attempts to predict rotor performance without a mathematical model of retreating-blade stall have met with little success. Furthermore, the modelling is complicated by the highly three-dimensional flowfield of the rotor. It is clear, however, that, in order to formulate modelling techniques for use in rotor airload calculations, a basic understanding of the unsteady stall process must be established.

An experimental investigation of retreating-blade stall, together with a boundary-layer analysis on a model rotor, by **McCroskey et al**[3,4] pointed to the modelling of blade dynamic stall by an oscillating aerofoil in the nominally two-dimensional flow environment of a wind tunnel. Many such experiments of aerofoils oscillating through stall have since been performed, and data have been gathered for both the analysis of the fluid mechanics of the dynamic stall phenomenon itself and for use in mathematical model development.

As part of this investigation, in recent years, in the dynamic stall facility at the University of Glasgow[5,6,7], two-dimensional data have been acquired from experiments on a number of aerofoils under a variety of motion types. These aerofoils can be divided into two groups: the first is a family of cambered aerofoils generated from the NACA 23012 section and intended for the examination on helicopter blades of the transition from trailing-edge to leading-edge stall and the mechanism of reattachment; the second is a series of symmetrical sections for use on large-scale vertical-axis wind turbines. Of this second group of aerofoils, **Angell et al**[8,9,10] tested the NACA 0015. That model, like all others tested before now, possessed a chord of length 0.55m. However, as part of the University's research into the effects on the data of model aspect ratio and tunnel blockage, it was decided to repeat a number of these experiments on a model of chord length 0.275m. This report presents the collected data from tests performed on this shortened NACA 0015 model in steady and unsteady conditions. The coordinates for the aerofoil section are listed in **Table 1**, and a brief descripton of the experimental apparatus and techniques is presented below.

2 DESCRIPTION OF TEST FACILITY

2.1 Aerofoil and Wind Tunnel

The general arrangement of the aerofoil in the wind tunnel was as shown in **Figure 1**. The aerofoil, of chord length 0.55m and span 1.61m, was constructed of fibre glass mounted on an aluminium spar and filled with an epoxy resin foam. The hand-finished surface was very smooth, and the profile accurate to better than 0.1mm. The instrumented model was fitted vertically into the University of Glasgow's "Handley Page" wind tunnel.

The "Handley Page" low-speed wind tunnel is an atmospheric-pressure closed-return type with a 1.61x2.13 octagonal working section (**Figure 2**) in which a wind velocity of 61ms^{-1} can be attained. The model was pivoted about its quarter-chord axis on two tubular steel shafts connected to the main support via two self-aligning bearings. A single thrust bearing on the top support beam took all the weight. The dynamic and aerodynamic loadings from the aerofoil were reacted to the tunnel framework by two transversely mounted beams.

2.2 Pitch Drive Mechanism

2.2.1 Actuator

Angular movement of the model was obtained using a linear hydraulic actuator and crank mechanism. The actuator was mounted horizontally below the tunnel working section on the supporting structure, with the crank rigidly connected to the tubular part of the spar by a welded sleeve and keyway. The acuator was a UNIDYNE 907/1 type with a normal dynamc thrust of 6.1KN operated from a supply pressure of 7.0MNm^{-2}. A MOOG 76 series 450 servo valve was used via a UNIDYNE servo controller unit to control the movement of the actuator. A suitable feedback signal for the controller was provided by a precision linear angular displacement transducer geared to the main spar of the model.

2.2.2 Command Signal

The model's angle of attack was incremented by the actuator controller. The input signal during the static tests was provided under software control by the data acquisition unit's own digital-to-analogue converter. This was possible because, during the sampling, the angle of attack was fixed and sufficient time was available between sampling to set the model at the required angle of attack. The two activities were separate and were performed sequentially.

Such was not the case during the unsteady tests, however, where sampling and control of the model's motion were required simultaneously. Therefore, during these tests, the input signal was provided by a separate function generator, comprised of an AMSTRAD 1512 microcomputer equipped with an ANALOG DEVICES RTI815 multi-function input/output board. The required output function was digitised into equal time steps in 2's complement code and the frequency of the function was controlled using the internal interrupts of the AMSTRAD microcomputer. The code was written in TURBO PASCAL.

2.3 Instrumentation and Data Logging

2.3.1 Pressure Transducers

To provide the chordwise pressure distribution at mid-span, thirty KULITE XCS-093-5 PSI G ultra-miniature pressure transducers were installed just below the surface of the centre section of the model. The transducers were of vented gauge type with one side of the pressure sensitive diaphragm open to the ambient pressure outside the wind-tunnel (via tubes in the model). Each transducer was fitted with a temperature compensation module, which minimised the change in zero-offset and sensitivity with temperature. The locations of the pressure transducers in the model are illustrated in **Figure 3**.

The low voltage outputs from the thirty presure transducers were suitably amplified and conditioned by a bank of differential amplifiers. The conditioned signals were passed to a "sample and hold" unit[5,11] to overcome the time-skew problem arising from the sequential conversion of the anlogue signals into digital form.

2.3.2 Dynamic Pressure

The dynamic pressure in the wind tunnel working section was determined by measuring the difference between the static pressure in the working section, 1.2m upstream of the leading edge, and the static pressure in the settling chamber. The pressure tappings were connected to a FURNESS FC012 micromanometer, which provided an analogue signal suitable for the data acquisition unit's analogue-to-digital converter. This dynamic pressure was recorded as the sample-and-hold unit was triggered to sample the output from the pressure transducers.

2.3.3 Incidence

The instantaneous angle of attack of the aerofoil was determined by an angular displacement transducer geared to the model's main spar. The signal voltage from the transducer was fed into an amplifier/splitter to produce three signals for the following purposes:

i) connection of the multiplexer for recording the aerofoil's angle of attack;

ii) connection of the Schmitt trigger for initiation of data sampling when a preset incidence (voltage) was attained;

iii) a feedback signal to the hydraulic actuator controller.

2.3.4 Acquisition Unit

The actual data acquisition unit was a DEC MINC-11 microcomputer, configured with an LSI-11/32 16-bit microprocessor and laboratory modules which included:

i) an analogue-to-digital converter module, with a 16-channel multiplexer incorporated. The converter was a 12-bit successive approximation type with a conversion time of of 30μs, but the multiplexer's settling time and the need to transfer the data from the analogue-to-digital converter into system memory increased the conversion time to 44μs;

ii) a multiplexer module, of 16 single-ended channels, which increased the number of channels that could be sampled to 32;

iii) a real-time clock module, with two Schmitt triggers. This was used as a time-base generator to accurately set the sampling frequency. For ramp experiments, the sampling frequency was determined at run time from the pitch rate and the requirement that 128 sample sweeps should be obtained when the incidence was increasing and the same number when the aerofoil was sitting at its final incidence. However this specification was qualified by the fact that data were required to be recorded at the final incidence for no longer than 4 seconds and that the maximum sampling frequency which could be attained was 550Hz. One of the Shmitt triggers was used to initiate data sampling, by setting its reference voltage to a value corresponding to the angular displacement transducer's output for the required starting angle of attack. For oscillatory tests, the sampling frequency was determined from the frequency of oscillation and the requirement that 128 sample sweeps should be obtained during each cycle;

iv) a digital-to-analogue converter module which housed four independent 12-bit digital to analogue converters. This was used to provide the command signal for the hydraulic actuator during static tests.

The path of data flow and system layout is shown diagrammatically in **Figure 4**. The main control programs for the tests were written in FORTRAN IV, as described by **Murray-Smith and Galbraith**[12]. The programs prompt the user for specific run information before calling a specialised subroutine written in MACRO-11 assembly language to receive and store the digitised data. The timing and control of the analogue-to-digital converter and associated circuitry was performed by the processor's hardware, but channel selection and data management were achieved under software control.

Part of the research on this model has involved calculating the velocity of the dynamic stall vortex over the aerofoil's upper surface. It was perceived that, for this purpose, it was necessary to record data at a higher frequency than the 550Hz which could be recorded by the system described above. Therefore, for a number of experiments, the data were converted by a THORN-EMI BE256 unit and logged via an IBM PSI180 microcomputer. These tests are indicated in the presentation plots by the fact that the sampling frequency was greater than 550Hz.

3 TEST SERIES AND PROCEDURE

3.1 Static Experiment

A number of experiments were performed under steady conditions. Once the wind velocity had reached the required value, the aerofoil was rotated about its quarter-chord axis until it was positioned at the incidence at which the first set of data were to be recorded.

Usually, this was approximately -2°. The model's angle of attack was then increased in steps of approximately 0.5°. After each increment in incidence, the flow was allowed to stabilise for a few seconds before each transducer's output was sampled 100 times and the mean value for each was stored. After 64 sweeps of data had been recorded, the model was returned to its starting position. Data sampling was maintained at the same rate on the return arc in order to record any delay in the reattachment of flow.

3.2 Unsteady Static Experiment

To record any fluctuations in the post-stall characteristics, the model's angle of attack was set at the required value and then a continuous sample of 256 data sweeps were recorded at a preset frequency (100Hz and 500Hz).

3.3 Ramp Experiment

During a ramp test the aerofoil was rotated about its quarter-chord axis over a preset arc at a constant pitch-rate. Five cycles of 256 data sweeps were recorded during each experiment. Between each ramp, the model sat at the finishing angle for five seconds, moved smoothly back to the starting angle in five seconds and sat at this position for another five seconds. Experiments were performed both when the pitch-rate was positive ("ramp up") and when it was negative ("ramp down").

3.4 Sinusoidal Experiment

For this experiment, the model was rotated about its quarter-chord axis so that its angle of attack varied sinusoidally with time. The amplitude and frequency were controlled by the AMSTRAD function generator. During each oscillatory cycle 128 data sweeps were recorded and logged, with data being sampled during ten cycles.

3.5 VAWT Experiment

The VAWT experiment was designed to emulate the incidence time histories encountered by the blade of a vertical-axis wind turbine. A computer algorithm, coded in FORTRAN 77, has been developed at the University of Reading to calculate the blade's angle of attack as a function of its azimuth position. The program can use both single and multiple streamtube models[13] based on SANDIA[14] data for the NACA series of aerofoil characteristics.

At low tip-speed ratios the time history for the single streamtube model is a skewed sine function, but this tends toward a true sine as the tip-speed ratio is increased. The upwind (positive) and downwind (negative) sections of each cycle attain identical peak values of incidence. Tip-speed ratio and amplitude are related as follows:

TSR	Amplitude
6.00	5.4°
4.00	9.9°
3.50	12.2°
3.25	13.8°
2.80	17.4°
2.33	22.6°
1.75	32.8°

The AMSTRAD function generator reproduced the angle of attack histories based upon the NACA 0015 aerofoil's characteristics. Data acquisition was performed in an identical manner to that for sinusoidal tests.

3.6 Procedure

Before each individual set of tests, the tunnel was shut down and the air flow allowed to cease before the transducer offsets were logged. Immediately after these values were recorded, the appropriate data acquisition routine was initiated whilst the tunnel was brought up to speed and thence data gathered as per the software prompts. The tunnel was then shut down, offsets logged again and further tests were performed in the manner described above.

3.7 Roughness Transition Strips

A number of the experiments were repeated with graded sand deposited at the aerofoil's leading edge. It was intended that this should trip the boundary layer in the leading-edge region. A direct comparison can be made between tests with and those without these roughness transition strips.

3.8 Data Presentation

All data collected by the data acquisition routines were stored in unformatted form on magnetic tape. A library of programs (coded in FORTRAN 77) is available for the reduction, presentation and analysis of the data on a DEC MICROVAX 3400. By applying offsets, gains and calibrations, the data reduction programs convert the cycles of raw data into averaged or unaveraged non-dimensional pressure coefficients. As described by **Leitch and Galbraith**[15], these data are stored on the University of Glasgow's aerofoil database. The airloads are determined by suitably integrating the pressure coefficient values.

4 RESULTS AND DISCUSSION

4.1 Tunnel Performance

Assessment of the quality of the data can only be made with a clear insight of the tunnel effects. Unfortunately the tunnel performance was such that, for the time scales of the model motion, it was not possible to hold the dynamic pressure in the working section constant whilst altering the blockage due to the pitching of the aerofoil. During the static tests (i.e. **k**=0.0 and **r**=0.0), this variation was as illustrated in **Figure 5**, where it can be seen that there was approximately a 30% reduction in dynamic pressure as the angle of attack was increased from 0° to 30°. As illustrated in **Figures 6** and **7**, this reduction in dynamic pressure decreased as reduced frequency increased.

Figure 8 reveals that, during ramps, there was a drastic reduction and subsequent unsteadiness in the dynamic pressure during a test. The model was pitched to an incidence of 40° so that uniform ramp conditions existed at stall. Once the aerofoil had stalled, however, all significant data had already been collected and the corresponding dynamic pressure reduction was only in the region of 10%. The subsequent data are of little relevance to the current work and is presented merely for completeness.

4.2 Averaging of the Data

The main data in this report are the average of a number of cycles. Individual cycles are presented in **Figures 9** and **10** where it may be seen that, whilst minor random differences do exist from cycle to cycle, the salient features are highlighted by the averaging process. In addition, the sweep at which any event occurred did not vary. Therefore the given data may be considered as typical of aerofoil performance during any given individual cycle. This is particularly relevant when considering the detailed flow phenomena of separation and reattachment.

4.3 Test Data

The test data are grouped for each motion type with compact details of the specific tests listed in **Tables 2** to **7**.

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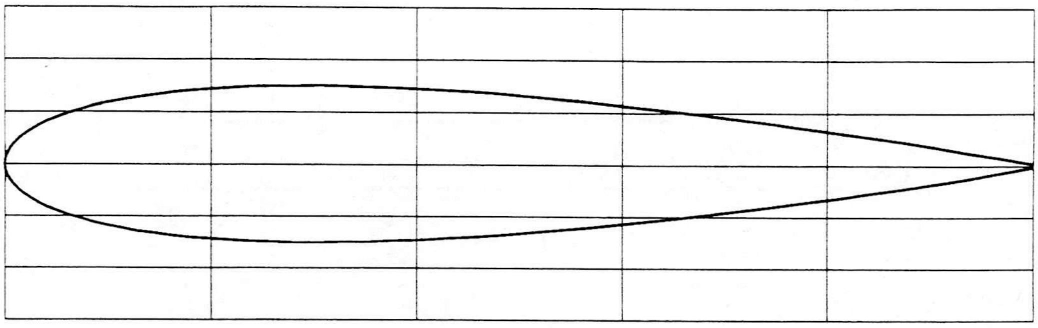
TABLE 1 : NACA 0015 AEROFOIL PROFILE AND COORDINATES



Coordinates in %Chord

Upper Surface		Lower Surface	
Station	Ordinate	Station	Ordinate
0.000	0.000	0.000	0.000
0.137	0.811	0.137	-0.811
0.548	1.596	0.548	-1.596
1.231	2.350	1.231	-2.350
2.185	3.073	2.185	-3.073
3.407	3.759	3.407	-3.759
4.894	4.403	4.894	-4.403
6.642	5.001	6.642	-5.001
8.645	5.547	8.645	-5.547
10.899	6.035	10.899	-6.035
13.397	6.460	13.397	-6.460
16.133	6.817	16.133	-6.817
19.098	7.103	19.098	-7.103
22.285	7.314	22.285	-7.314
25.686	7.447	25.686	-7.447
29.289	7.501	29.289	-7.501
33.087	7.476	33.087	-7.476
37.068	7.373	37.068	-7.373
41.221	7.194	41.221	-7.194
45.536	6.941	45.536	-6.941
50.000	6.618	50.000	-6.618
54.601	6.227	54.601	-6.227
59.326	5.773	59.326	-5.773
64.163	5.259	64.163	-5.259
69.098	4.689	69.098	-4.689
74.118	4.064	74.118	-4.064
79.209	3.388	79.209	-3.388
84.357	2.660	84.357	-2.660
89.547	1.880	89.547	-1.880
94.766	1.047	94.766	-1.047
100.000	0.158	100.000	-0.158

TABLE 2 : DETAILS OF STATIC TESTS

TABLE 2.1 : SUMMARY OF STATIC TESTS (nominal)

Reynolds Number	1.0×10^6	1.5×10^6	2.0×10^6
Angle of Attack	-2° to 30°		

(all permutations)

TABLE 2.2 : LIST OF STATIC TESTS (actual)

Run Number	Start (°)	Sweep (°)	Reynolds No. x 10^{-6}
00411	-2	32	1.04
00421	-2	32	1.01
00431	-2	32	0.98
00441	30	32	0.90
00451	-2	32	1.01
00461	-2	32	0.78
00471	-2	32	0.77
00481	-2	32	0.77
00491	-2	32	1.06
00511	-2	32	0.95
00531	-2	32	0.85
00551	-2	32	0.76
00571	-2	32	0.66
00591	-2	32	0.55
00611	-2	32	0.83
00781	-2	32	0.83
00831	-2	32	1.08
01111	-2	32	2.15
01211	-2	32	1.69
01251	-2	32	1.58
01381	-2	32	1.58
01661	-2	32	1.57
01721	-2	32	2.13
*801971	-2	32	2.20
*801981	-2	32	1.77

*experiments with roughness transition strips

TABLE 3 : DETAILS OF UNSTEADY STATIC TESTS

TABLE 3.1 : SUMMARY OF UNSTEADY STATIC TESTS (nominal)

Incidence Range	0^o - 35^o
Sampling Frequency	500Hz
Reynolds Number	$2.0x10^6$

TABLE 3.2 : LIST OF UNSTEADY STATIC TESTS (actual)

Run Number	Angle of Attack (°)	Sampling Frequency (Hz)	Reynolds Number x 10^{-6}
40841	0	500	1.06
40851	1	500	1.06
40861	2	500	1.05
40871	3	500	1.04
40881	4	500	1.04
40891	5	500	1.04
40901	6	500	1.04
40911	7	500	1.04
40921	8	500	1.04
40931	9	500	1.03
40941	10	500	1.03
40951	11	500	1.03
40961	12	500	1.03
40971	13	500	2.06
40981	14	500	2.08
40991	15	500	2.07
41001	16	500	2.06
41011	17	500	2.07
41021	18	500	2.07
41031	19	500	2.06
41041	20	500	2.06
41051	21	500	2.06
41061	22	500	2.05
41071	23	500	2.05
41081	24	500	2.04
41091	25	500	2.04
41101	26	500	2.04
41121	27	500	2.12
41131	28	500	2.11
41141	29	500	2.10
41151	30	500	2.10
41161	31	500	2.09
41171	32	500	2.09
41181	33	500	2.09
41191	34	500	2.08
41201	35	500	2.08

TABLE 4 : DETAILS OF RAMP UP TESTS

TABLE 4.1 : SUMMARY OF FAST RAMPS (nominal)

Starting Angle	-1^o											
Finishing Angle	40^o											
Pitch Rate ($^o s^{-1}$)	180	210	240	270	300	335	370	400	435	470	500	530
Reynolds Number	$0.8x10^6$						$1.0x10^6$					

(all permutations, with and without roughness transition strips)

TABLE 4.2 : SUMMARY OF SLOW RAMPS (nominal)

Starting Angle	-1^o													
Finishing Angle	40^o													
Pitch Rate ($^o s^{-1}$)	2	4	8	12	16	20	30	40	60	80	100	120	150	160
Reynolds Number	$0.8x10^6$													

(all permutations, without roughness transition strips)

TABLE 4.3 : LIST OF RAMP UP TESTS (actual)

Run Number	Start (^{o})	Arc (^{o})	Pitch Rate ($^o s^{-1}$)	Reduced Pitch Rate	Reynolds No. x 10^{-6}
20023	-1	41	1.9	0.0001	0.78
20033	-1	41	3.8	0.0002	0.78
20043	-1	41	7.7	0.0004	0.77
20053	-1	41	11.9	0.0007	0.77
20063	-1	41	16.0	0.0009	0.77
20073	-1	41	20.4	0.0011	0.77
20083	-1	41	37.6	0.0021	0.76
20093	-1	41	79.8	0.0044	0.76
20103	-1	41	123.4	0.0069	0.76
20113	-1	41	168.3	0.0094	0.76
20123	-1	41	197.9	0.0110	0.76
20133	-1	41	252.5	0.0140	0.76
20143	-1	41	284.2	0.0159	0.77
20153	-1	41	320.1	0.0179	0.76
20163	-1	41	355.2	0.0198	0.76
20173	-1	41	366.3	0.0204	0.76
20183	-1	41	444.8	0.0249	0.76
20194	-1	41	442.3	0.0247	0.76
21221	-1	40	463.9	0.0257	0.80
21231	-1	40	501.4	0.0278	0.80
21241	-1	41	534.5	0.0297	0.80
21261	-1	41	16.6	0.0009	0.80
21271	-1	40	20.5	0.0011	0.80
21281	-1	41	29.2	0.0016	0.79
21291	-1	40	40.7	0.0023	0.79
21301	-1	41	57.8	0.0032	0.80

TABLE 4.3 : LIST OF RAMP UP TESTS (concluded)

Run Number	Start (°)	Arc (°)	Pitch Rate ($°s^{-1}$)	Reduced Pitch Rate	Reynolds No. x 10^{-6}
21311	-1	41	80.6	0.0045	0.79
21321	-1	40	98.3	0.0054	0.80
21331	-1	40	124.2	0.0069	0.80
21341	-1	40	151.8	0.0083	0.81
21351	-1	40	183.5	0.0100	0.80
21361	-1	40	213.1	0.0117	0.80
21371	-1	40	242.5	0.0132	0.80
21391	-1	41	274.4	0.0156	0.79
21401	-1	40	309.2	0.0175	0.79
21411	-1	40	334.3	0.0188	0.79
21421	-1	40	366.5	0.0205	0.79
21431	-1	40	398.8	0.0225	0.79
21441	-1	40	434.3	0.0242	0.80
21731	-1	40	181.6	0.0074	1.06
21741	-1	40	211.3	0.0086	1.05
21751	-1	40	242.7	0.0098	1.04
21761	-1	40	272.2	0.0110	1.04
21771	-1	40	304.5	0.0123	1.03
21781	-1	40	335.3	0.0134	1.04
21791	-1	40	368.7	0.0151	1.01
21801	-1	40	399.5	0.0162	1.02
21811	-1	40	432.2	0.0177	1.00
21821	-1	40	469.9	0.0192	1.00
21831	-1	40	498.8	0.0204	1.00
21841	-1	40	529.4	0.0215	1.00
*821991	-1	40	181.4	0.0092	0.88
*822001	-1	40	213.0	0.0108	0.88
*822011	-1	40	241.7	0.0123	0.87
*822021	-1	40	271.4	0.0138	0.87
*822031	-1	40	306.8	0.0155	0.87
*822041	-1	40	336.7	0.0170	0.87
*822051	-1	40	368.1	0.0186	0.86
*822061	-1	40	399.1	0.0201	0.86
*822071	-1	40	436.1	0.0221	0.86
*822081	-1	40	474.0	0.0239	0.86
*822091	-1	40	500.6	0.0253	0.85
*822101	-1	40	534.8	0.0271	0.85
*822231	-1	41	181.2	0.0075	1.10
*822241	-1	41	211.3	0.0087	1.09
*822251	-1	41	241.7	0.0099	1.09
*822261	-1	41	272.1	0.0111	1.08
*822271	-1	41	272.1	0.0111	1.08
*822281	-1	41	335.2	0.0138	1.05
*822291	-1	41	368.2	0.0150	1.05
*822301	-1	41	398.9	0.0163	1.04
*822311	-1	41	433.0	0.0176	1.04
*822321	-1	41	470.6	0.0190	1.05
*822331	-1	41	496.6	0.0202	1.03
*822341	-1	41	530.4	0.0215	1.04

*experiments with roughness transition strips

TABLE 5 : DETAILS OF RAMP DOWN TESTS

TABLE 5.1 : SUMMARY OF RAMPS FROM 40° TO -1° AT A REYNOLDS NUMBER OF 0.8×10^6 (nominal)

Starting Angle	40°											
Finishing Angle	-1°											
Pitch Rate ($^\circ s^{-1}$)	-2	-4	-8	-12	-16	-20	-40	-80	-120	-160	-200	-230
		-260	-290	-320	-360	-400	-440	-470	-500	-500		
Reynolds Number	0.8×10^6											

(all permutations, without roughness transition strips)

TABLE 5.2 : SUMMARY OF RAMPS FROM 40° TO -1° AT A REDUCED PITCH RATE OF -0.02 (nominal)

Starting Angle	40°					
Finishing Angle	-1°					
Reduced Pitch Rate	-0.02					
Reynolds Number	0.6×10^6	0.7×10^6	0.8×10^6	0.9×10^6	1.0×10^6	1.1×10^6

(all permutations, without roughness transition strips)

TABLE 5.3 : SUMMARY OF RAMPS TO -10° (nominal)

Starting Angle	40°	35°	30°	28°	26°	24°	22°	20°	18°	16°	14°	12°
Finishing Angle	-10°											
Pitch Rate	$-450^\circ s^{-1}$											
Reynolds Number	0.8×10^6											

(all permutations, without roughness transition strips)

TABLE 5.4 : SUMMARY OF RAMPS FROM 40° TO -10° (nominal)

Starting Angle	40°											
Finishing Angle	-10°											
Pitch Rate ($^\circ s^{-1}$)	-230	-270	-310	-340	-380	-410	-440	-470	-500	-550	-600	-650
Reynolds Number	0.8×10^6						1.0×10^6					

(all permutations, with and without roughness transition strips)

TABLE 5.5 : LIST OF RAMP DOWN TESTS (actual)

Run Number	Start (°)	Arc (°)	Pitch Rate (°s^{-1})	Reduced Pitch Rate	Reynolds No. x 10^{-6}
30223	40	-41	-1.8	-0.0001	0.76
30233	40	-41	-4.0	-0.0002	0.76
30243	40	-41	-7.3	-0.0004	0.76
30253	40	-41	-11.5	-0.0006	0.76
30263	40	-41	-15.6	-0.0009	0.76
30273	40	-41	-19.5	-0.0011	0.76
30283	40	-41	-39.1	-0.0022	0.75
30293	40	-41	-76.6	-0.0043	0.75
30303	40	-41	-120.2	-0.0067	0.78
30313	40	-41	-159.0	-0.0089	0.78
30323	40	-41	-200.2	-0.0112	0.78
30333	40	-41	-230.6	-0.0129	0.77
30343	40	-41	-255.9	-0.0143	0.77
30353	40	-41	-288.6	-0.0161	0.77
30363	40	-41	-326.8	-0.0183	0.77
30373	40	-41	-367.8	-0.0205	0.77
30383	40	-41	-404.4	-0.0230	0.75
30394	40	-41	-438.1	-0.0249	0.75
30501	40	-41	-545.0	-0.0224	1.05
30521	40	-41	-490.3	-0.0218	0.95
30541	40	-41	-445.0	-0.0220	0.85
30561	40	-41	-382.8	-0.0219	0.76
30581	40	-41	-323.6	-0.0213	0.65
30601	40	-41	-262.0	-0.0207	0.55
30621	40	-50	-541.3	-0.0288	0.82
30631	35	-45	-408.6	-0.0217	0.82
30641	30	-40	-430.3	-0.0228	0.81
30651	28	-38	-425.3	-0.0225	0.81
30661	26	-36	-433.3	-0.0231	0.81
30671	24	-34	-448.3	-0.0239	0.81
30681	22	-32	-445.2	-0.0237	0.80
30691	20	-30	-453.7	-0.0241	0.80
30791	18	-28	-445.5	-0.0238	0.82
30801	16	-26	-430.9	-0.0230	0.82
30811	14	-24	-426.3	-0.0228	0.82
30821	12	-22	-410.6	-0.0219	0.82
31451	40	-50	-21.7	-0.0014	0.71
31461	40	-50	-26.7	-0.0017	0.72
31471	40	-50	-38.0	-0.0024	0.71
31481	40	-50	-53.0	-0.0034	0.70
31491	40	-50	-75.6	-0.0047	0.72
31501	40	-50	-103.7	-0.0065	0.70
31511	40	-50	-123.9	-0.0077	0.71
31521	40	-50	-153.7	-0.0095	0.71
31531	40	-50	-186.1	-0.0116	0.70
31541	40	-50	-230.4	-0.0140	0.72
31551	40	-50	-276.5	-0.0174	0.69
31561	40	-50	-302.1	-0.0189	0.70
31571	40	-50	-342.5	-0.0214	0.70
31581	40	-50	-379.5	-0.0260	0.67
31591	40	-50	-409.7	-0.0278	0.67

TABLE 5.5 : LIST OF RAMP DOWN TESTS (concluded)

Run Number	Start (°)	Arc (°)	Pitch Rate (°s^{-1})	Reduced Pitch Rate	Reynolds No. x 10^{-6}
31601	40	-50	-447.9	-0.0306	0.66
31611	40	-50	-476.8	-0.0322	0.67
31621	40	-50	-507.6	-0.0341	0.67
31631	40	-50	-549.5	-0.0367	0.67
31641	40	-50	-595.0	-0.0394	0.67
31651	40	-50	-645.4	-0.0432	0.67
31851	40	-50	-231.4	-0.0108	0.91
31861	40	-50	-272.2	-0.0126	0.91
31871	40	-50	-311.4	-0.0146	0.90
31881	40	-50	-344.6	-0.0162	0.88
31891	40	-50	-379.2	-0.0180	0.87
31901	40	-50	-411.3	-0.0192	0.88
31911	40	-50	-420.0	-0.0199	0.86
31921	40	-50	-478.1	-0.0225	0.88
31931	40	-50	-510.5	-0.0235	0.89
31941	40	-50	-558.8	-0.0262	0.87
31951	40	-50	-607.7	-0.0281	0.88
31961	40	-50	-654.9	-0.0306	0.87
*832111	40	50	-232.8	-0.0134	0.75
*832121	40	50	-273.4	-0.0154	0.77
*832131	40	50	-309.1	-0.0176	0.76
*832141	40	50	-341.9	-0.0197	0.74
*832151	40	50	-377.2	-0.0215	0.75
*832161	40	50	-412.4	-0.0240	0.74
*832171	40	50	-440.5	-0.0252	0.75
*832181	40	50	-473.2	-0.0272	0.74
*832191	40	50	-506.7	-0.0284	0.76
*832201	40	50	-559.2	-0.0321	0.74
*832211	40	50	-606.4	-0.0351	0.73
*832221	40	50	-658.9	-0.0377	0.74
*832351	40	50	-229.9	-0.0108	0.90
*832361	40	50	-273.3	-0.0128	0.89
*832371	41	50	-312.8	-0.0149	0.87
*832381	40	50	-345.1	-0.0161	0.89
*832391	40	50	-346.2	-0.0162	0.88
*832401	40	50	-394.8	-0.0184	0.88
*832411	40	50	-445.0	-0.0208	0.88
*832421	40	50	-477.9	-0.0223	0.88
*832431	40	50	-509.3	-0.0240	0.86
*832441	40	50	-562.2	-0.0257	0.89
*832451	40	50	-614.0	-0.0286	0.87
*832461	40	50	-661.9	-0.0308	0.87

*experiments with roughness transition strips

TABLE 6 : DETAILS OF SINUSOIDAL TESTS

TABLE 6.1 : SUMMARY OF SINUSOIDAL TESTS (nominal)

Mean Angle	4°	6°	8°	15°	16°	17°	18°	20°
Amplitude	10°							
Reduced Frequency	0.175							
Reynolds Number	$0.8x10^6$							

(all permutations, without roughness transition strips)

TABLE 6.2 : SUMMARY OF SINUSOIDAL TESTS (actual)

Run Number	Mean (°)	Amp'ude (°)	Reduced Frequency	Reynolds No. x 10^{-6}
10702	4	10	0.168	0.83
10712	6	10	0.167	0.83
10722	8	10	0.167	0.82
10732	15	10	0.167	0.82
10742	16	10	0.167	0.82
10752	17	10	0.167	0.82
10762	18	10	0.167	0.82
10772	20	10	0.167	0.82

TABLE 7 : DETAILS OF VAWT TESTS

TABLE 7.1 : SUMMARY OF VAWT TESTS (nominal)

Mean Angle	0^o				
TSR	1.75				
Reduced Frequency	0.040	0.080	0.100	0.125	0.150
Reynolds Number	1.5×10^6				

(all permutations, without roughness transition strips)

TABLE 7.2 : SUMMARY OF VAWT TESTS (actual)

Run Number	Mean (°)	TSR	Reduced Frequency	Reynolds No. x 10^6
51671	0	1.75	0.145	1.58
51681	0	1.75	0.118	1.57
51691	0	1.75	0.097	1.57
51701	0	1.75	0.076	1.58
51711	0	1.75	0.037	1.58

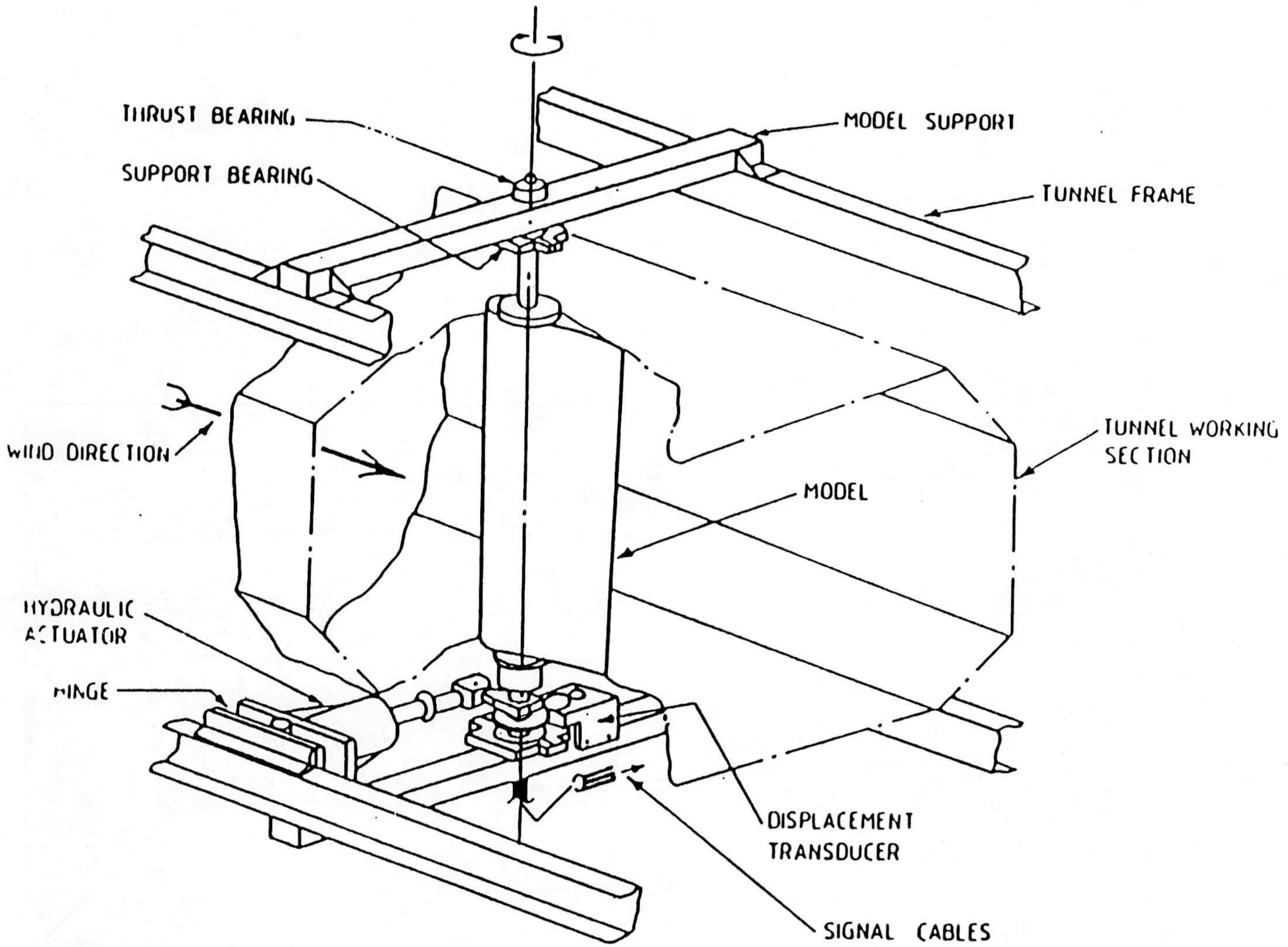


FIGURE 1 : GLASGOW UNIVERSITY'S DYNAMIC STALL RIG

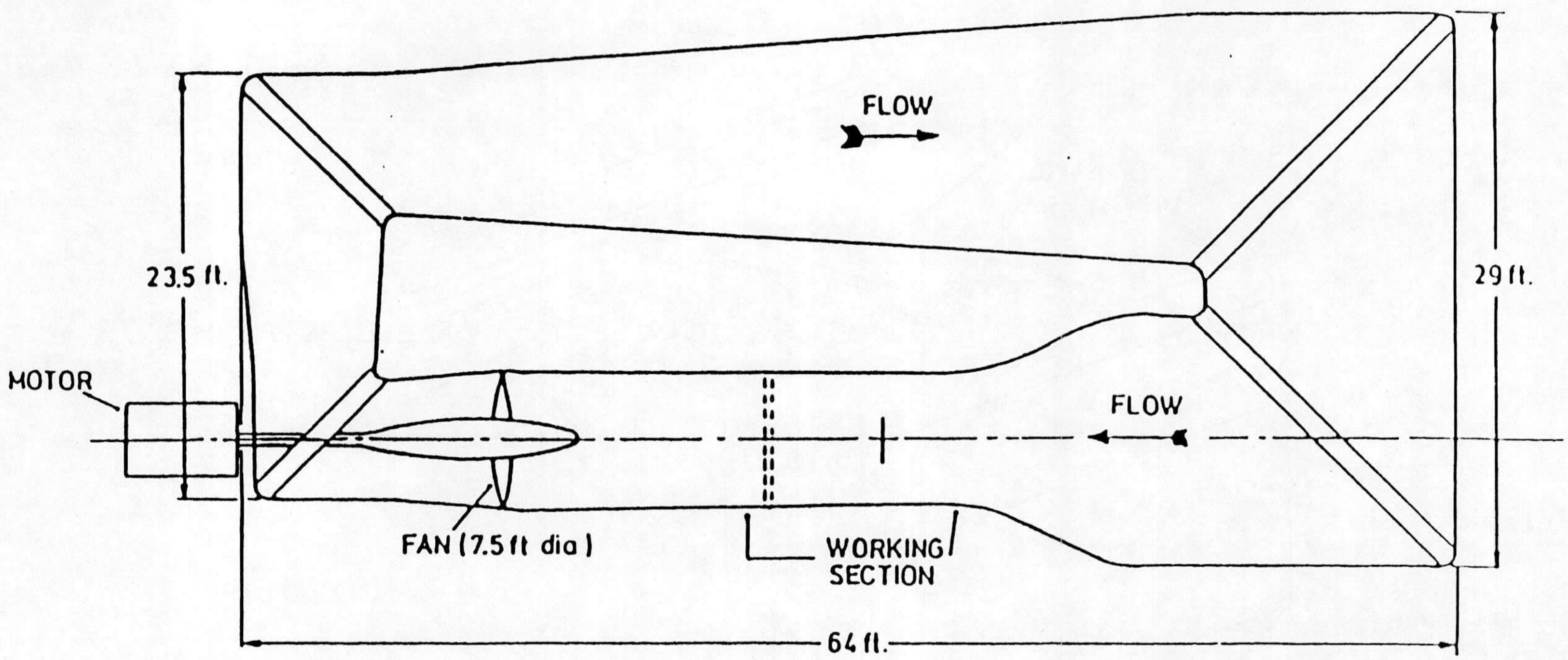
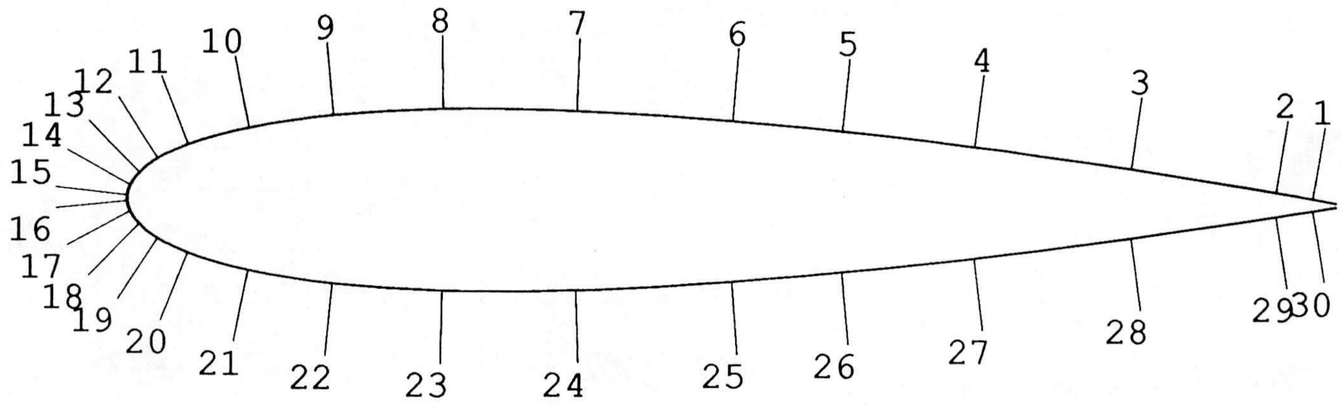


FIGURE 2 : PLAN VIEW OF THE GLASGOW UNIVERSITY "HANDLEY PAGE" 7ft X 5ft 3in WIND TUNNEL



X(1)/C = 0.98000	X(11)/C = 0.05000	X(21)/C = 0.10000
X(2)/C = 0.95000	X(12)/C = 0.02500	X(22)/C = 0.17000
X(3)/C = 0.83000	X(13)/C = 0.01000	X(23)/C = 0.26000
X(4)/C = 0.70000	X(14)/C = 0.00250	X(24)/C = 0.37000
X(5)/C = 0.59000	X(15)/C = 0.00025	X(25)/C = 0.50000
X(6)/C = 0.50000	X(16)/C = 0.00025	X(26)/C = 0.59000
X(7)/C = 0.37000	X(17)/C = 0.00250	X(27)/C = 0.70000
X(8)/C = 0.26000	X(18)/C = 0.01000	X(28)/C = 0.83000
X(9)/C = 0.17000	X(19)/C = 0.02500	X(29)/C = 0.95000
X(10)/C = 0.10000	X(20)/C = 0.05000	X(30)/C = 0.98000

FIGURE 3 : PRESSURE TRASDUCER LOCATIONS FOR THE NACA 0015.

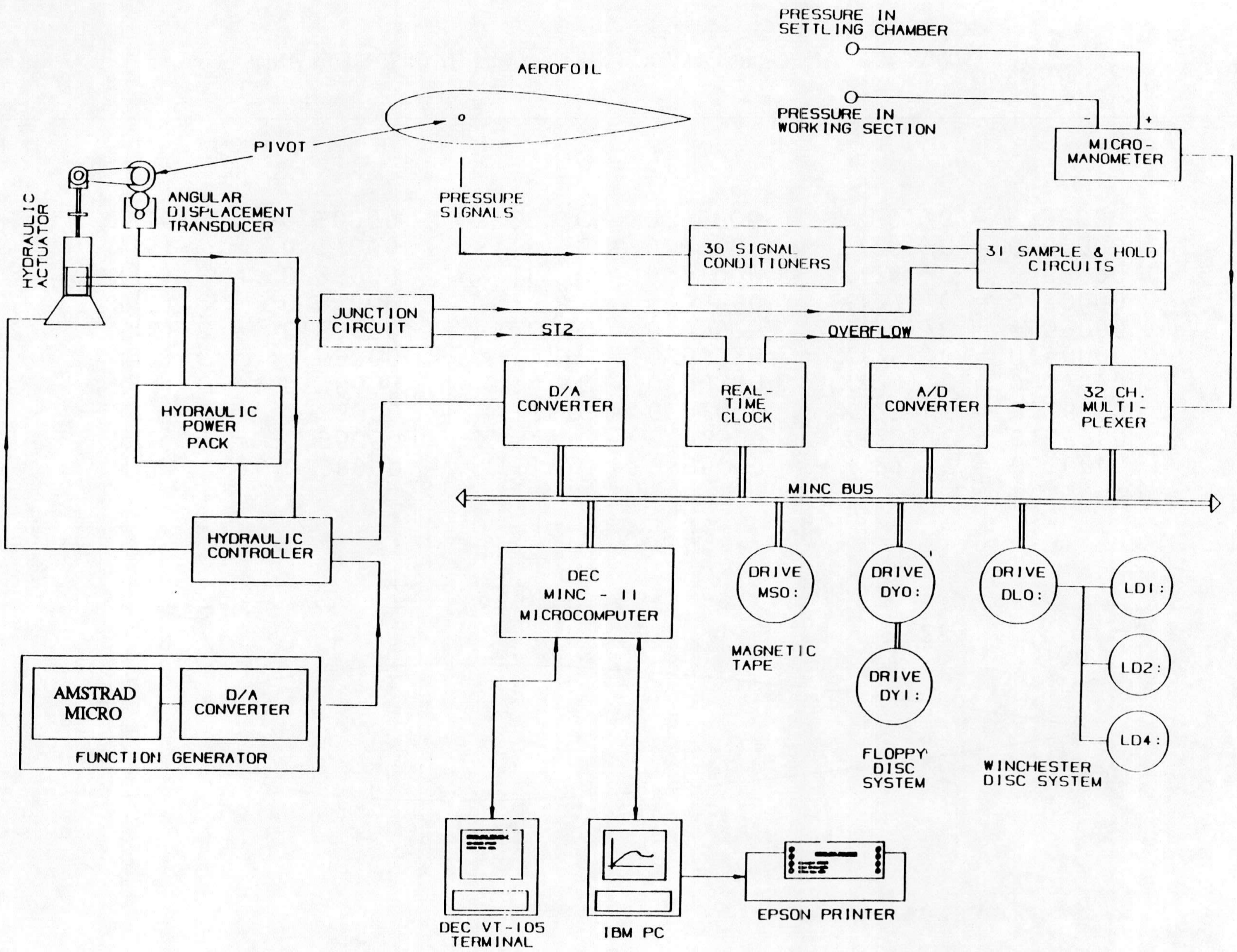


FIGURE 4: SYSTEMATIC ARRANGEMENT OF DATA ACQUSITION AND CONTROL SYSTEM

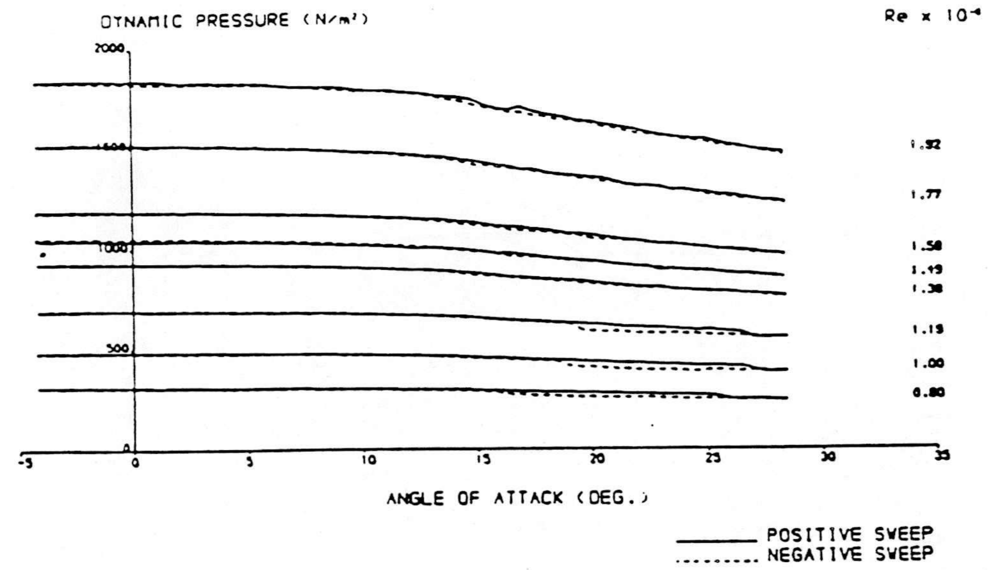


FIGURE 5 : REDUCTION OF DYNAMIC PRESSURE WITH INCREASING ANGLE OF ATTACK.

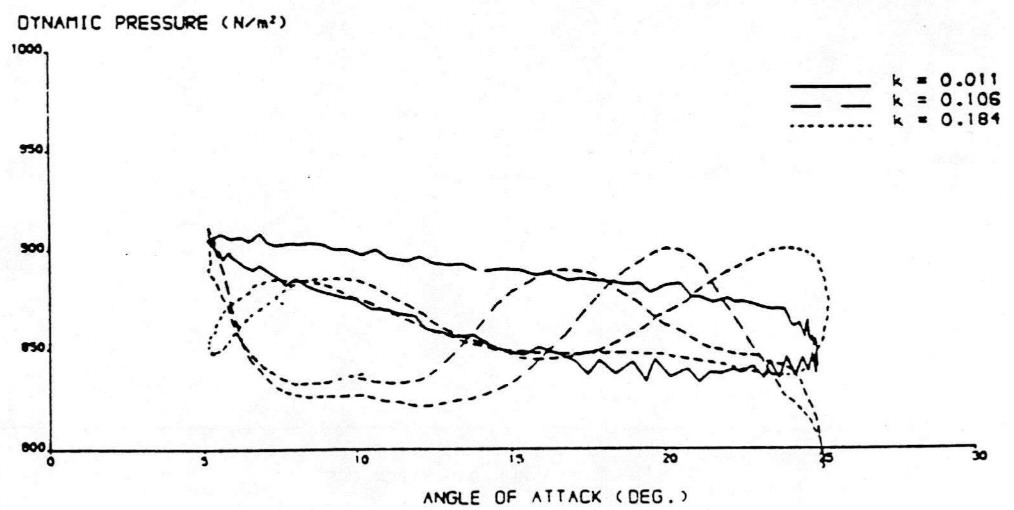


FIGURE 6 : VARIATION OF DYNAMIC PRESSURE DURING OSCILLATORY TESTS.

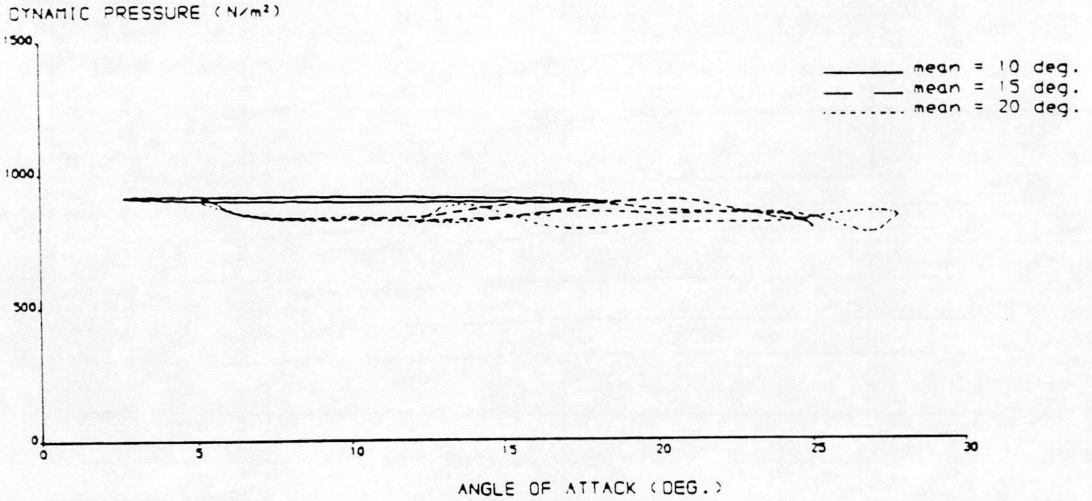


FIGURE 7 : VARIATION OF DYNAMIC PRESSURE FOR VARIOUS MEAN ANGLES OF ATTACK AT A REDUCED FREQUENCY OF 0.10.

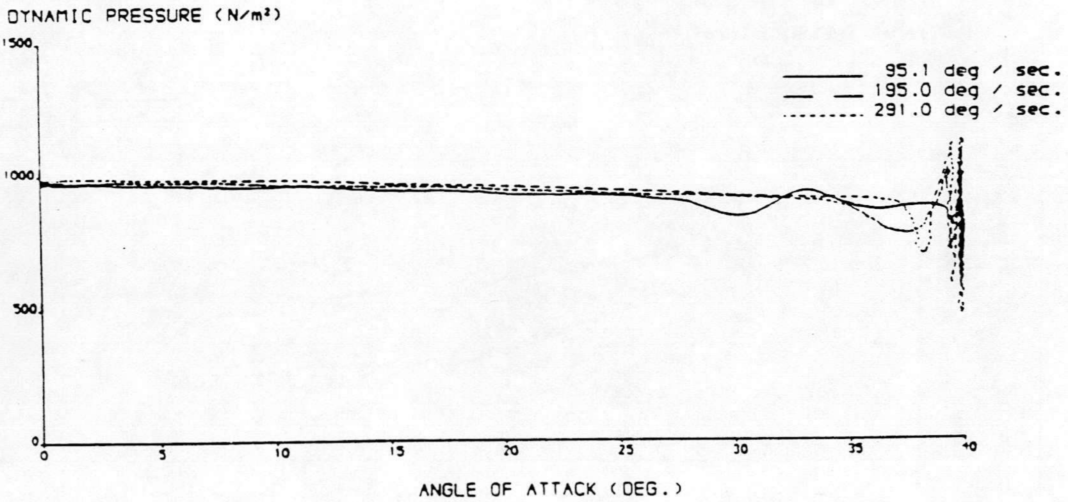


FIGURE 8 : VARIATION OF DYNAMIC PRESSURE FOR VARIOUS PITCH RATES DURING RAMP TESTS.

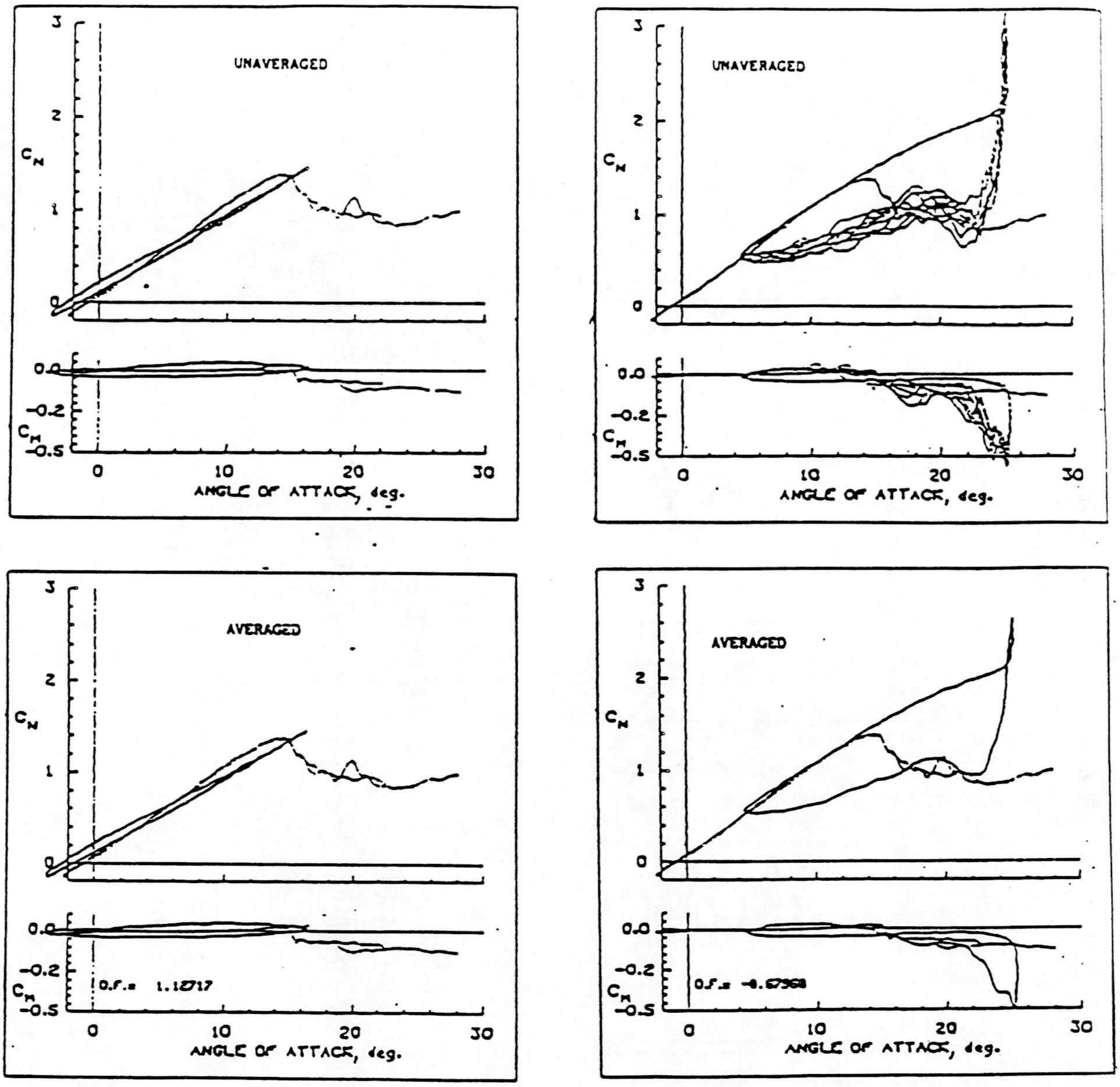


FIGURE 9: EFFECT OF AVERAGING ON THE NORMAL FORCE AND PITCHING MOMENT FOR OSCILLATORY TESTS.

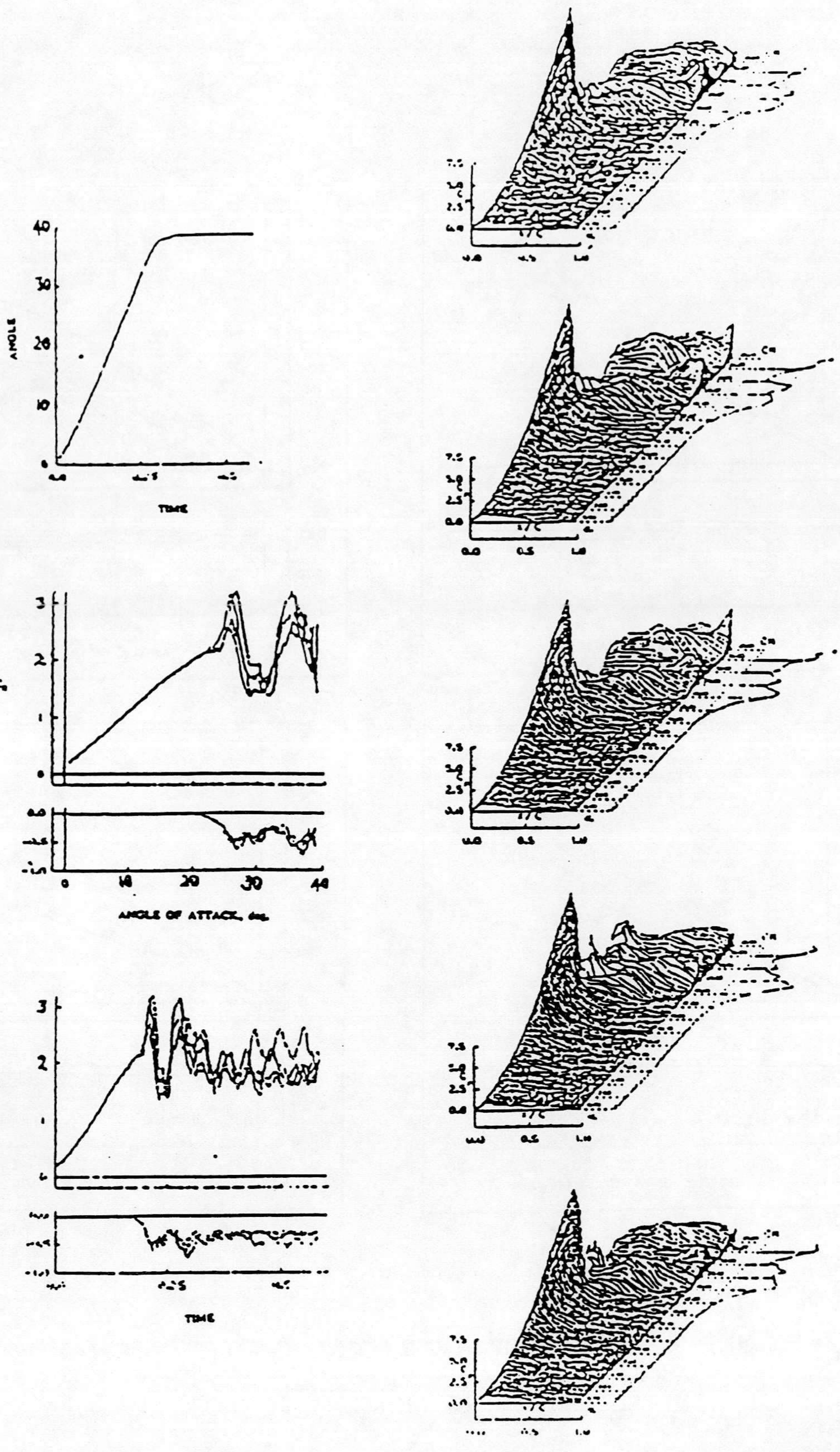


FIGURE 10: TYPICAL UNAVERAGED DATA FOR RAMP TESTS.

G.U. Aero Report 9209

UNIVERSITY OF GLASGOW

DEPARTMENT OF AEROSPACE ENGINEERING

PRESSURE DATA FROM

STATIC EXPERIMENTS

DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 411

REYNOLDS NUMBER = 1037823.

DYNAMIC PRESSURE = 1908.24 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

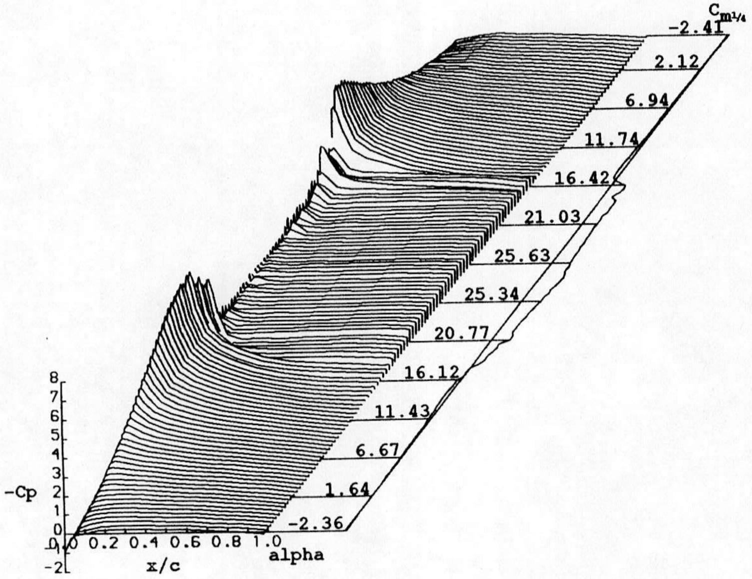
DATE OF TEST: 31/7/91

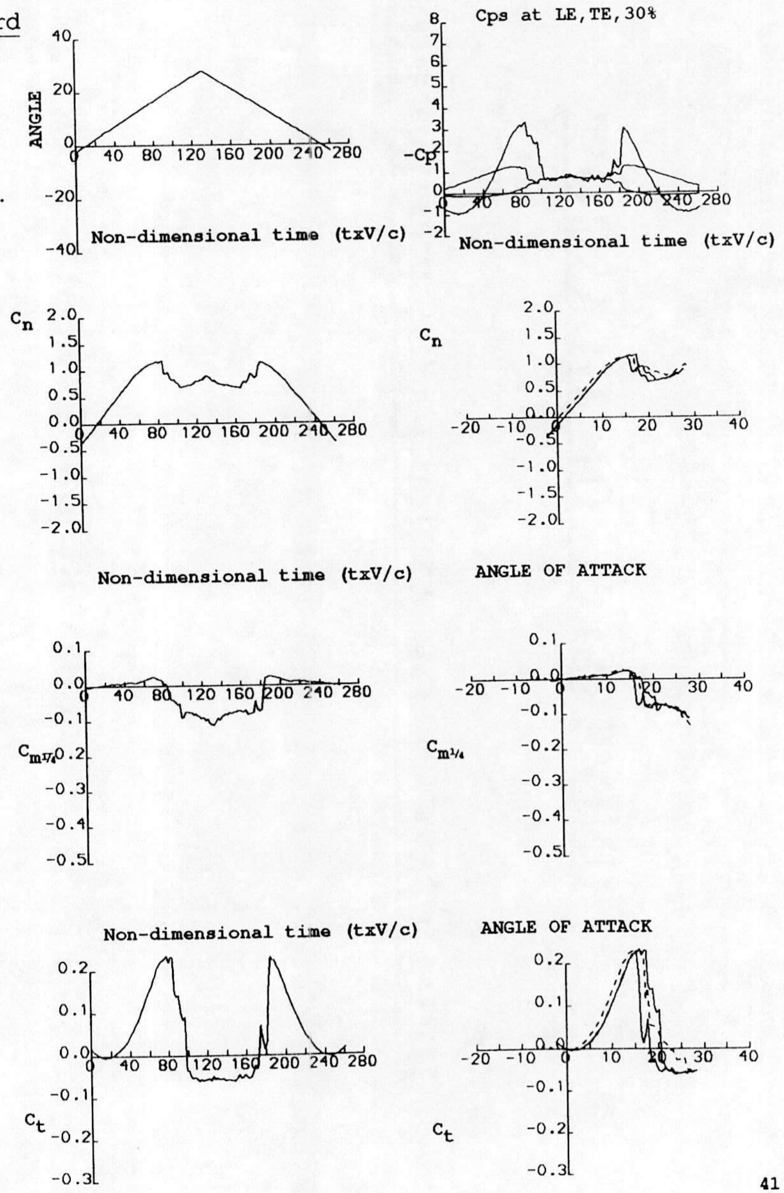
MACH NUMBER = 0.165

AIR TEMPERATURE = 21.1°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 421

REYNOLDS NUMBER = 1008093.

DYNAMIC PRESSURE = 1854.36 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

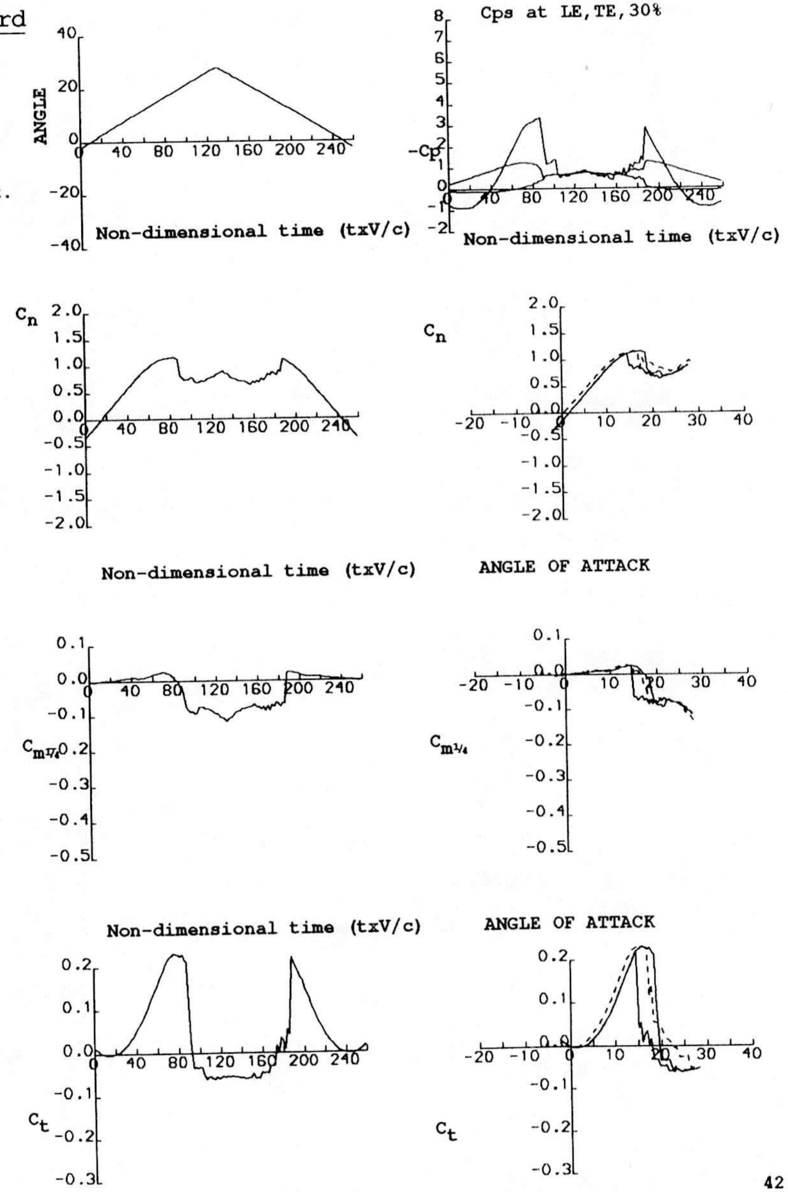
DATE OF TEST: 31/7/91

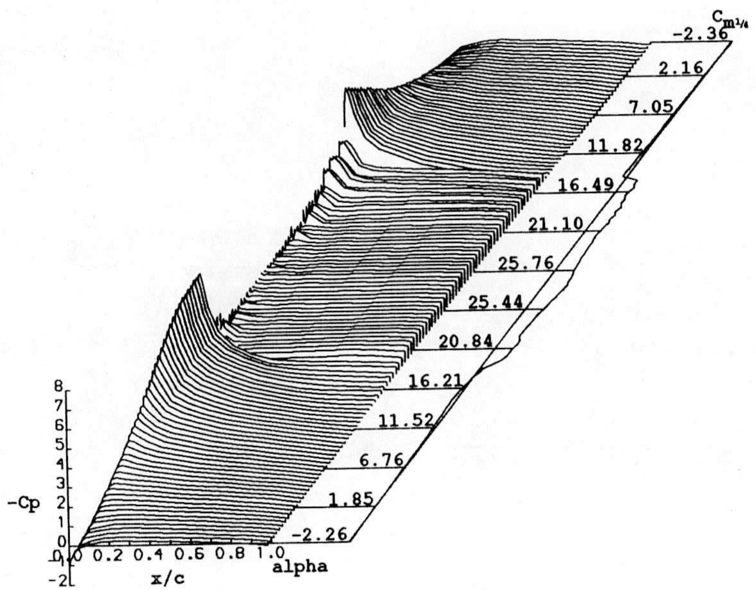
MACH NUMBER = 0.162

AIR TEMPERATURE = 24.5°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 431

REYNOLDS NUMBER = 979291.

DYNAMIC PRESSURE = 1792.06 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

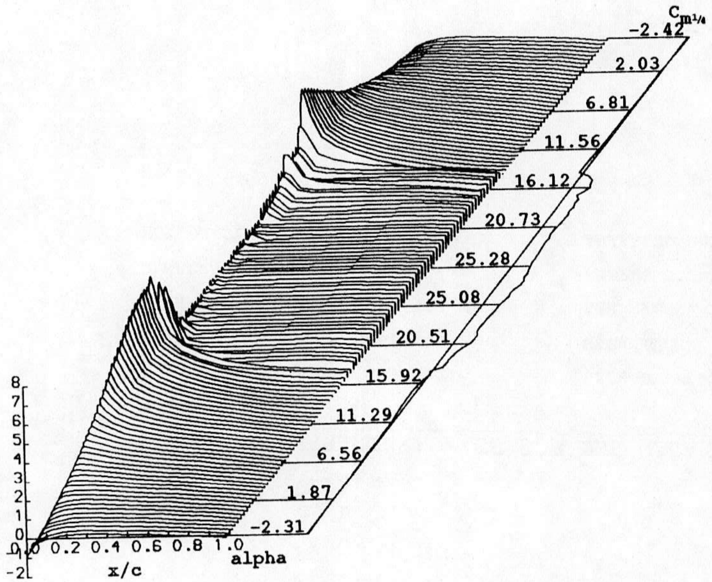
DATE OF TEST: 31/7/91

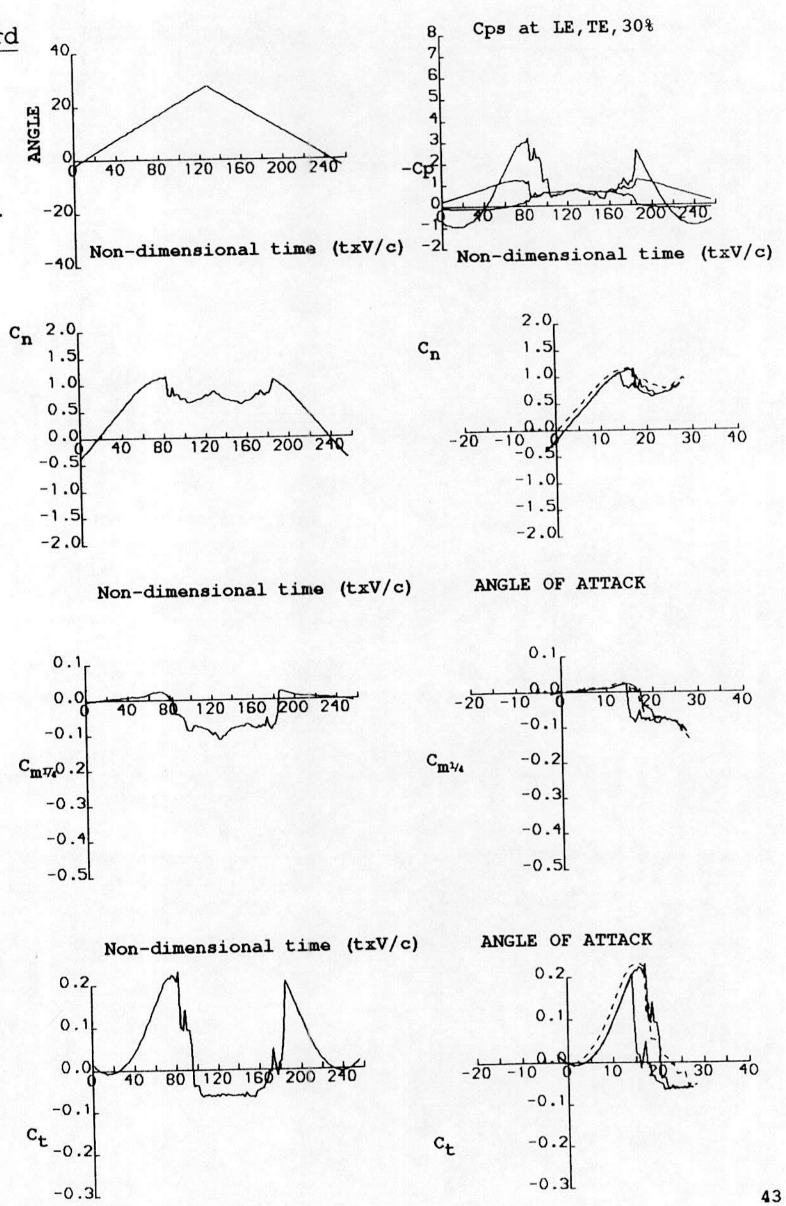
MACH NUMBER = 0.160

AIR TEMPERATURE = 27.2°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 441

REYNOLDS NUMBER = 904350.

DYNAMIC PRESSURE = 1669.82 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

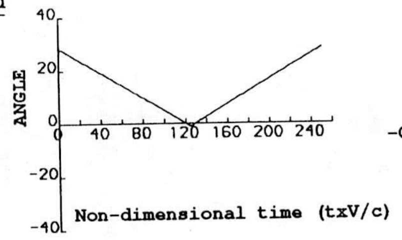
DATE OF TEST: 31/7/91

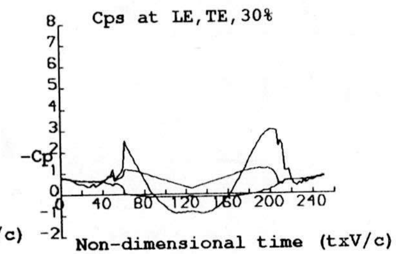
MACH NUMBER = 0.154

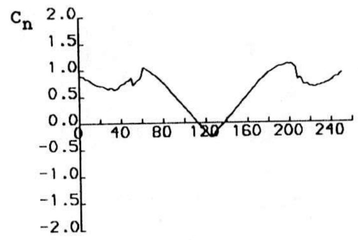
AIR TEMPERATURE = 37.8°C

SAMPLING FREQUENCY = 100.00 Hz.

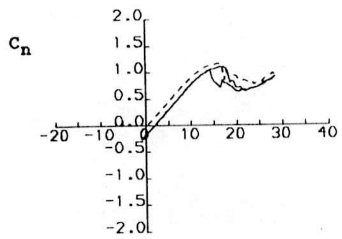
AVERAGED DATA OF 1 CYCLES



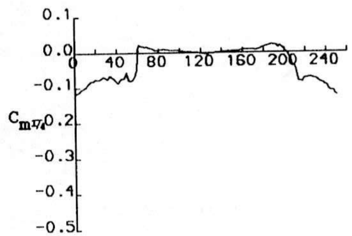




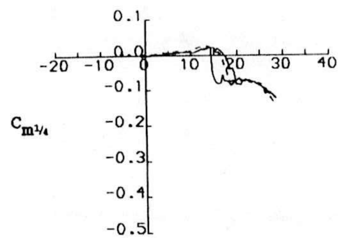
Non-dimensional time (txV/c)



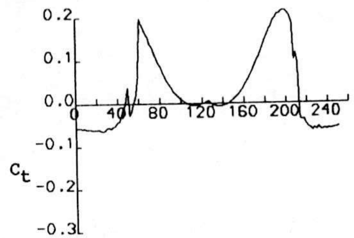
ANGLE OF ATTACK

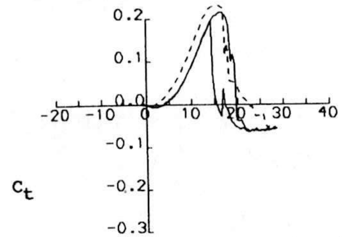


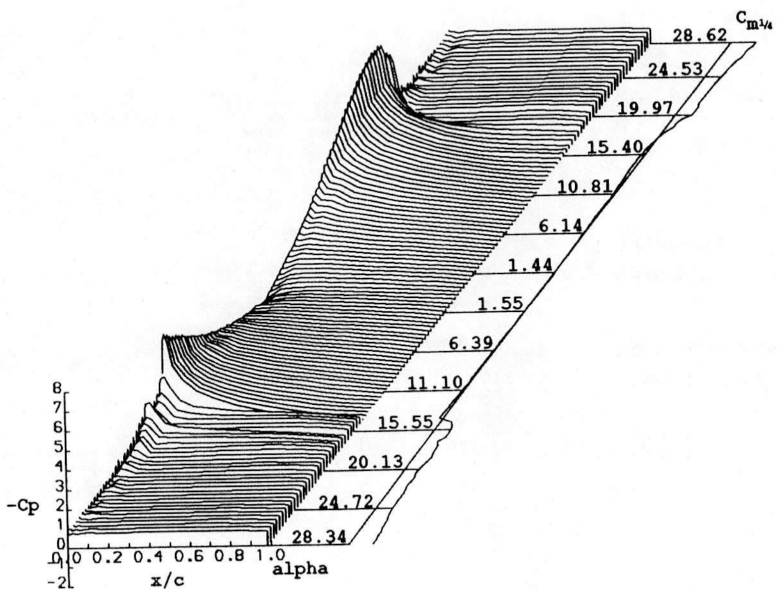
Non-dimensional time (txV/c)



ANGLE OF ATTACK







DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 451

REYNOLDS NUMBER = 1008320.

DYNAMIC PRESSURE = 1826.33 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

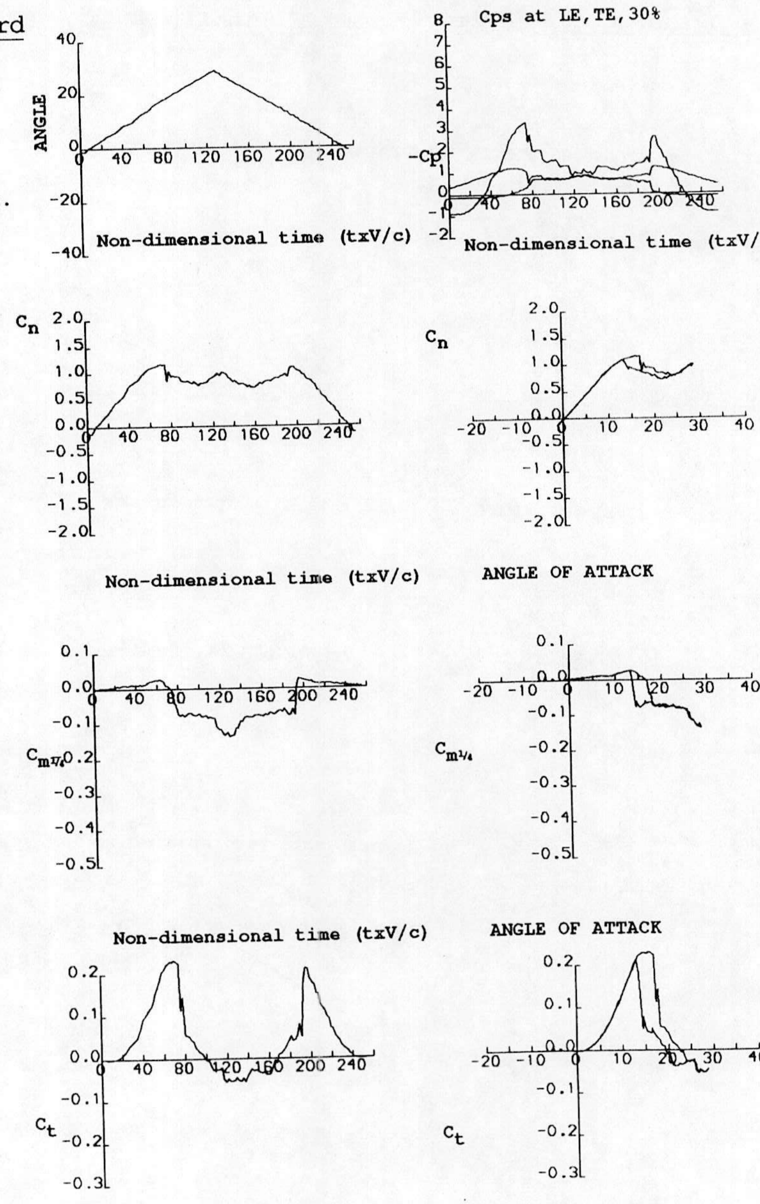
DATE OF TEST: 2/8/91

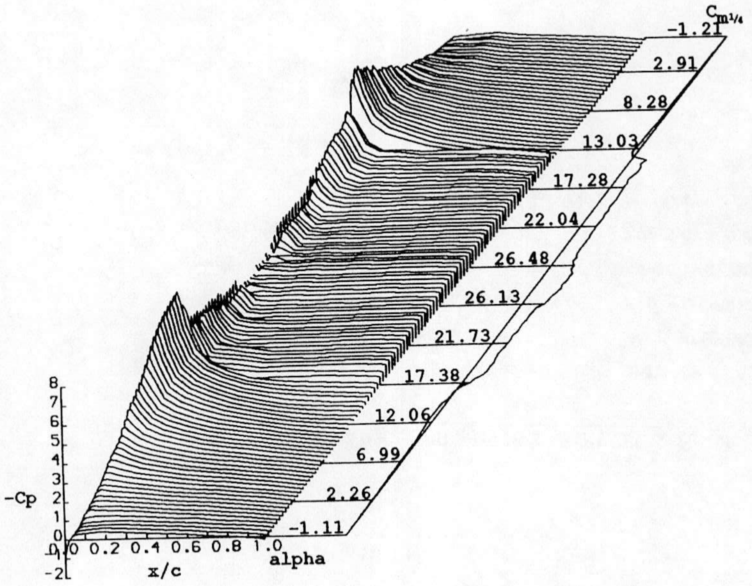
MACH NUMBER = 0.160

AIR TEMPERATURE = 23.6°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 461

REYNOLDS NUMBER = 779823.

DYNAMIC PRESSURE = 1094.27 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

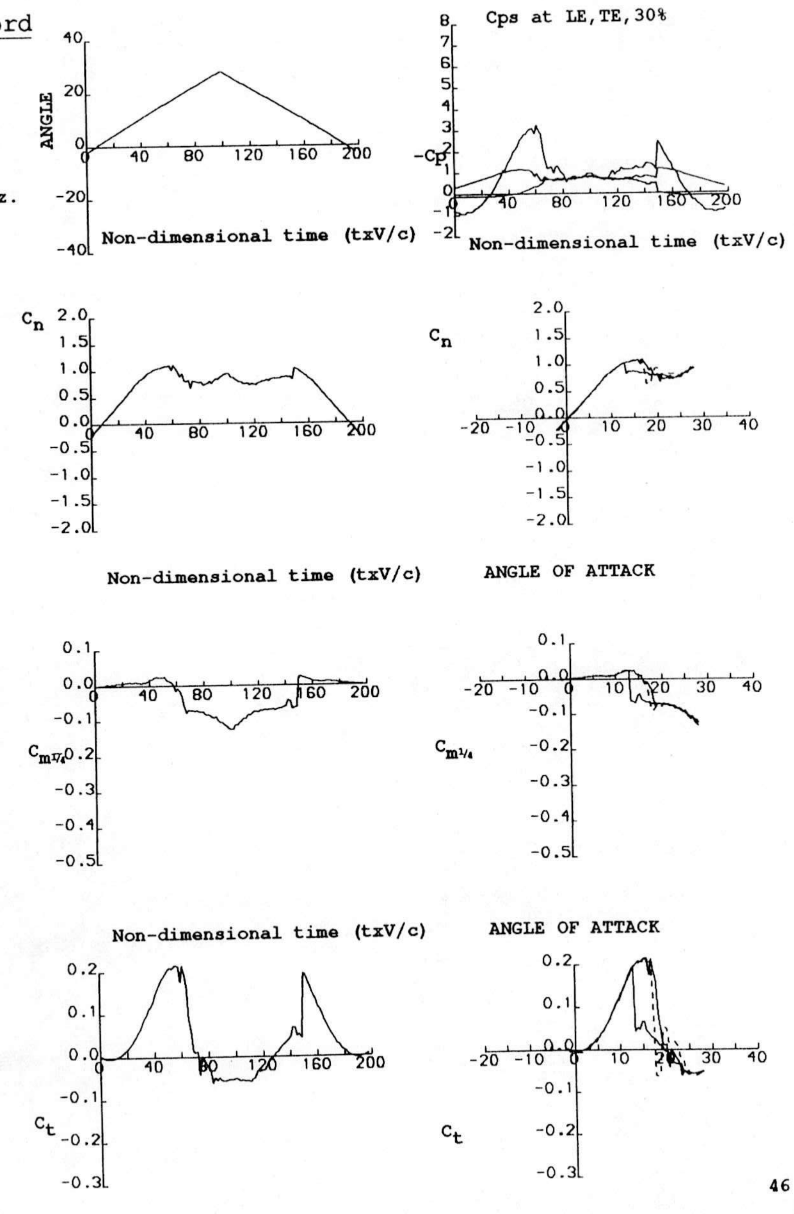
DATE OF TEST: 2/8/91

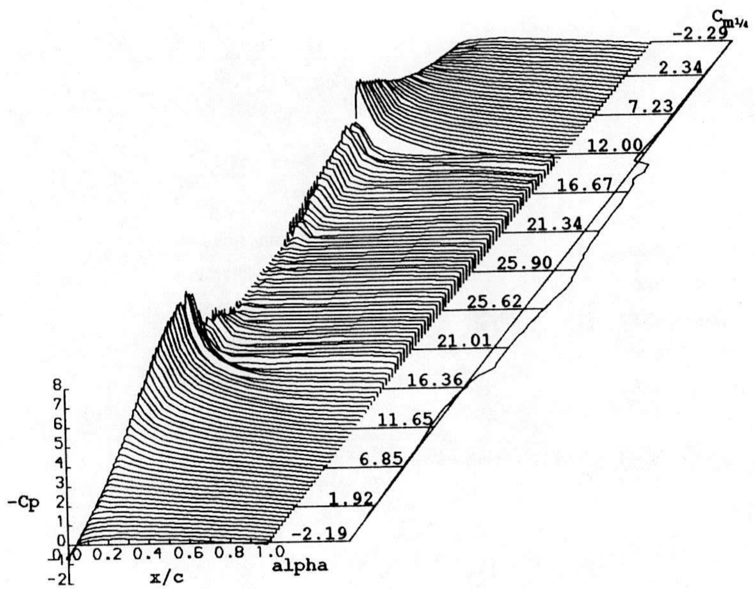
MACH NUMBER = 0.124

AIR TEMPERATURE = 23.8°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 471

REYNOLDS NUMBER = 771138.

DYNAMIC PRESSURE = 1088.11 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

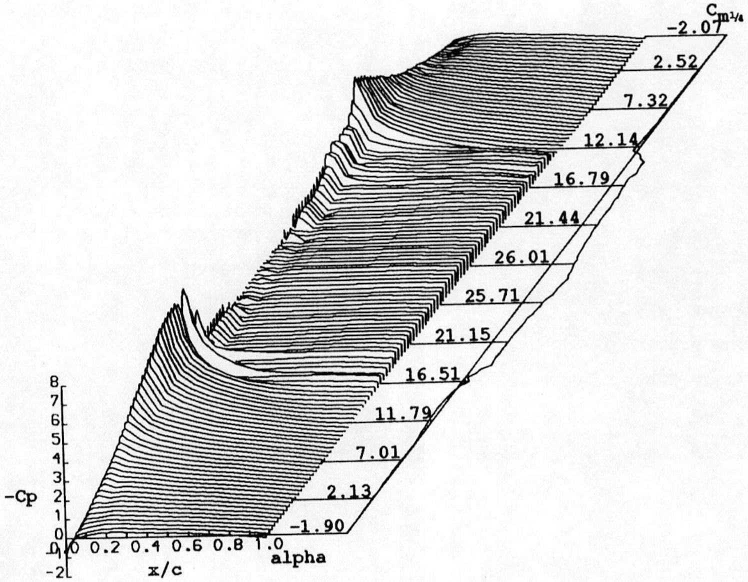
DATE OF TEST: 2/8/91

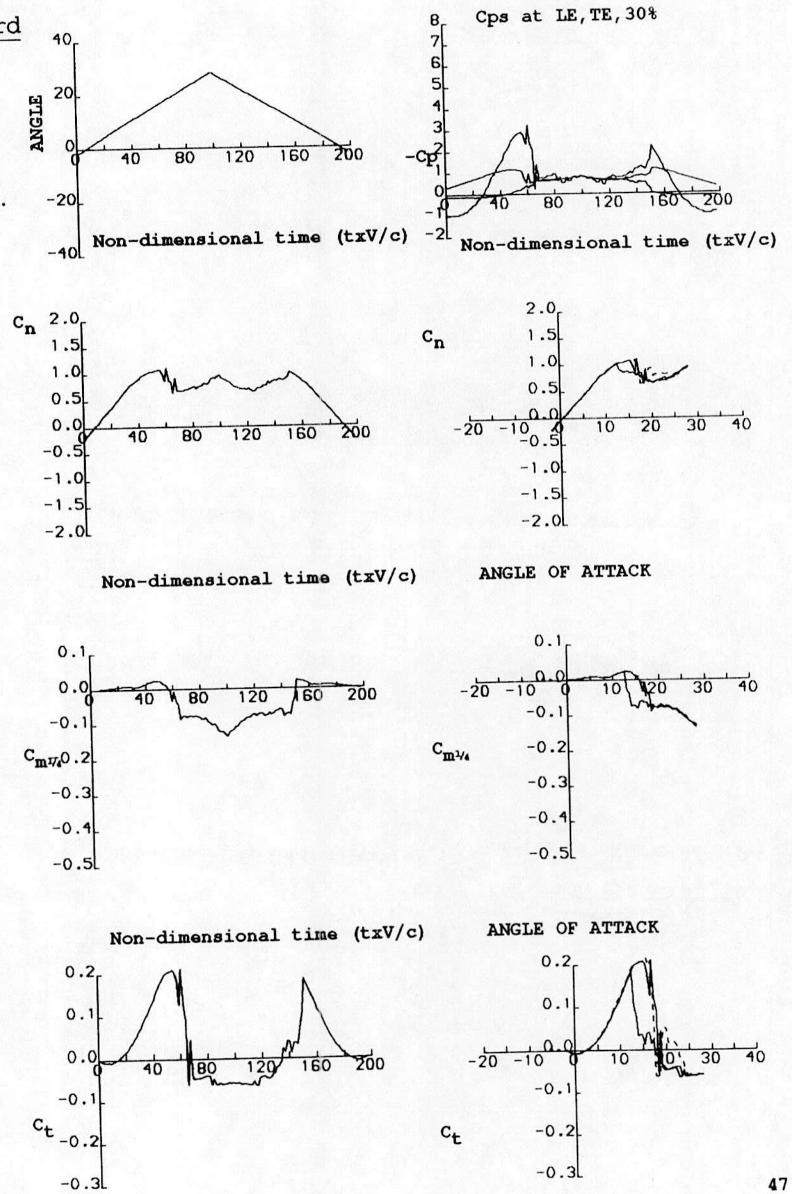
MACH NUMBER = 0.124

AIR TEMPERATURE = 25.9°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 481

REYNOLDS NUMBER = 771281.

DYNAMIC PRESSURE = 1047.95 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

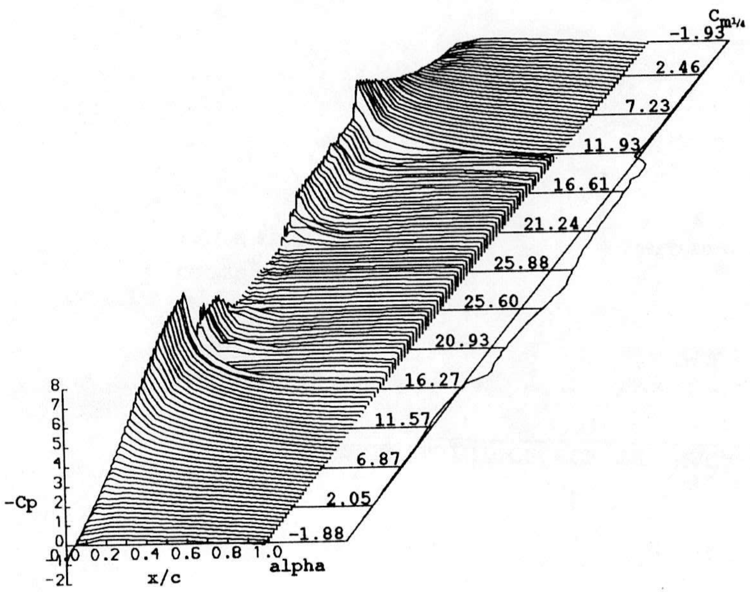
DATE OF TEST: 5/8/91

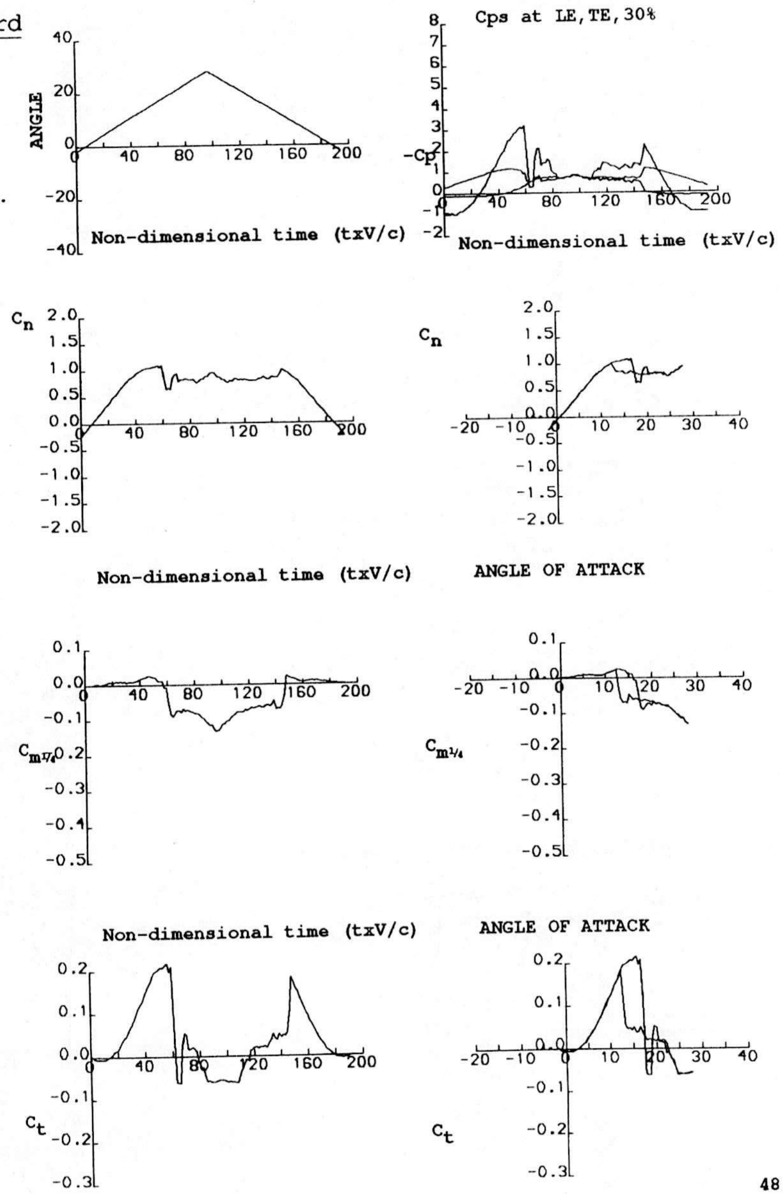
MACH NUMBER = 0.122

AIR TEMPERATURE = 20.6°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 491

REYNOLDS NUMBER = 1055952.

DYNAMIC PRESSURE = 2006.41 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

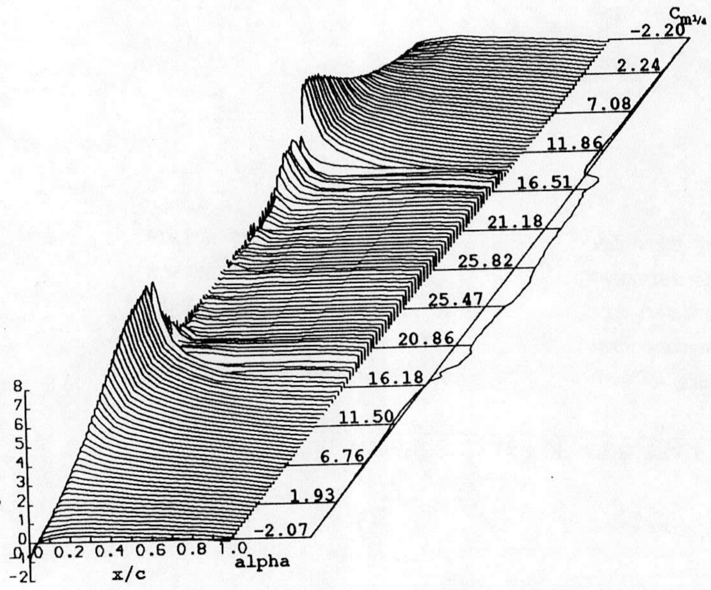
DATE OF TEST: 14/8/91

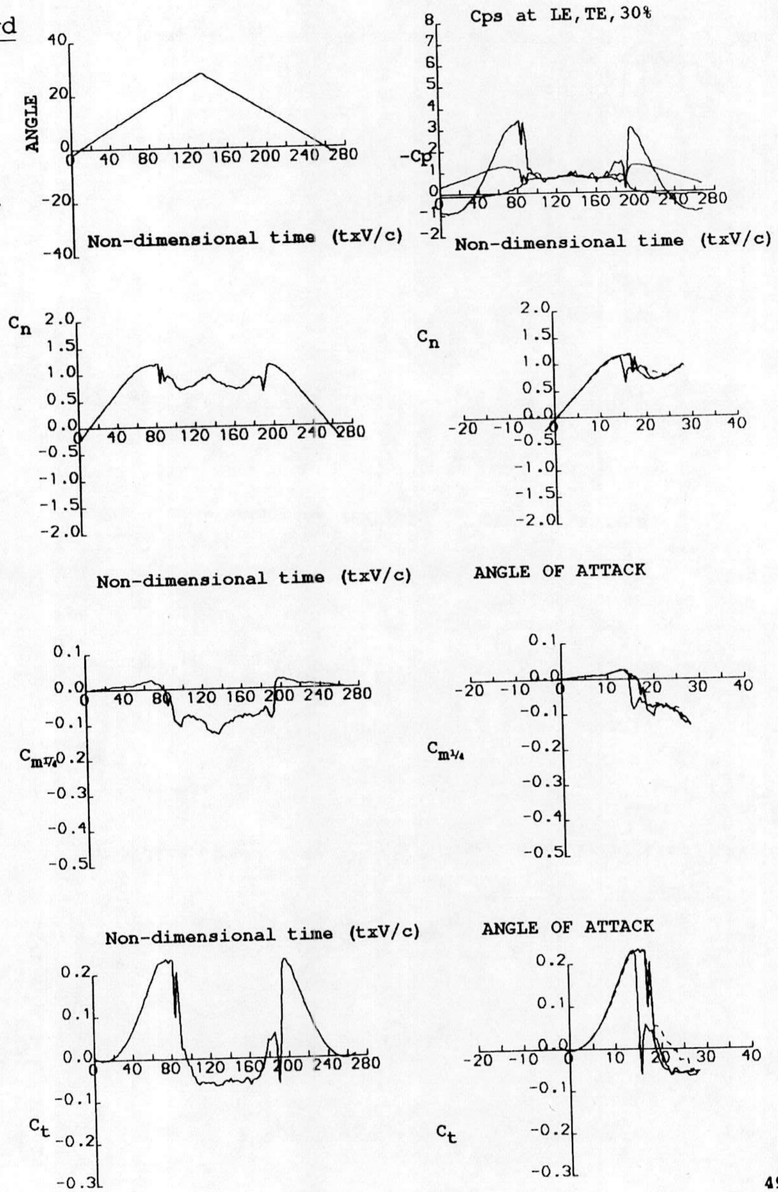
MACH NUMBER = 0.168

AIR TEMPERATURE = 23.8°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 511

REYNOLDS NUMBER = 950259.

DYNAMIC PRESSURE = 1680.11 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

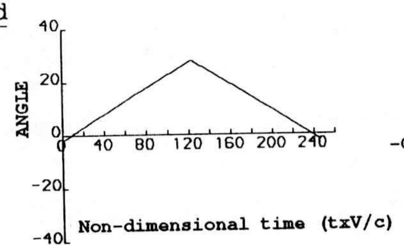
DATE OF TEST: 14/8/91

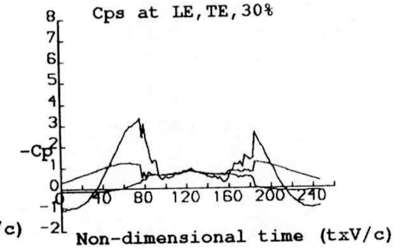
MACH NUMBER = 0.154

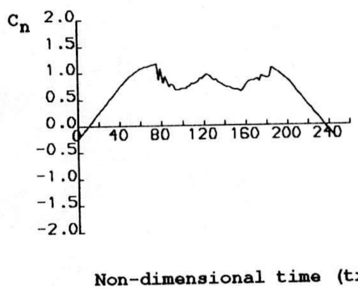
AIR TEMPERATURE = 27.7°C

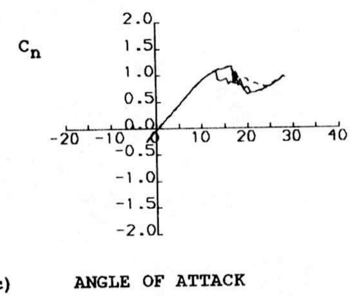
SAMPLING FREQUENCY = 100.00 Hz.

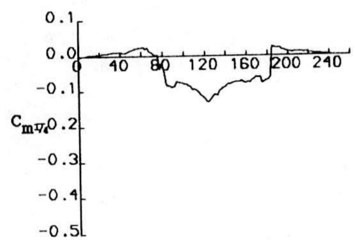
AVERAGED DATA OF 1 CYCLES

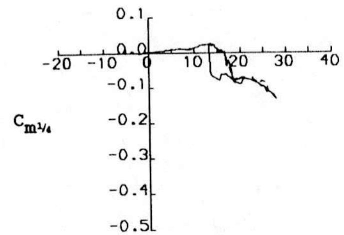


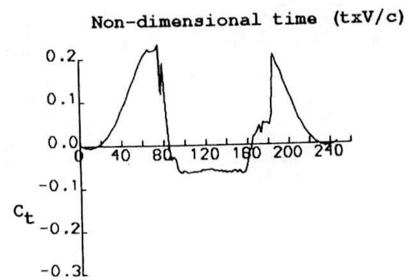


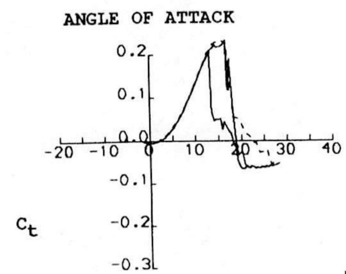


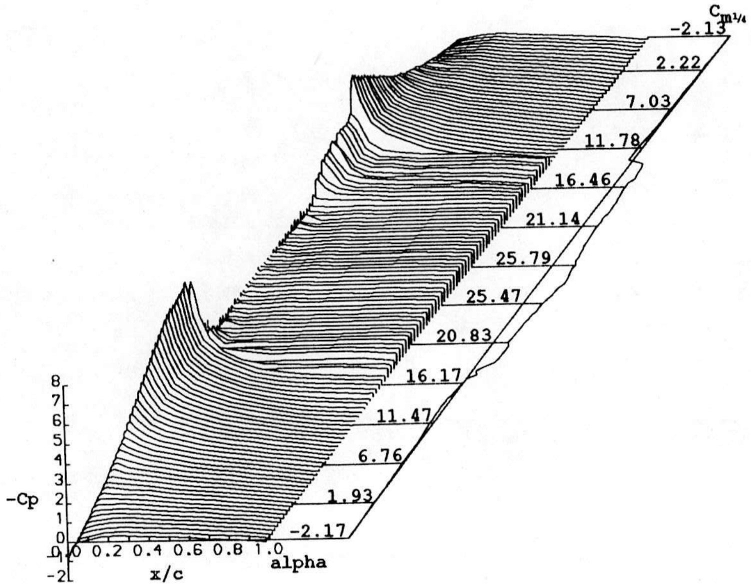






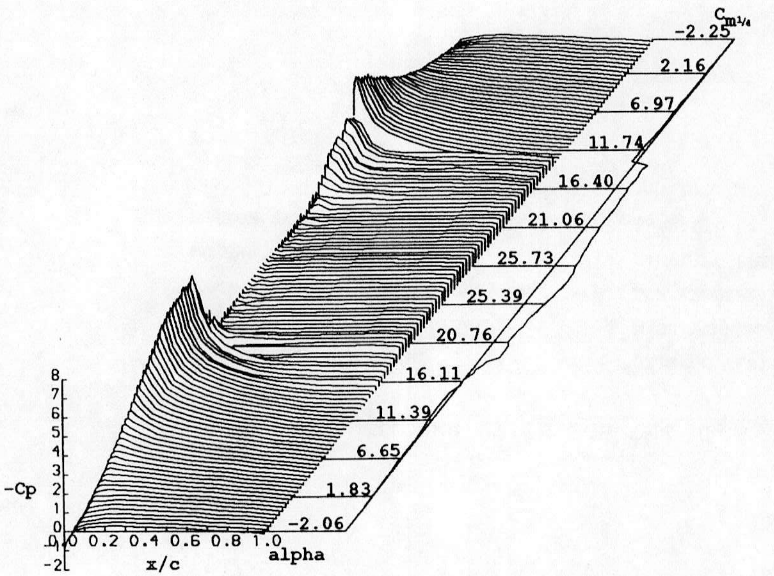


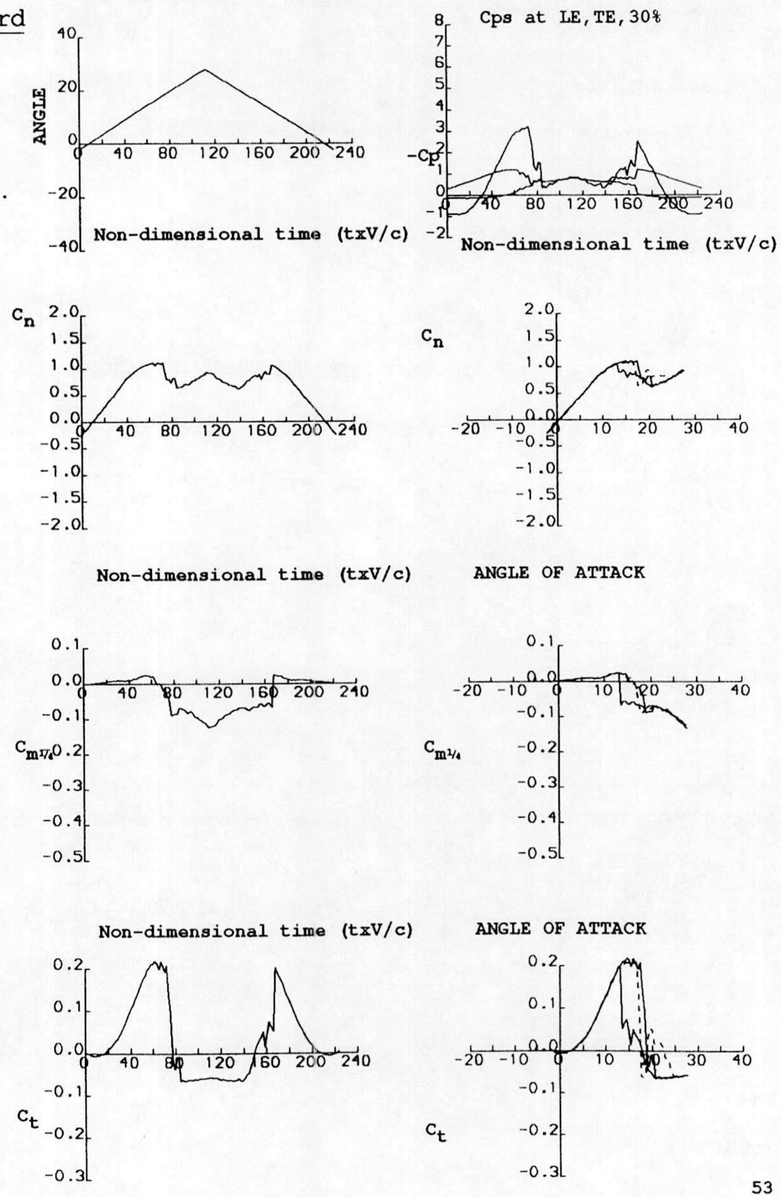




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 531	DATE OF TEST: 14/8/91
REYNOLDS NUMBER = 852926.	MACH NUMBER = 0.139
DYNAMIC PRESSURE = 1374.37 Nm^{-2}	AIR TEMPERATURE = 29.5°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 100.00 Hz.
MOTION TYPE: STATIC	AVERAGED DATA OF 1 CYCLES

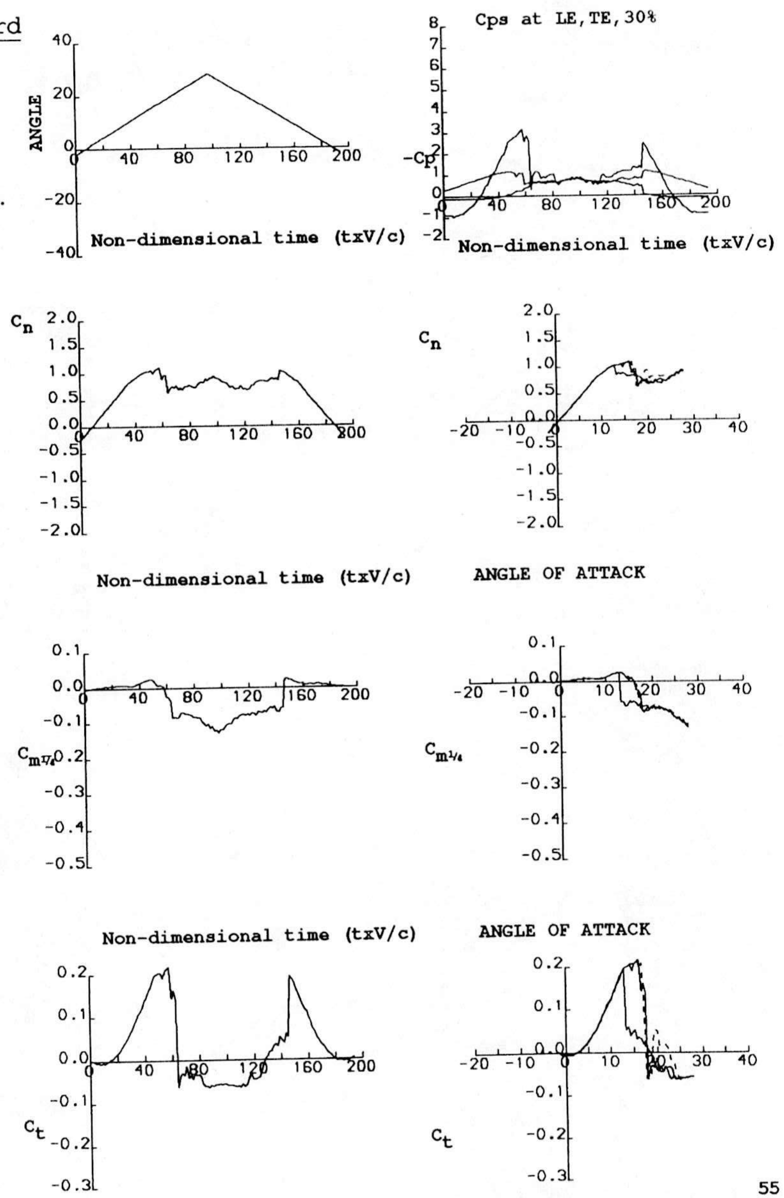


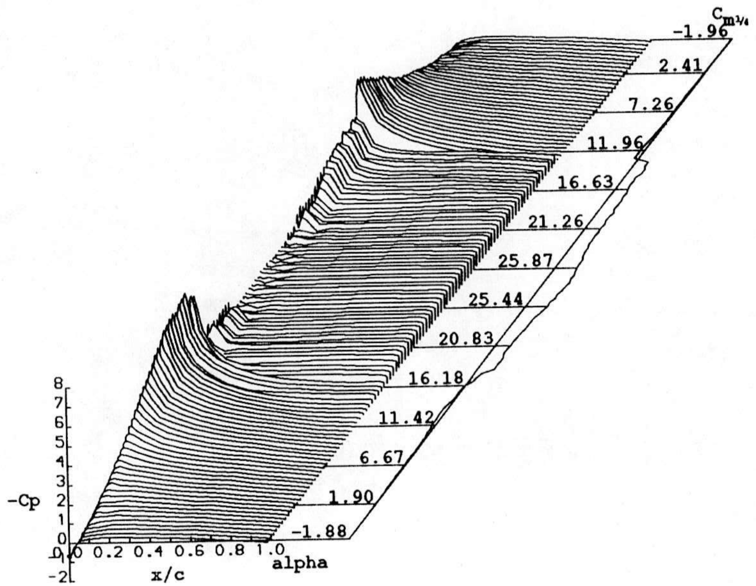


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 551
REYNOLDS NUMBER = 763537.
DYNAMIC PRESSURE = 1049.04 Nm^{-2}
NUMBER OF CYCLES = 1
MOTION TYPE: STATIC

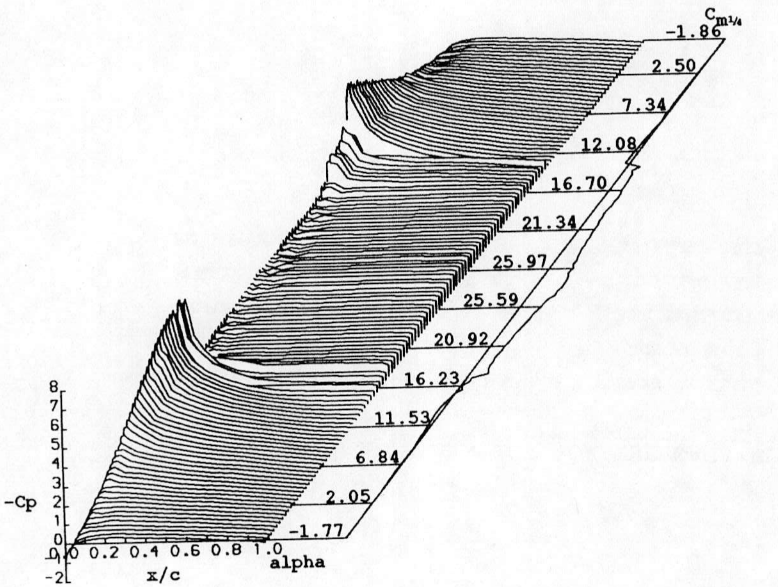
DATE OF TEST: 14/8/91
MACH NUMBER = 0.122
AIR TEMPERATURE = 23.8°C
SAMPLING FREQUENCY = 100.00 Hz.
AVERAGED DATA OF 1 CYCLES

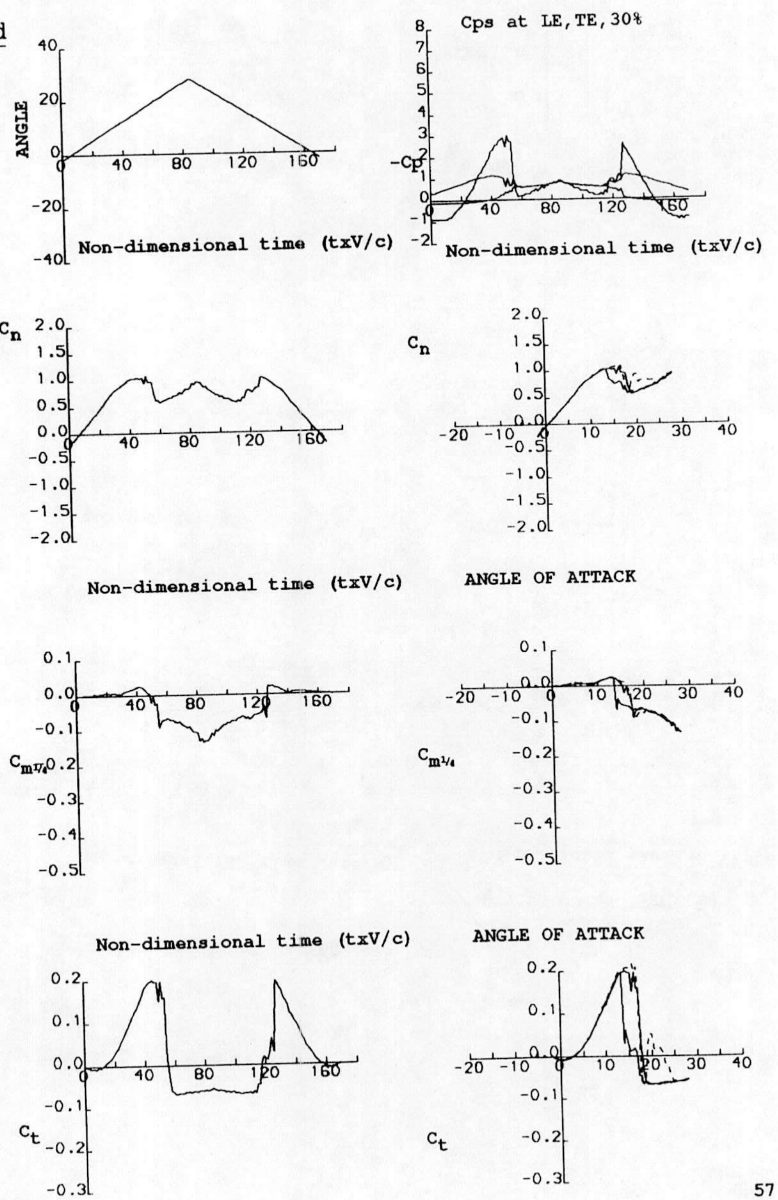




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 571	DATE OF TEST: 14/8/91
REYNOLDS NUMBER = 661389.	MACH NUMBER = 0.106
DYNAMIC PRESSURE = 799.42 Nm^{-2}	AIR TEMPERATURE = 25.6°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 100.00 Hz.
MOTION TYPE: STATIC	AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 591

REYNOLDS NUMBER = 547387.

DYNAMIC PRESSURE = 548.52 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

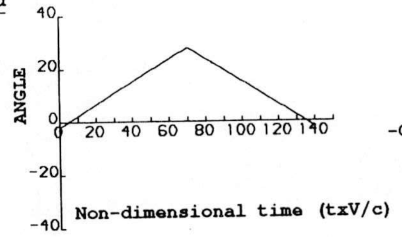
DATE OF TEST: 14/8/91

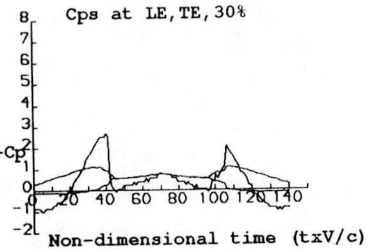
MACH NUMBER = 0.088

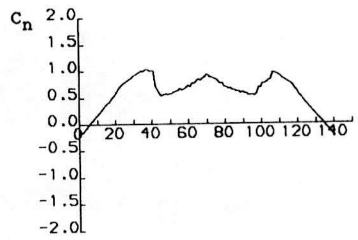
AIR TEMPERATURE = 25.8°C

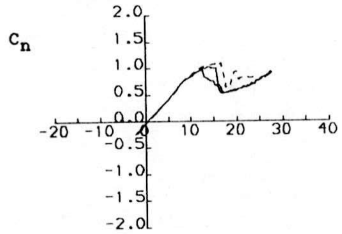
SAMPLING FREQUENCY = 100.00 Hz.

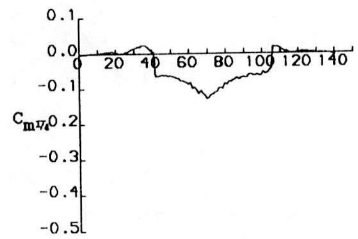
AVERAGED DATA OF 1 CYCLES

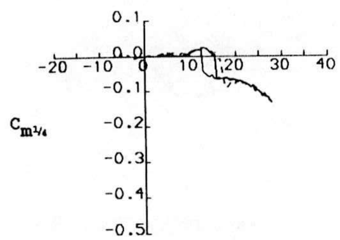


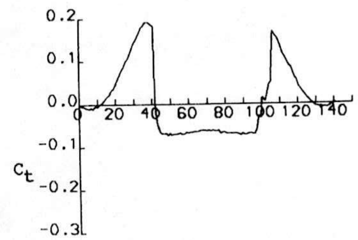


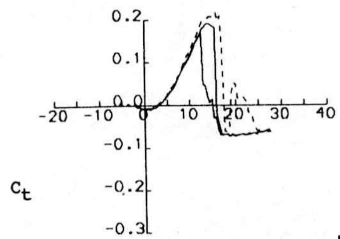


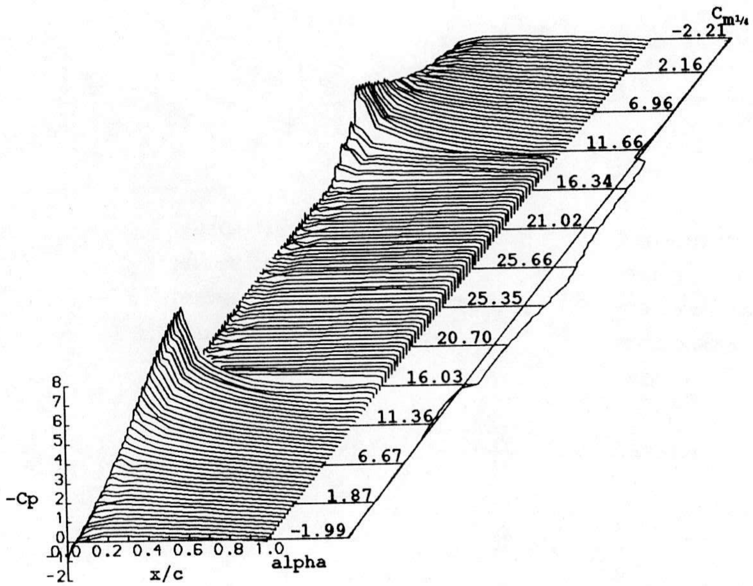












DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 611

REYNOLDS NUMBER = 826547.

DYNAMIC PRESSURE = 1210.53 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

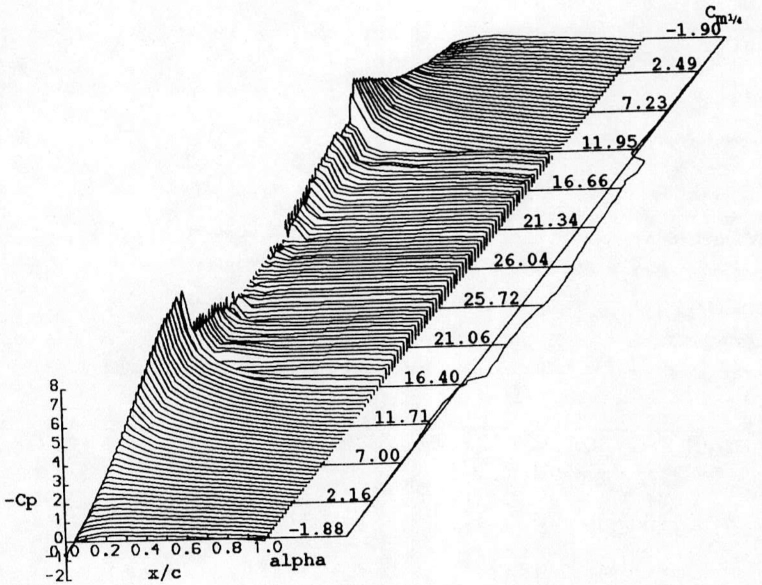
DATE OF TEST: 15/8/91

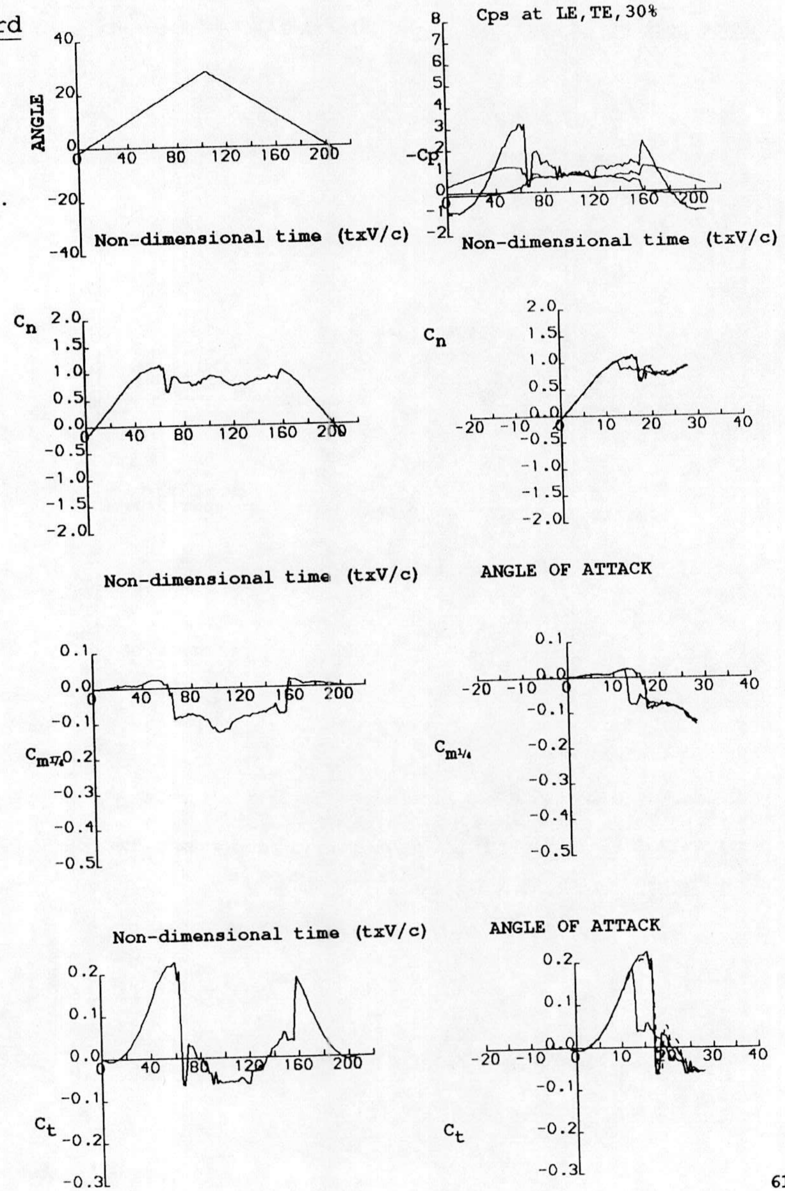
MACH NUMBER = 0.131

AIR TEMPERATURE = 21.0°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 781

REYNOLDS NUMBER = 830696.

DYNAMIC PRESSURE = 1211.59 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

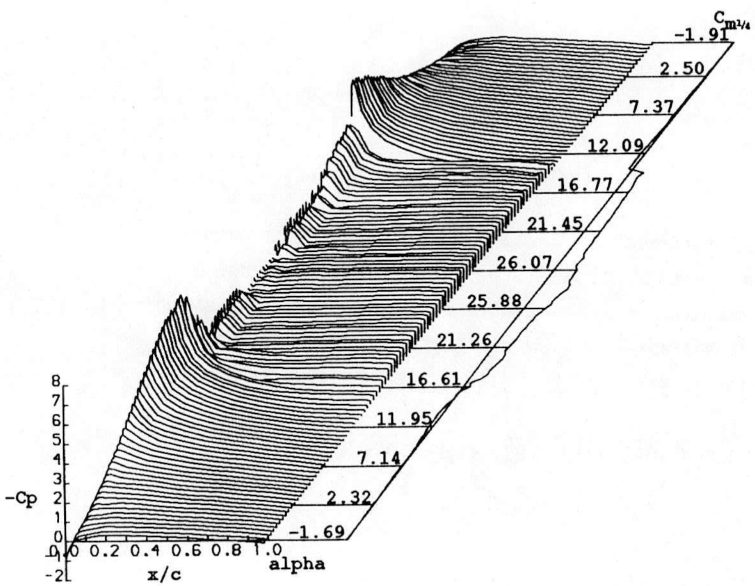
DATE OF TEST: 26/8/91

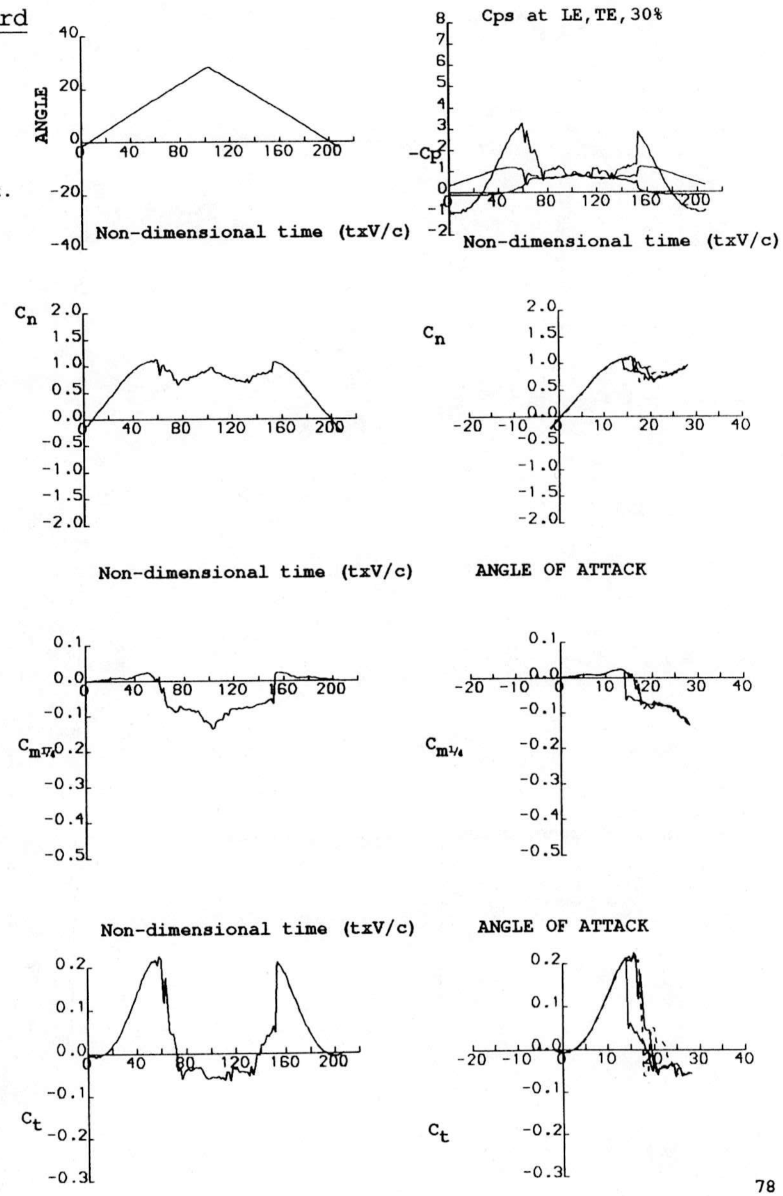
MACH NUMBER = 0.130

AIR TEMPERATURE = 21.5°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES

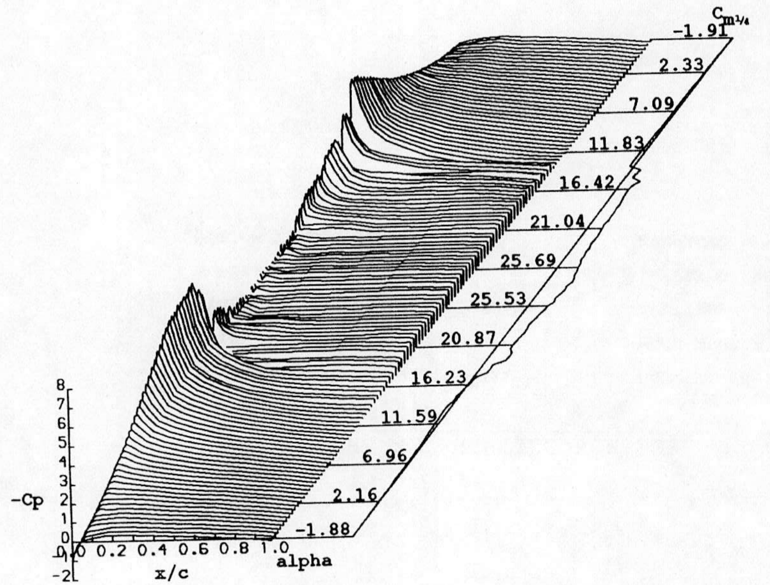


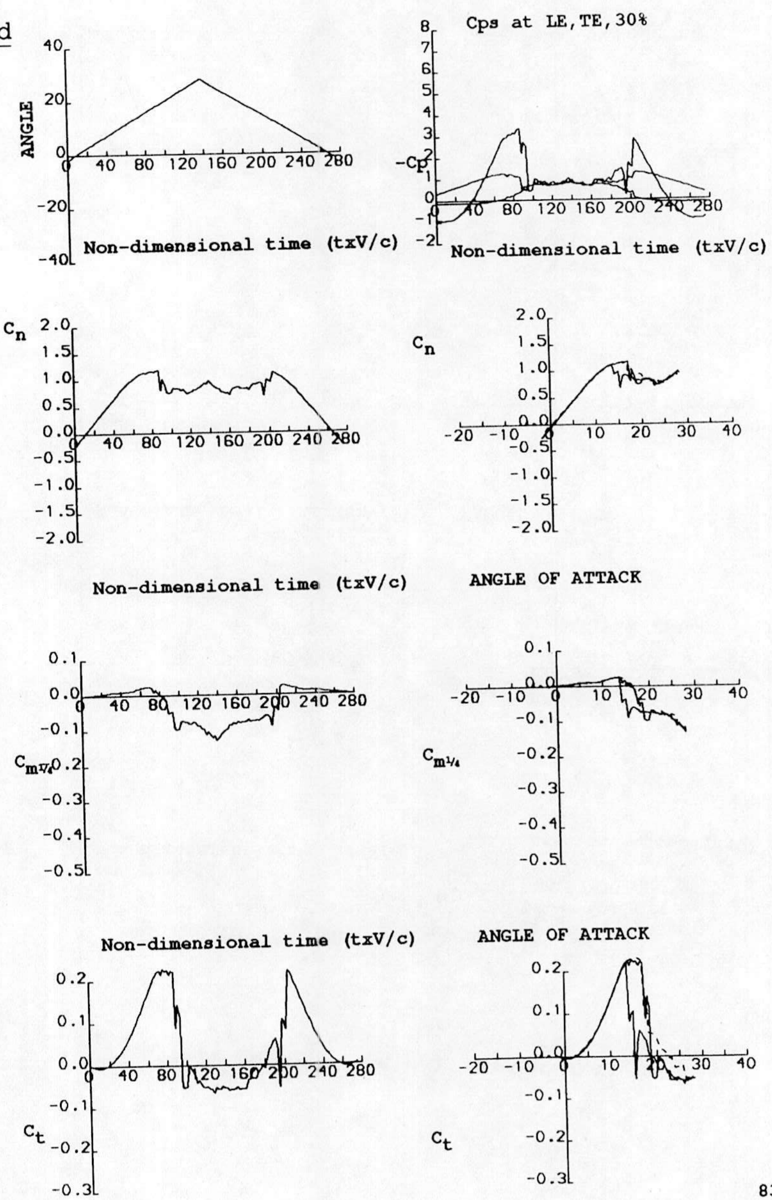


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 831
REYNOLDS NUMBER = 1076558.
DYNAMIC PRESSURE = 2114.21 Nm^{-2}
NUMBER OF CYCLES = 1
MOTION TYPE: STATIC

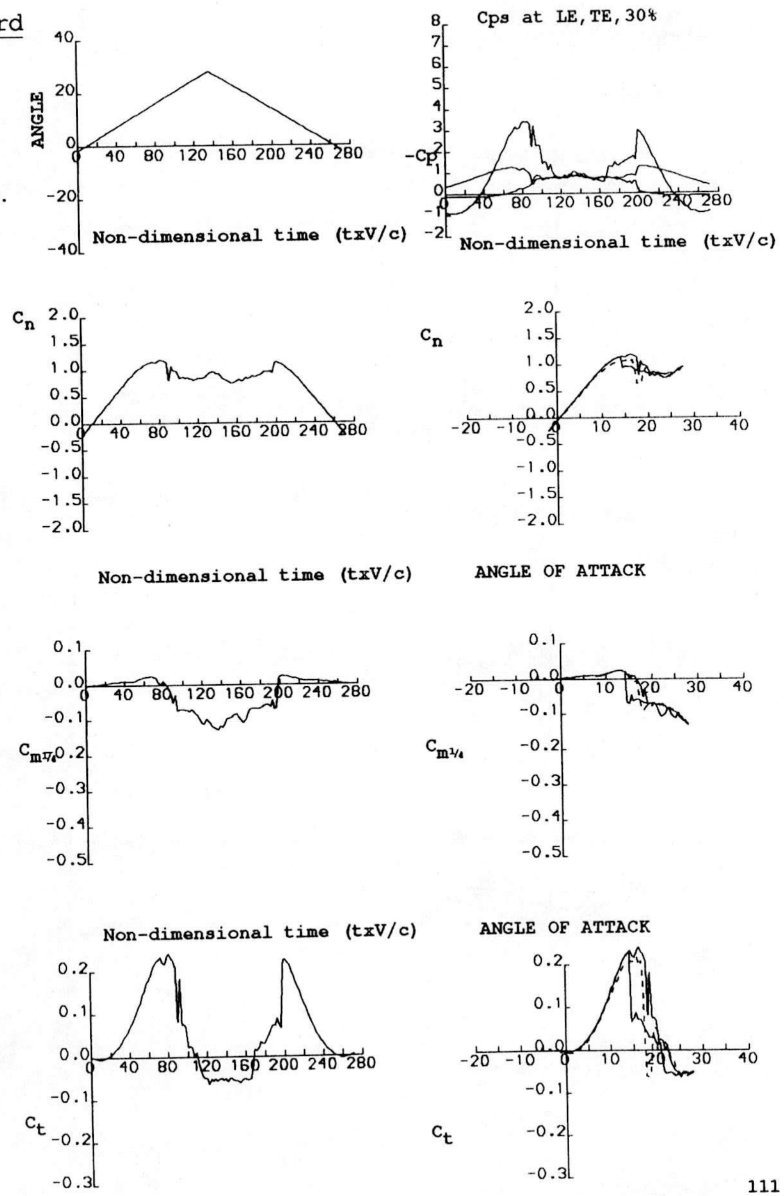
DATE OF TEST: 26/8/91
MACH NUMBER = 0.172
AIR TEMPERATURE = 26.0°C
SAMPLING FREQUENCY = 100.00 Hz.
AVERAGED DATA OF 1 CYCLES

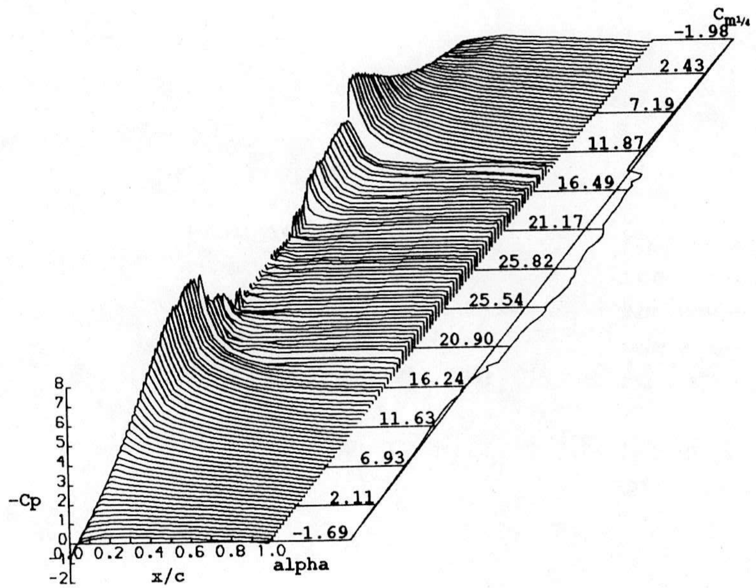




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 1111	DATE OF TEST: 27/8/91
REYNOLDS NUMBER = 2151806.	MACH NUMBER = 0.170
DYNAMIC PRESSURE = 2073.32 Nm^{-2}	AIR TEMPERATURE = 24.4°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 100.00 Hz.
MOTION TYPE: STATIC	AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 1211

REYNOLDS NUMBER = 1693886.

DYNAMIC PRESSURE = 1257.81 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

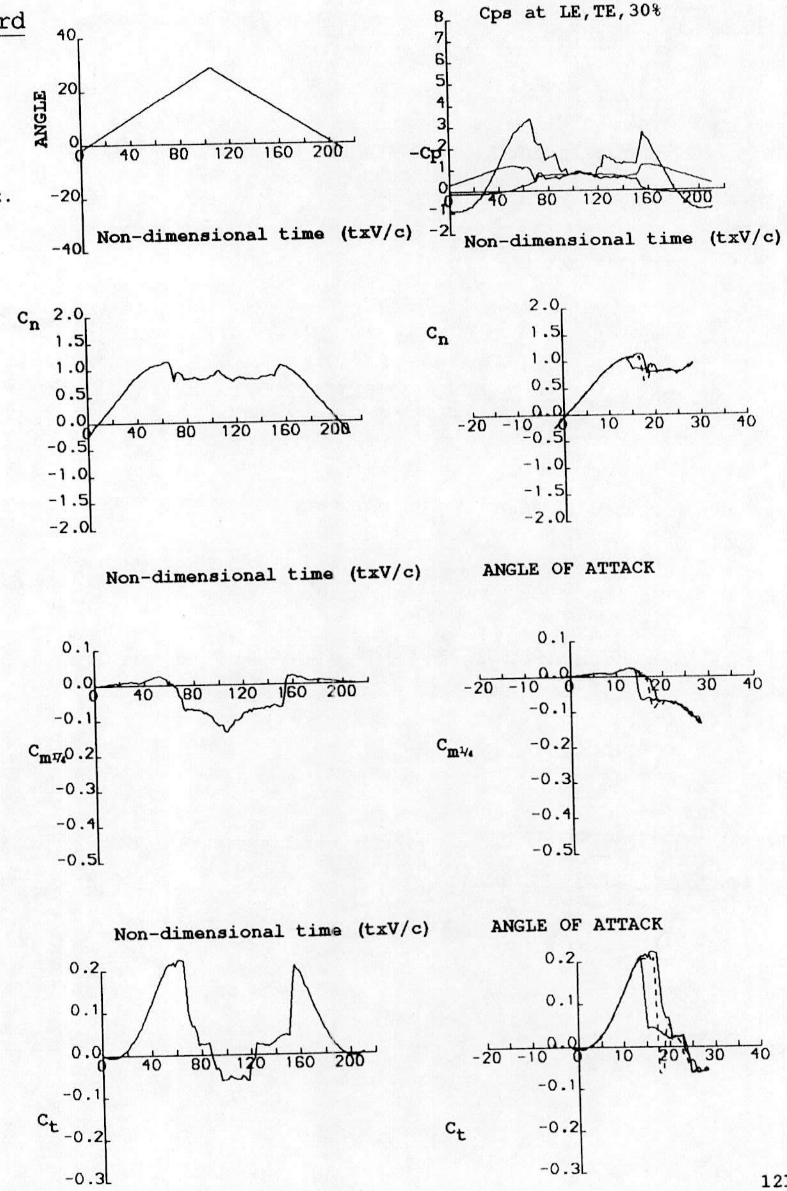
DATE OF TEST: 30/8/91

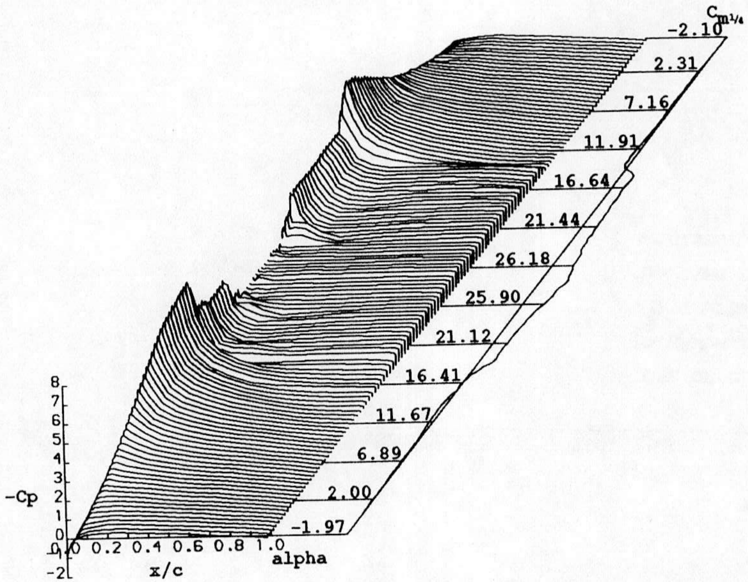
MACH NUMBER = 0.133

AIR TEMPERATURE = 21.8°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 1251

REYNOLDS NUMBER = 1582677.

DYNAMIC PRESSURE = 1086.06 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

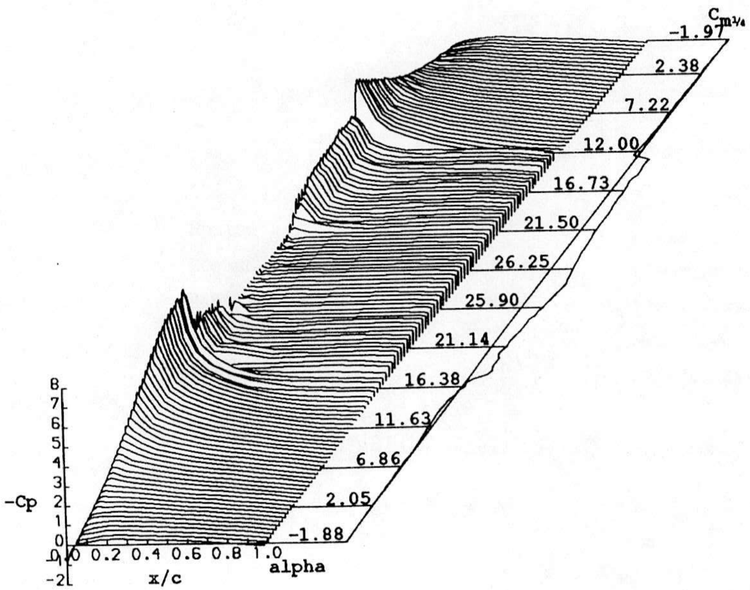
DATE OF TEST: 2/9/91

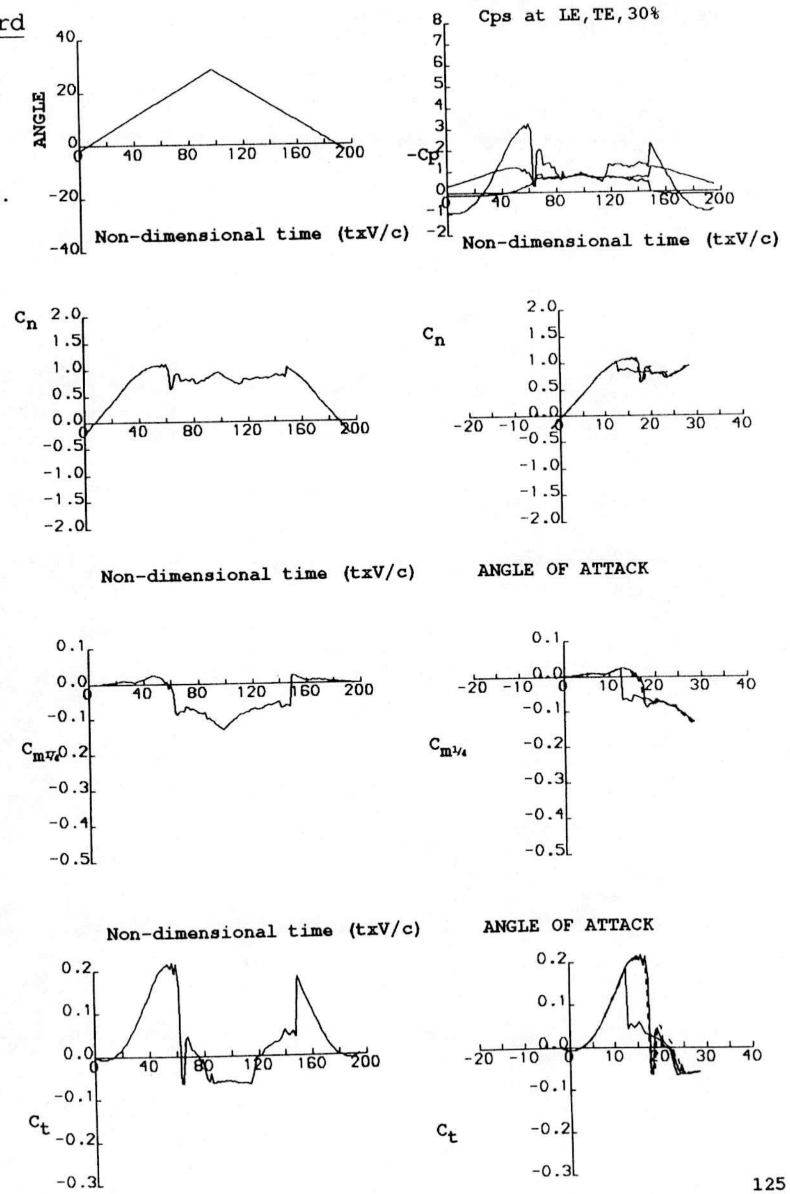
MACH NUMBER = 0.123

AIR TEMPERATURE = 20.8°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 1381

REYNOLDS NUMBER = 1583098.

DYNAMIC PRESSURE = 1091.08 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

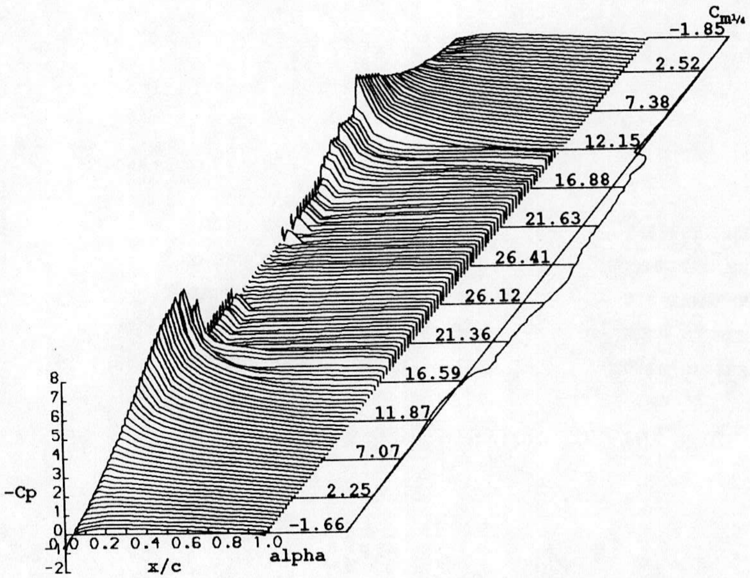
DATE OF TEST: 3/9/91

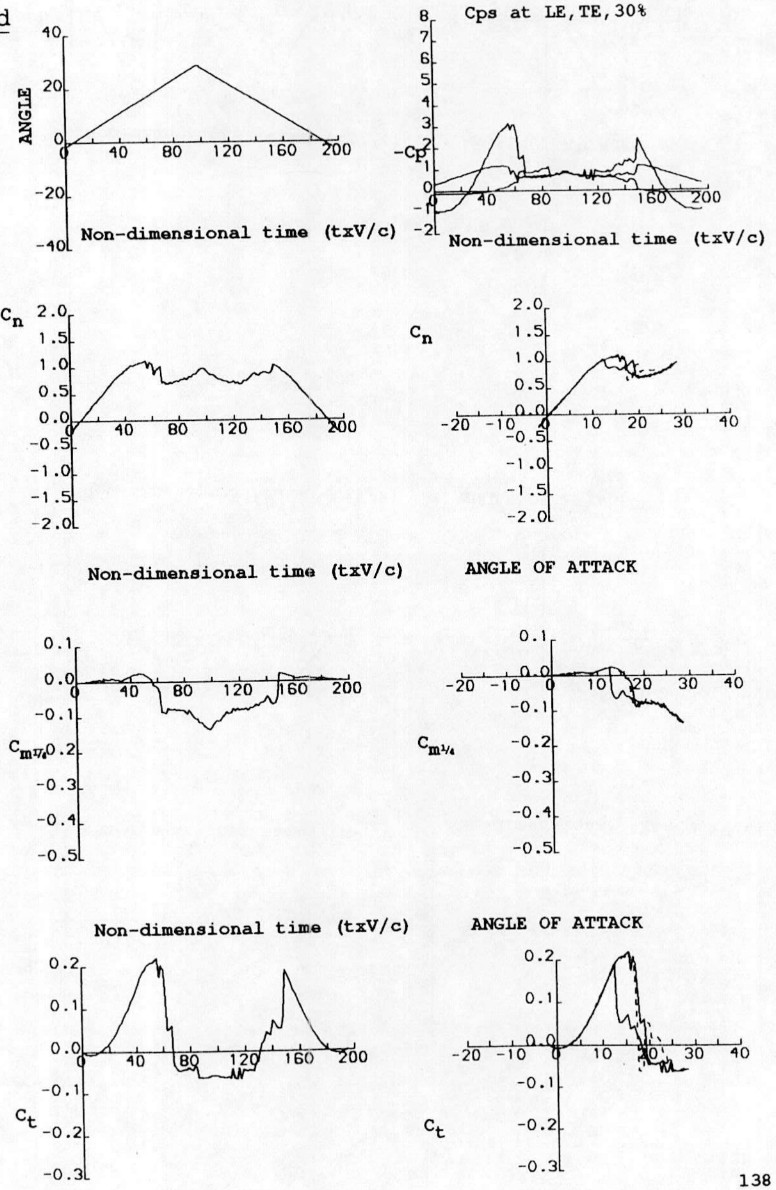
MACH NUMBER = 0.123

AIR TEMPERATURE = 21.9°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 1661

REYNOLDS NUMBER = 1573711.

DYNAMIC PRESSURE = 1077.91 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

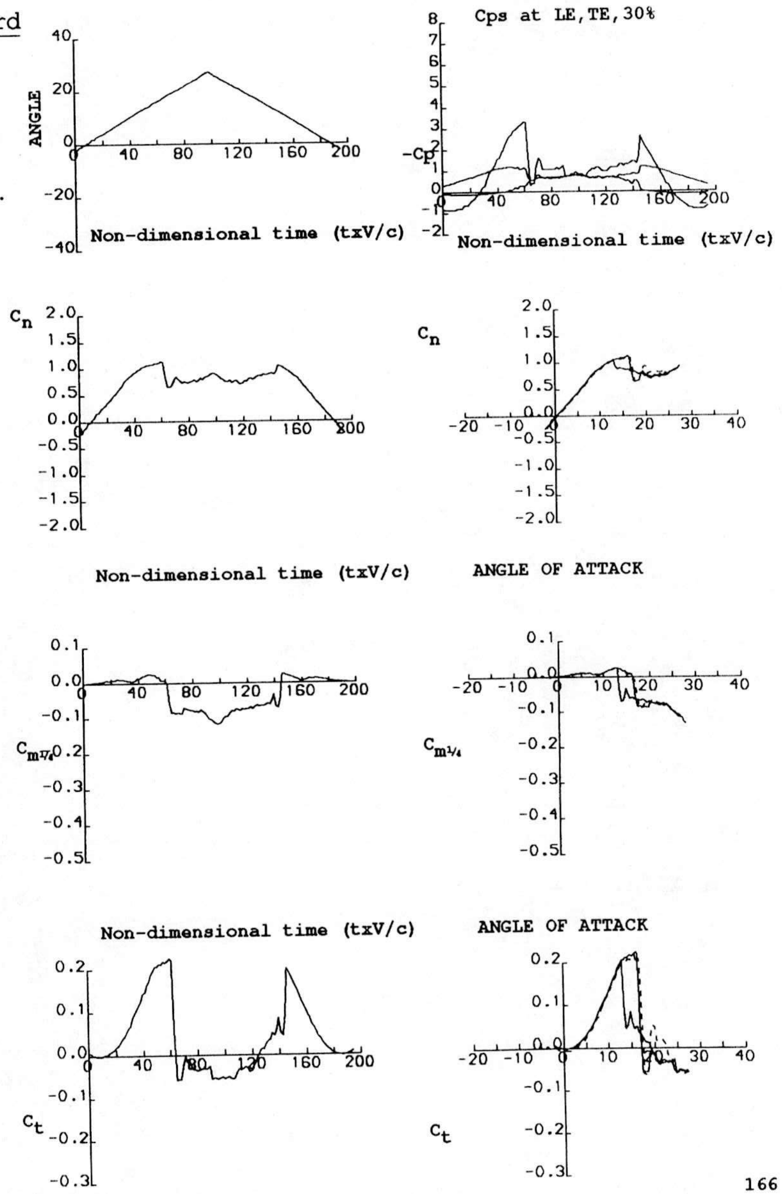
DATE OF TEST: 5/9/91

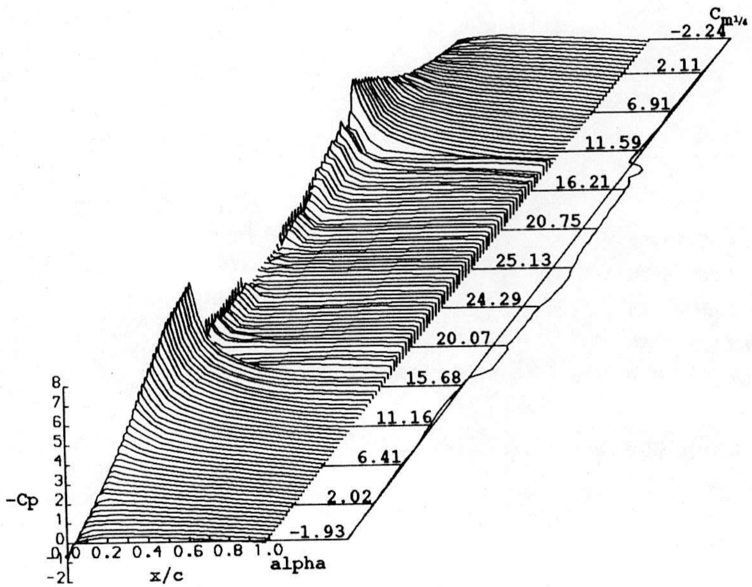
MACH NUMBER = 0.122

AIR TEMPERATURE = 21.5°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 1721

REYNOLDS NUMBER = 1066452.

DYNAMIC PRESSURE = 2019.26 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

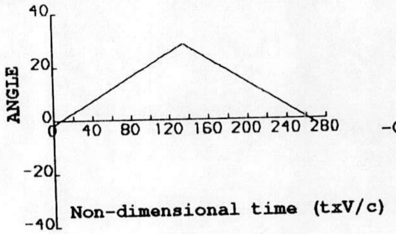
DATE OF TEST: 24/9/91

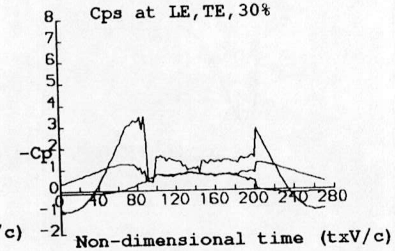
MACH NUMBER = 0.171

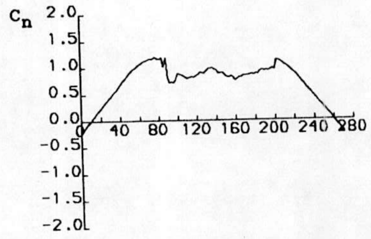
AIR TEMPERATURE = 18.9°C

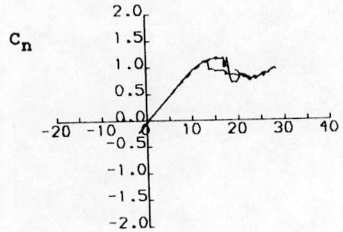
SAMPLING FREQUENCY = 100.00 Hz.

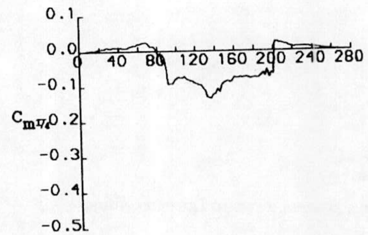
AVERAGED DATA OF 1 CYCLES

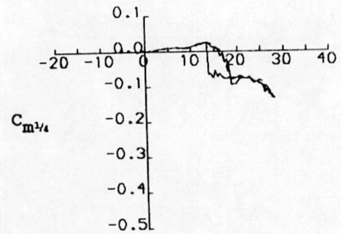


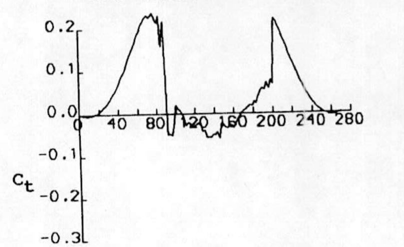


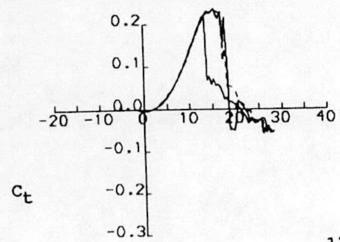


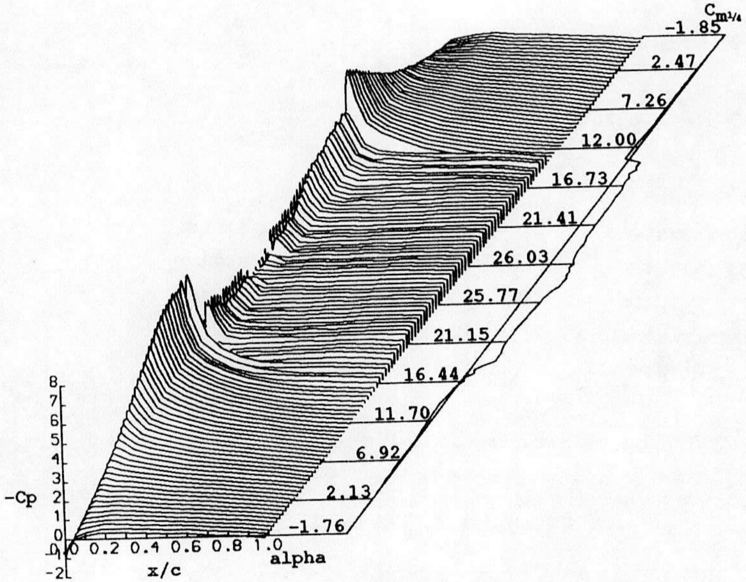












DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 801971

REYNOLDS NUMBER = 2195513.

DYNAMIC PRESSURE = 2040.03 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

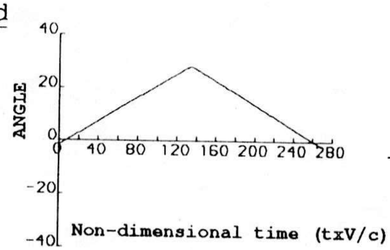
DATE OF TEST: 1/10/91

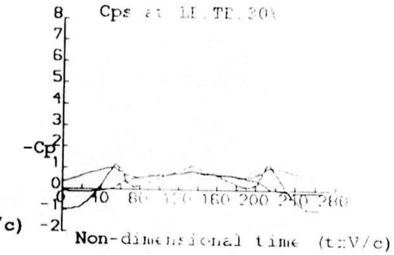
MACH NUMBER = 0.172

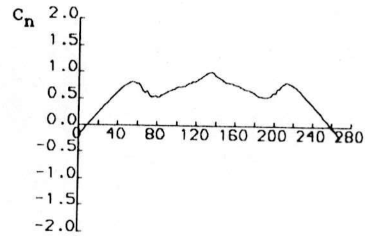
AIR TEMPERATURE = 14.0°C

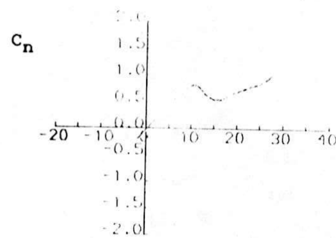
SAMPLING FREQUENCY = 100.00 Hz.

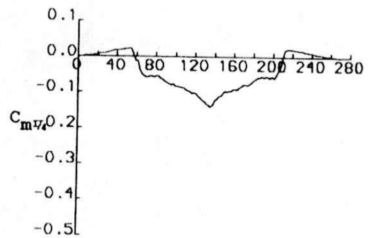
AVERAGED DATA OF 1 CYCLES

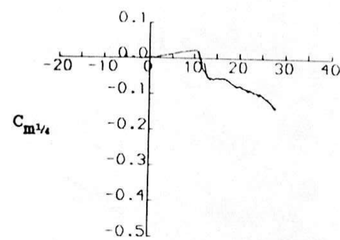


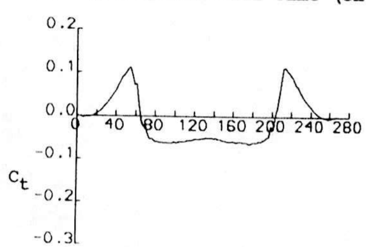


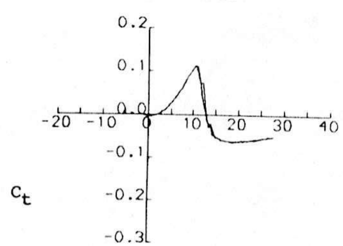


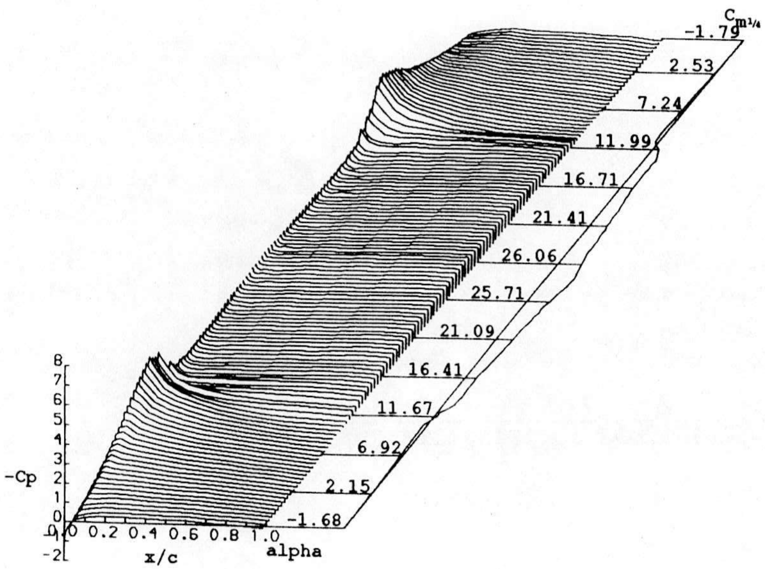












DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 801981

REYNOLDS NUMBER = 1769809.

DYNAMIC PRESSURE = 1331.87 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: STATIC

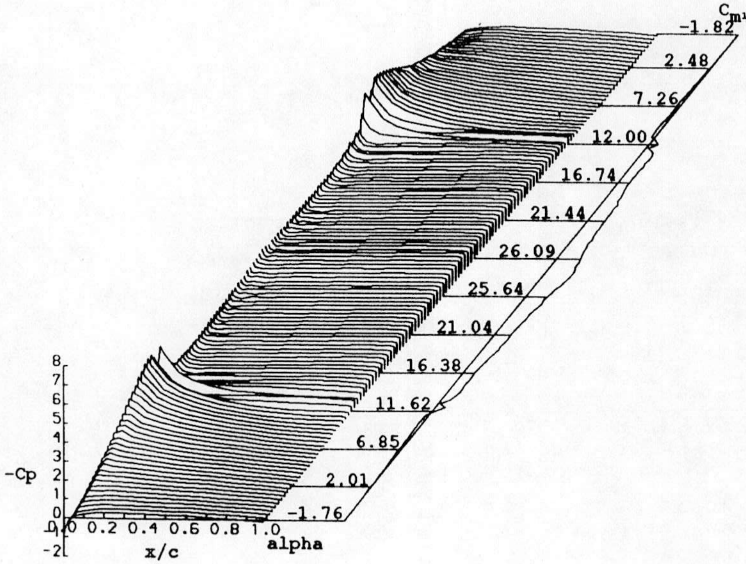
DATE OF TEST: 1/10/91

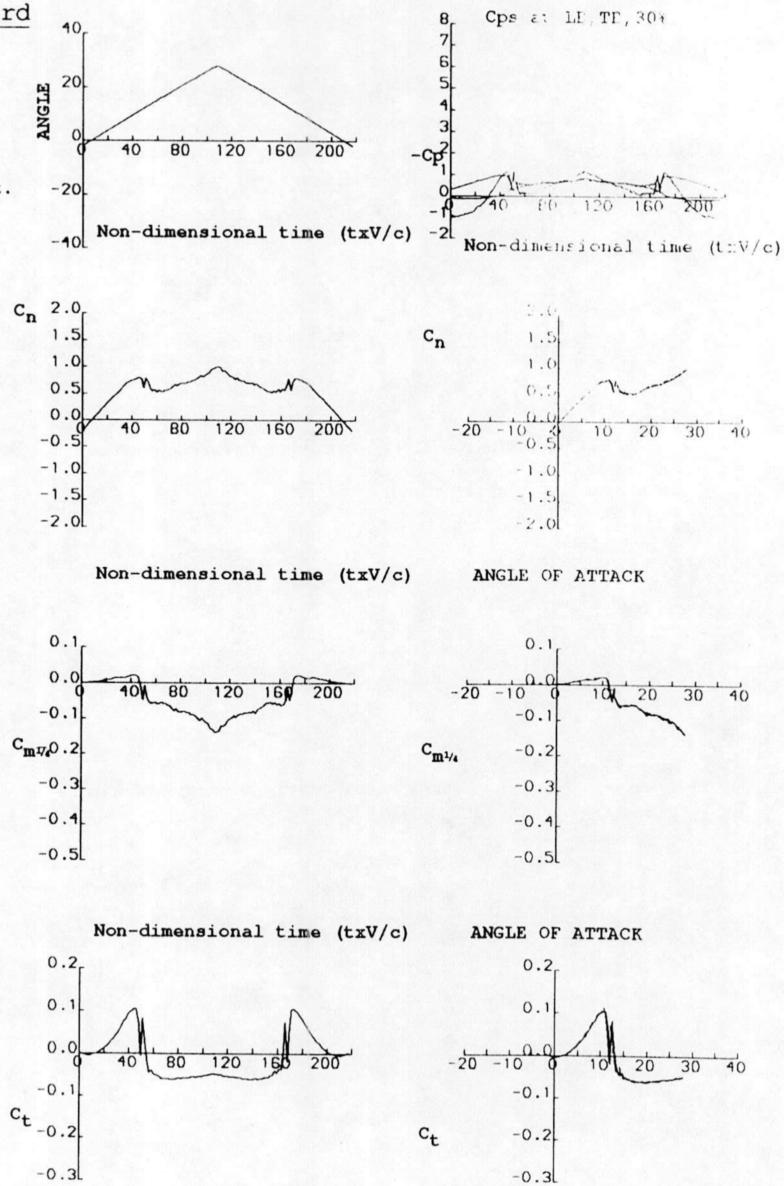
MACH NUMBER = 0.139

AIR TEMPERATURE = 14.6°C

SAMPLING FREQUENCY = 100.00 Hz.

AVERAGED DATA OF 1 CYCLES





G.U. Aero Report 9209

UNIVERSITY OF GLASGOW

DEPARTMENT OF AEROSPACE ENGINEERING

PRESSURE DATA FROM

UNSTEADY STATIC EXPERIMENTS

DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 40841

REYNOLDS NUMBER = 1061678.

DYNAMIC PRESSURE = 2091.56 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

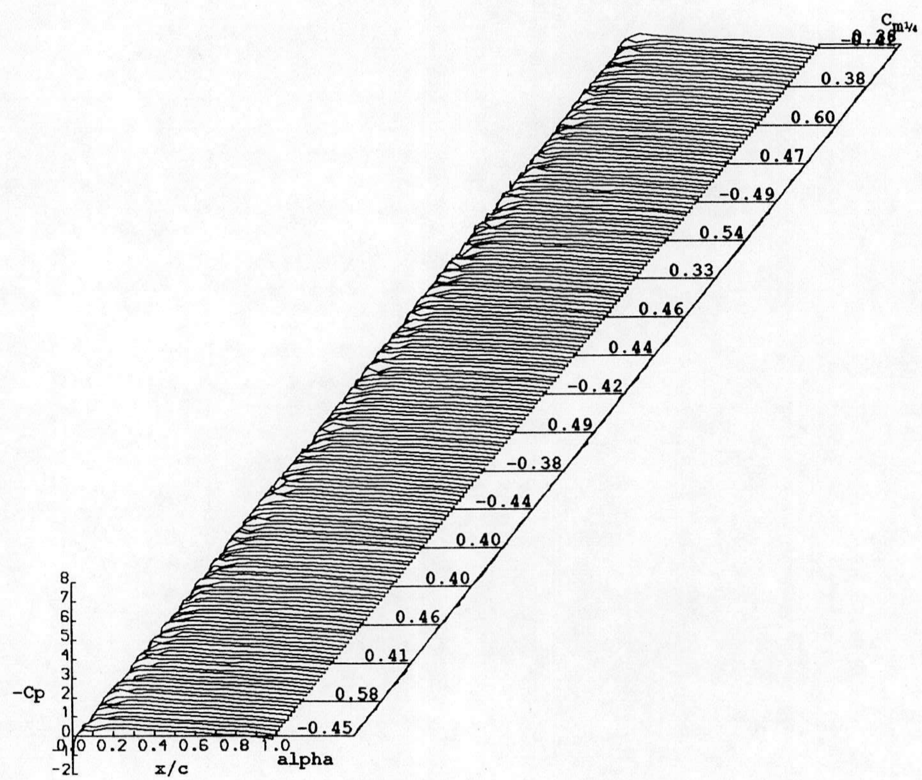
DATE OF TEST: 26/8/91

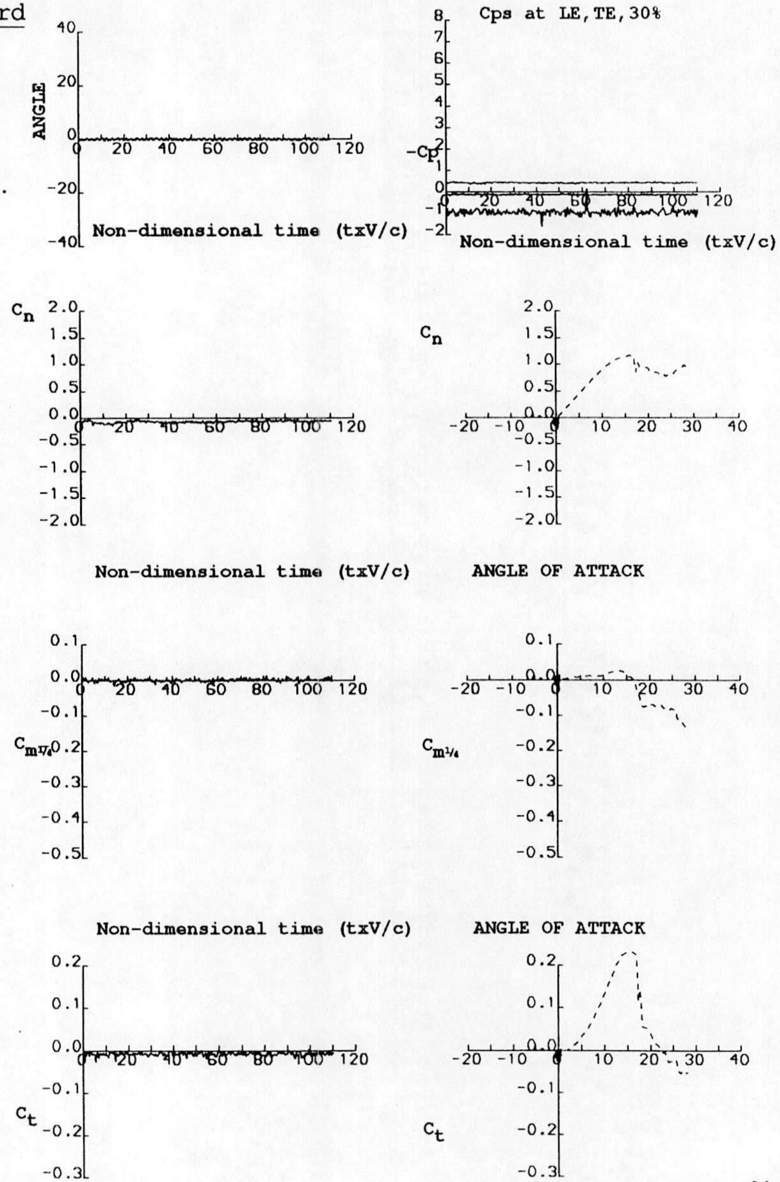
MACH NUMBER = 0.171

AIR TEMPERATURE = 28.0°C

SAMPLING FREQUENCY = 500.00 Hz.

ANGLE OF ATTACK = 0.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 40851

REYNOLDS NUMBER = 1055397.

DYNAMIC PRESSURE = 2091.56 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

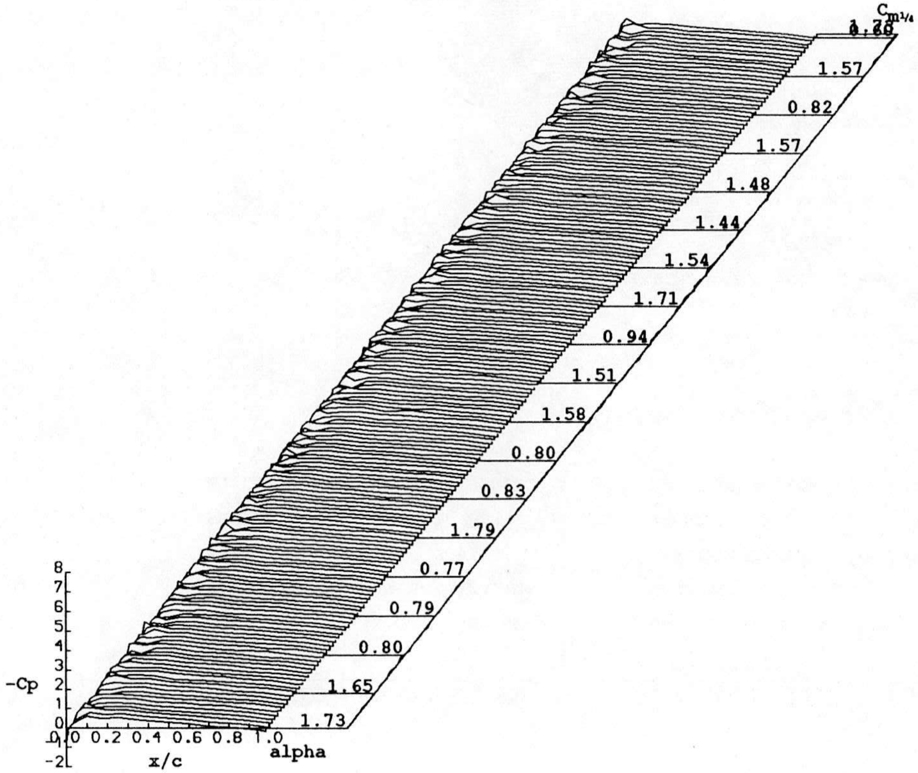
DATE OF TEST: 26/8/91

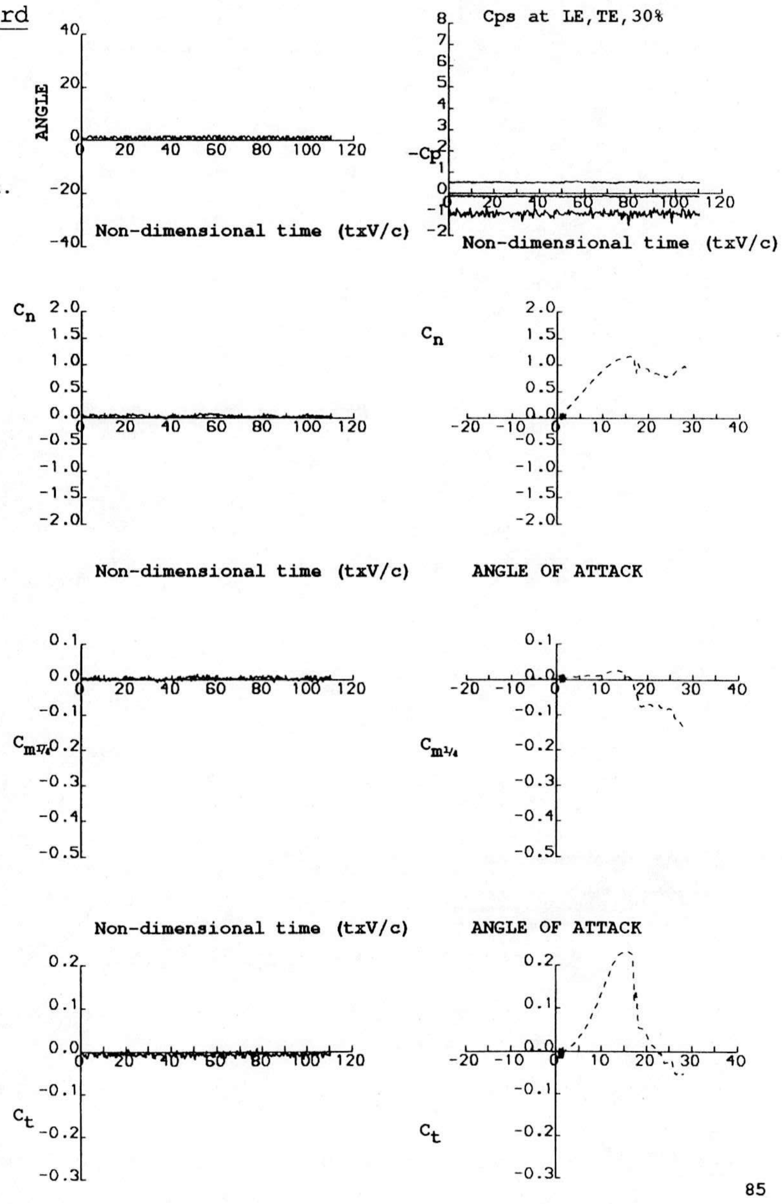
MACH NUMBER = 0.171

AIR TEMPERATURE = 29.4°C

SAMPLING FREQUENCY = 500.00 Hz.

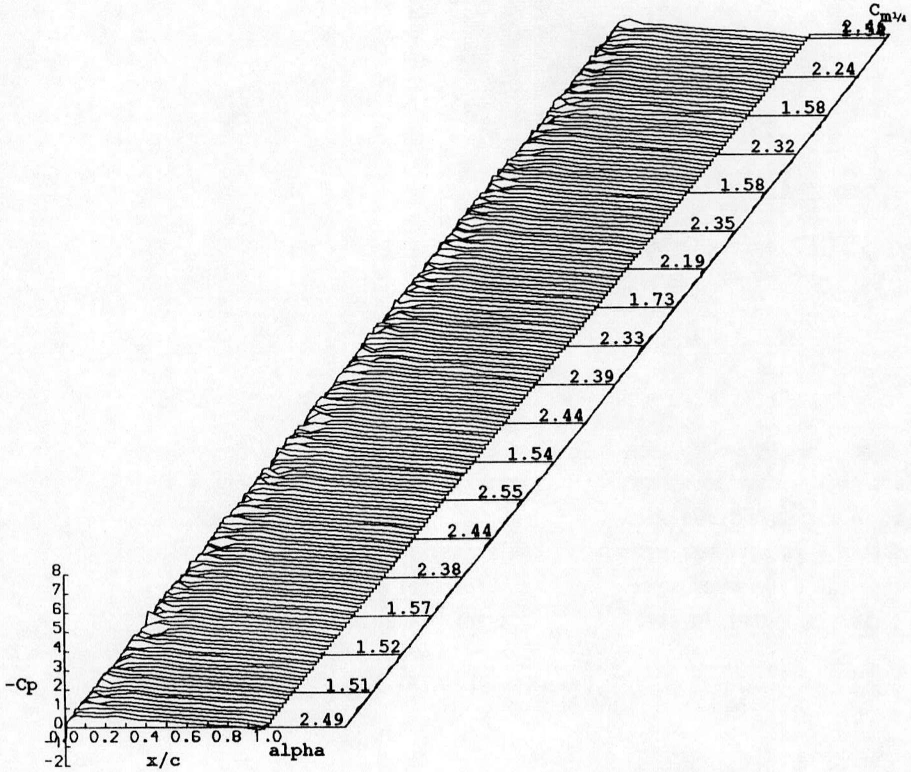
ANGLE OF ATTACK = 1.0

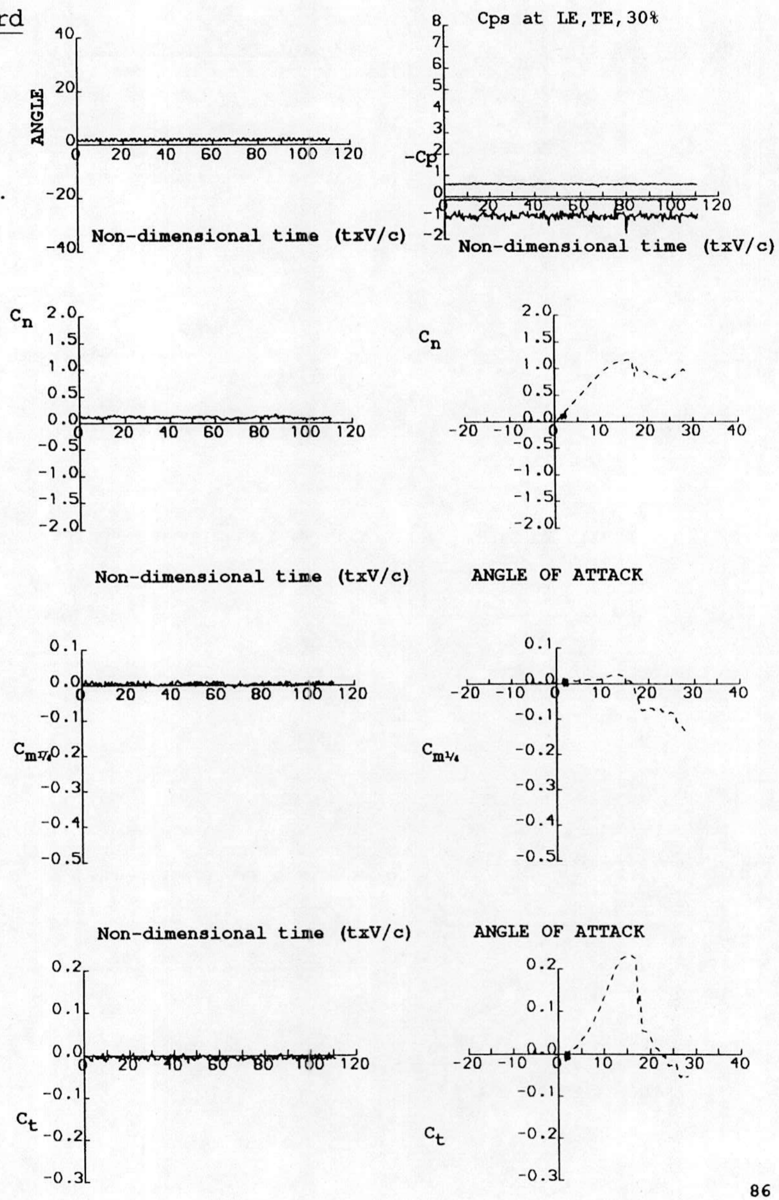




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 40861	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1047424.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2091.56 Nm^{-2}	AIR TEMPERATURE = 31.2°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 2.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

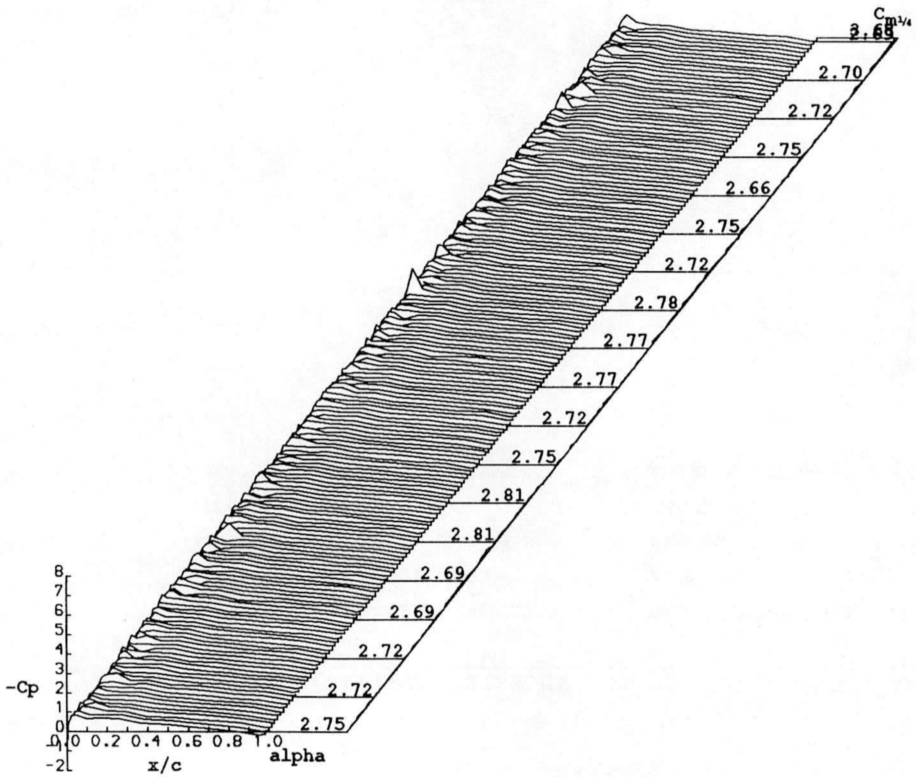
RUN REFERENCE NUMBER: 40871 | DATE OF TEST: 26/8/91

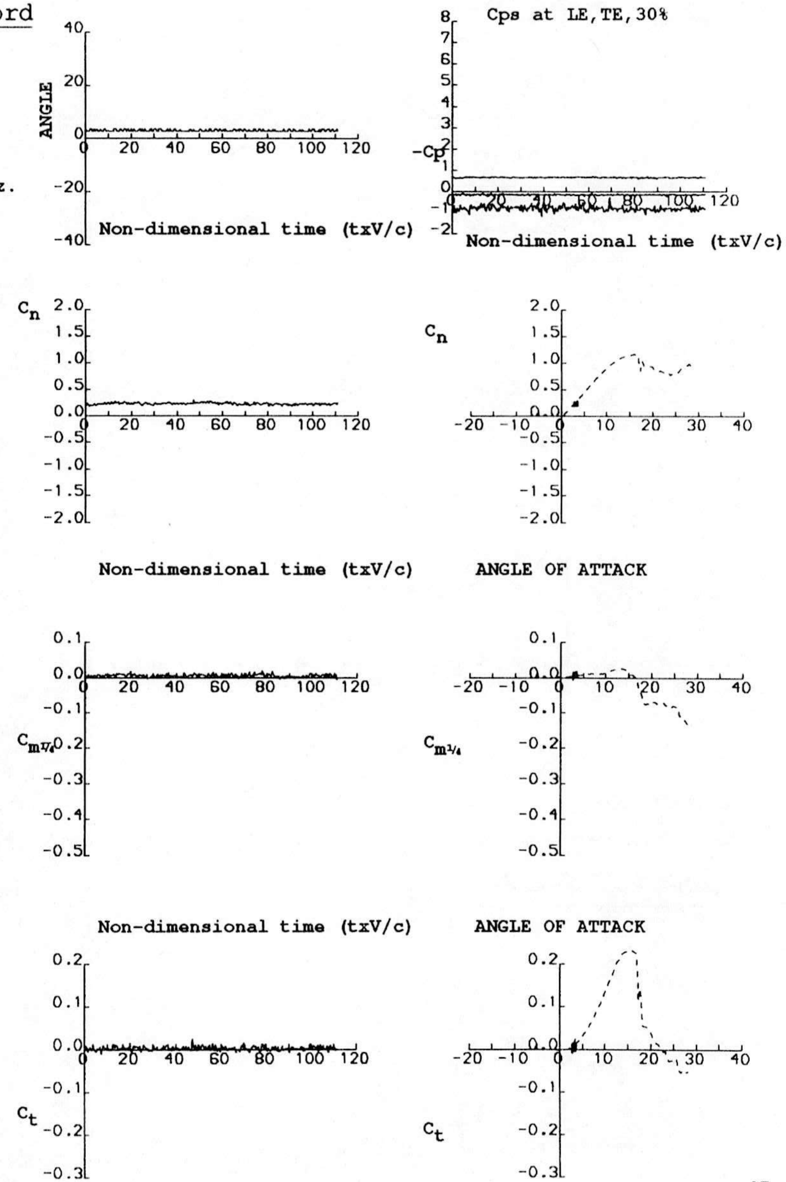
REYNOLDS NUMBER = 1044355. | MACH NUMBER = 0.171

DYNAMIC PRESSURE = 2091.56 Nm^{-2} | AIR TEMPERATURE = 31.9°C

NUMBER OF CYCLES = 1 | SAMPLING FREQUENCY = 500.00 Hz.

MOTION TYPE: UNSTEADY STATIC | ANGLE OF ATTACK = 3.0

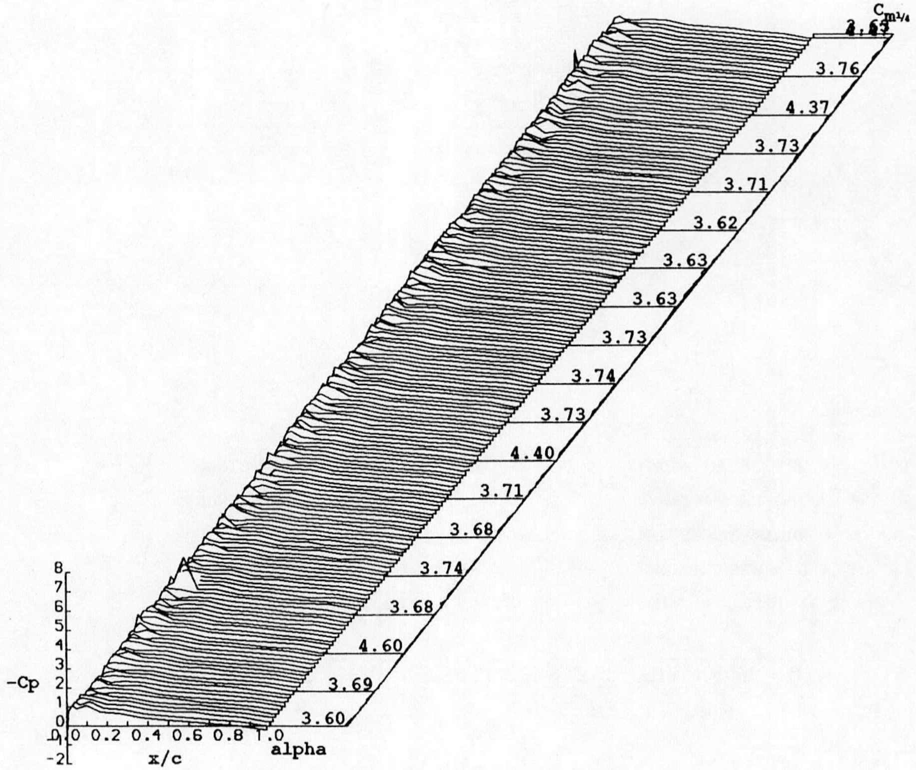


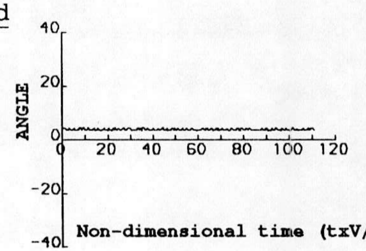


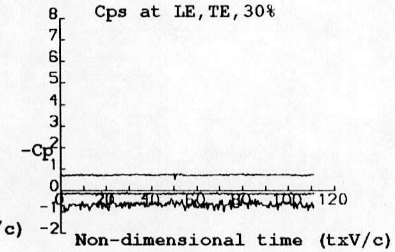
DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

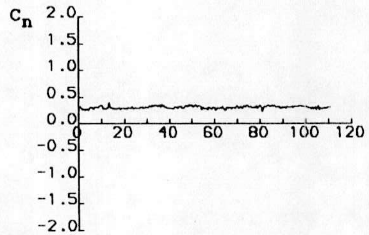
RUN REFERENCE NUMBER: 40881
REYNOLDS NUMBER = 1042173.
DYNAMIC PRESSURE = 2091.56 Nm^{-2}
NUMBER OF CYCLES = 1
MOTION TYPE: UNSTEADY STATIC

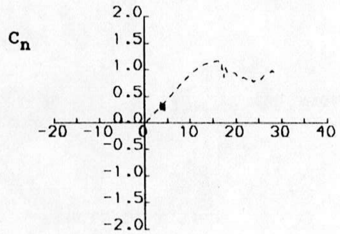
DATE OF TEST: 26/8/91
MACH NUMBER = 0.171
AIR TEMPERATURE = 32.4°C
SAMPLING FREQUENCY = 500.00 Hz.
ANGLE OF ATTACK = 4.0

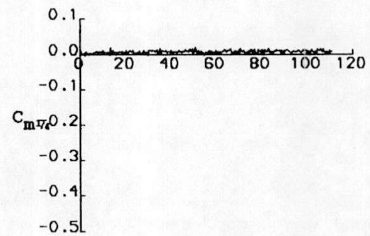


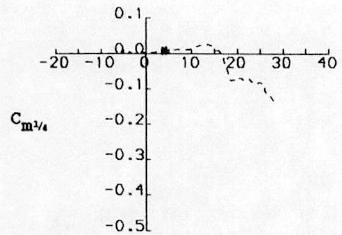


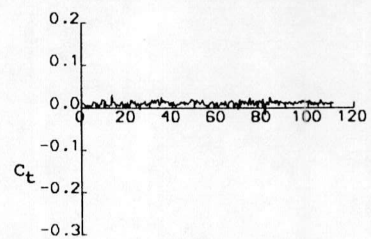


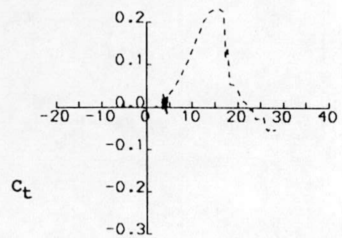












DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 40891

REYNOLDS NUMBER = 1040868.

DYNAMIC PRESSURE = 2091.56 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

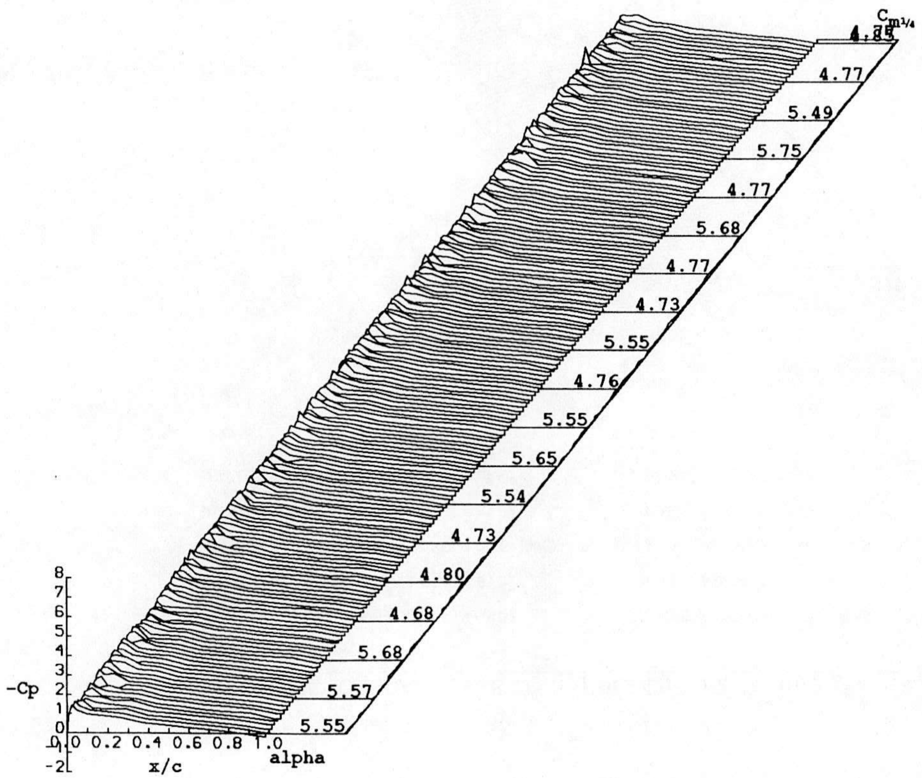
DATE OF TEST: 26/8/91

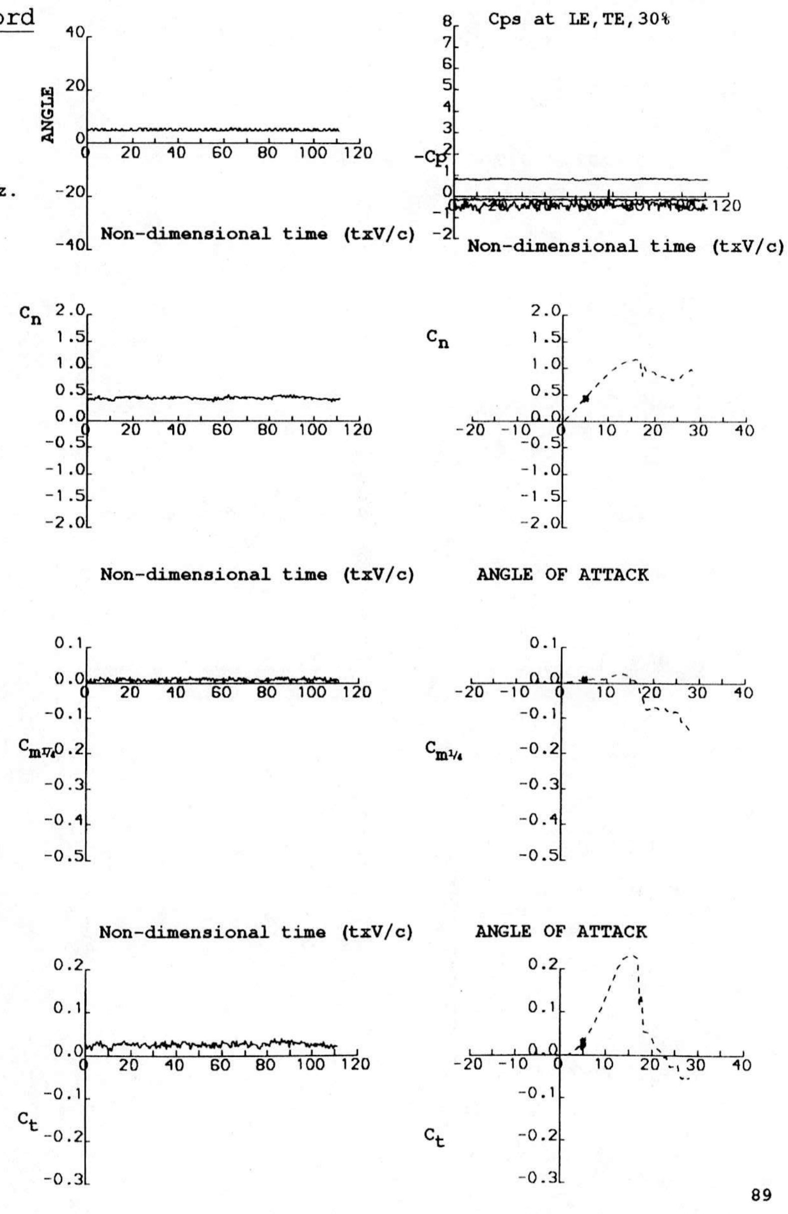
MACH NUMBER = 0.171

AIR TEMPERATURE = 32.7°C

SAMPLING FREQUENCY = 500.00 Hz.

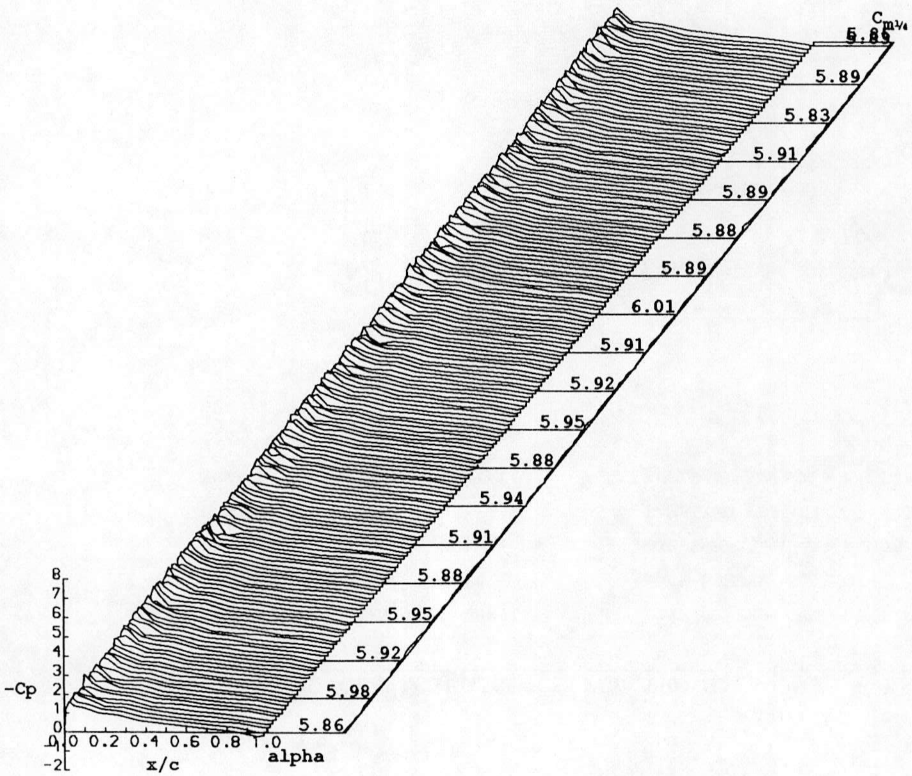
ANGLE OF ATTACK = 5.0

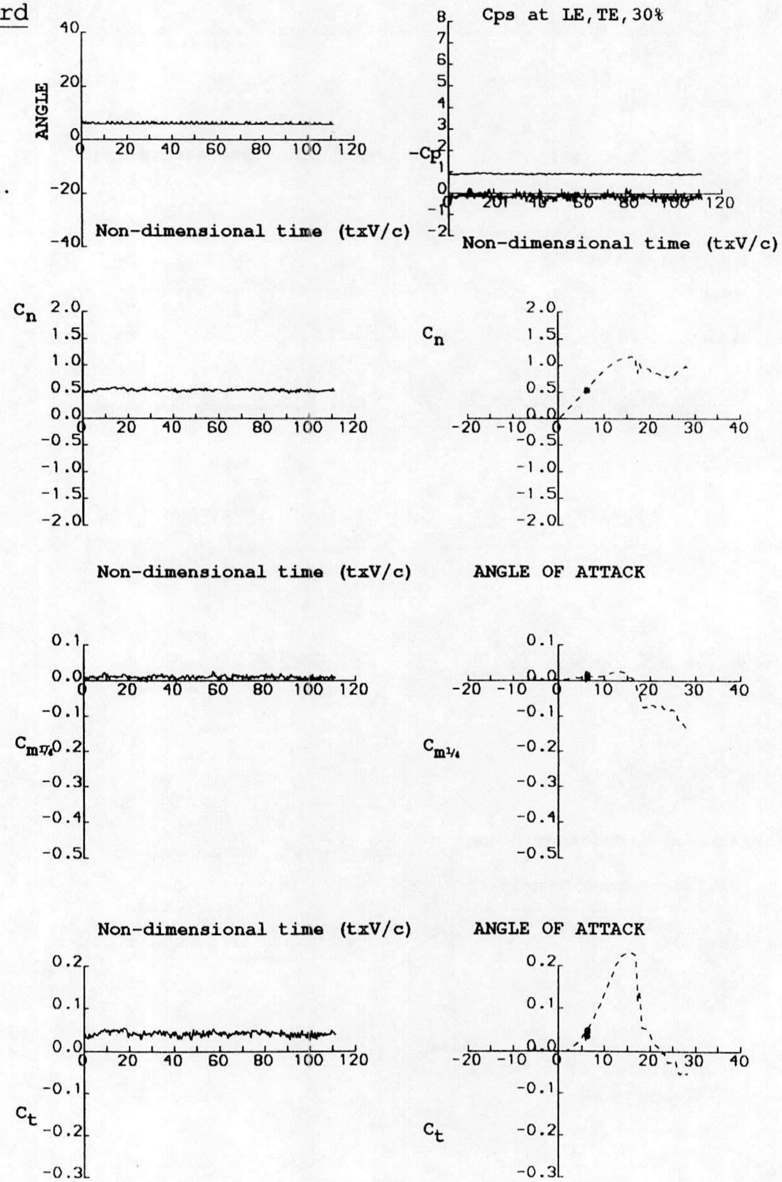




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

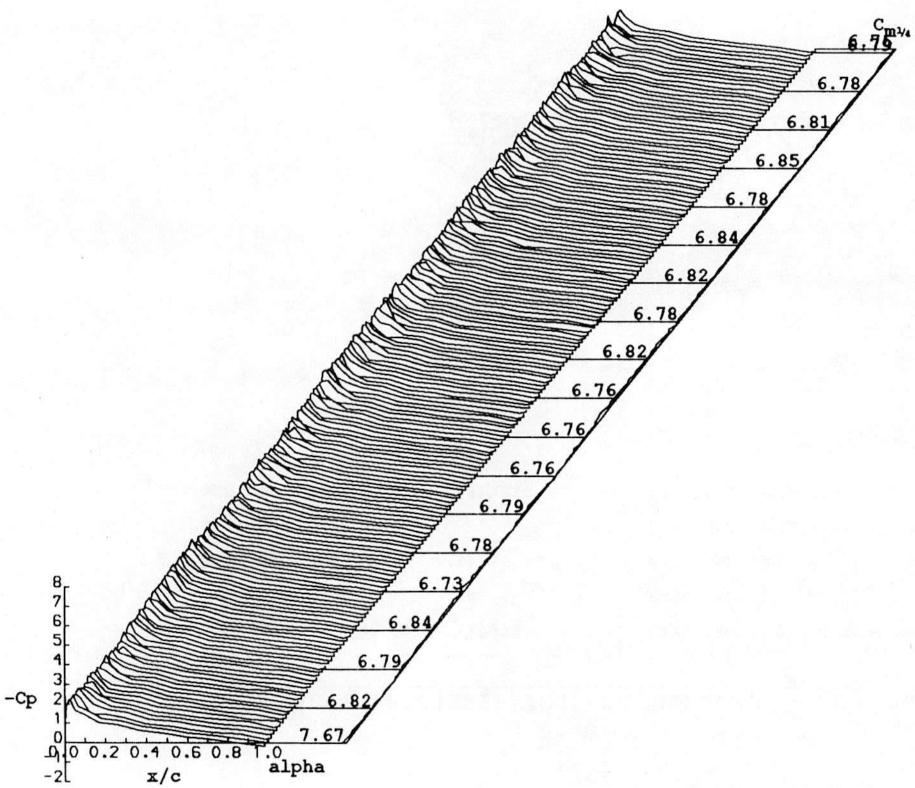
RUN REFERENCE NUMBER: 40901	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1039566.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2091.56 Nm^{-2}	AIR TEMPERATURE = 33.0°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 6.0

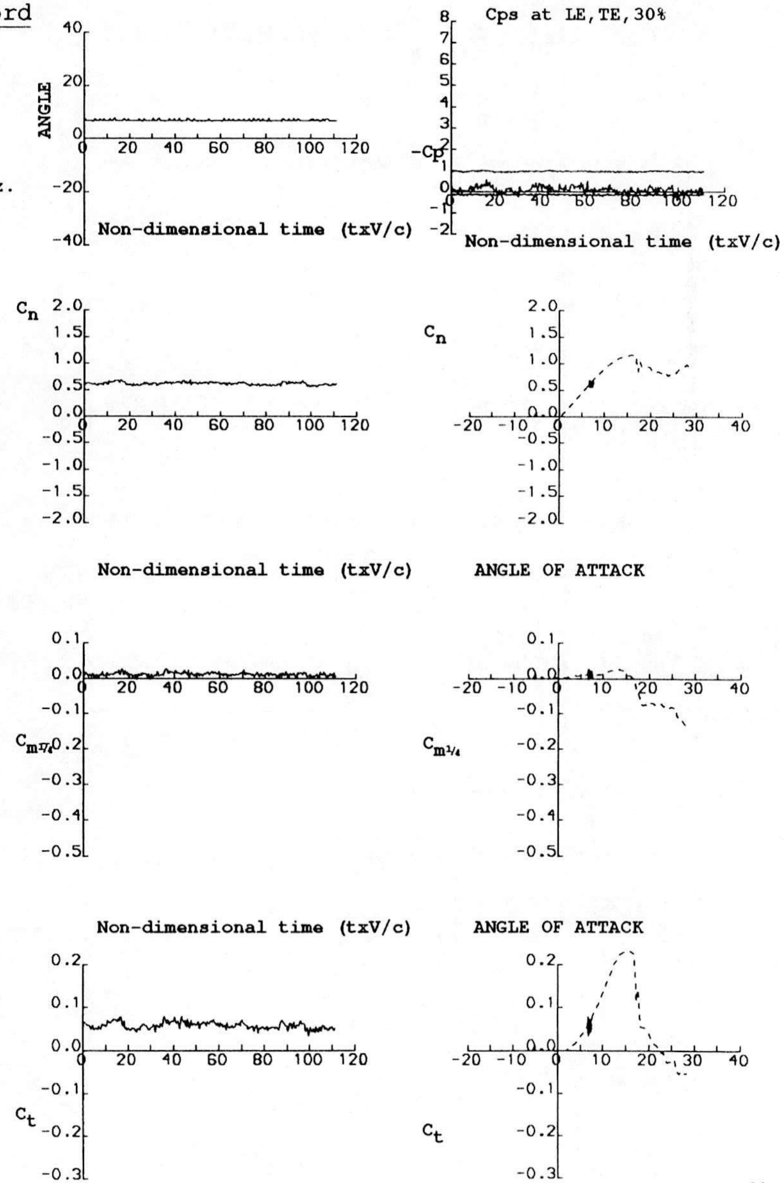




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

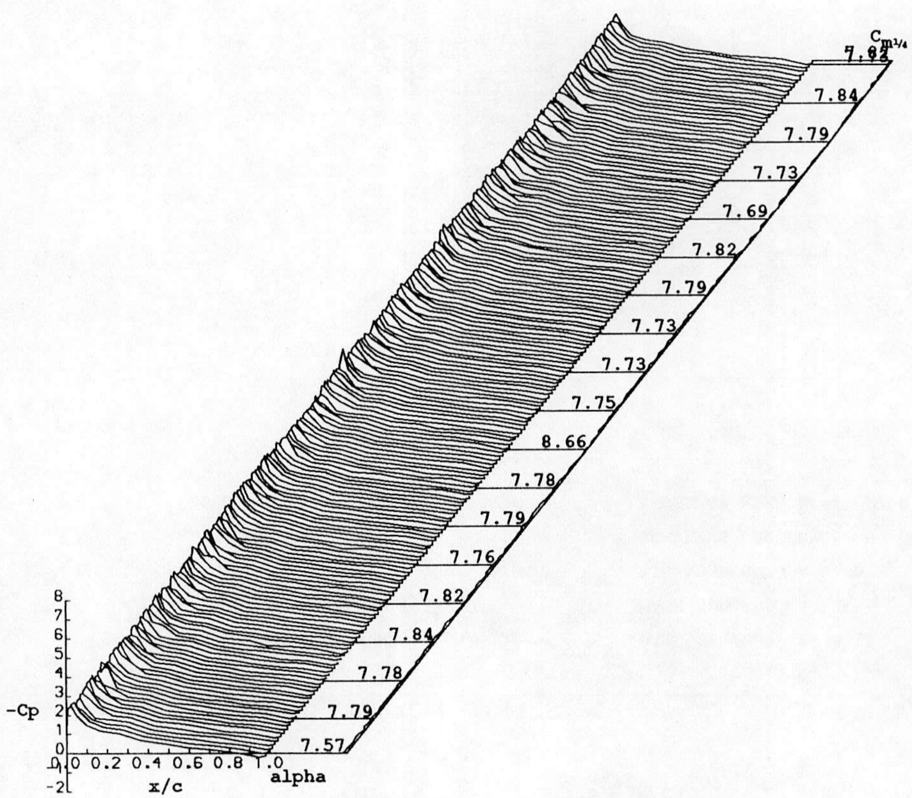
RUN REFERENCE NUMBER: 40911
DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1038267.
MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2091.56 Nm^{-2}
AIR TEMPERATURE = 33.3°C
NUMBER OF CYCLES = 1
SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC
ANGLE OF ATTACK = 7.0

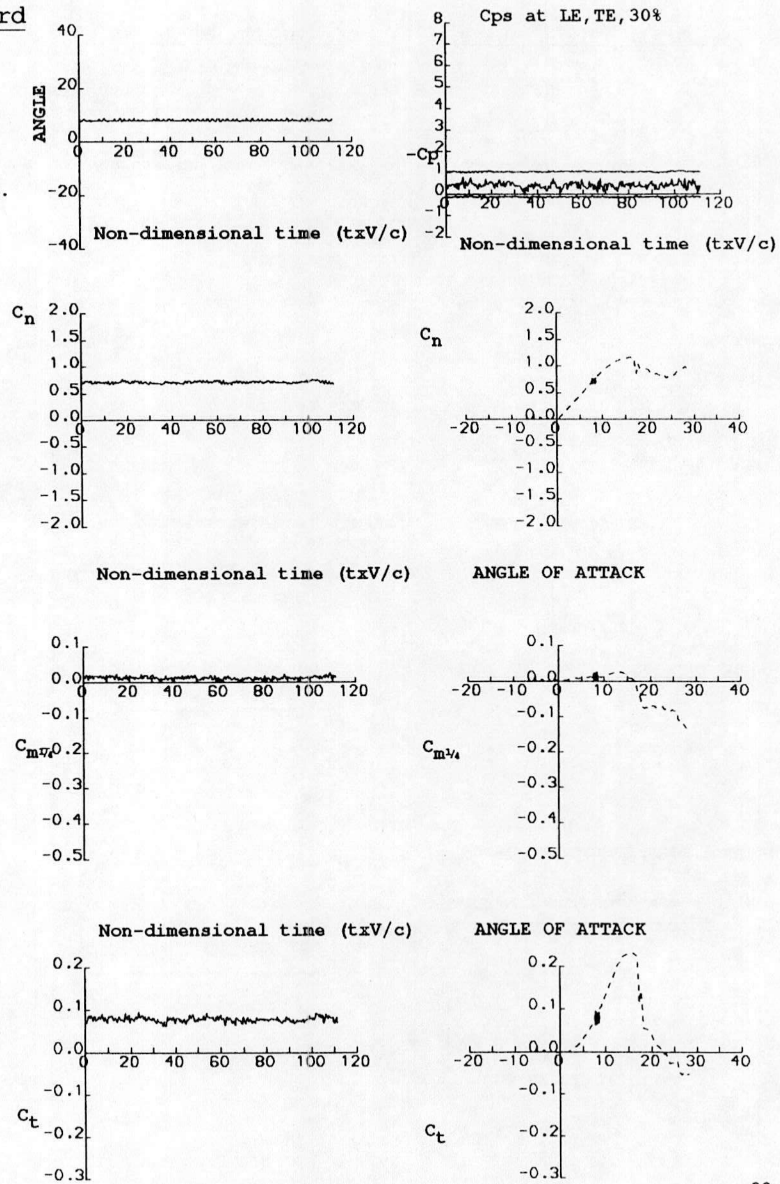




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 40921	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1036109.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2091.56 Nm^{-2}	AIR TEMPERATURE = 33.8°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 8.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 40931

REYNOLDS NUMBER = 1034819.

DYNAMIC PRESSURE = 2091.56 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

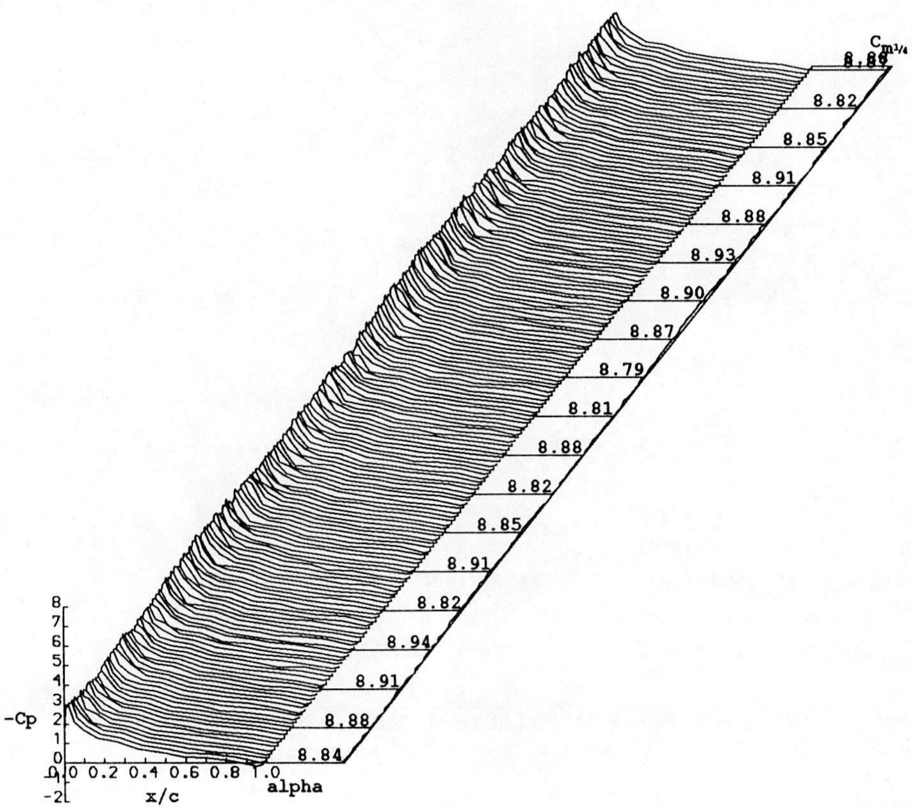
DATE OF TEST: 26/8/91

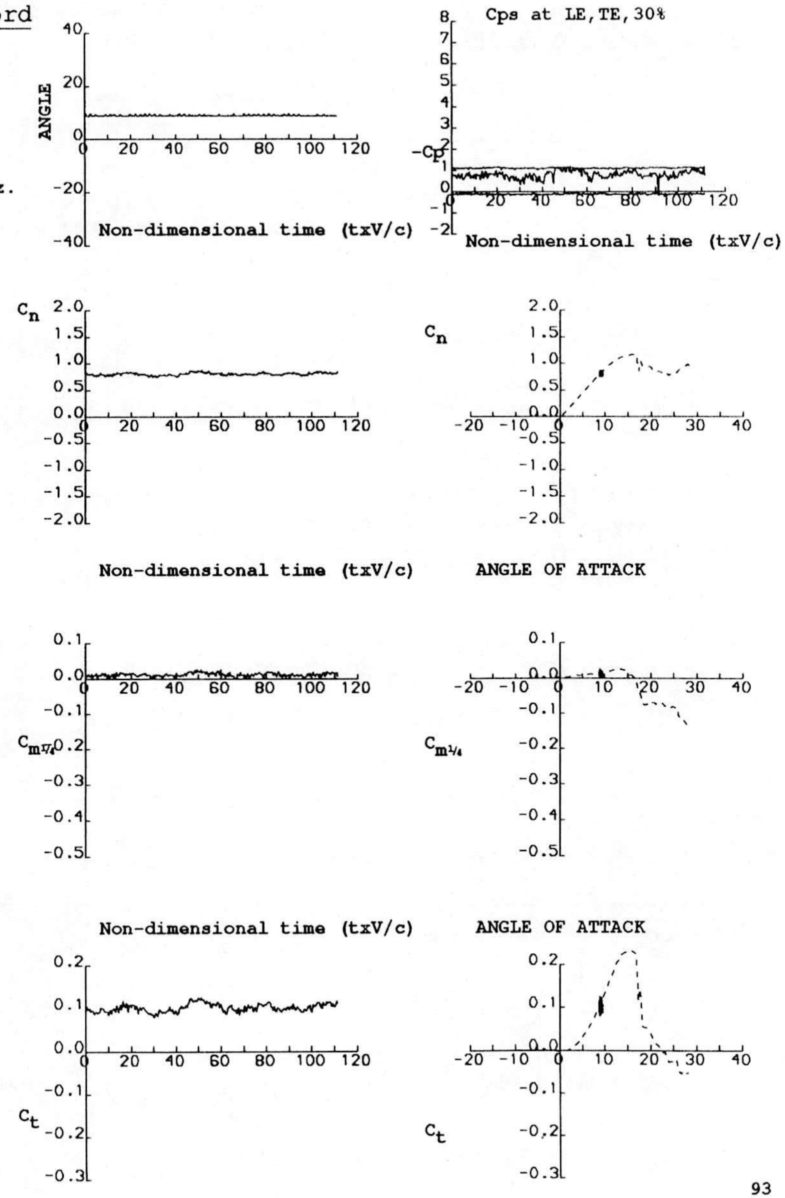
MACH NUMBER = 0.171

AIR TEMPERATURE = 34.1°C

SAMPLING FREQUENCY = 500.00 Hz.

ANGLE OF ATTACK = 9.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 40941

REYNOLDS NUMBER = 1033103.

DYNAMIC PRESSURE = 2091.56 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

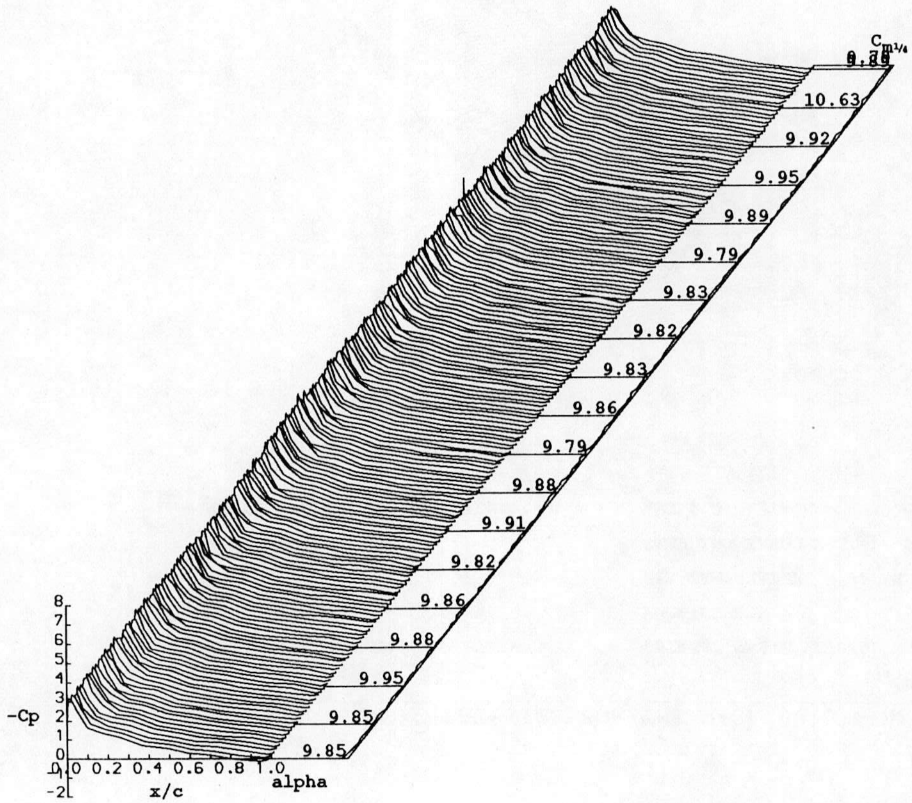
DATE OF TEST: 26/8/91

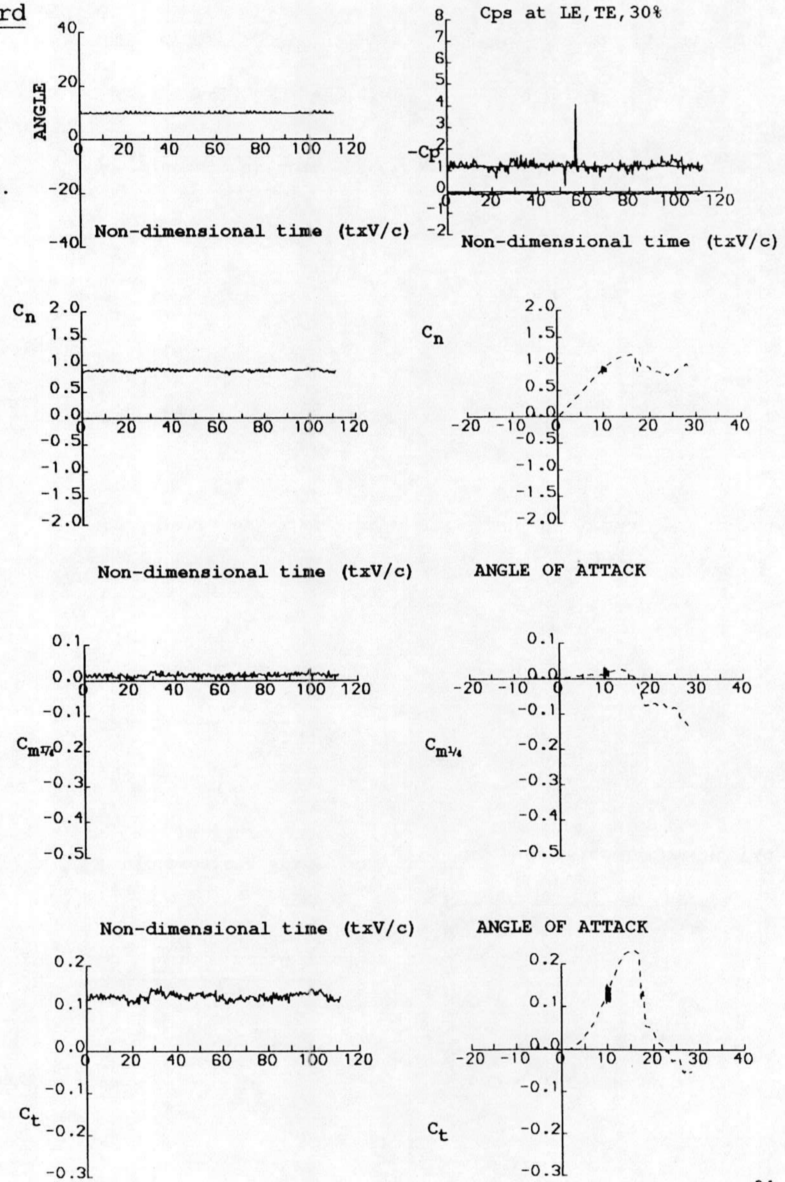
MACH NUMBER = 0.171

AIR TEMPERATURE = 34.5°C

SAMPLING FREQUENCY = 500.00 Hz.

ANGLE OF ATTACK = 10.0

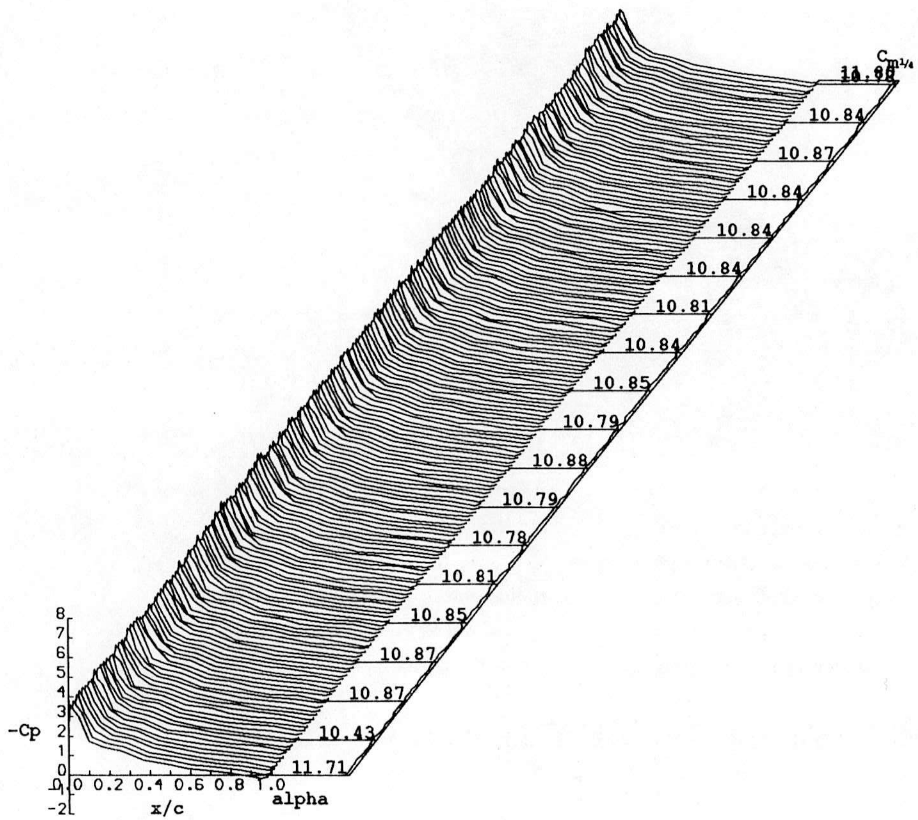


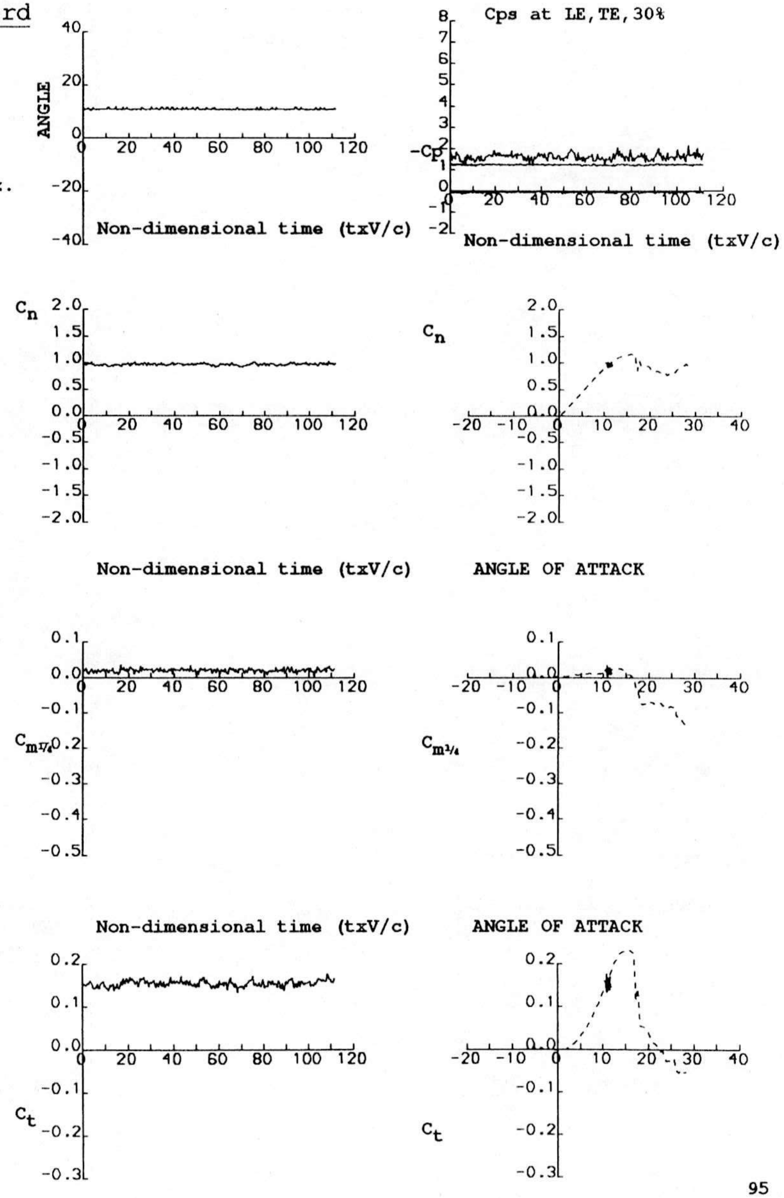


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 40951
REYNOLDS NUMBER = 1032247.
DYNAMIC PRESSURE = 2091.56 Nm^{-2}
NUMBER OF CYCLES = 1
MOTION TYPE: UNSTEADY STATIC

DATE OF TEST: 26/8/91
MACH NUMBER = 0.171
AIR TEMPERATURE = 34.7°C
SAMPLING FREQUENCY = 500.00 Hz.
ANGLE OF ATTACK = 11.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 40961

REYNOLDS NUMBER = 1030966.

DYNAMIC PRESSURE = 2091.56 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

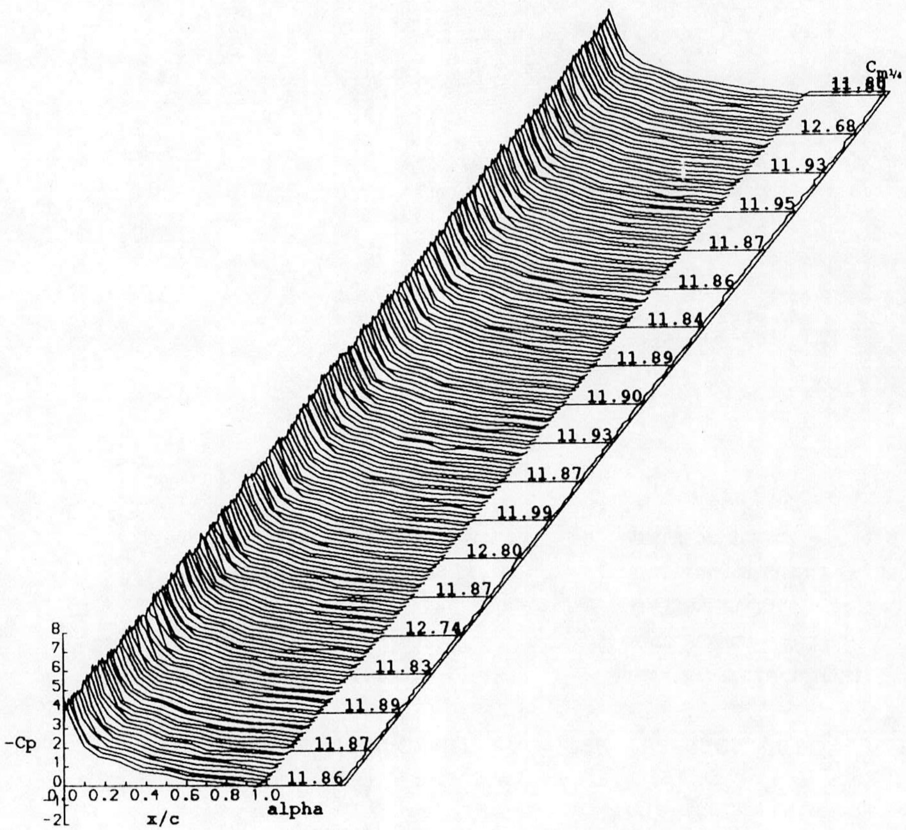
DATE OF TEST: 26/8/91

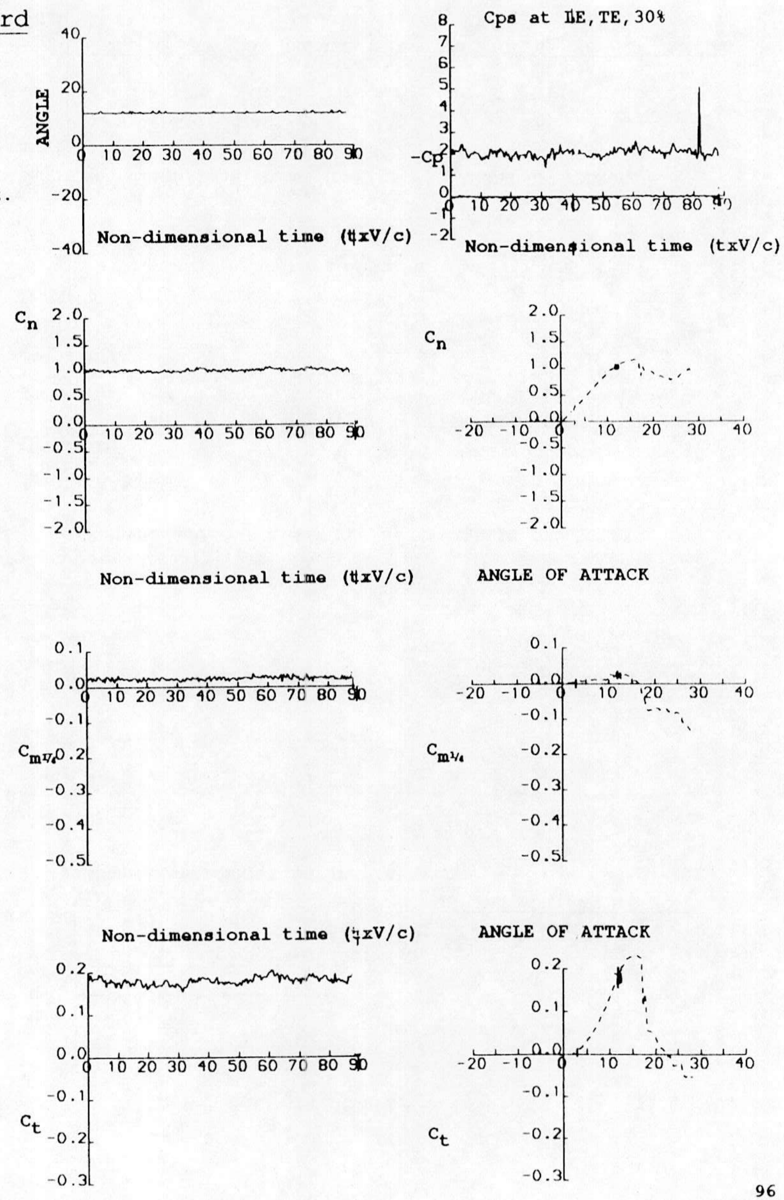
MACH NUMBER = 0.171

AIR TEMPERATURE = 35.0°C

SAMPLING FREQUENCY = 500.00 Hz.

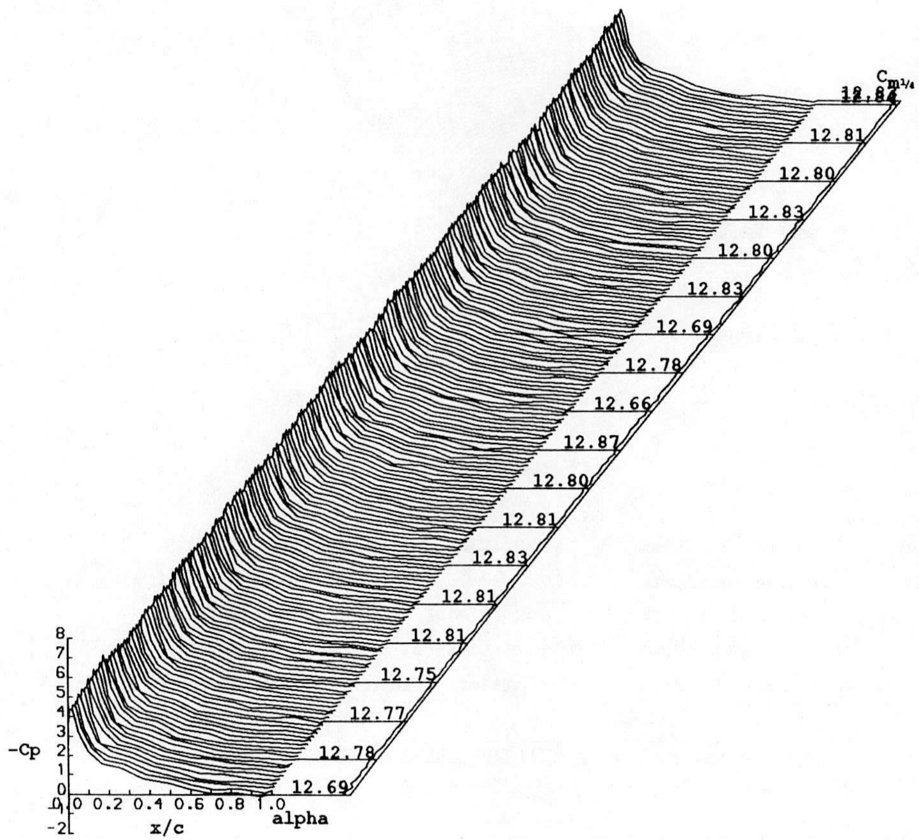
ANGLE OF ATTACK = 12.0

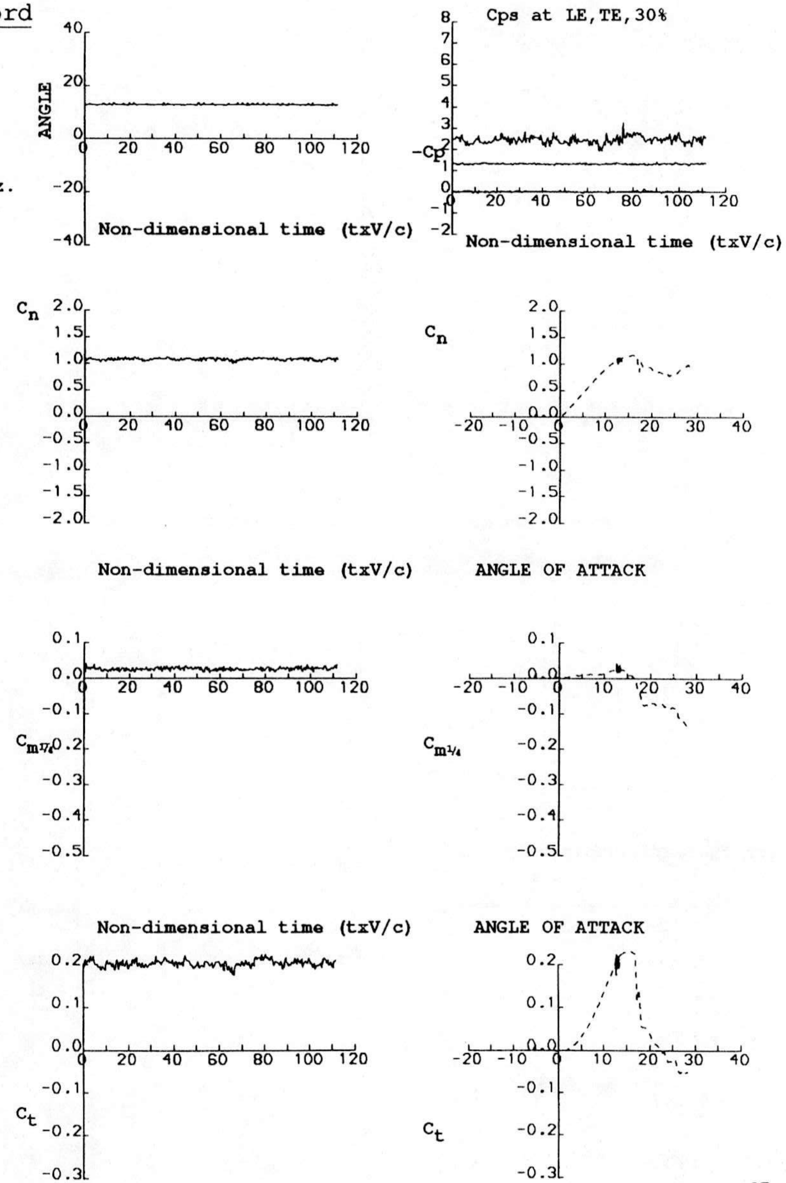




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

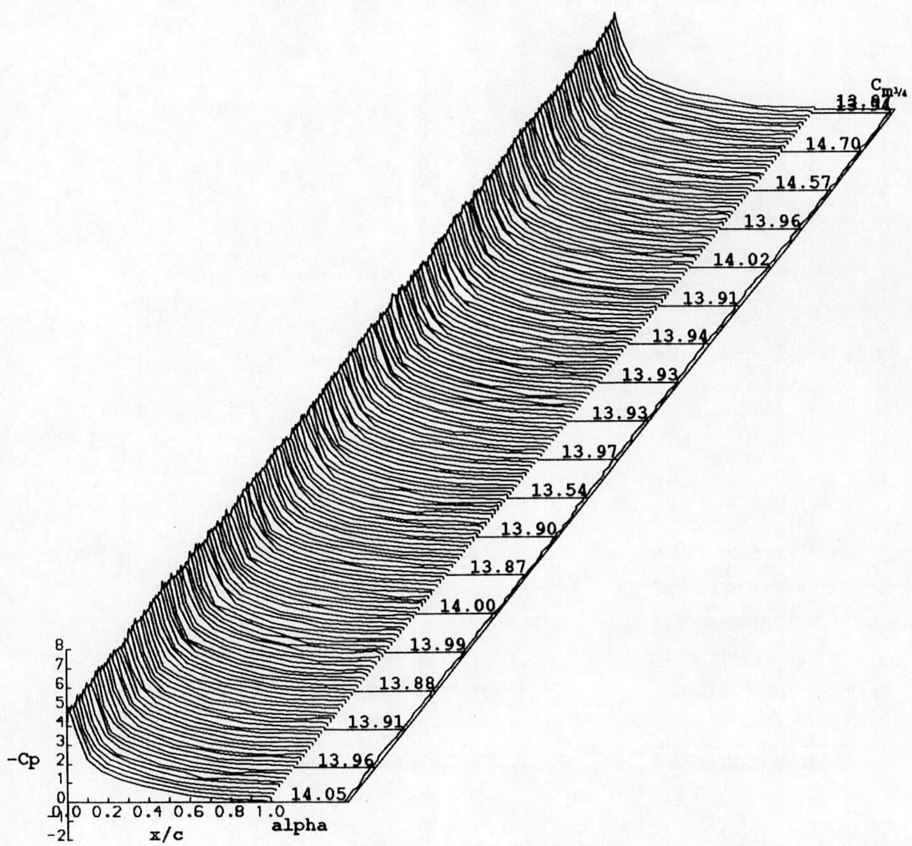
RUN REFERENCE NUMBER: 40971	**DATE OF TEST:** 26/8/91
REYNOLDS NUMBER = 1029687.	**MACH NUMBER** = 0.171
DYNAMIC PRESSURE = 2091.56 Nm^{-2}	**AIR TEMPERATURE** = 35.3°C
NUMBER OF CYCLES = 1	**SAMPLING FREQUENCY** = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	**ANGLE OF ATTACK** = 13.0

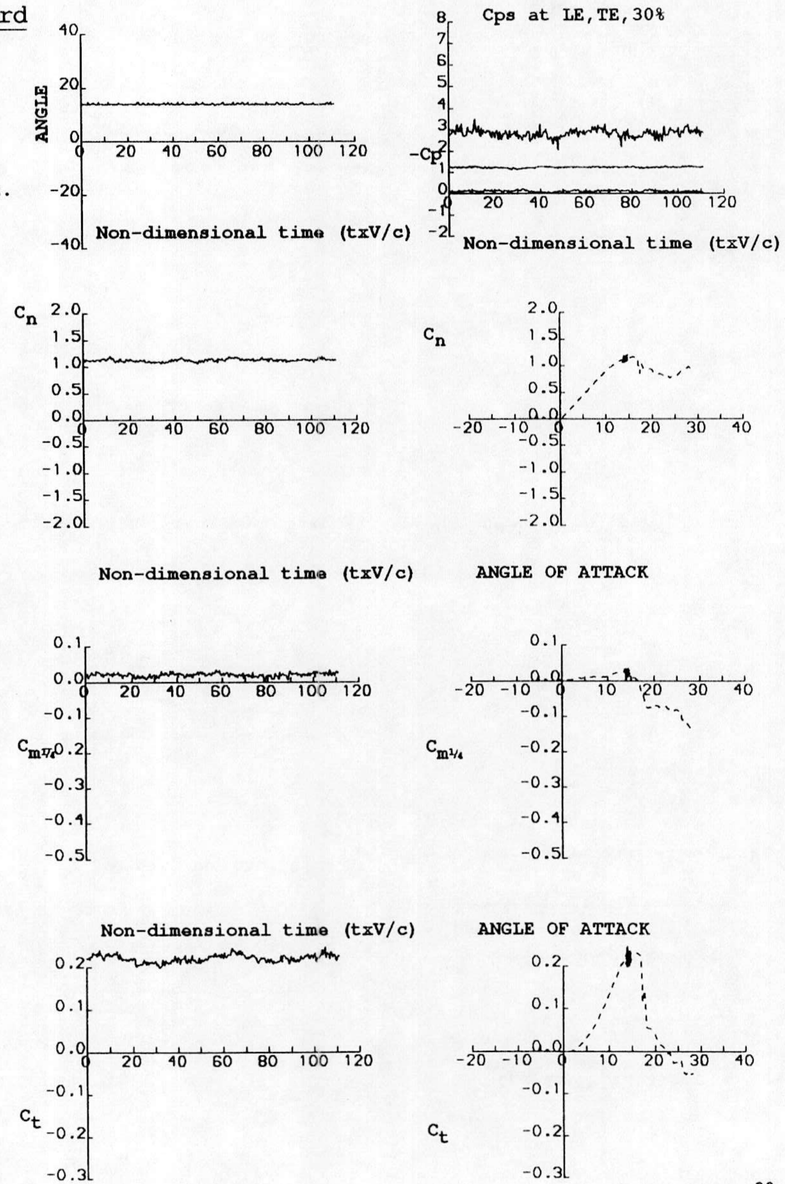




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

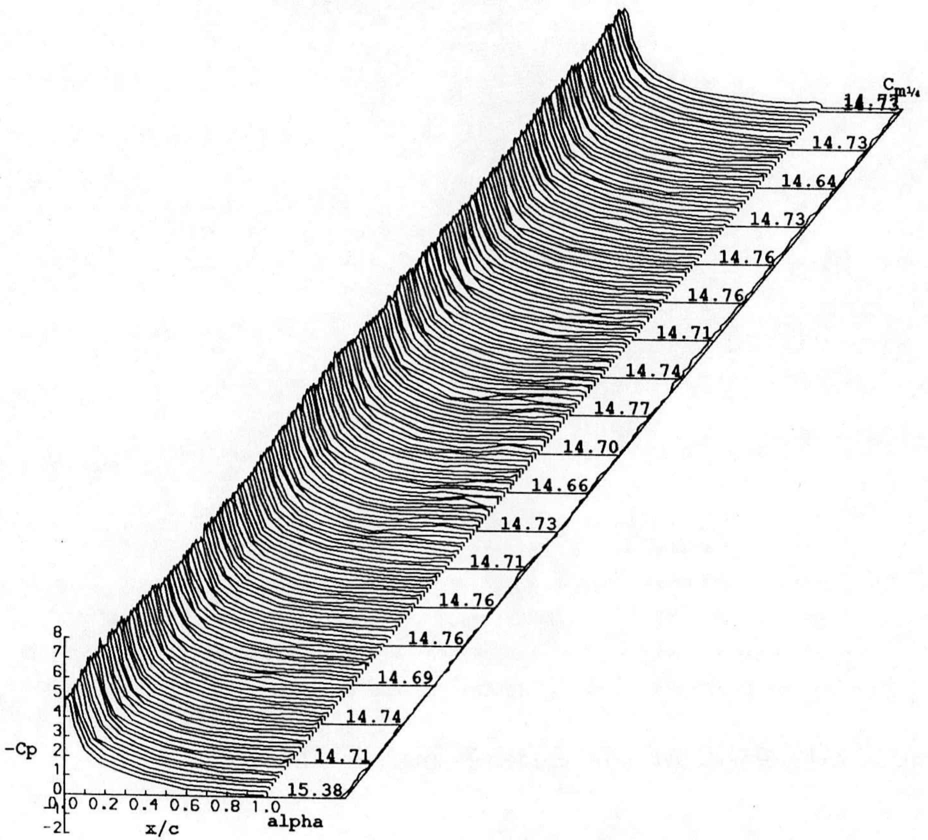
RUN REFERENCE NUMBER: 40981	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1039530.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2084.44 Nm^{-2}	AIR TEMPERATURE = 32.6°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 14.0

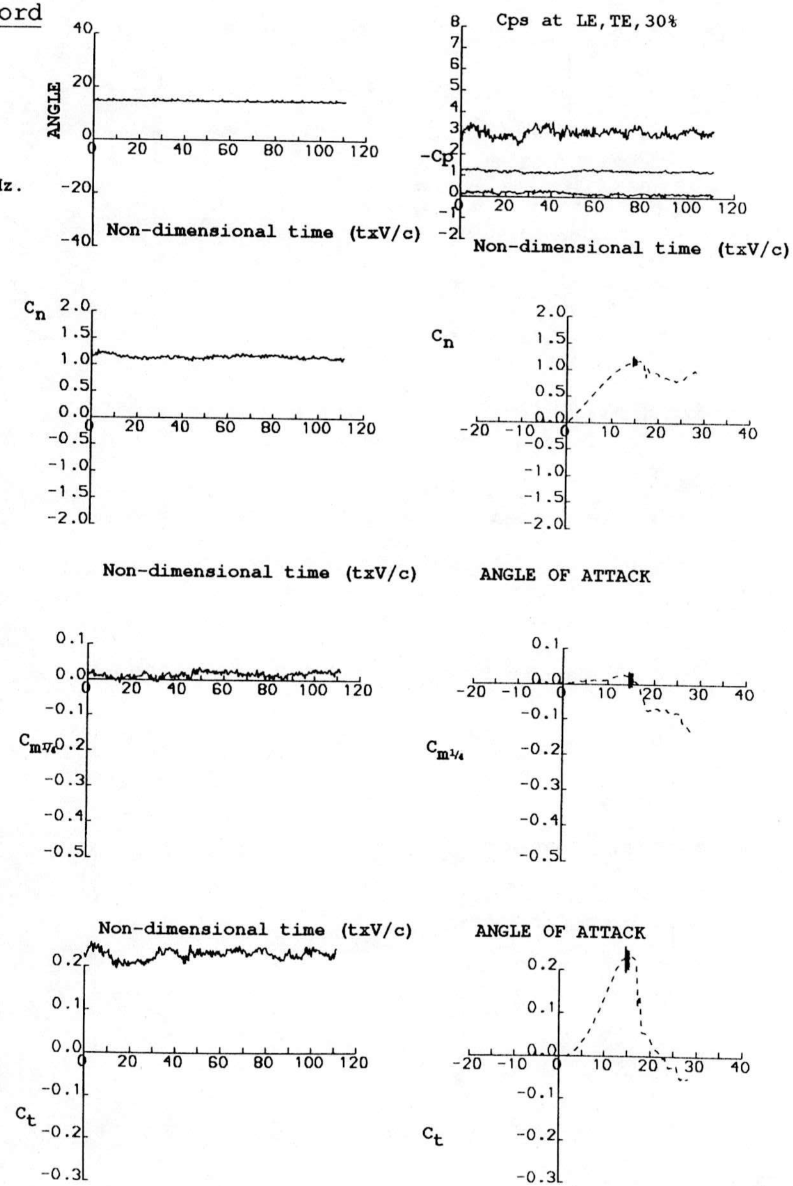




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

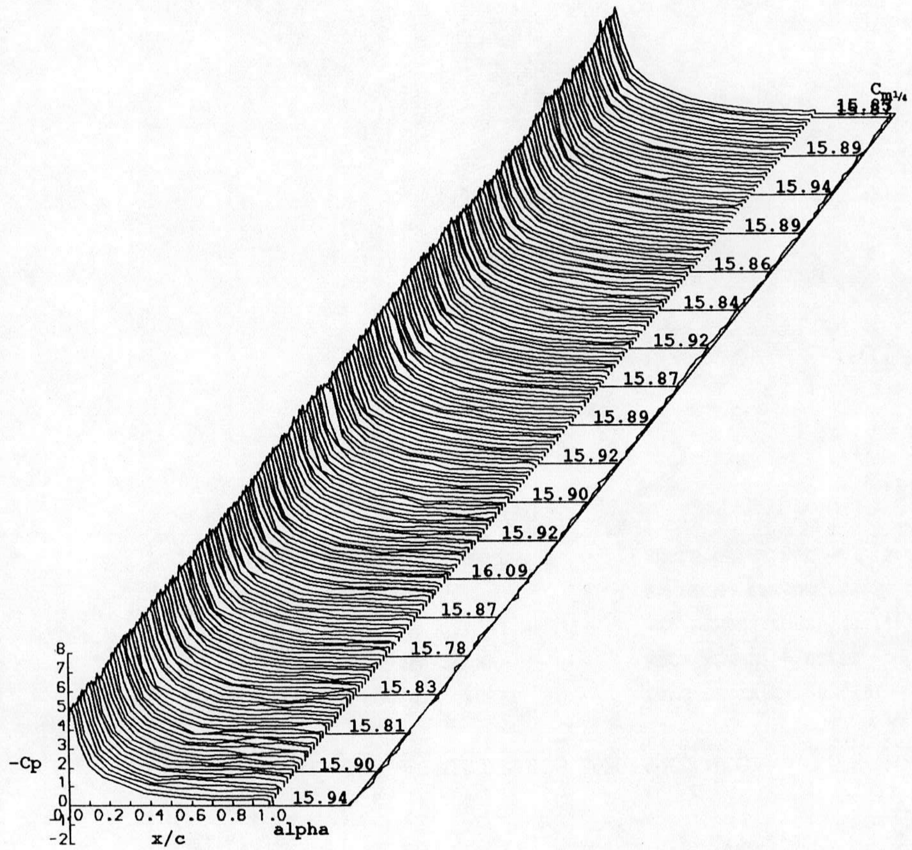
RUN REFERENCE NUMBER: 40991	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1032629.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2084.44 Nm^{-2}	AIR TEMPERATURE = 34.2°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 15.0

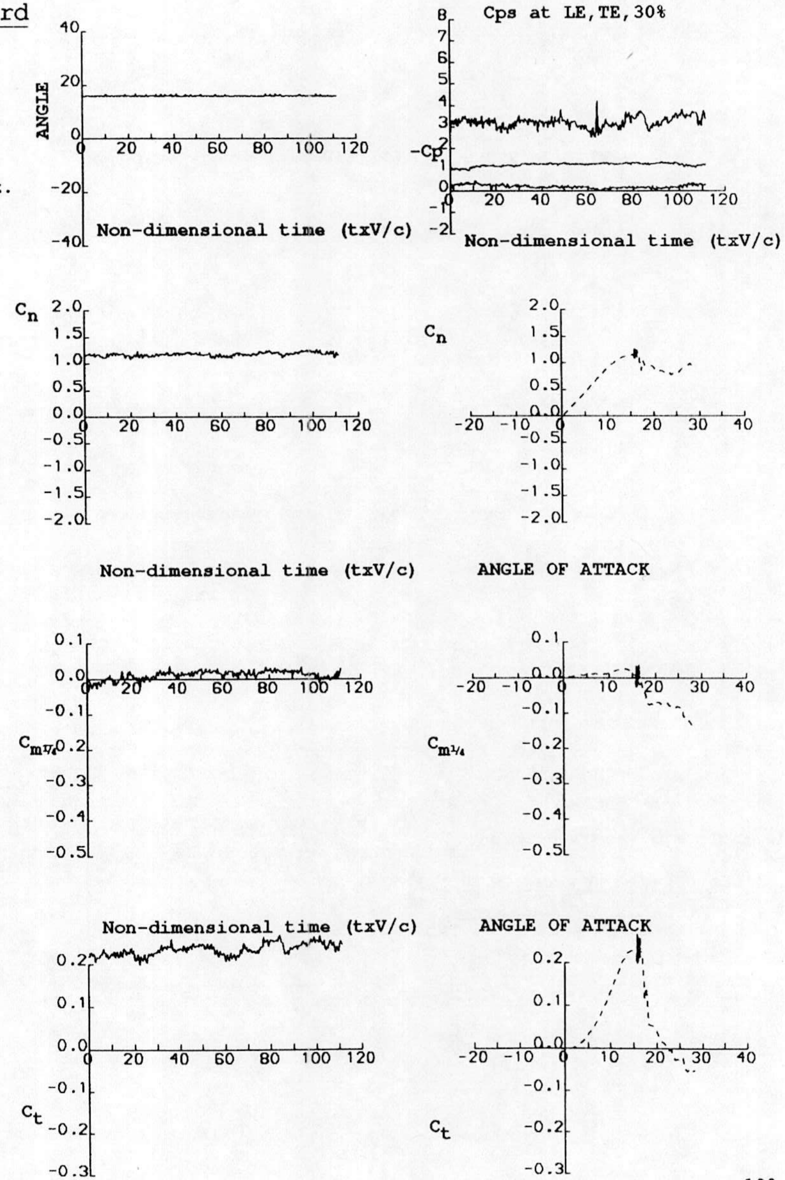




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

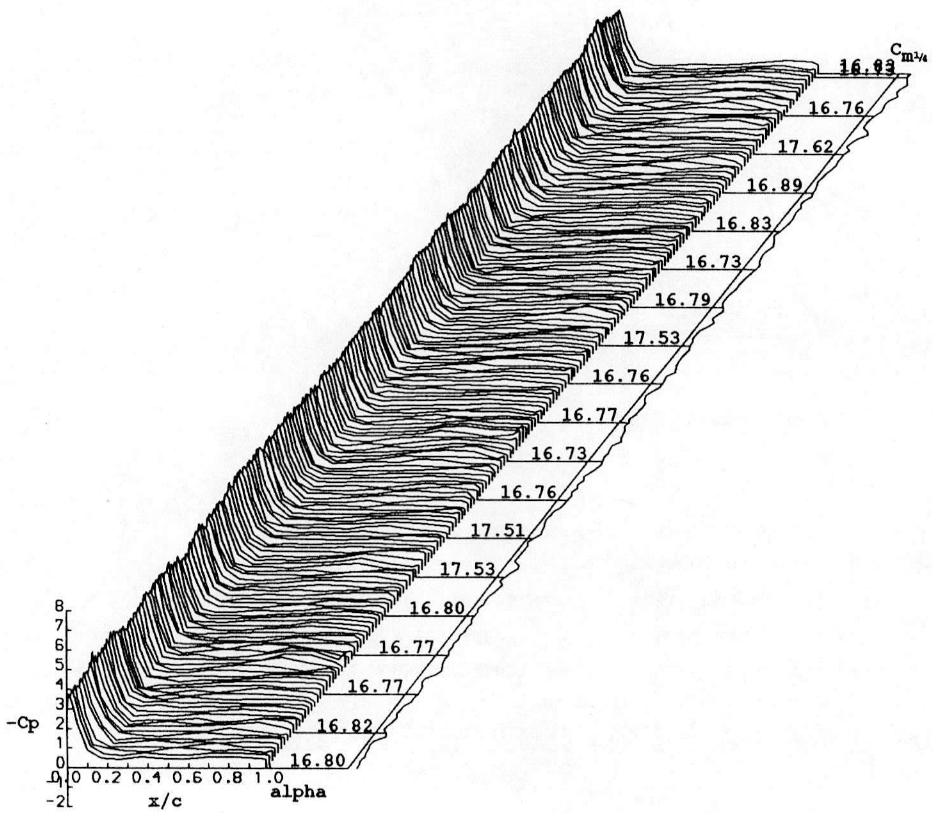
RUN REFERENCE NUMBER: 41001	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1030490.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2084.44 Nm^{-2}	AIR TEMPERATURE = 34.7°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 16.0

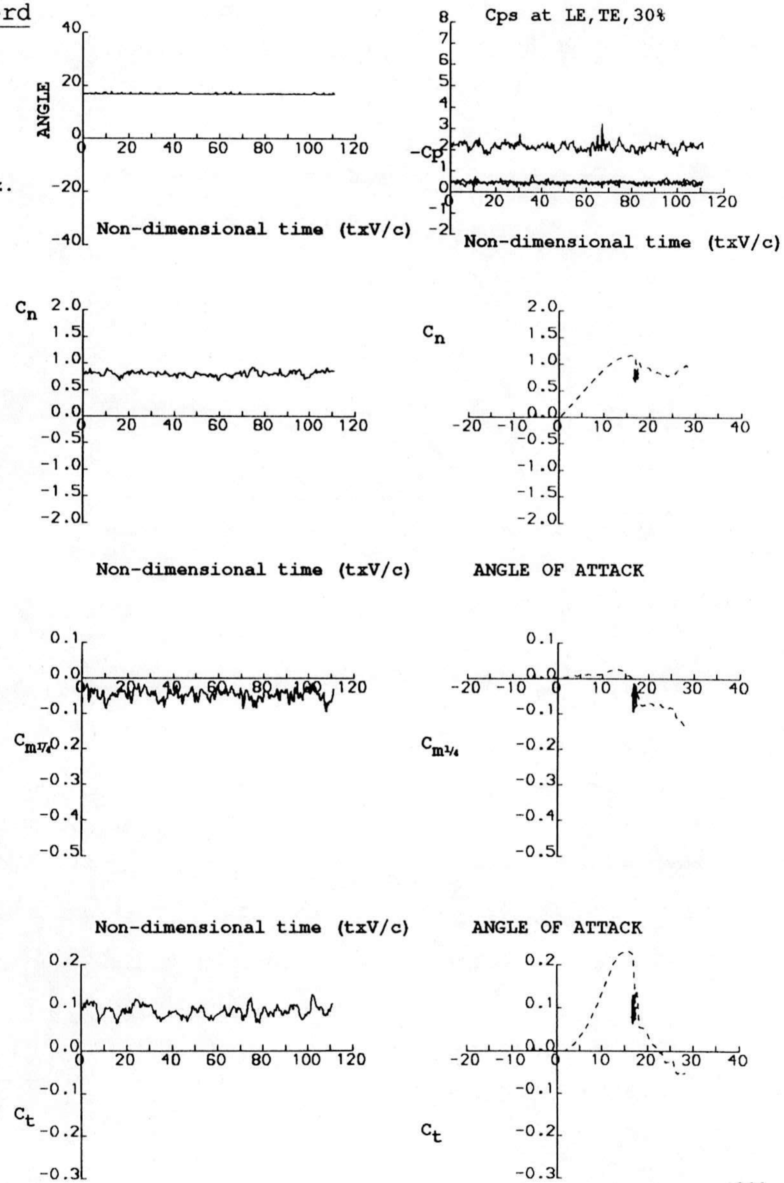




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

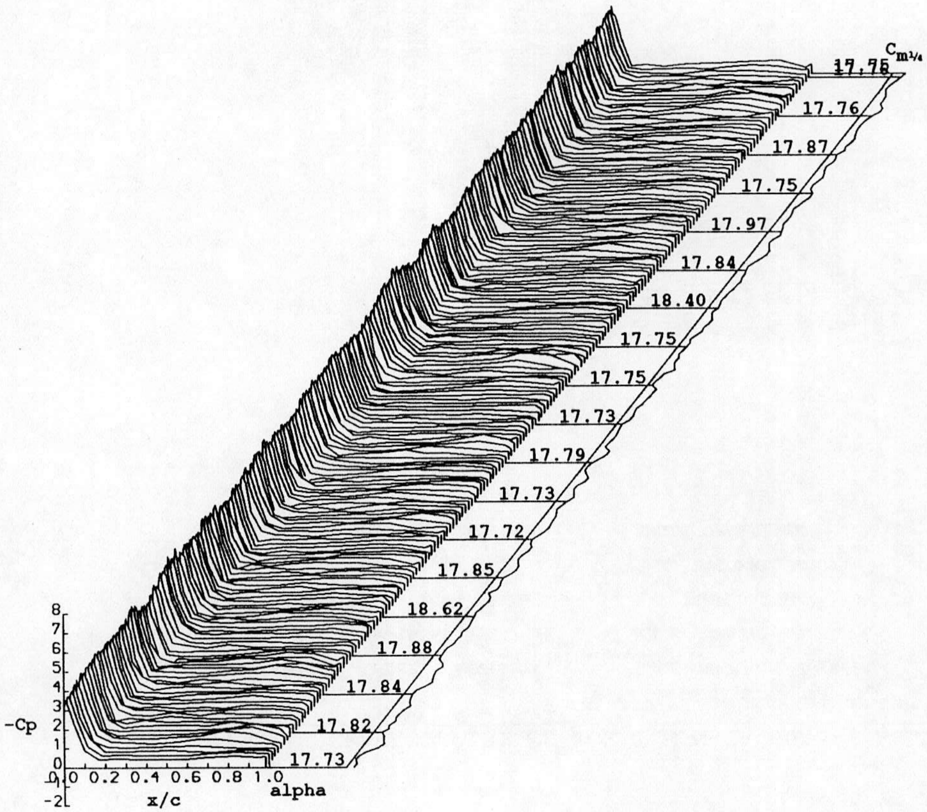
RUN REFERENCE NUMBER: 41011	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1036965.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2084.58 Nm^{-2}	AIR TEMPERATURE = 33.2°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 17.0

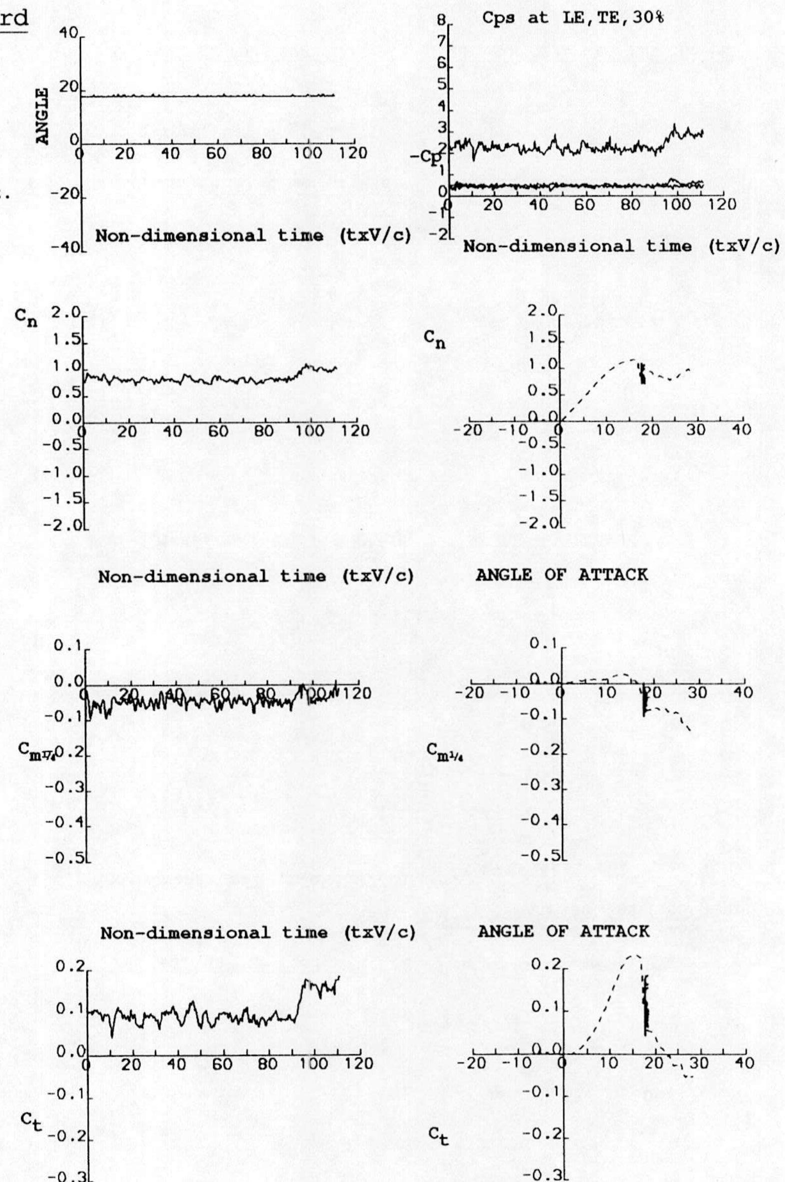




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41021	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1032662.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2084.58 Nm^{-2}	AIR TEMPERATURE = 34.2°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 18.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41031

REYNOLDS NUMBER = 1030523.

DYNAMIC PRESSURE = 2084.58 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

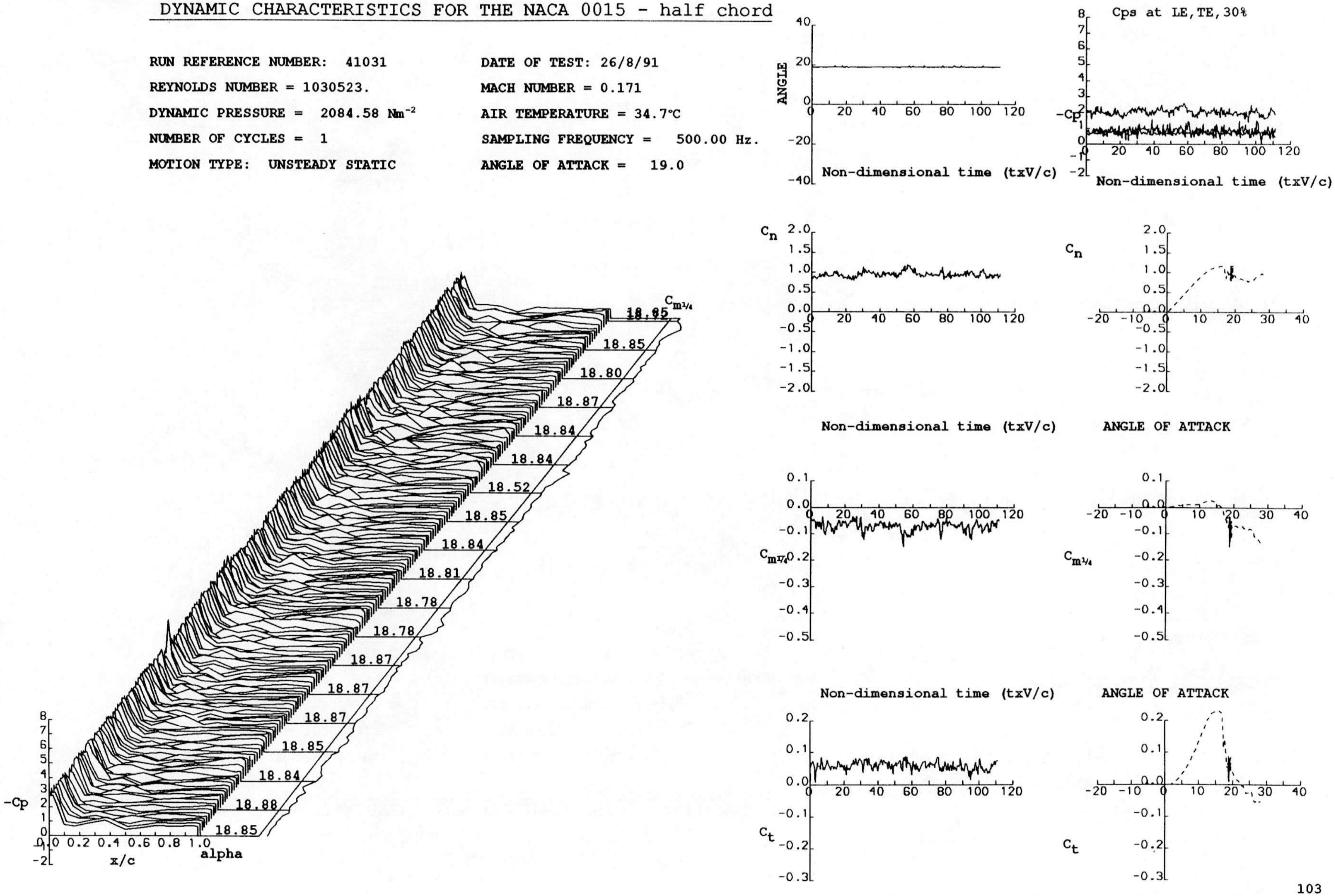
DATE OF TEST: 26/8/91

MACH NUMBER = 0.171

AIR TEMPERATURE = 34.7°C

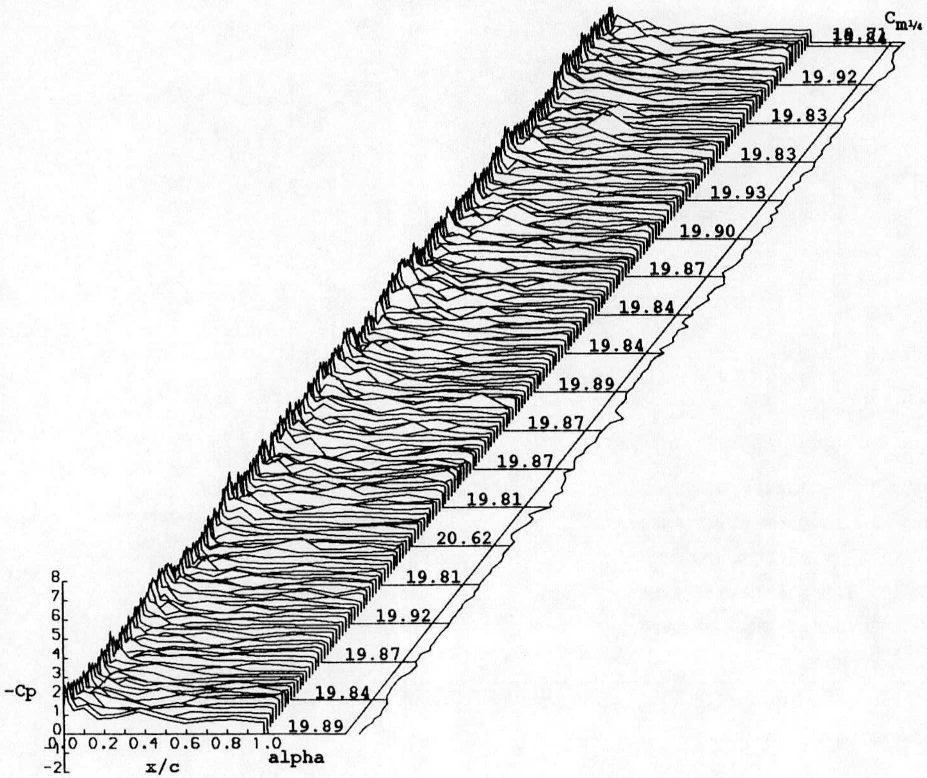
SAMPLING FREQUENCY = 500.00 Hz.

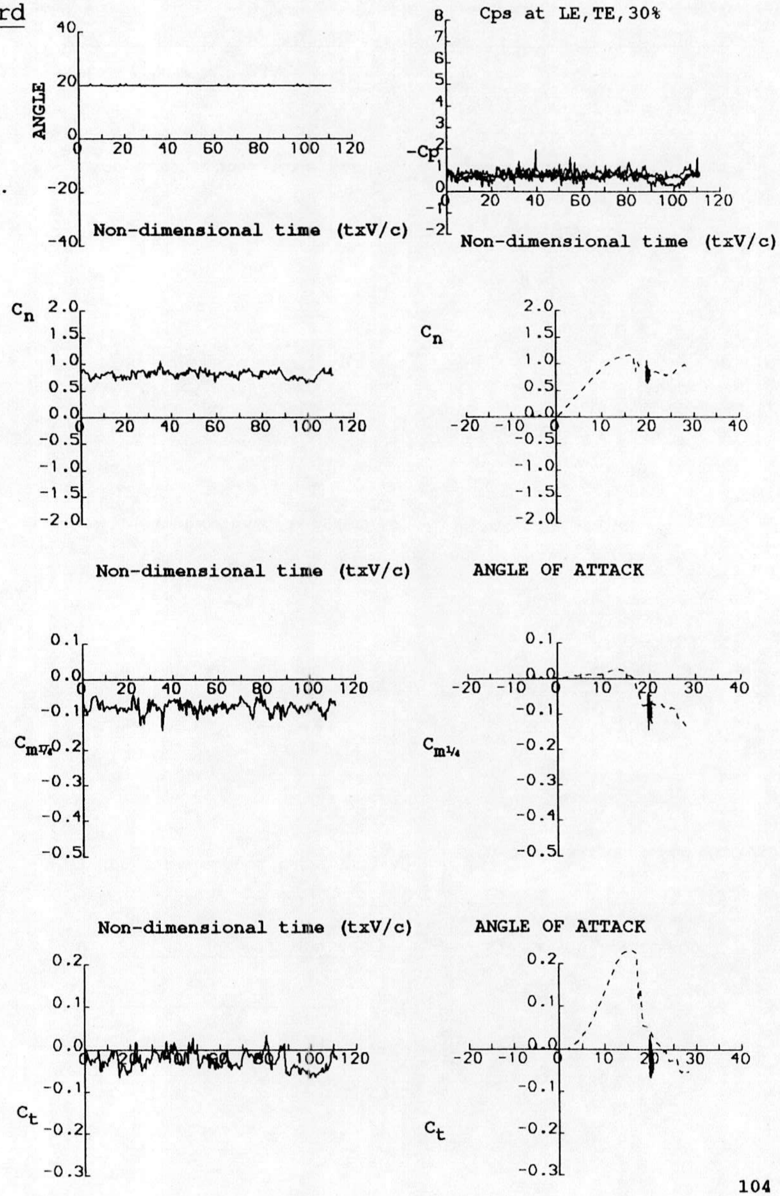
ANGLE OF ATTACK = 19.0



DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

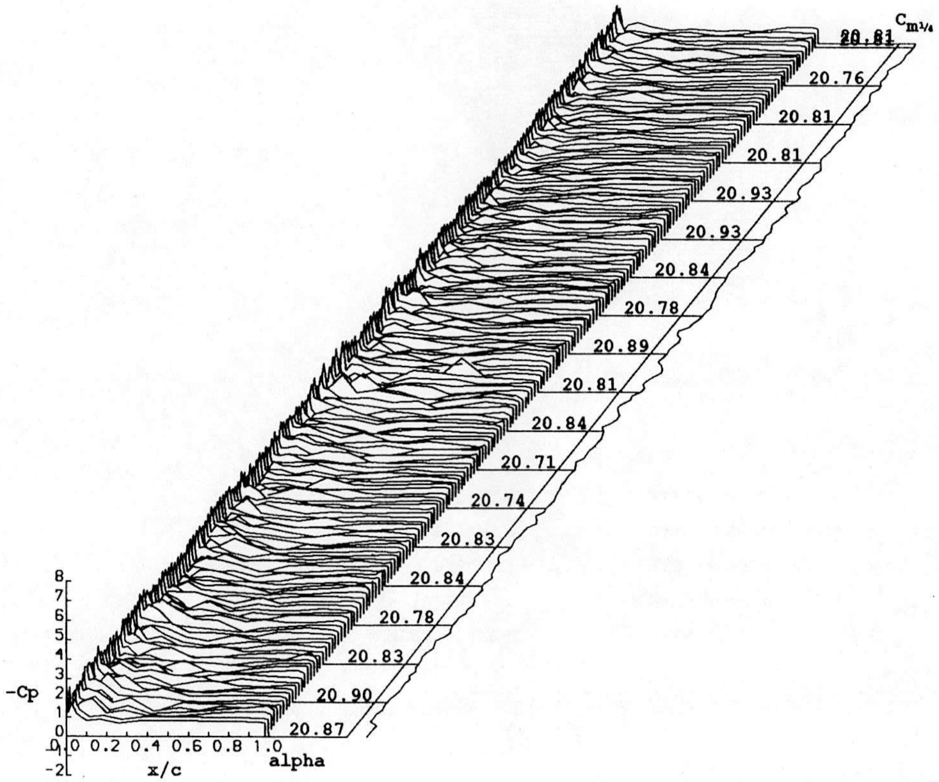
RUN REFERENCE NUMBER: 41041	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1029243.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2084.58 Nm^{-2}	AIR TEMPERATURE = 35.0°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 20.0

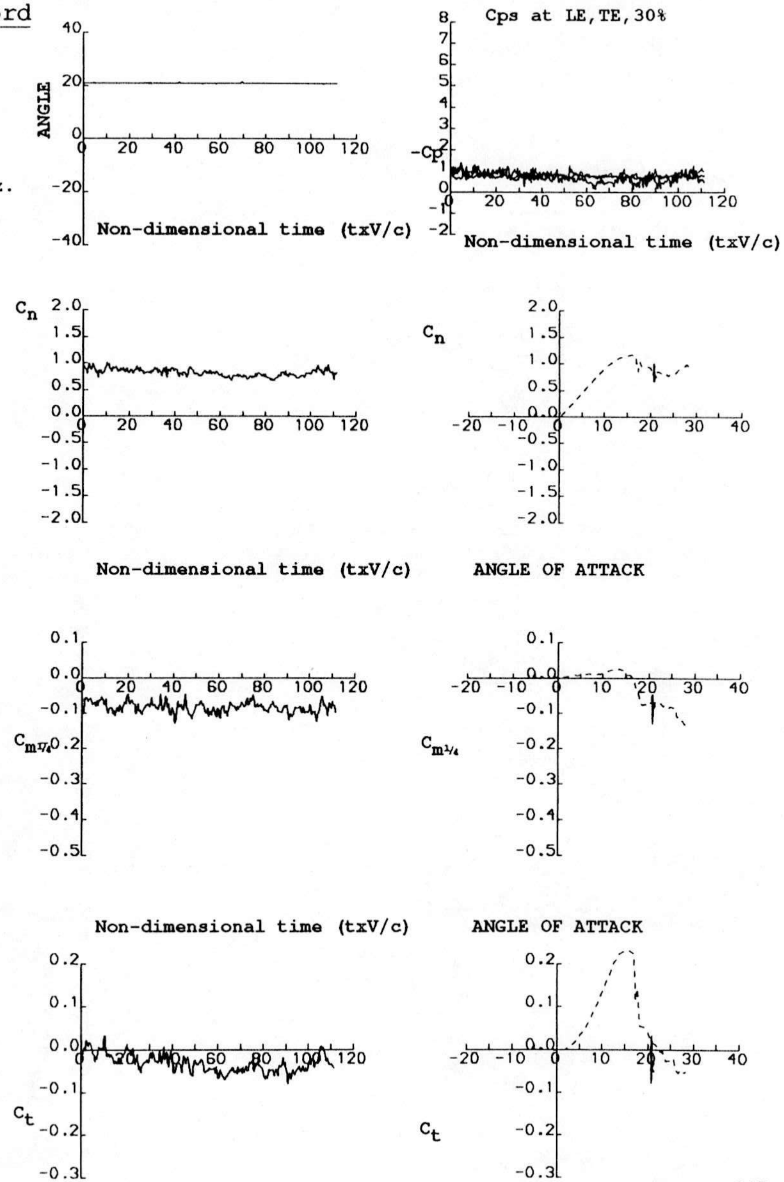




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41051	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1027967.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2084.58 Nm^{-2}	AIR TEMPERATURE = 35.3°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 21.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41061

REYNOLDS NUMBER = 1025847.

DYNAMIC PRESSURE = 2084.58 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

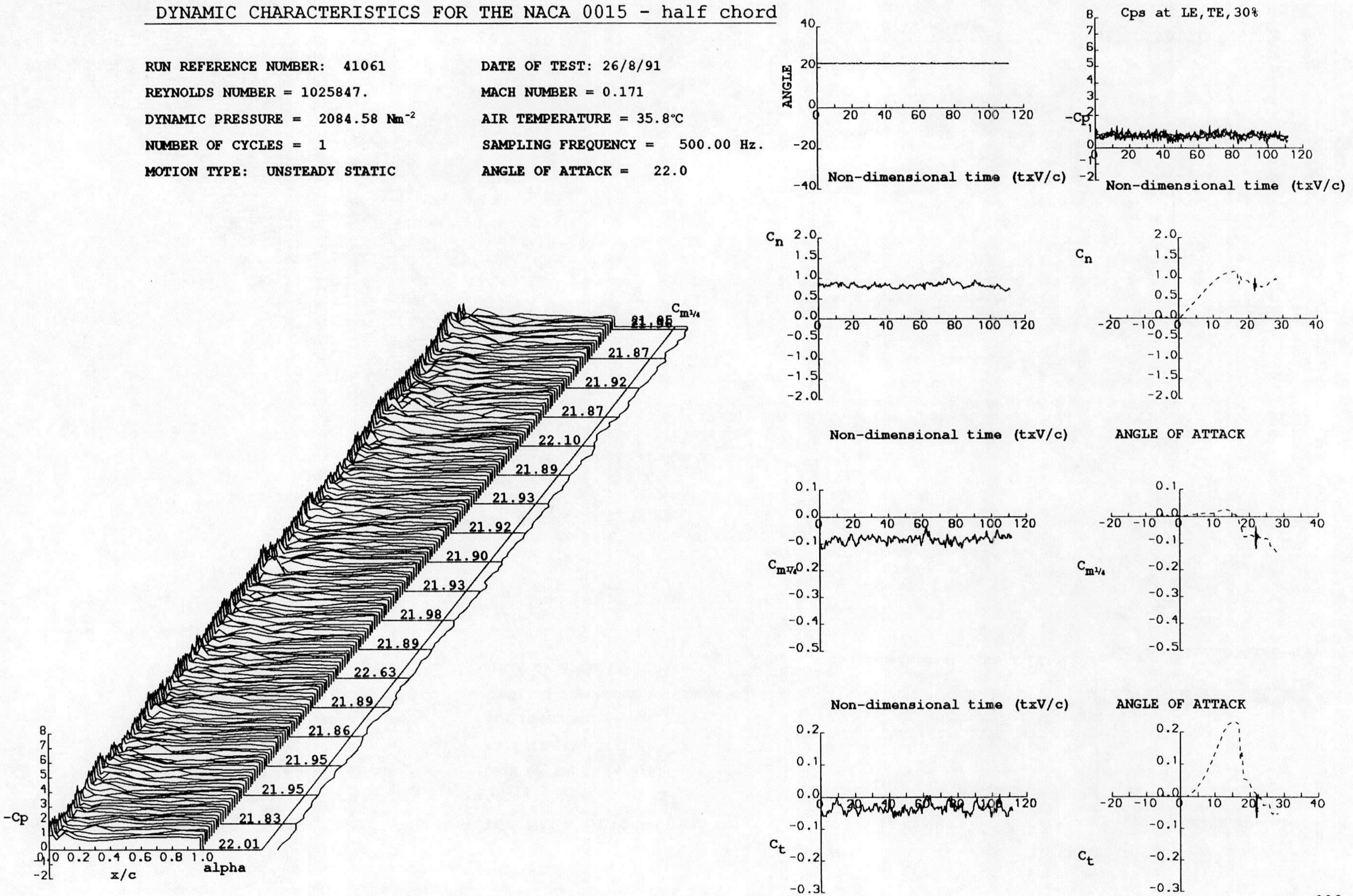
DATE OF TEST: 26/8/91

MACH NUMBER = 0.171

AIR TEMPERATURE = 35.8°C

SAMPLING FREQUENCY = 500.00 Hz.

ANGLE OF ATTACK = 22.0



DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41071

REYNOLDS NUMBER = 1024578.

DYNAMIC PRESSURE = 2084.58 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

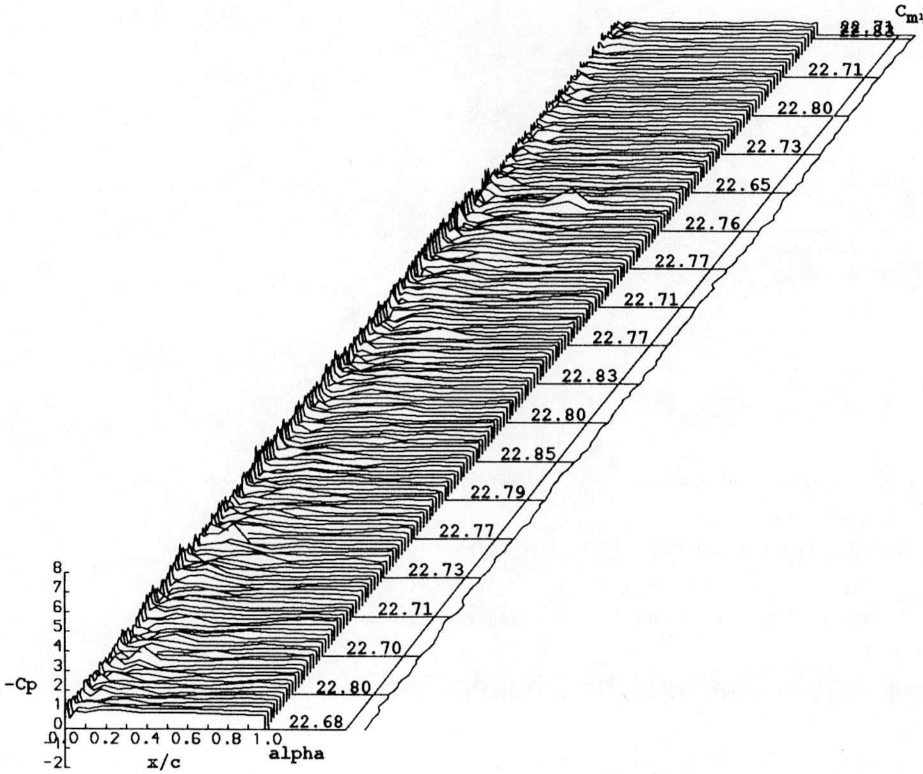
DATE OF TEST: 26/8/91

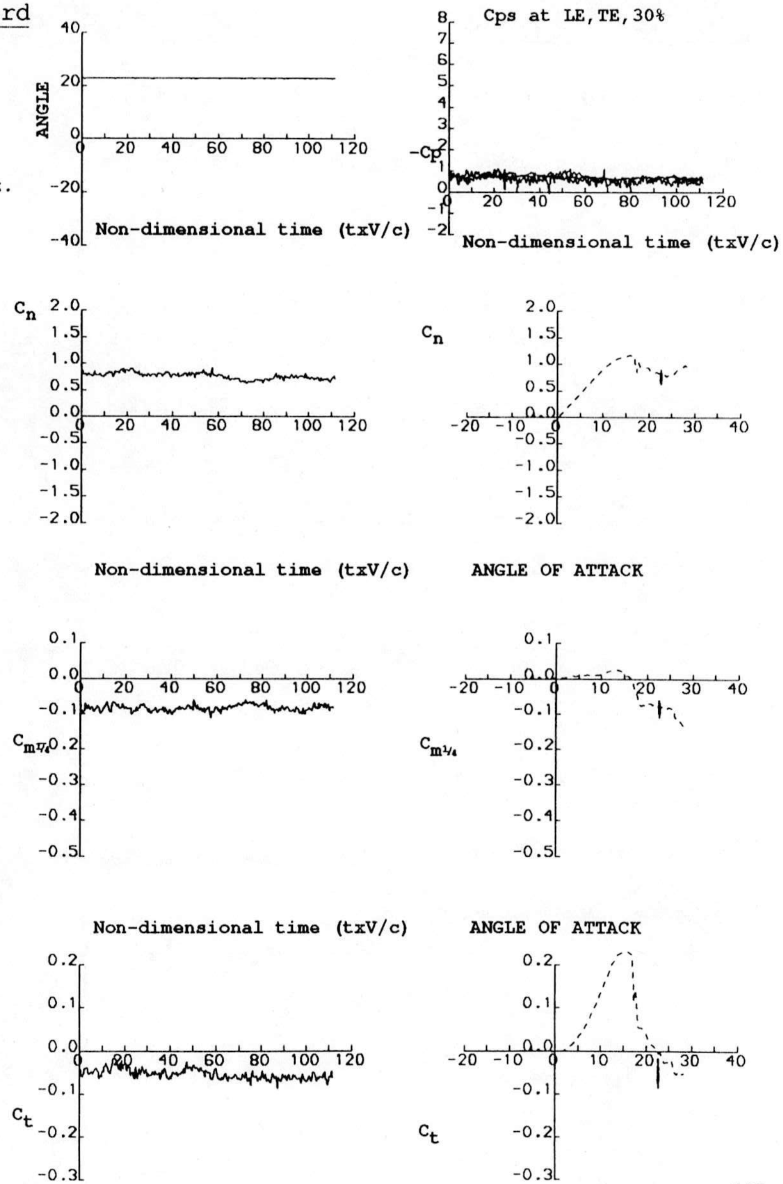
MACH NUMBER = 0.171

AIR TEMPERATURE = 36.1°C

SAMPLING FREQUENCY = 500.00 Hz.

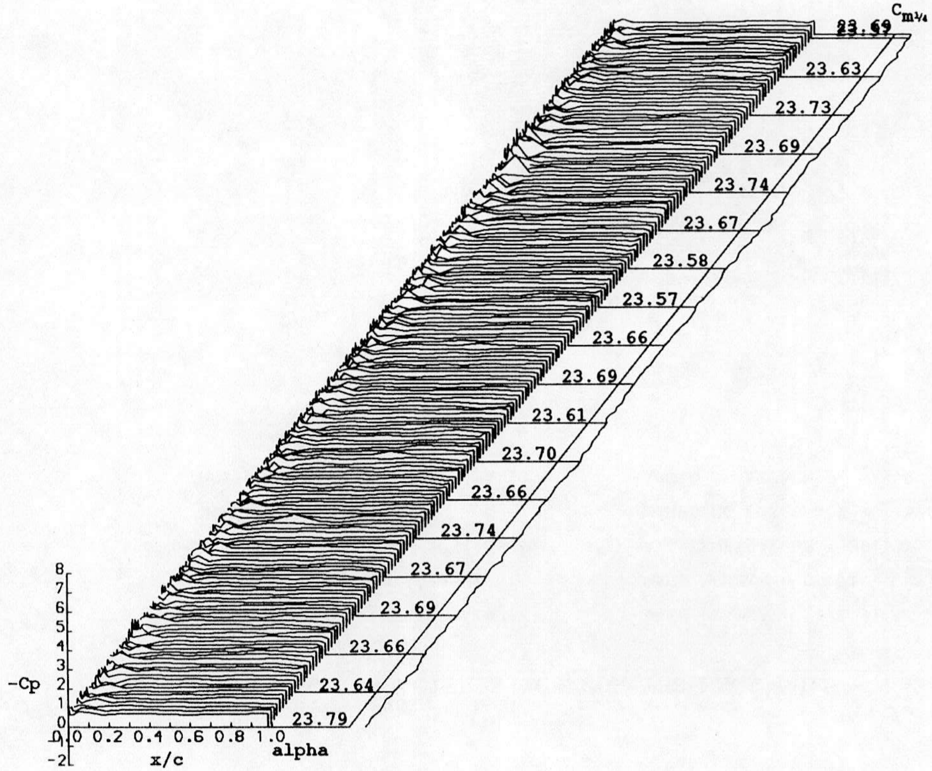
ANGLE OF ATTACK = 23.0

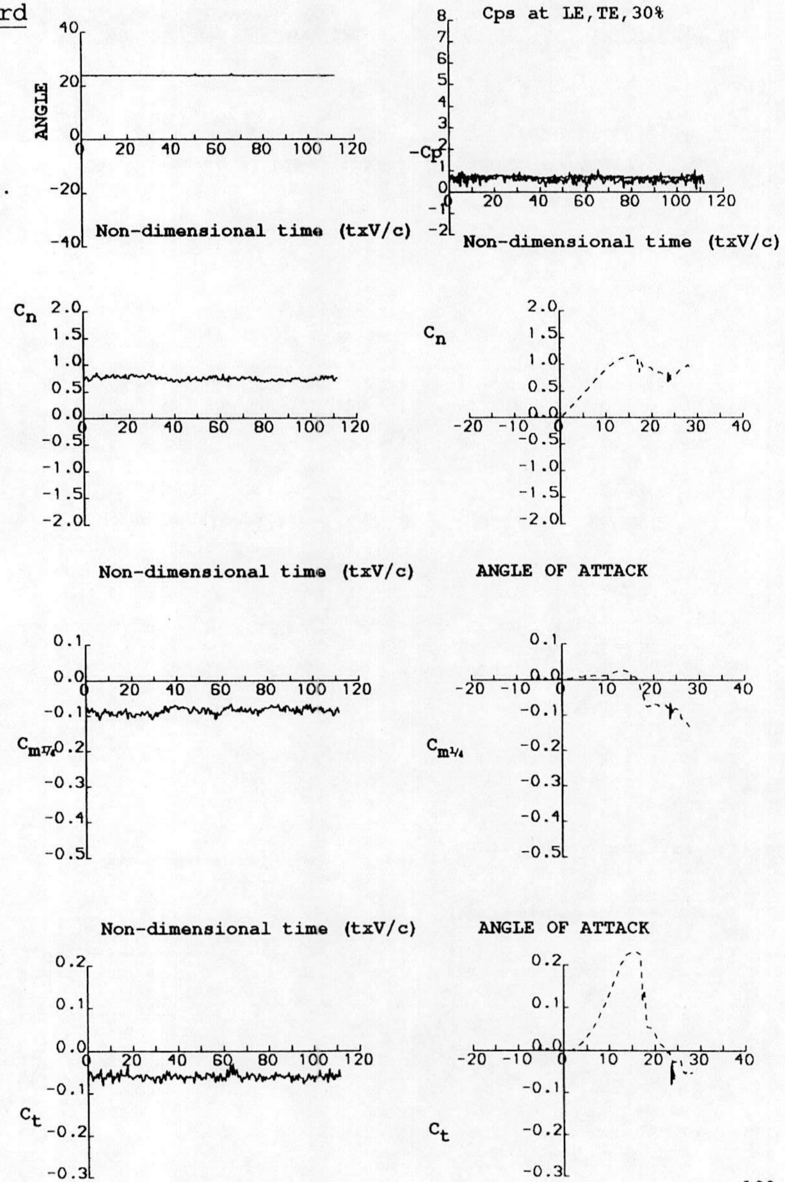




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41081	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1022471.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2084.58 Nm^{-2}	AIR TEMPERATURE = 36.6°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 24.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41091

DATE OF TEST: 26/8/91

REYNOLDS NUMBER = 1021631.

MACH NUMBER = 0.171

DYNAMIC PRESSURE = 2084.58 Nm^{-2}

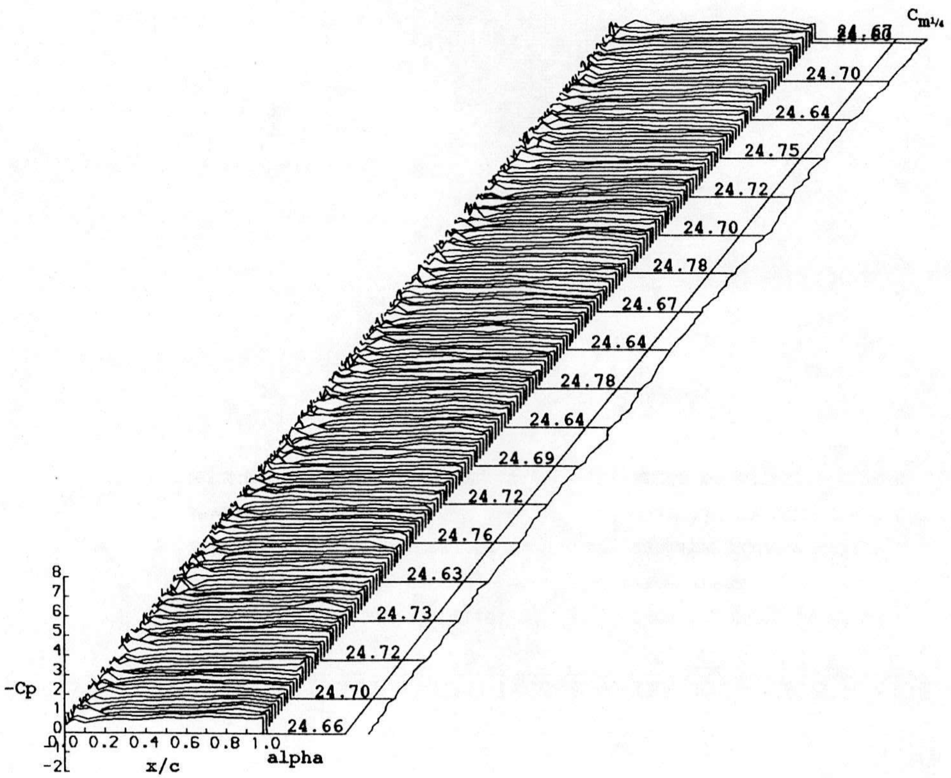
AIR TEMPERATURE = 36.8°C

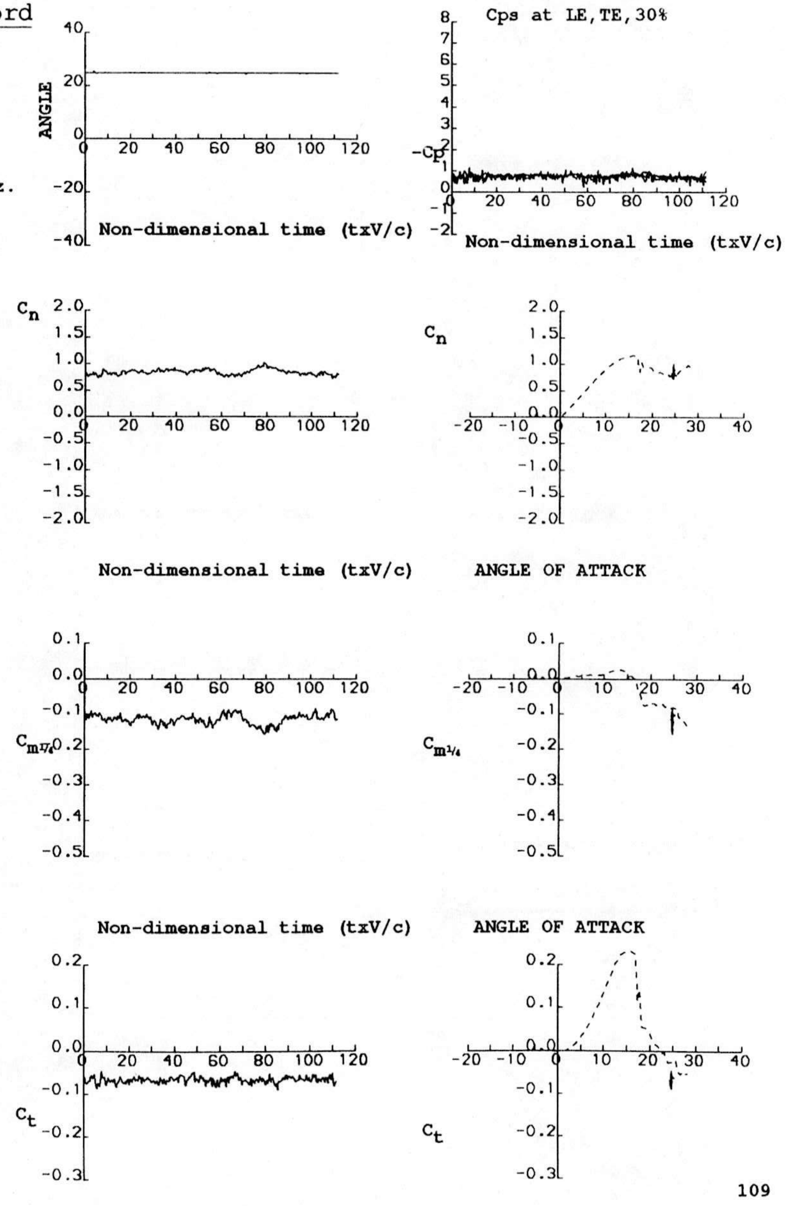
NUMBER OF CYCLES = 1

SAMPLING FREQUENCY = 500.00 Hz.

MOTION TYPE: UNSTEADY STATIC

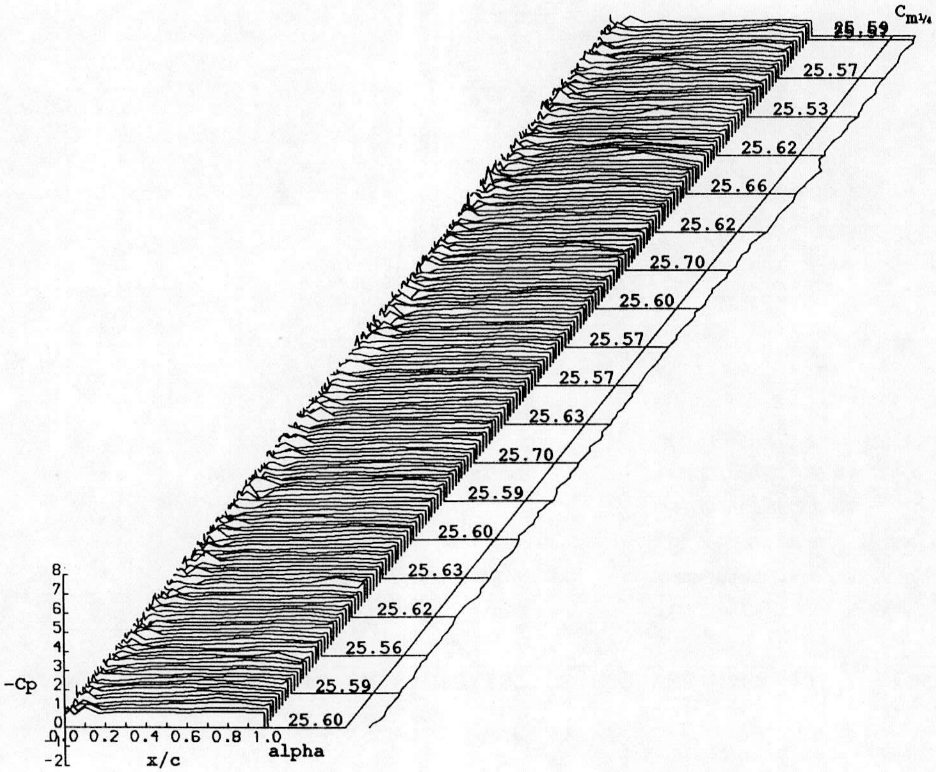
ANGLE OF ATTACK = 25.0

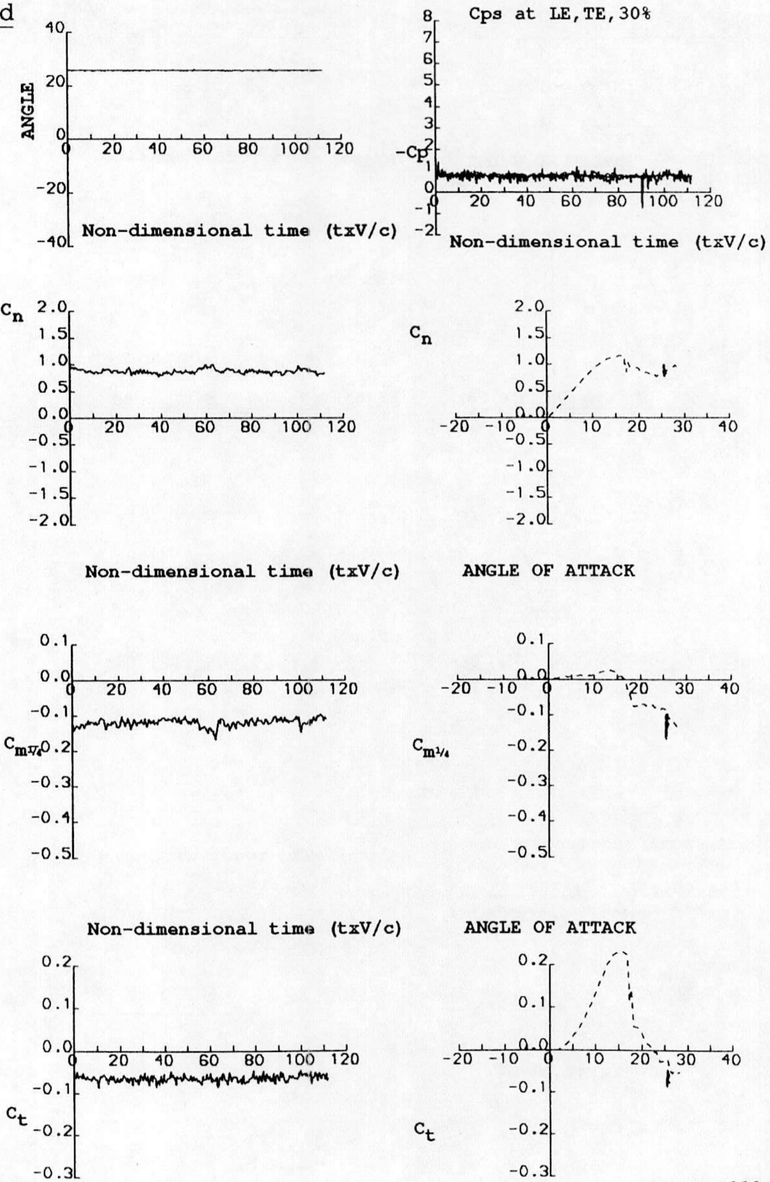




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

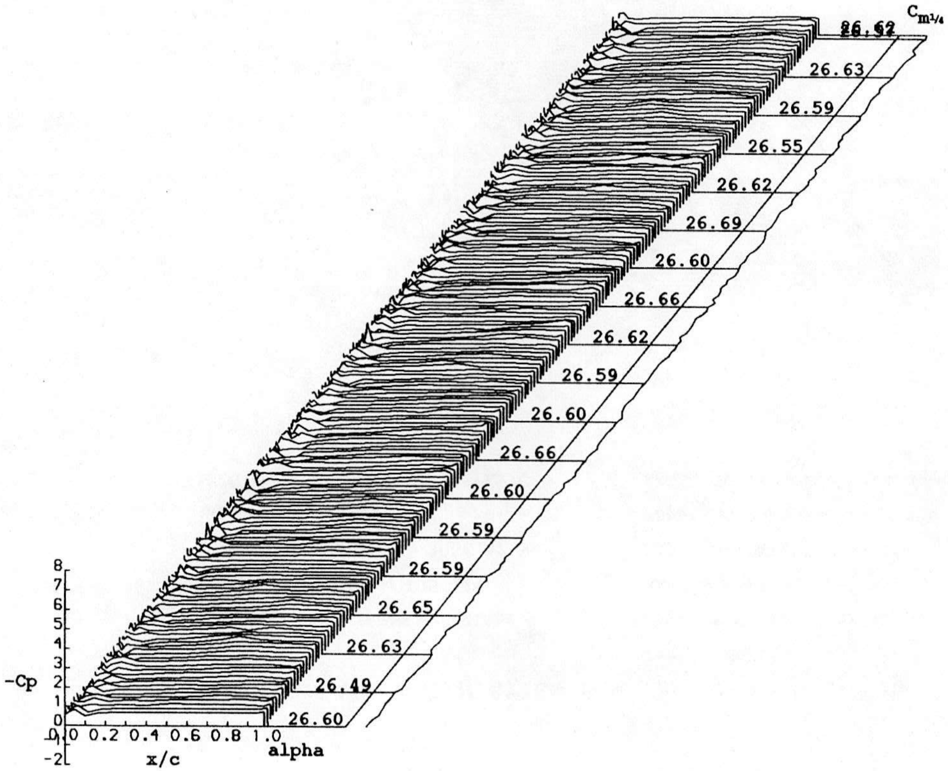
RUN REFERENCE NUMBER: 41101	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 1020372.	MACH NUMBER = 0.171
DYNAMIC PRESSURE = 2084.58 Nm^{-2}	AIR TEMPERATURE = 37.1°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 26.0

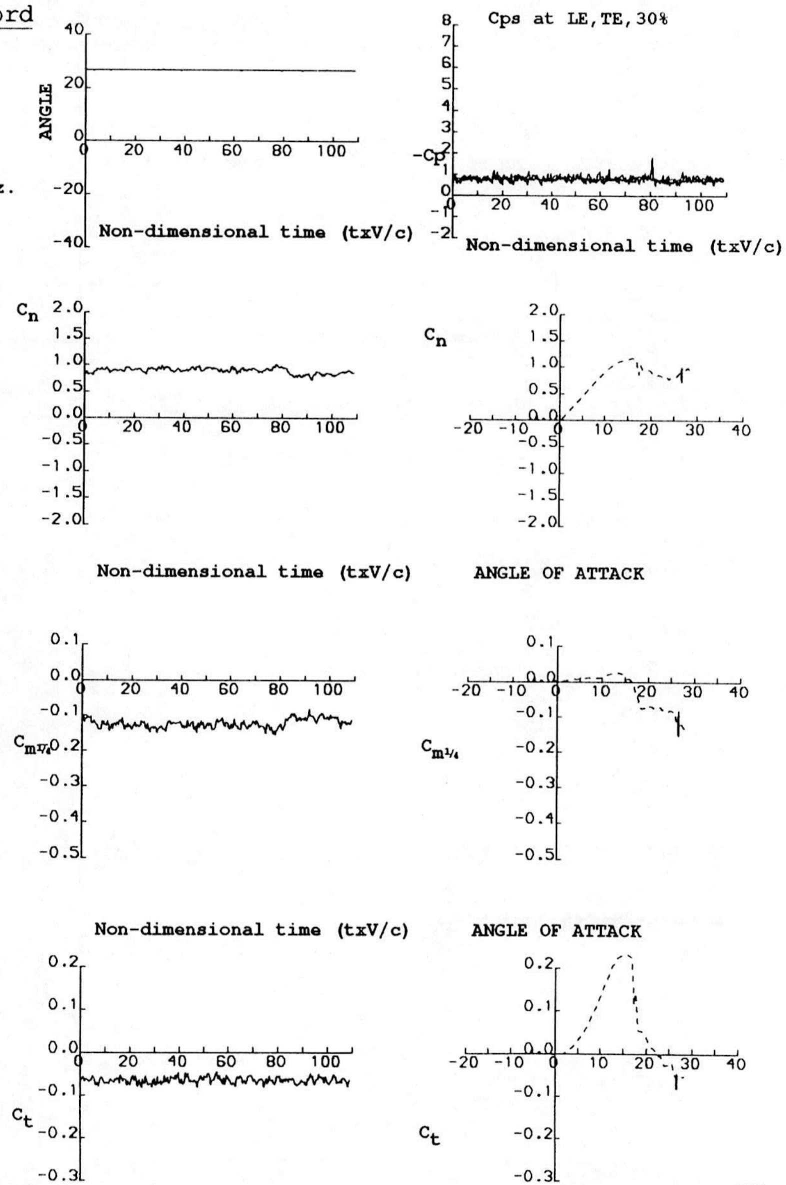




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41121	DATE OF TEST: 27/8/91
REYNOLDS NUMBER = 1059628.	MACH NUMBER = 0.169
DYNAMIC PRESSURE = 2056.42 Nm^{-2}	AIR TEMPERATURE = 27.0°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 27.0

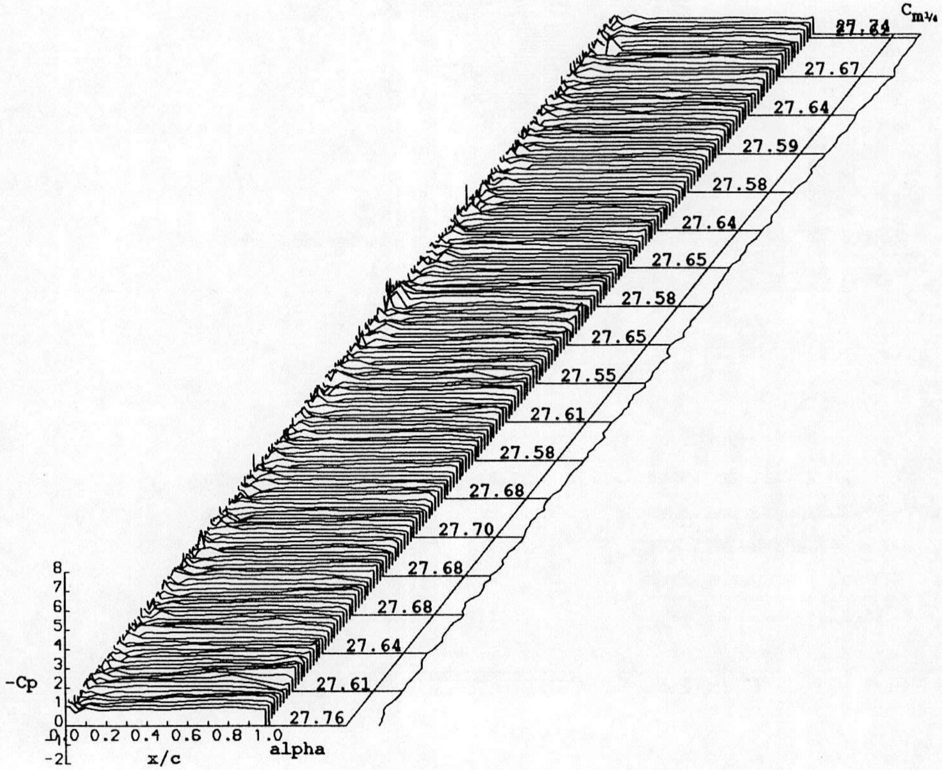


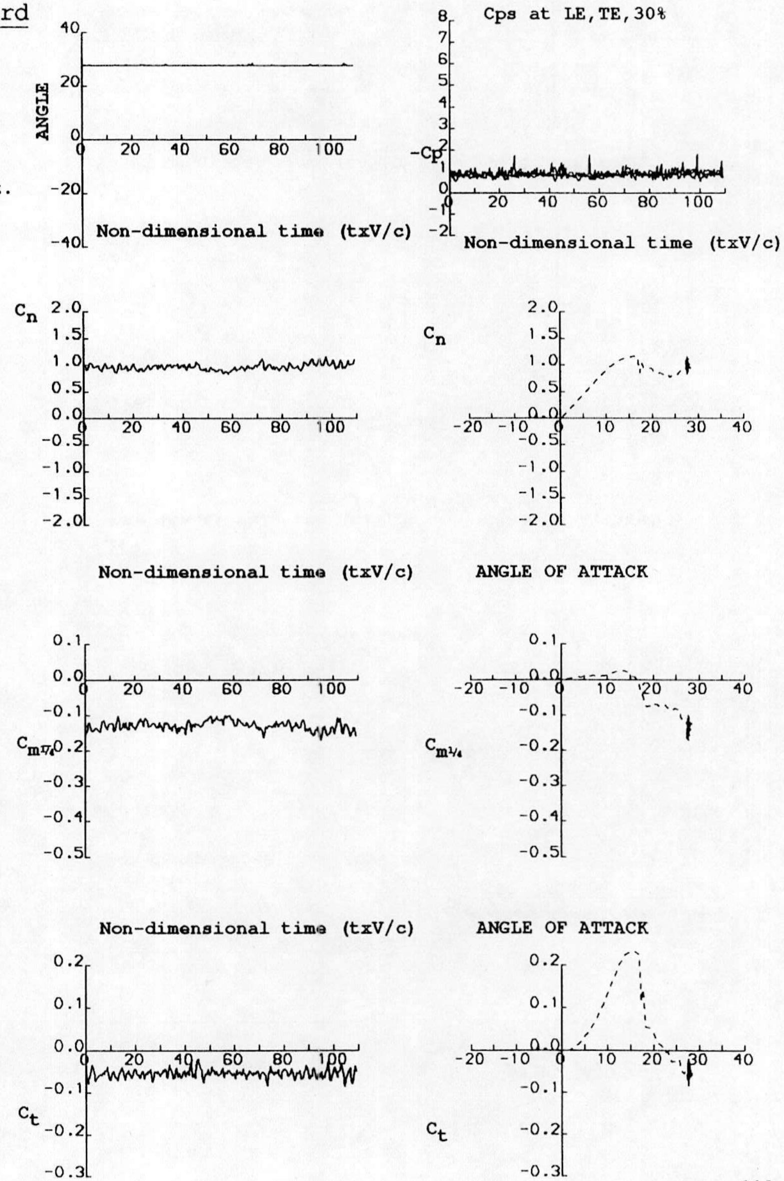


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41131
REYNOLDS NUMBER = 1055126.
DYNAMIC PRESSURE = 2056.42 Nm^{-2}
NUMBER OF CYCLES = 1
MOTION TYPE: UNSTEADY STATIC

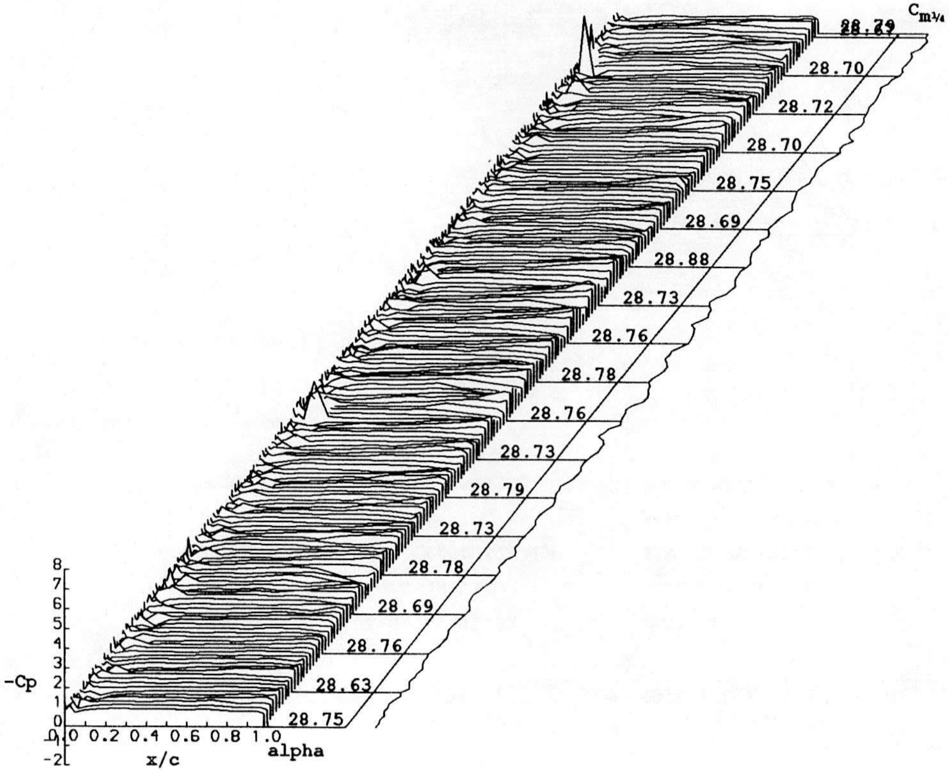
DATE OF TEST: 27/8/91
MACH NUMBER = 0.169
AIR TEMPERATURE = 28.0°C
SAMPLING FREQUENCY = 500.00 Hz.
ANGLE OF ATTACK = 28.0

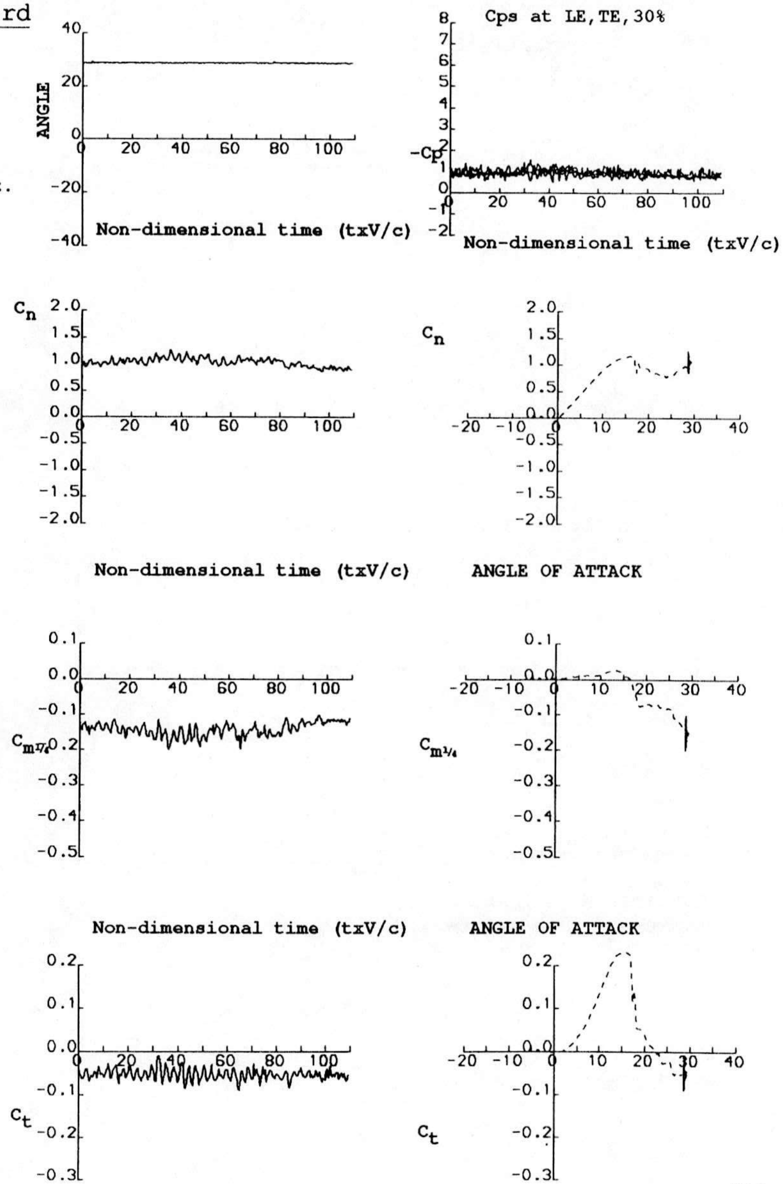




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41141	DATE OF TEST: 27/8/91
REYNOLDS NUMBER = 1051551.	MACH NUMBER = 0.169
DYNAMIC PRESSURE = 2056.42 Nm^{-2}	AIR TEMPERATURE = 28.8°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 29.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41151

REYNOLDS NUMBER = 1049771.

DYNAMIC PRESSURE = 2056.42 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

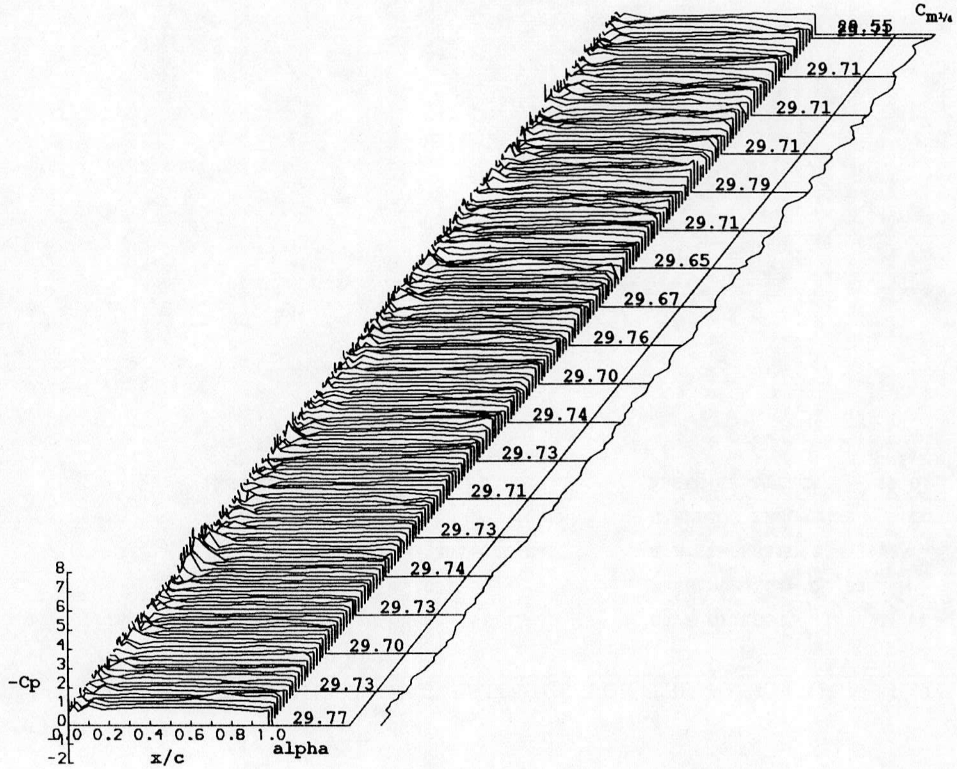
DATE OF TEST: 27/8/91

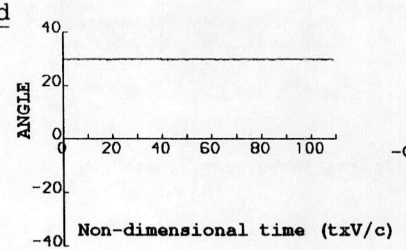
MACH NUMBER = 0.169

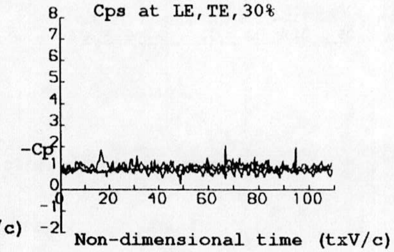
AIR TEMPERATURE = 29.2°C

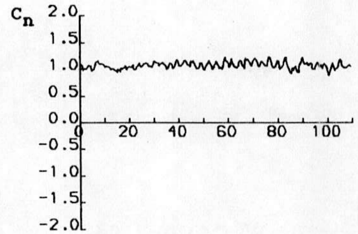
SAMPLING FREQUENCY = 500.00 Hz.

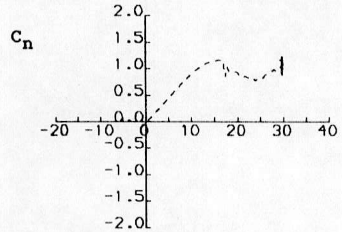
ANGLE OF ATTACK = 30.0

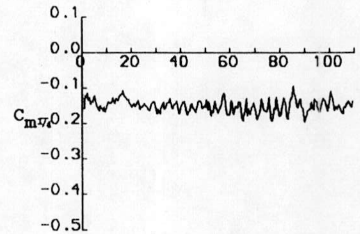


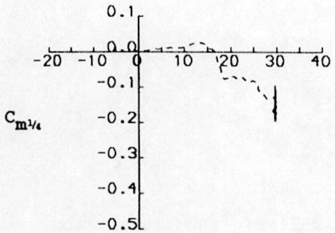


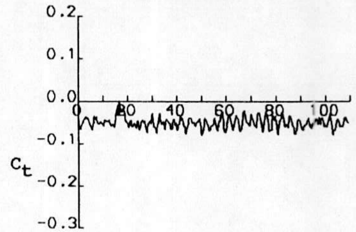


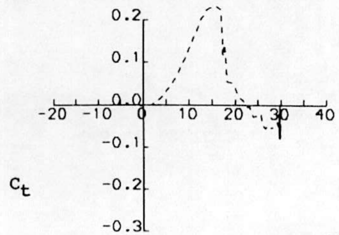












DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41161

REYNOLDS NUMBER = 1047113.

DYNAMIC PRESSURE = 2056.42 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

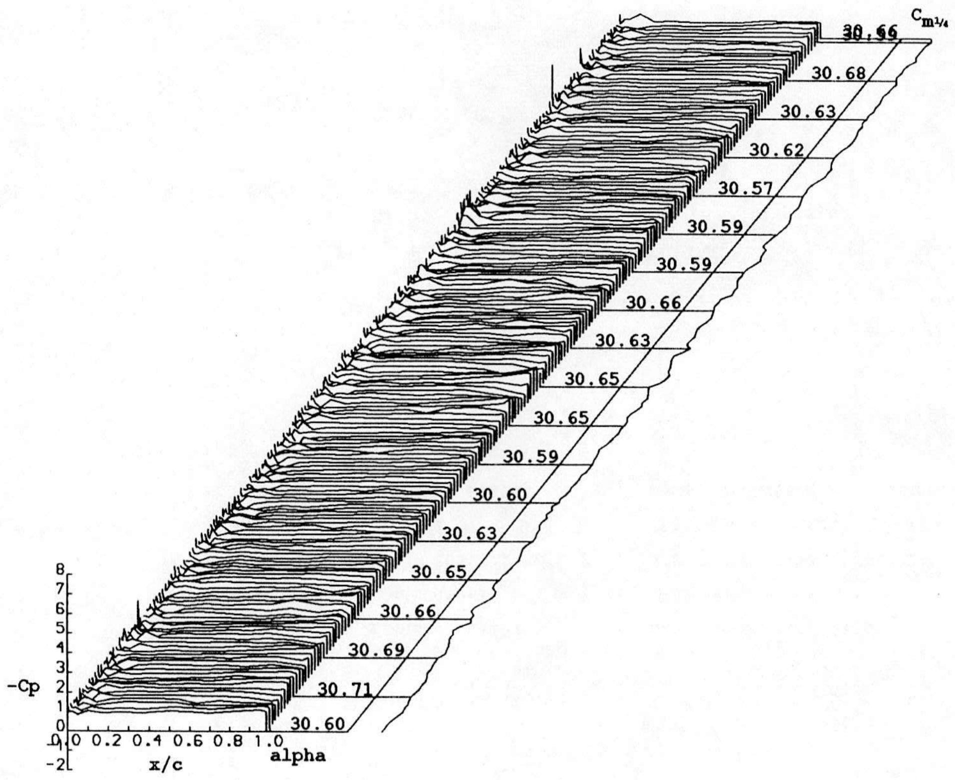
DATE OF TEST: 27/8/91

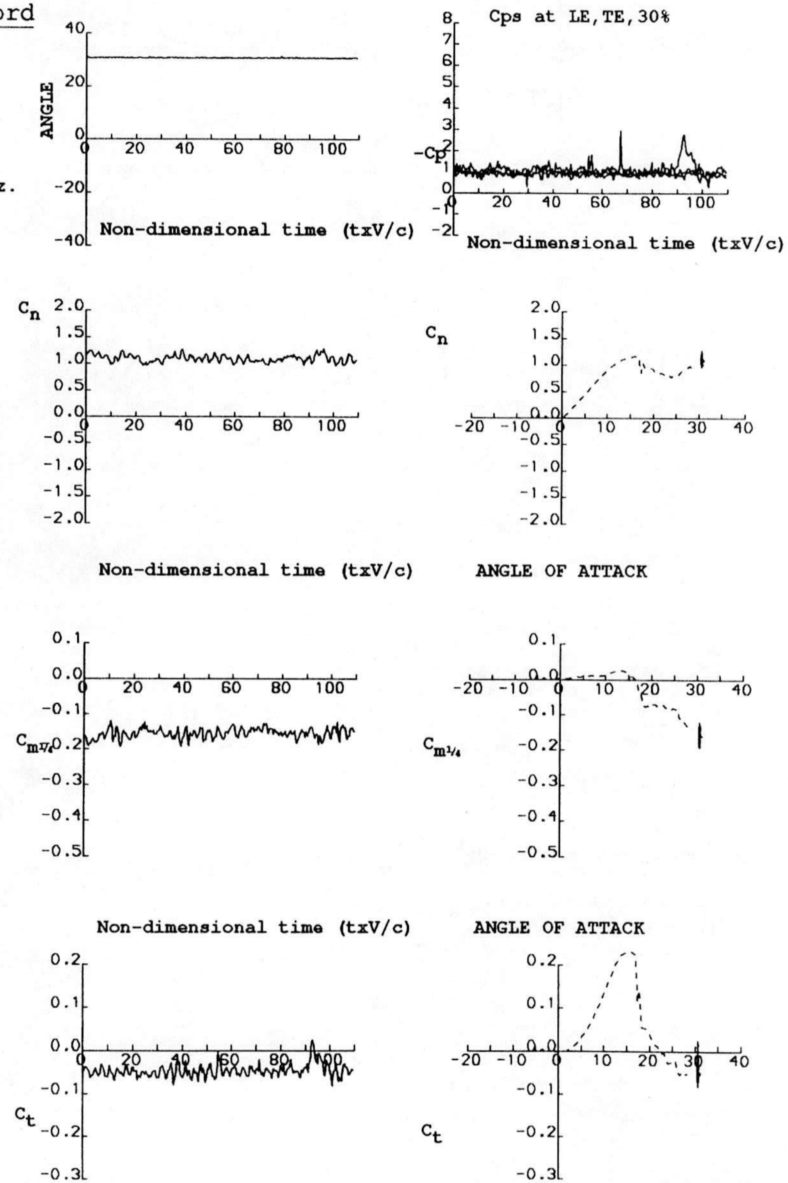
MACH NUMBER = 0.169

AIR TEMPERATURE = 29.8°C

SAMPLING FREQUENCY = 500.00 Hz.

ANGLE OF ATTACK = 31.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41171

REYNOLDS NUMBER = 1045789.

DYNAMIC PRESSURE = 2056.42 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

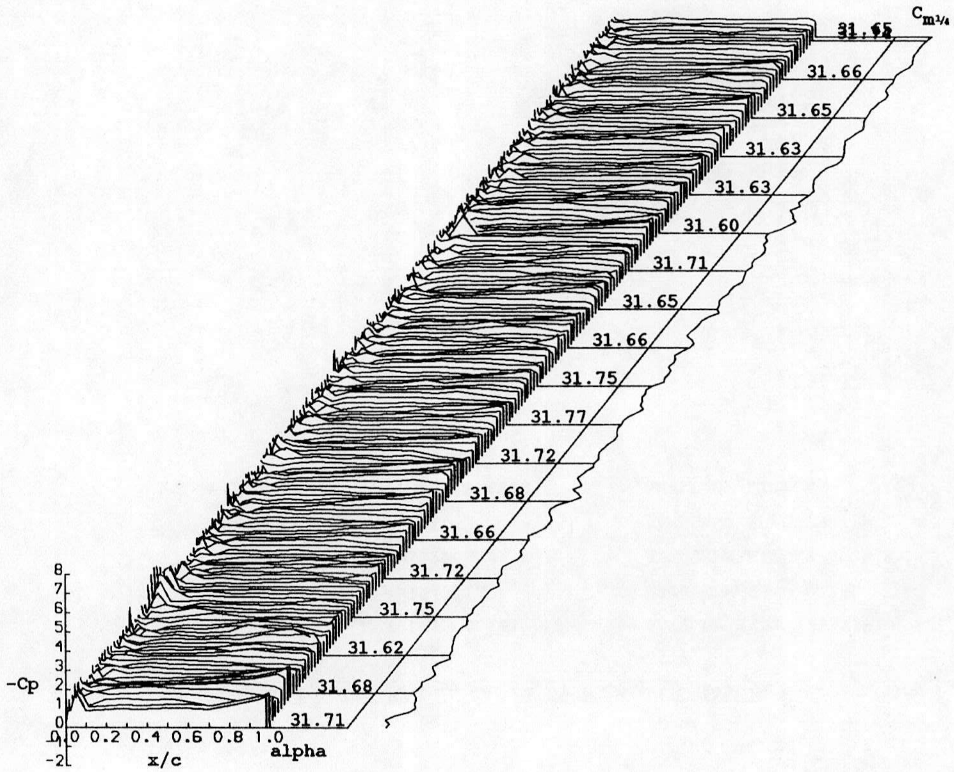
DATE OF TEST: 27/8/91

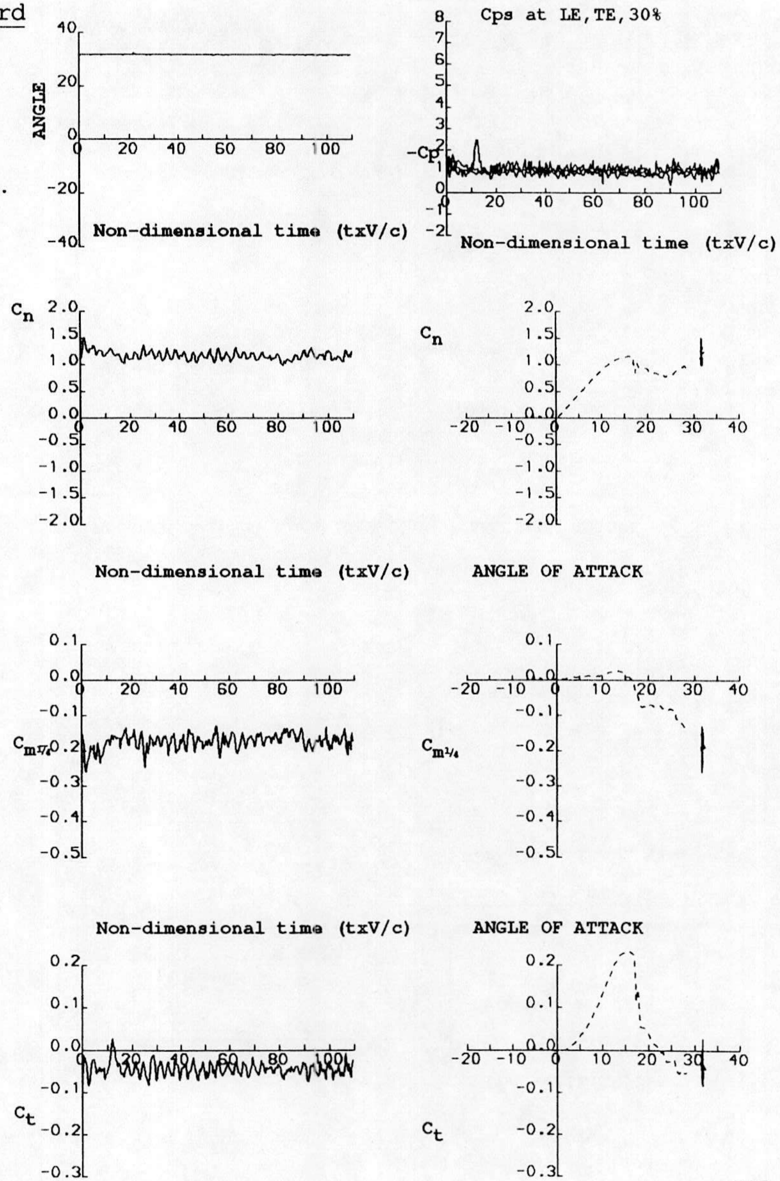
MACH NUMBER = 0.169

AIR TEMPERATURE = 30.1°C

SAMPLING FREQUENCY = 500.00 Hz.

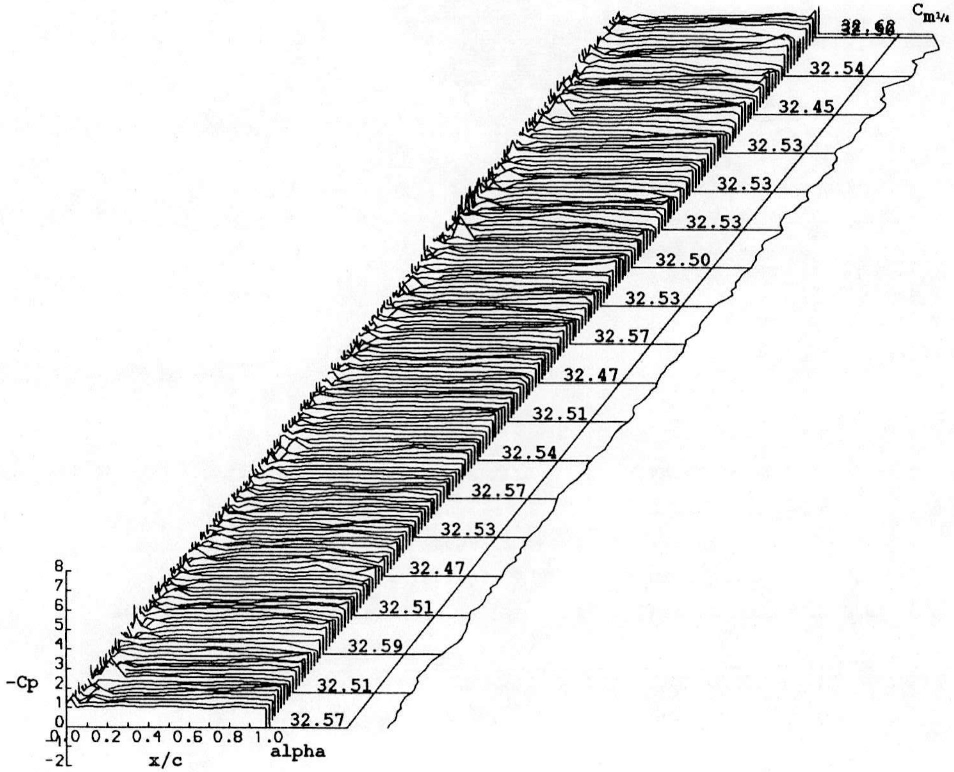
ANGLE OF ATTACK = 32.0

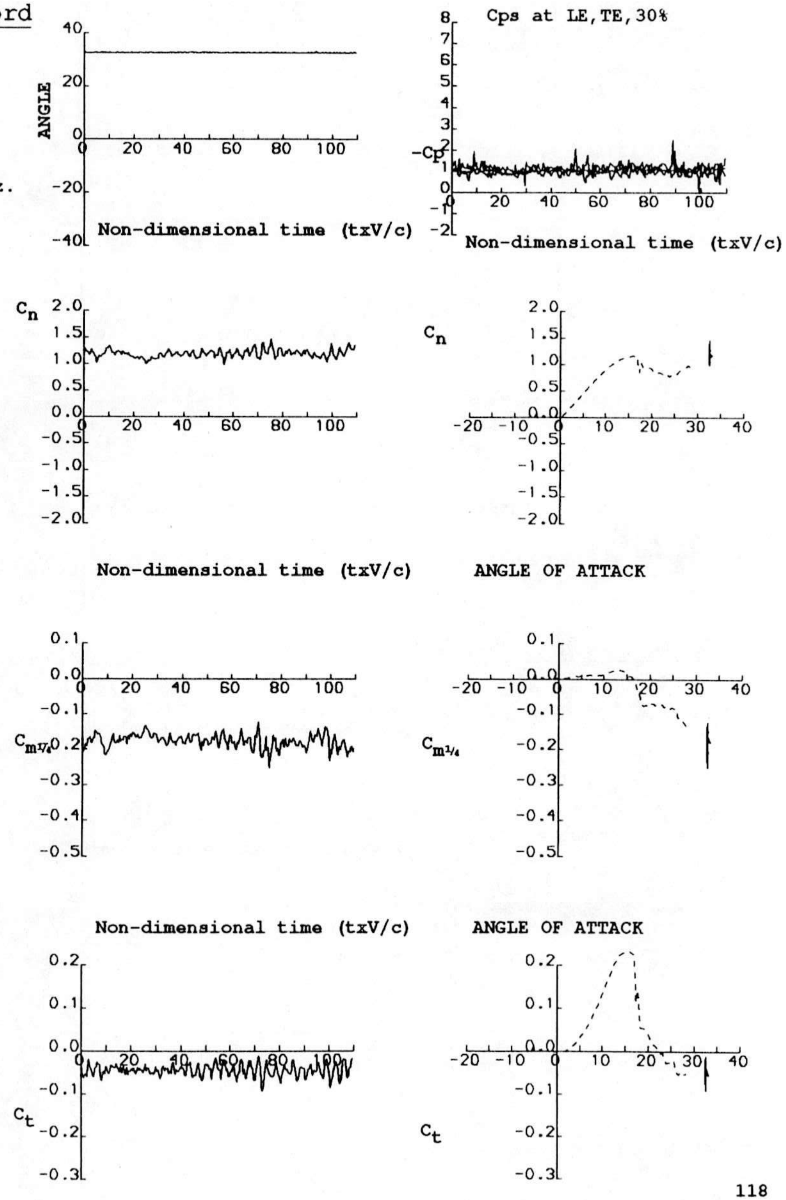




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41181	DATE OF TEST: 27/8/91
REYNOLDS NUMBER = 1044028.	MACH NUMBER = 0.169
DYNAMIC PRESSURE = 2056.42 Nm^{-2}	AIR TEMPERATURE = 30.5°C
NUMBER OF CYCLES = 1	SAMPLING FREQUENCY = 500.00 Hz.
MOTION TYPE: UNSTEADY STATIC	ANGLE OF ATTACK = 33.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41191

REYNOLDS NUMBER = 1041836.

DYNAMIC PRESSURE = 2056.42 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

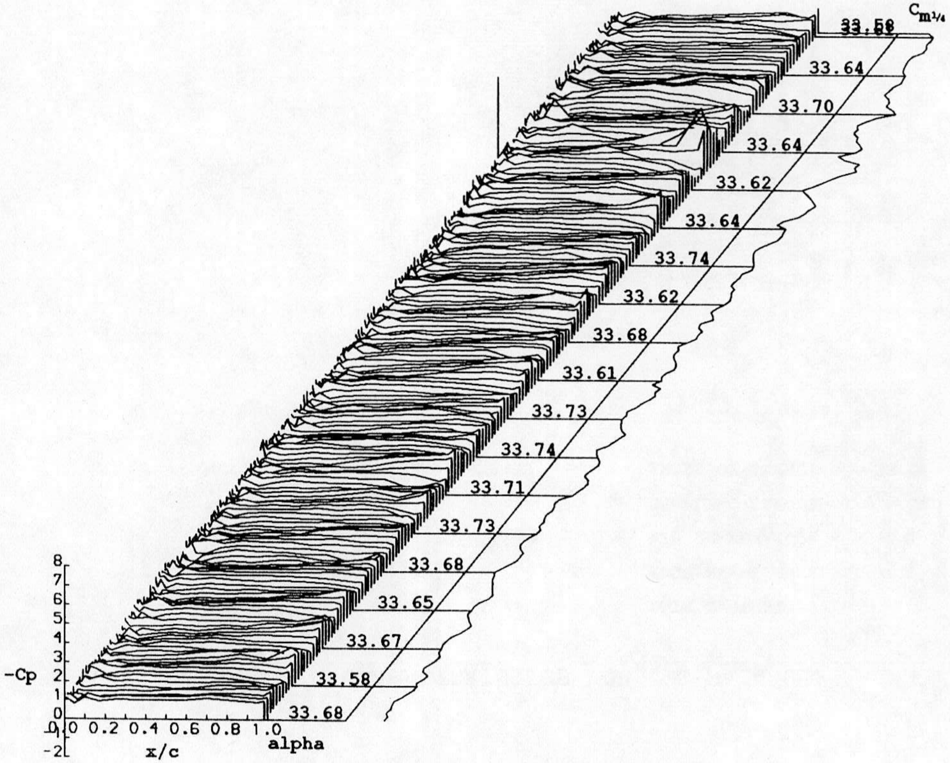
DATE OF TEST: 27/8/91

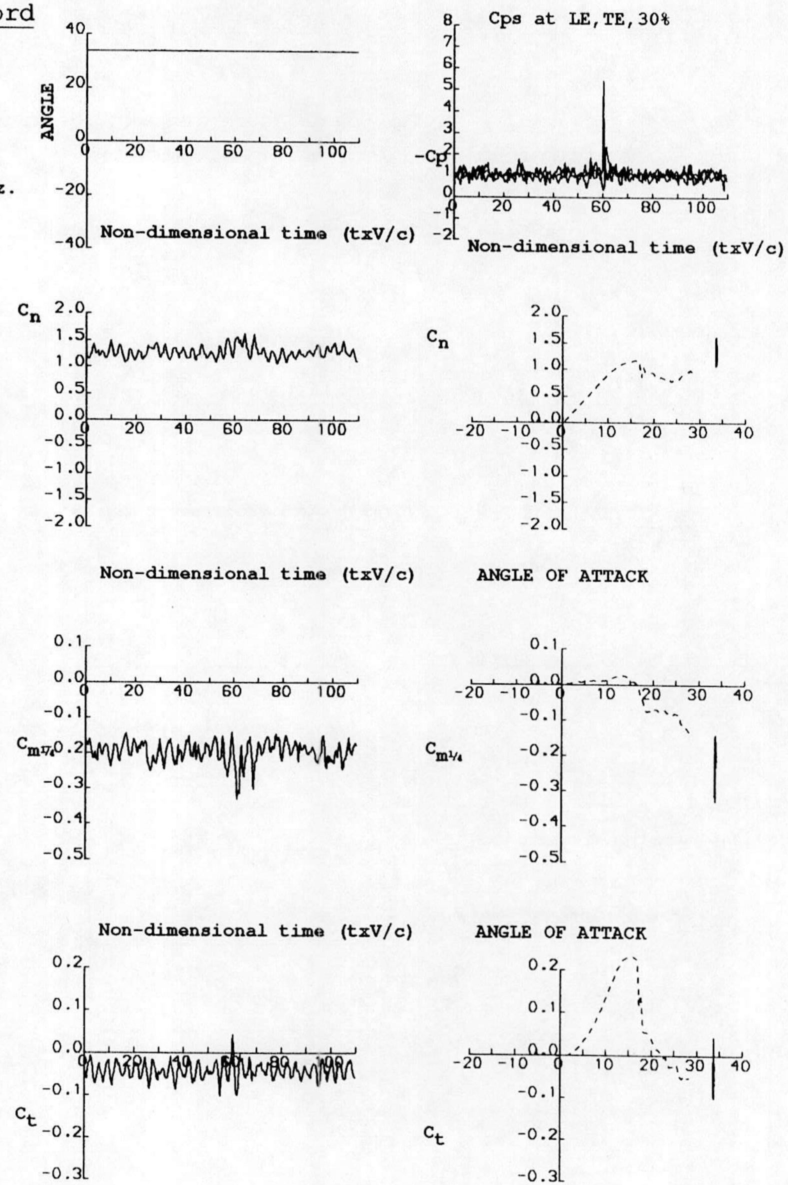
MACH NUMBER = 0.169

AIR TEMPERATURE = 31.0°C

SAMPLING FREQUENCY = 500.00 Hz.

ANGLE OF ATTACK = 34.0





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 41201

REYNOLDS NUMBER = 1040524.

DYNAMIC PRESSURE = 2056.42 Nm^{-2}

NUMBER OF CYCLES = 1

MOTION TYPE: UNSTEADY STATIC

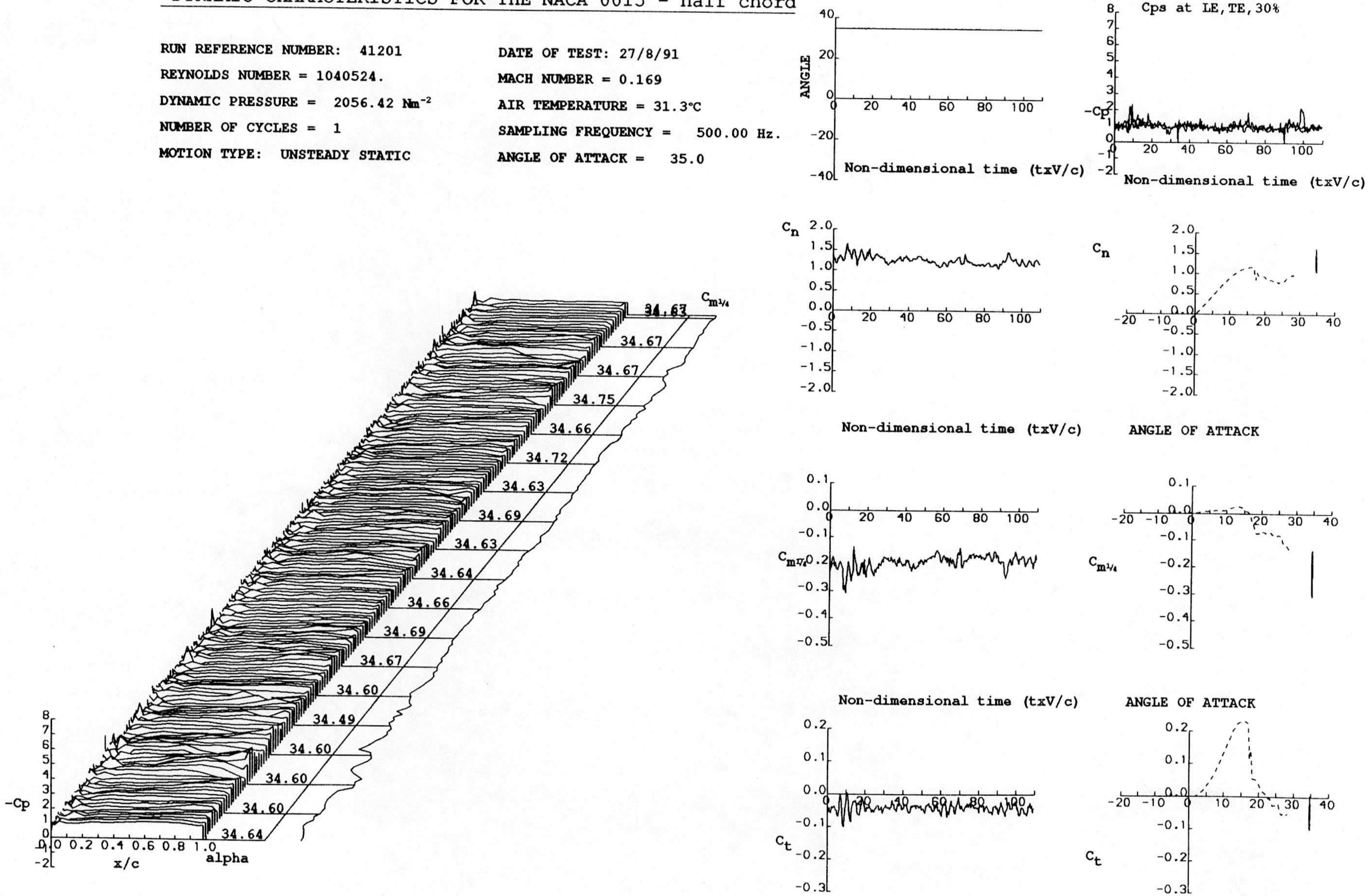
DATE OF TEST: 27/8/91

MACH NUMBER = 0.169

AIR TEMPERATURE = 31.3°C

SAMPLING FREQUENCY = 500.00 Hz.

ANGLE OF ATTACK = 35.0



G.U. Aero Report 9209

UNIVERSITY OF GLASGOW

DEPARTMENT OF AEROSPACE ENGINEERING

PRESSURE DATA FROM

RAMP UP EXPERIMENTS

DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20023

REYNOLDS NUMBER = 776783.

DYNAMIC PRESSURE = 1093.27 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

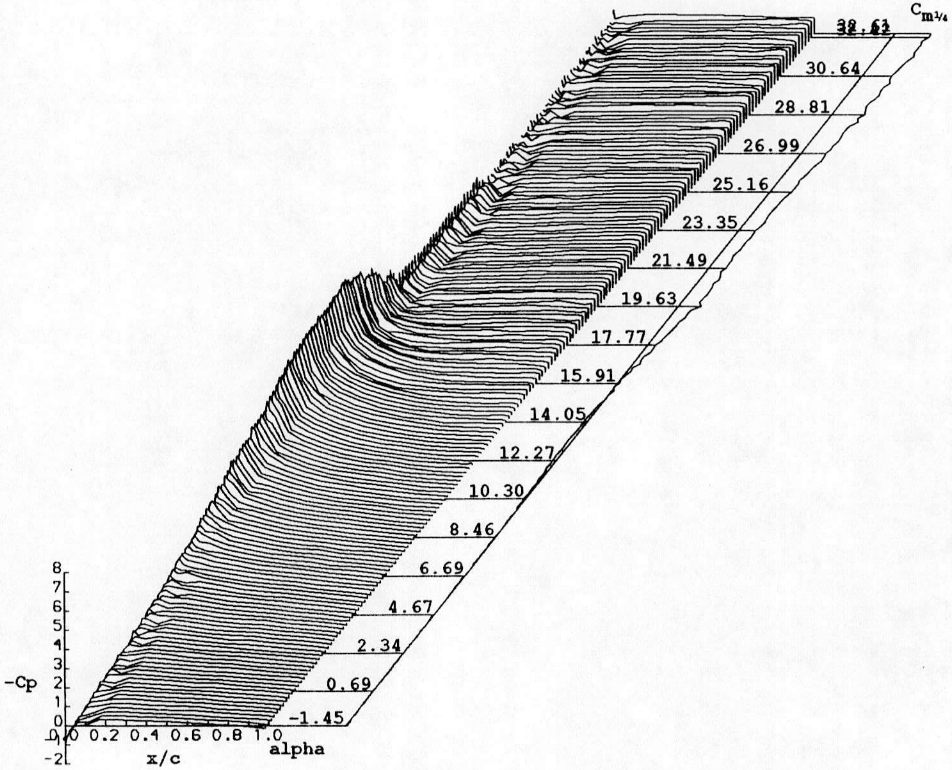
MACH NUMBER = 0.124

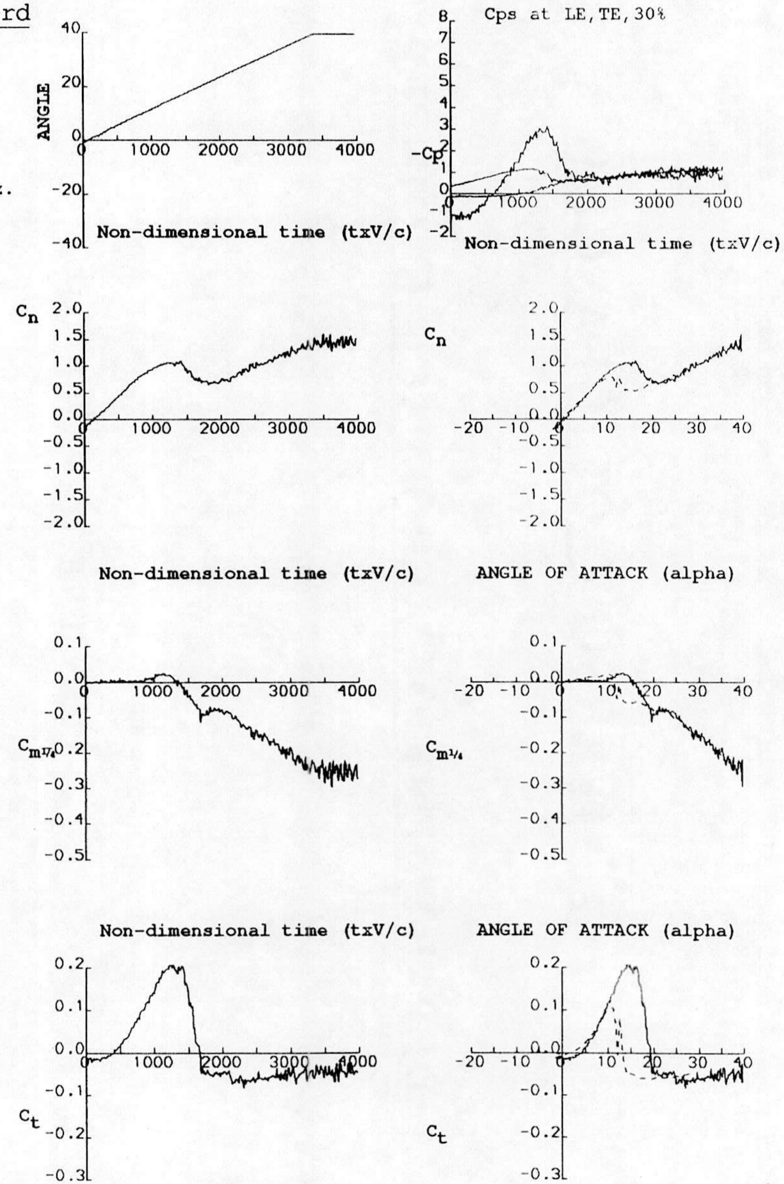
AIR TEMPERATURE = 24.6°C

SAMPLING FREQUENCY = 10.00 Hz.

REDUCED PITCH RATE = 0.00010

LINEAR PITCH RATE = 1.86°S^{-1}

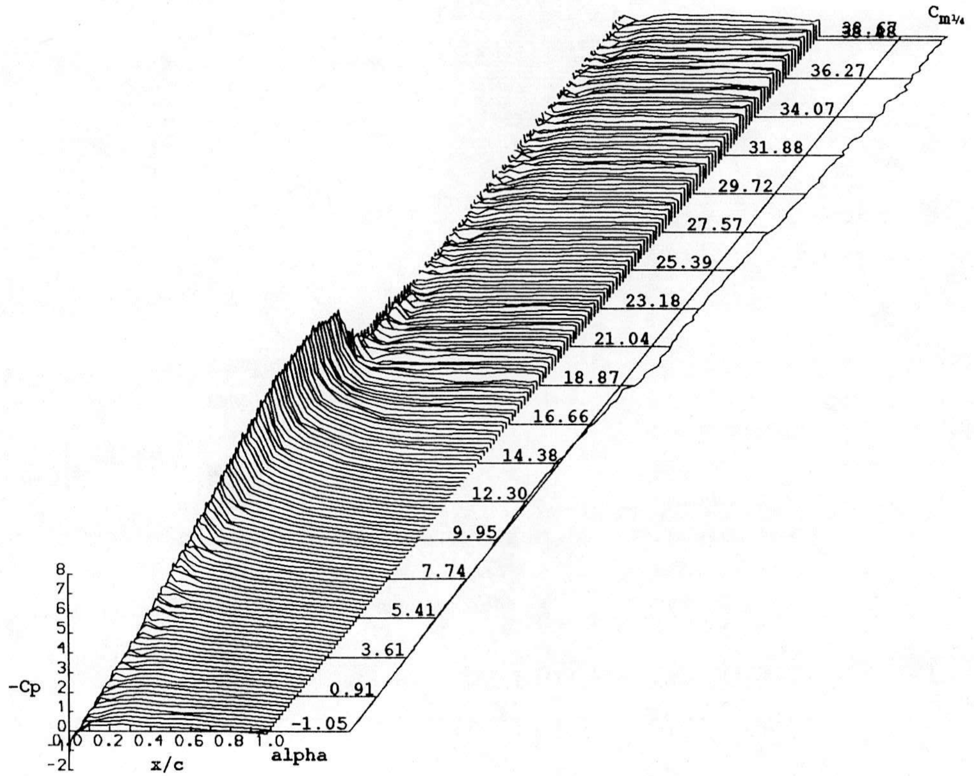


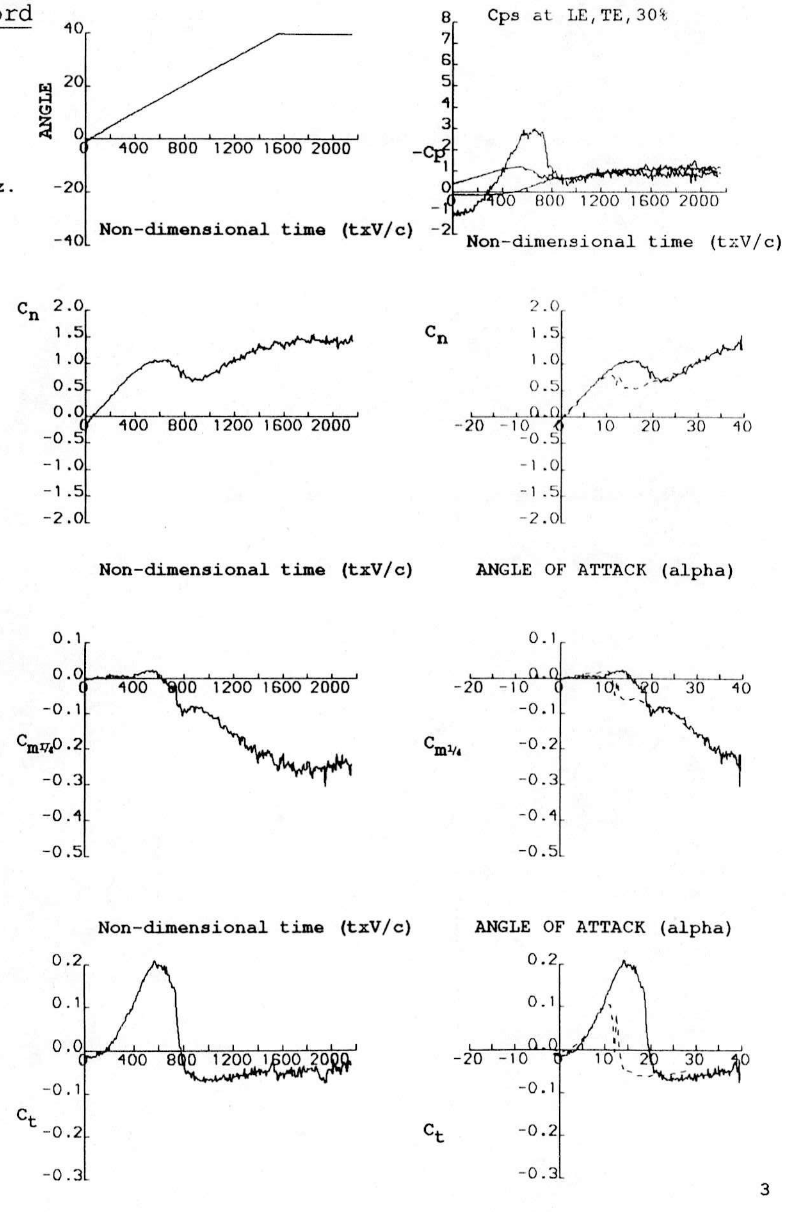


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20033
REYNOLDS NUMBER = 776367.
DYNAMIC PRESSURE = 1110.05 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91
MACH NUMBER = 0.125
AIR TEMPERATURE = 26.5°C
SAMPLING FREQUENCY = 18.60 Hz.
REDUCED PITCH RATE = 0.00021
LINEAR PITCH RATE = 3.77°S^{-1}

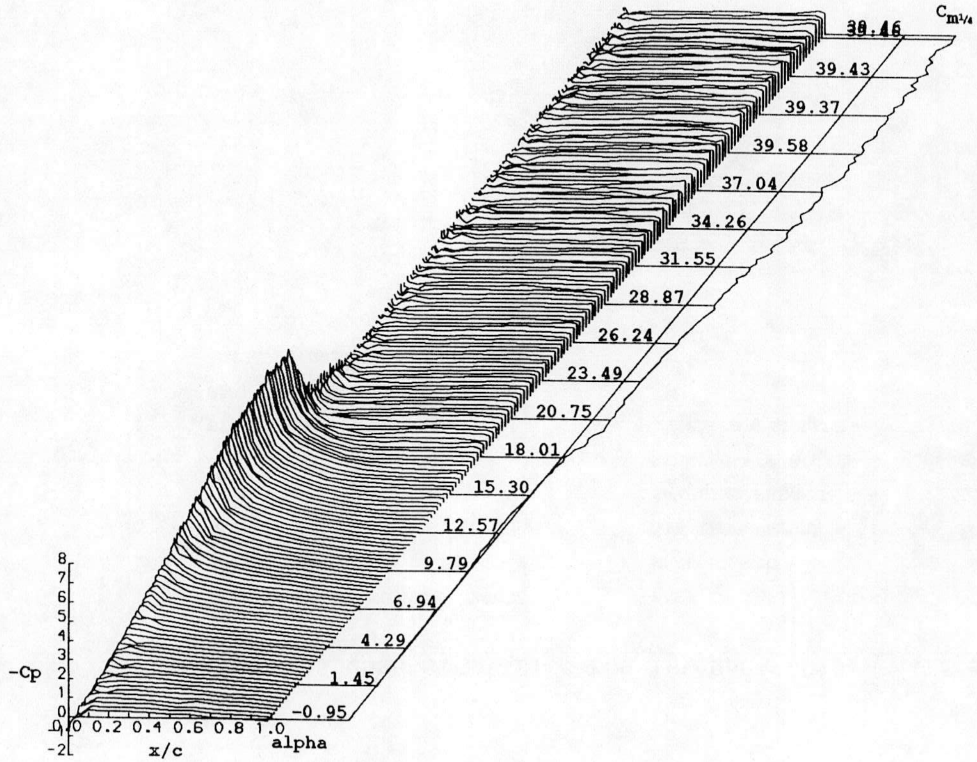


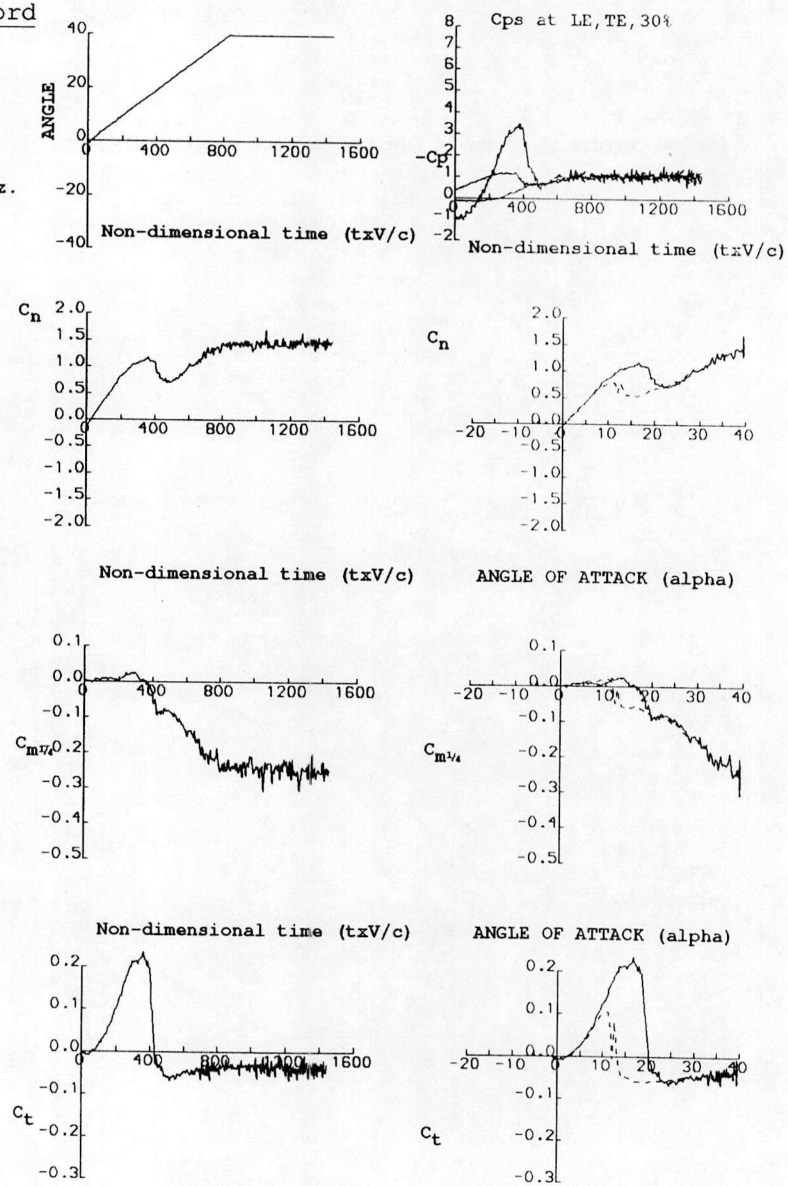


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20043
REYNOLDS NUMBER = 771927.
DYNAMIC PRESSURE = 1096.45 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 26.4°C
SAMPLING FREQUENCY = 27.70 Hz.
REDUCED PITCH RATE = 0.00043
LINEAR PITCH RATE = 7.69°S^{-1}

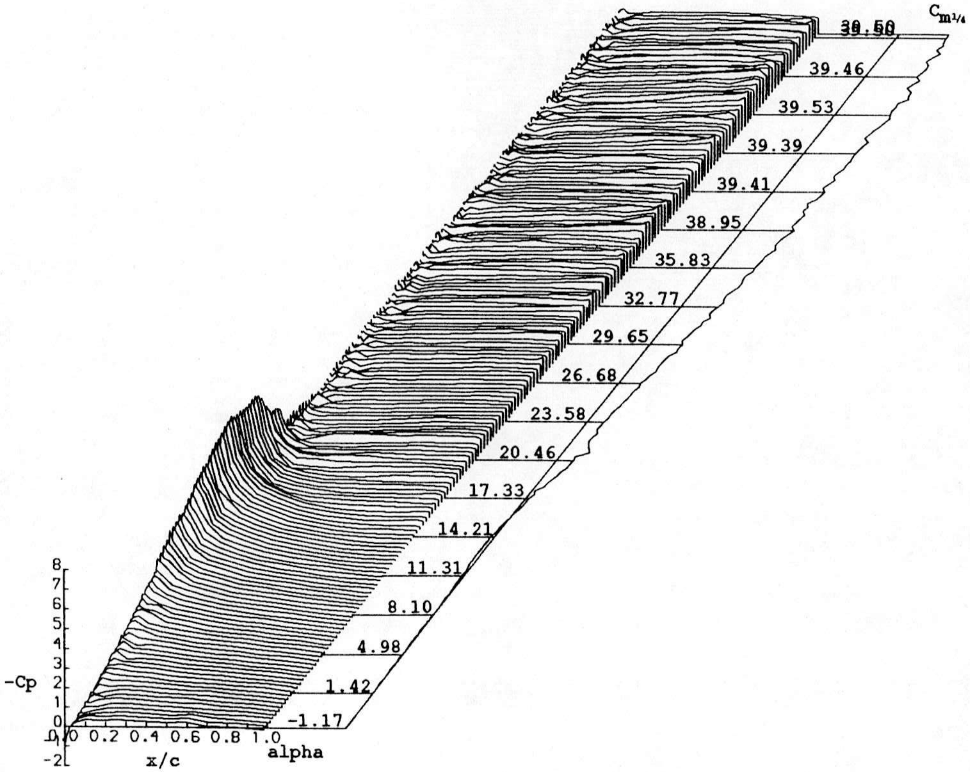


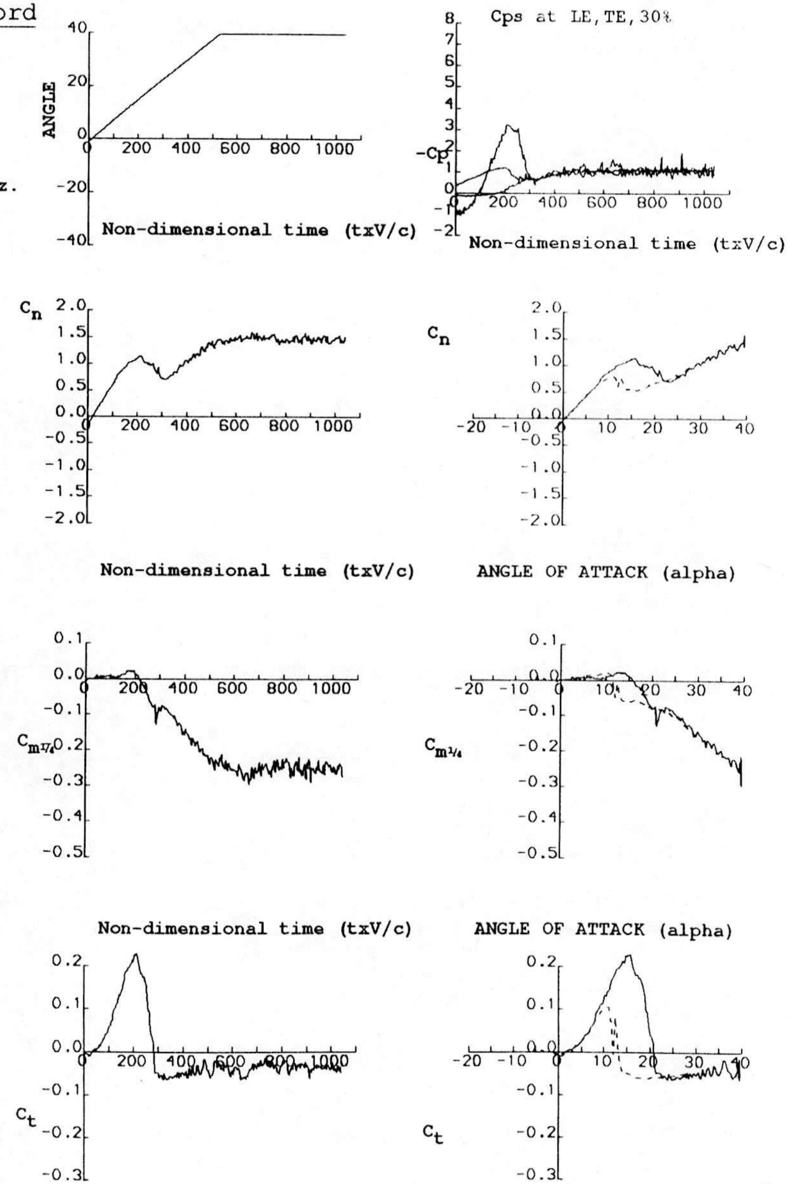


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20053
REYNOLDS NUMBER = 768312.
DYNAMIC PRESSURE = 1096.45 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 27.5°C
SAMPLING FREQUENCY = 38.40 Hz.
REDUCED PITCH RATE = 0.00066
LINEAR PITCH RATE = 11.86°S^{-1}

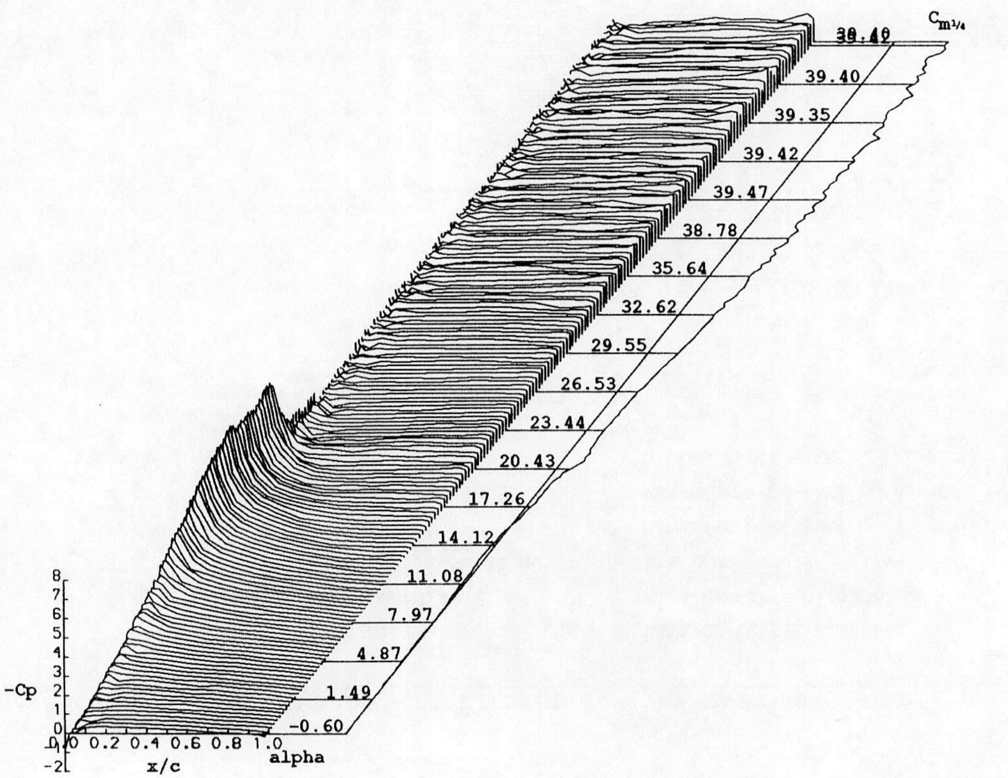


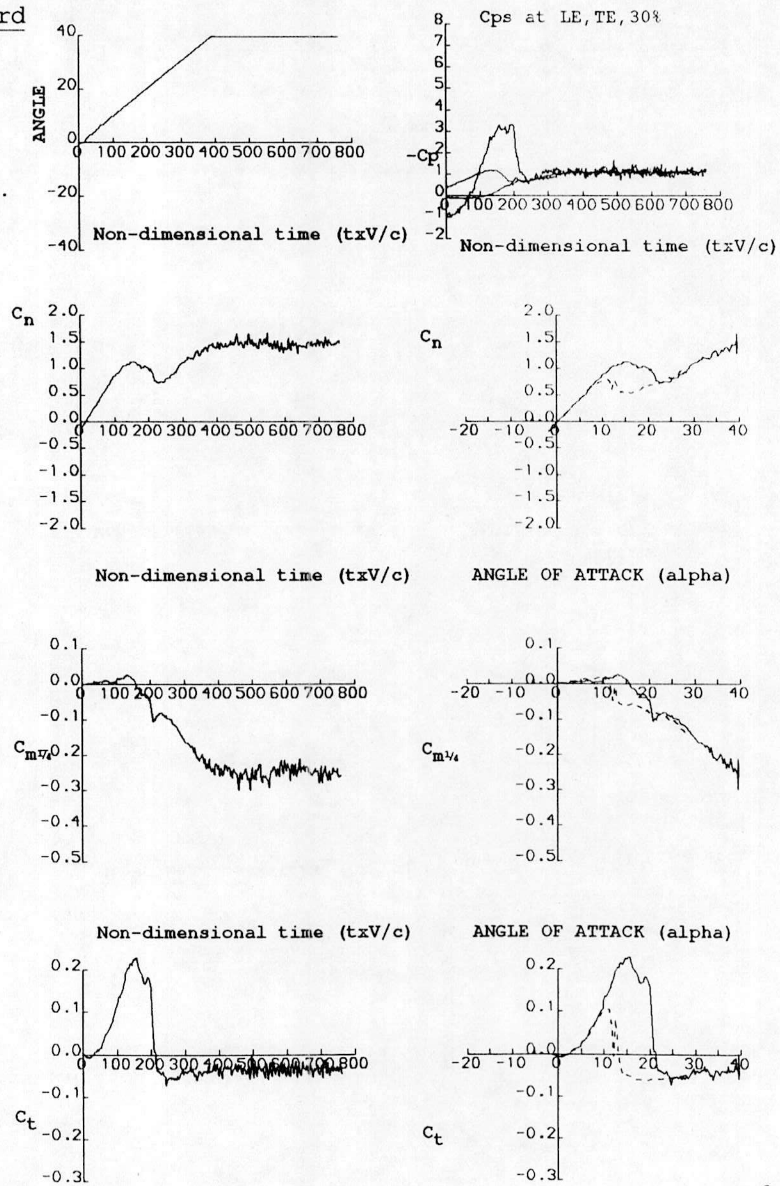


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20063
REYNOLDS NUMBER = 769034.
DYNAMIC PRESSURE = 1094.78 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

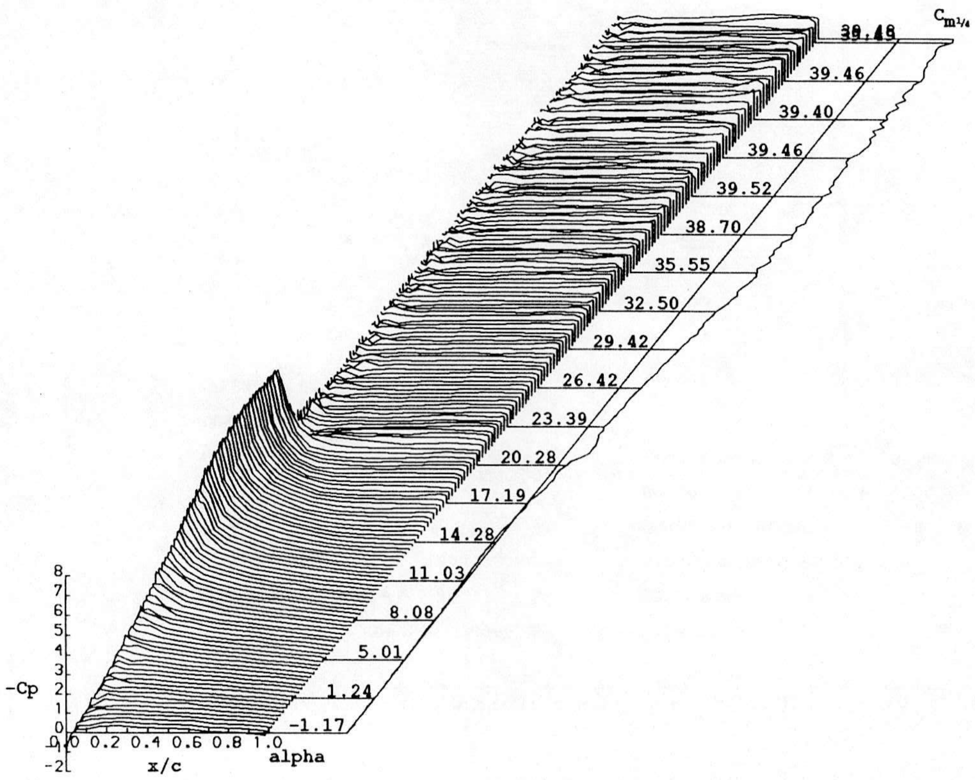
DATE OF TEST: 2/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 27.1°C
SAMPLING FREQUENCY = 52.50 Hz.
REDUCED PITCH RATE = 0.00089
LINEAR PITCH RATE = 15.98°S^{-1}

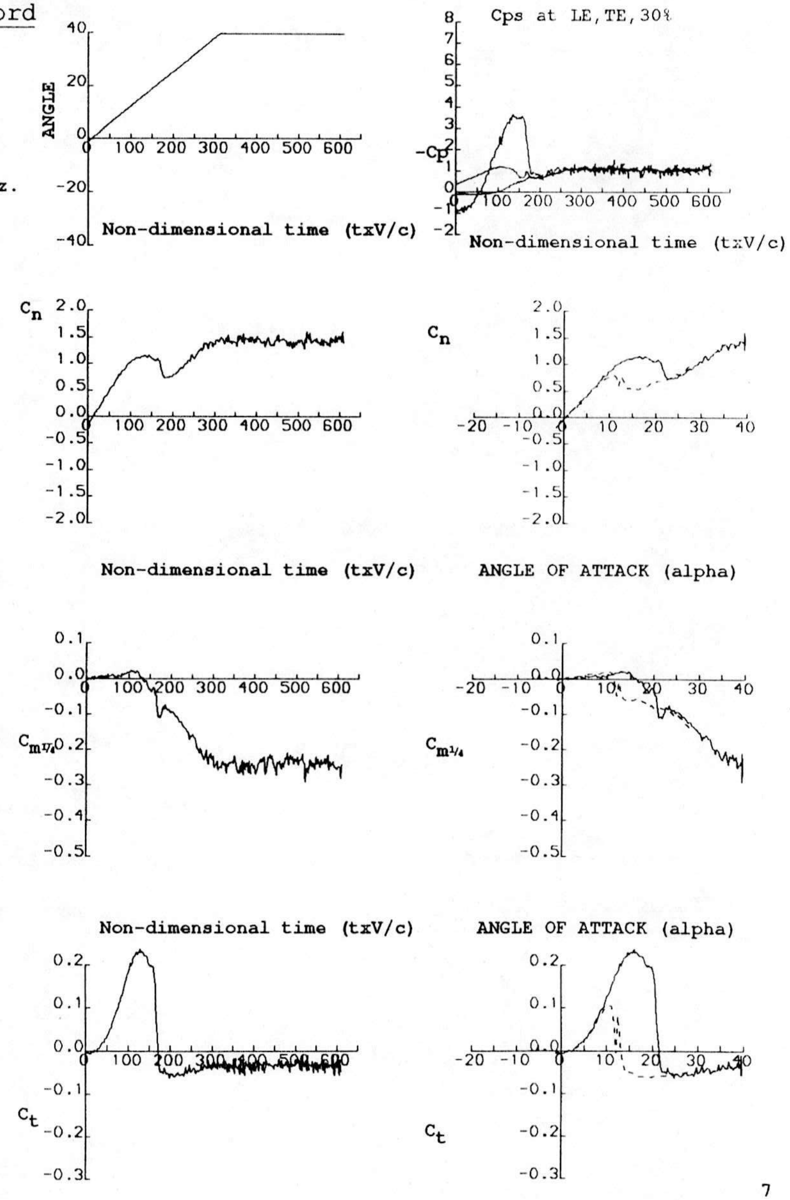




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20073	**DATE OF TEST:** 2/8/91
REYNOLDS NUMBER = 766094.	**MACH NUMBER =** 0.124
DYNAMIC PRESSURE = 1094.78 Nm^{-2}	**AIR TEMPERATURE =** 28.0°C
NUMBER OF CYCLES = 5	**SAMPLING FREQUENCY =** 65.60 Hz.
MOTION TYPE: RAMP UP	**REDUCED PITCH RATE =** 0.00113
START ANGLE = -1.00°	**LINEAR PITCH RATE =** 20.36°S^{-1}
RAMP ARC = 41.000°	
AVERAGED DATA OF 5 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20083

REYNOLDS NUMBER = 763821.

DYNAMIC PRESSURE = 1094.78 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

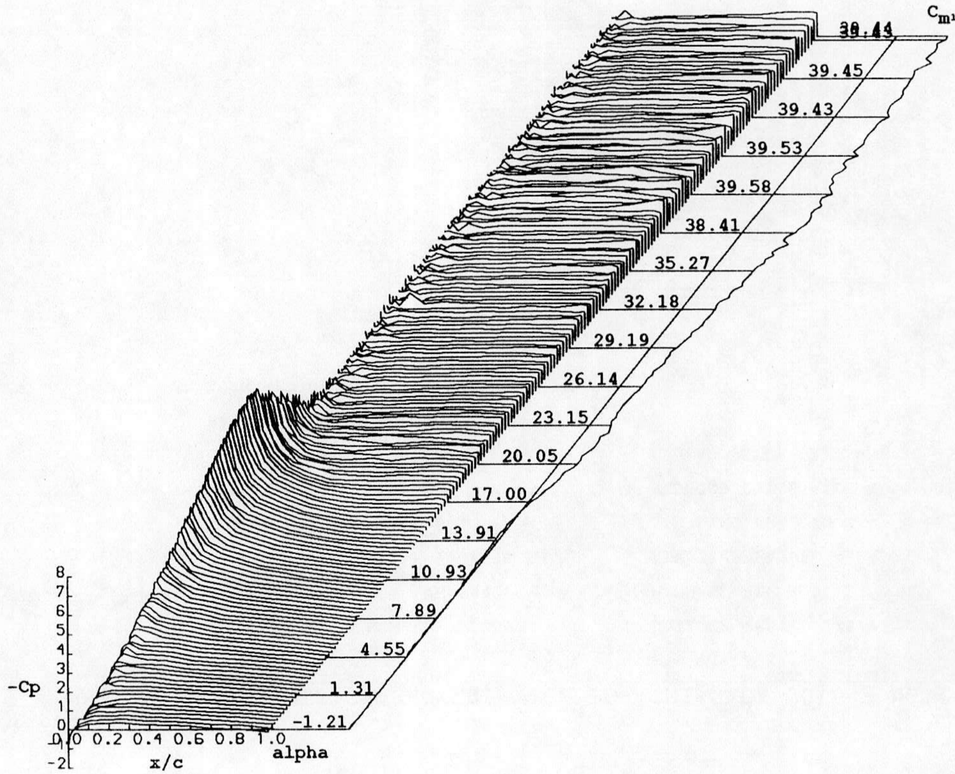
MACH NUMBER = 0.124

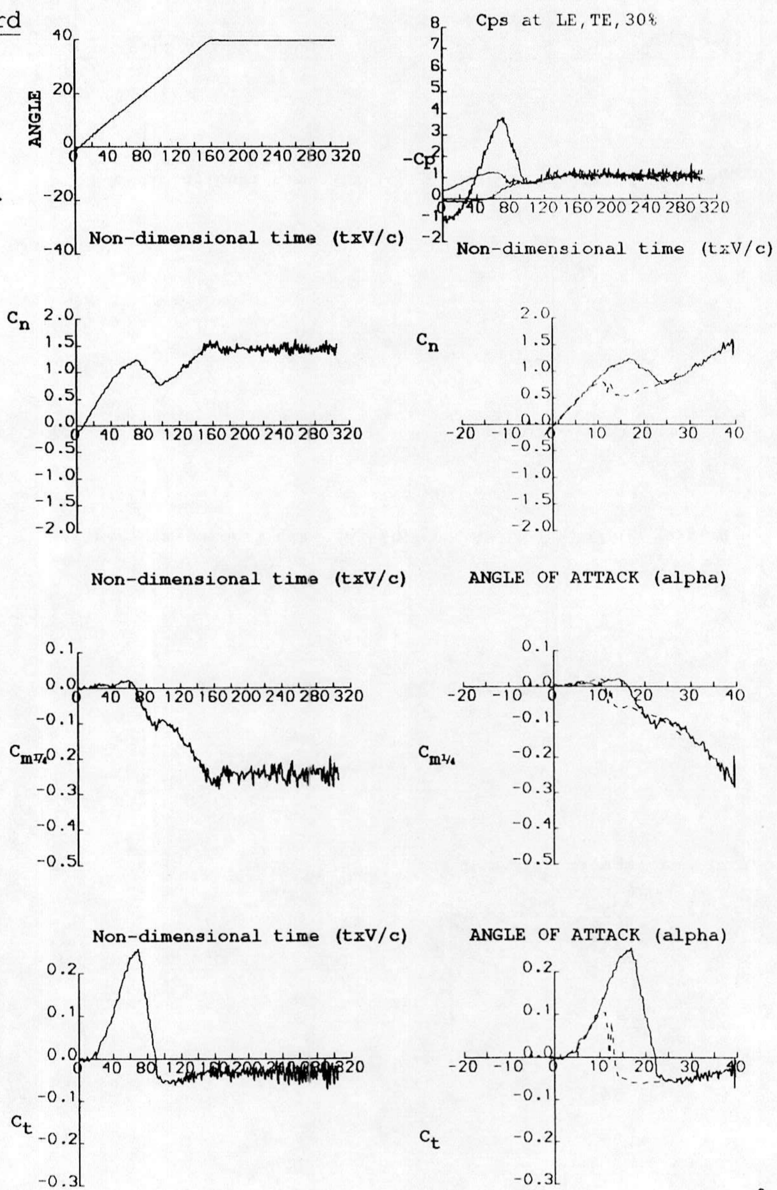
AIR TEMPERATURE = 28.7°C

SAMPLING FREQUENCY = 131.10 Hz.

REDUCED PITCH RATE = 0.00209

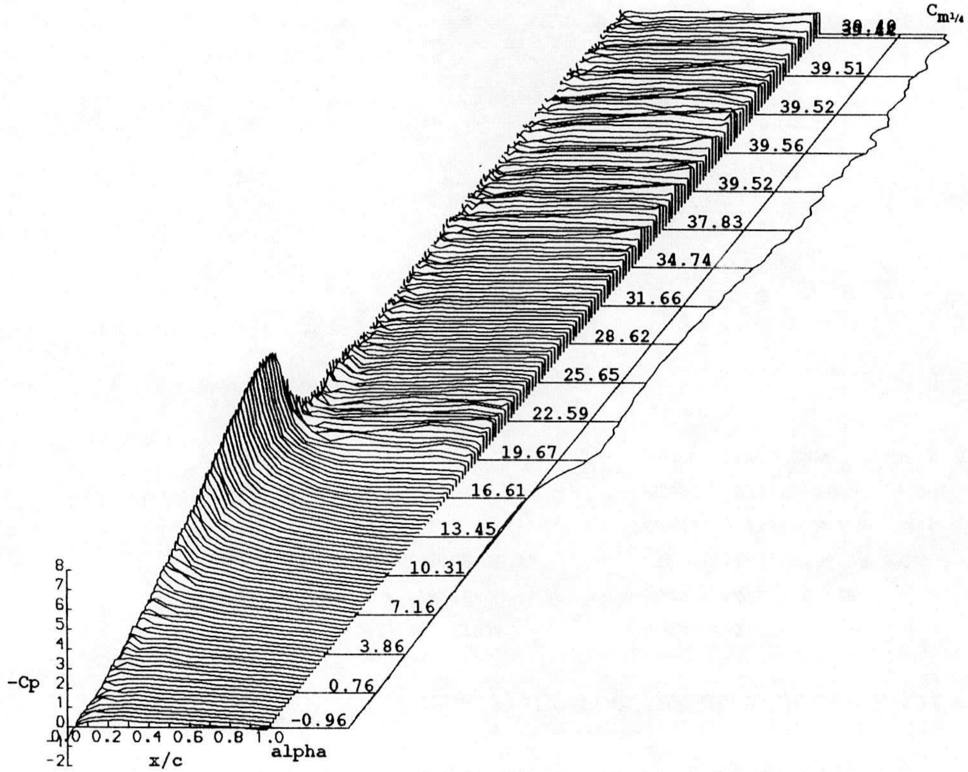
LINEAR PITCH RATE = 37.60°S^{-1}

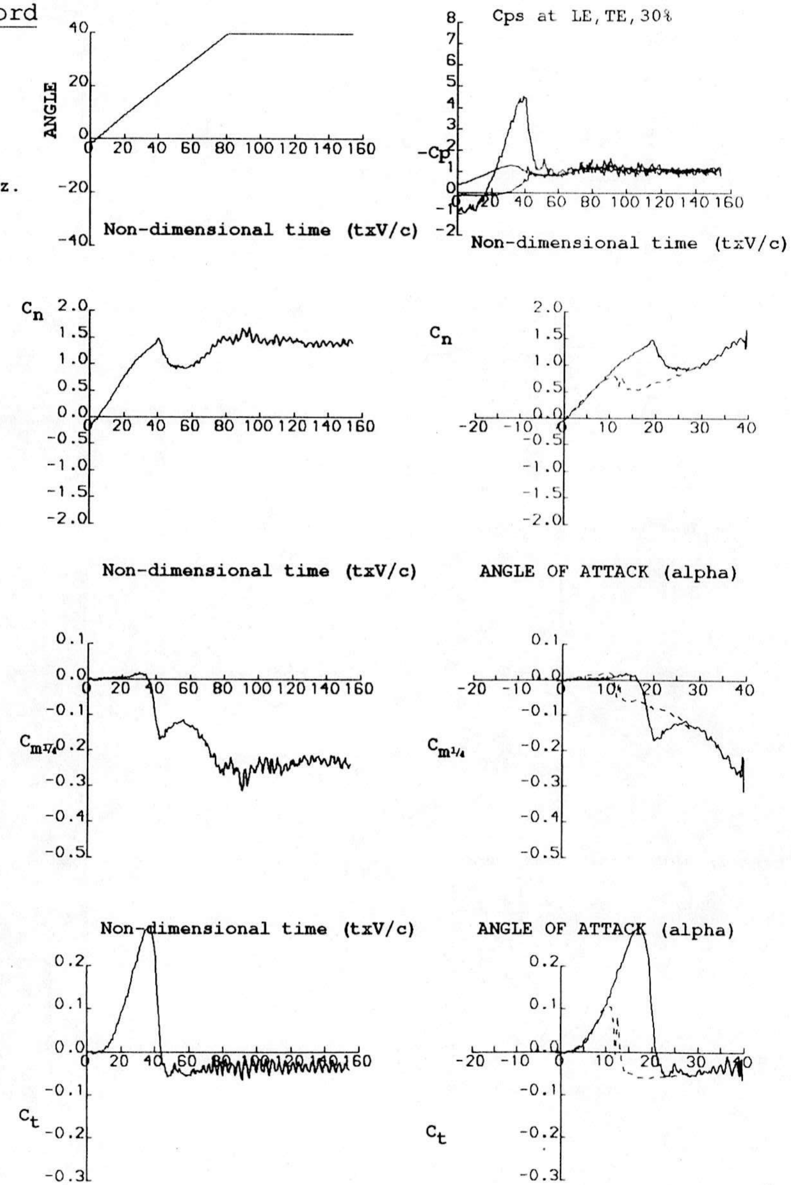




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20093	**DATE OF TEST:** 2/8/91
REYNOLDS NUMBER = 762528.	**MACH NUMBER =** 0.124
DYNAMIC PRESSURE = 1094.78 Nm^{-2}	**AIR TEMPERATURE =** 29.1°C
NUMBER OF CYCLES = 5	**SAMPLING FREQUENCY =** 259.81 Hz.
MOTION TYPE: RAMP UP	**REDUCED PITCH RATE =** 0.00443
START ANGLE = -1.00°	**LINEAR PITCH RATE =** 79.83°s^{-1}
RAMP ARC = 41.000°	
AVERAGED DATA OF 5 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20103

REYNOLDS NUMBER = 762766.

DYNAMIC PRESSURE = 1088.05 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

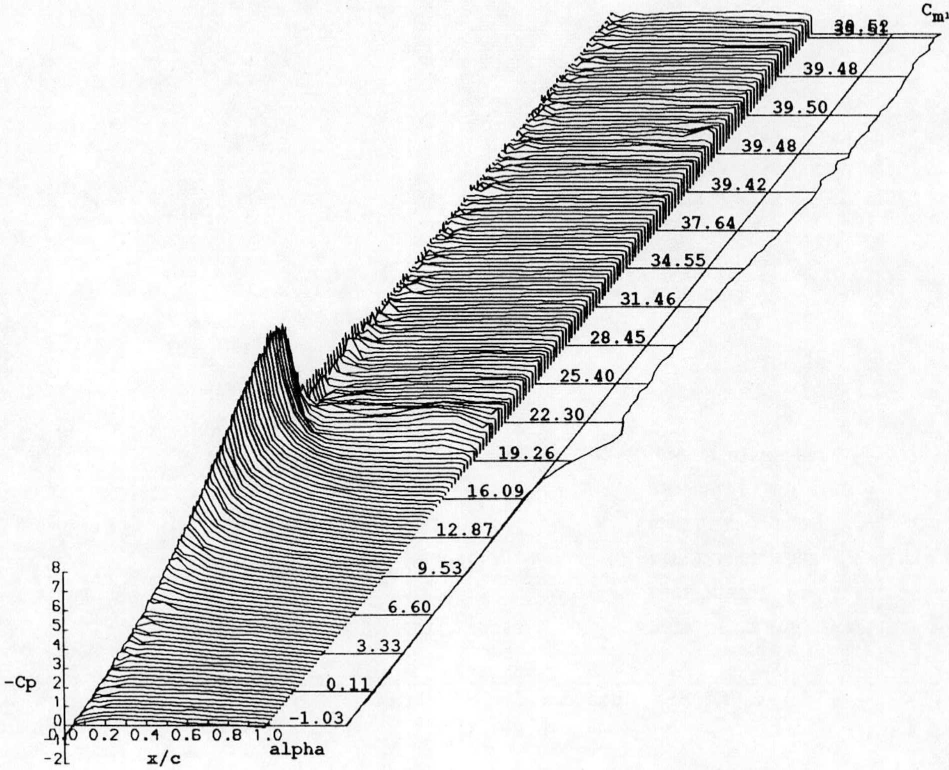
MACH NUMBER = 0.124

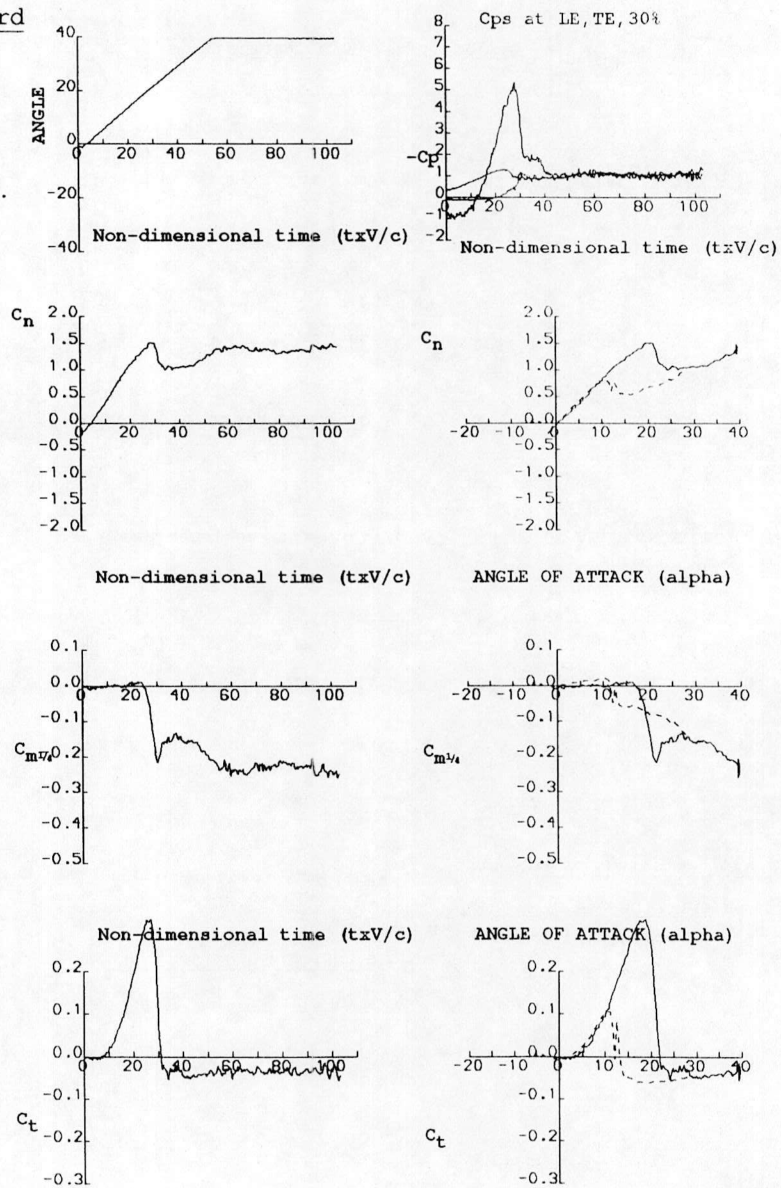
AIR TEMPERATURE = 28.3°C

SAMPLING FREQUENCY = 386.55 Hz.

REDUCED PITCH RATE = 0.00688

LINEAR PITCH RATE = 123.43°s^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20113

REYNOLDS NUMBER = 760184.

DYNAMIC PRESSURE = 1088.05 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

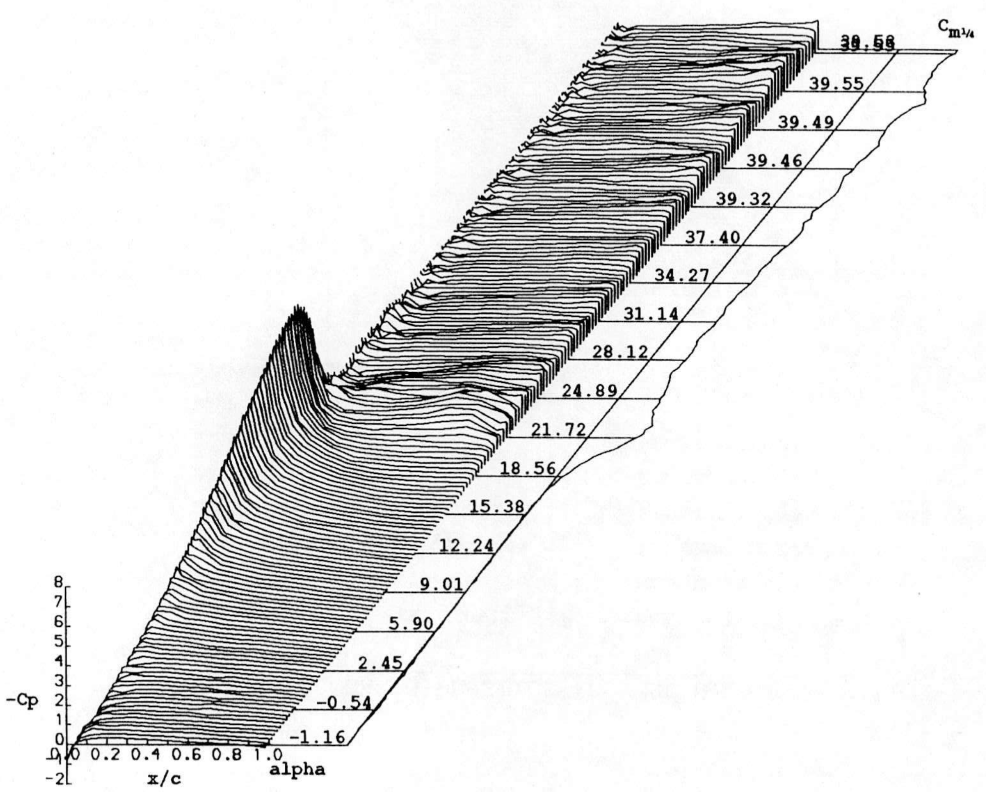
MACH NUMBER = 0.124

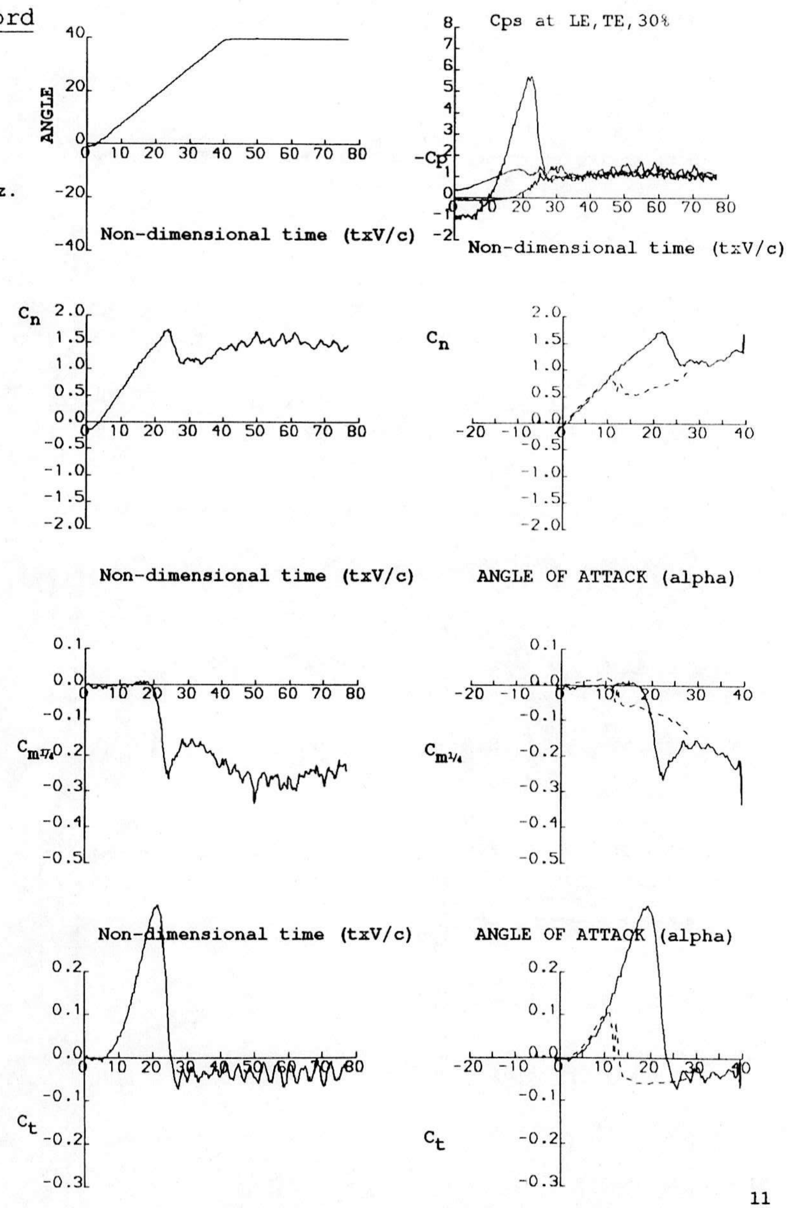
AIR TEMPERATURE = 29.1°C

SAMPLING FREQUENCY = 520.02 Hz.

REDUCED PITCH RATE = 0.00936

LINEAR PITCH RATE = 168.28°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20123

REYNOLDS NUMBER = 758579.

DYNAMIC PRESSURE = 1088.05 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

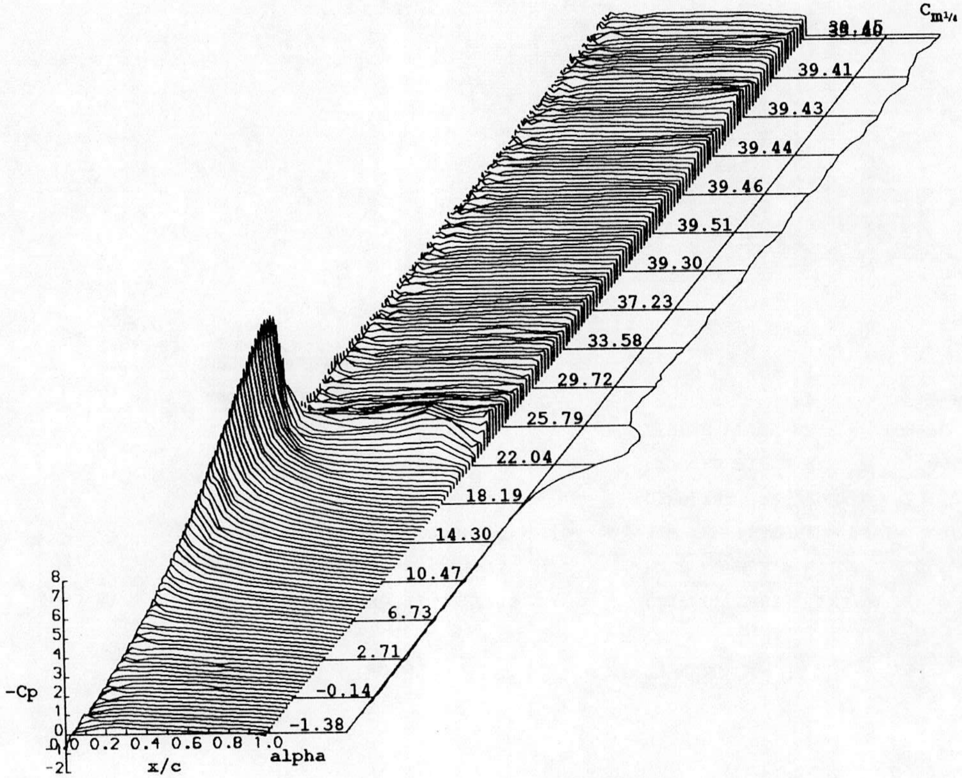
MACH NUMBER = 0.124

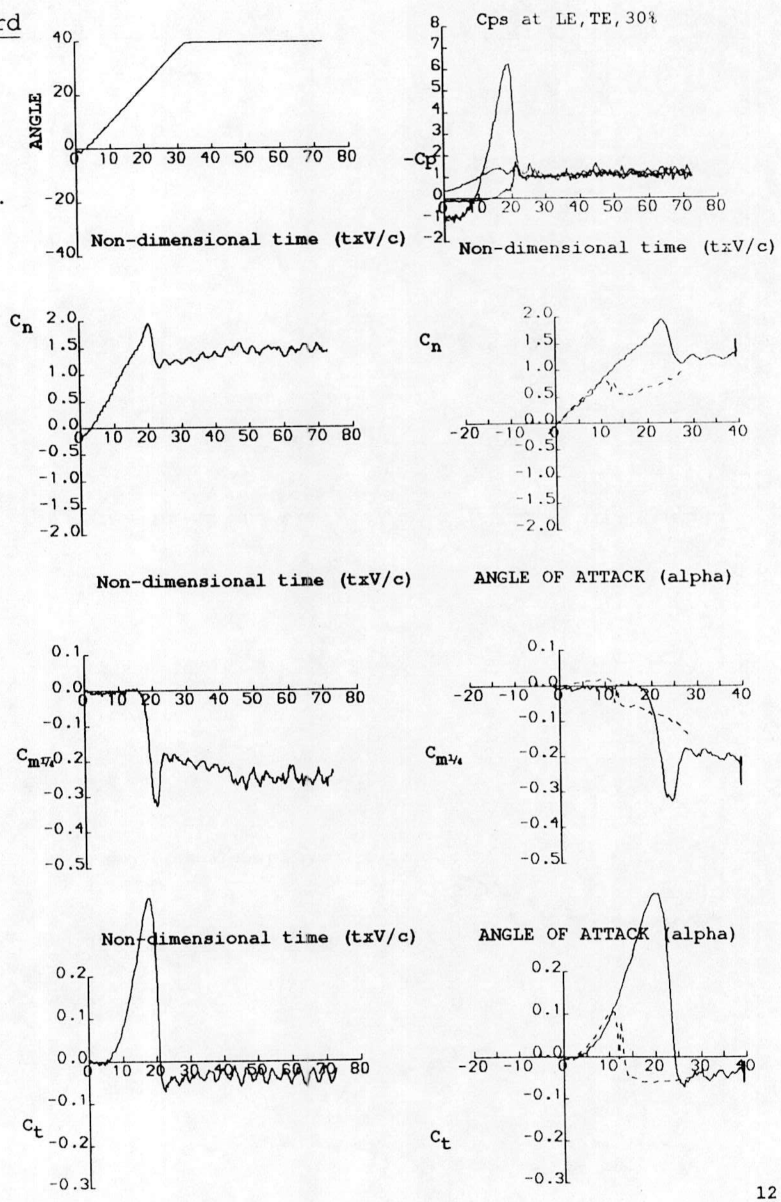
AIR TEMPERATURE = 29.6°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = 0.01100

LINEAR PITCH RATE = 197.94°S^{-1}

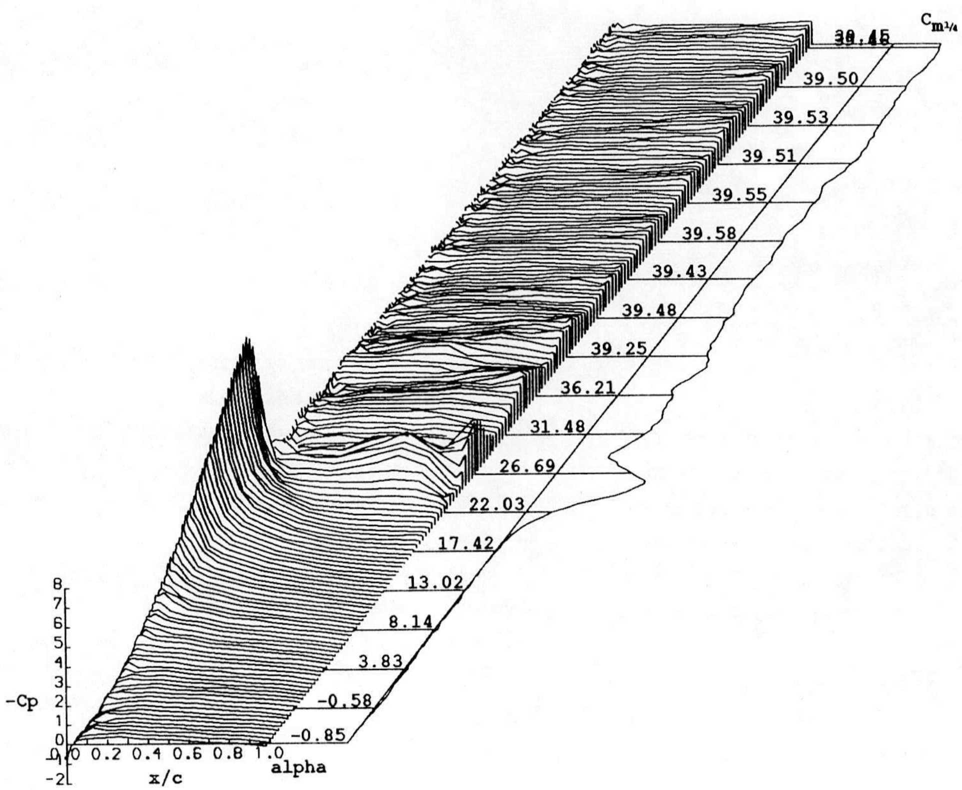


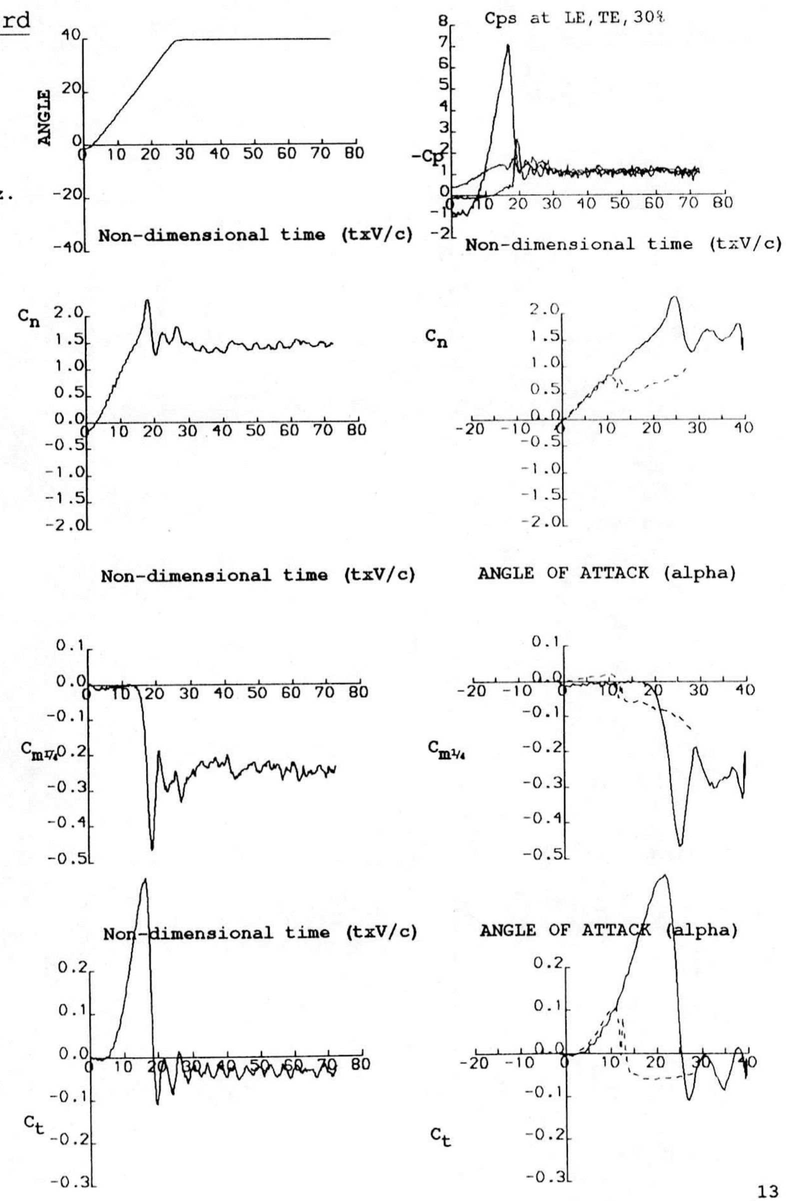


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20133
REYNOLDS NUMBER = 757299.
DYNAMIC PRESSURE = 1088.05 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 30.0°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = 0.01403
LINEAR PITCH RATE = 252.49°S^{-1}

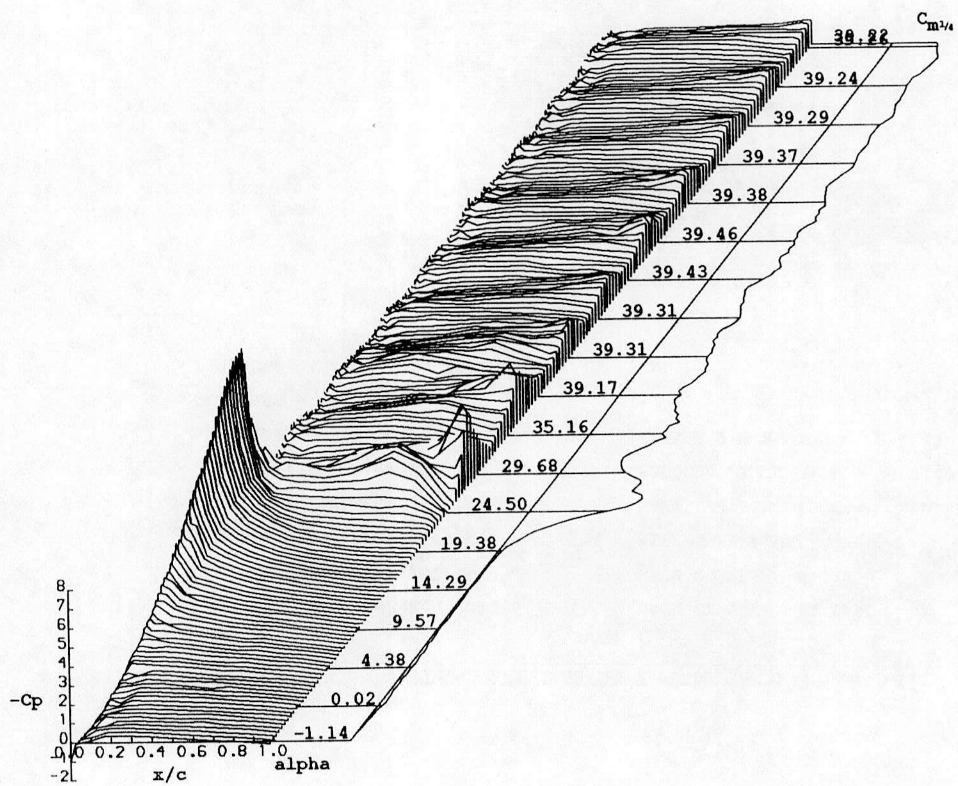


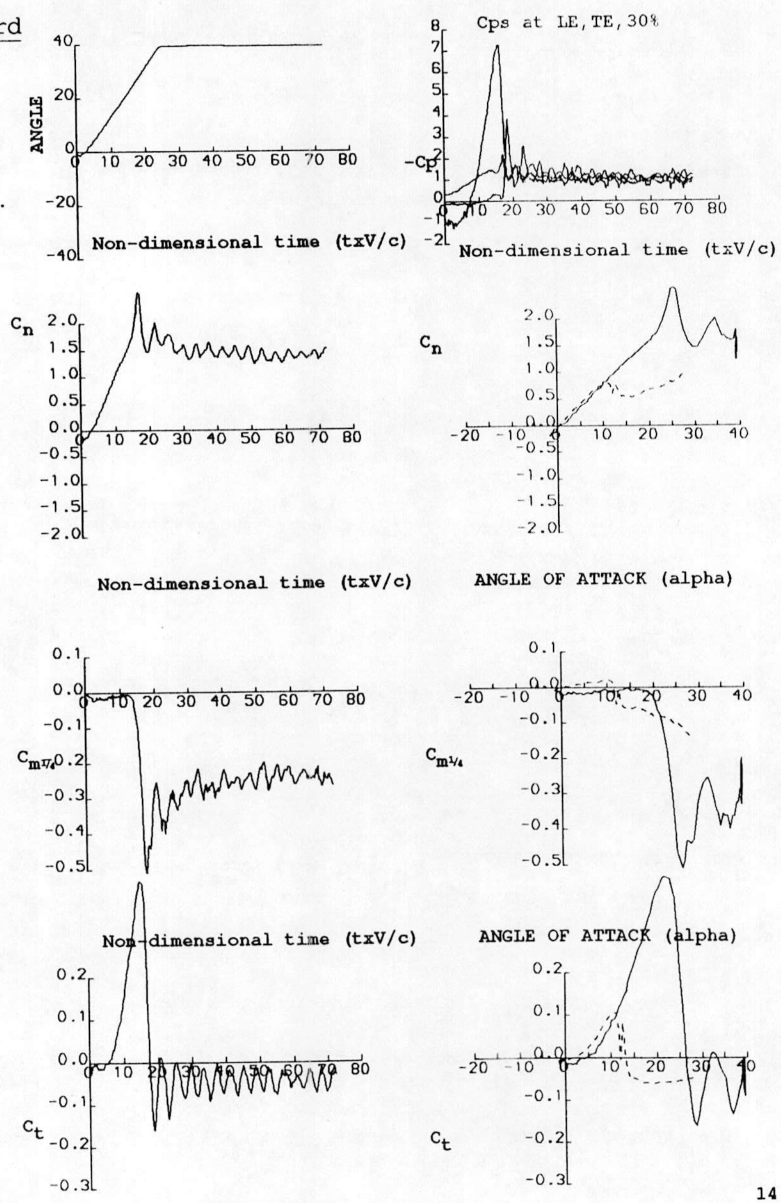


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20143
REYNOLDS NUMBER = 765966.
DYNAMIC PRESSURE = 1086.48 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

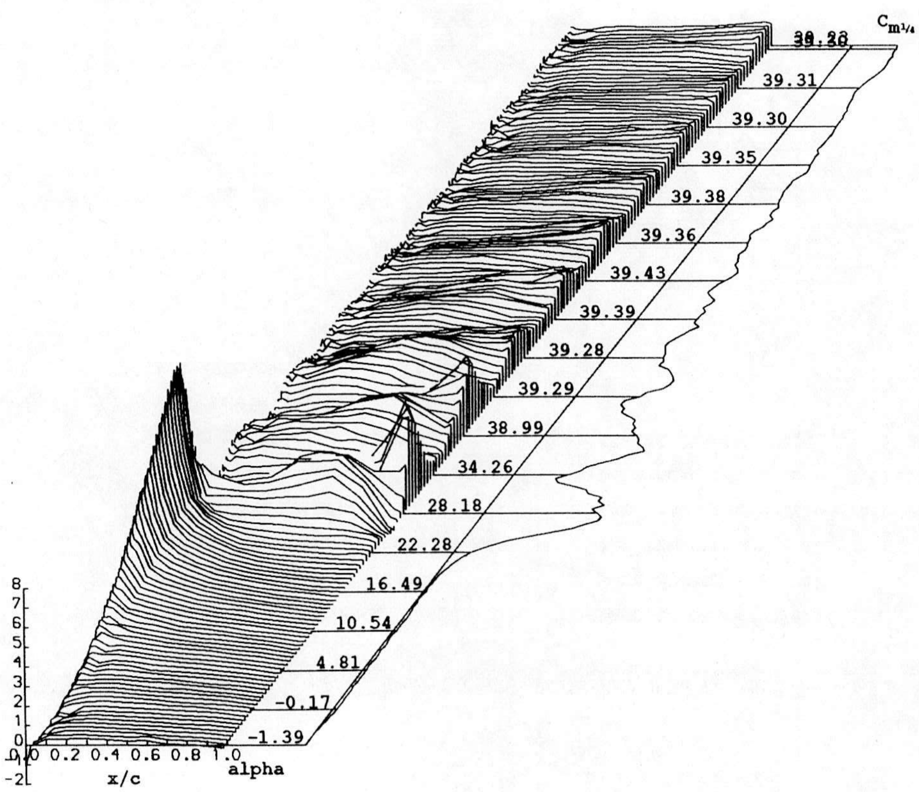
DATE OF TEST: 2/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 27.3°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = 0.01588
LINEAR PITCH RATE = 284.21°S^{-1}

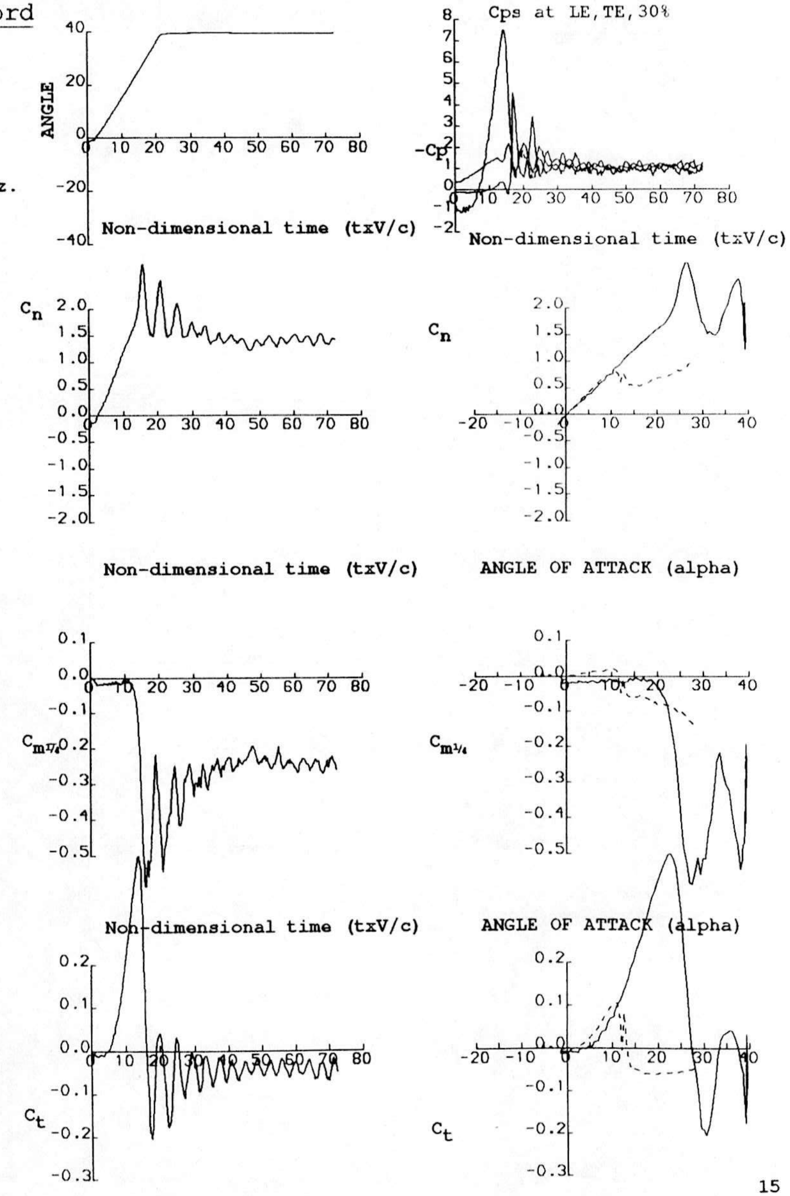




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20153	**DATE OF TEST:** 2/8/91
REYNOLDS NUMBER = 763687.	**MACH NUMBER =** 0.124
DYNAMIC PRESSURE = 1086.48 Nm^{-2}	**AIR TEMPERATURE =** 28.0°C
NUMBER OF CYCLES = 5	**SAMPLING FREQUENCY =** 550.05 Hz.
MOTION TYPE: RAMP UP	**REDUCED PITCH RATE =** 0.01786
START ANGLE = -1.00°	**LINEAR PITCH RATE =** 320.08°S^{-1}
RAMP ARC = 41.000°	
AVERAGED DATA OF 5 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20163

REYNOLDS NUMBER = 762068.

DYNAMIC PRESSURE = 1086.48 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

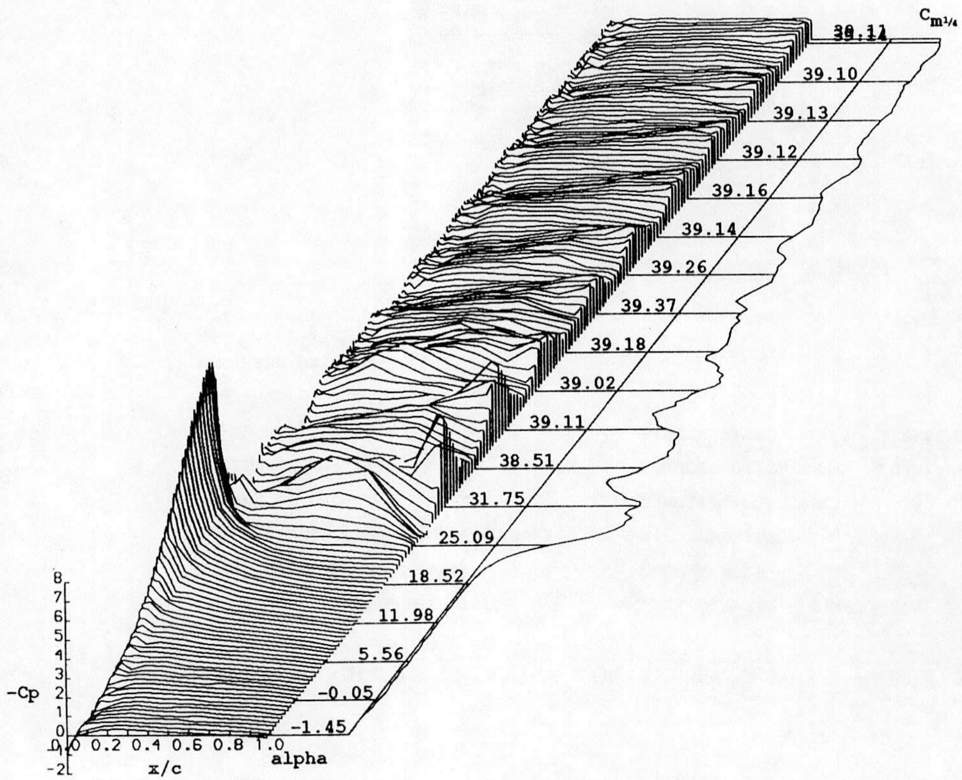
MACH NUMBER = 0.124

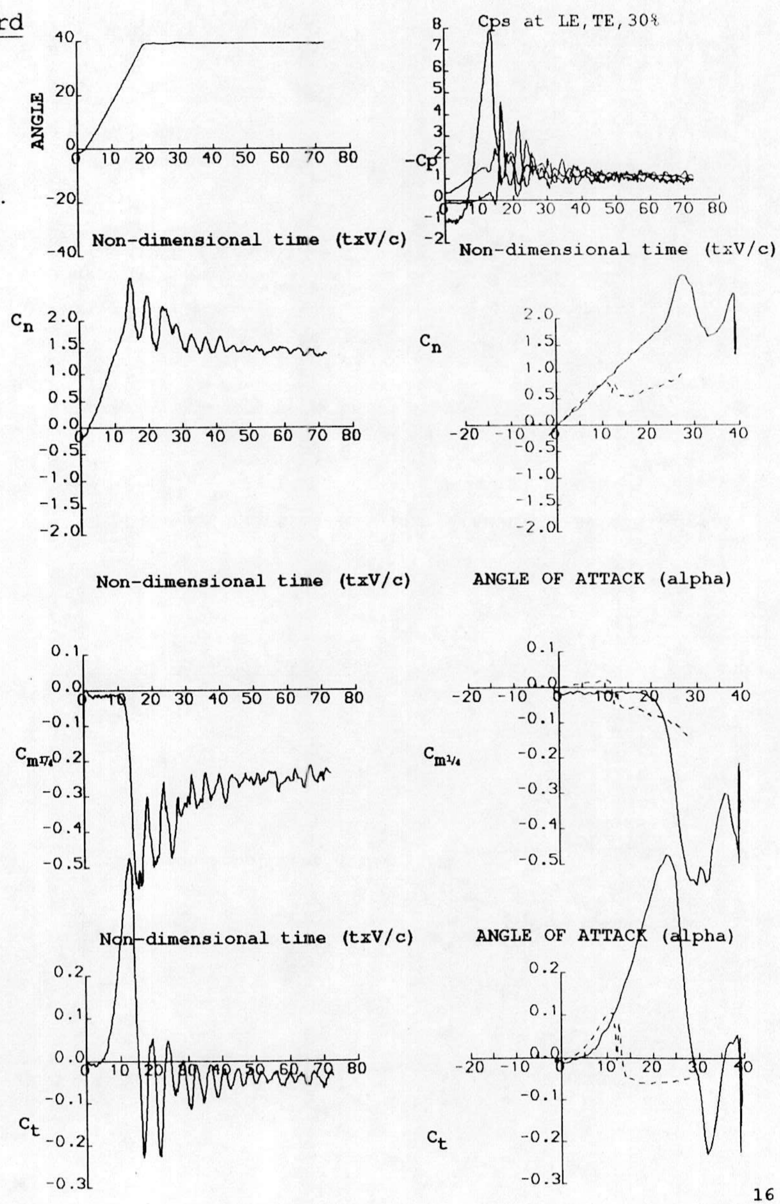
AIR TEMPERATURE = 28.5°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = 0.01981

LINEAR PITCH RATE = 355.17°s^{-1}

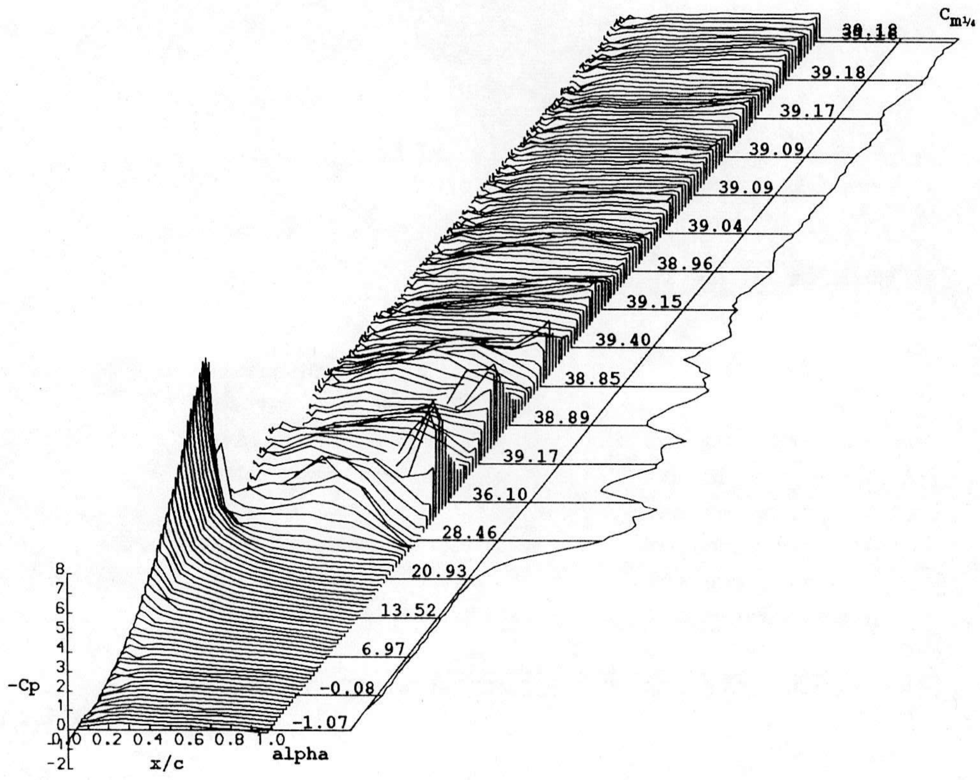


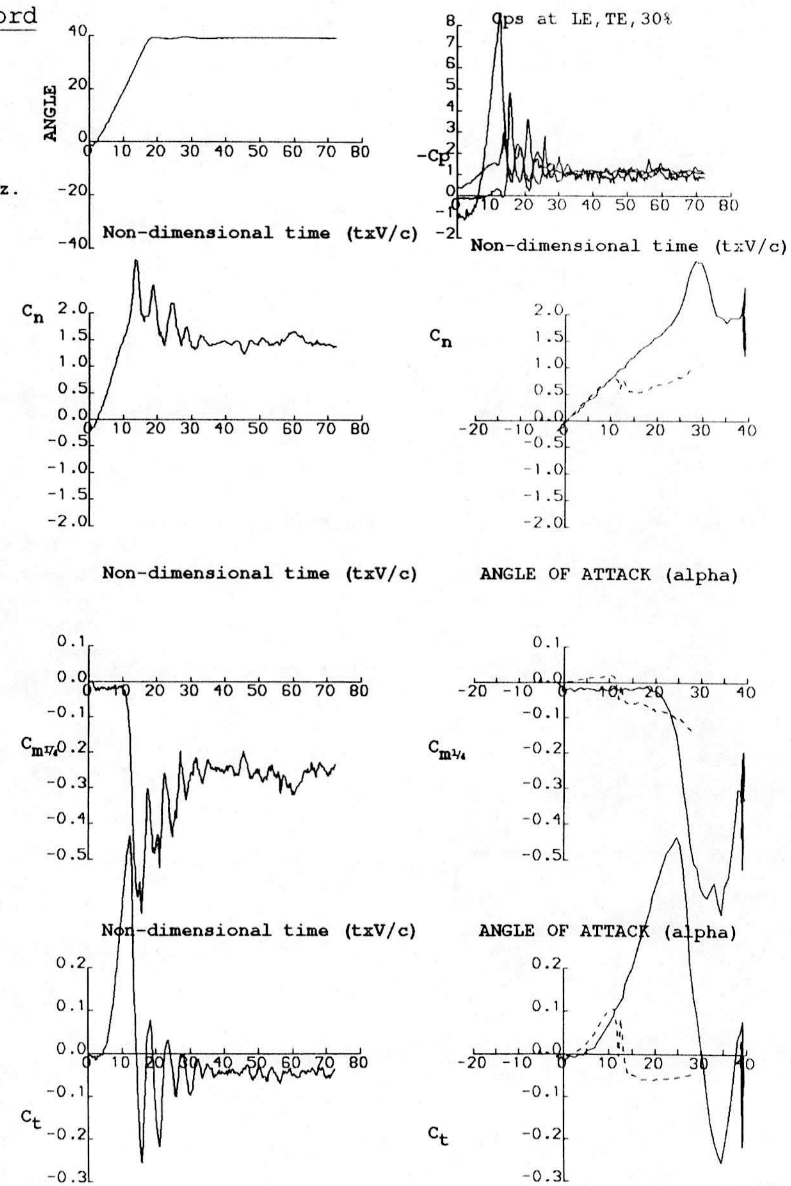


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20173
REYNOLDS NUMBER = 760777.
DYNAMIC PRESSURE = 1086.48 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 28.9°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = 0.02041
LINEAR PITCH RATE = 366.32°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20183

REYNOLDS NUMBER = 759437.

DYNAMIC PRESSURE = 1078.99 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

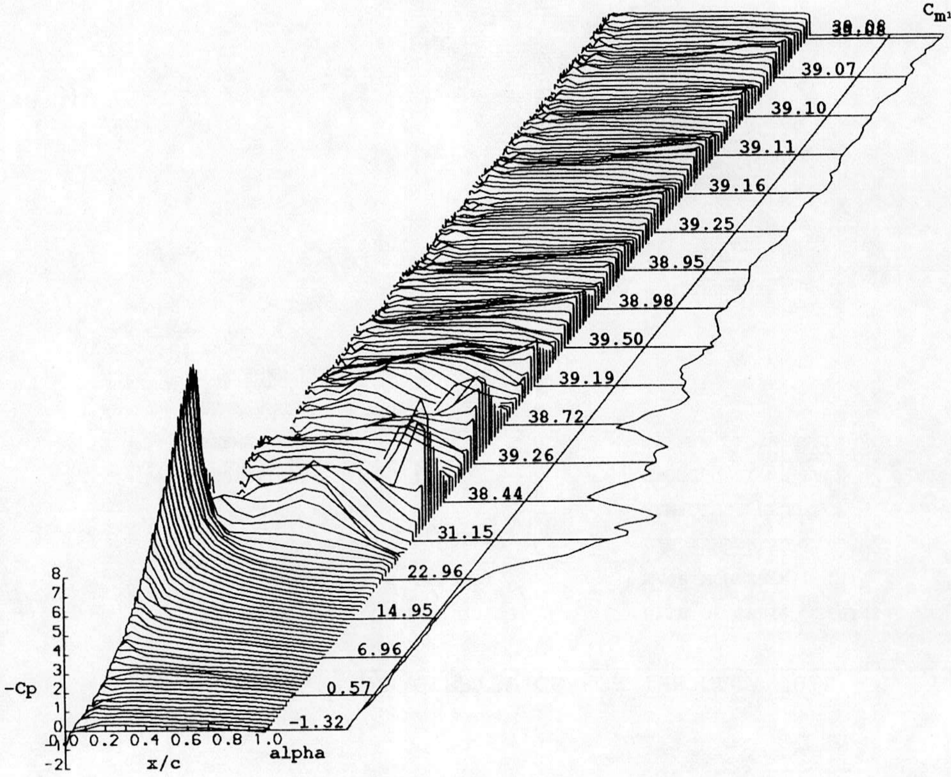
MACH NUMBER = 0.123

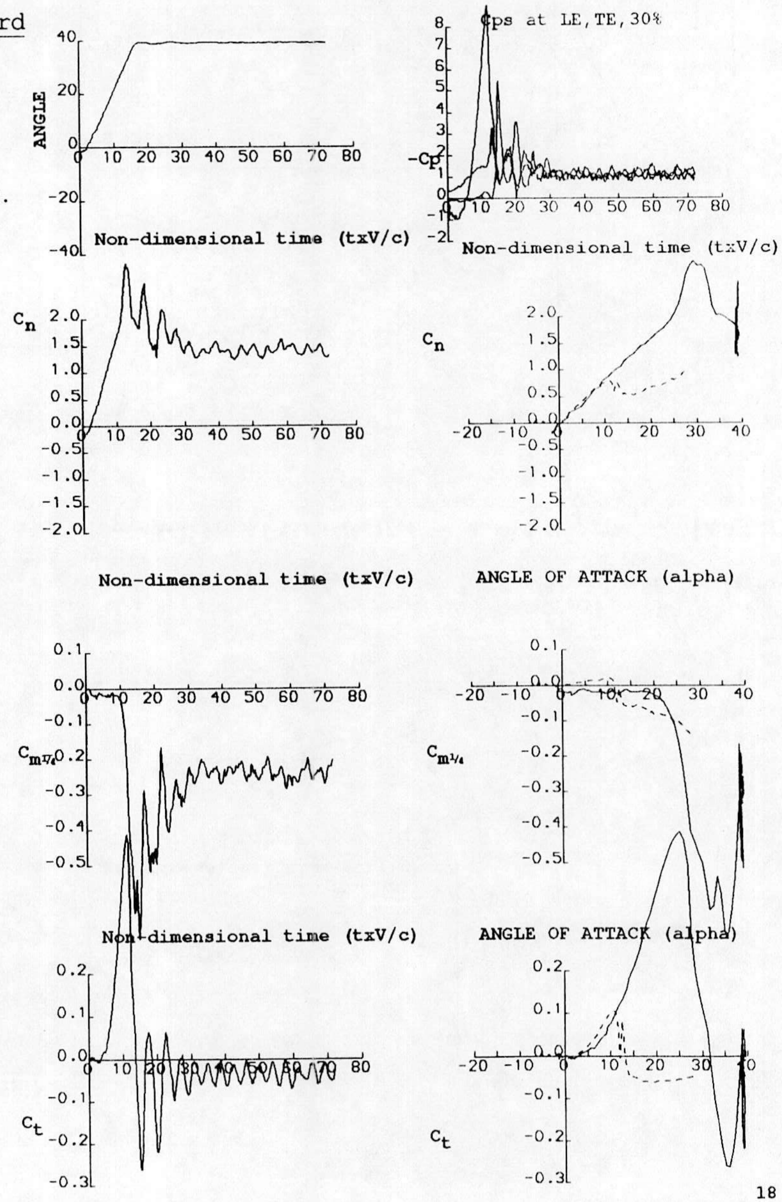
AIR TEMPERATURE = 28.5°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = 0.02489

LINEAR PITCH RATE = 444.80°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 20194

REYNOLDS NUMBER = 757188.

DYNAMIC PRESSURE = 1078.99 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

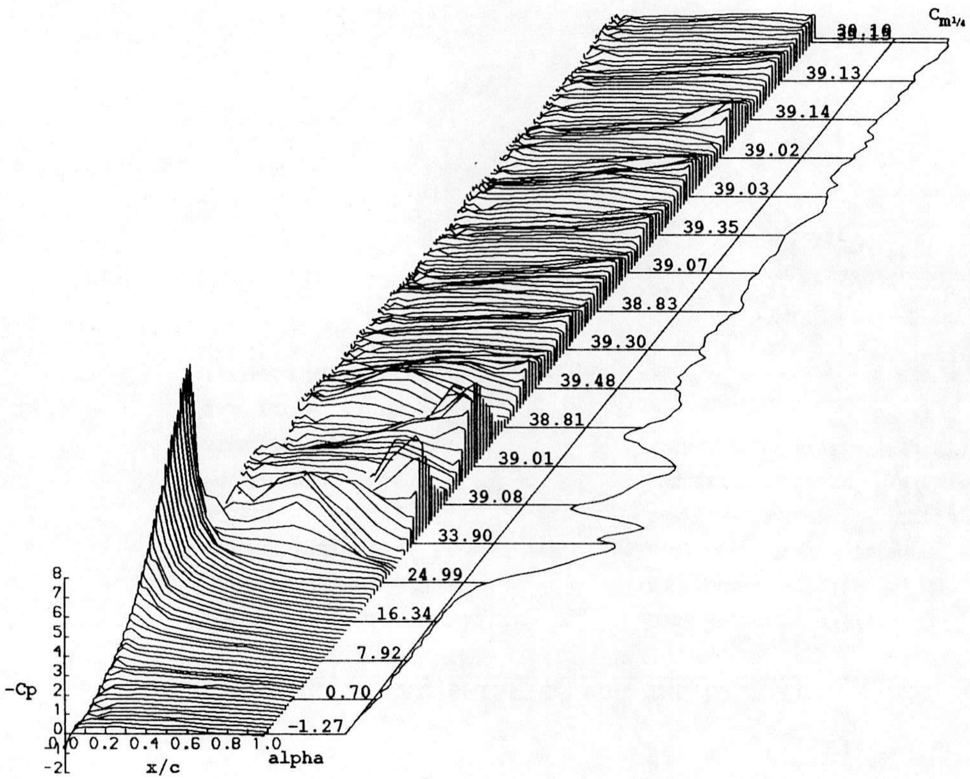
MACH NUMBER = 0.123

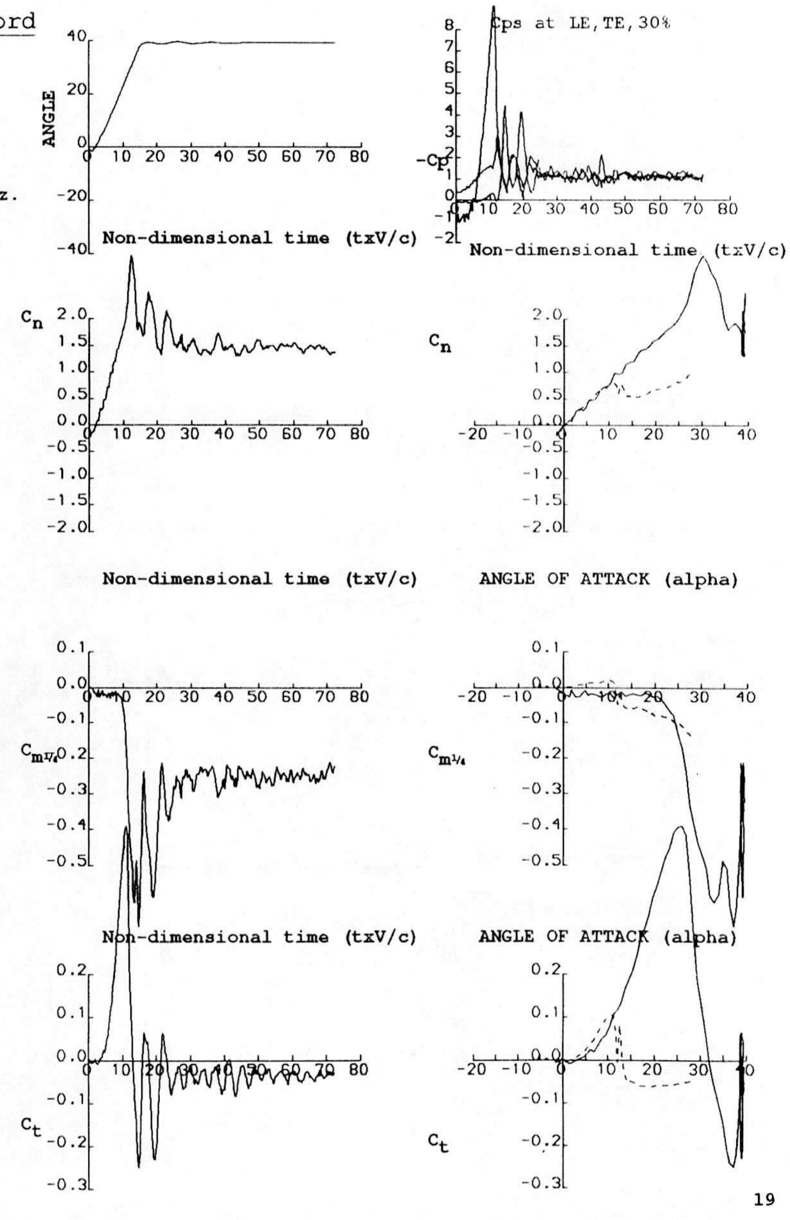
AIR TEMPERATURE = 29.2°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = 0.02472

LINEAR PITCH RATE = 442.32°S^{-1}

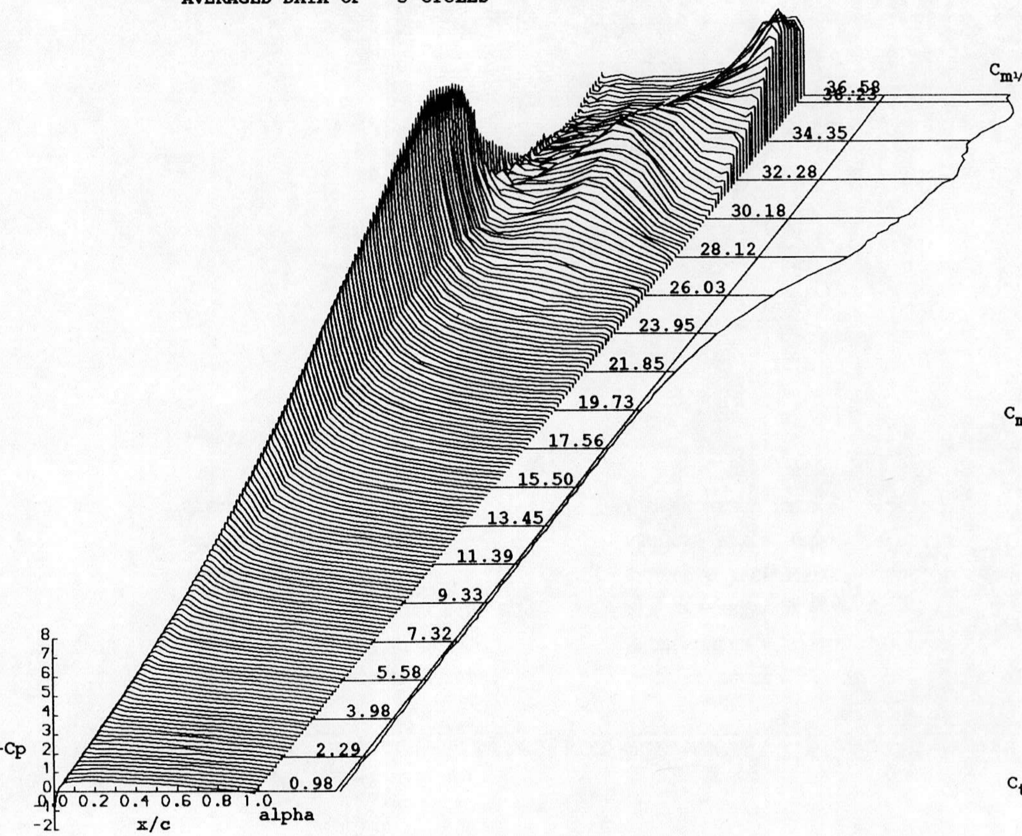


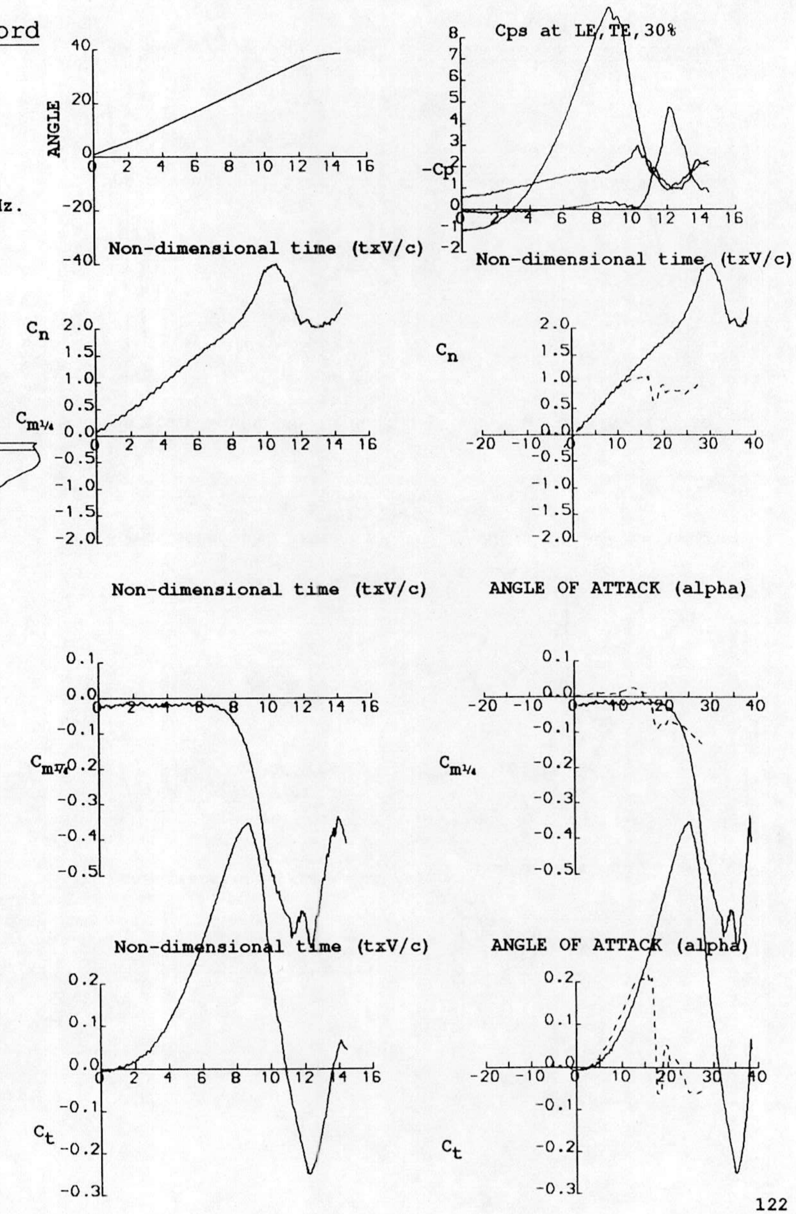


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21221
REYNOLDS NUMBER = 798813.
DYNAMIC PRESSURE = 1129.65 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

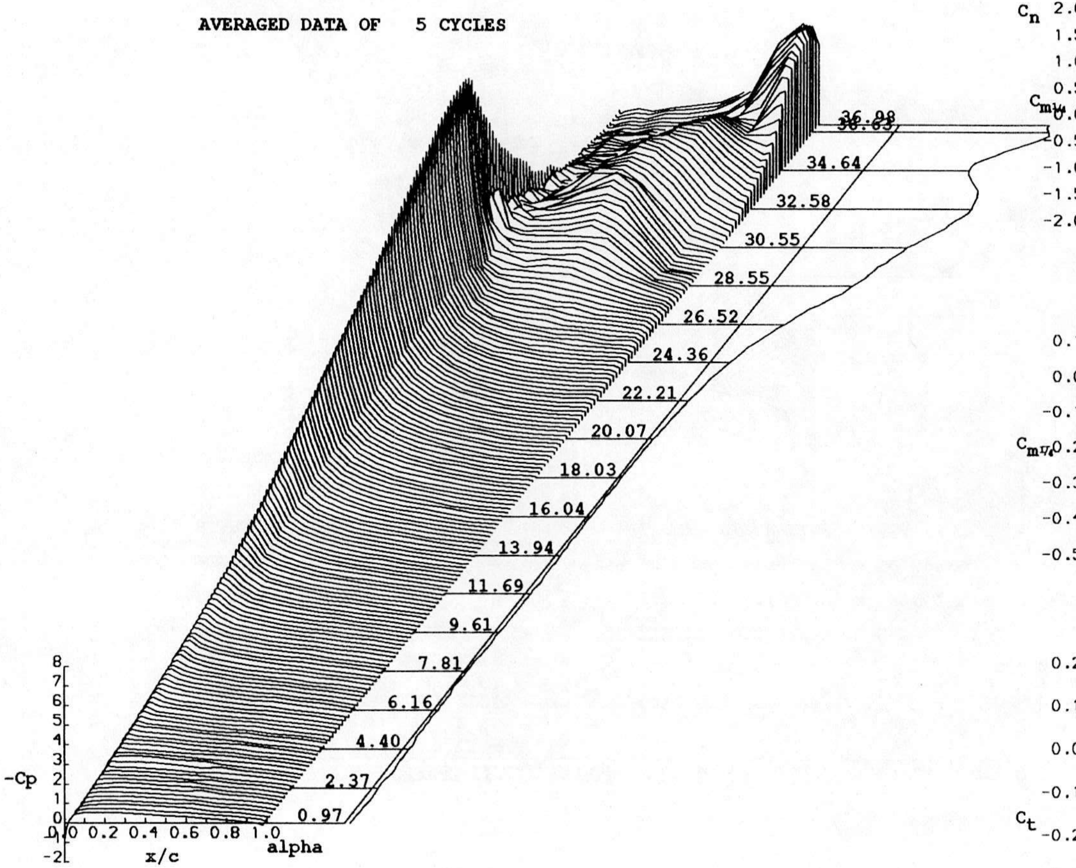
DATE OF TEST: 3/9/91
MACH NUMBER = 0.126
AIR TEMPERATURE = 22.9°C
SAMPLING FREQUENCY = 11110.00 Hz.
REDUCED PITCH RATE = 0.02570
LINEAR PITCH RATE = 463.92°S^{-1}

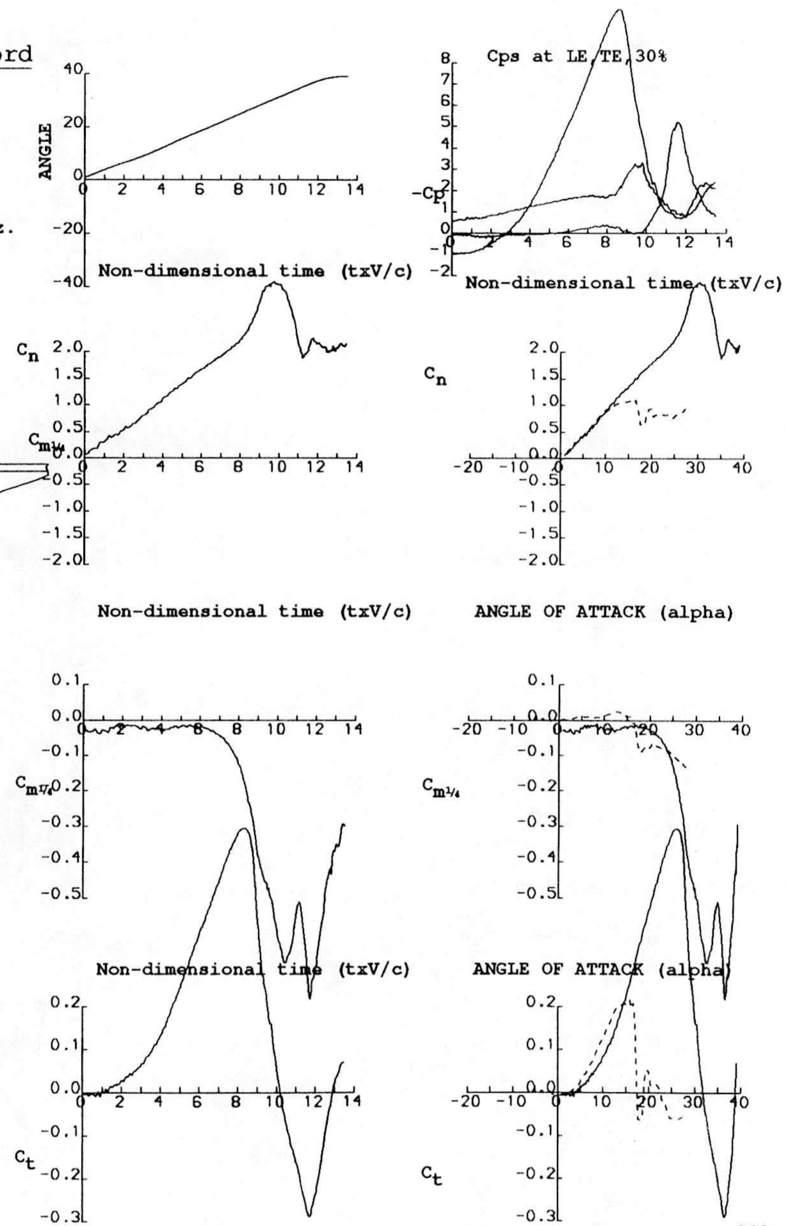




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21231	DATE OF TEST: 2/9/91
REYNOLDS NUMBER = 800585.	MACH NUMBER = 0.126
DYNAMIC PRESSURE = 1130.74 Nm^{-2}	AIR TEMPERATURE = 22.5°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 11900.00 Hz.
MOTION TYPE: RAMP UP	REDUCED PITCH RATE = 0.02778
START ANGLE = -1.00°	LINEAR PITCH RATE = 501.36°S^{-1}
RAMP ARC = 40.000°	
AVERAGED DATA OF 5 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21241

REYNOLDS NUMBER = 796366.

DYNAMIC PRESSURE = 1123.72 Nm^{-2}

NUMBER OF CYCLES = 6

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 6 CYCLES

DATE OF TEST: 29/8/91

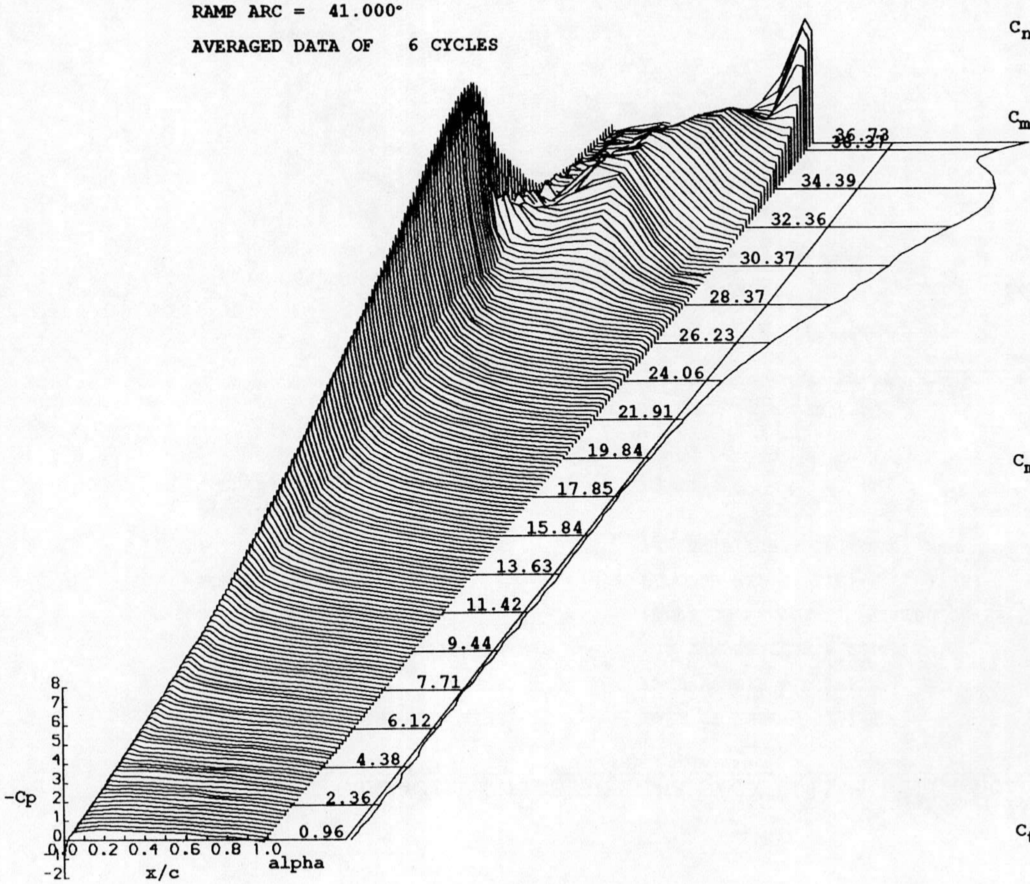
MACH NUMBER = 0.125

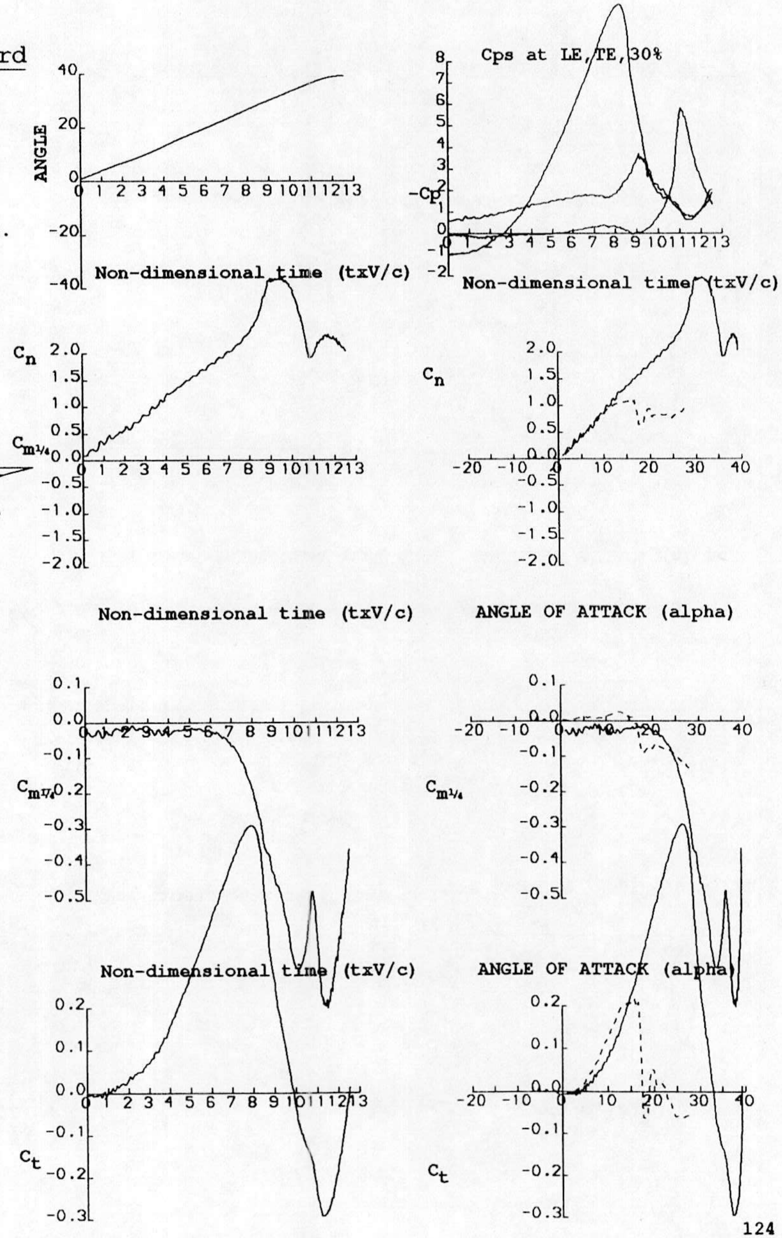
AIR TEMPERATURE = 23.0°C

SAMPLING FREQUENCY = 12760.00 Hz.

REDUCED PITCH RATE = 0.02969

LINEAR PITCH RATE = 534.54°S^{-1}

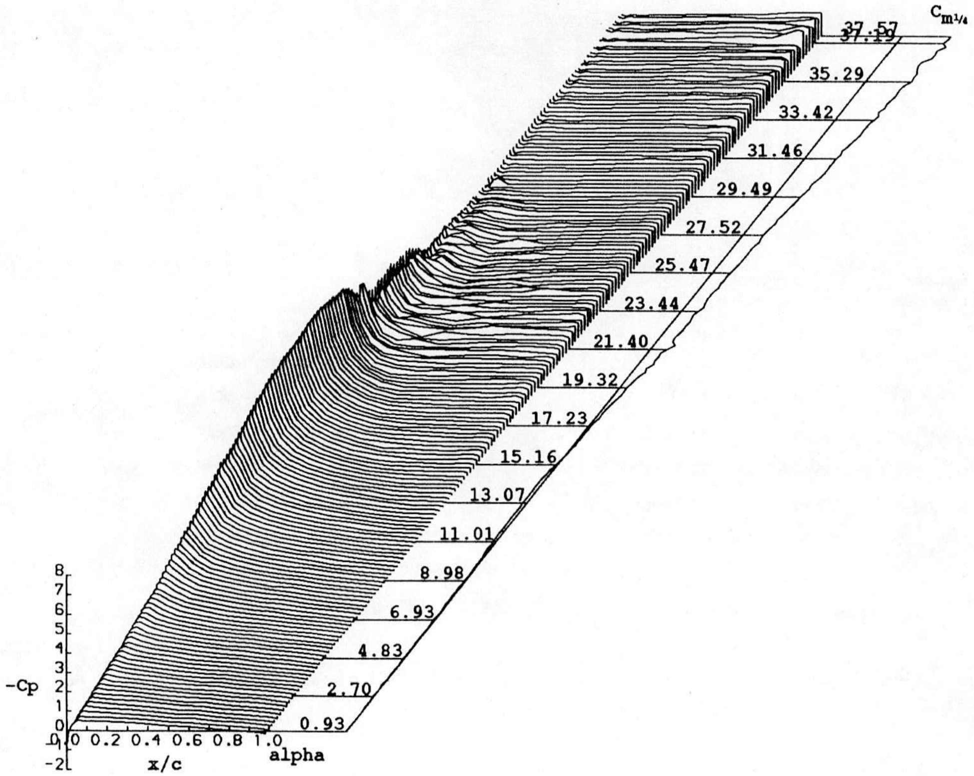


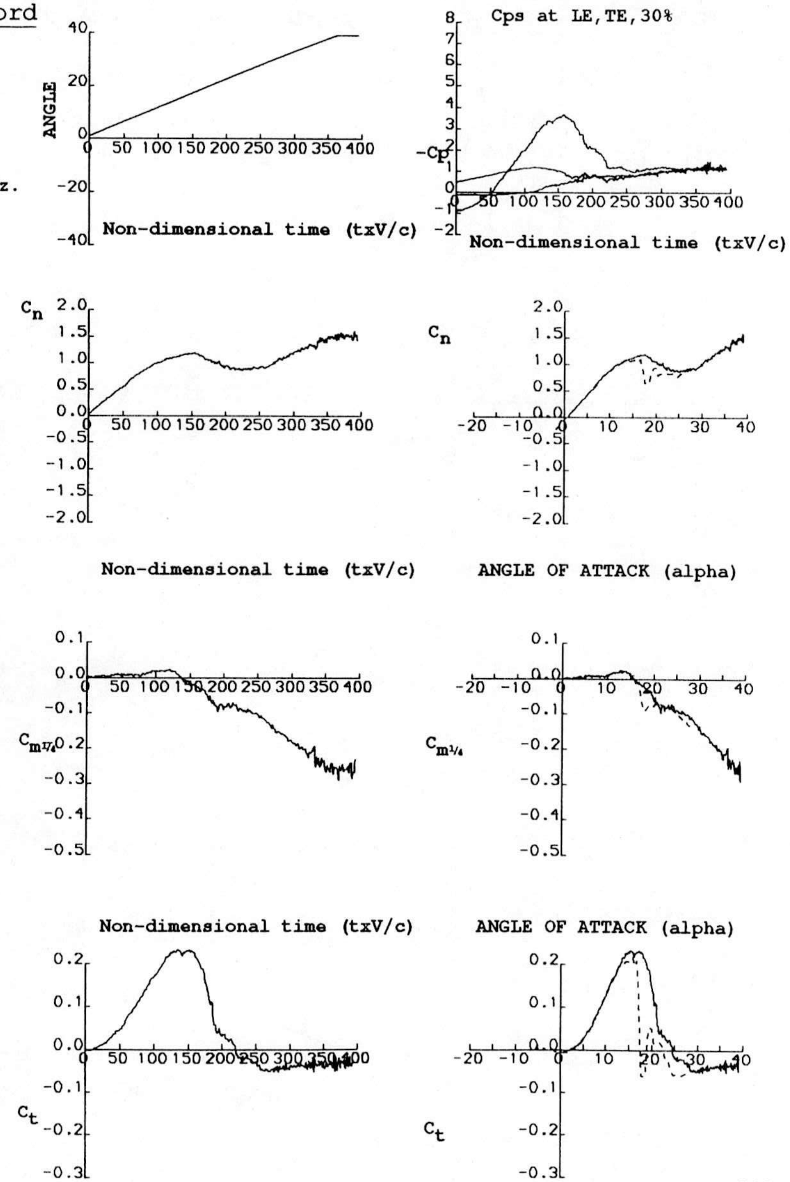


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21261
REYNOLDS NUMBER = 802886.
DYNAMIC PRESSURE = 1107.15 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/9/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 19.8°C
SAMPLING FREQUENCY = 400.00 Hz.
REDUCED PITCH RATE = 0.00094
LINEAR PITCH RATE = 16.61°S^{-1}

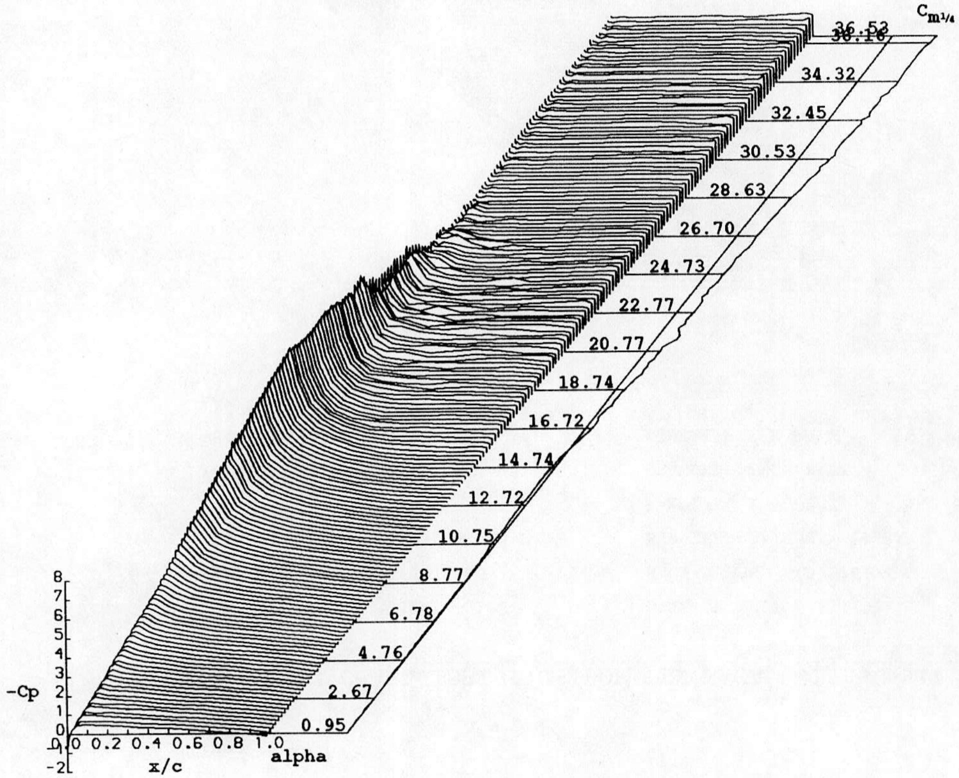


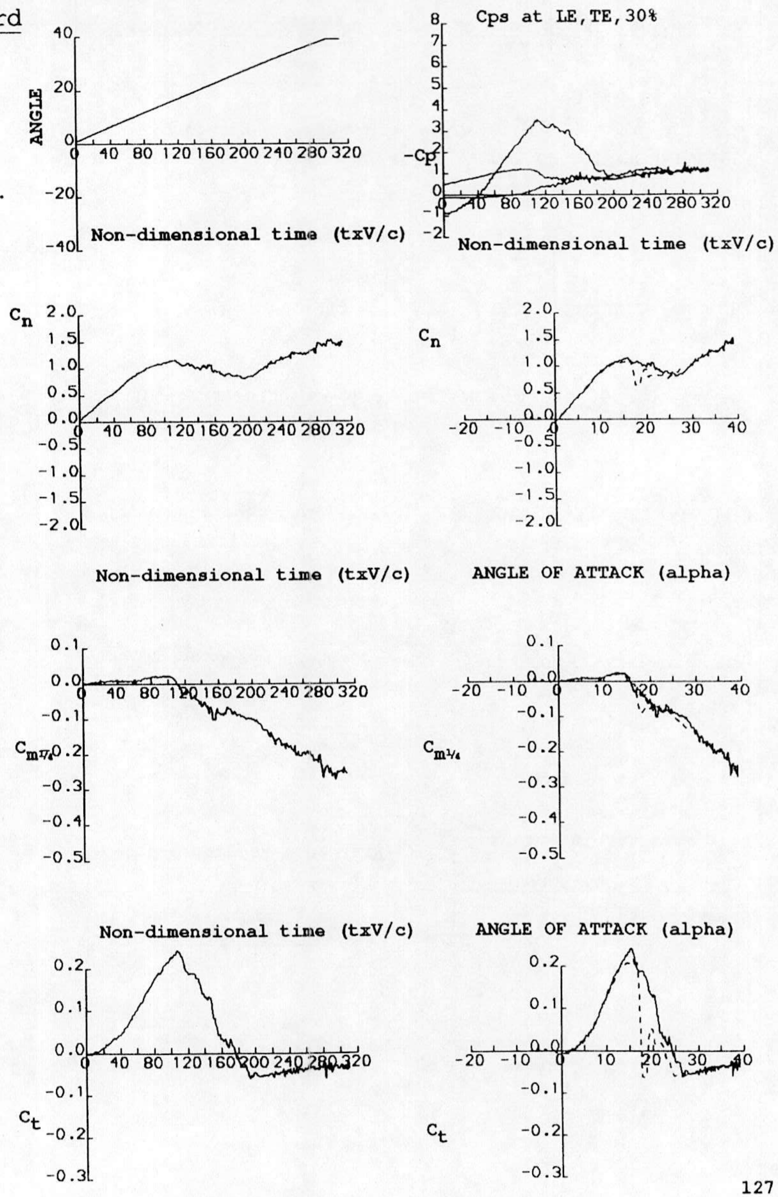


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21271
REYNOLDS NUMBER = 798720.
DYNAMIC PRESSURE = 1109.20 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

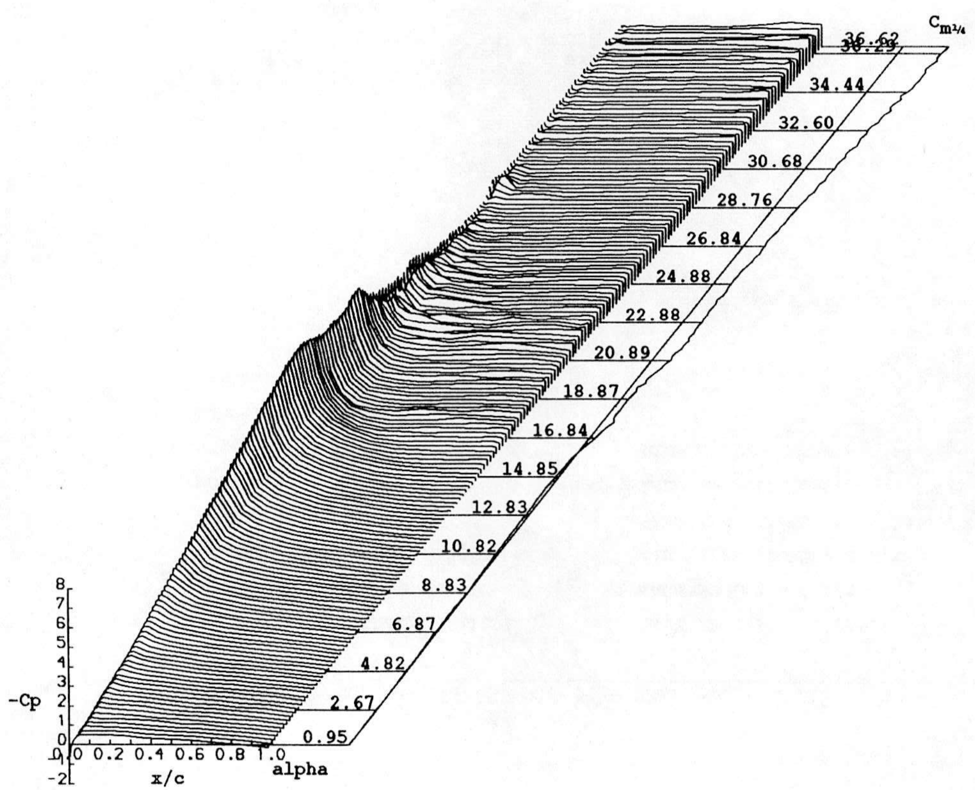
DATE OF TEST: 2/9/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 21.2°C
SAMPLING FREQUENCY = 510.20 Hz.
REDUCED PITCH RATE = 0.00115
LINEAR PITCH RATE = 20.46°S^{-1}

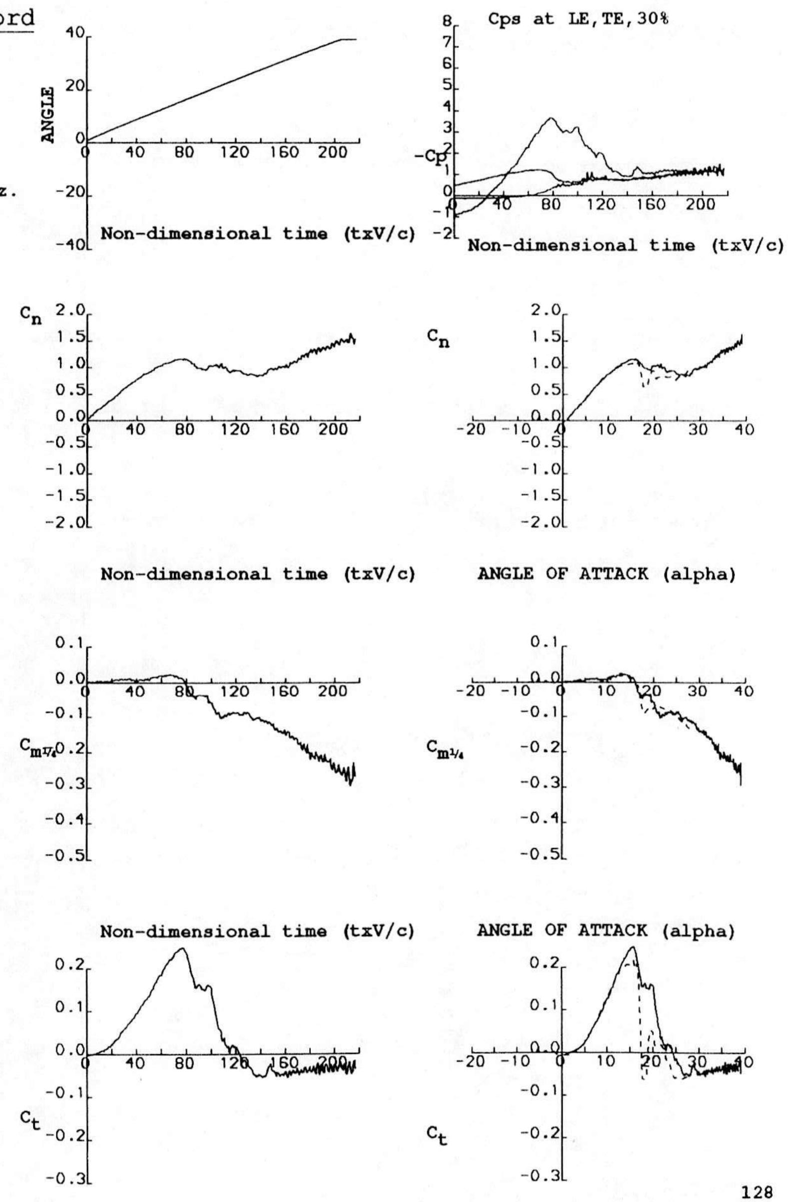




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21281	DATE OF TEST: 2/9/91
REYNOLDS NUMBER = 790425.	MACH NUMBER = 0.123
DYNAMIC PRESSURE = 1093.88 Nm^{-2}	AIR TEMPERATURE = 22.0°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 725.10 Hz.
MOTION TYPE: RAMP UP	REDUCED PITCH RATE = 0.00165
START ANGLE = -1.00°	LINEAR PITCH RATE = 29.21°S^{-1}
RAMP ARC = 41.000°	
AVERAGED DATA OF 5 CYCLES	

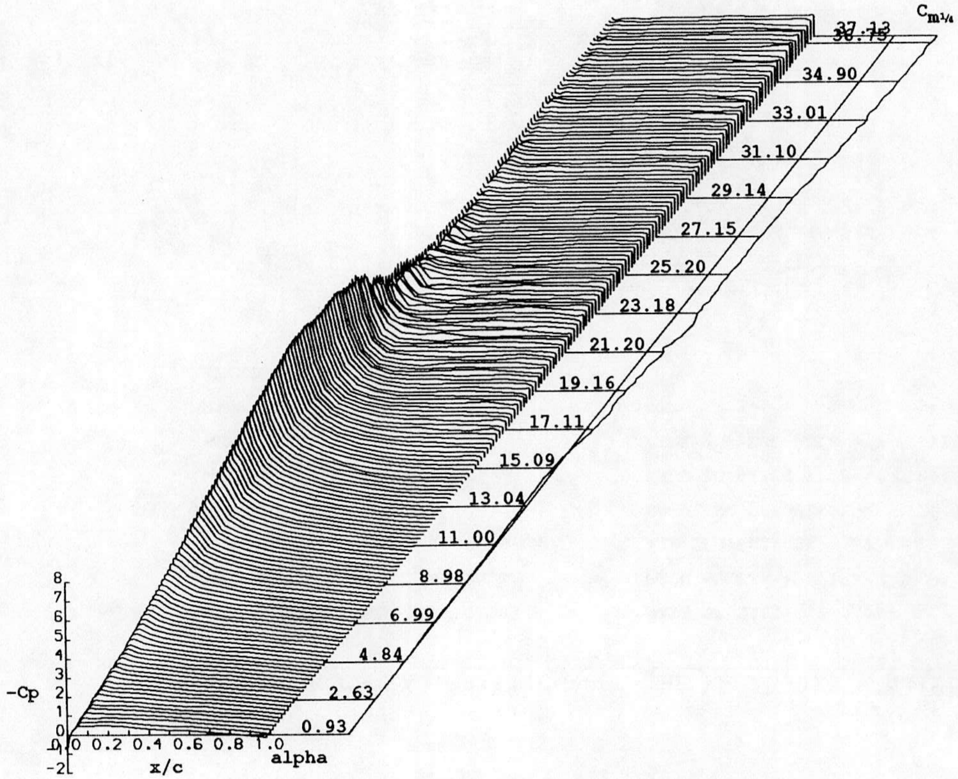


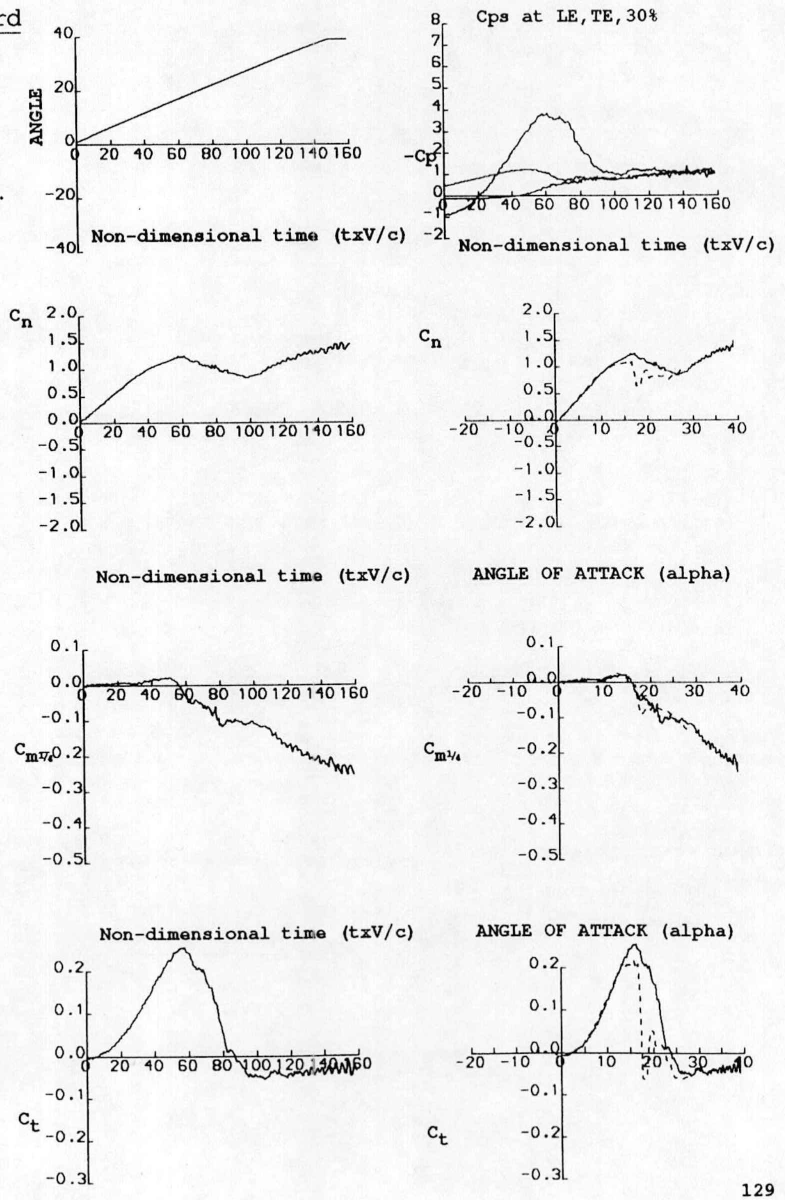


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21291
REYNOLDS NUMBER = 794266.
DYNAMIC PRESSURE = 1109.35 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/9/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 22.5°C
SAMPLING FREQUENCY = 1000.00 Hz.
REDUCED PITCH RATE = 0.00228
LINEAR PITCH RATE = 40.75°S^{-1}

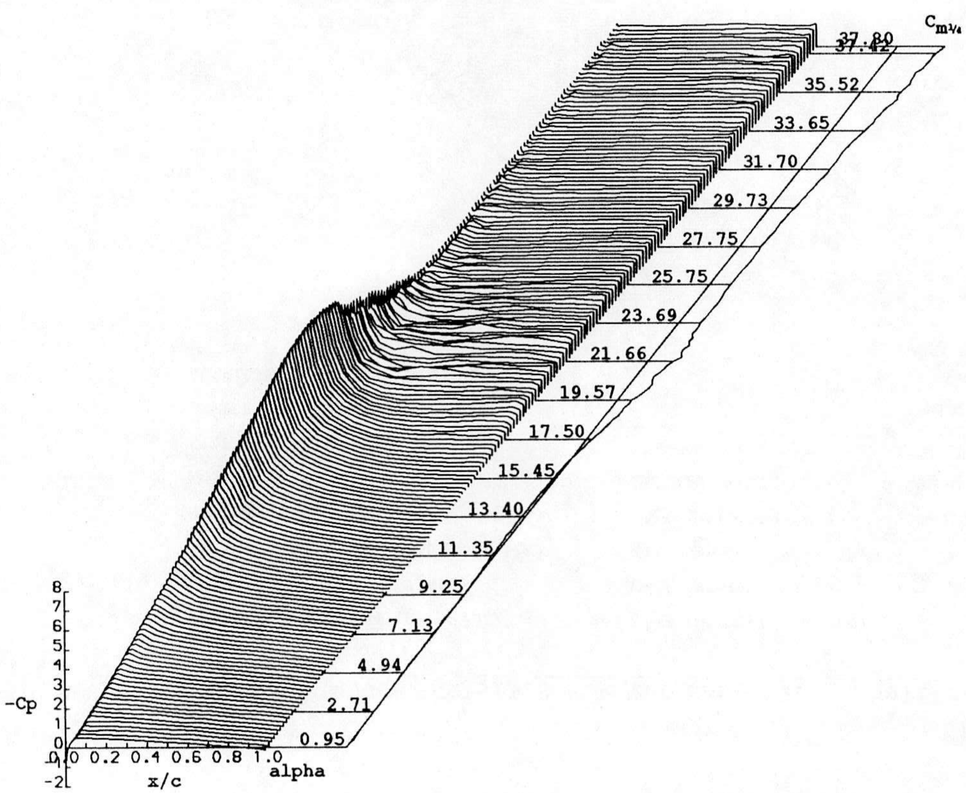


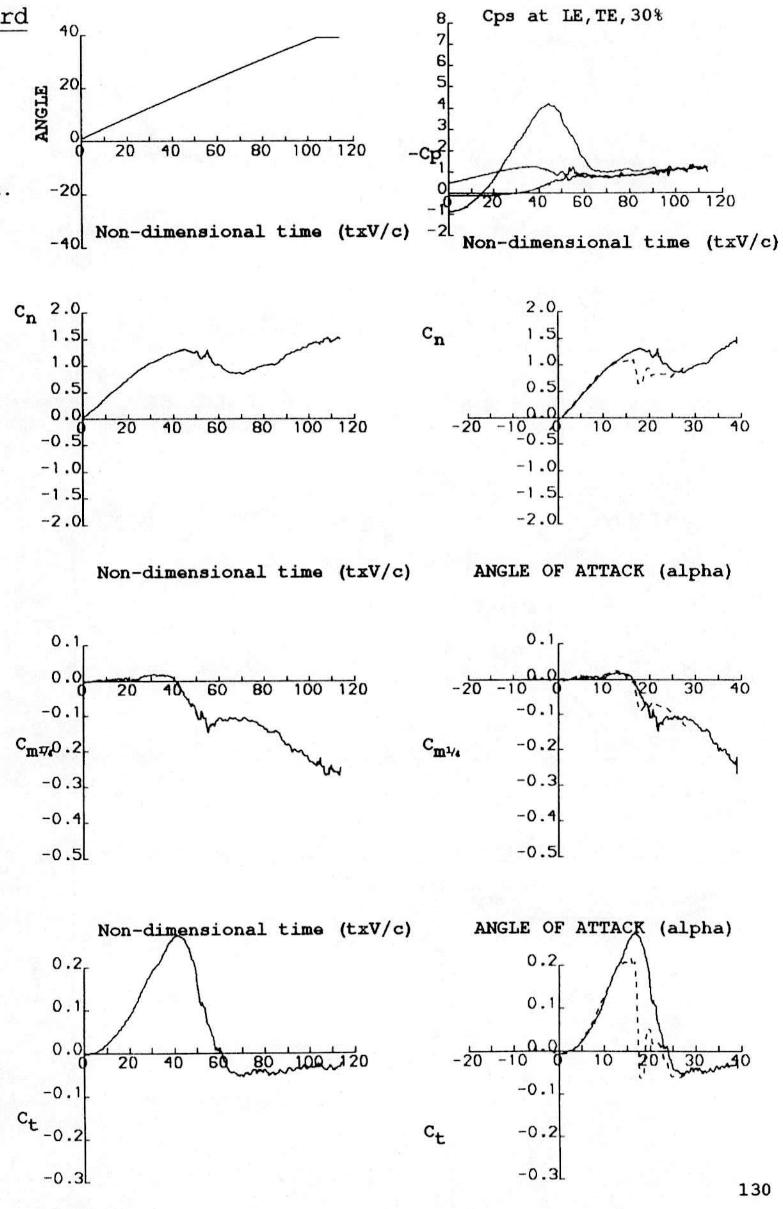


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21301
REYNOLDS NUMBER = 795413.
DYNAMIC PRESSURE = 1115.45 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/9/91
MACH NUMBER = 0.125
AIR TEMPERATURE = 22.8°C
SAMPLING FREQUENCY = 1400.00 Hz.
REDUCED PITCH RATE = 0.00323
LINEAR PITCH RATE = 57.79°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21311

REYNOLDS NUMBER = 794809.

DYNAMIC PRESSURE = 1116.66 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/9/91

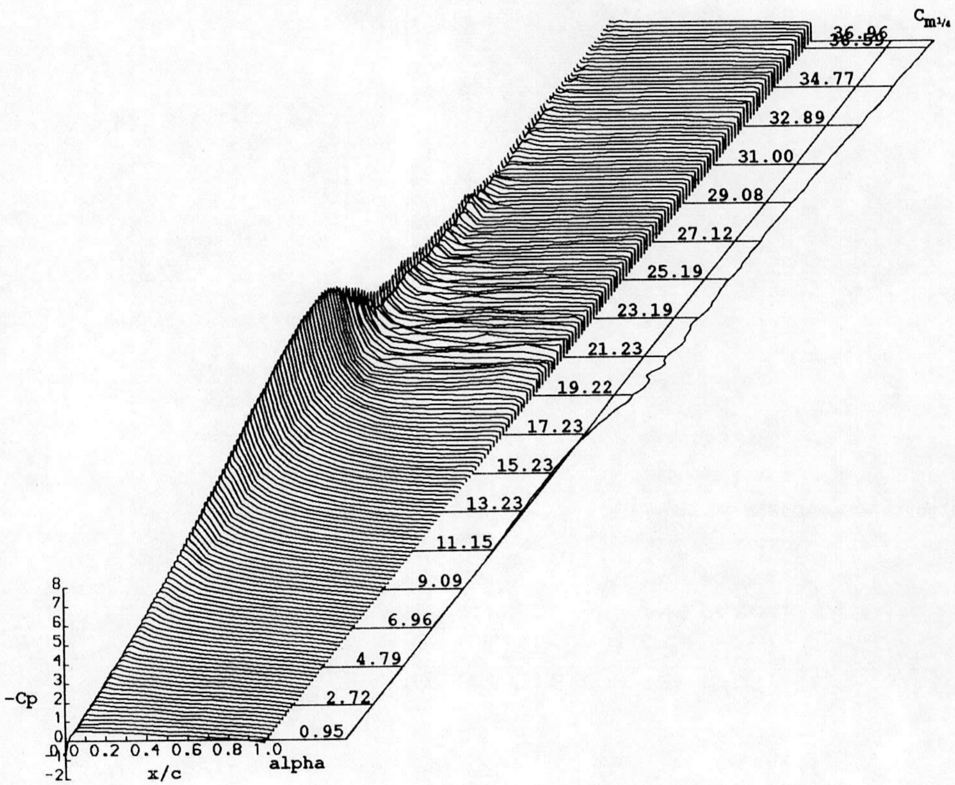
MACH NUMBER = 0.125

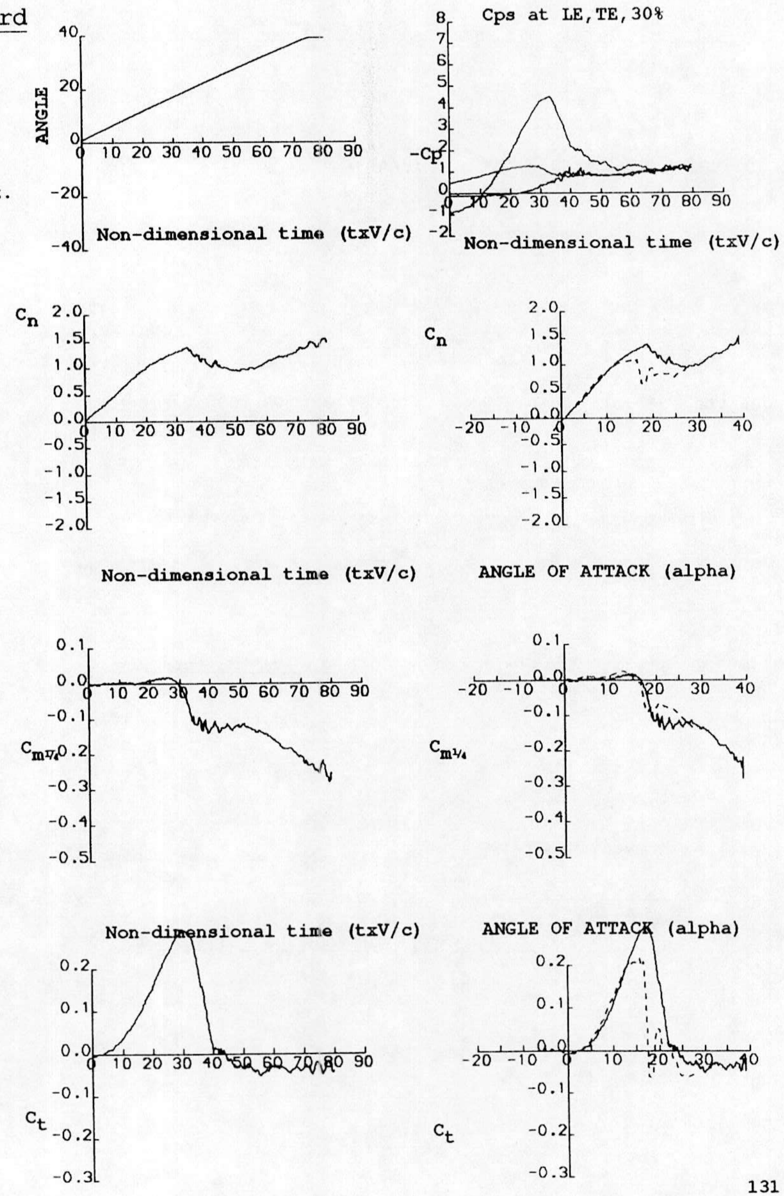
AIR TEMPERATURE = 23.1°C

SAMPLING FREQUENCY = 2000.00 Hz.

REDUCED PITCH RATE = 0.00450

LINEAR PITCH RATE = 80.63$°S^{-1}$





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21321

REYNOLDS NUMBER = 799563.

DYNAMIC PRESSURE = 1134.96 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/9/91

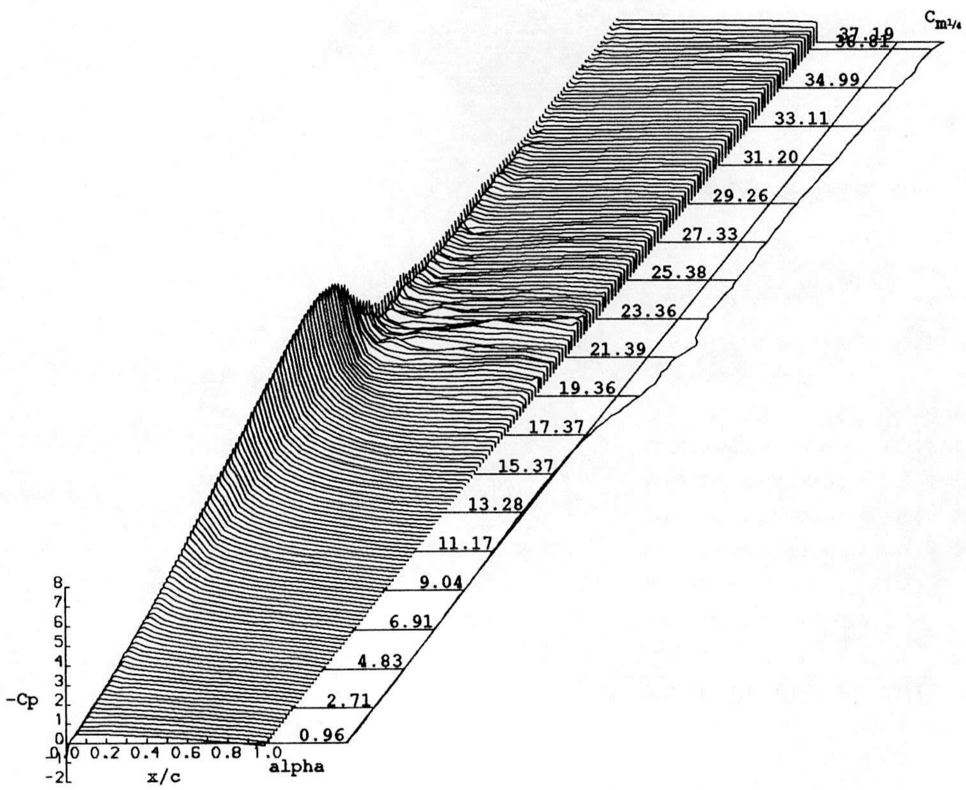
MACH NUMBER = 0.126

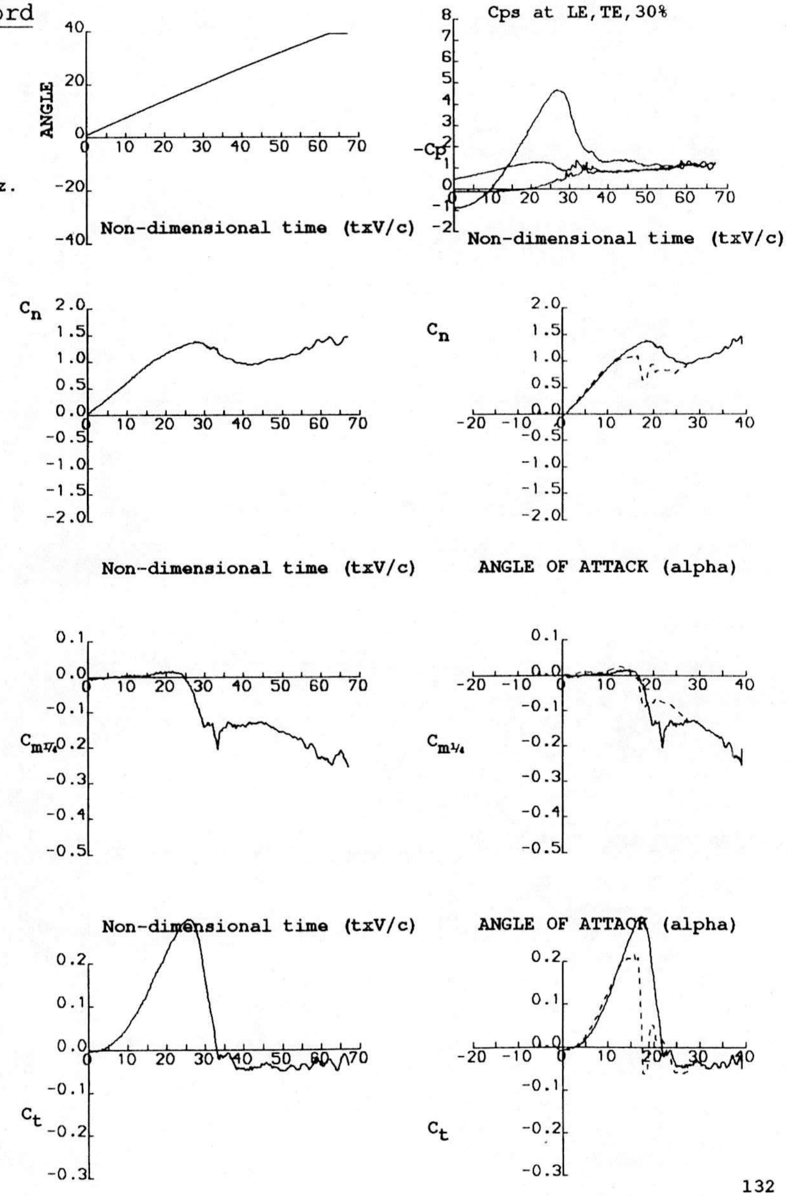
AIR TEMPERATURE = 23.6°C

SAMPLING FREQUENCY = 2400.00 Hz.

REDUCED PITCH RATE = 0.00543

LINEAR PITCH RATE = 98.27°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21331

REYNOLDS NUMBER = 797786.

DYNAMIC PRESSURE = 1134.81 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/9/91

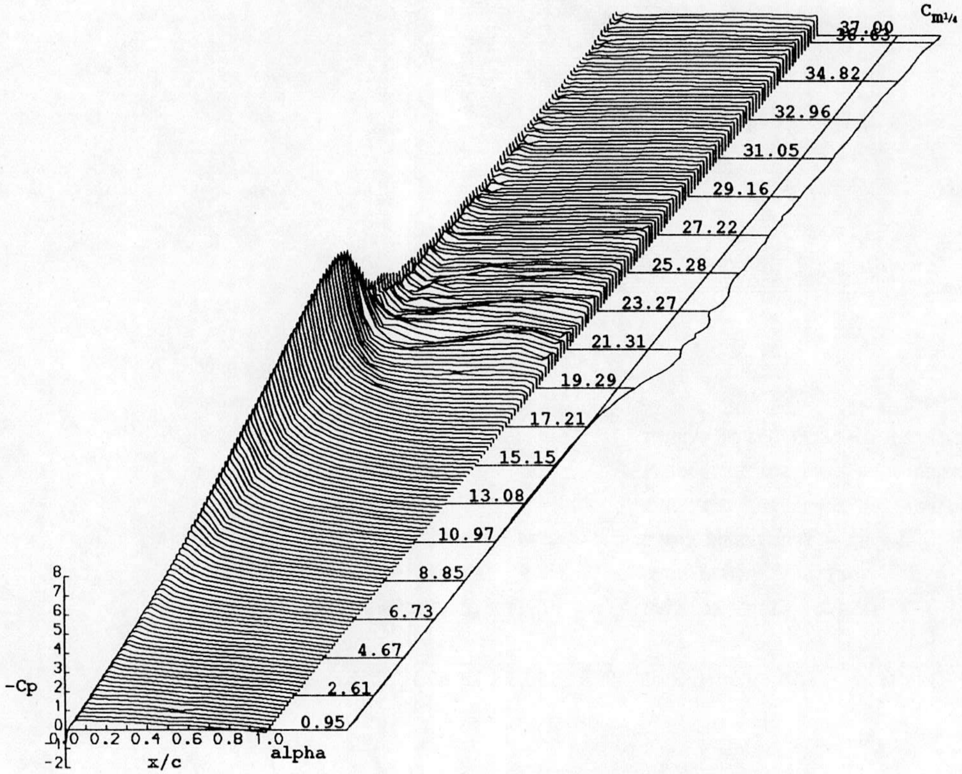
MACH NUMBER = 0.126

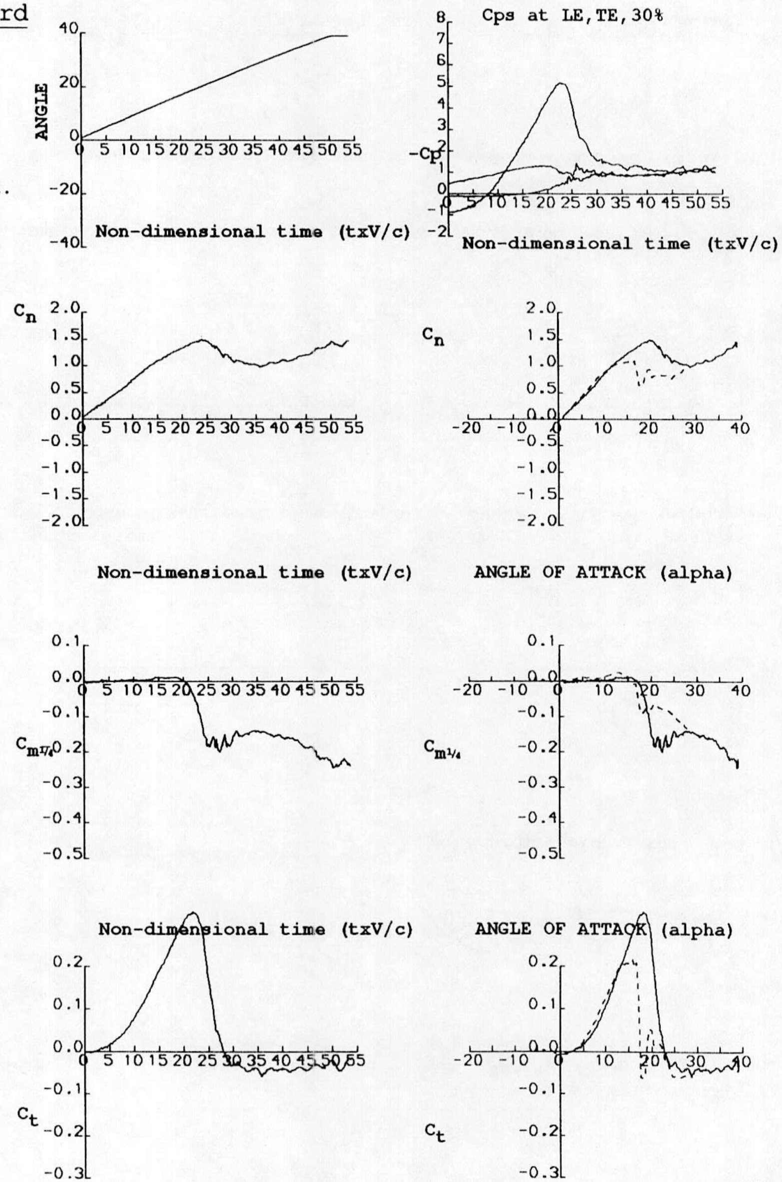
AIR TEMPERATURE = 24.1°C

SAMPLING FREQUENCY = 3000.00 Hz.

REDUCED PITCH RATE = 0.00686

LINEAR PITCH RATE = 124.21°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21341

REYNOLDS NUMBER = 805490.

DYNAMIC PRESSURE = 1160.83 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/9/91

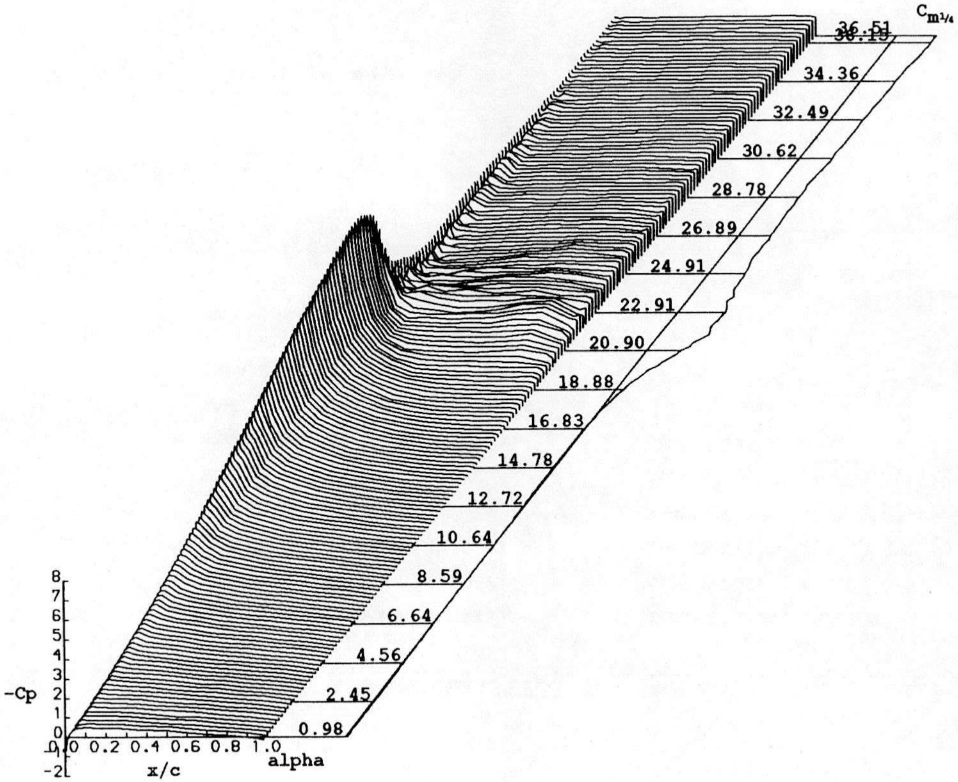
MACH NUMBER = 0.127

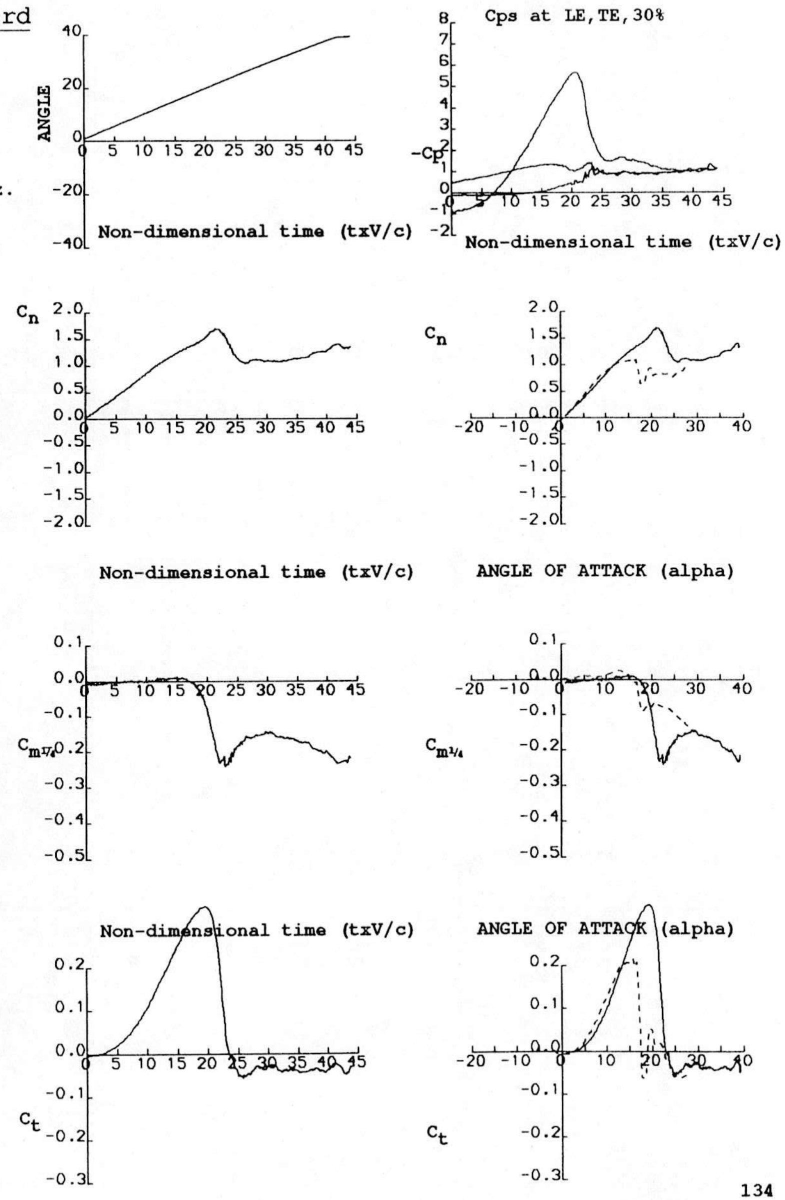
AIR TEMPERATURE = 24.5°C

SAMPLING FREQUENCY = 3703.00 Hz.

REDUCED PITCH RATE = 0.00829

LINEAR PITCH RATE = 151.79° S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21351

REYNOLDS NUMBER = 802526.

DYNAMIC PRESSURE = 1157.27 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/9/91

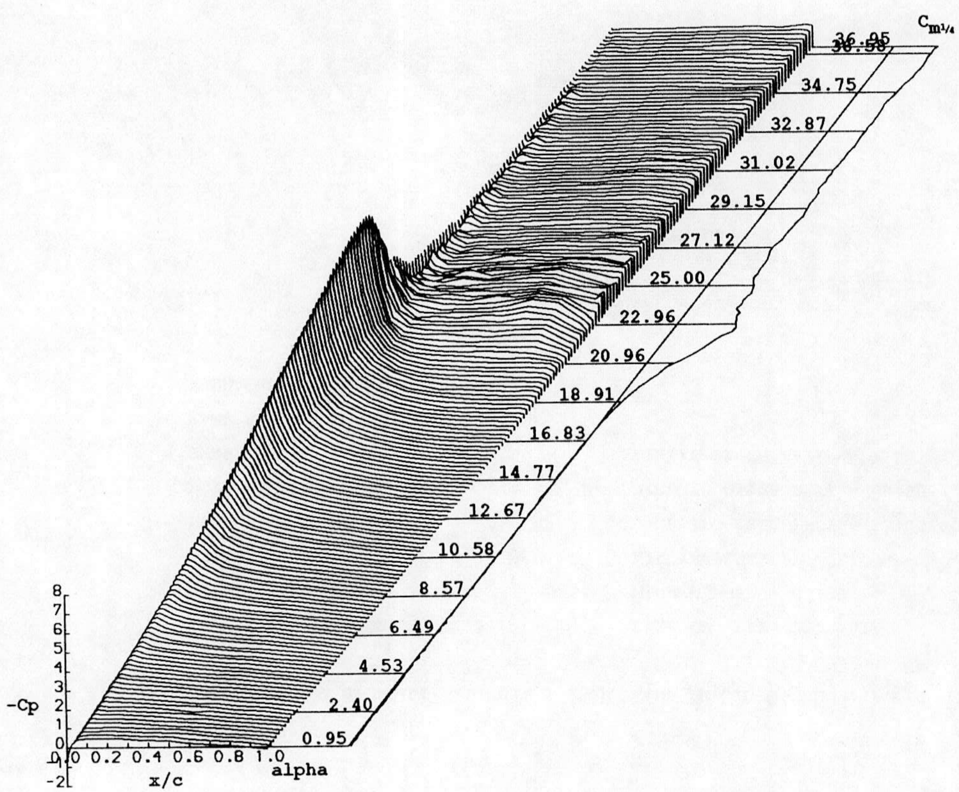
MACH NUMBER = 0.127

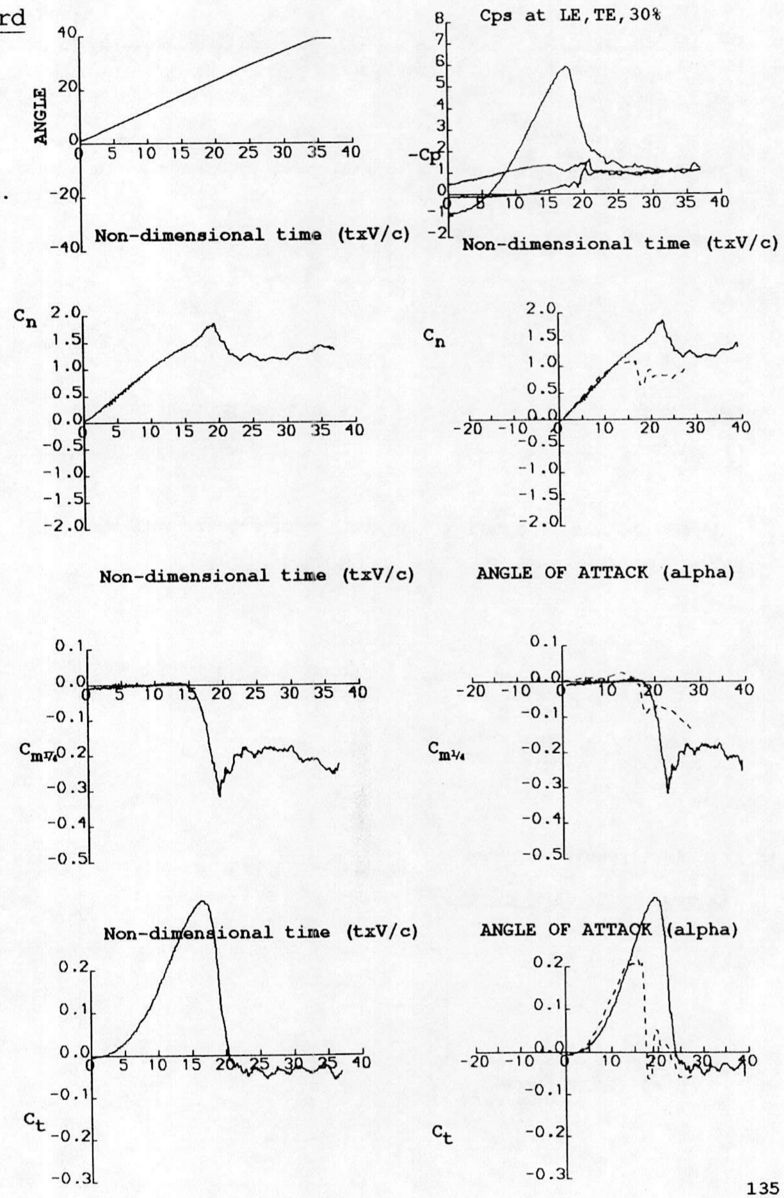
AIR TEMPERATURE = 25.0°C

SAMPLING FREQUENCY = 4405.00 Hz.

REDUCED PITCH RATE = 0.01003

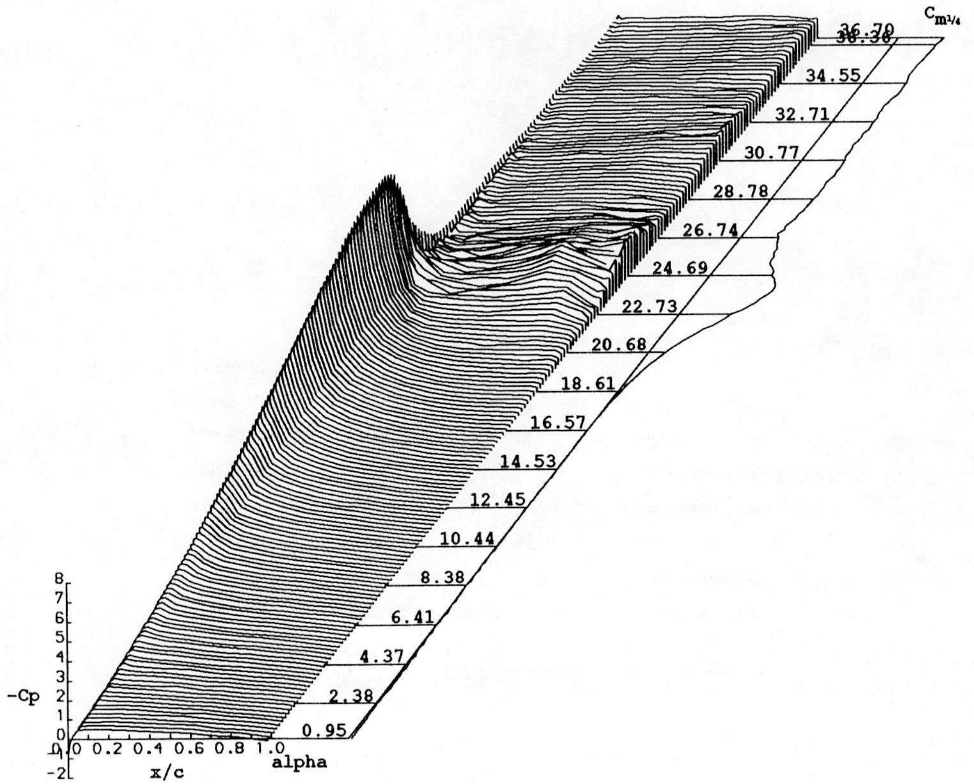
LINEAR PITCH RATE = 183.52°S^{-1}

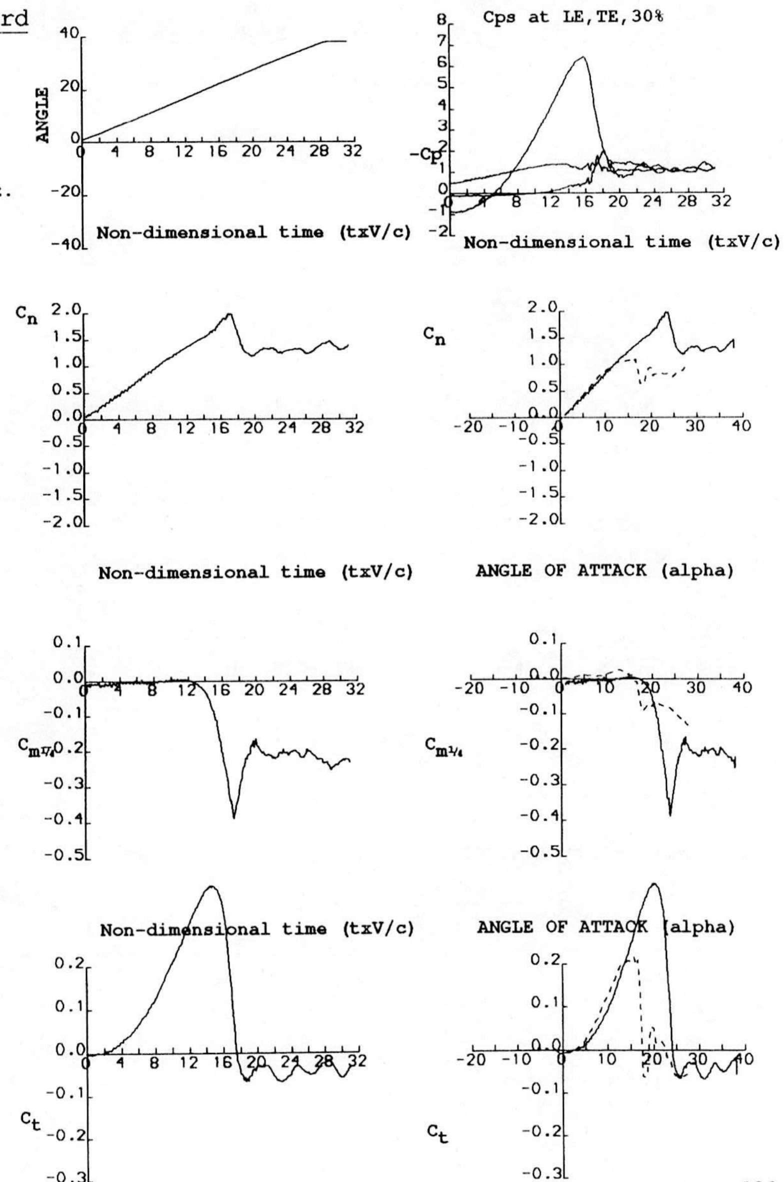




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21361	**DATE OF TEST:** 2/9/91
REYNOLDS NUMBER = 795951.	**MACH NUMBER =** 0.126
DYNAMIC PRESSURE = 1142.31 Nm^{-2}	**AIR TEMPERATURE =** 25.4°C
NUMBER OF CYCLES = 5	**SAMPLING FREQUENCY =** 5208.00 Hz.
MOTION TYPE: RAMP UP	**REDUCED PITCH RATE =** 0.01171
START ANGLE = -1.00°	**LINEAR PITCH RATE =** 213.11°S^{-1}
RAMP ARC = 40.000°	
AVERAGED DATA OF 5 CYCLES	

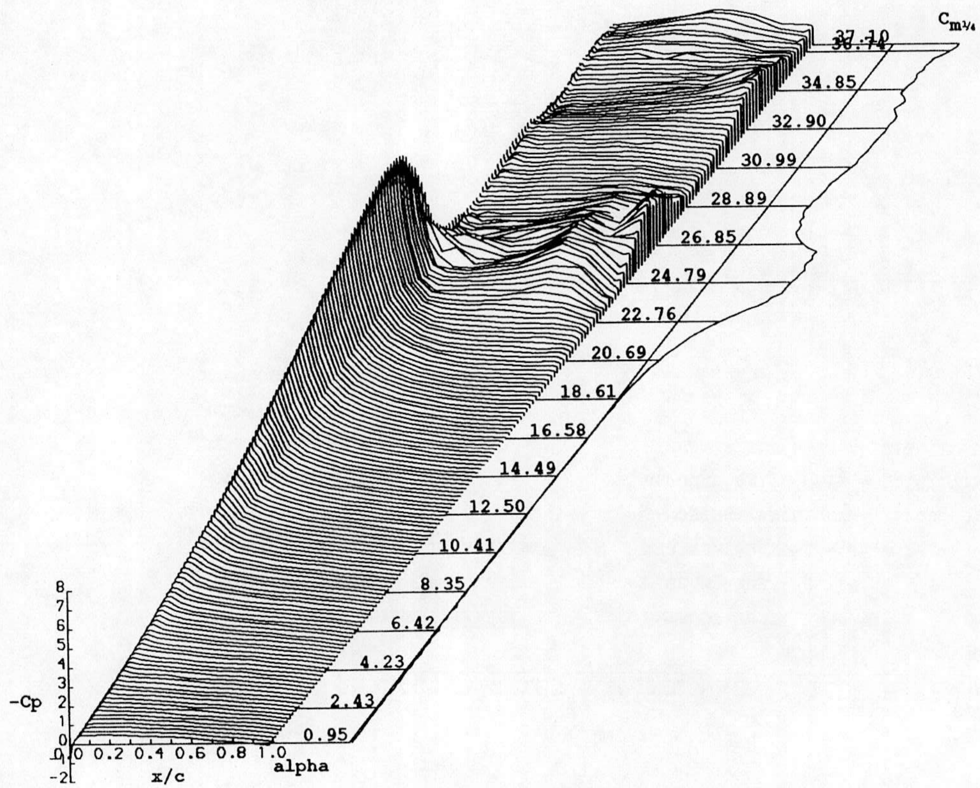


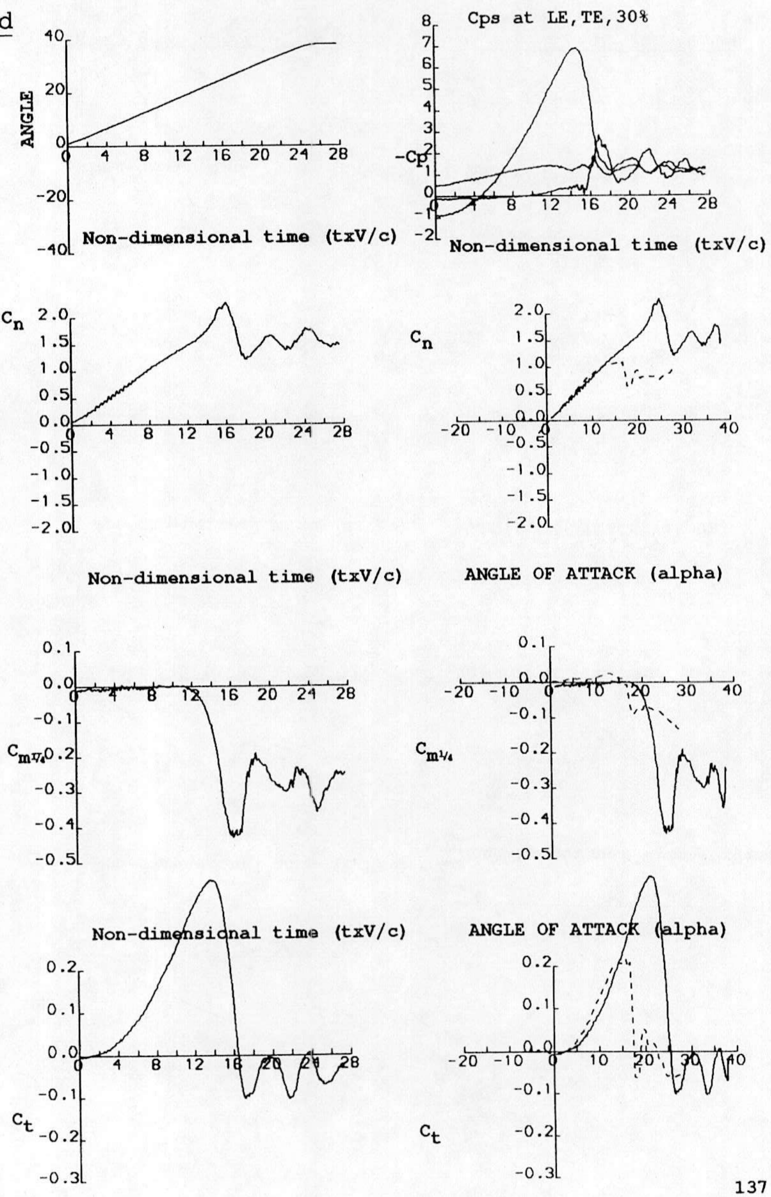


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21371
REYNOLDS NUMBER = 801066.
DYNAMIC PRESSURE = 1163.00 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

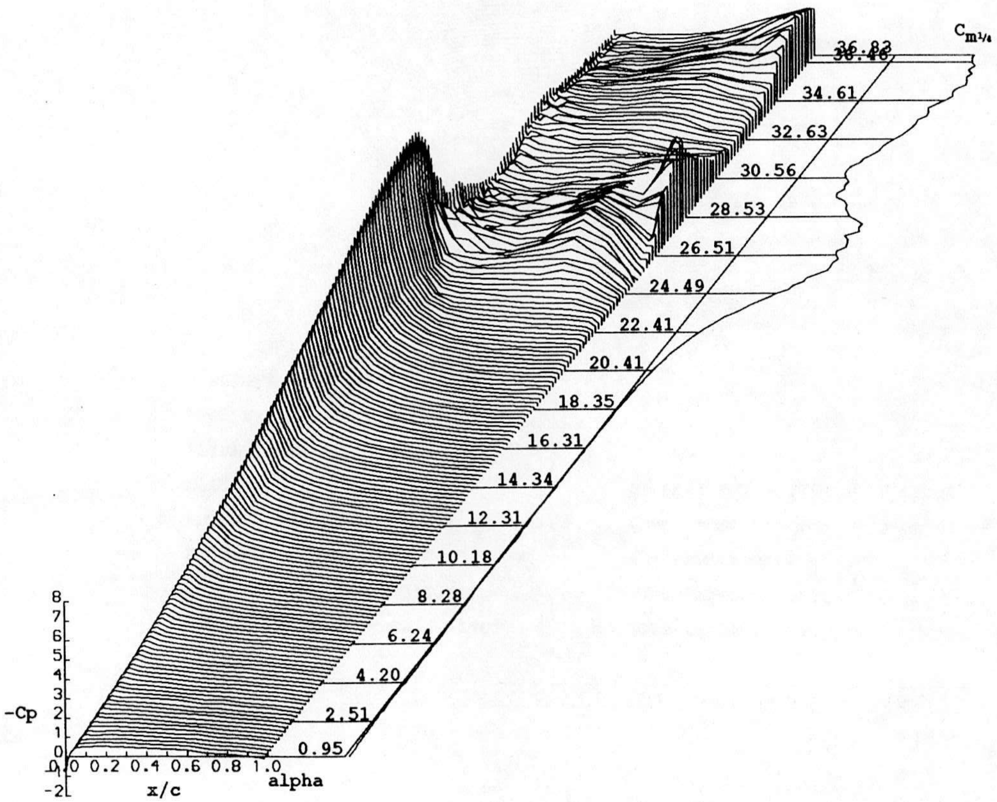
DATE OF TEST: 2/9/91
MACH NUMBER = 0.127
AIR TEMPERATURE = 26.0°C
SAMPLING FREQUENCY = 5917.00 Hz.
REDUCED PITCH RATE = 0.01319
LINEAR PITCH RATE = 242.49°S^{-1}

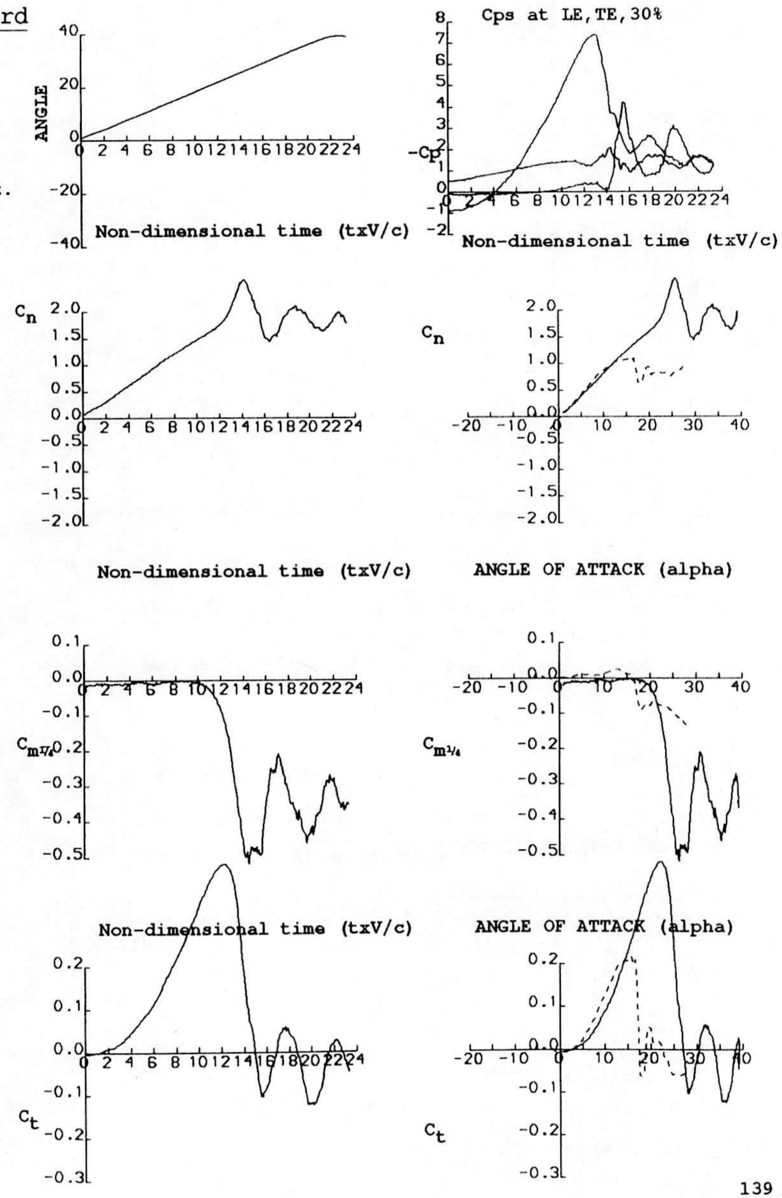




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21391	DATE OF TEST: 2/9/91
REYNOLDS NUMBER = 788507.	MACH NUMBER = 0.123
DYNAMIC PRESSURE = 1083.65 Nm^{-2}	AIR TEMPERATURE = 22.0°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 6711.00 Hz.
MOTION TYPE: RAMP UP	REDUCED PITCH RATE = 0.01561
START ANGLE = -1.00°	LINEAR PITCH RATE = 274.40°S^{-1}
RAMP ARC = 41.000°	
AVERAGED DATA OF 5 CYCLES	

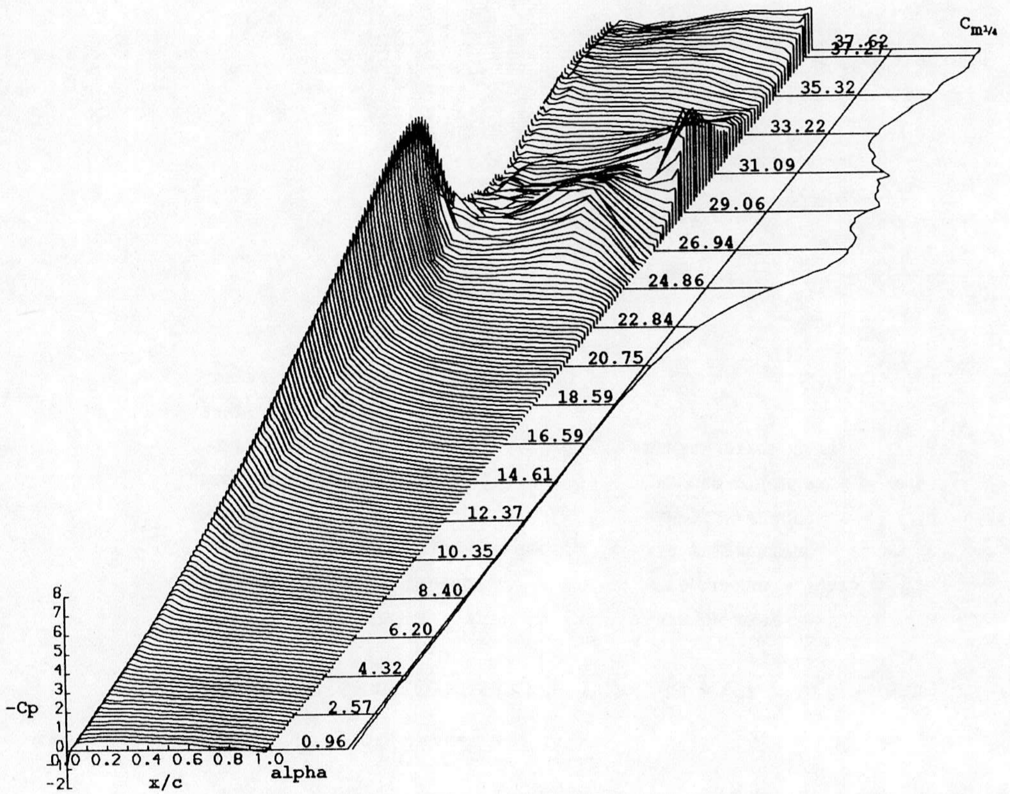


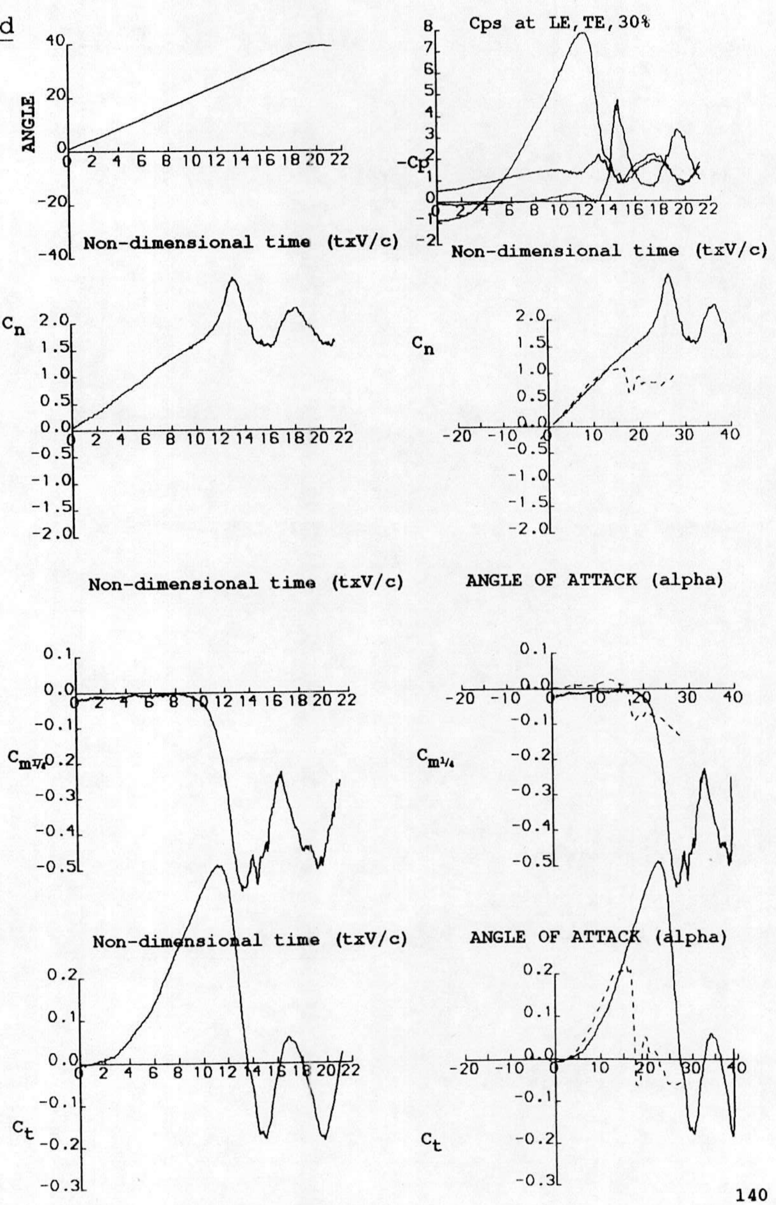


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21401
REYNOLDS NUMBER = 791168.
DYNAMIC PRESSURE = 1094.78 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91
MACH NUMBER = 0.123
AIR TEMPERATURE = 22.4°C
SAMPLING FREQUENCY = 7407.00 Hz.
REDUCED PITCH RATE = 0.01748
LINEAR PITCH RATE = 309.22°S^{-1}

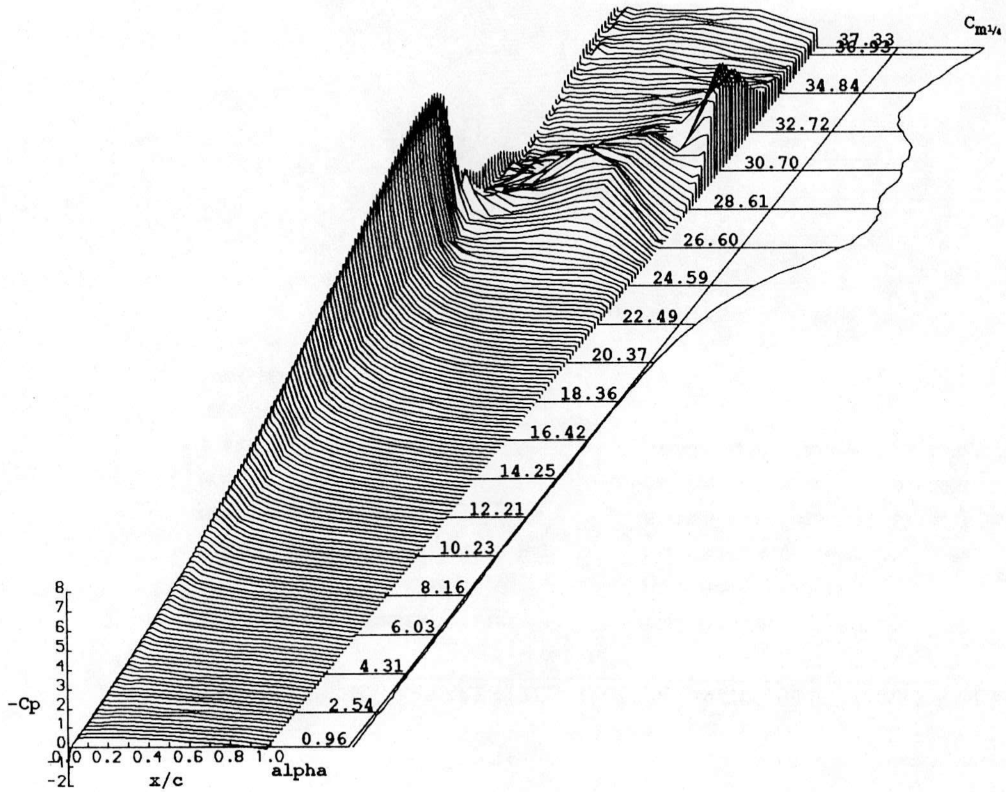


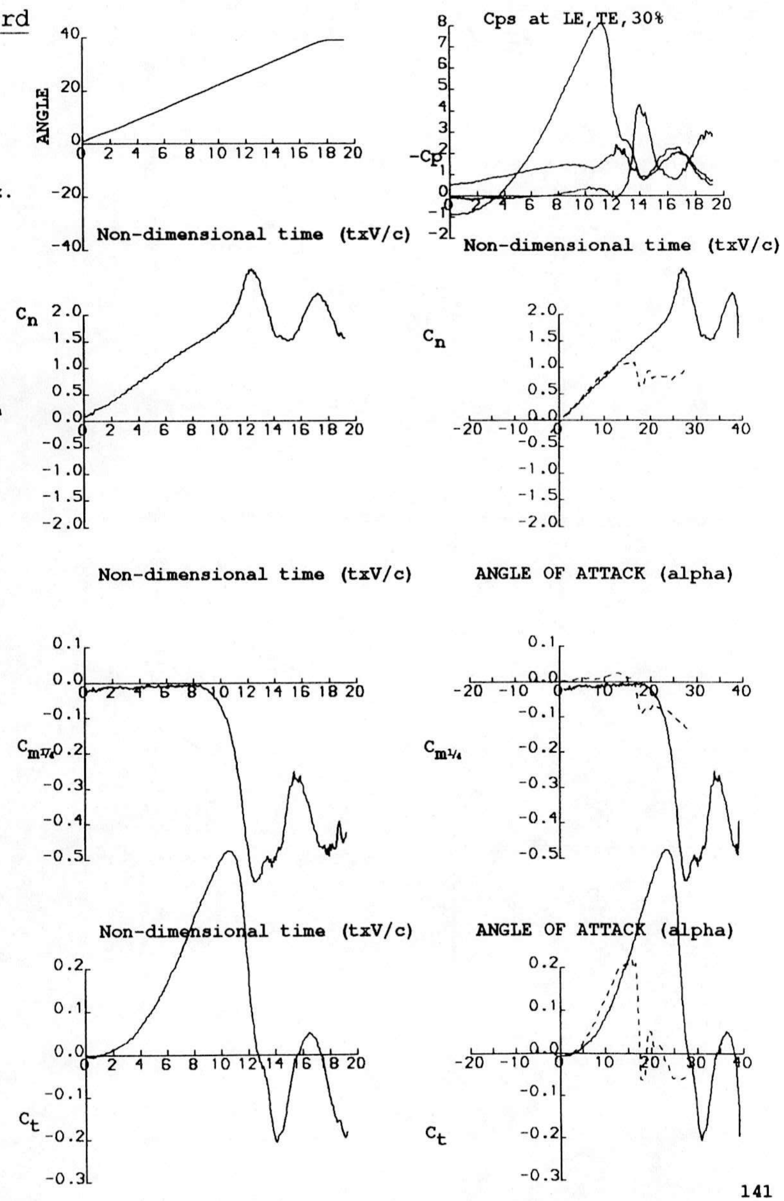


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21411
REYNOLDS NUMBER = 791709.
DYNAMIC PRESSURE = 1102.00 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 23.0°C
SAMPLING FREQUENCY = 8219.00 Hz.
REDUCED PITCH RATE = 0.01882
LINEAR PITCH RATE = 334.34°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21421

REYNOLDS NUMBER = 794399.

DYNAMIC PRESSURE = 1111.43 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

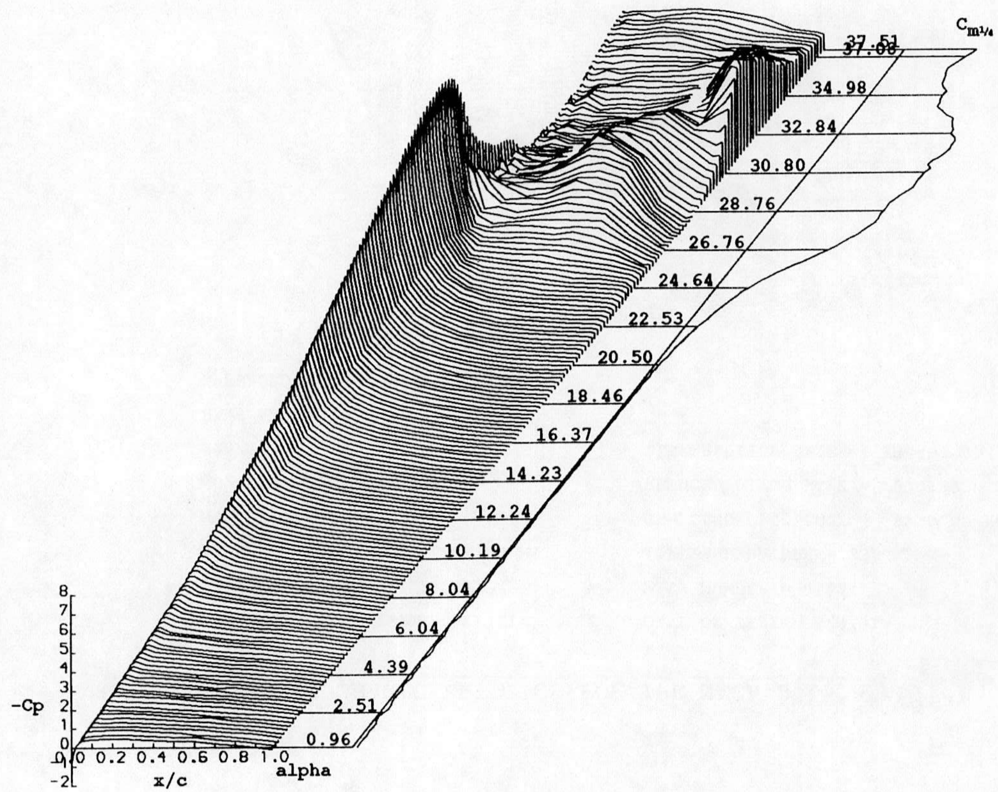
MACH NUMBER = 0.124

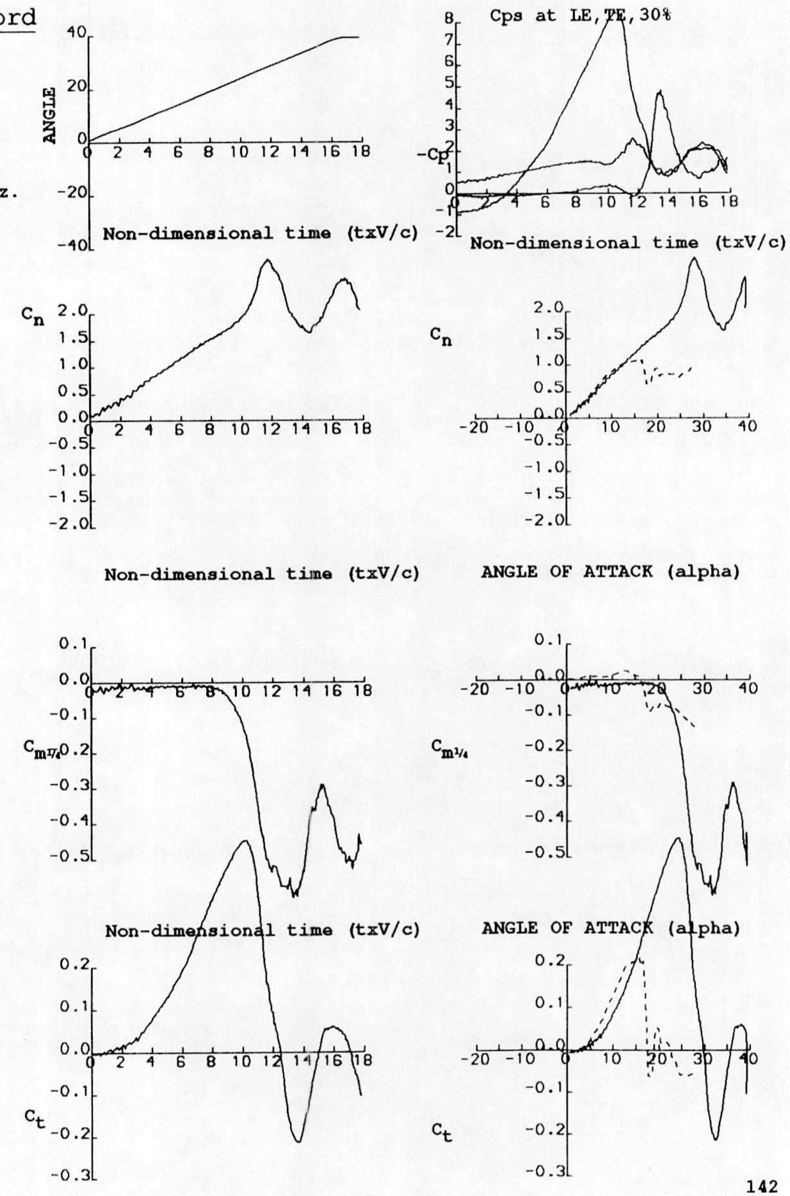
AIR TEMPERATURE = 23.2°C

SAMPLING FREQUENCY = 8928.00 Hz.

REDUCED PITCH RATE = 0.02054

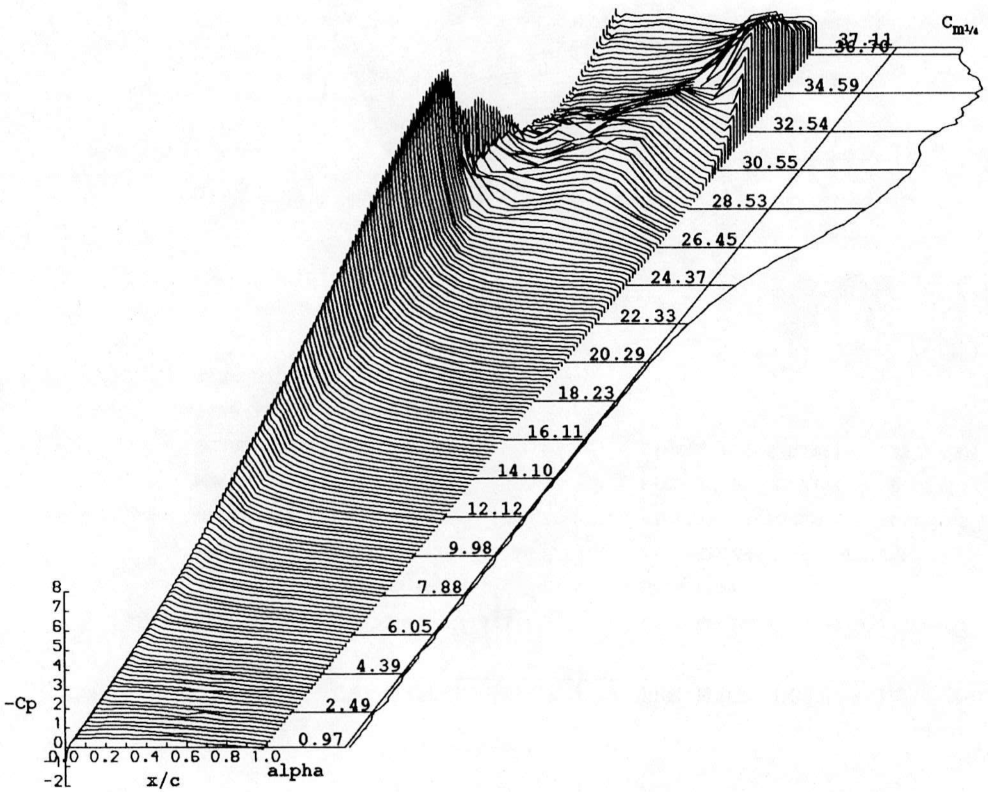
LINEAR PITCH RATE = 366.46°S^{-1}

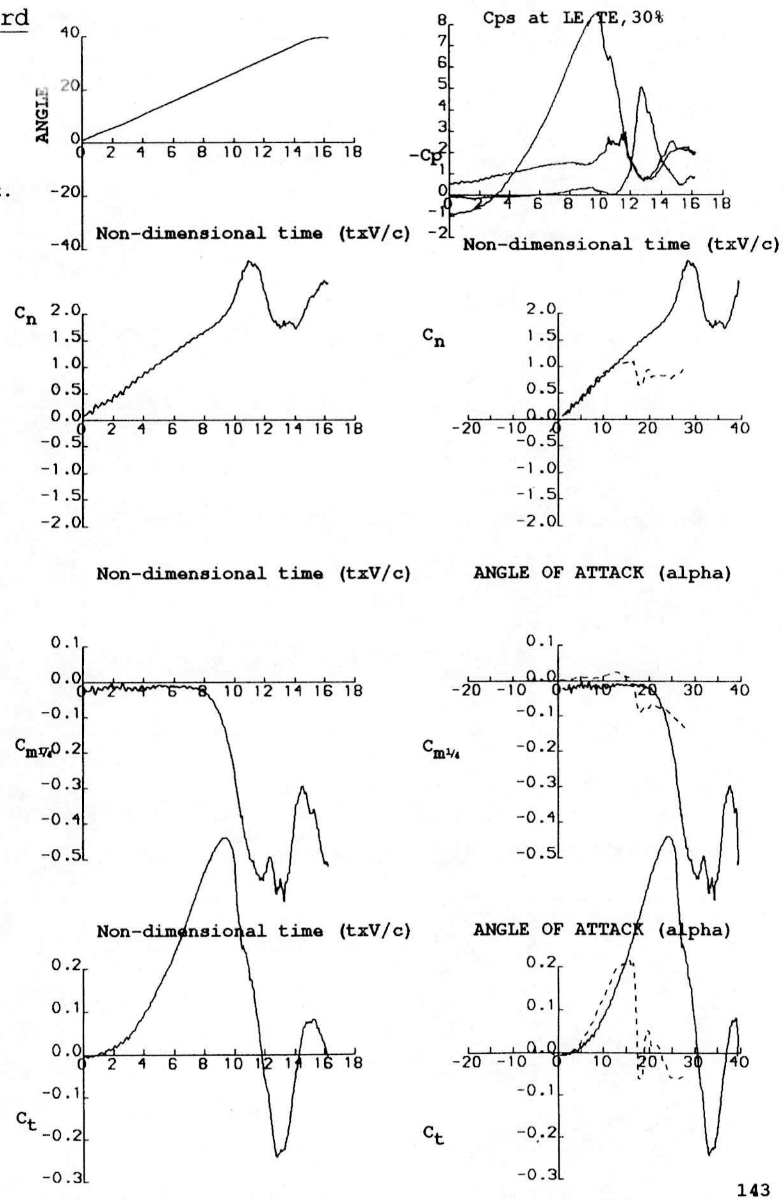




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21431	DATE OF TEST: 3/9/91
REYNOLDS NUMBER = 787960.	MACH NUMBER = 0.123
DYNAMIC PRESSURE = 1094.43 Nm^{-2}	AIR TEMPERATURE = 23.3°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 9708.00 Hz.
MOTION TYPE: RAMP UP	REDUCED PITCH RATE = 0.02252
START ANGLE = -1.00°	LINEAR PITCH RATE = 398.78°S^{-1}
RAMP ARC = 40.000°	
AVERAGED DATA OF 5 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21441

REYNOLDS NUMBER = 795545.

DYNAMIC PRESSURE = 1120.43 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

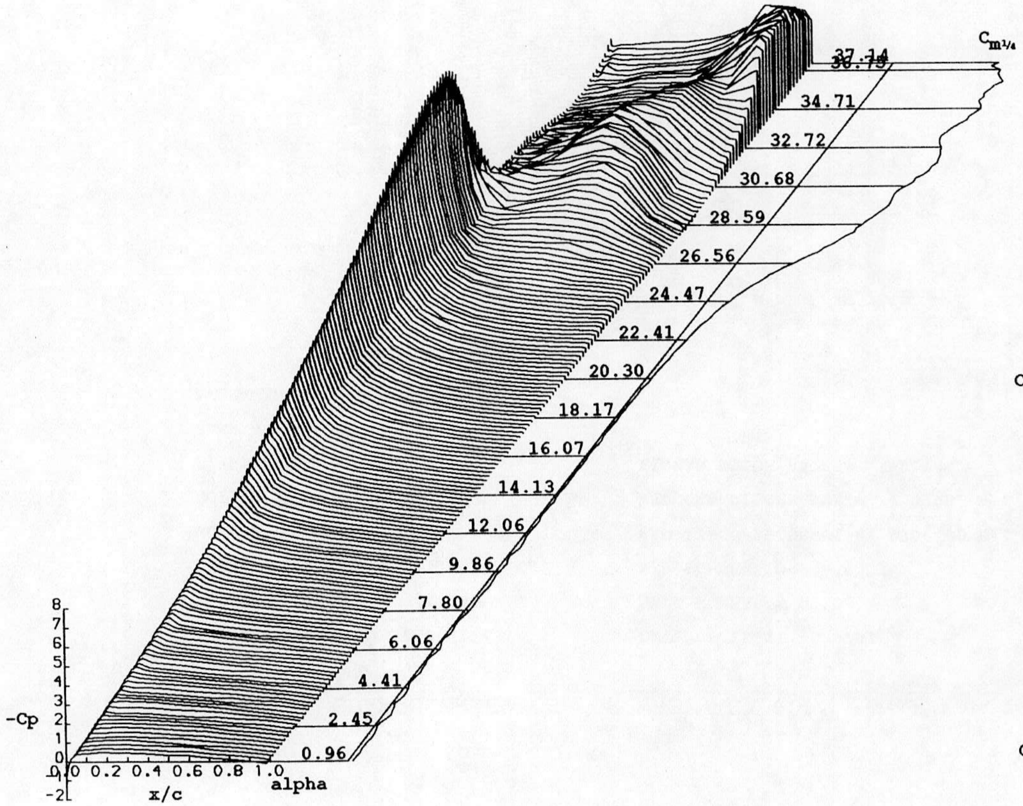
MACH NUMBER = 0.125

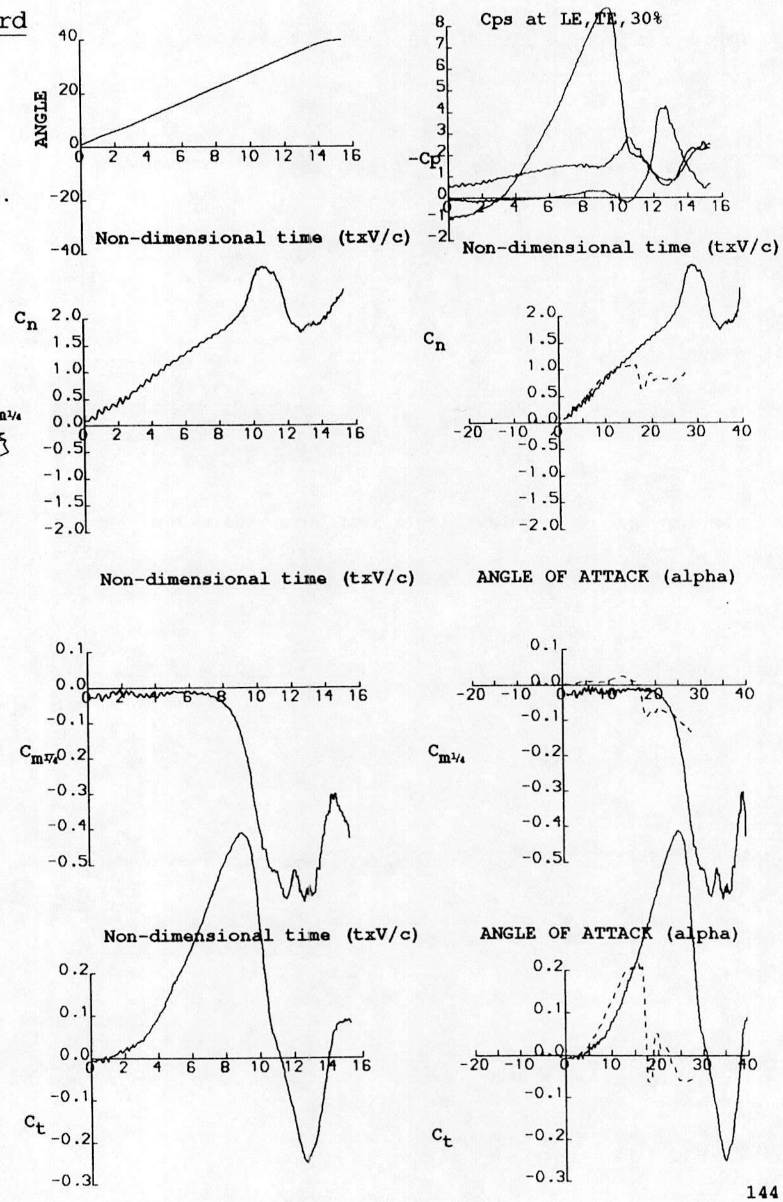
AIR TEMPERATURE = 23.8°C

SAMPLING FREQUENCY = 10410.00 Hz.

REDUCED PITCH RATE = 0.02422

LINEAR PITCH RATE = 434.27°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21731

REYNOLDS NUMBER = 1056728.

DYNAMIC PRESSURE = 2037.54 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

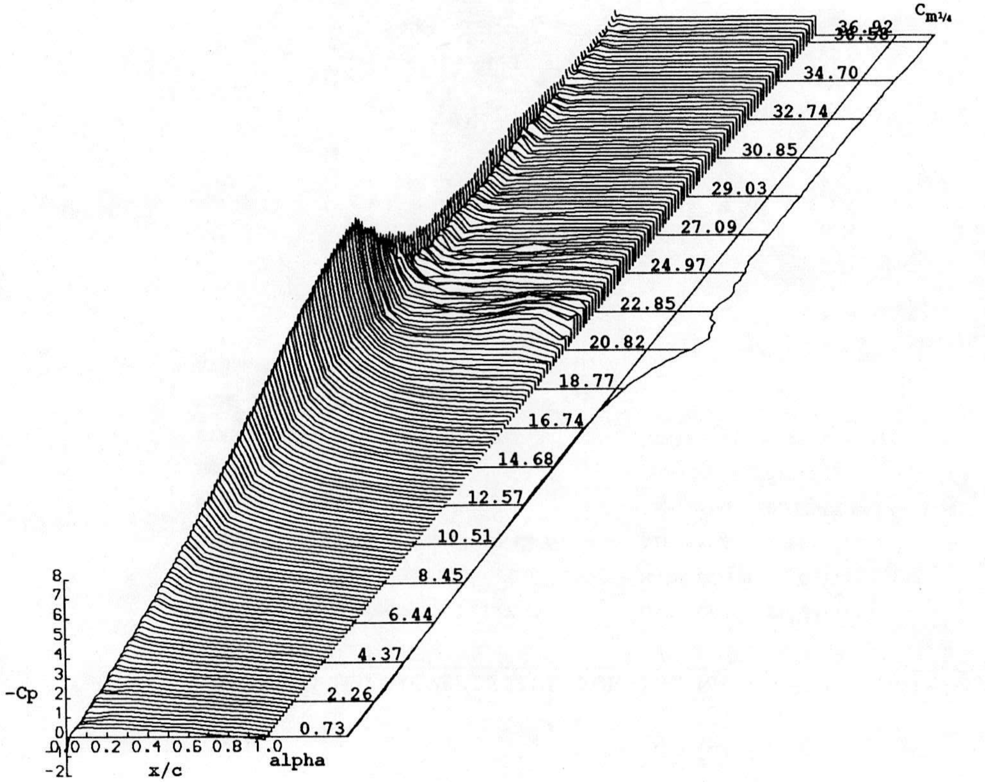
MACH NUMBER = 0.172

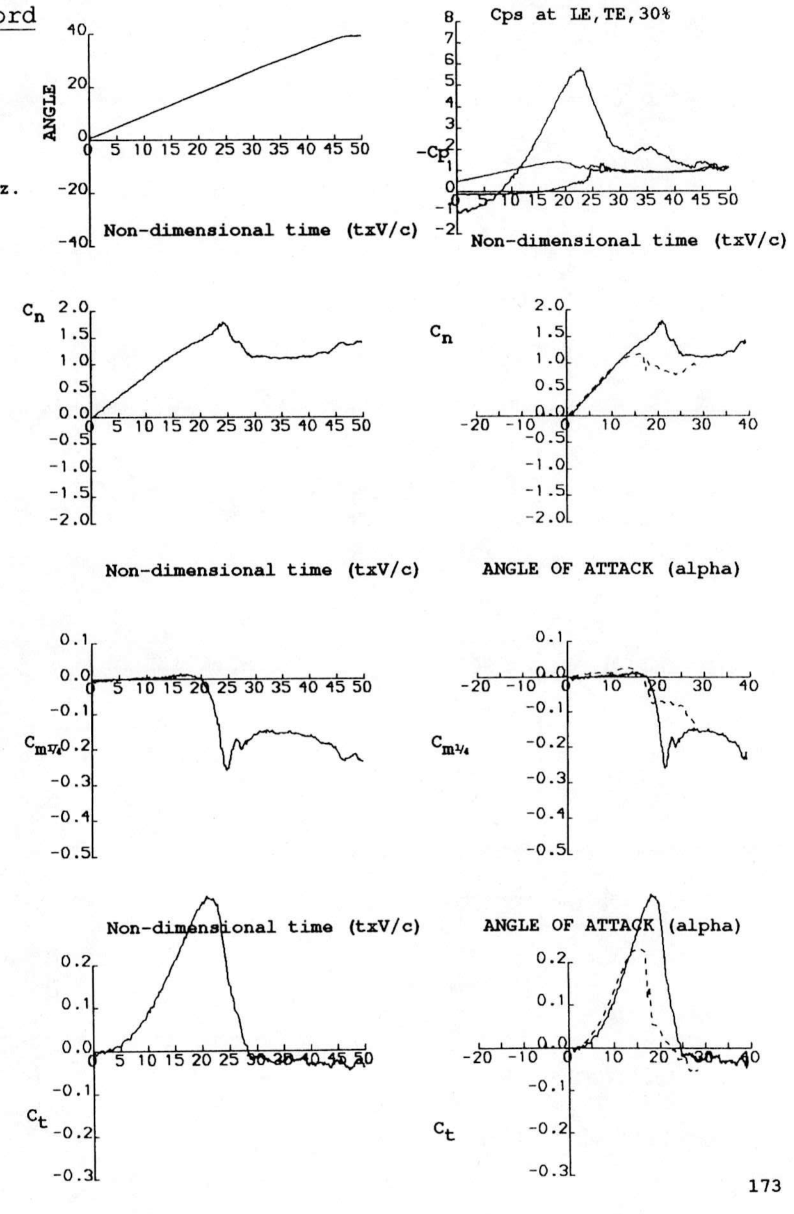
AIR TEMPERATURE = 22.1°C

SAMPLING FREQUENCY = 4405.00 Hz.

REDUCED PITCH RATE = 0.00736

LINEAR PITCH RATE = 181.57°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21741

REYNOLDS NUMBER = 1051486.

DYNAMIC PRESSURE = 2019.62 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

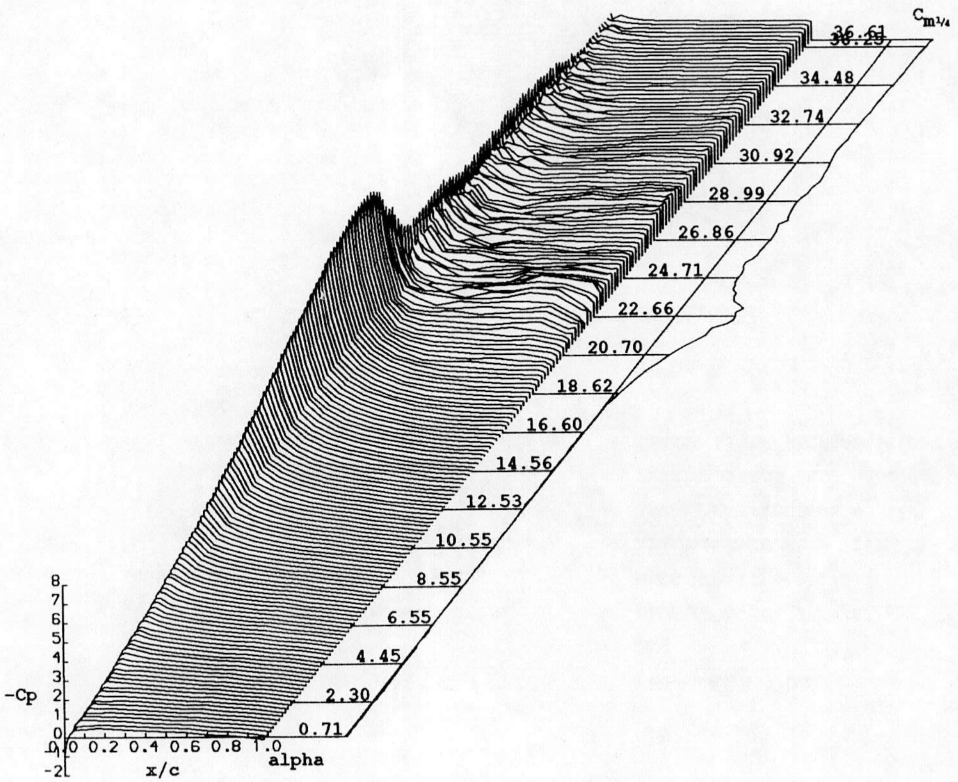
MACH NUMBER = 0.171

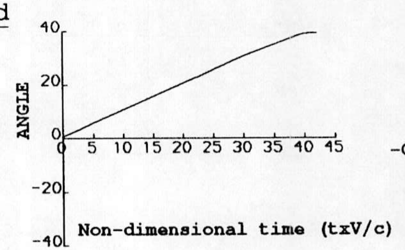
AIR TEMPERATURE = 22.5°C

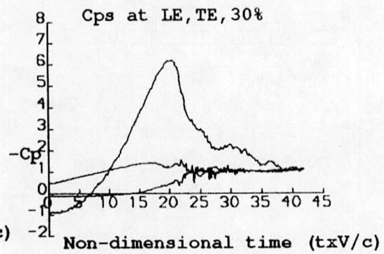
SAMPLING FREQUENCY = 5208.00 Hz.

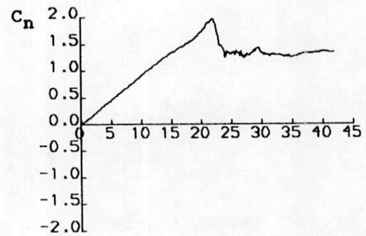
REDUCED PITCH RATE = 0.00861

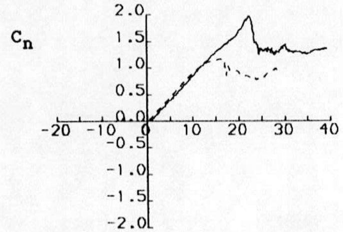
LINEAR PITCH RATE = 211.32°S^{-1}

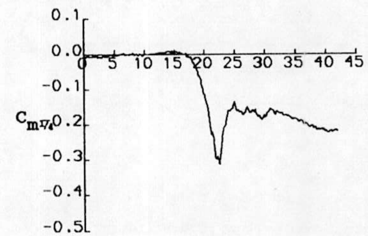


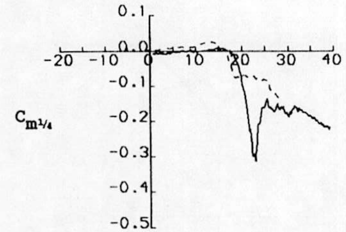


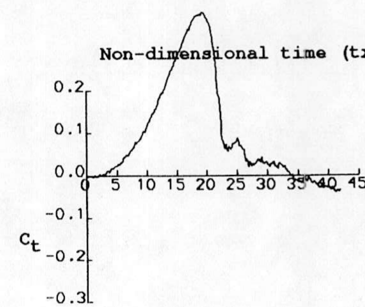


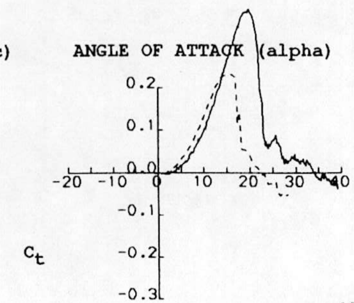








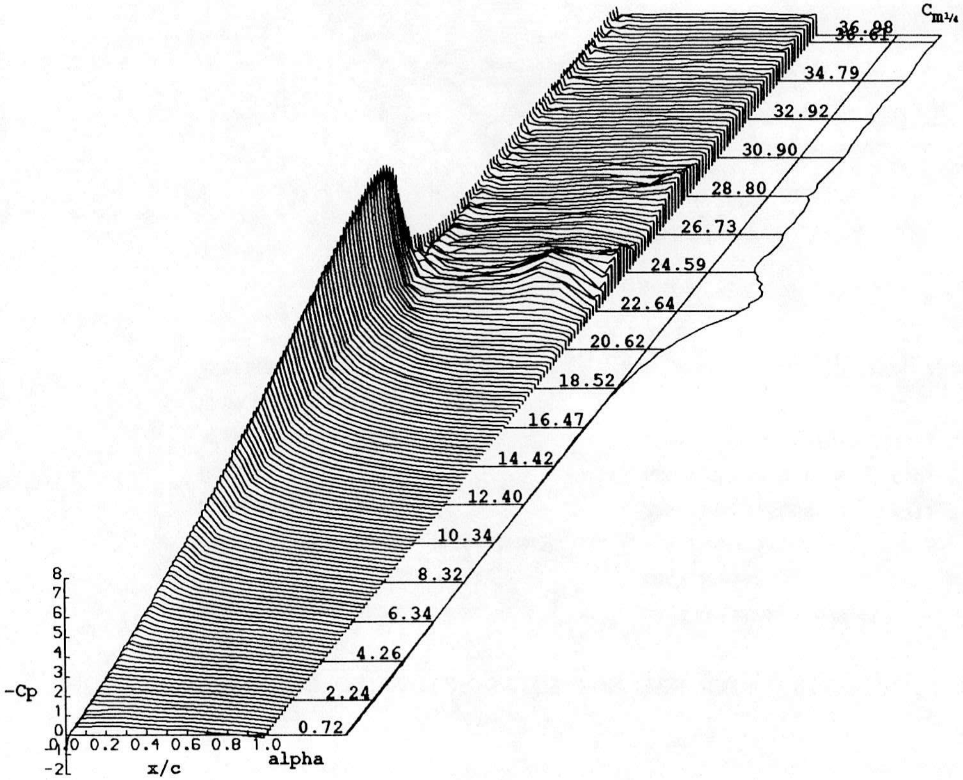


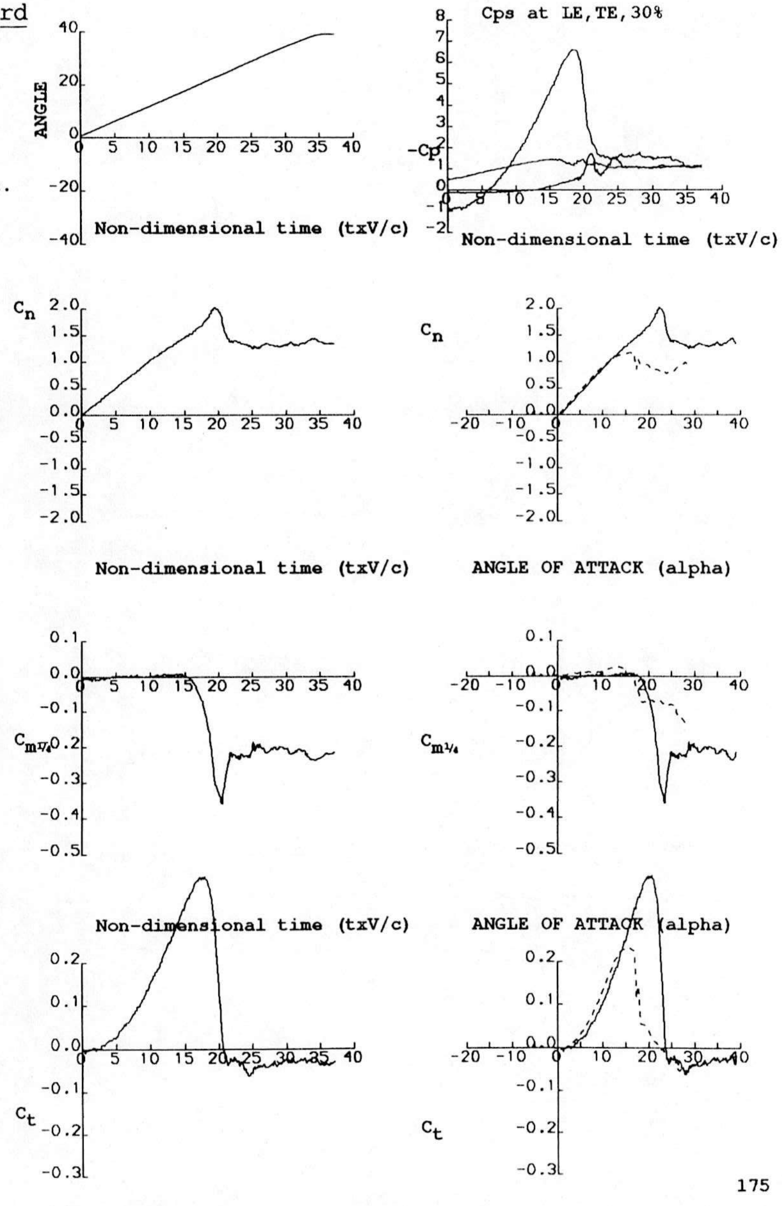


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21751
REYNOLDS NUMBER = 1043274.
DYNAMIC PRESSURE = 2027.67 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91
MACH NUMBER = 0.171
AIR TEMPERATURE = 24.5°C
SAMPLING FREQUENCY = 5917.00 Hz.
REDUCED PITCH RATE = 0.00983
LINEAR PITCH RATE = 242.71°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21761

REYNOLDS NUMBER = 1038141.

DYNAMIC PRESSURE = 2026.84 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

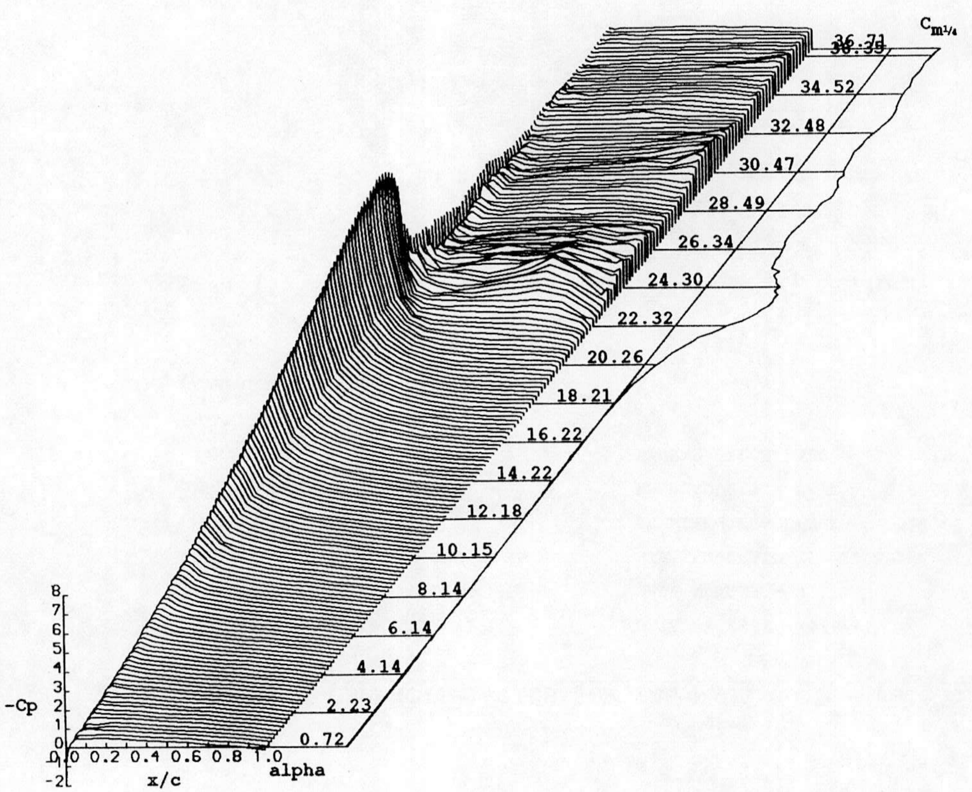
MACH NUMBER = 0.171

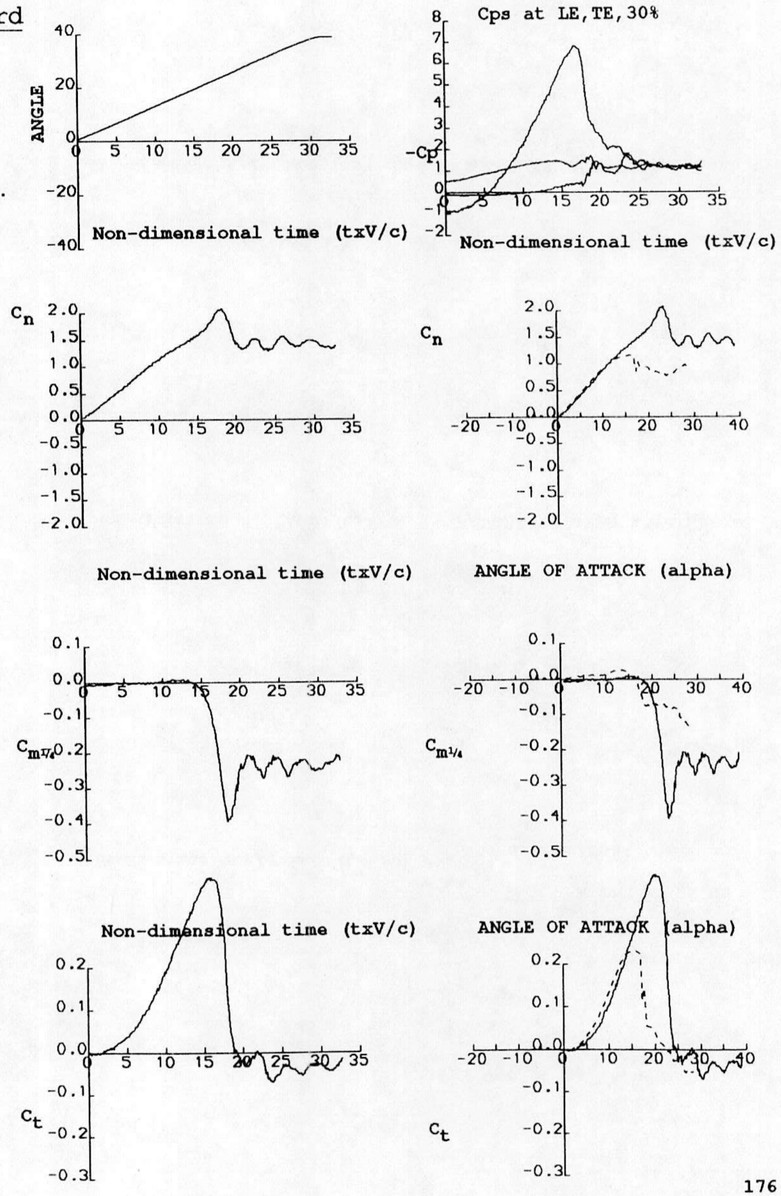
AIR TEMPERATURE = 25.6°C

SAMPLING FREQUENCY = 6711.00 Hz.

REDUCED PITCH RATE = 0.01100

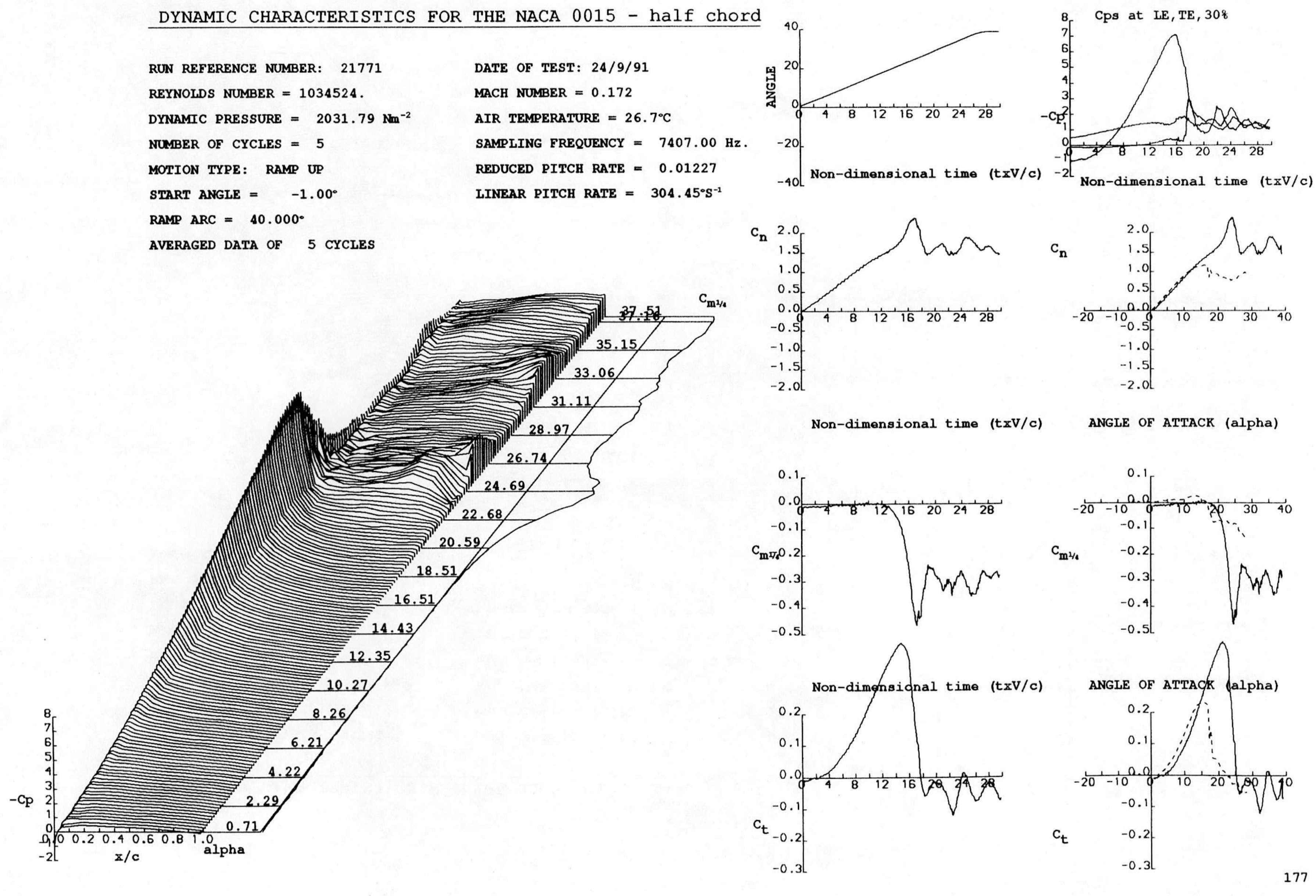
LINEAR PITCH RATE = 272.23°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21771	DATE OF TEST: 24/9/91
REYNOLDS NUMBER = 1034524.	MACH NUMBER = 0.172
DYNAMIC PRESSURE = 2031.79 Nm^{-2}	AIR TEMPERATURE = 26.7°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 7407.00 Hz.
MOTION TYPE: RAMP UP	REDUCED PITCH RATE = 0.01227
START ANGLE = -1.00°	LINEAR PITCH RATE = 304.45°S^{-1}
RAMP ARC = 40.000°	
AVERAGED DATA OF 5 CYCLES	



DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21781

REYNOLDS NUMBER = 1036256.

DYNAMIC PRESSURE = 2054.30 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

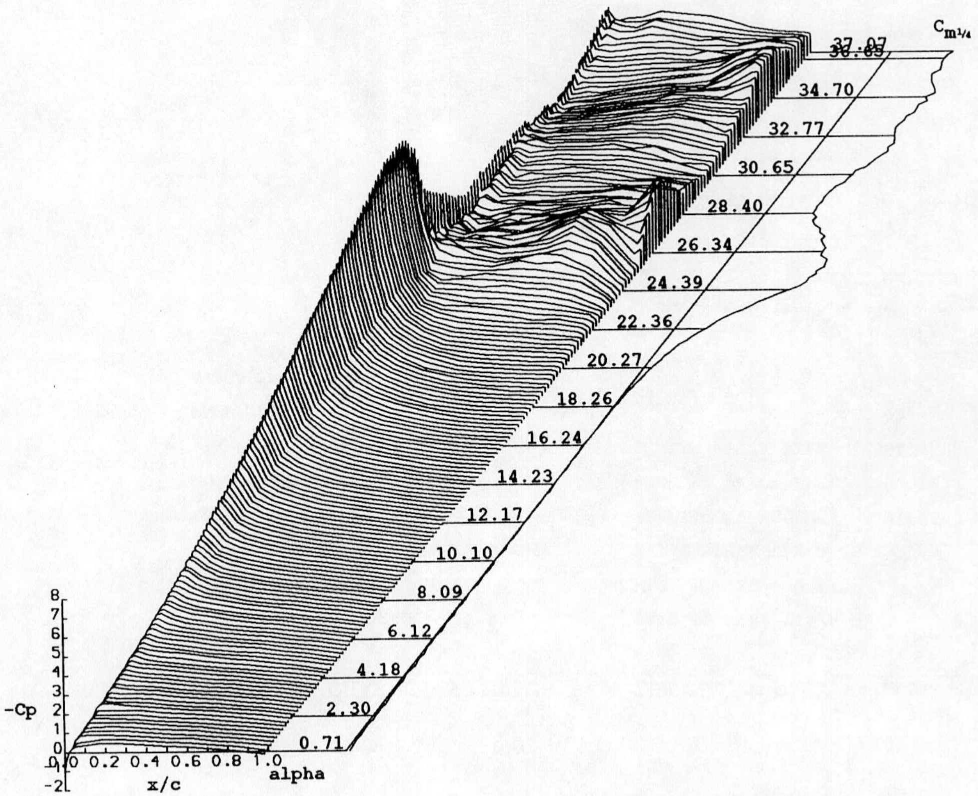
MACH NUMBER = 0.173

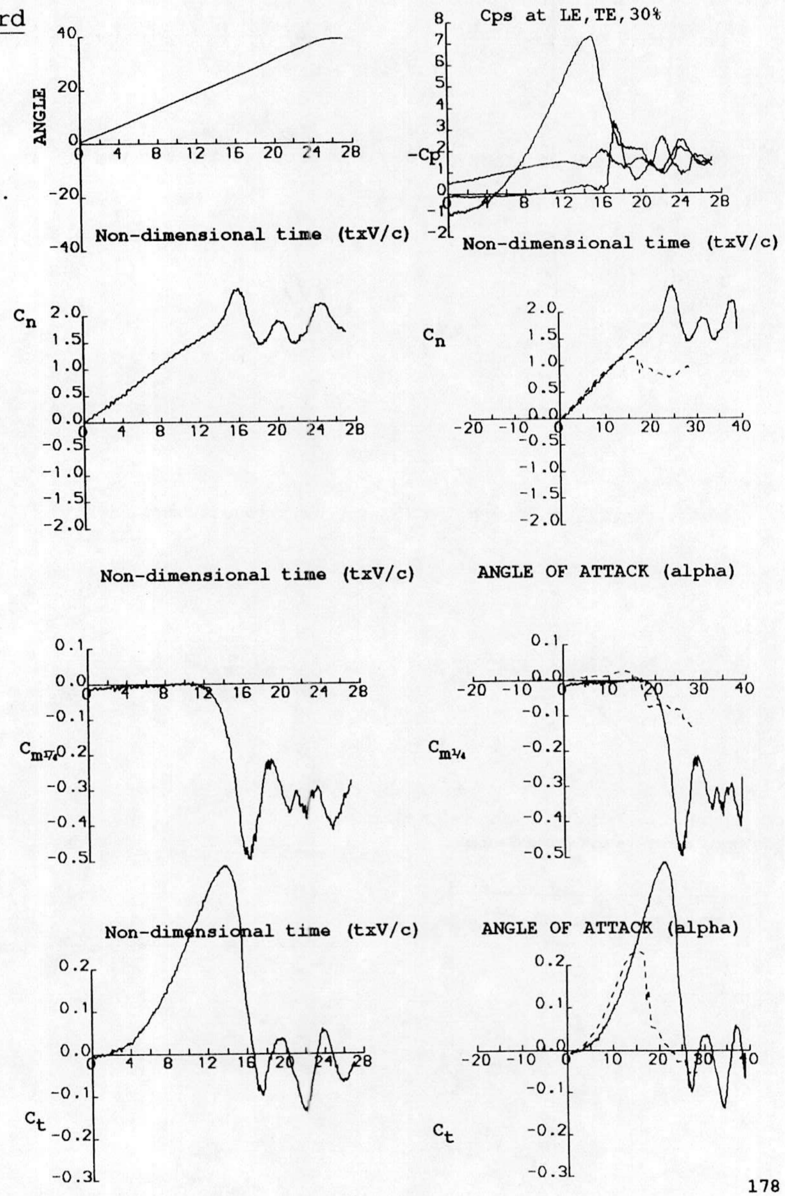
AIR TEMPERATURE = 27.6°C

SAMPLING FREQUENCY = 8219.00 Hz.

REDUCED PITCH RATE = 0.01342

LINEAR PITCH RATE = 335.35°S^{-1}

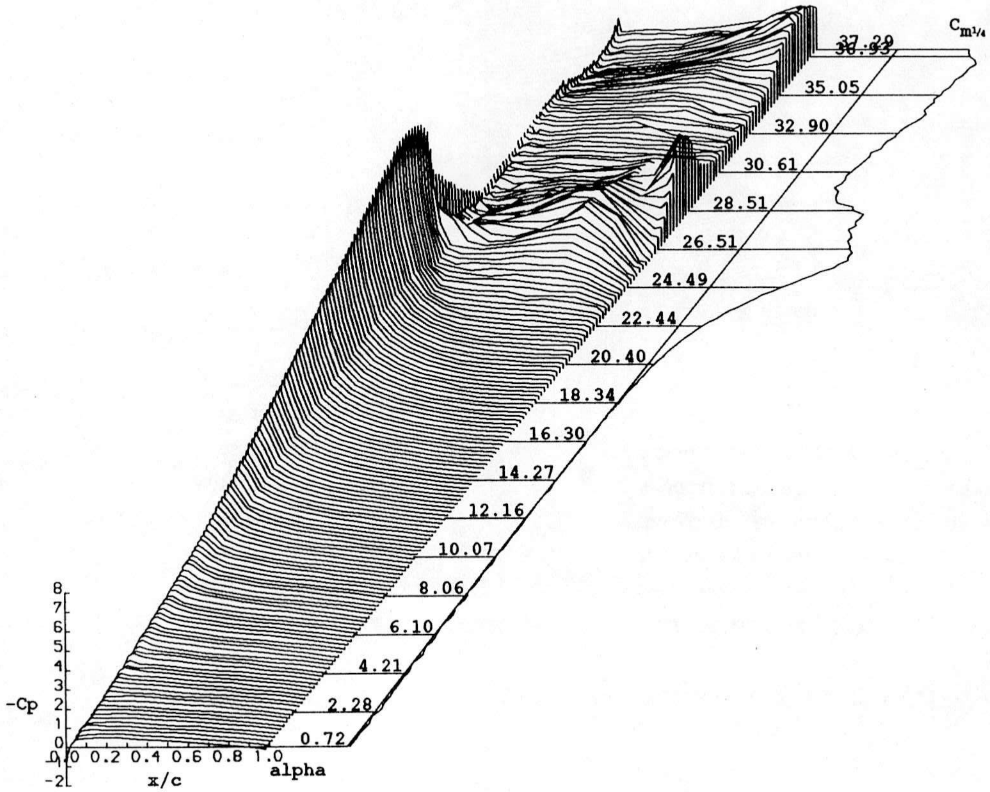


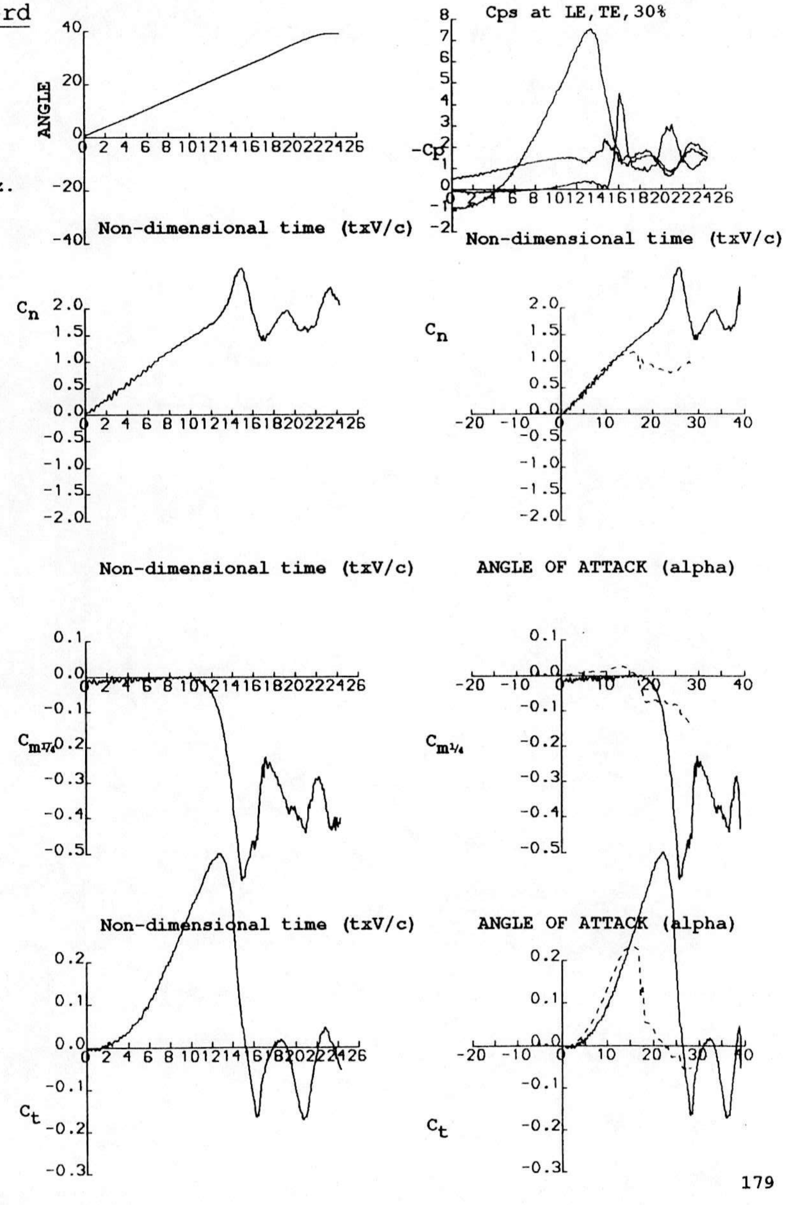


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21791
REYNOLDS NUMBER = 1007380.
DYNAMIC PRESSURE = 1954.65 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91
MACH NUMBER = 0.168
AIR TEMPERATURE = 28.4°C
SAMPLING FREQUENCY = 8928.00 Hz.
REDUCED PITCH RATE = 0.01510
LINEAR PITCH RATE = 368.74°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21801

REYNOLDS NUMBER = 1016844.

DYNAMIC PRESSURE = 2001.71 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

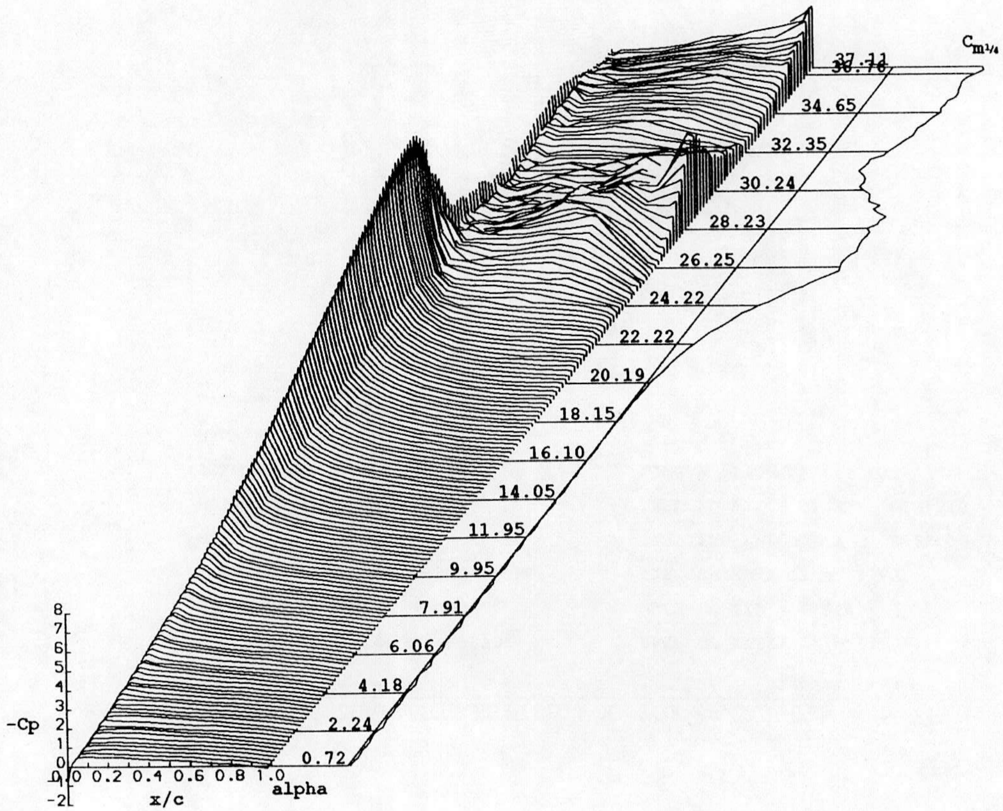
MACH NUMBER = 0.170

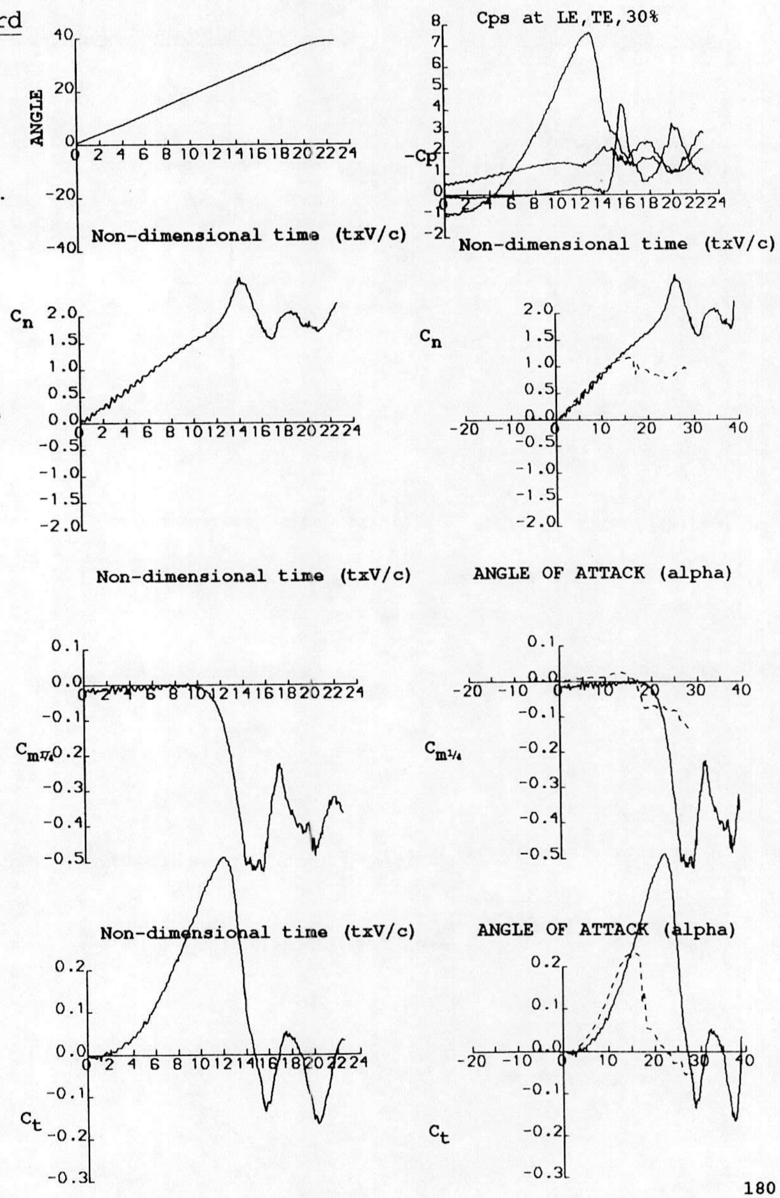
AIR TEMPERATURE = 29.0°C

SAMPLING FREQUENCY = 9708.00 Hz.

REDUCED PITCH RATE = 0.01616

LINEAR PITCH RATE = 399.55°S^{-1}

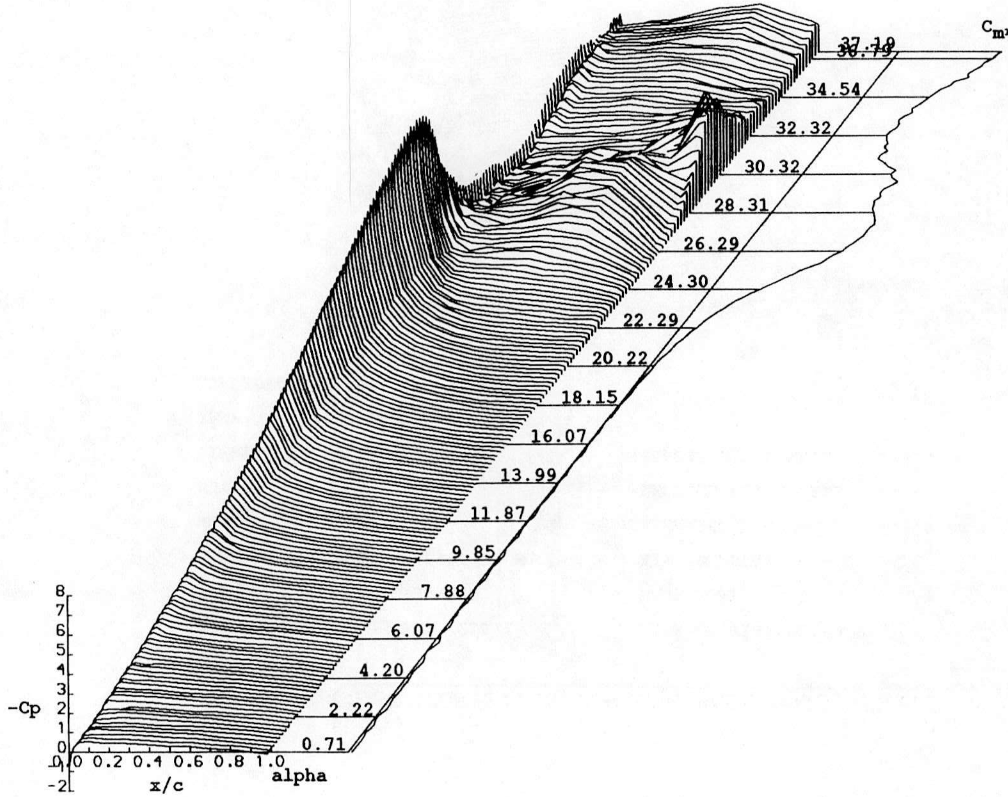


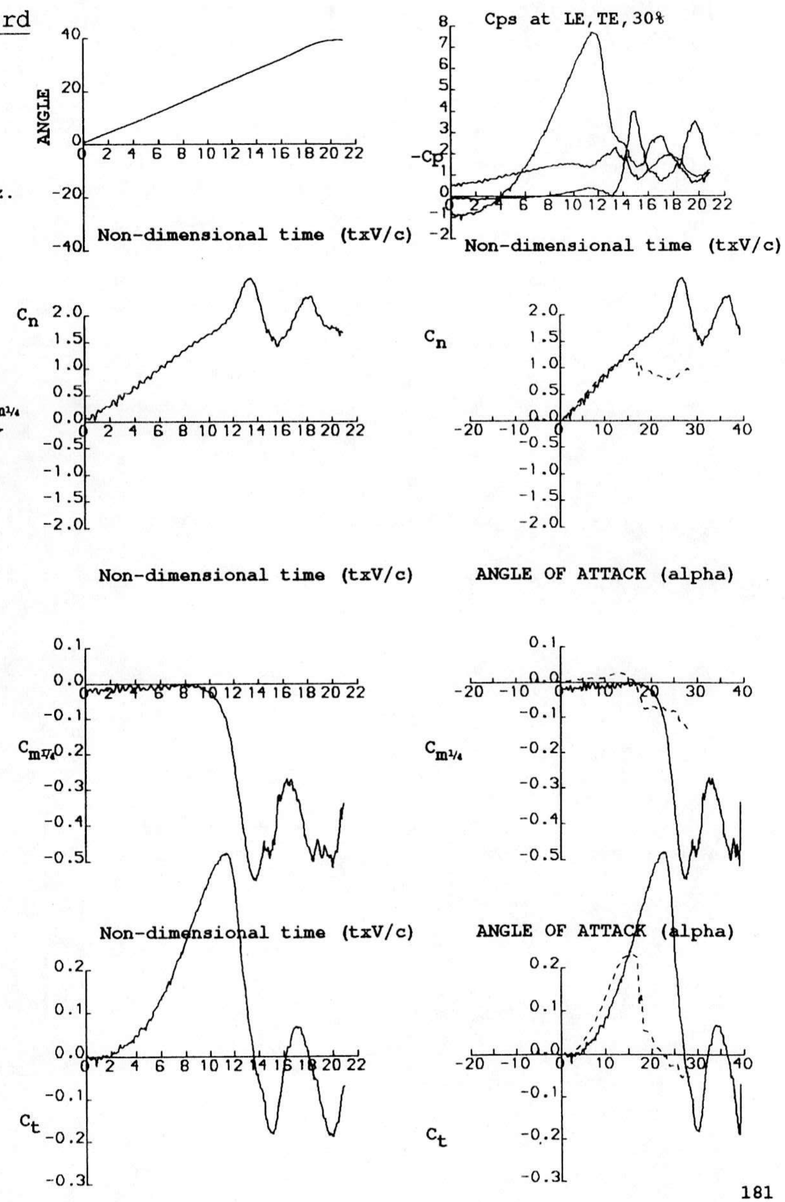


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21811
REYNOLDS NUMBER = 1003207.
DYNAMIC PRESSURE = 1956.64 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91
MACH NUMBER = 0.168
AIR TEMPERATURE = 29.5°C
SAMPLING FREQUENCY = 10410.00 Hz.
REDUCED PITCH RATE = 0.01766
LINEAR PITCH RATE = 432.22°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21821

REYNOLDS NUMBER = 998622.

DYNAMIC PRESSURE = 1950.28 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

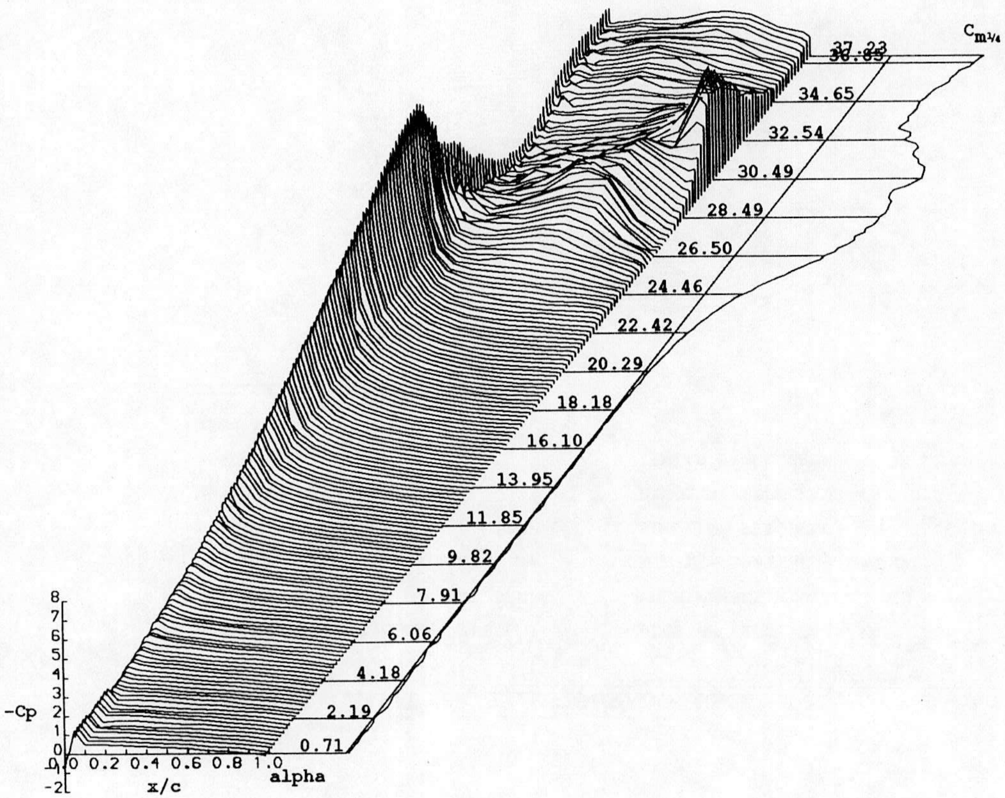
MACH NUMBER = 0.168

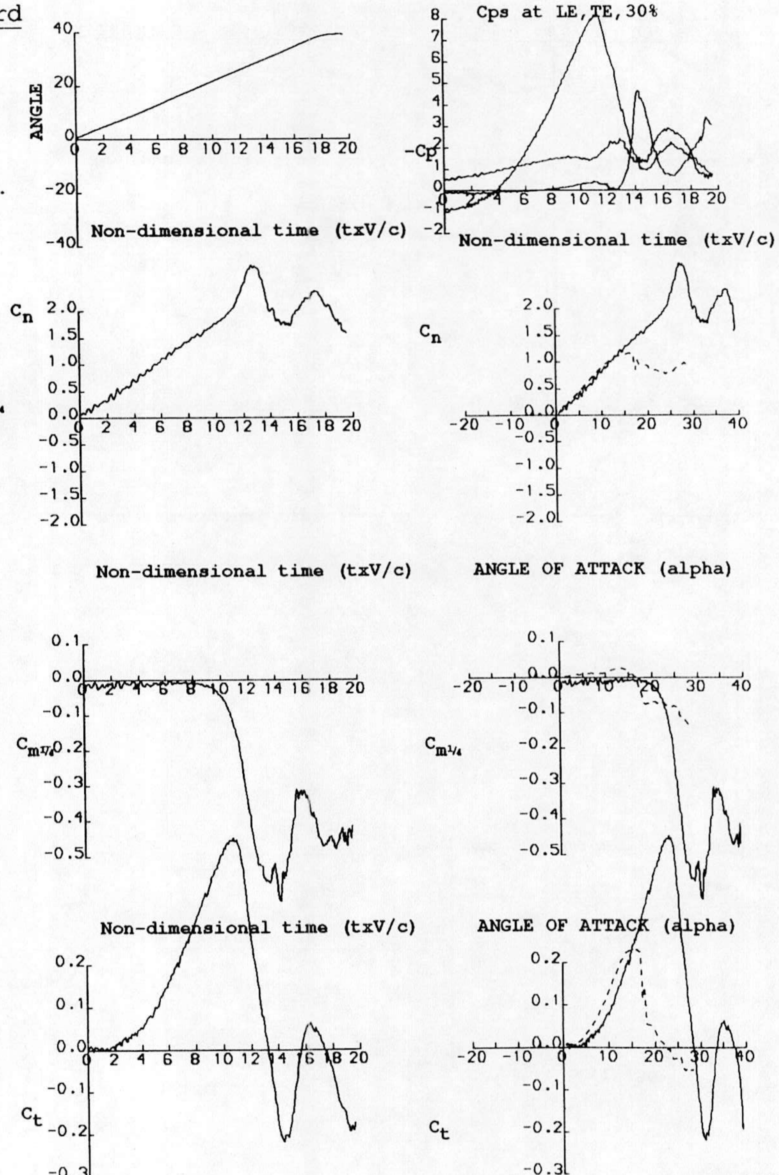
AIR TEMPERATURE = 30.2°C

SAMPLING FREQUENCY = 11110.00 Hz.

REDUCED PITCH RATE = 0.01921

LINEAR PITCH RATE = 469.89°s^{-1}

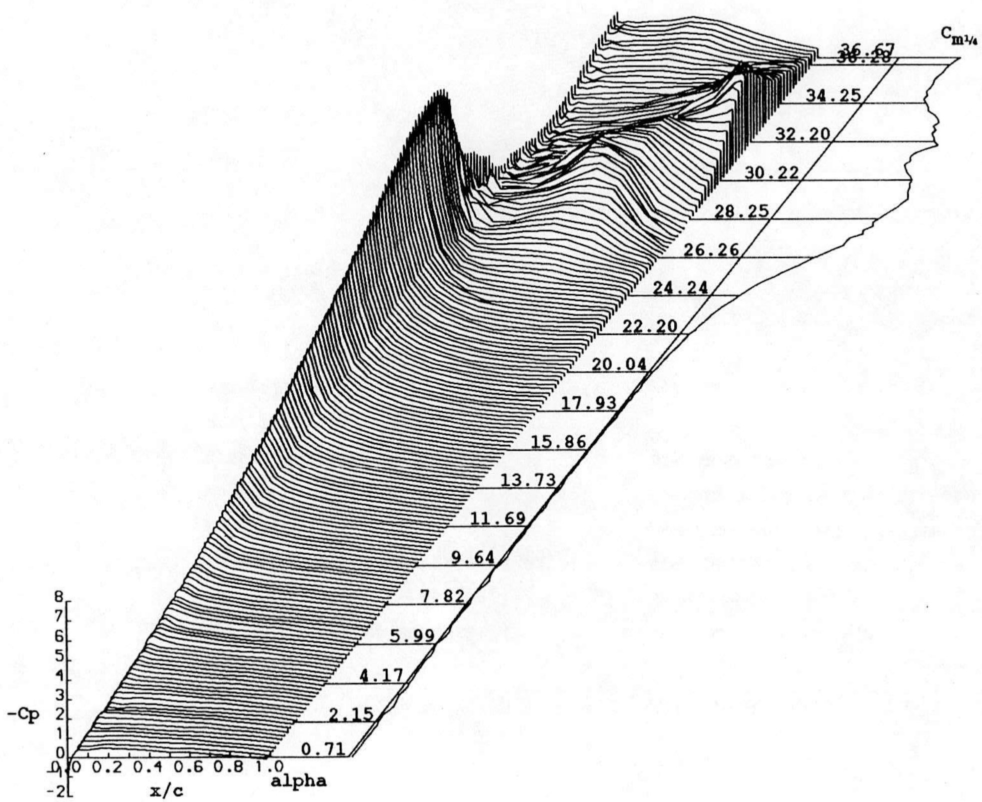


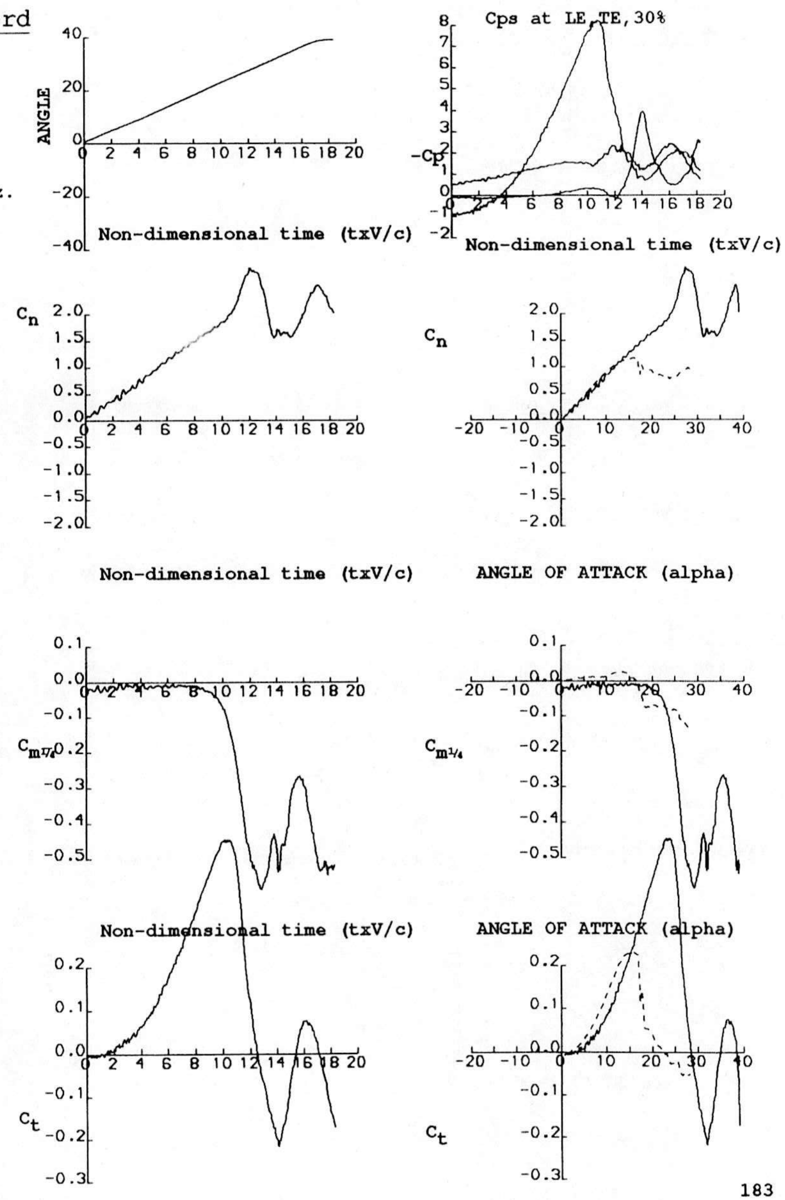


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21831
REYNOLDS NUMBER = 997318.
DYNAMIC PRESSURE = 1951.76 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91
MACH NUMBER = 0.168
AIR TEMPERATURE = 30.6°C
SAMPLING FREQUENCY = 11900.00 Hz.
REDUCED PITCH RATE = 0.02037
LINEAR PITCH RATE = 498.75°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 21841

REYNOLDS NUMBER = 999289.

DYNAMIC PRESSURE = 1969.39 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

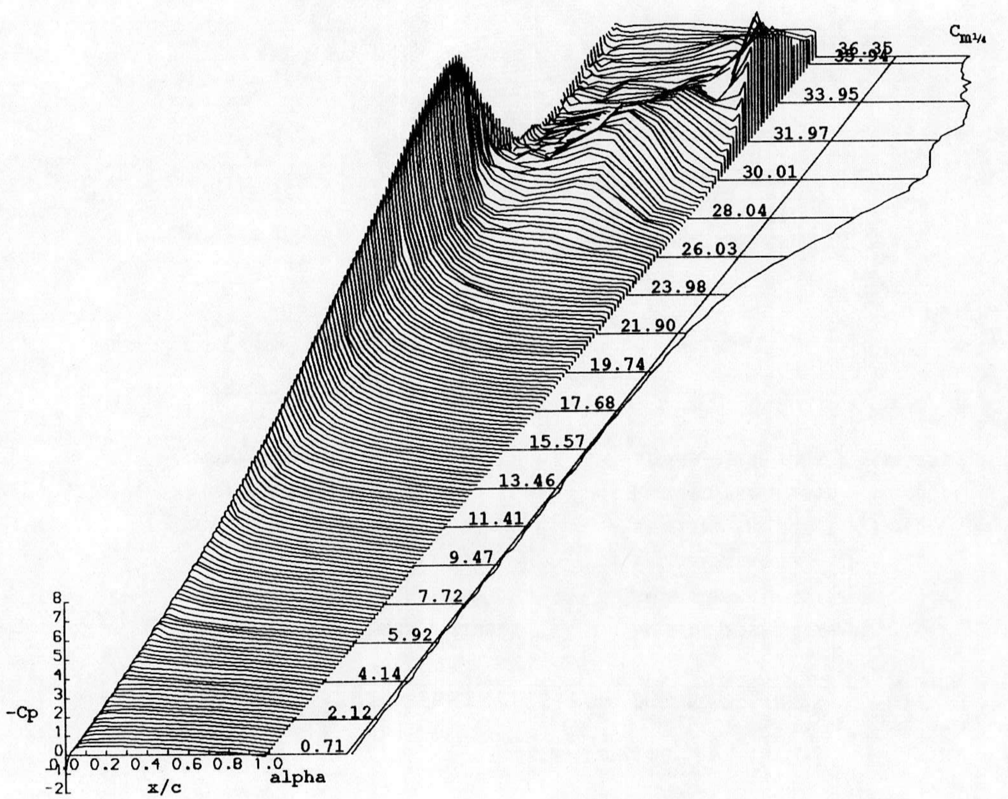
MACH NUMBER = 0.169

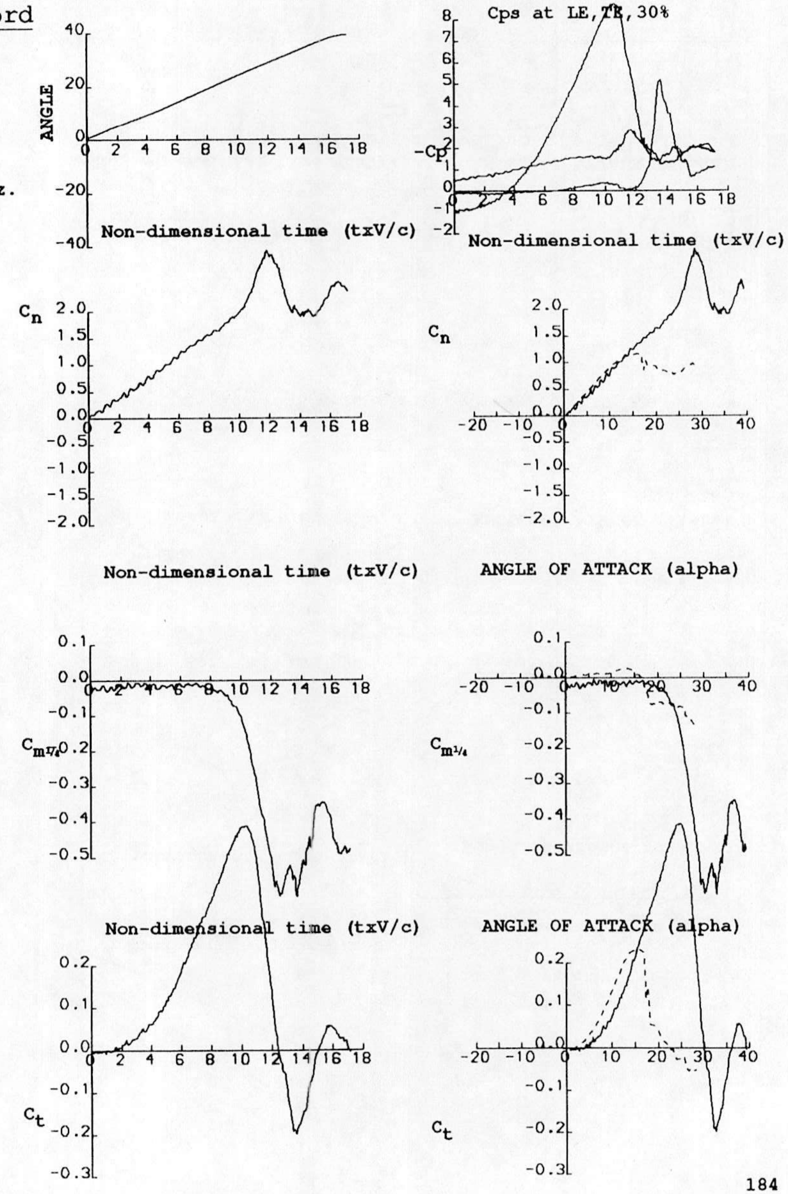
AIR TEMPERATURE = 31.2°C

SAMPLING FREQUENCY = 12760.00 Hz.

REDUCED PITCH RATE = 0.02150

LINEAR PITCH RATE = 529.36°S^{-1}





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DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 821991

REYNOLDS NUMBER = 880916.

DYNAMIC PRESSURE = 1333.23 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91

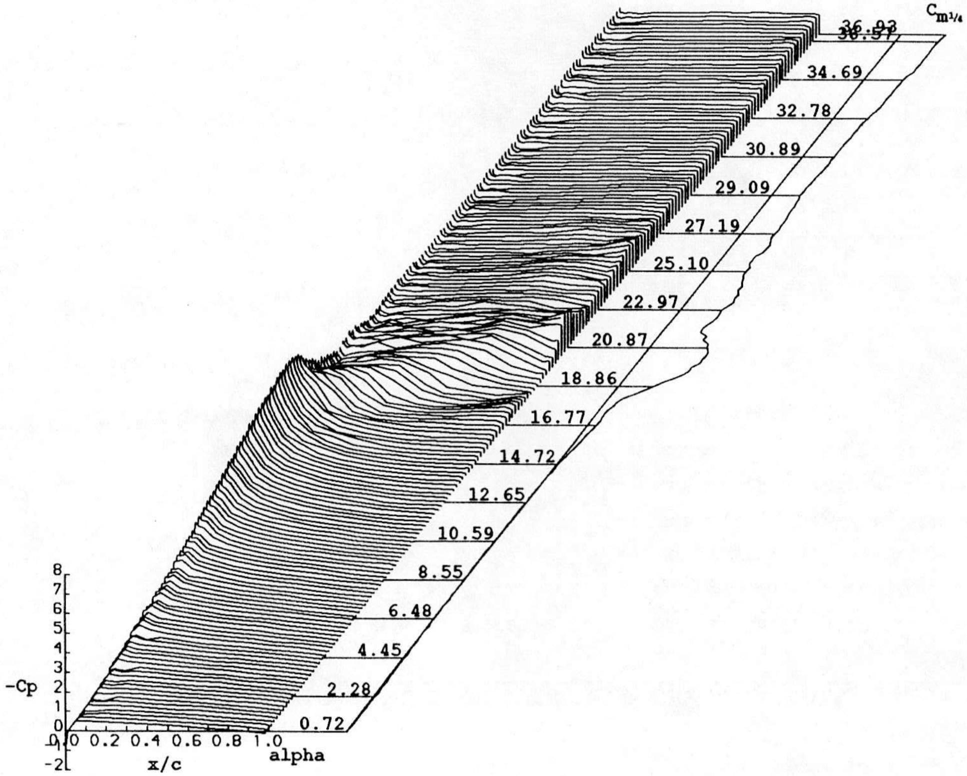
MACH NUMBER = 0.139

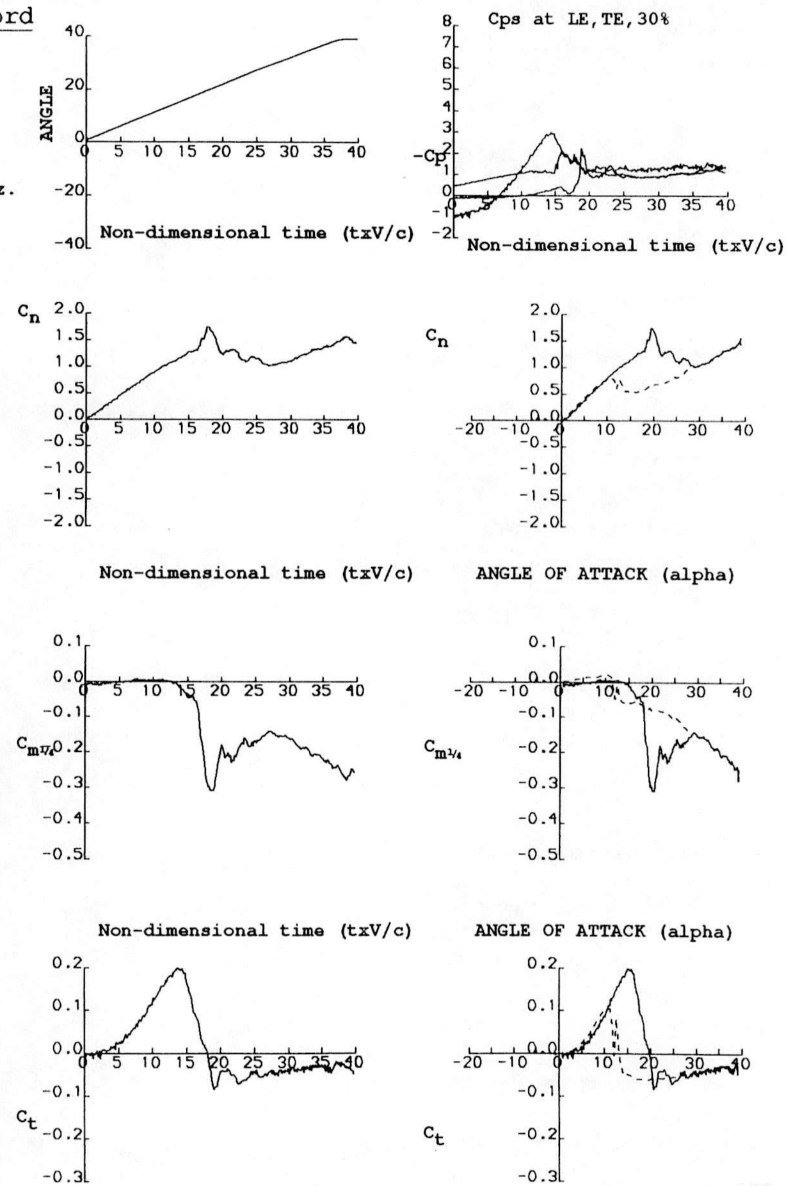
AIR TEMPERATURE = 15.8°C

SAMPLING FREQUENCY = 4405.00 Hz.

REDUCED PITCH RATE = 0.00921

LINEAR PITCH RATE = 181.38°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822001

REYNOLDS NUMBER = 875670.

DYNAMIC PRESSURE = 1329.17 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91

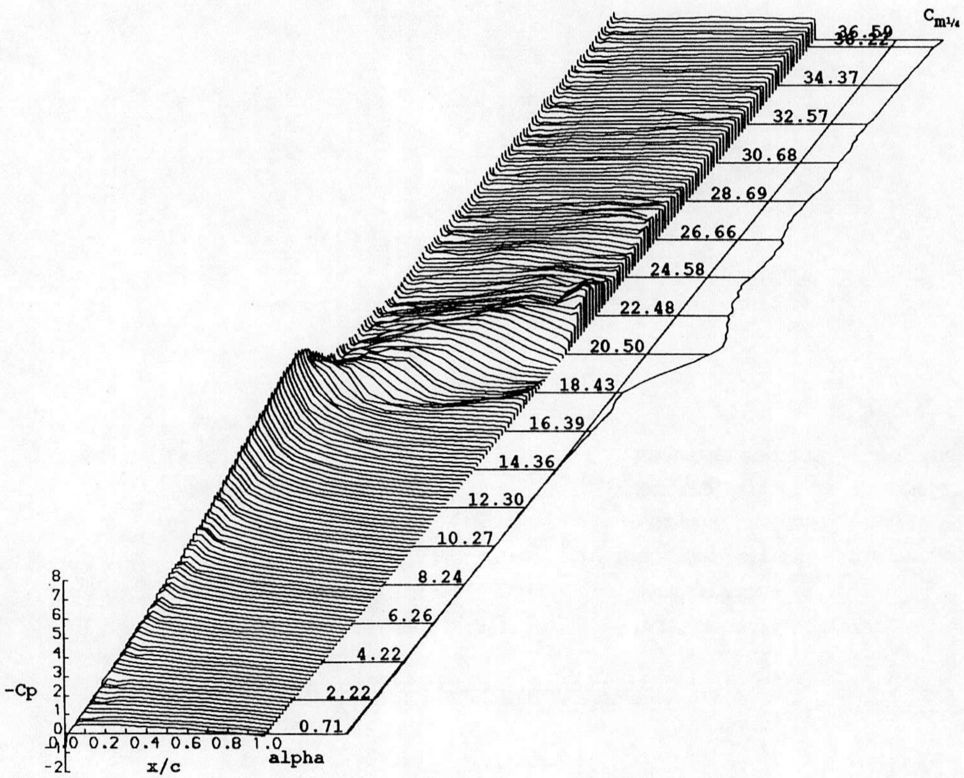
MACH NUMBER = 0.138

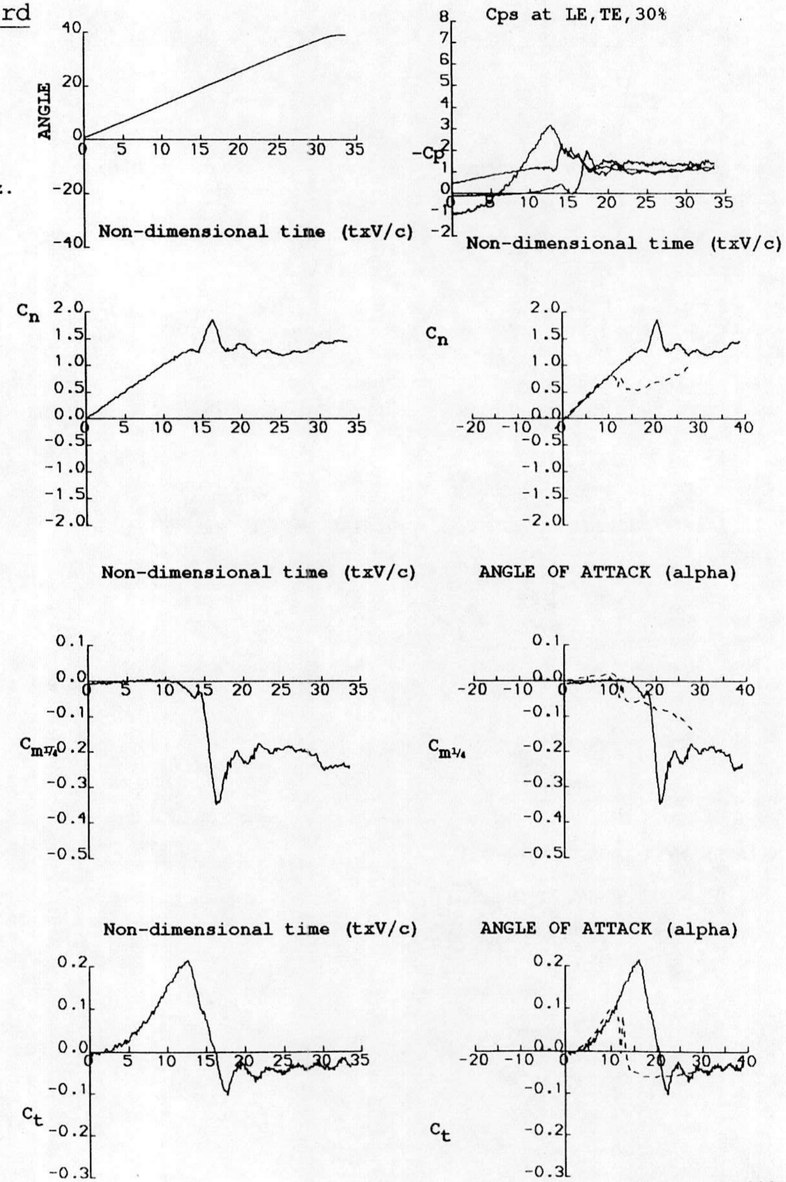
AIR TEMPERATURE = 16.8°C

SAMPLING FREQUENCY = 5208.00 Hz.

REDUCED PITCH RATE = 0.01082

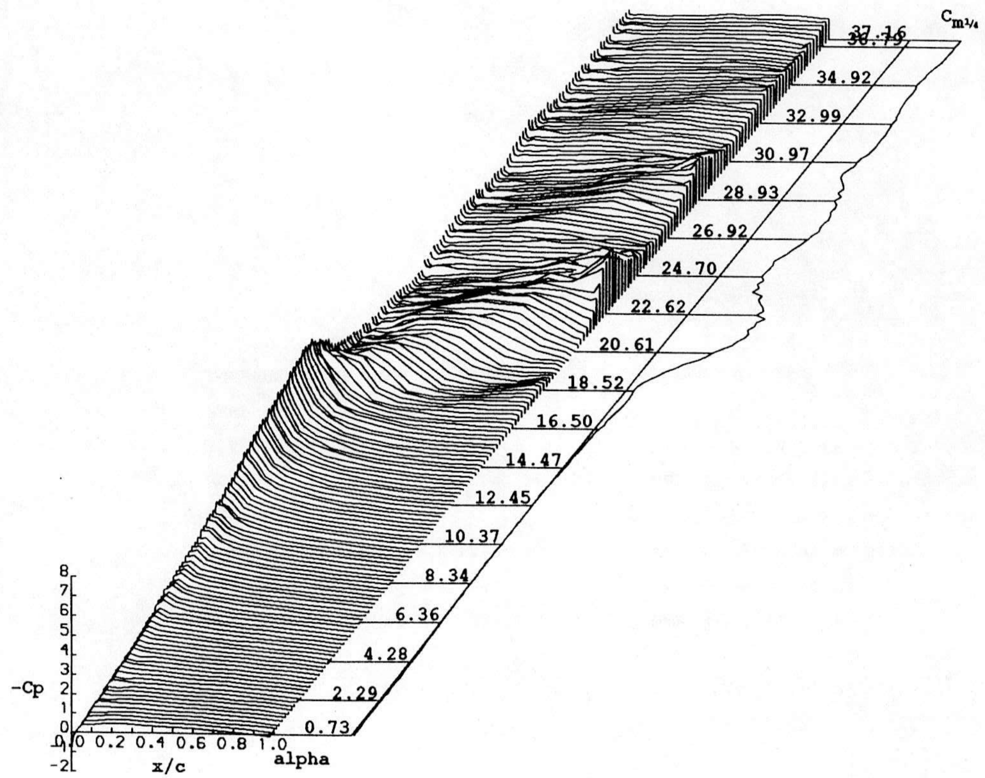
LINEAR PITCH RATE = 213.03°S^{-1}

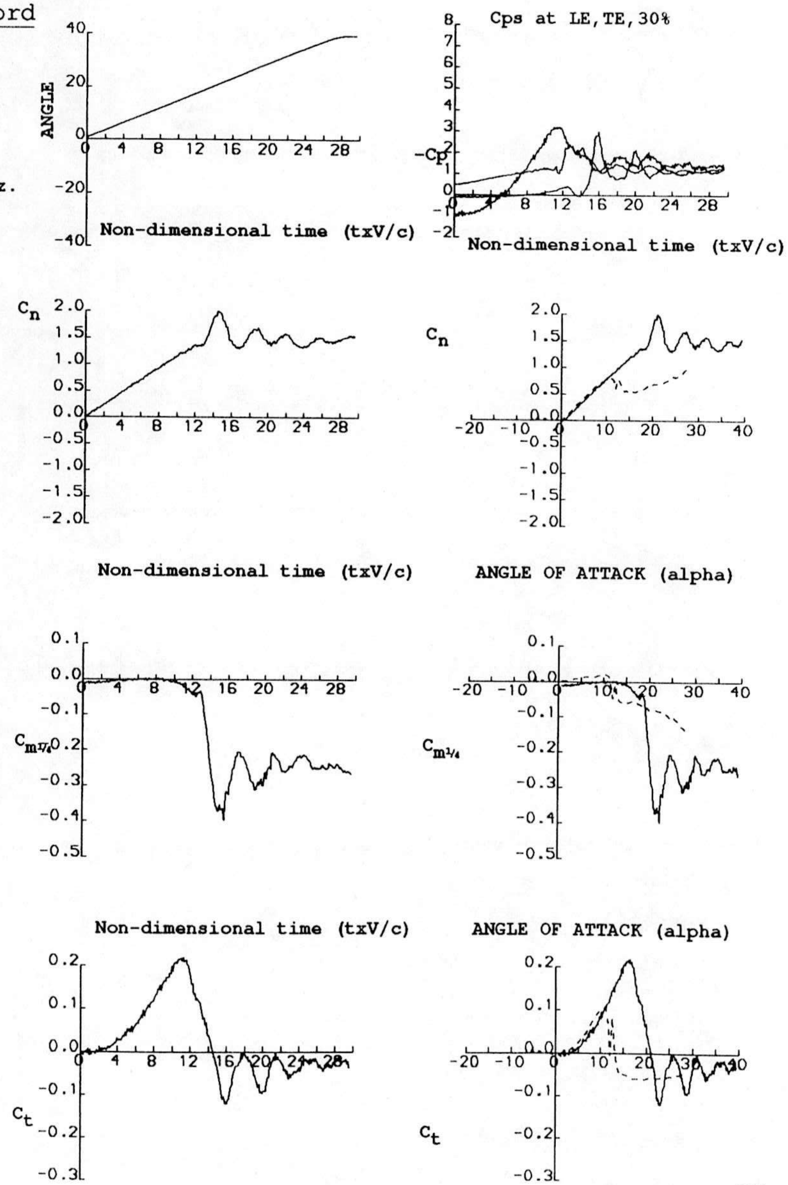




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822011	DATE OF TEST: 1/10/91
REYNOLDS NUMBER = 871340.	MACH NUMBER = 0.138
DYNAMIC PRESSURE = 1324.26 Nm^{-2}	AIR TEMPERATURE = 17.5°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 5917.00 Hz.
MOTION TYPE: RAMP UP	REDUCED PITCH RATE = 0.01228
START ANGLE = -1.00°	LINEAR PITCH RATE = 241.72°s^{-1}
RAMP ARC = 40.000°	
AVERAGED DATA OF 5 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822021

REYNOLDS NUMBER = 867225.

DYNAMIC PRESSURE = 1318.76 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91

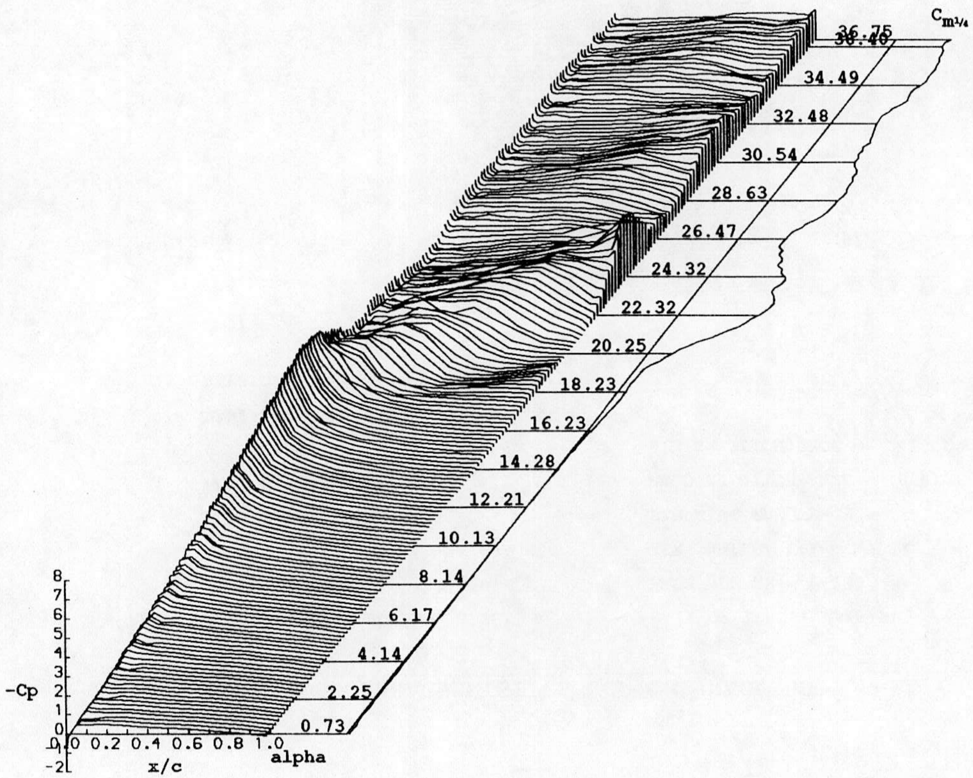
MACH NUMBER = 0.138

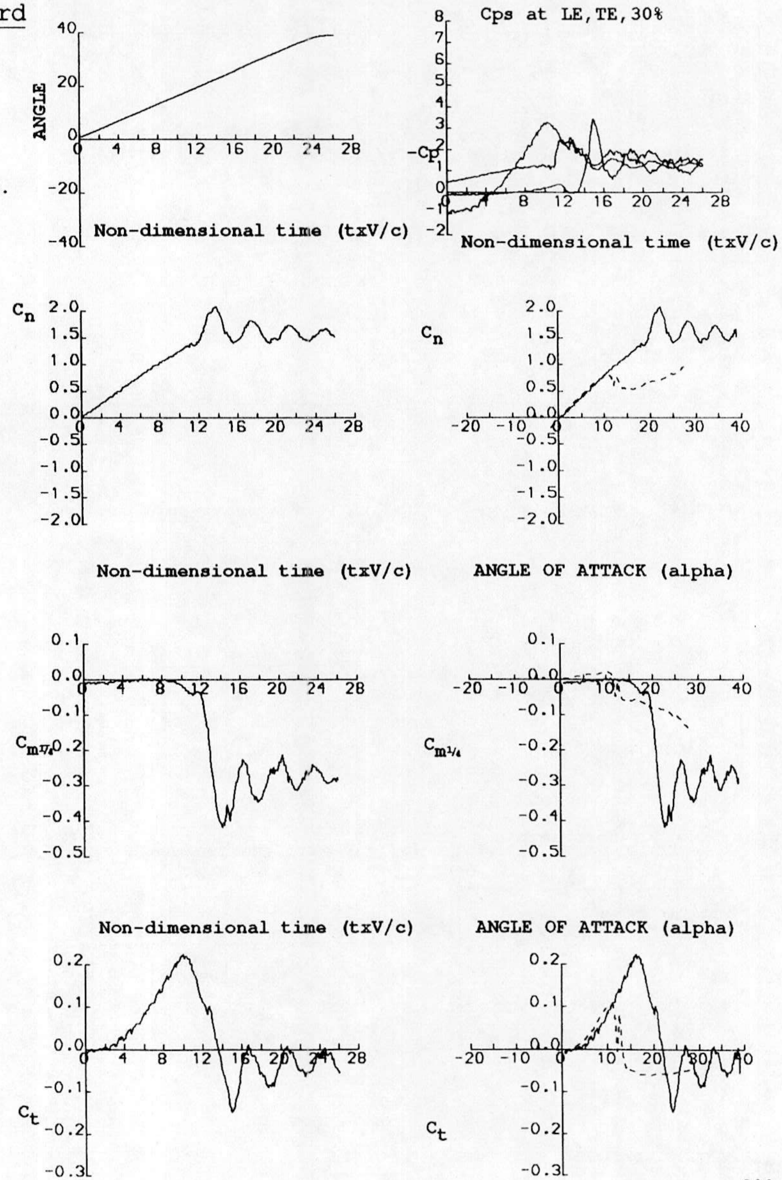
AIR TEMPERATURE = 18.1°C

SAMPLING FREQUENCY = 6711.00 Hz.

REDUCED PITCH RATE = 0.01380

LINEAR PITCH RATE = 271.38°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822031

REYNOLDS NUMBER = 867320.

DYNAMIC PRESSURE = 1327.22 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91

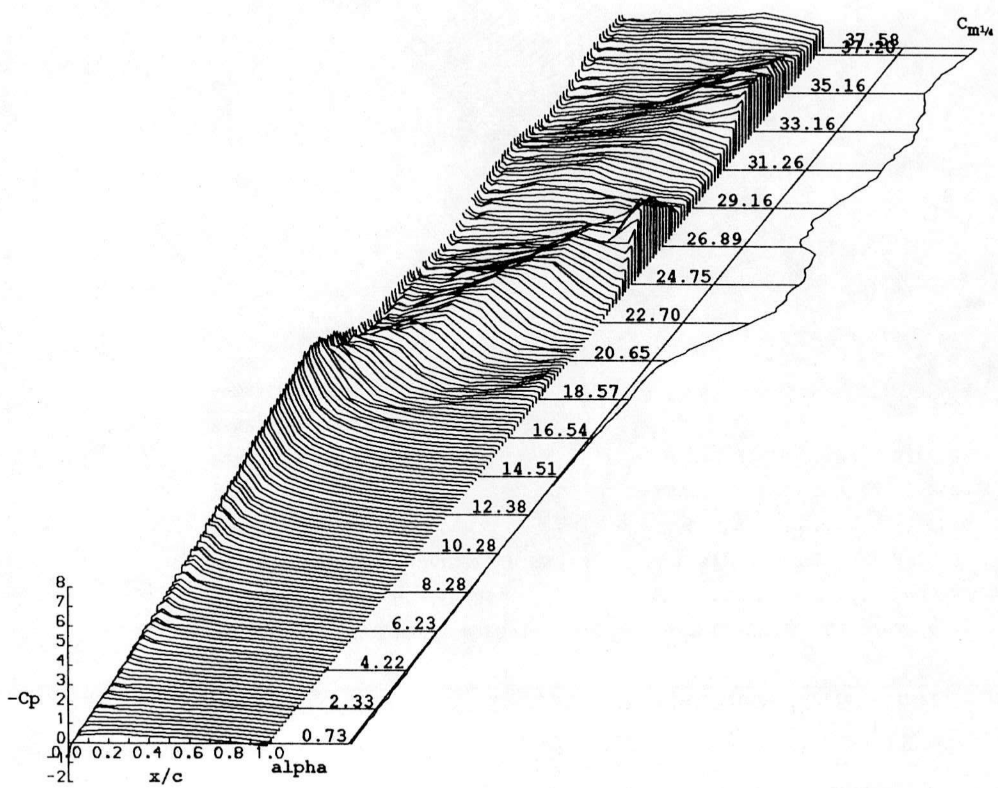
MACH NUMBER = 0.138

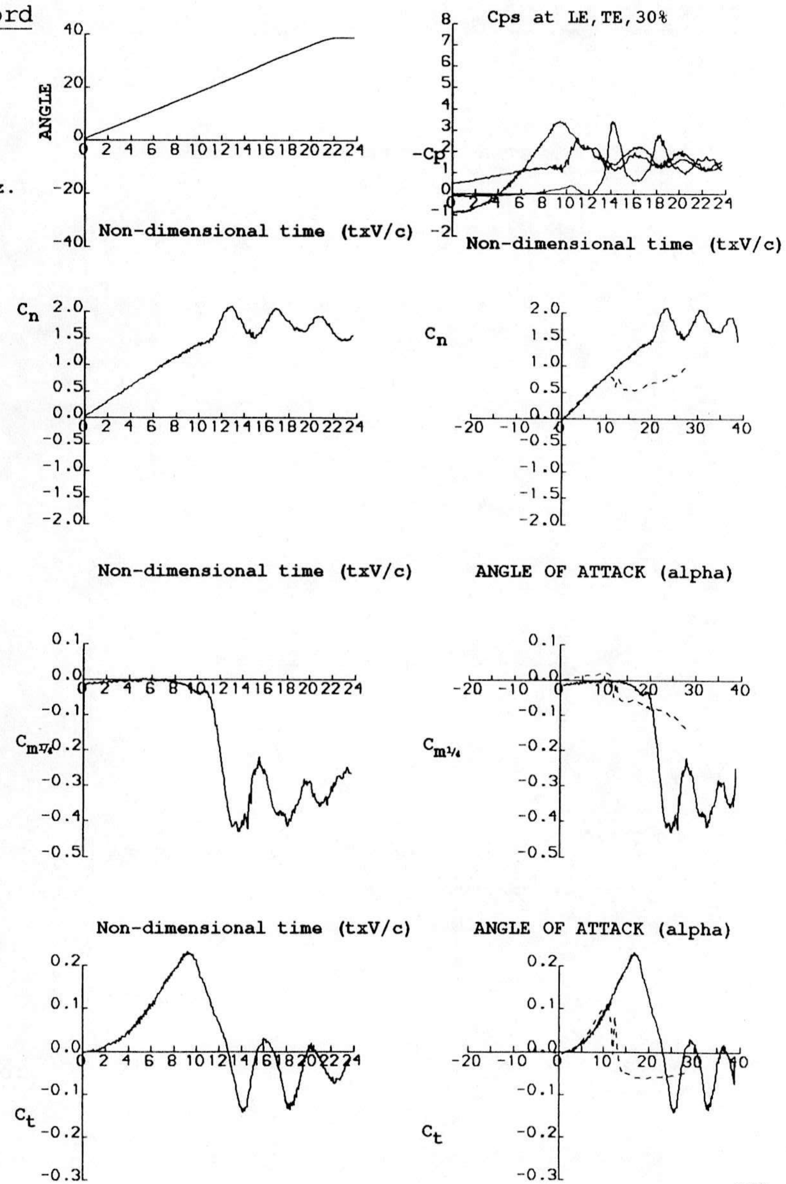
AIR TEMPERATURE = 18.8°C

SAMPLING FREQUENCY = 7407.00 Hz.

REDUCED PITCH RATE = 0.01554

LINEAR PITCH RATE = 306.81°S^{-1}

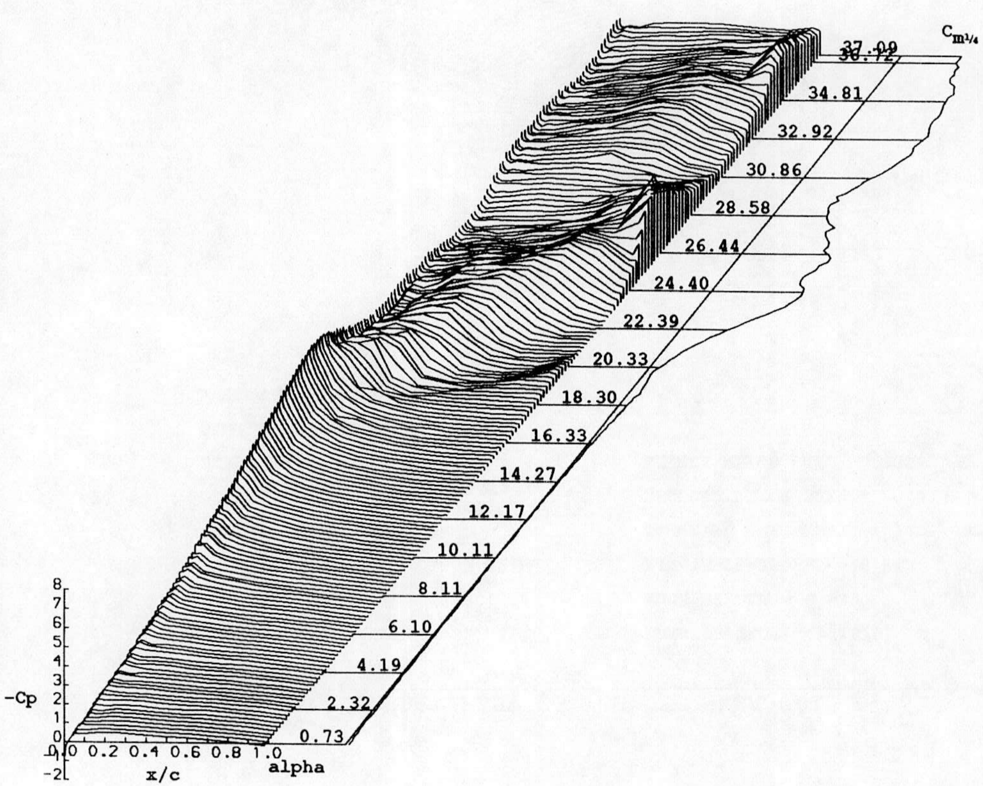


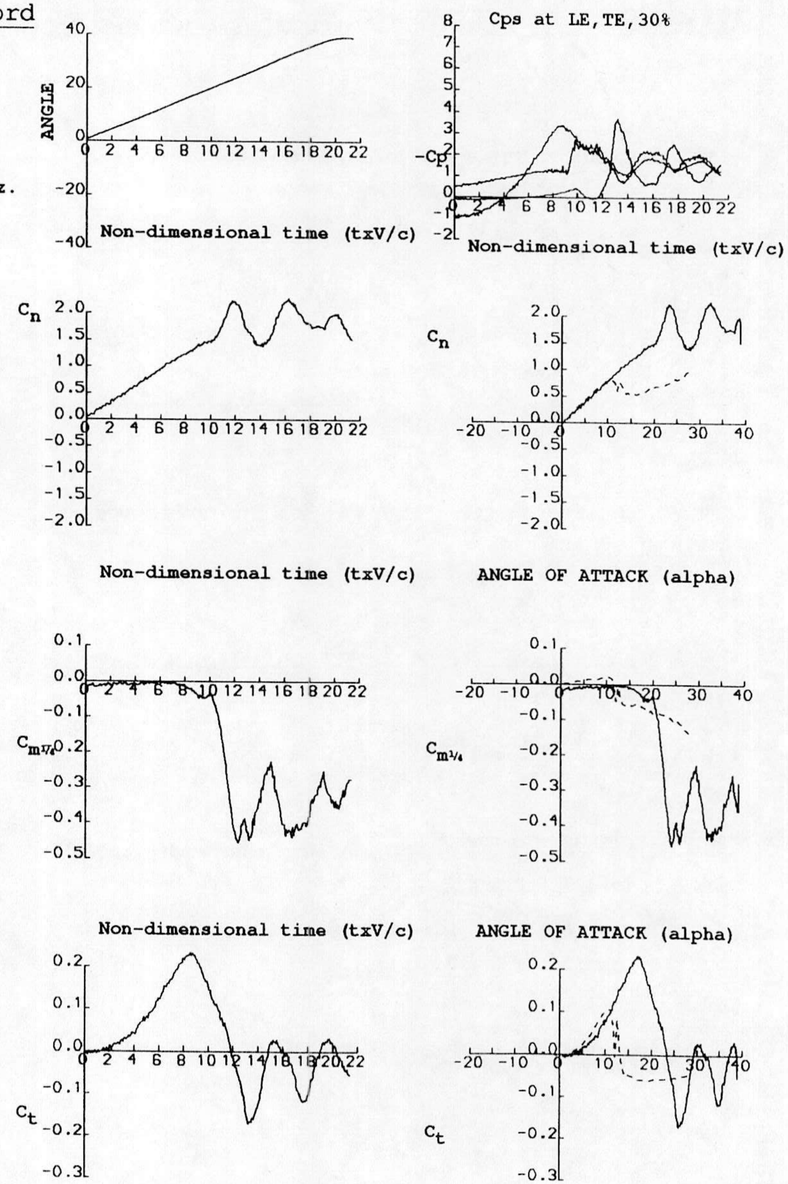


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822041
REYNOLDS NUMBER = 867156.
DYNAMIC PRESSURE = 1331.40 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91
MACH NUMBER = 0.139
AIR TEMPERATURE = 19.2°C
SAMPLING FREQUENCY = 8219.00 Hz.
REDUCED PITCH RATE = 0.01701
LINEAR PITCH RATE = 336.73°S^{-1}

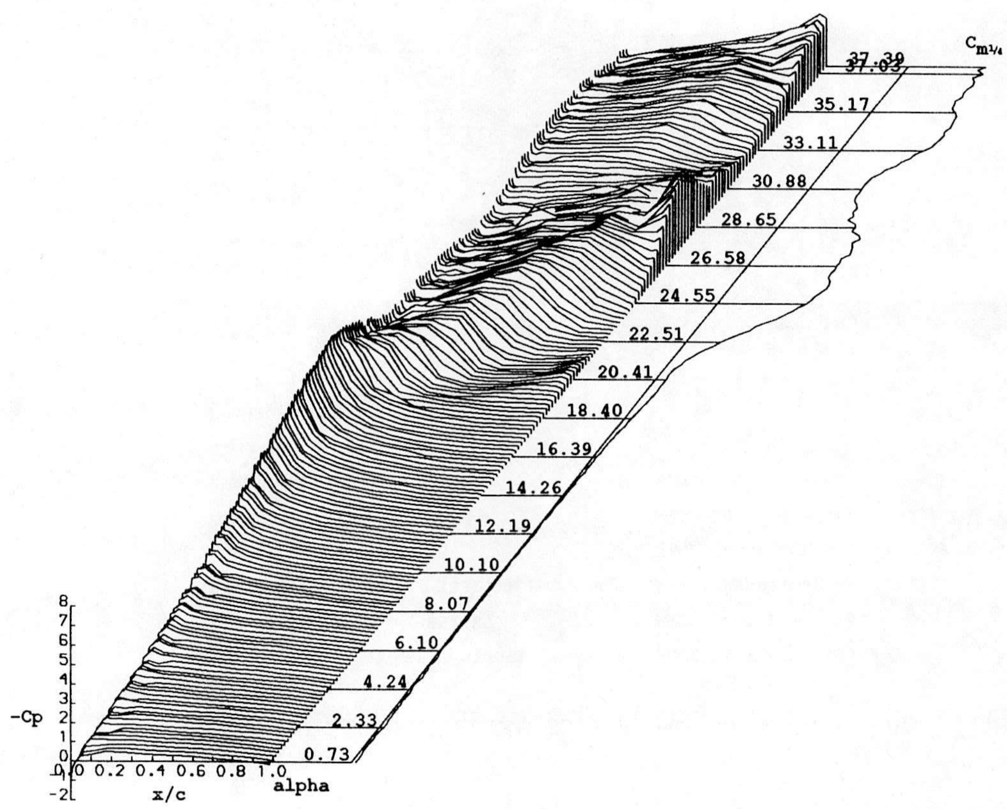


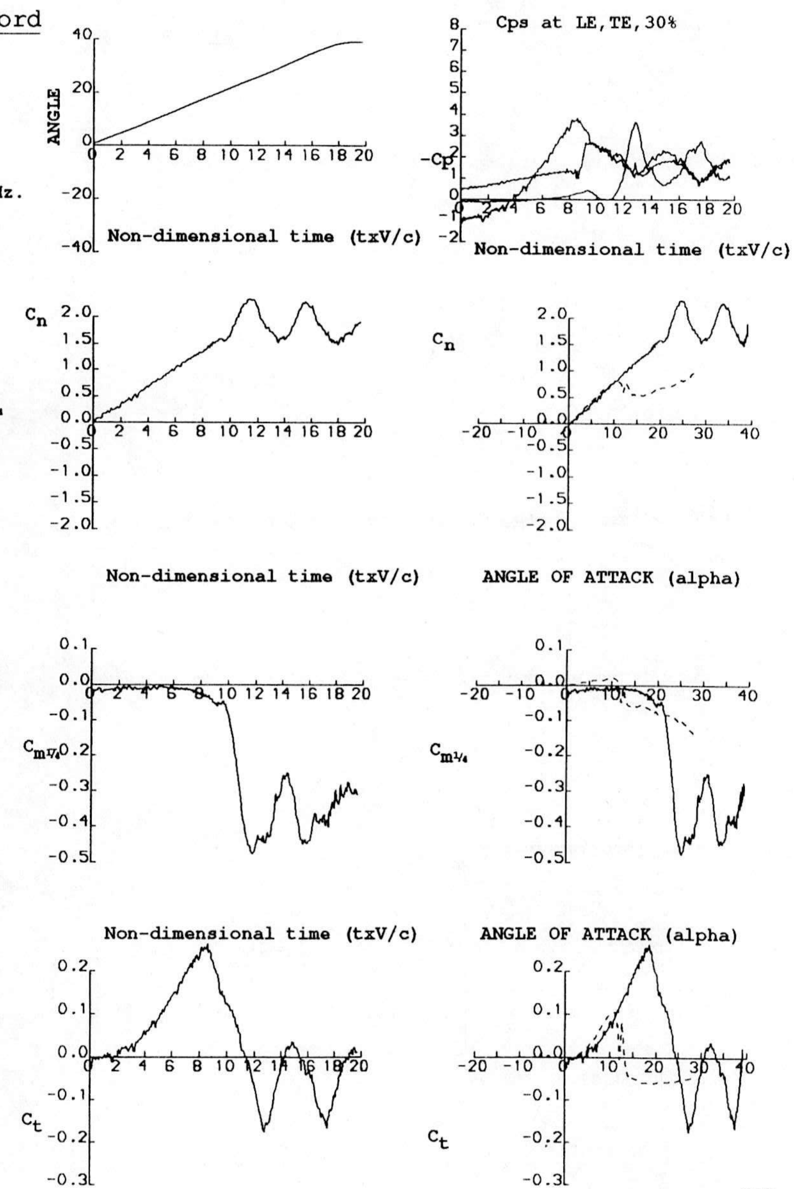


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822051
REYNOLDS NUMBER = 863564.
DYNAMIC PRESSURE = 1326.20 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

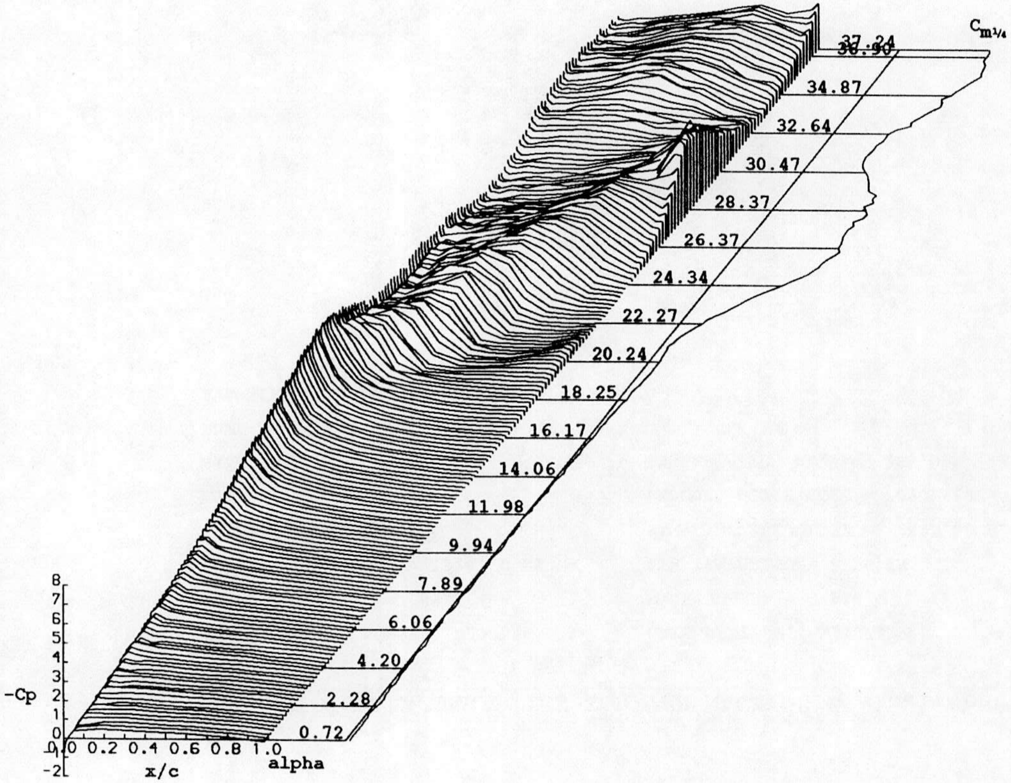
DATE OF TEST: 1/10/91
MACH NUMBER = 0.138
AIR TEMPERATURE = 19.7°C
SAMPLING FREQUENCY = 8928.00 Hz.
REDUCED PITCH RATE = 0.01862
LINEAR PITCH RATE = 368.06°S^{-1}

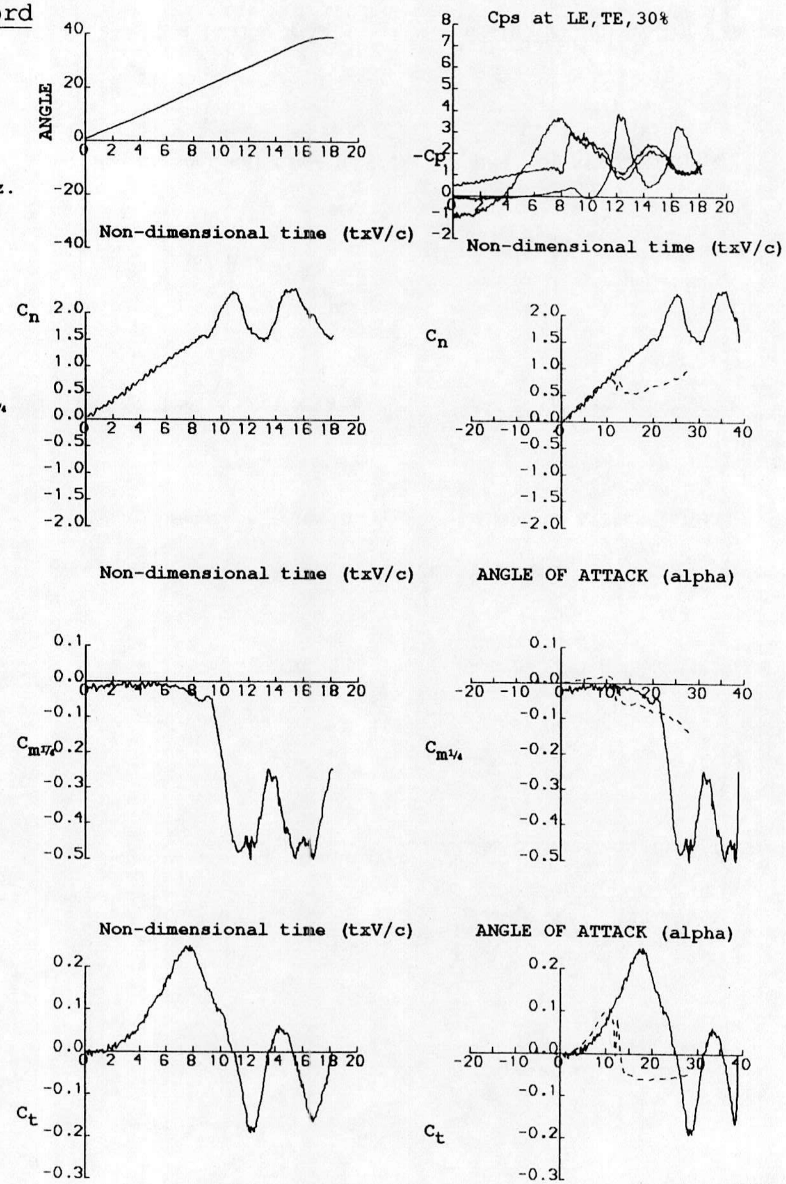




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822061	DATE OF TEST: 1/10/91
REYNOLDS NUMBER = 862887.	MACH NUMBER = 0.139
DYNAMIC PRESSURE = 1331.11 Nm^{-2}	AIR TEMPERATURE = 20.3°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 9708.00 Hz.
MOTION TYPE: RAMP UP	REDUCED PITCH RATE = 0.02013
START ANGLE = -1.00°	LINEAR PITCH RATE = 399.13°S^{-1}
RAMP ARC = 40.000°	
AVERAGED DATA OF 5 CYCLES	

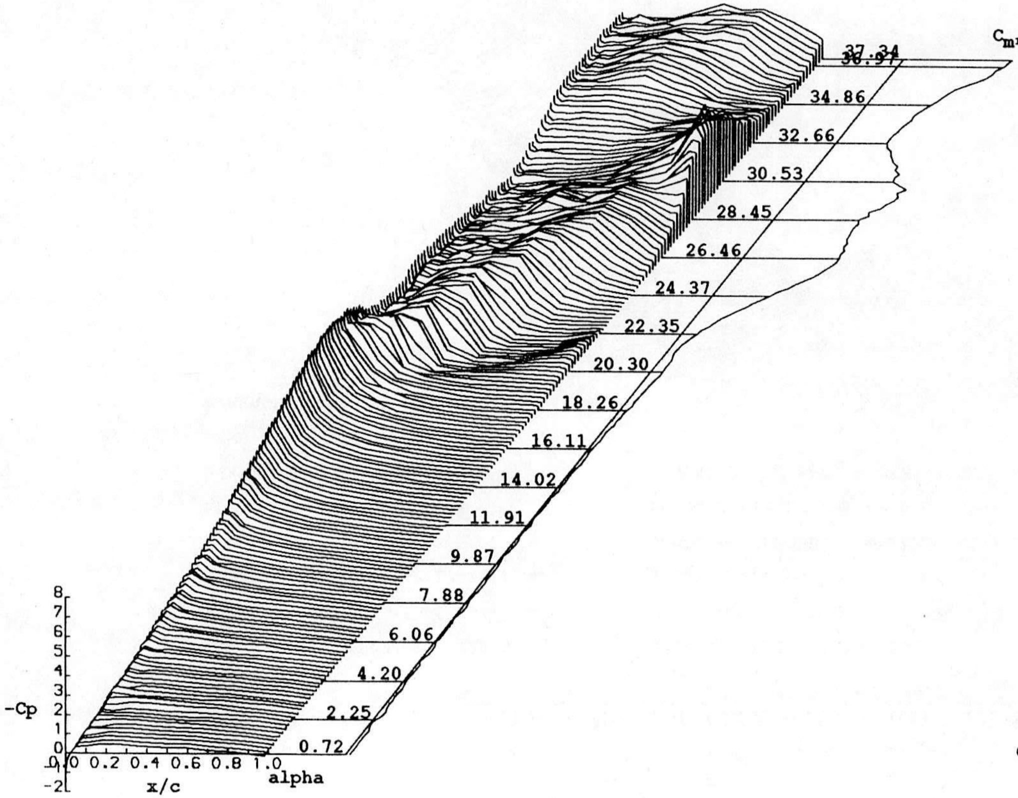


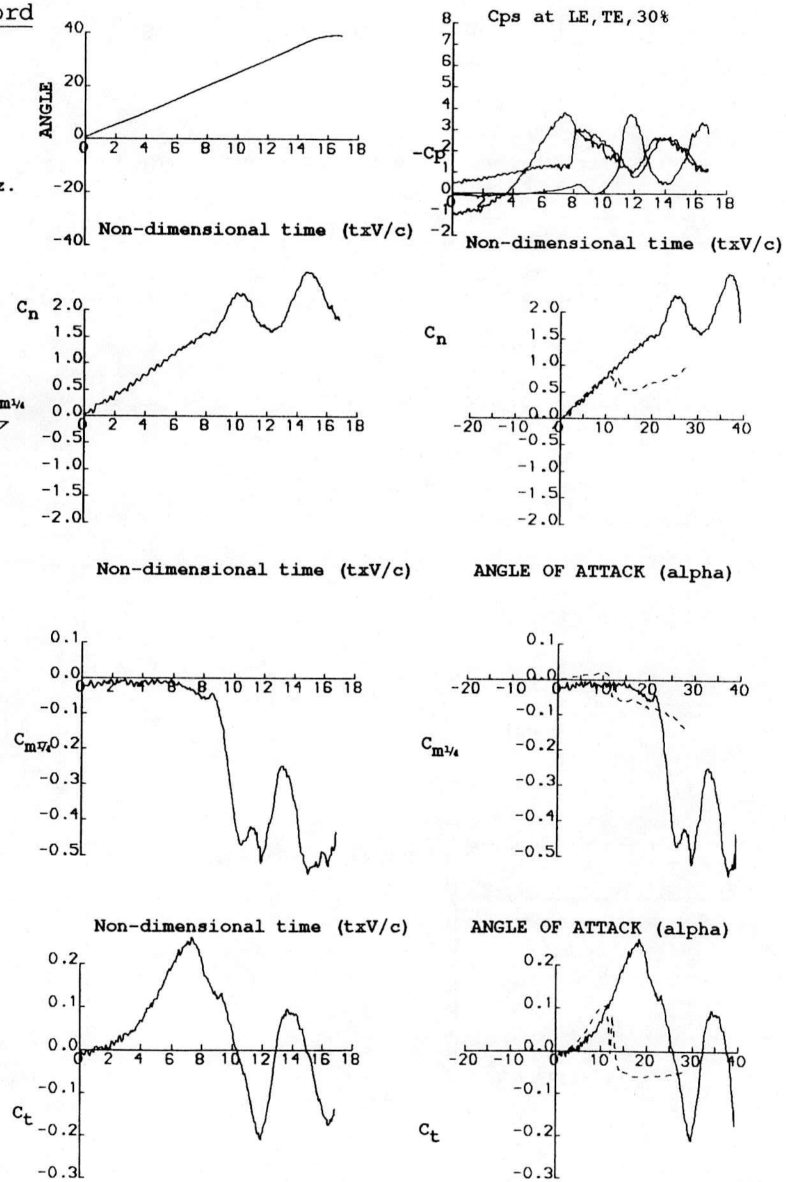


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822071
REYNOLDS NUMBER = 856202.
DYNAMIC PRESSURE = 1314.01 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91
MACH NUMBER = 0.138
AIR TEMPERATURE = 20.6°C
SAMPLING FREQUENCY = 10410.00 Hz.
REDUCED PITCH RATE = 0.02213
LINEAR PITCH RATE = 436.07°s^{-1}

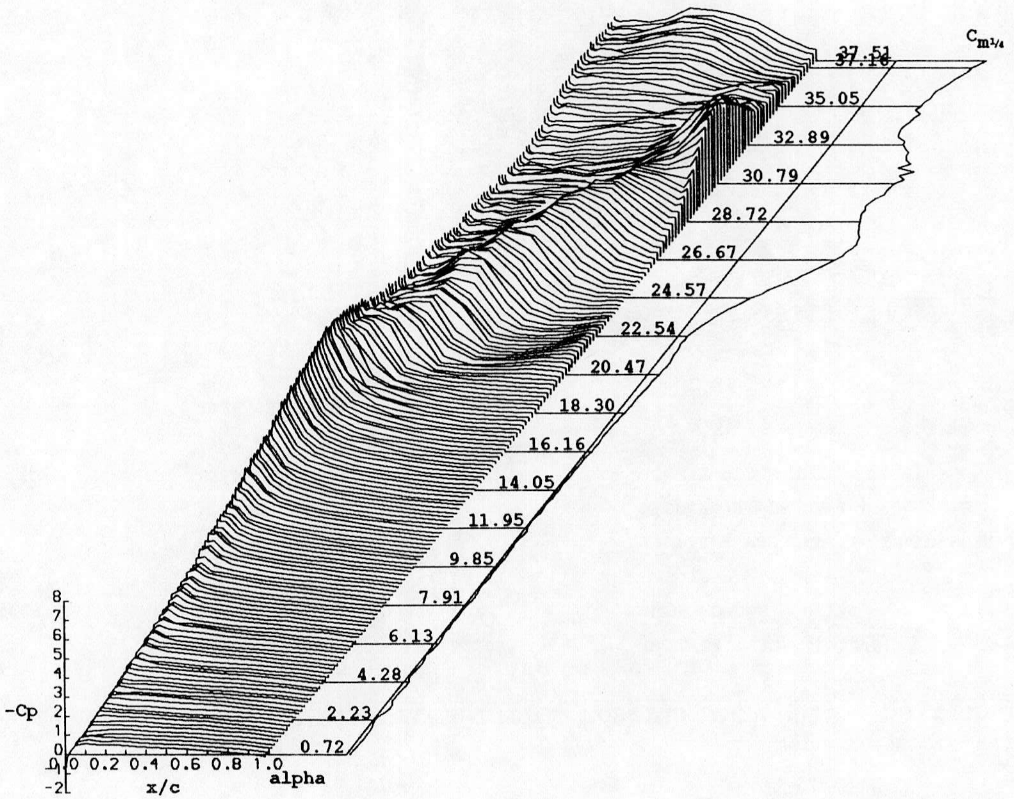


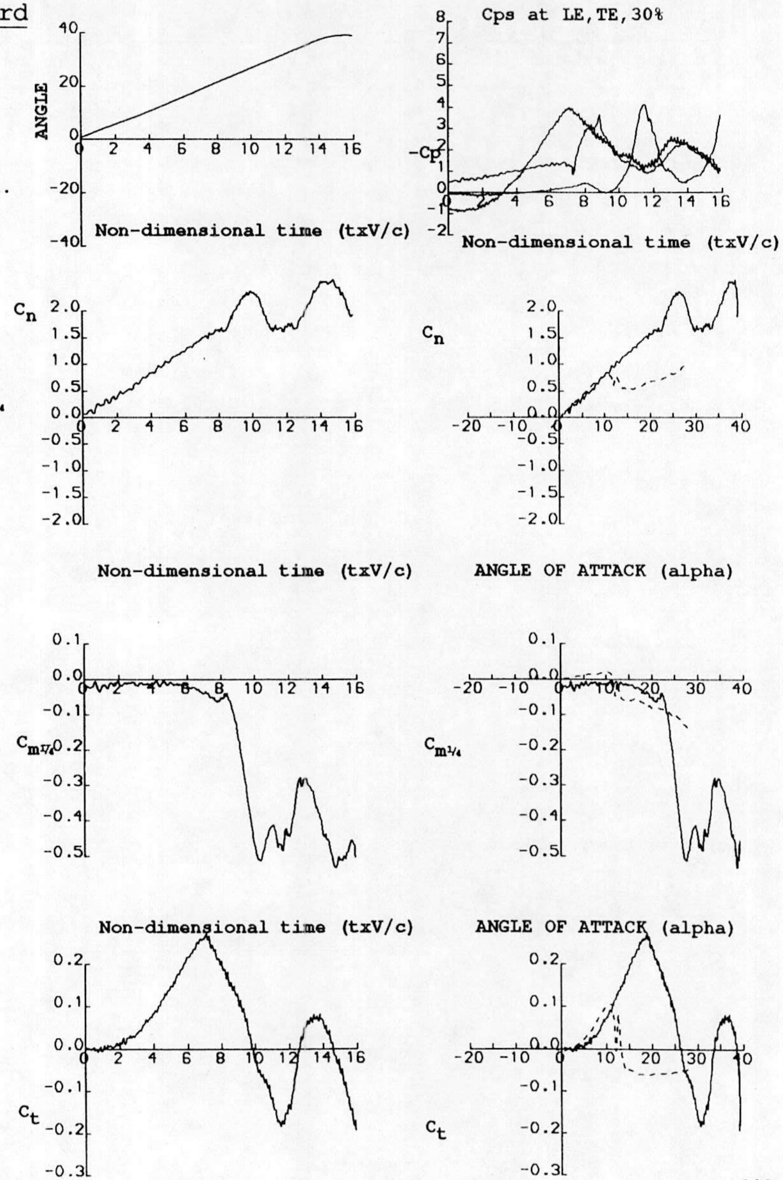


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822081
REYNOLDS NUMBER = 860994.
DYNAMIC PRESSURE = 1333.42 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91
MACH NUMBER = 0.139
AIR TEMPERATURE = 21.0°C
SAMPLING FREQUENCY = 11110.00 Hz.
REDUCED PITCH RATE = 0.02386
LINEAR PITCH RATE = 474.00°s^{-1}

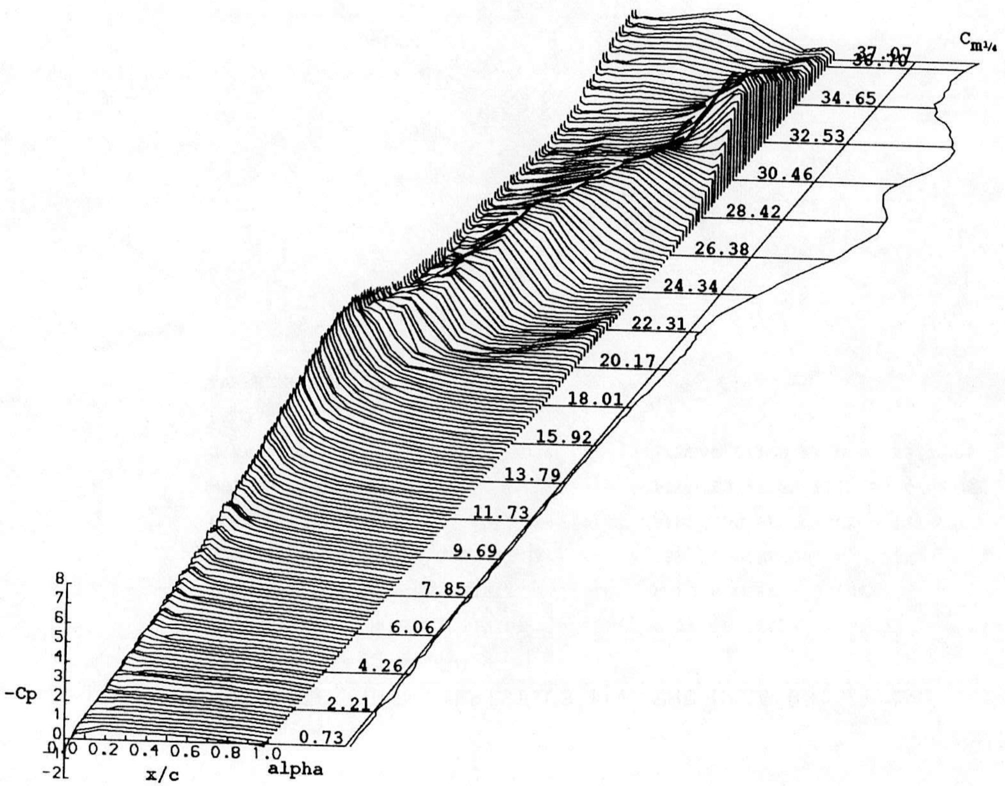


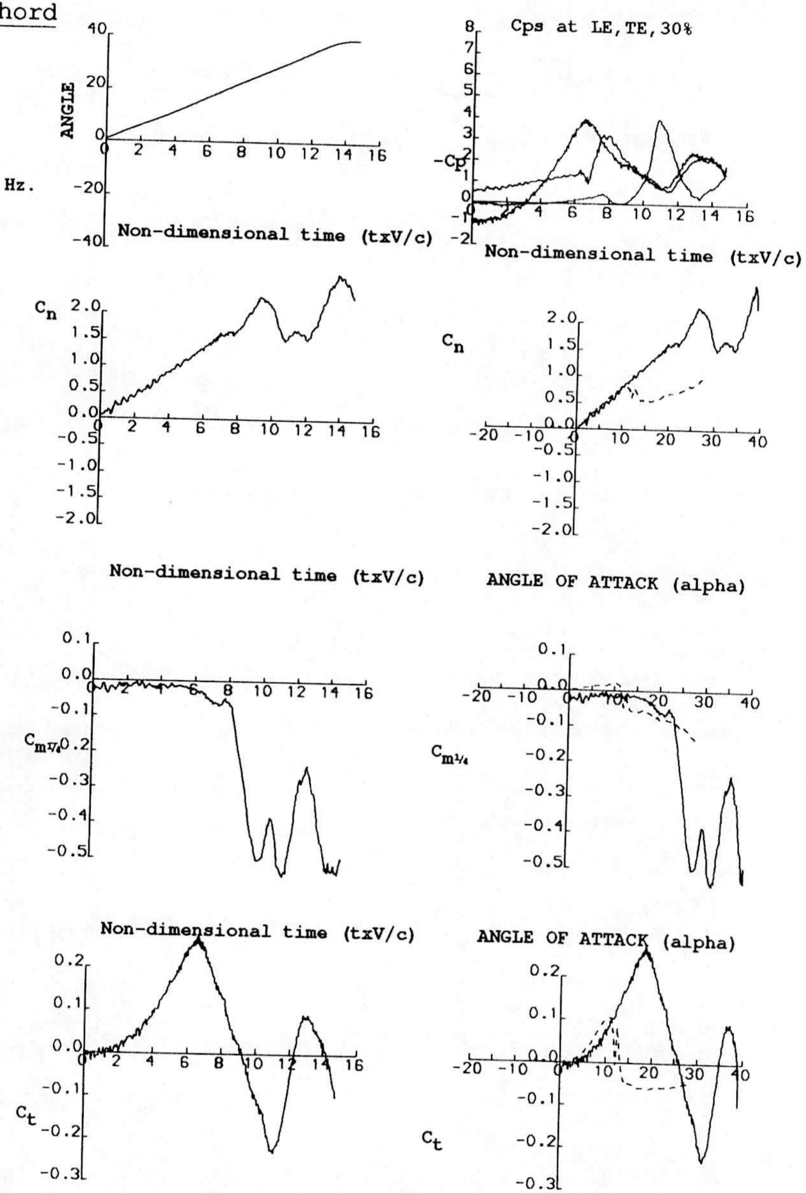


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822091
REYNOLDS NUMBER = 854416.
DYNAMIC PRESSURE = 1317.71 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91
MACH NUMBER = 0.138
AIR TEMPERATURE = 21.4°C
SAMPLING FREQUENCY = 11900.00 Hz.
REDUCED PITCH RATE = 0.02533
LINEAR PITCH RATE = 500.61°s^{-1}

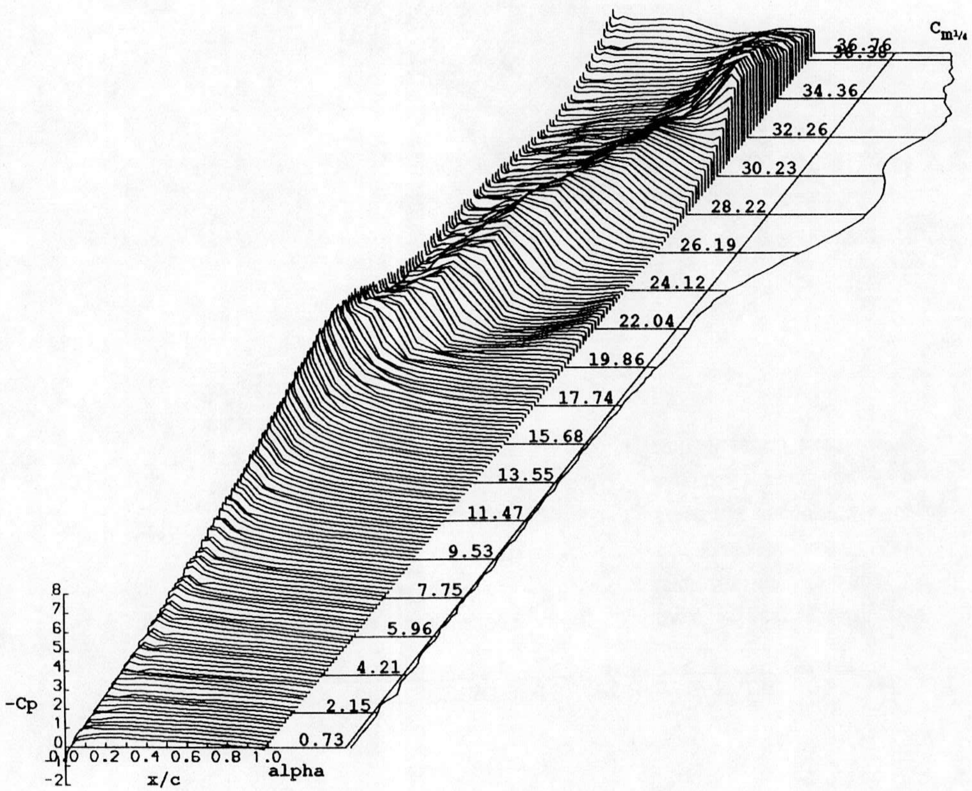


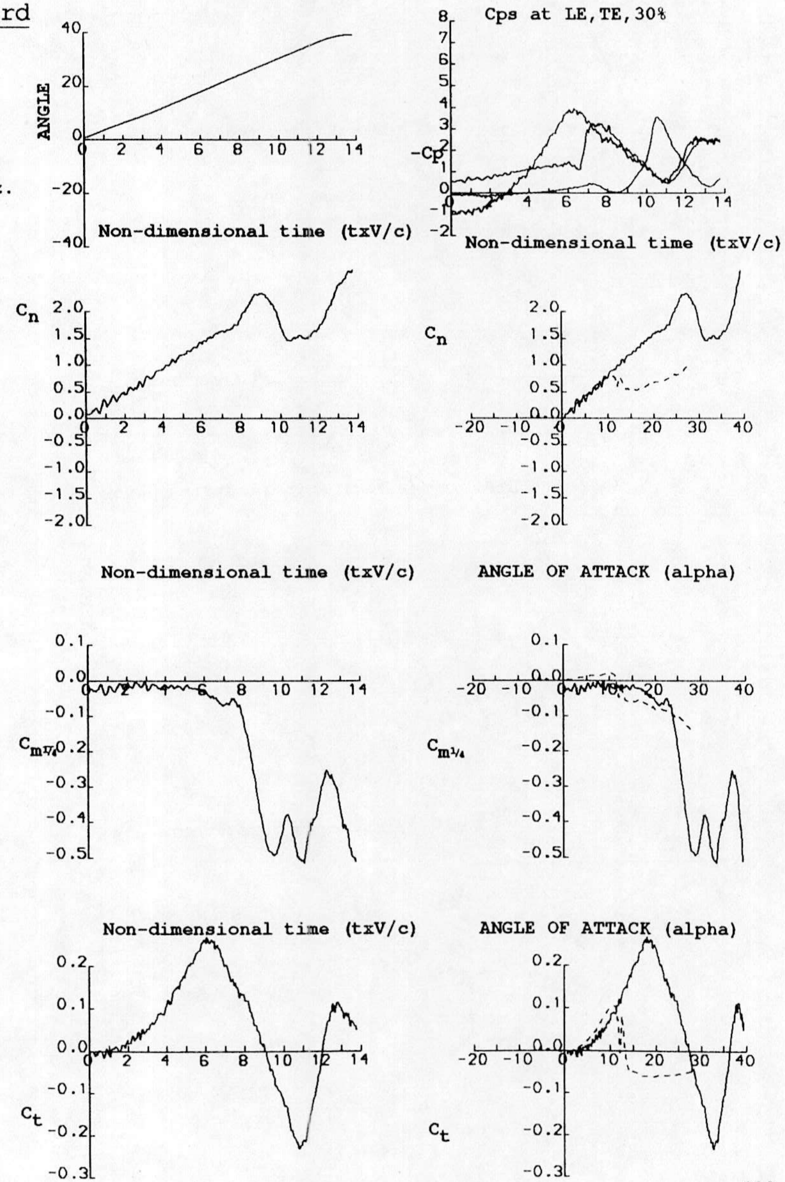


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822101
REYNOLDS NUMBER = 853218.
DYNAMIC PRESSURE = 1317.46 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 40.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91
MACH NUMBER = 0.138
AIR TEMPERATURE = 21.7°C
SAMPLING FREQUENCY = 12760.00 Hz.
REDUCED PITCH RATE = 0.02705
LINEAR PITCH RATE = 534.82°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822231

REYNOLDS NUMBER = 1100296.

DYNAMIC PRESSURE = 2044.93 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91

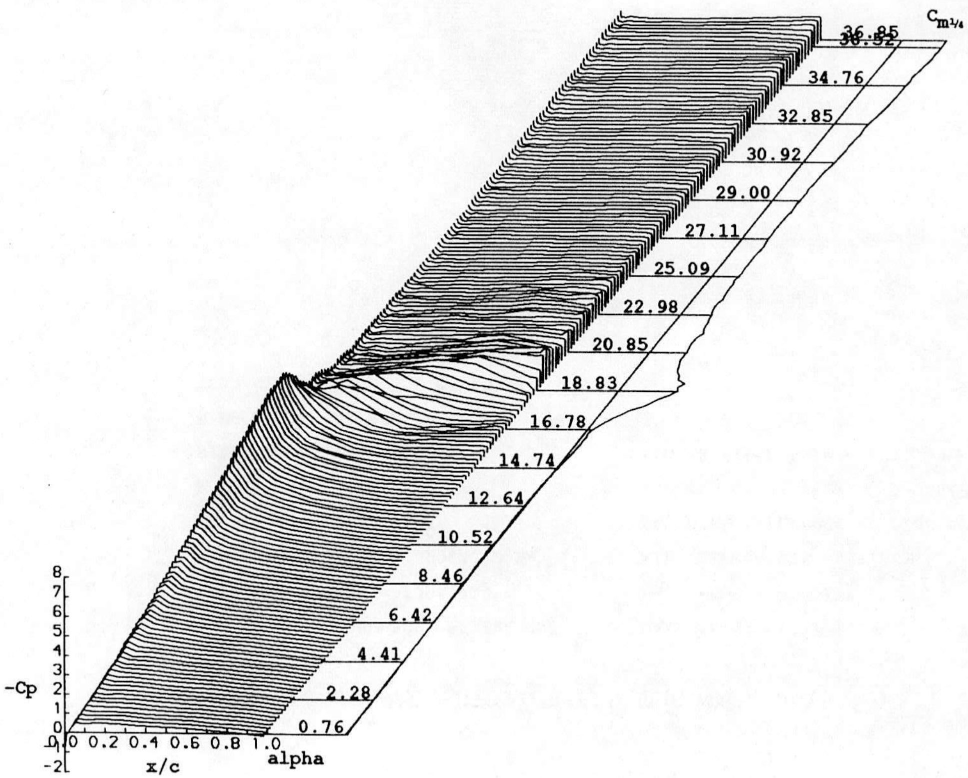
MACH NUMBER = 0.170

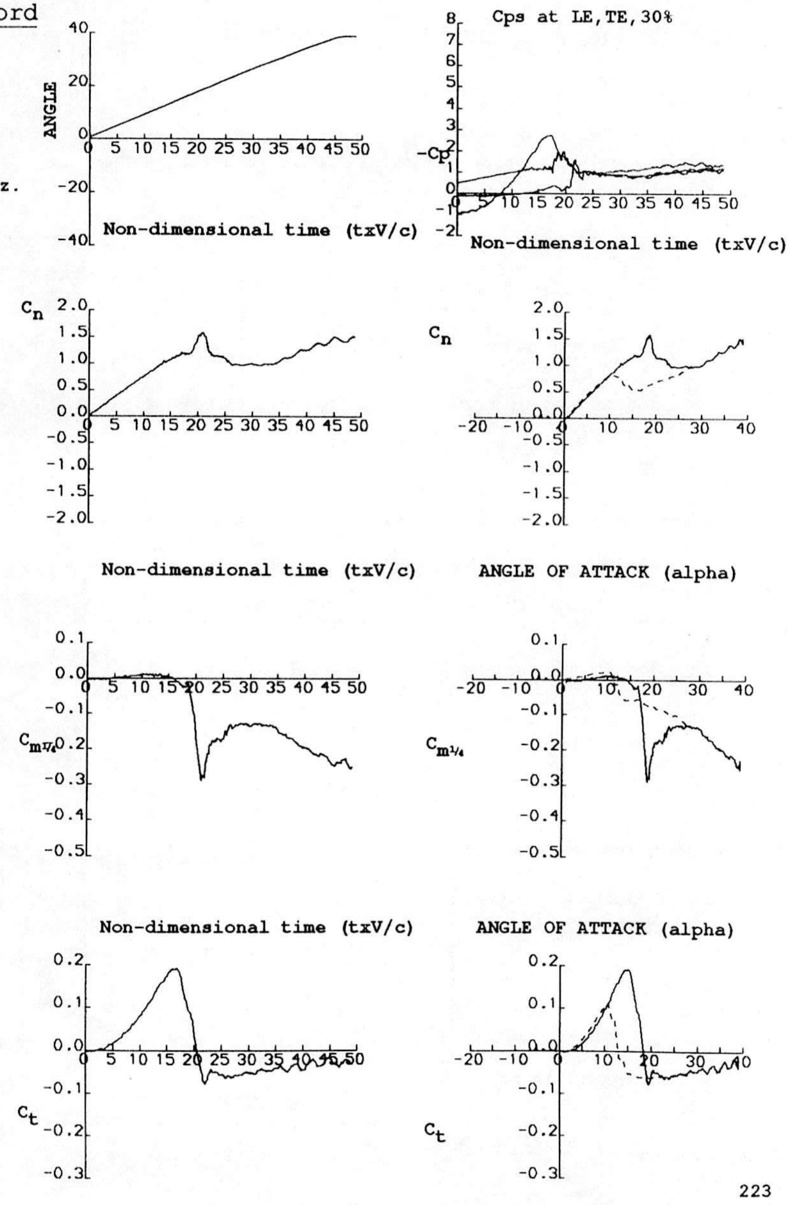
AIR TEMPERATURE = 16.1°C

SAMPLING FREQUENCY = 4405.00 Hz.

REDUCED PITCH RATE = 0.00750

LINEAR PITCH RATE = 181.20°s^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822241

REYNOLDS NUMBER = 1094321.

DYNAMIC PRESSURE = 2062.63 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91

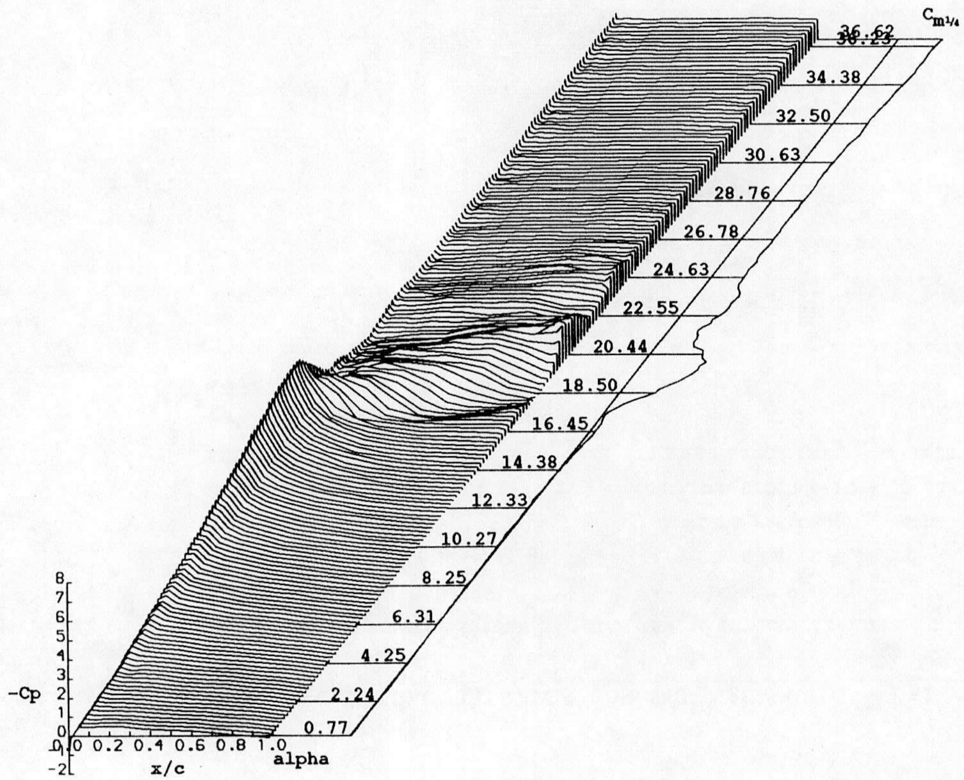
MACH NUMBER = 0.171

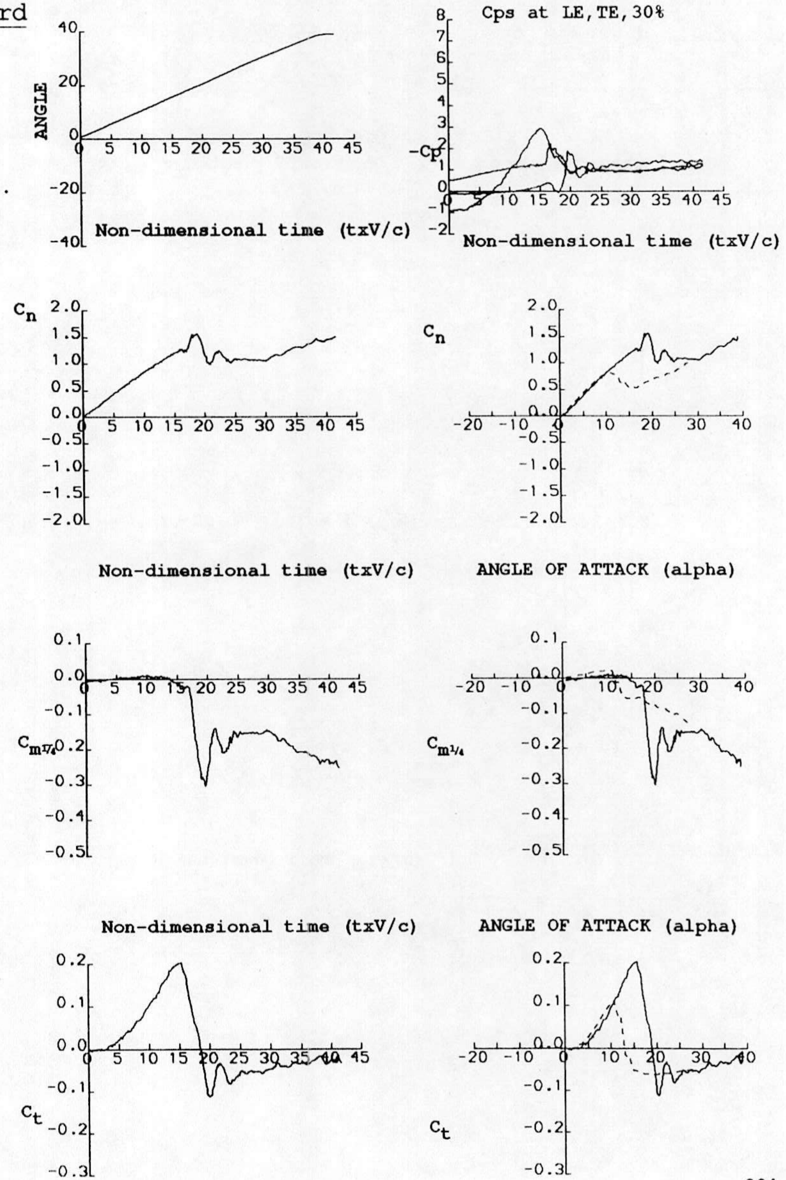
AIR TEMPERATURE = 18.3°C

SAMPLING FREQUENCY = 5208.00 Hz.

REDUCED PITCH RATE = 0.00868

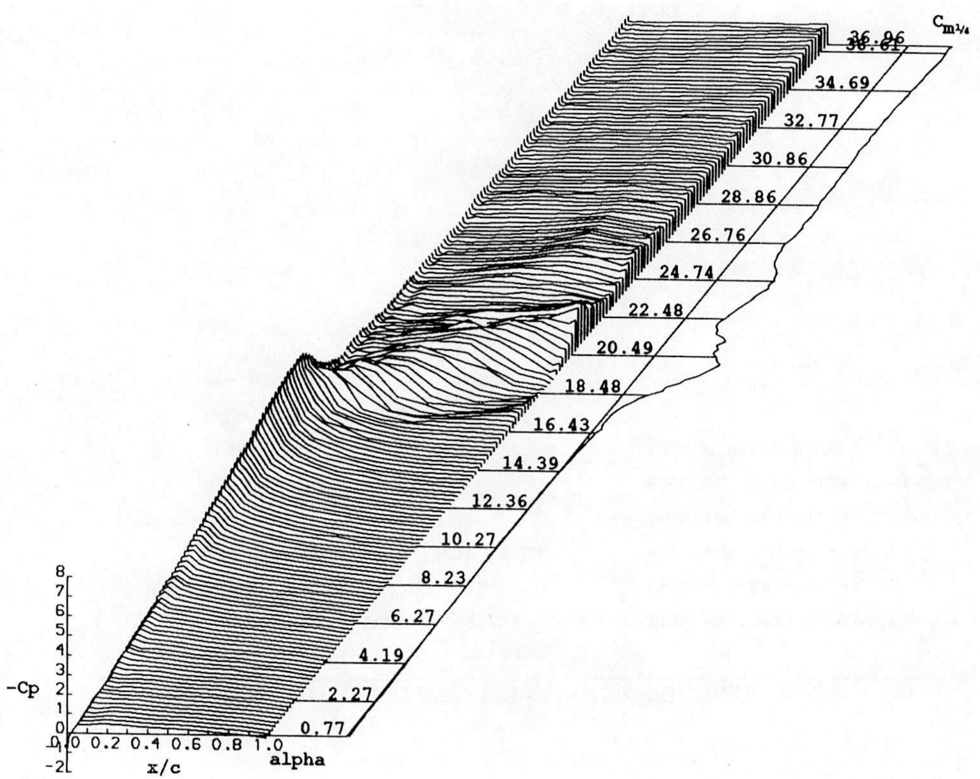
LINEAR PITCH RATE = 211.34°S^{-1}

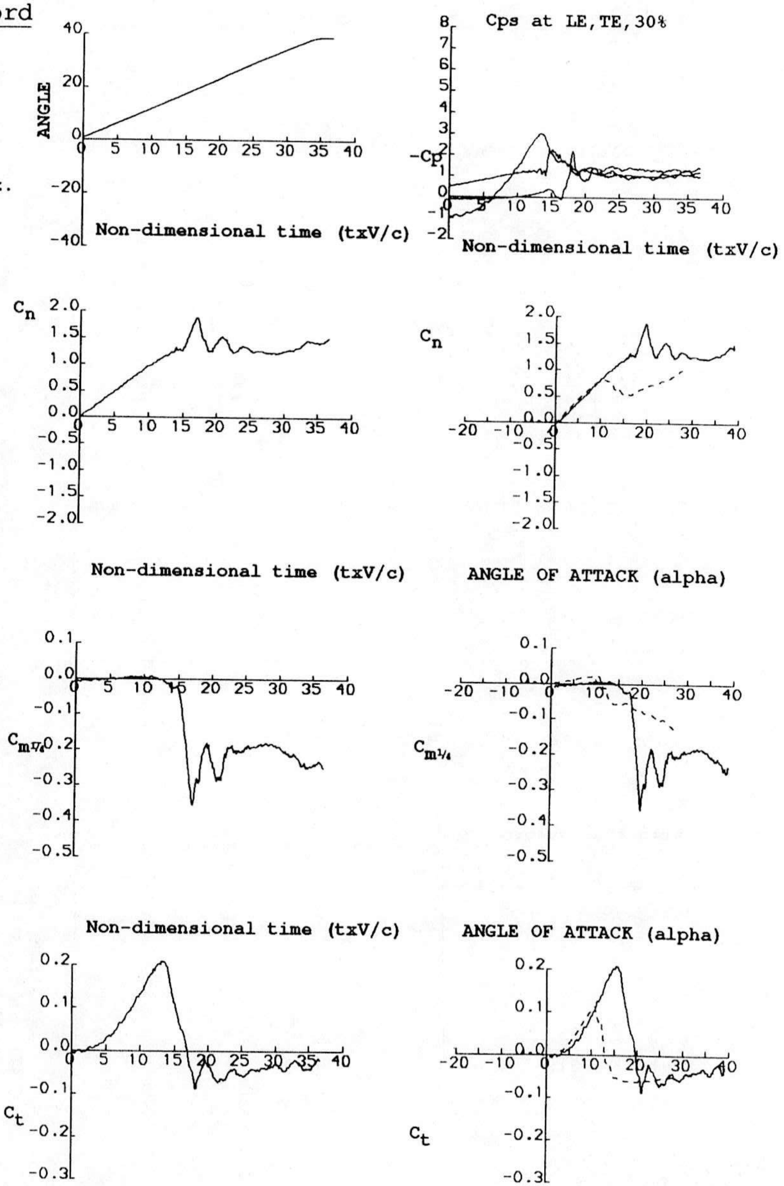




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822251	**DATE OF TEST:** 3/10/91
REYNOLDS NUMBER = 1087361.	**MACH NUMBER** = 0.171
DYNAMIC PRESSURE = 2063.54 Nm^{-2}	**AIR TEMPERATURE** = 19.8°C
NUMBER OF CYCLES = 5	**SAMPLING FREQUENCY** = 5917.00 Hz.
MOTION TYPE: RAMP UP	**REDUCED PITCH RATE** = 0.00990
START ANGLE = -1.00°	**LINEAR PITCH RATE** = 241.74°S^{-1}
RAMP ARC = 41.000°	
AVERAGED DATA OF 5 CYCLES	

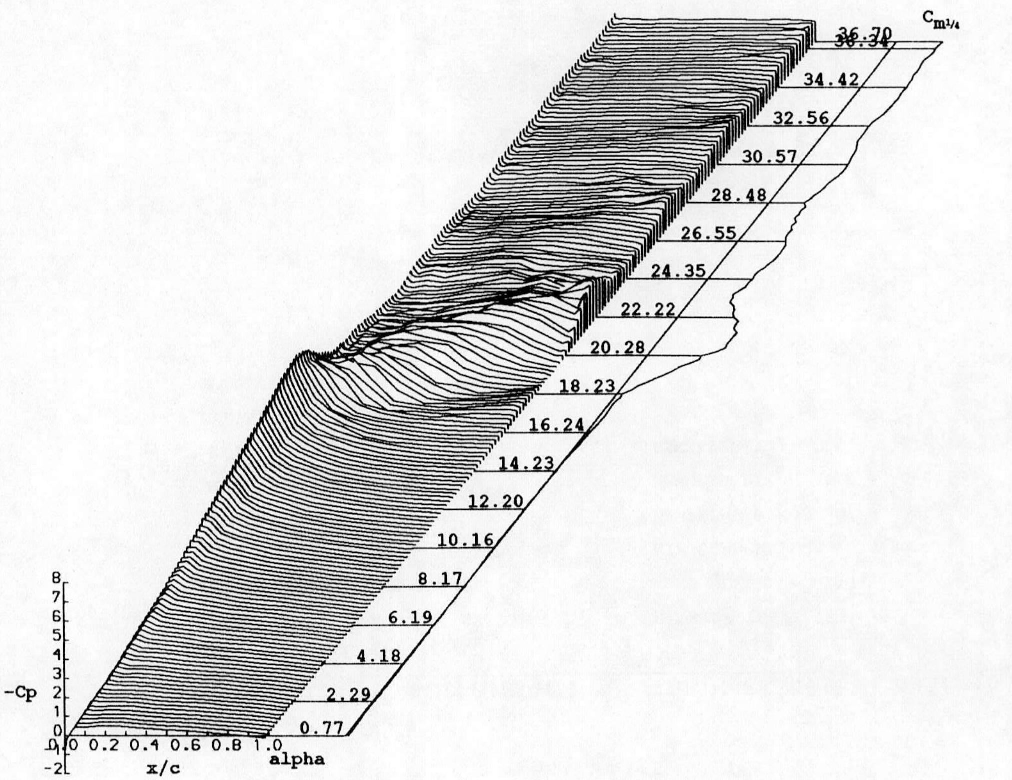


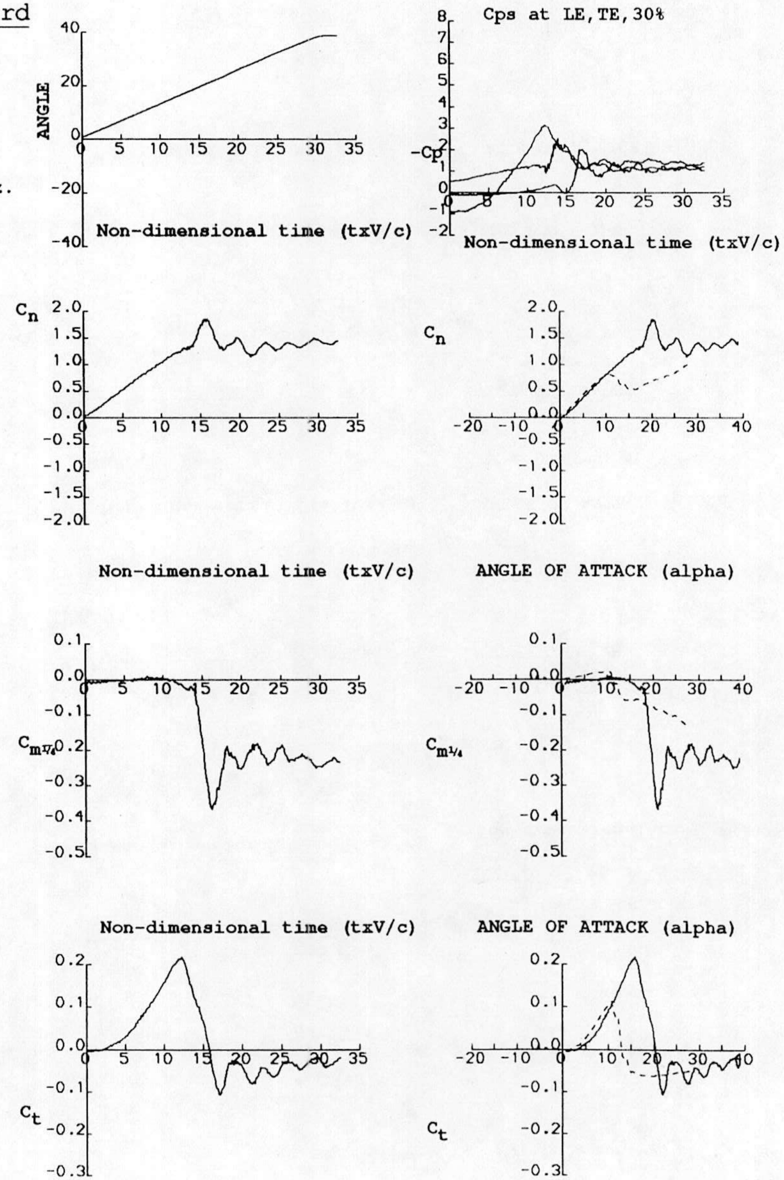


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822261
REYNOLDS NUMBER = 1083713.
DYNAMIC PRESSURE = 2076.79 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91
MACH NUMBER = 0.171
AIR TEMPERATURE = 21.3°C
SAMPLING FREQUENCY = 6711.00 Hz.
REDUCED PITCH RATE = 0.01108
LINEAR PITCH RATE = 272.13°S^{-1}

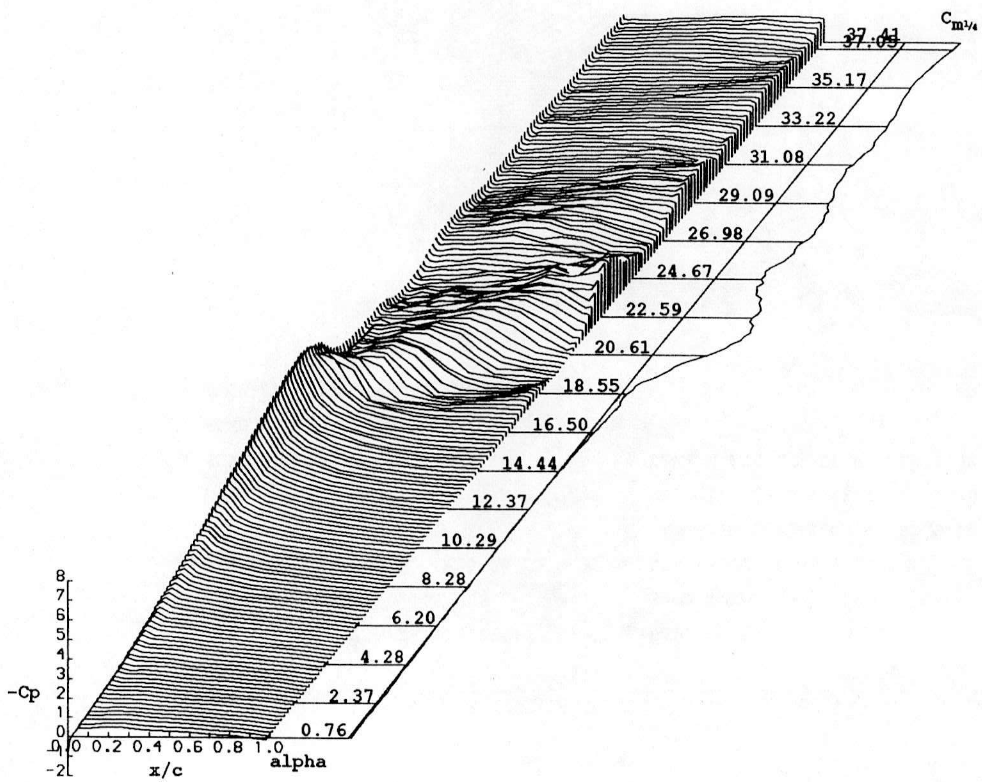


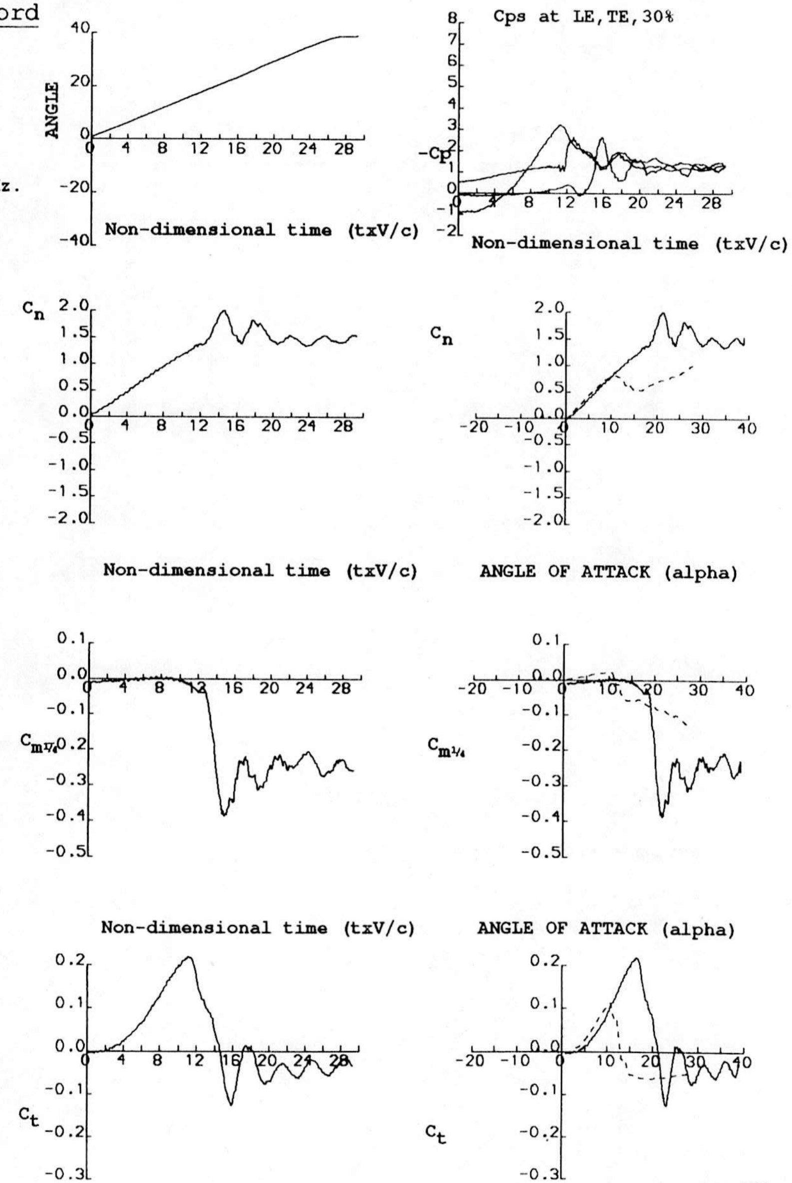


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822271
REYNOLDS NUMBER = 1061485.
DYNAMIC PRESSURE = 2030.92 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

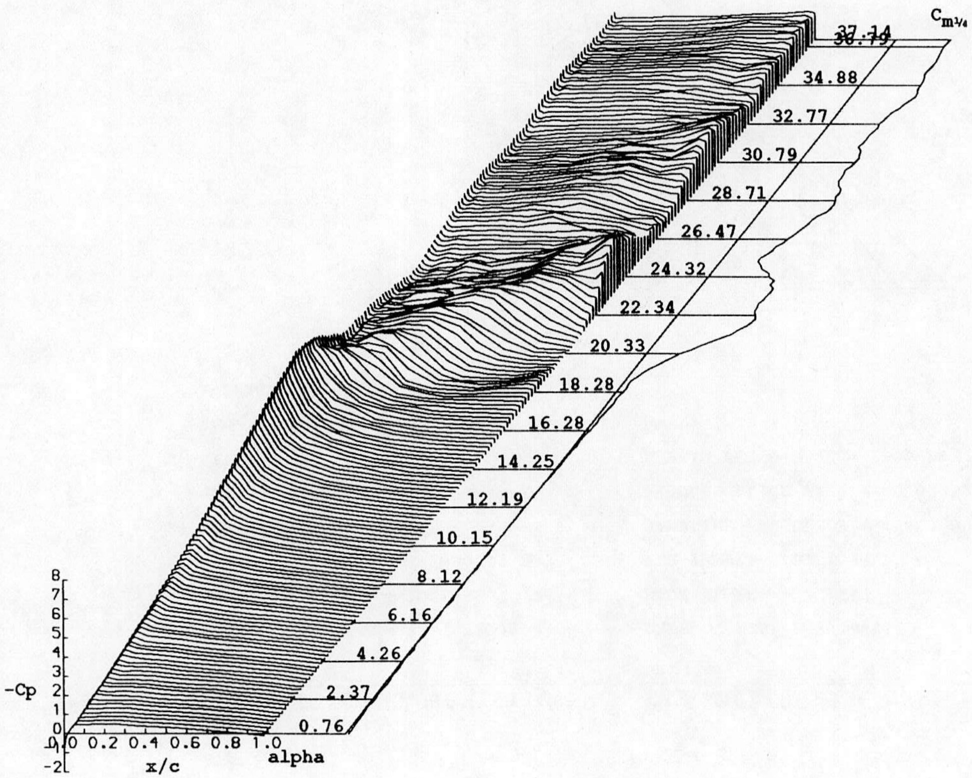
DATE OF TEST: 3/10/91
MACH NUMBER = 0.169
AIR TEMPERATURE = 23.5°C
SAMPLING FREQUENCY = 7407.00 Hz.
REDUCED PITCH RATE = 0.01252
LINEAR PITCH RATE = 305.28° s^{-1}

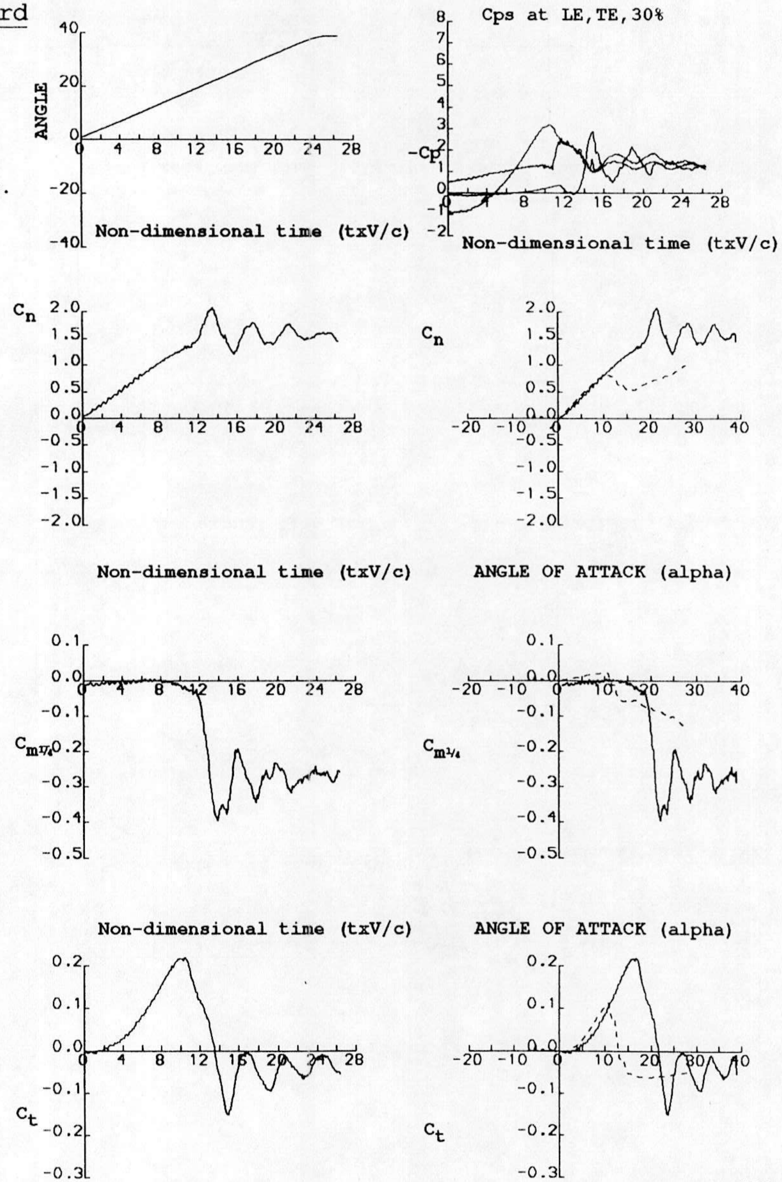




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822281	DATE OF TEST: 3/10/91
REYNOLDS NUMBER = 1051855.	MACH NUMBER = 0.169
DYNAMIC PRESSURE = 2020.20 Nm^{-2}	AIR TEMPERATURE = 25.0°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 8219.00 Hz.
MOTION TYPE: RAMP UP	REDUCED PITCH RATE = 0.01375
START ANGLE = -1.00°	LINEAR PITCH RATE = 335.21°S^{-1}
RAMP ARC = 41.000°	
AVERAGED DATA OF 5 CYCLES	

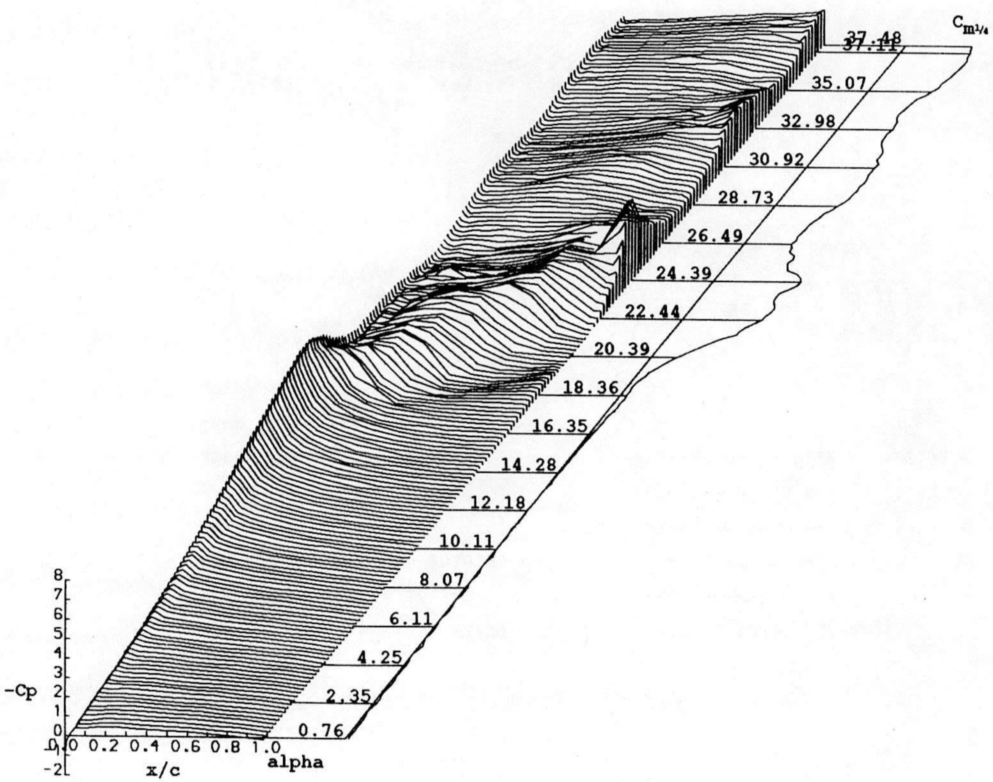


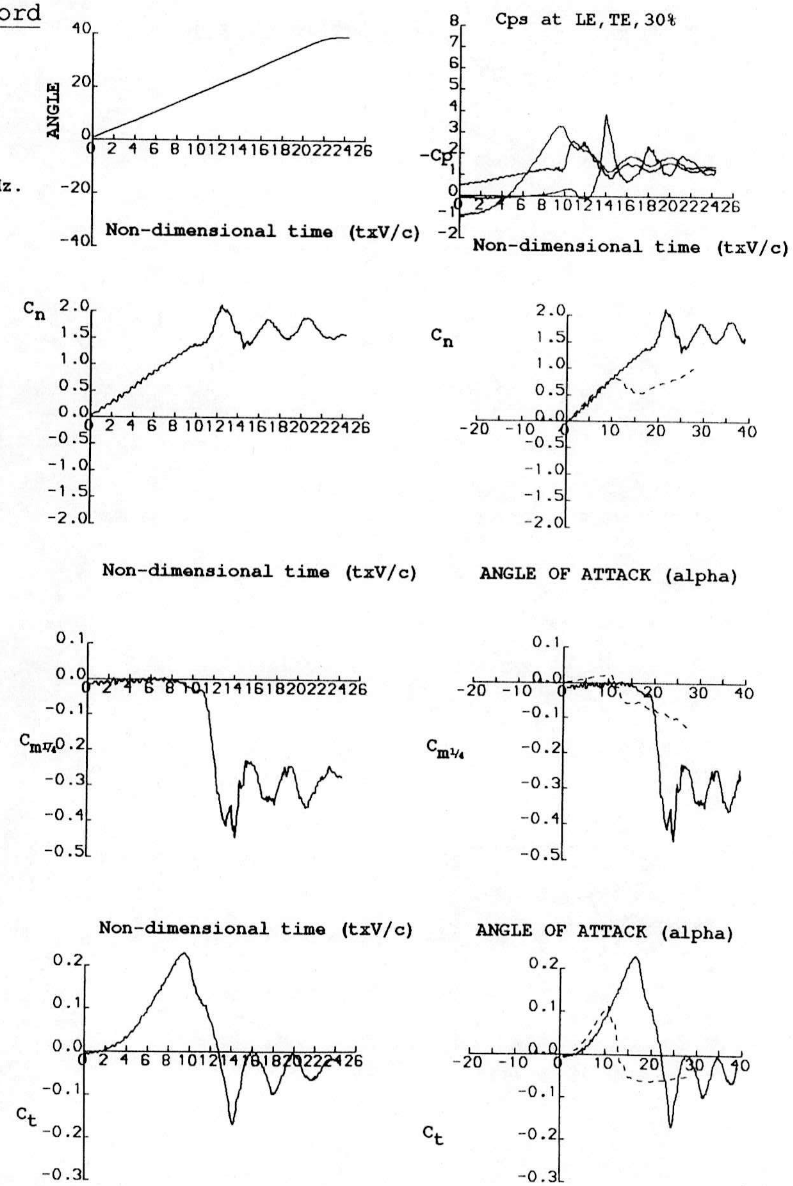


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822291
REYNOLDS NUMBER = 1050636.
DYNAMIC PRESSURE = 2029.41 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91
MACH NUMBER = 0.169
AIR TEMPERATURE = 25.8°C
SAMPLING FREQUENCY = 8928.00 Hz.
REDUCED PITCH RATE = 0.01505
LINEAR PITCH RATE = 368.16°s^{-1}

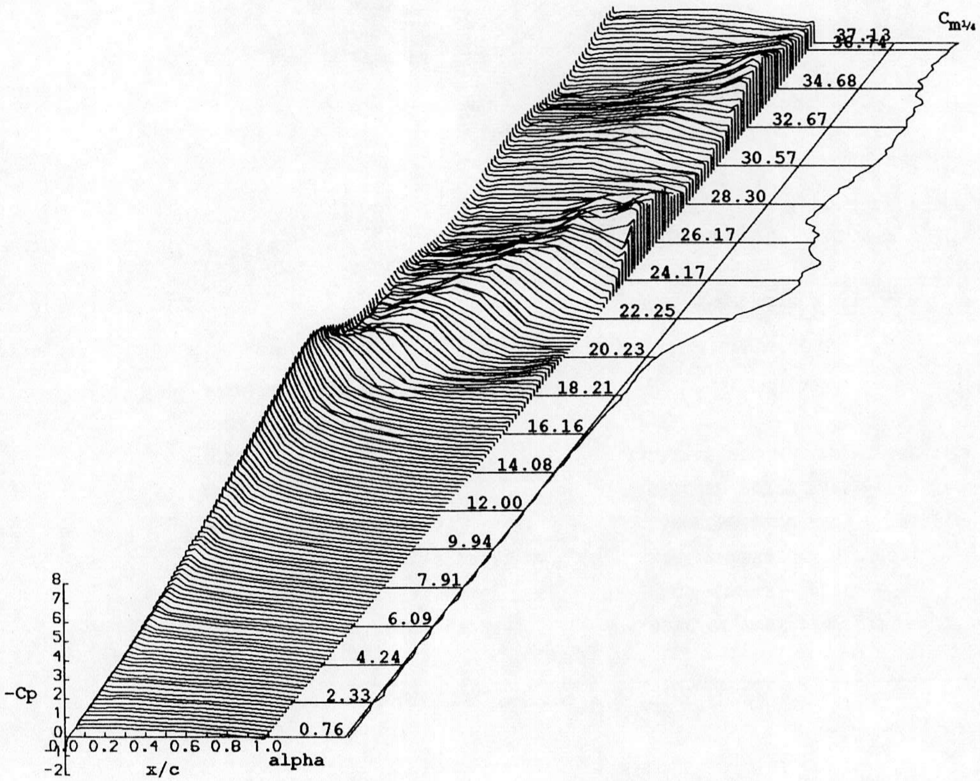


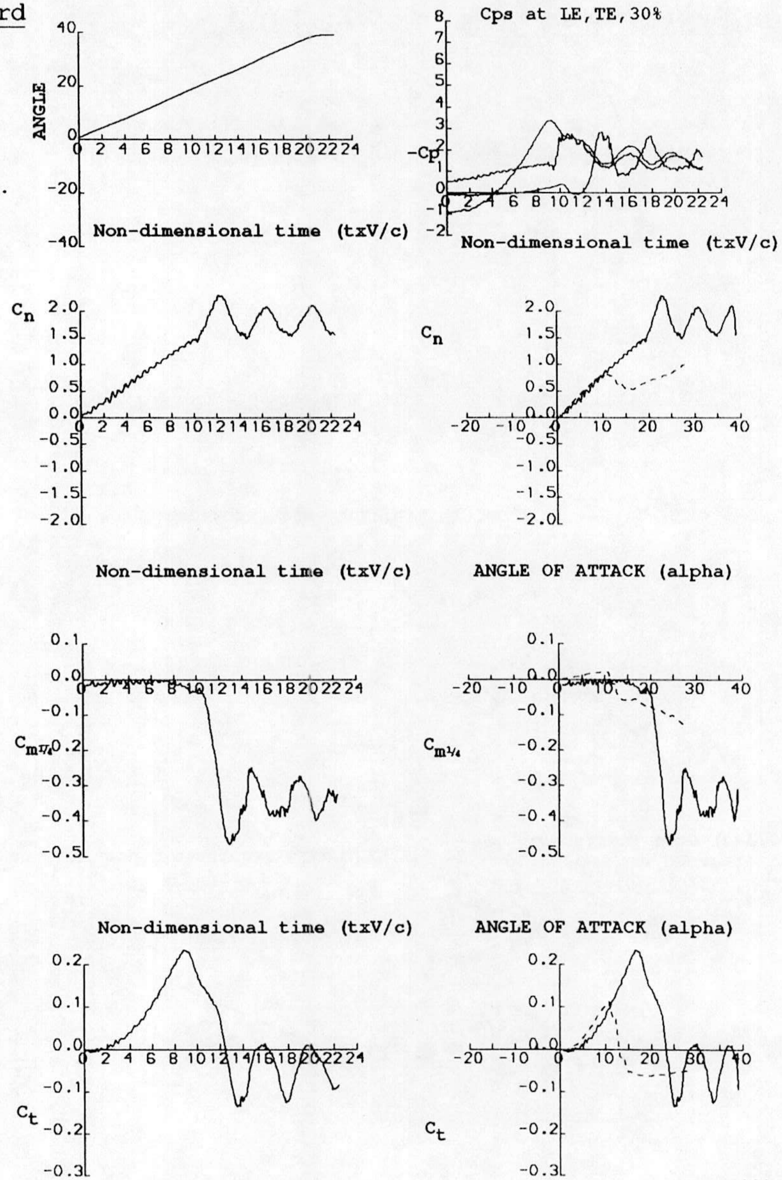


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822301
REYNOLDS NUMBER = 1043453.
DYNAMIC PRESSURE = 2020.68 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91
MACH NUMBER = 0.169
AIR TEMPERATURE = 26.9°C
SAMPLING FREQUENCY = 9708.00 Hz.
REDUCED PITCH RATE = 0.01631
LINEAR PITCH RATE = 398.91°S^{-1}

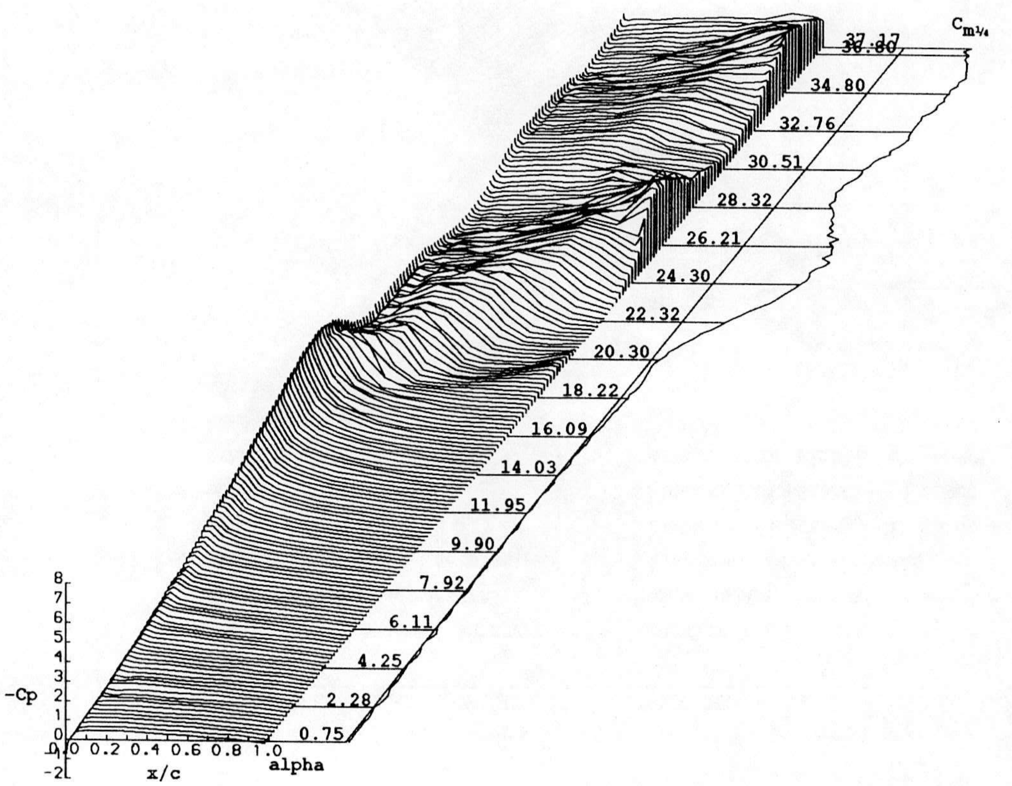


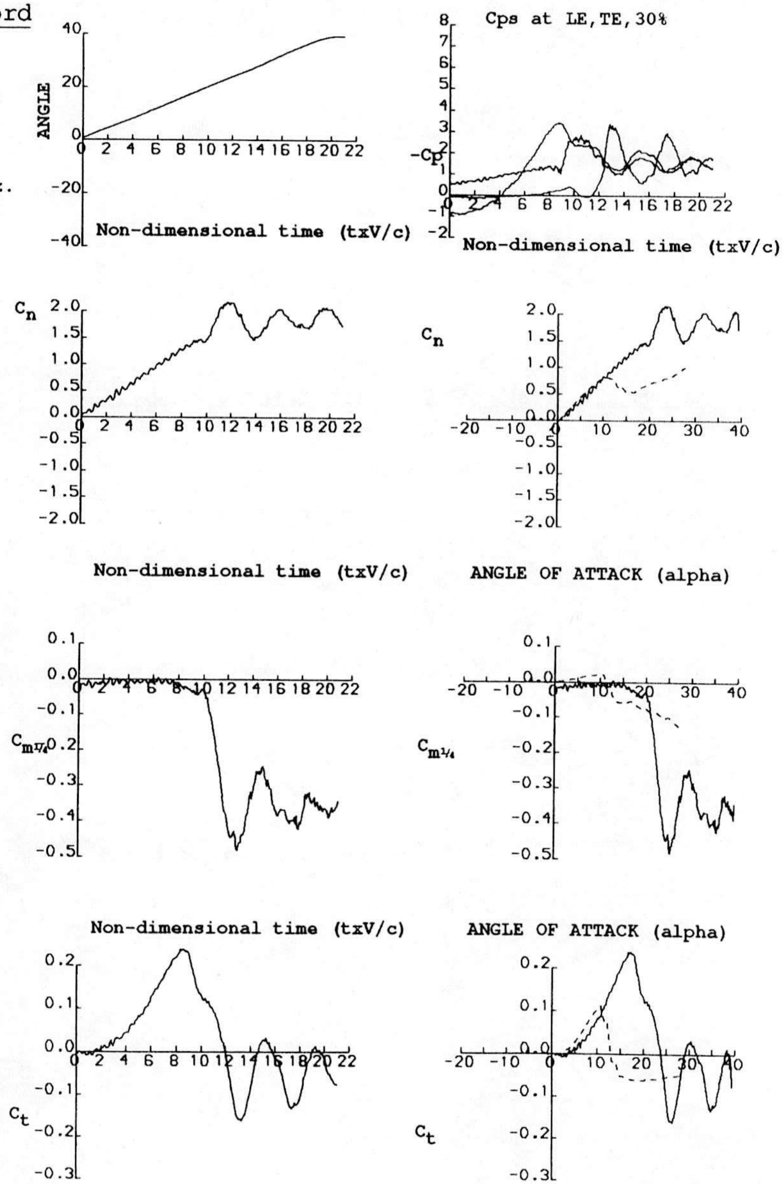


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822311
REYNOLDS NUMBER = 1044859.
DYNAMIC PRESSURE = 2041.72 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP UP
START ANGLE = -1.00°
RAMP ARC = 41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91
MACH NUMBER = 0.170
AIR TEMPERATURE = 27.8°C
SAMPLING FREQUENCY = 10410.00 Hz.
REDUCED PITCH RATE = 0.01759
LINEAR PITCH RATE = 433.00°s^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822321

REYNOLDS NUMBER = 1045763.

DYNAMIC PRESSURE = 2060.95 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91

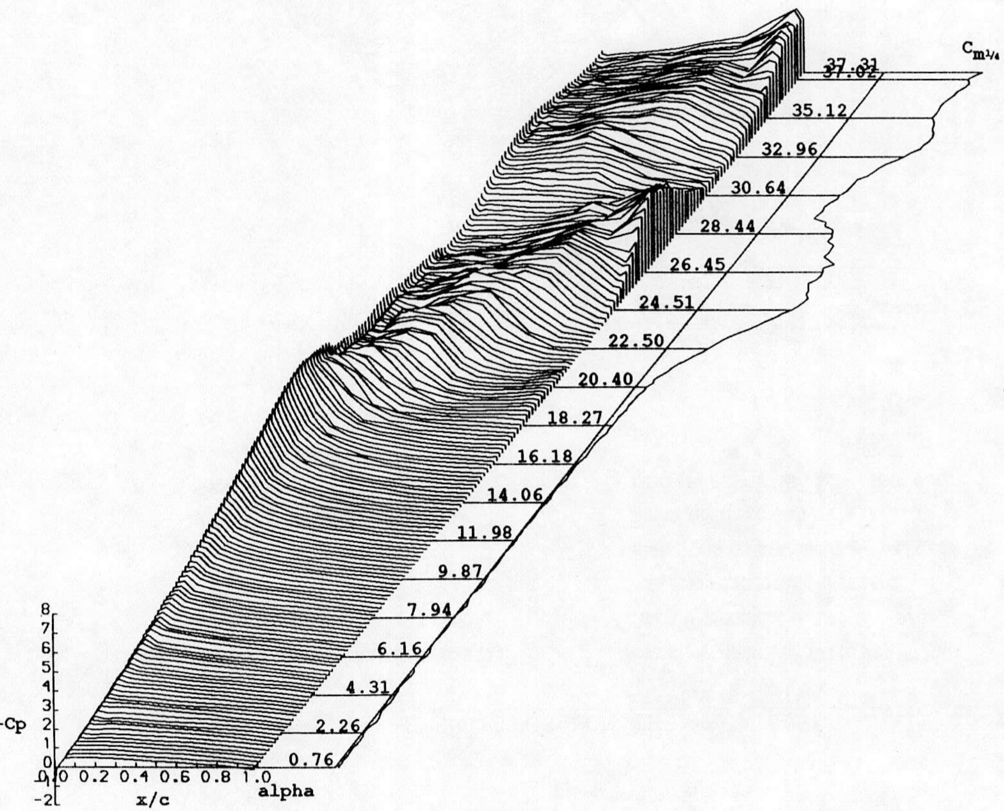
MACH NUMBER = 0.171

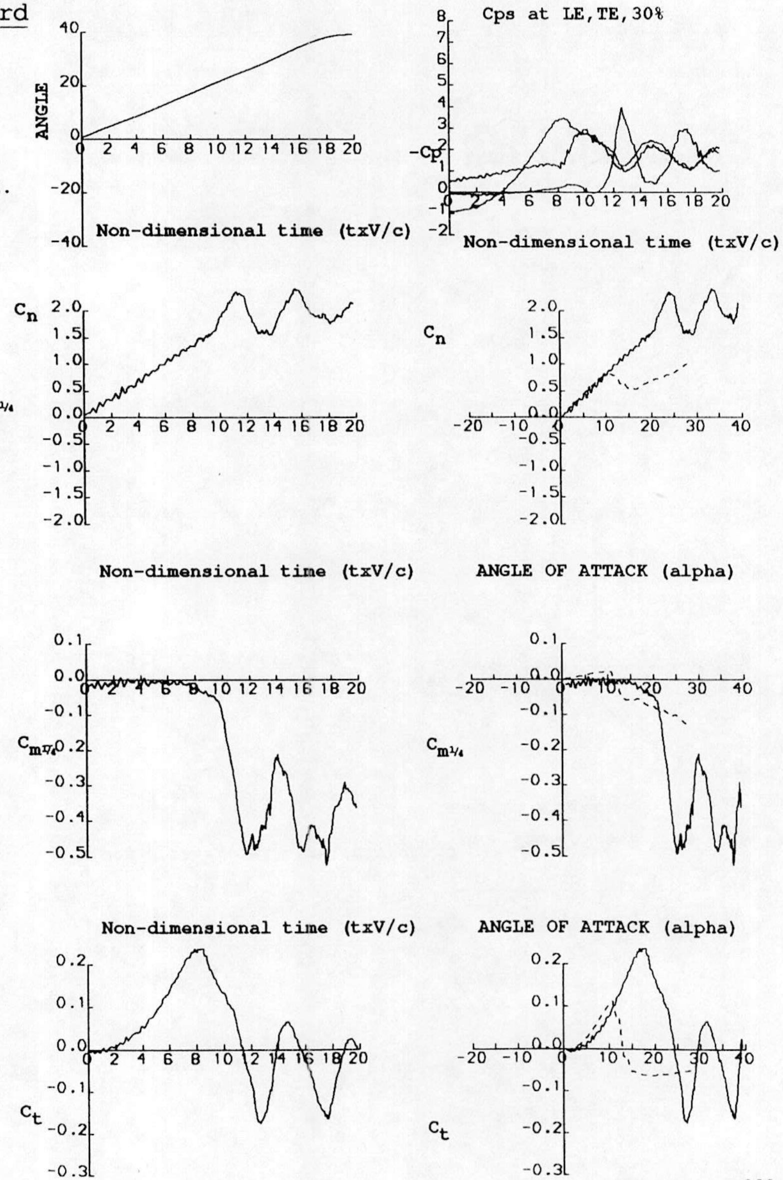
AIR TEMPERATURE = 28.7°C

SAMPLING FREQUENCY = 11110.00 Hz.

REDUCED PITCH RATE = 0.01900

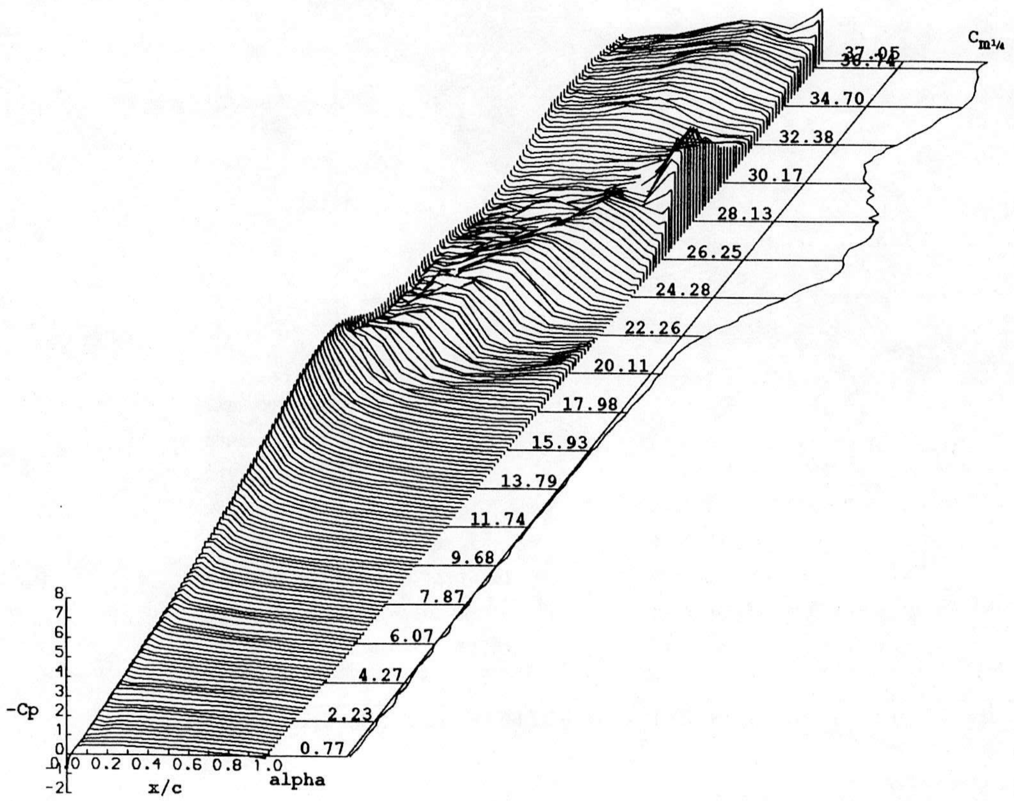
LINEAR PITCH RATE = 470.65°S^{-1}

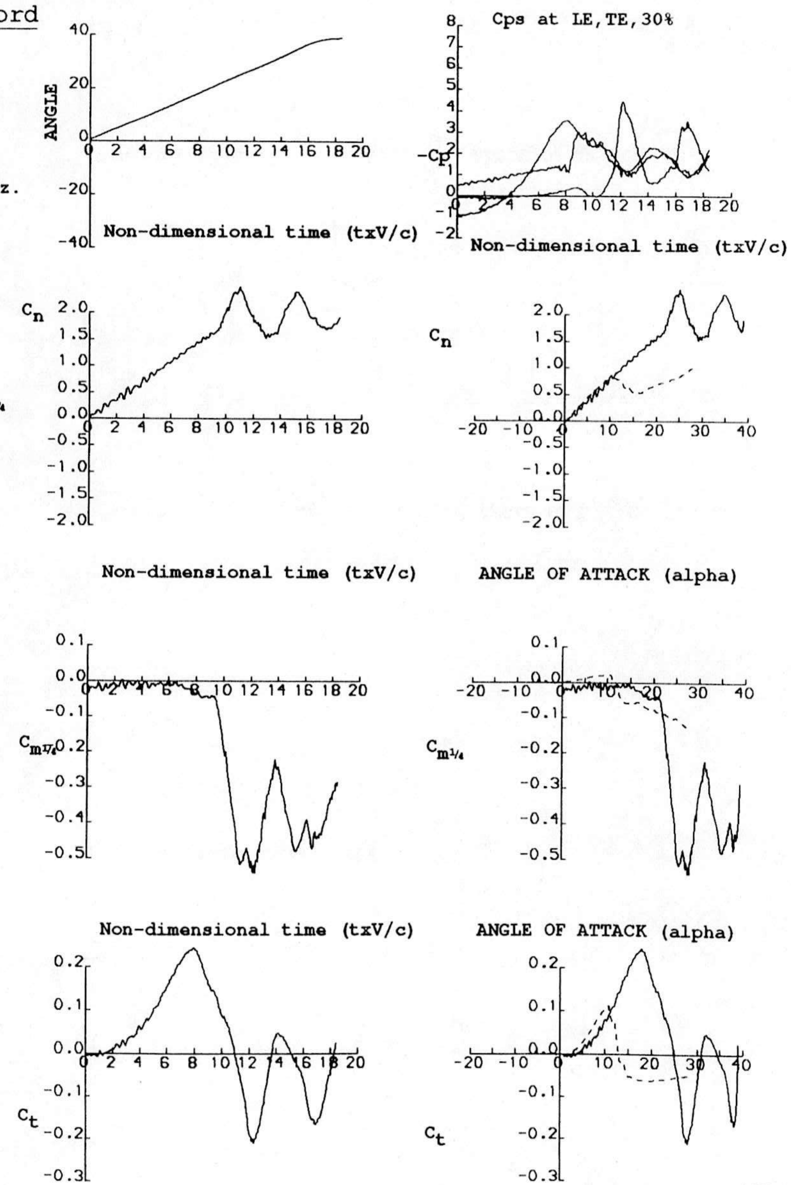




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822331	DATE OF TEST: 3/10/91
REYNOLDS NUMBER = 1032379.	MACH NUMBER = 0.169
DYNAMIC PRESSURE = 2030.73 Nm^{-2}	AIR TEMPERATURE = 30.0°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 11900.00 Hz.
MOTION TYPE: RAMP UP	REDUCED PITCH RATE = 0.02015
START ANGLE = -1.00°	LINEAR PITCH RATE = 496.65°s^{-1}
RAMP ARC = 41.000°	
AVERAGED DATA OF 5 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 822341

REYNOLDS NUMBER = 1035162.

DYNAMIC PRESSURE = 2039.97 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP UP

START ANGLE = -1.00°

RAMP ARC = 41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91

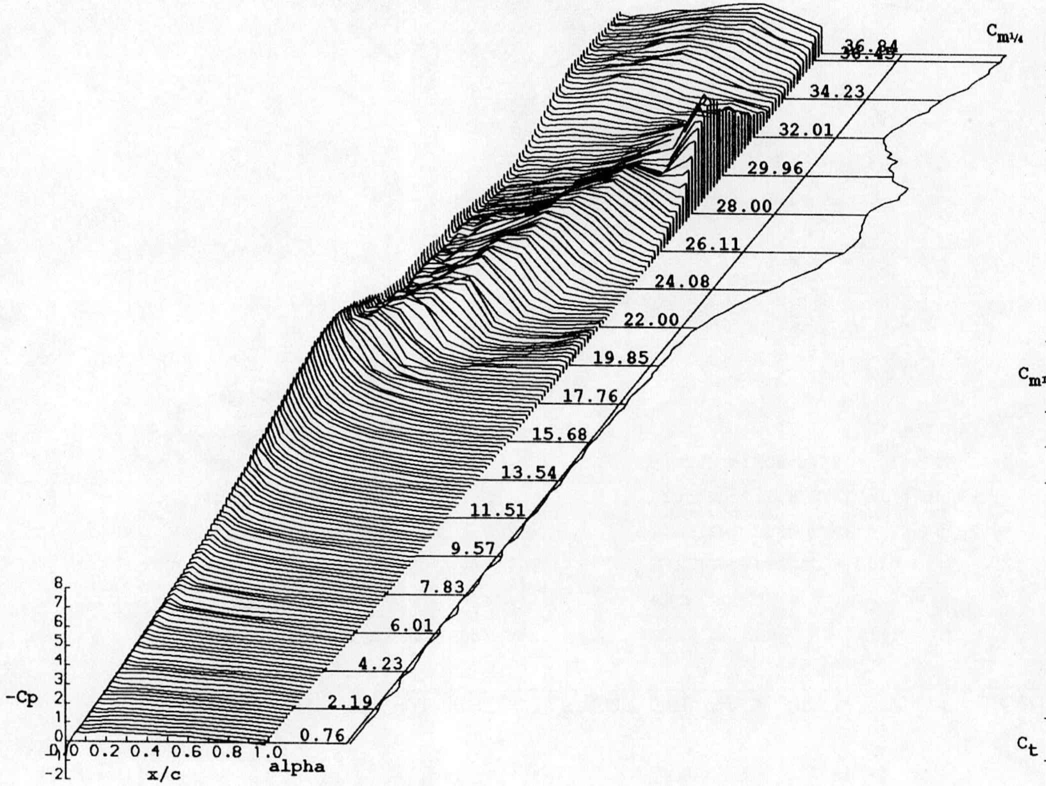
MACH NUMBER = 0.170

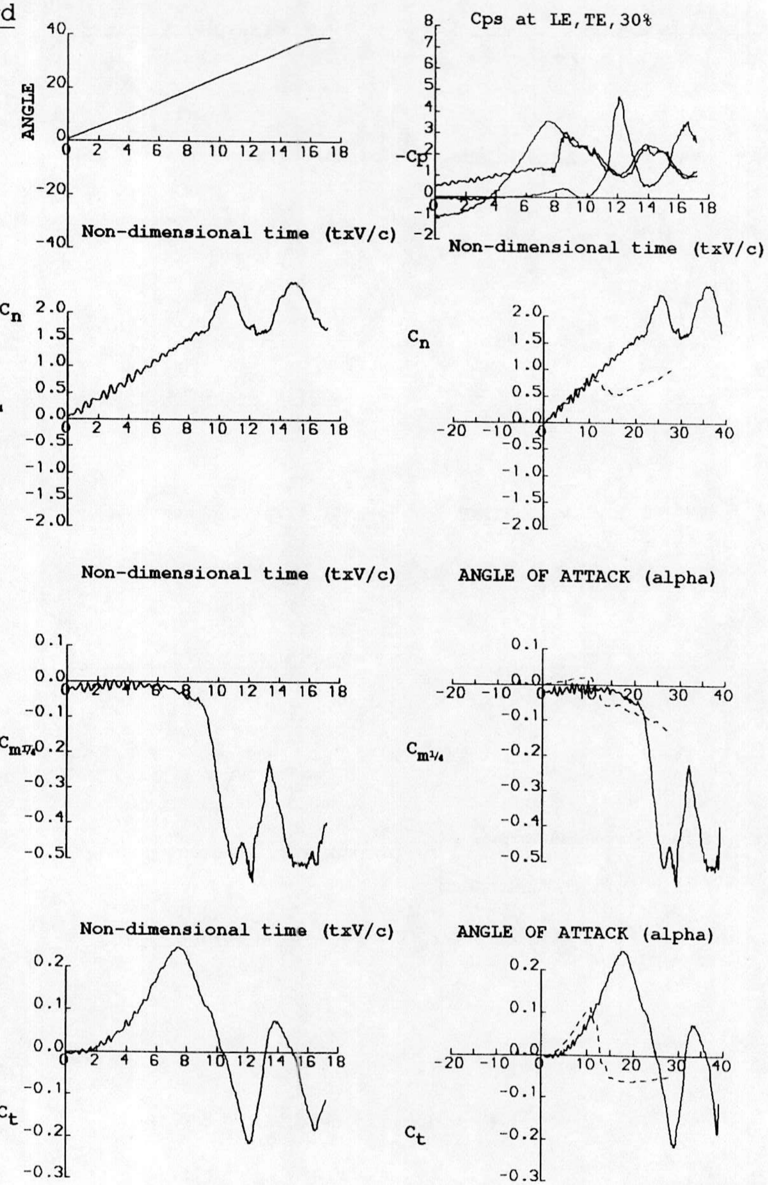
AIR TEMPERATURE = 29.9°C

SAMPLING FREQUENCY = 12760.00 Hz.

REDUCED PITCH RATE = 0.02148

LINEAR PITCH RATE = 530.42°S^{-1}





G.U. Aero Report 9209

UNIVERSITY OF GLASGOW

DEPARTMENT OF AEROSPACE ENGINEERING

PRESSURE DATA FROM

RAMP DOWN EXPERIMENTS

DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30223

REYNOLDS NUMBER = 760185.

DYNAMIC PRESSURE = 1084.79 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

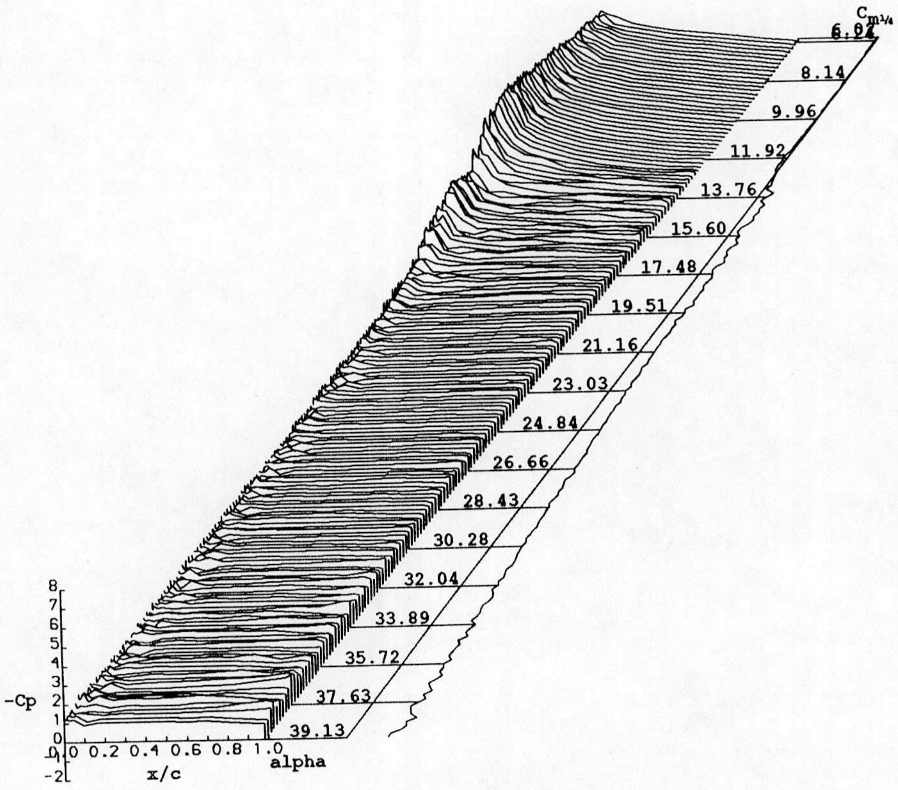
MACH NUMBER = 0.124

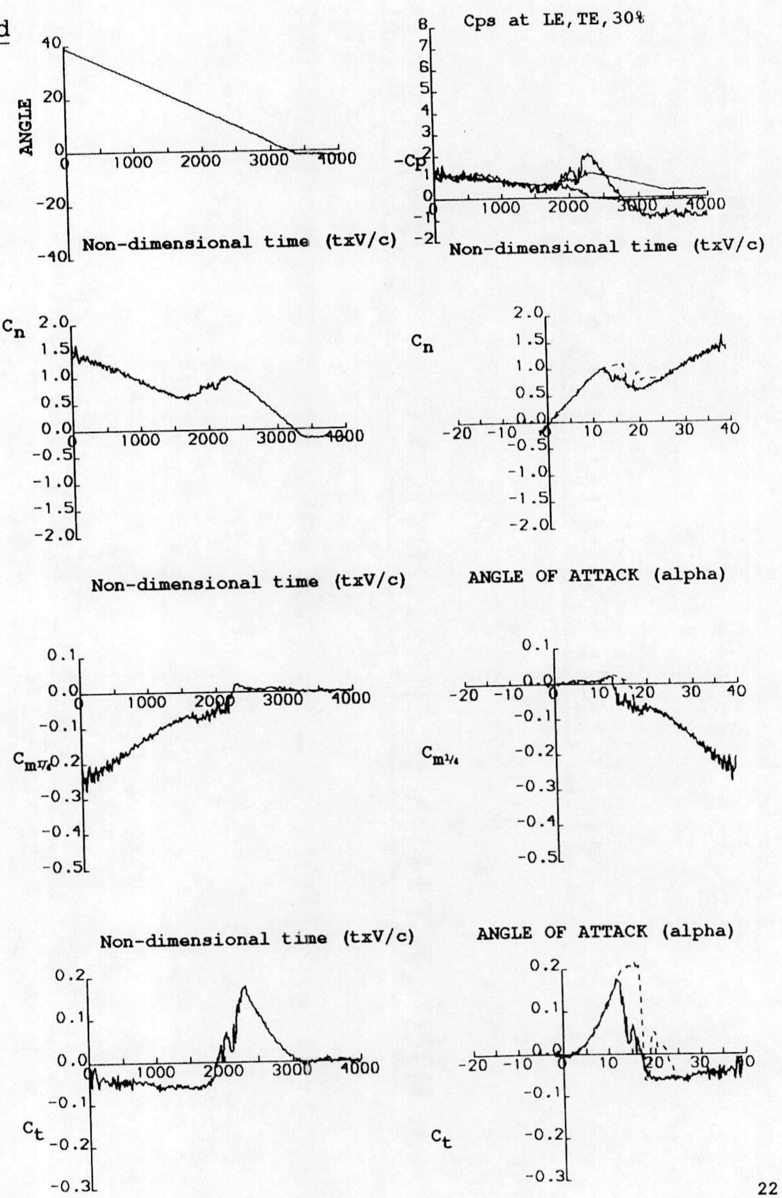
AIR TEMPERATURE = 28.9°C

SAMPLING FREQUENCY = 10.00 Hz.

REDUCED PITCH RATE = -0.00010

LINEAR PITCH RATE = $-1.80°S^{-1}$

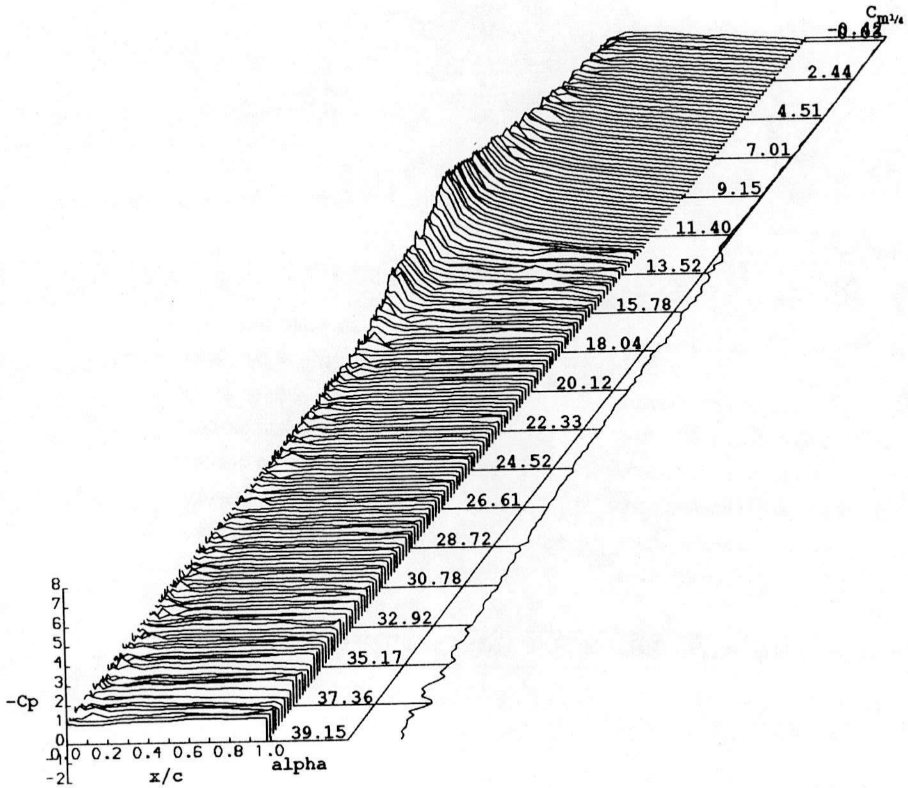


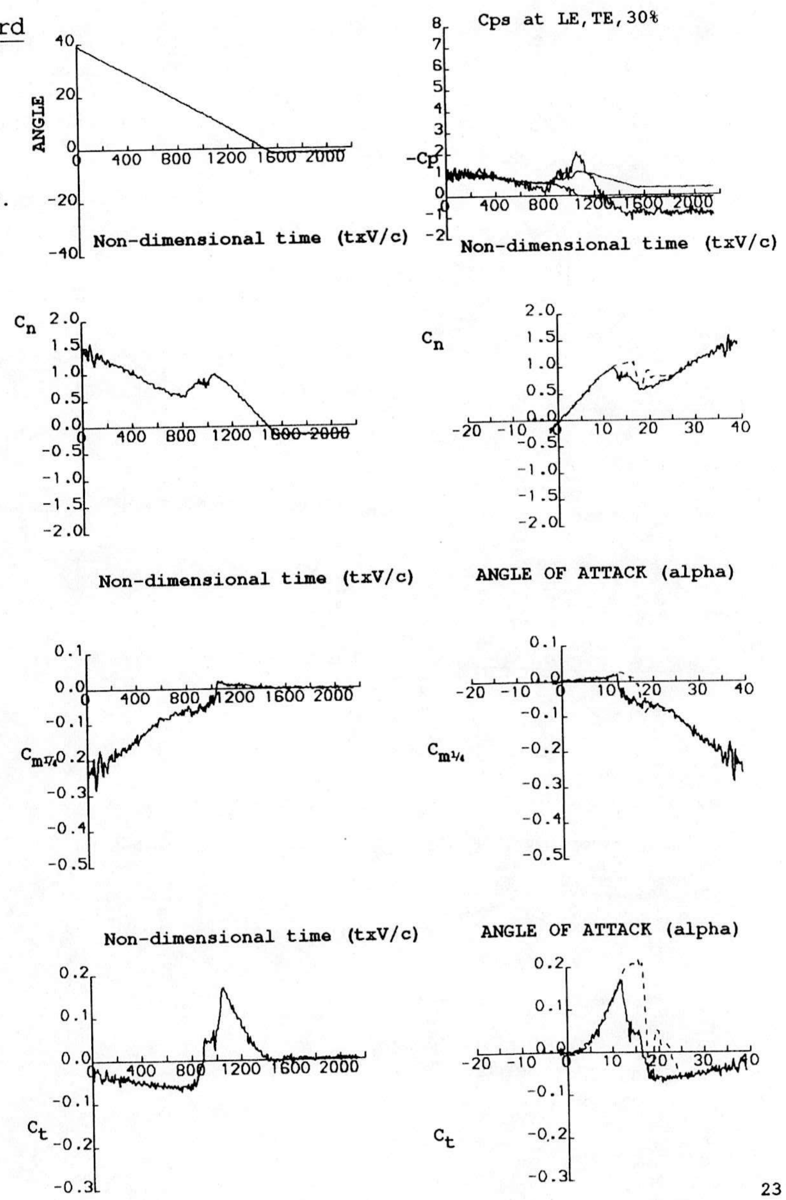


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30233
REYNOLDS NUMBER = 756978.
DYNAMIC PRESSURE = 1084.79 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 29.9°C
SAMPLING FREQUENCY = 18.60 Hz.
REDUCED PITCH RATE = -0.00022
LINEAR PITCH RATE = -4.04°S^{-1}

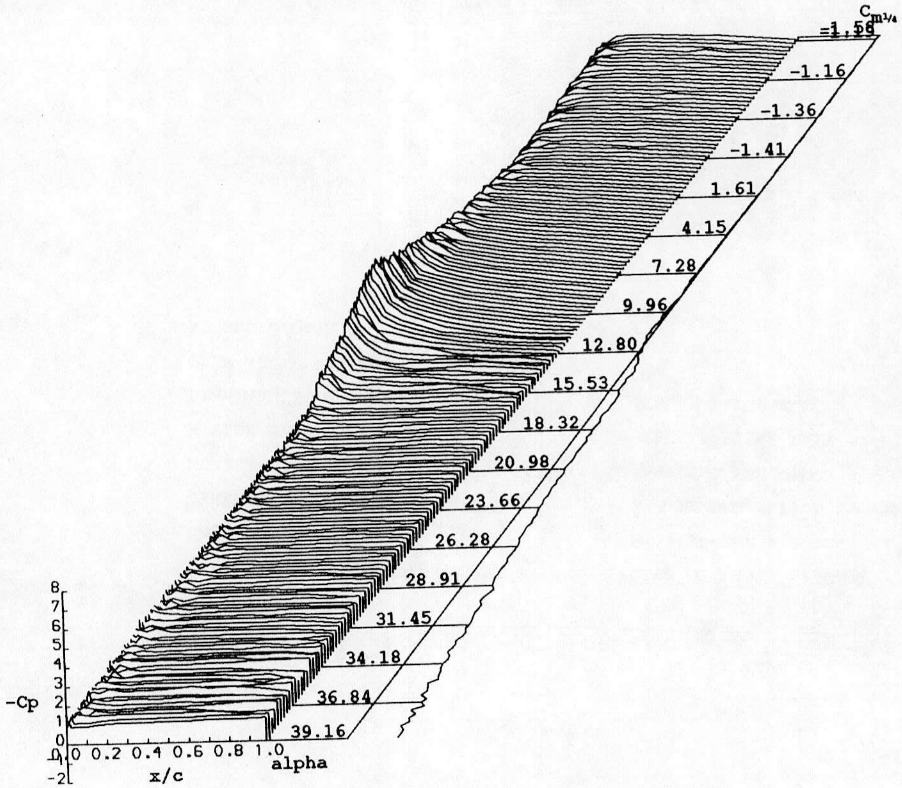


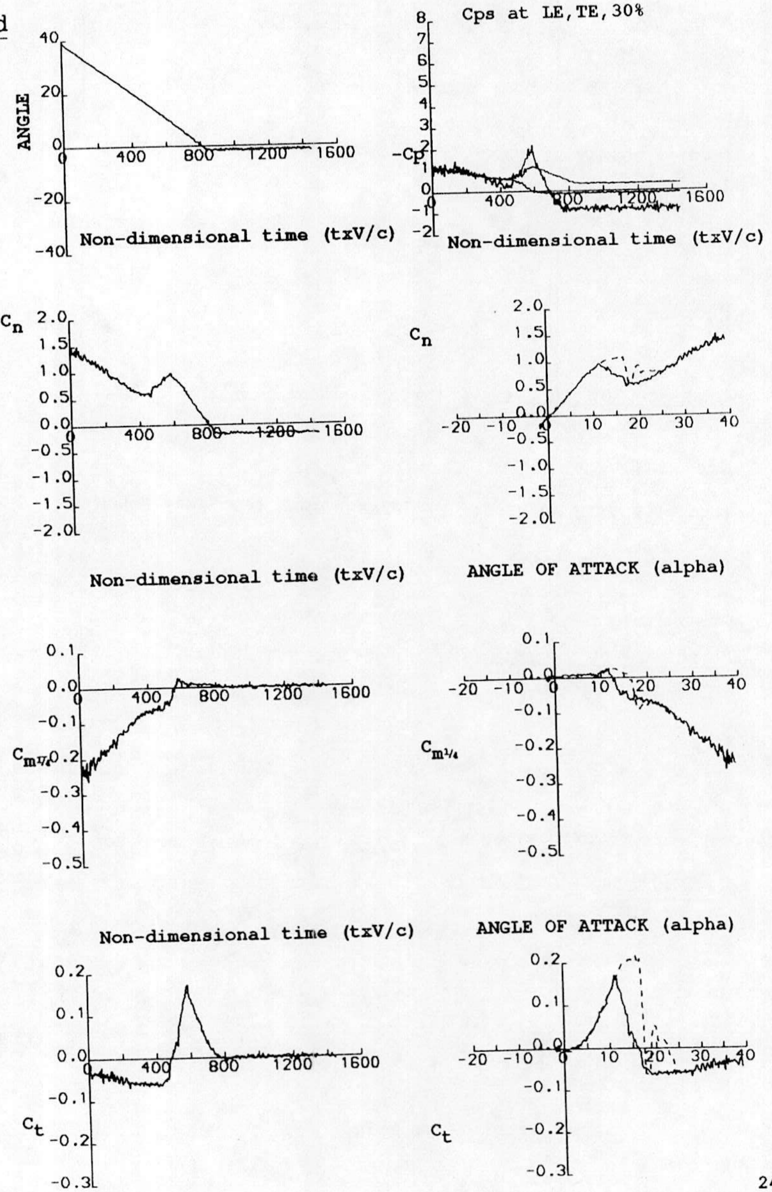


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30243
REYNOLDS NUMBER = 759552.
DYNAMIC PRESSURE = 1091.26 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 29.8°C
SAMPLING FREQUENCY = 27.70 Hz.
REDUCED PITCH RATE = -0.00040
LINEAR PITCH RATE = -7.28°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30253

REYNOLDS NUMBER = 756996.

DYNAMIC PRESSURE = 1091.26 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

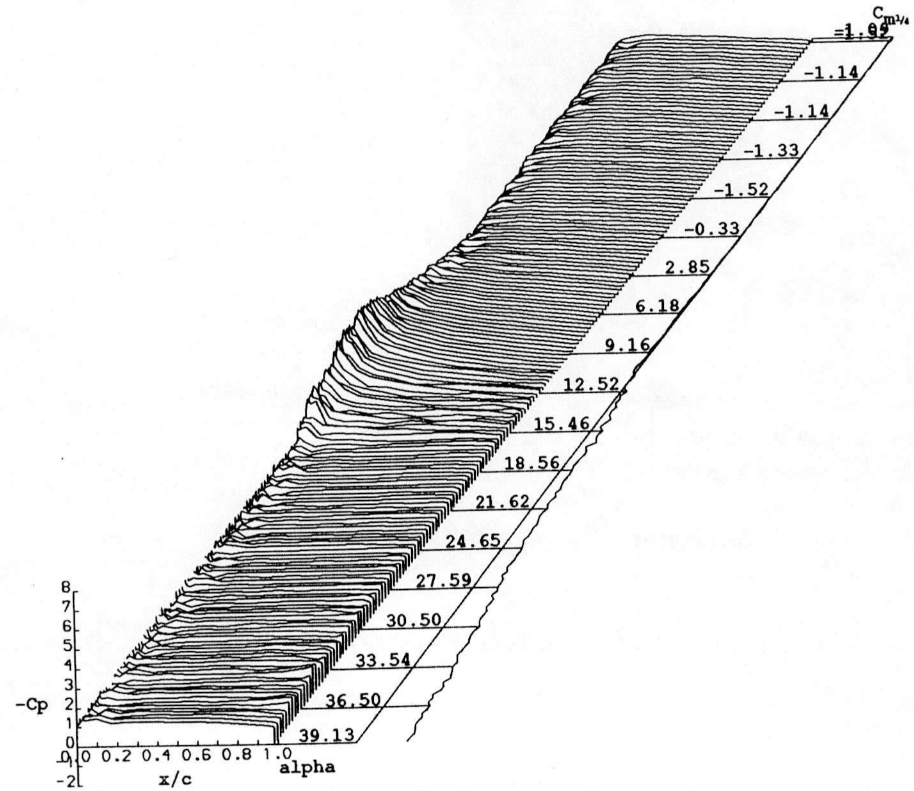
MACH NUMBER = 0.124

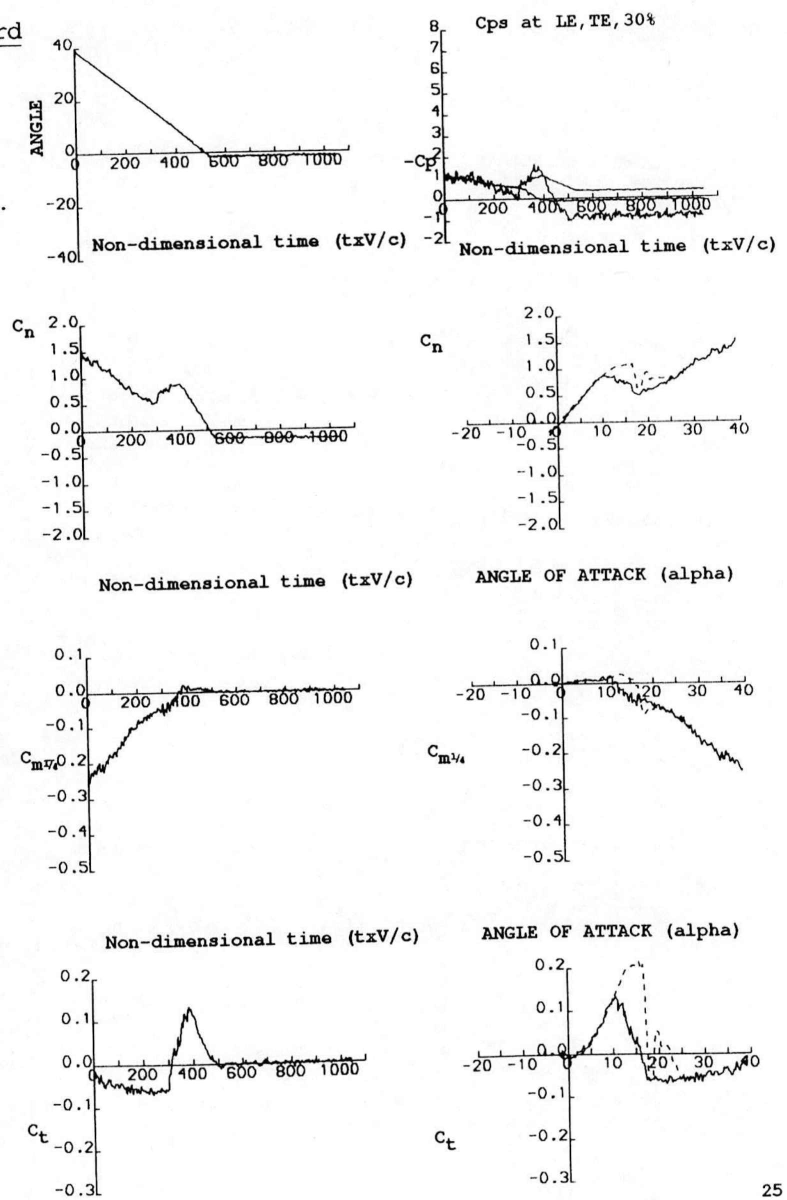
AIR TEMPERATURE = 30.6°C

SAMPLING FREQUENCY = 38.40 Hz.

REDUCED PITCH RATE = -0.00064

LINEAR PITCH RATE = -11.53°S^{-1}

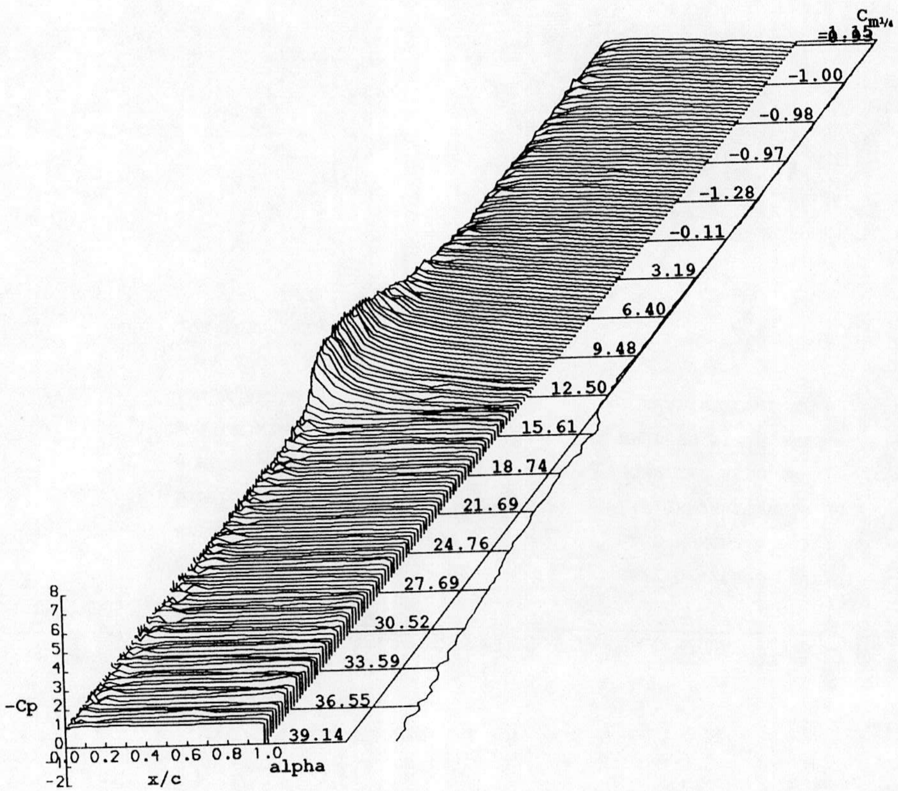


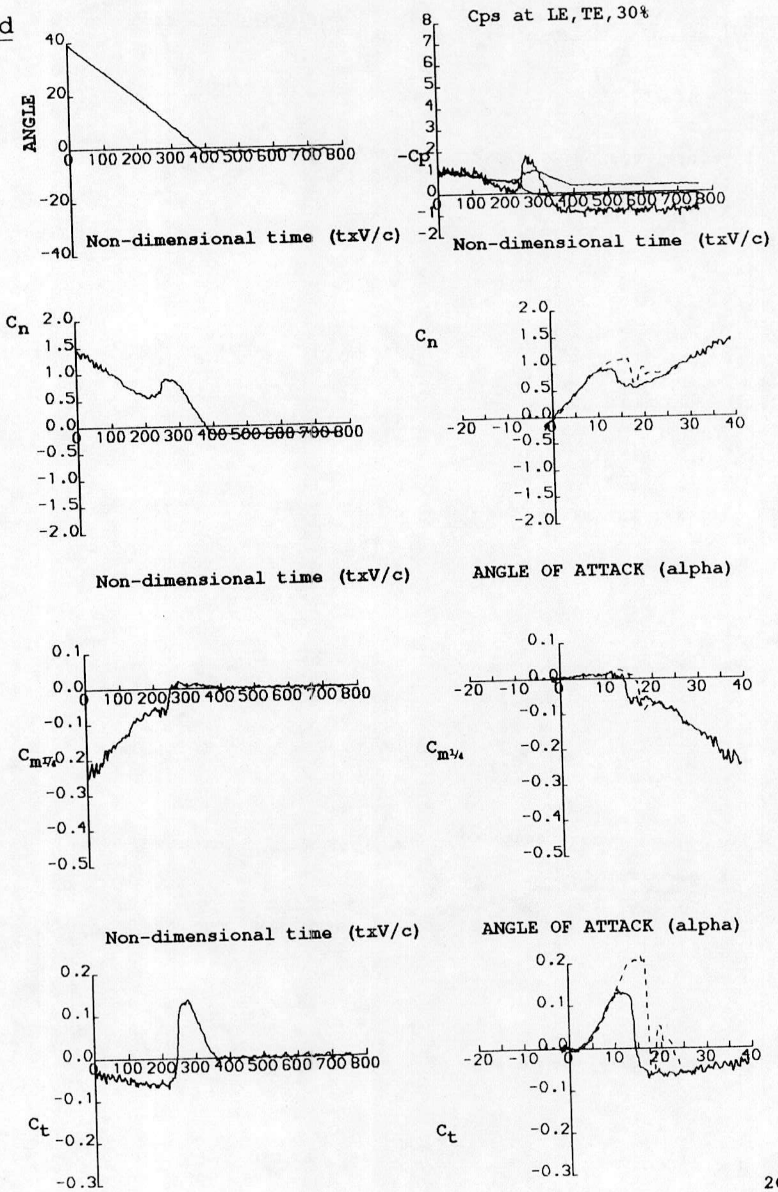


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30263
REYNOLDS NUMBER = 757533.
DYNAMIC PRESSURE = 1085.47 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 29.8°C
SAMPLING FREQUENCY = 52.50 Hz.
REDUCED PITCH RATE = -0.00087
LINEAR PITCH RATE = $-15.64°S^{-1}$

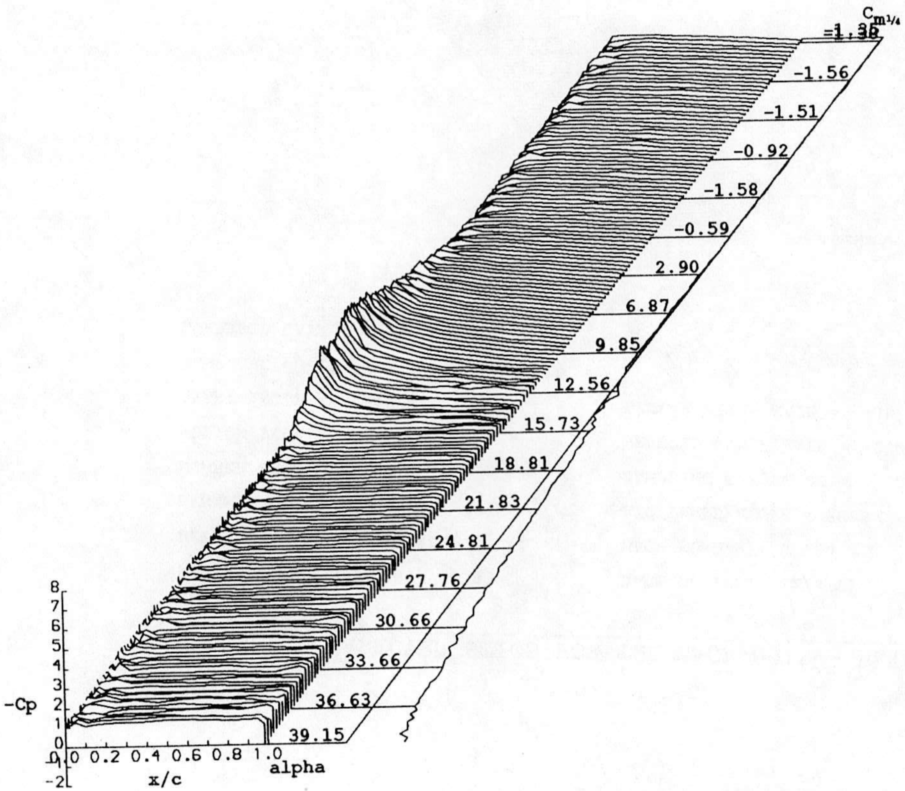


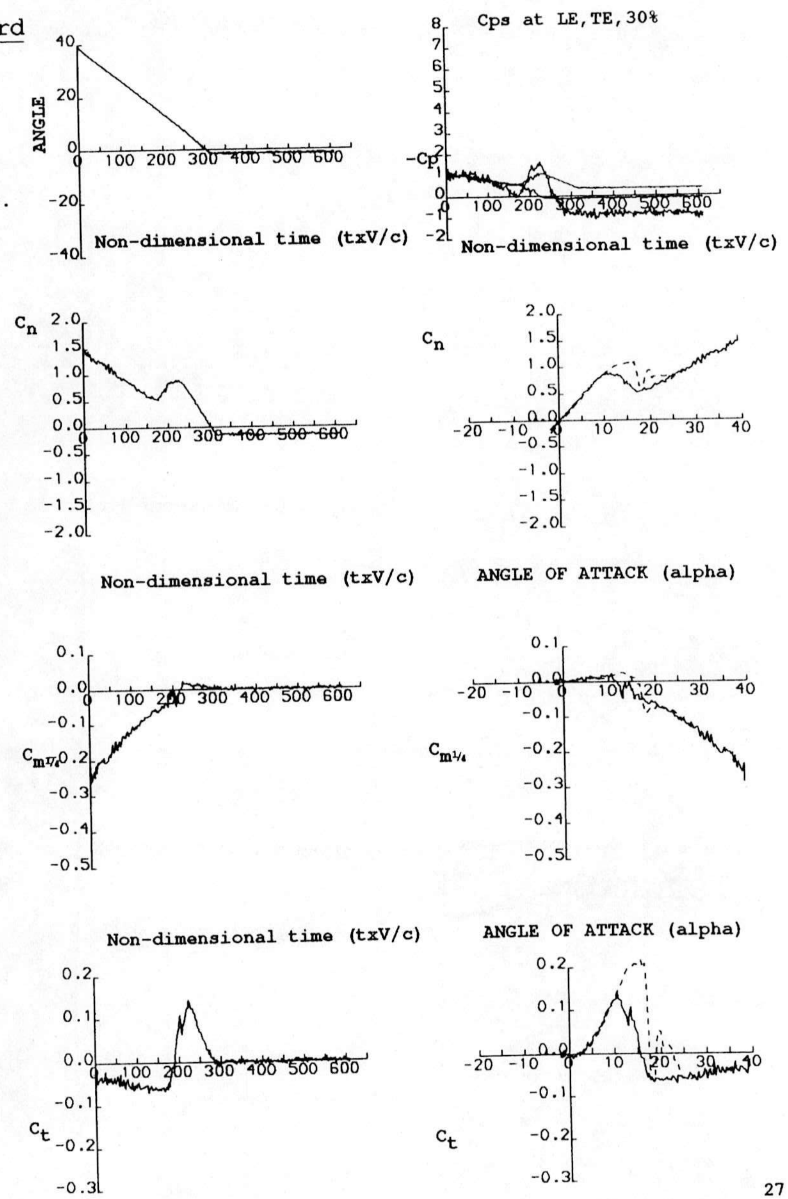


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30273
REYNOLDS NUMBER = 755301.
DYNAMIC PRESSURE = 1085.47 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 30.5°C
SAMPLING FREQUENCY = 65.60 Hz.
REDUCED PITCH RATE = -0.00109
LINEAR PITCH RATE = -19.55°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30283

REYNOLDS NUMBER = 754032.

DYNAMIC PRESSURE = 1085.47 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

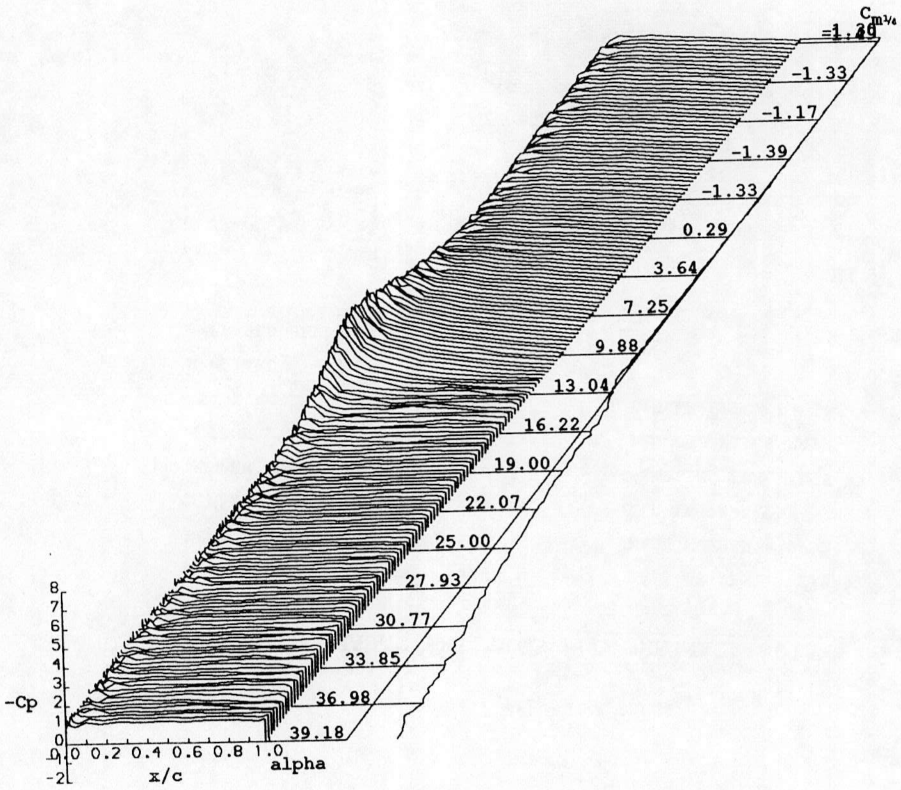
MACH NUMBER = 0.124

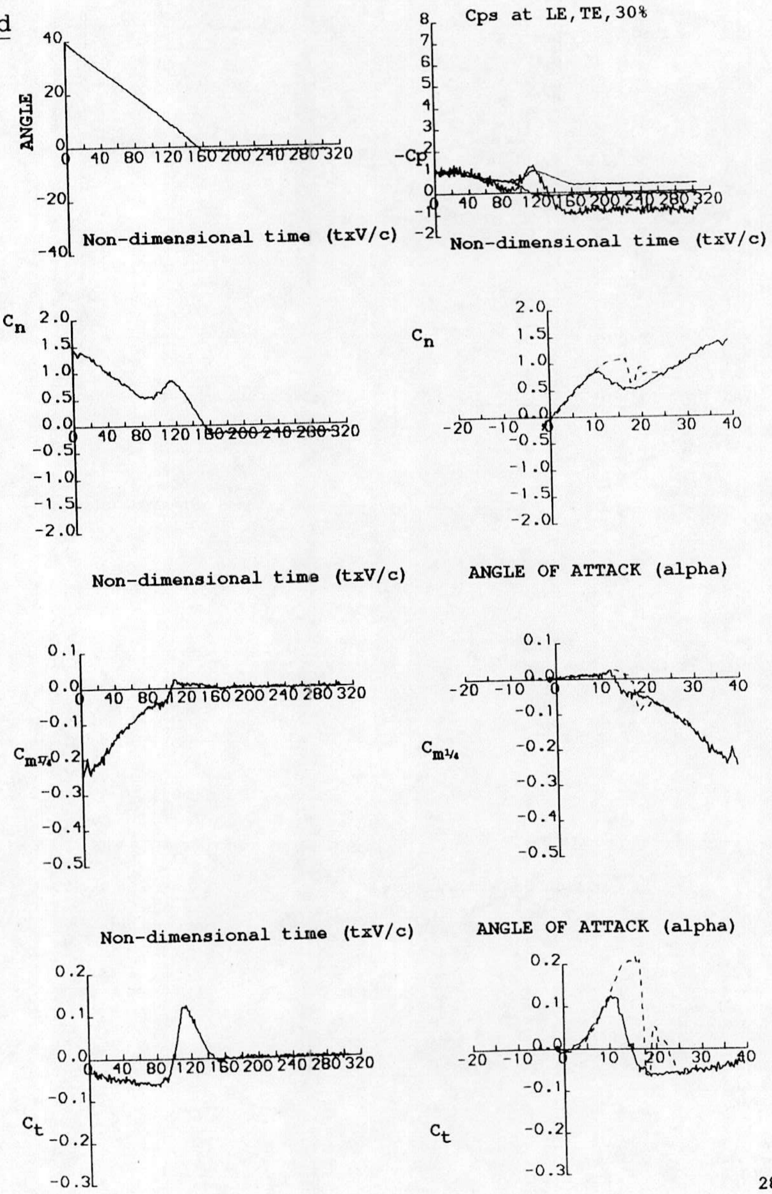
AIR TEMPERATURE = 30.9°C

SAMPLING FREQUENCY = 131.10 Hz.

REDUCED PITCH RATE = -0.00217

LINEAR PITCH RATE = -39.08°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30293

REYNOLDS NUMBER = 752451.

DYNAMIC PRESSURE = 1085.47 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 2/8/91

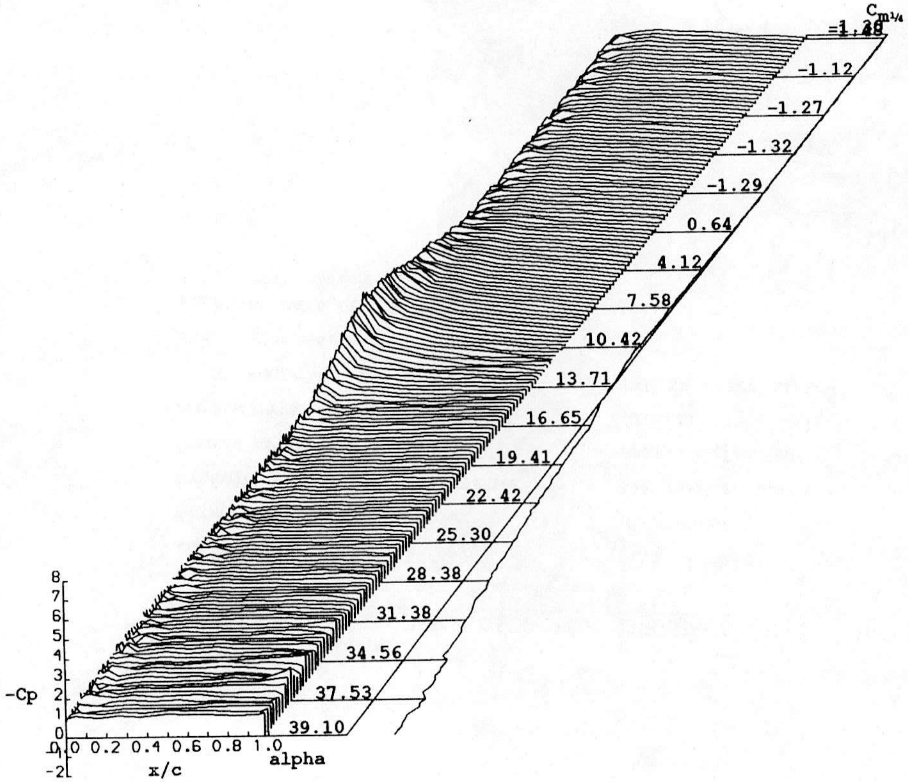
MACH NUMBER = 0.124

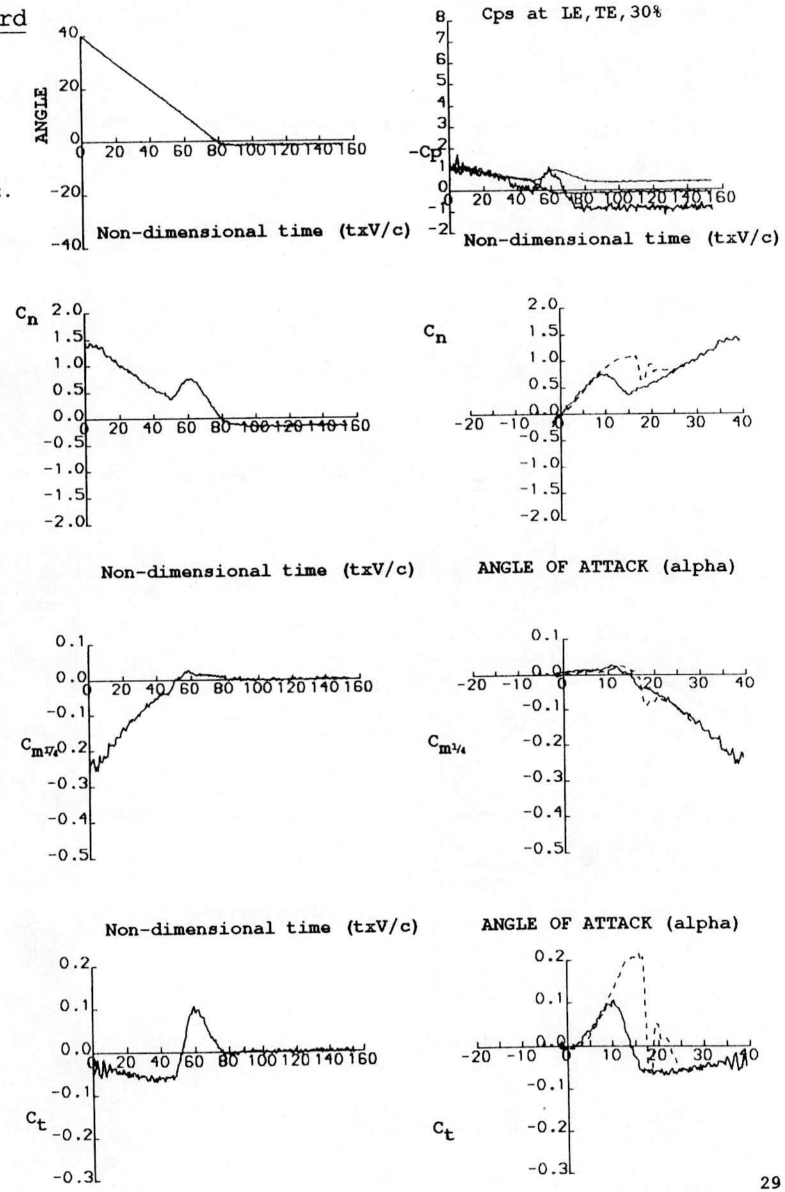
AIR TEMPERATURE = 31.4°C

SAMPLING FREQUENCY = 259.81 Hz.

REDUCED PITCH RATE = -0.00425

LINEAR PITCH RATE = -76.56°S^{-1}

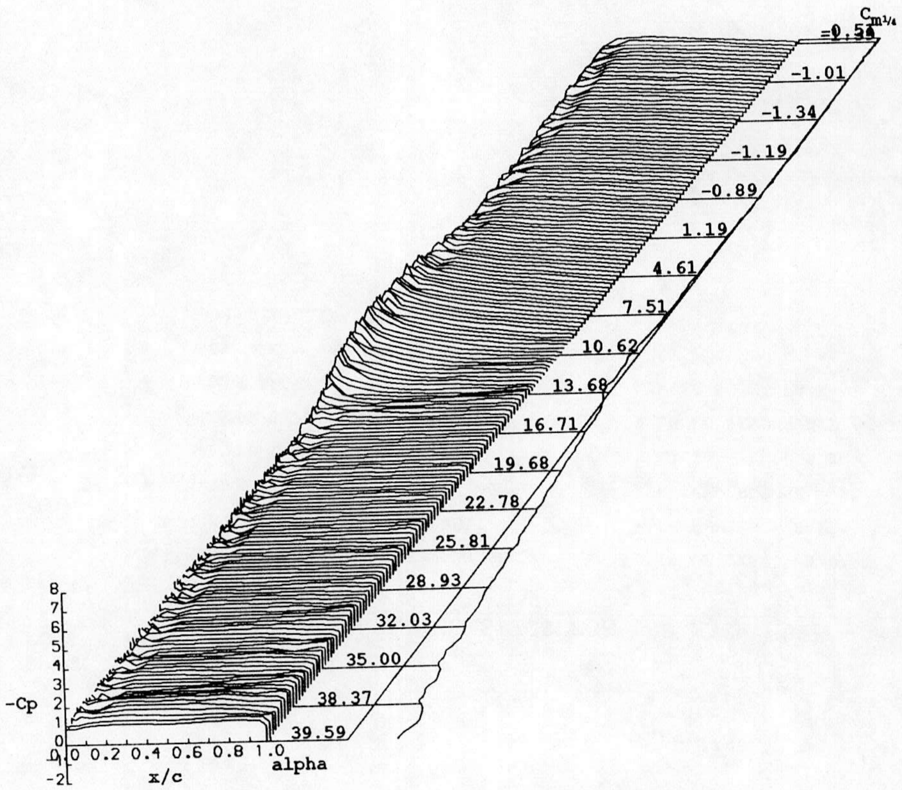


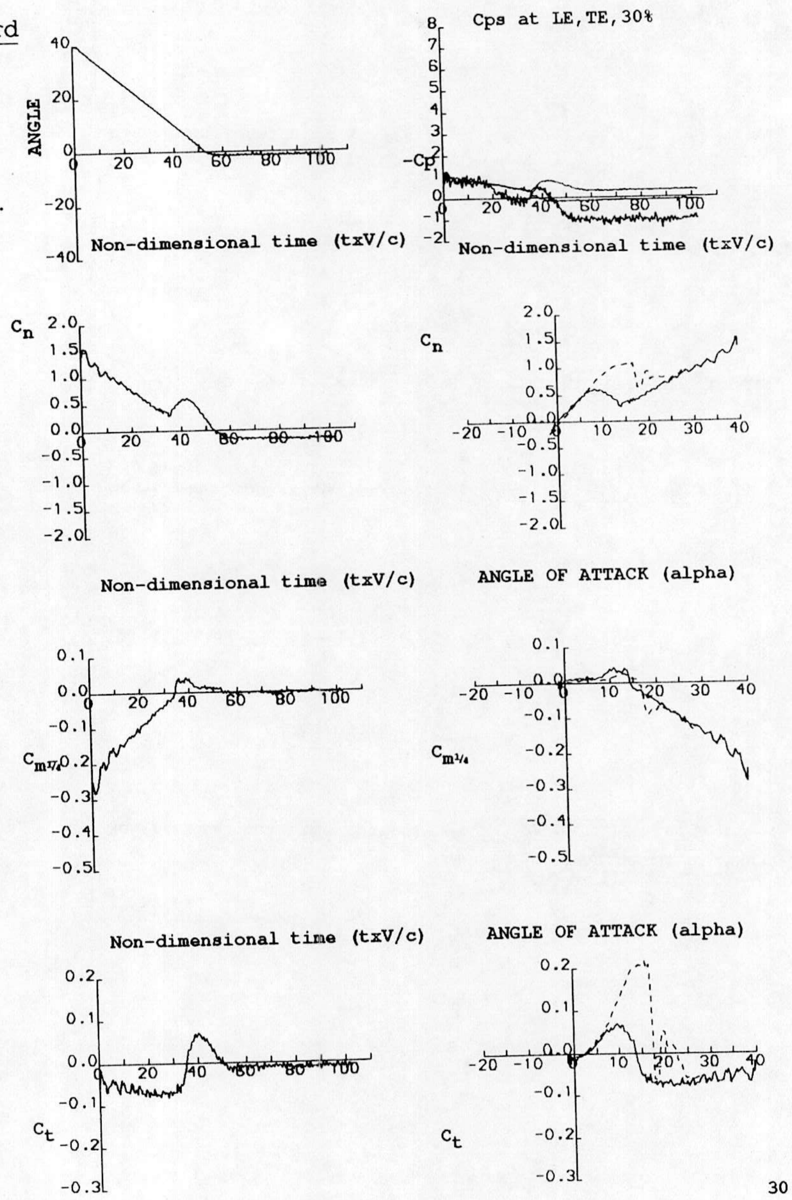


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30303
REYNOLDS NUMBER = 780038.
DYNAMIC PRESSURE = 1086.94 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 5/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 22.2°C
SAMPLING FREQUENCY = 386.55 Hz.
REDUCED PITCH RATE = -0.00675
LINEAR PITCH RATE = $-120.24°S^{-1}$

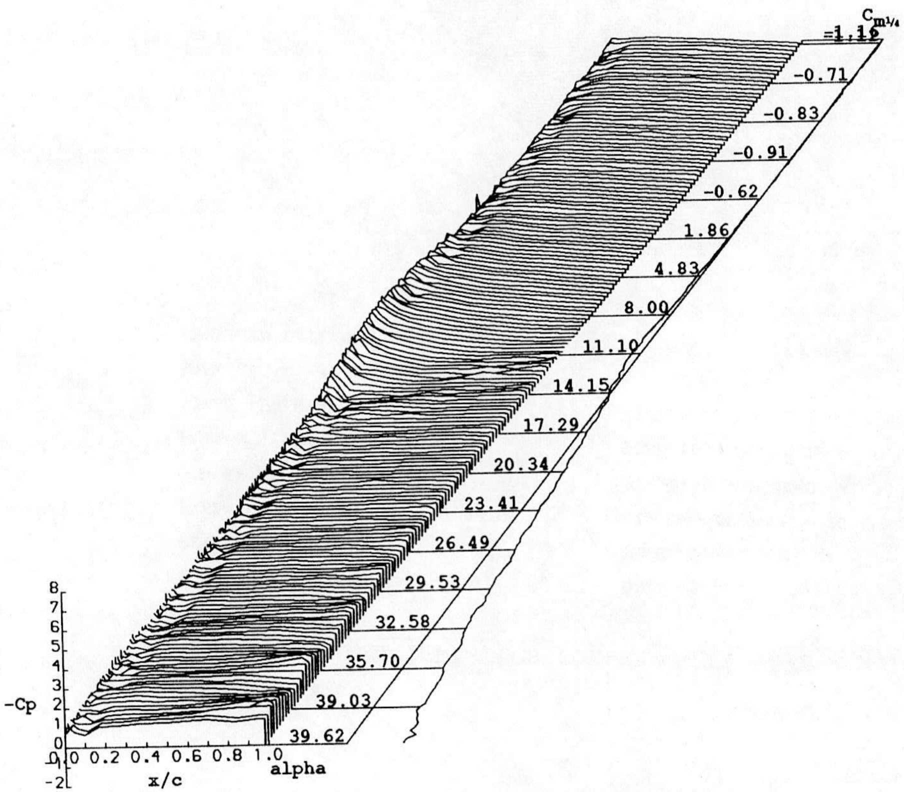


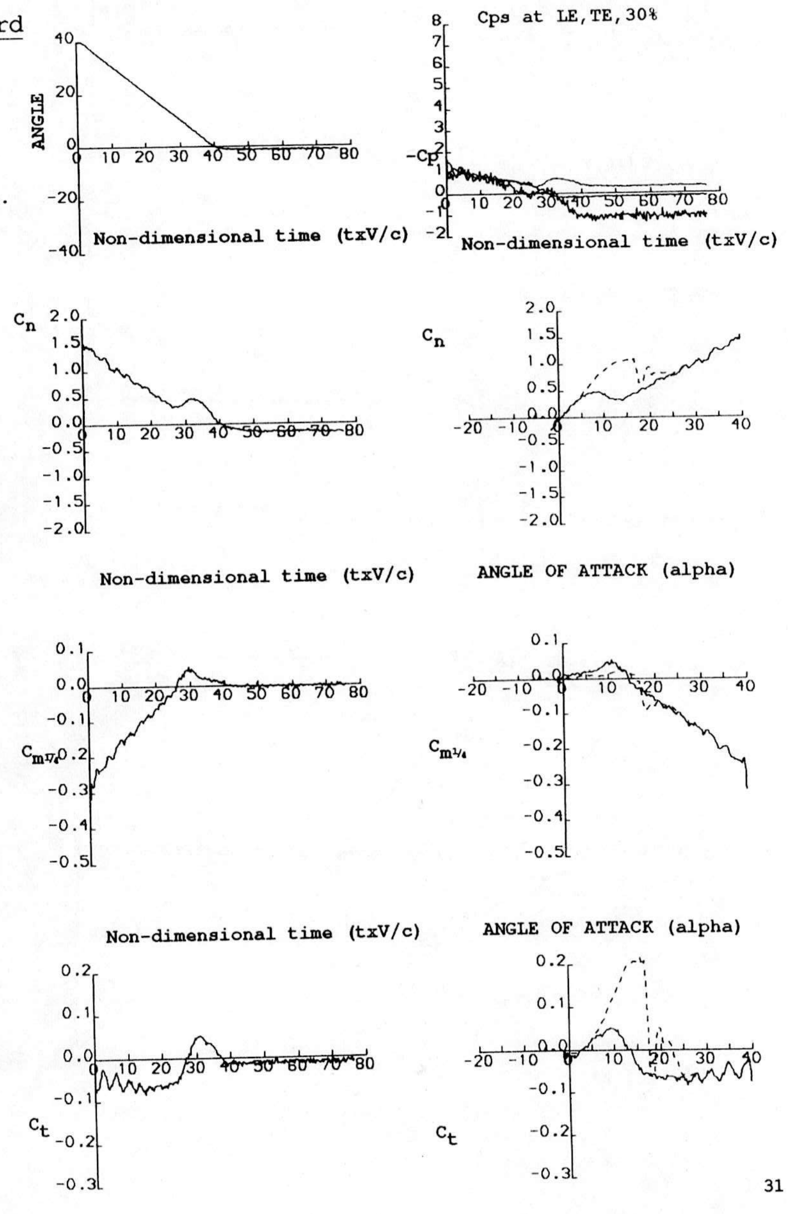


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30313
REYNOLDS NUMBER = 777335.
DYNAMIC PRESSURE = 1086.94 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 5/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 23.0°C
SAMPLING FREQUENCY = 520.02 Hz.
REDUCED PITCH RATE = -0.00891
LINEAR PITCH RATE = -158.96°S^{-1}

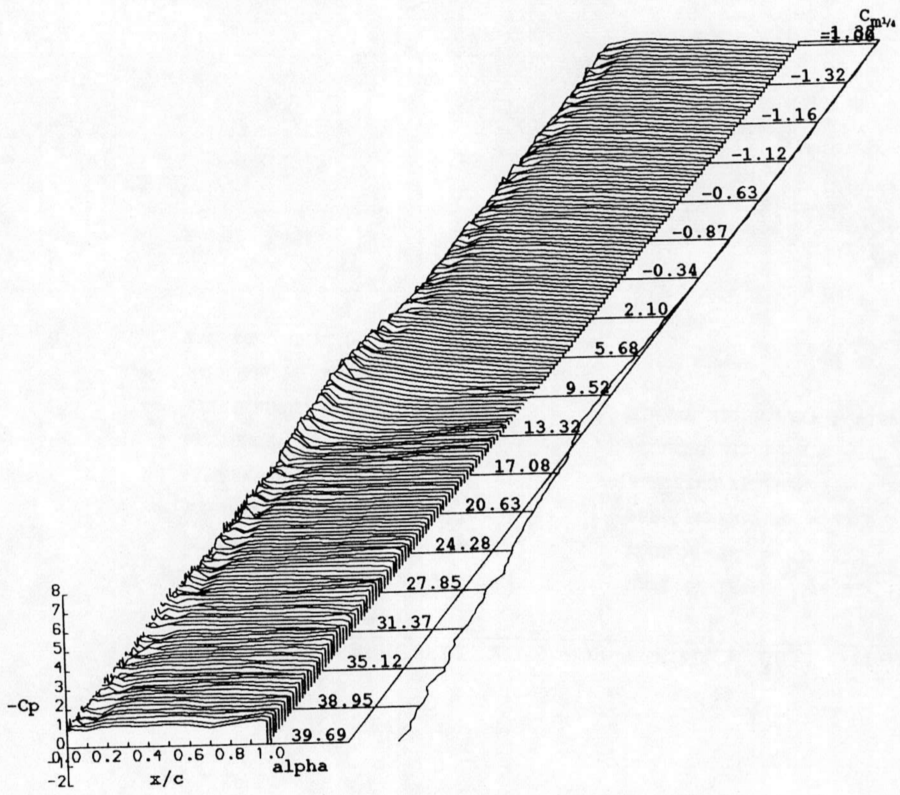


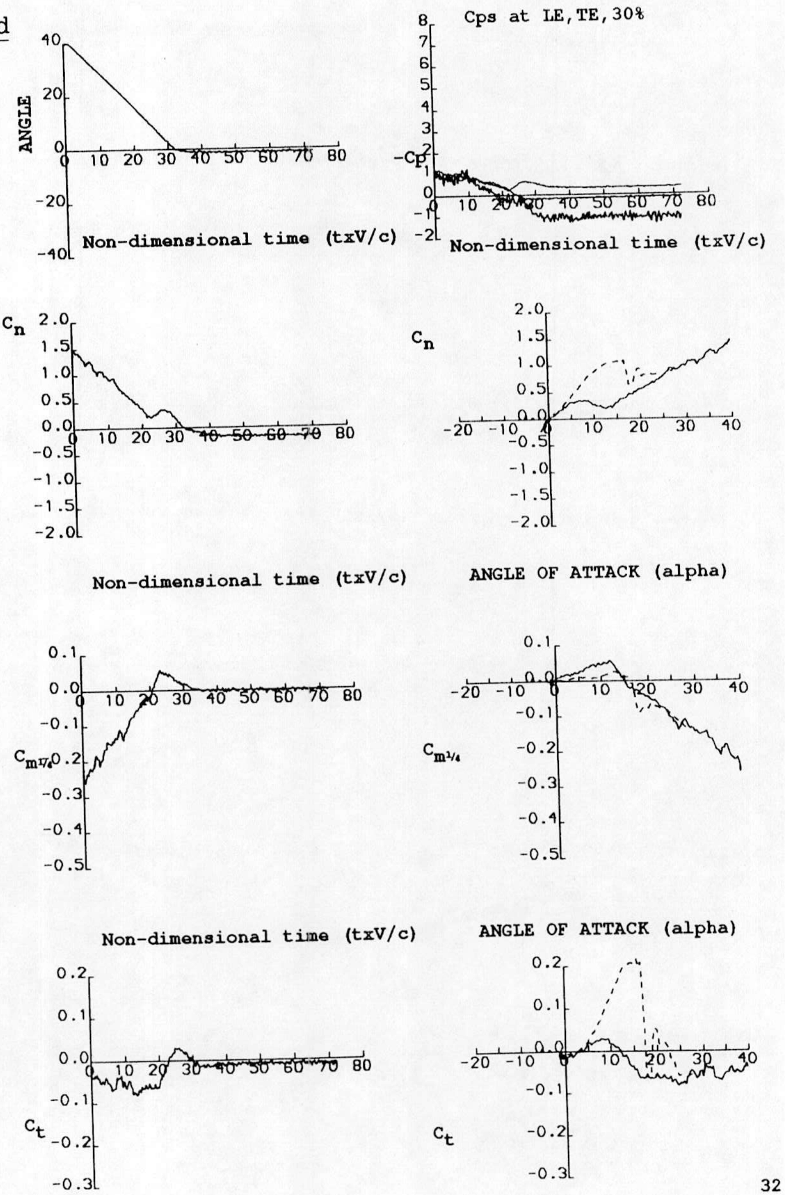


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30323
REYNOLDS NUMBER = 775319.
DYNAMIC PRESSURE = 1086.94 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 5/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 23.6°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = -0.01121
LINEAR PITCH RATE = -200.20°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30333

REYNOLDS NUMBER = 772980.

DYNAMIC PRESSURE = 1086.94 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 5/8/91

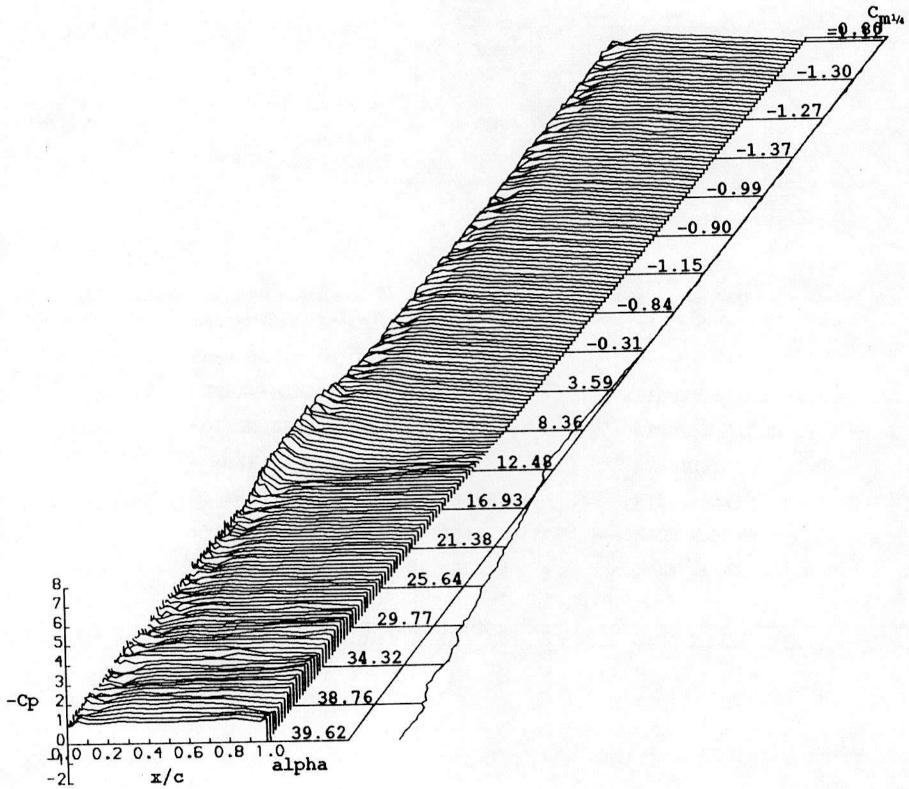
MACH NUMBER = 0.124

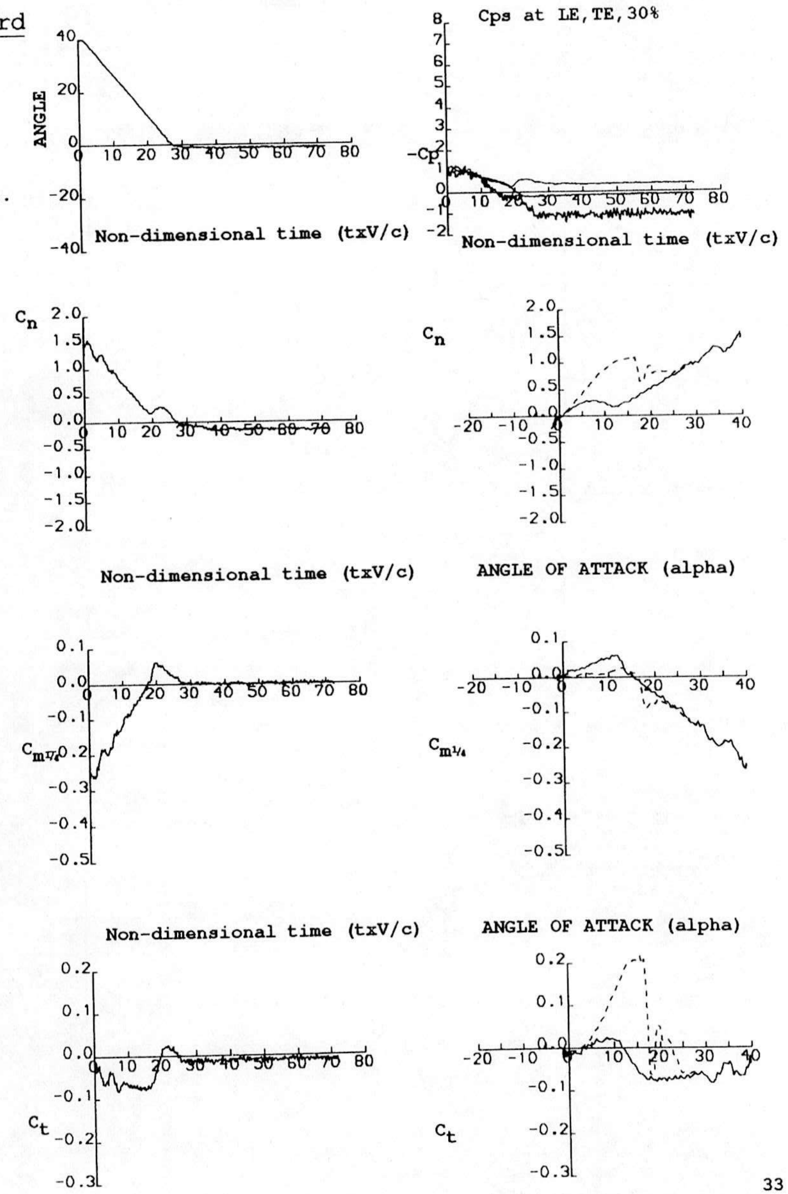
AIR TEMPERATURE = 24.3°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.01290

LINEAR PITCH RATE = -230.62°s^{-1}

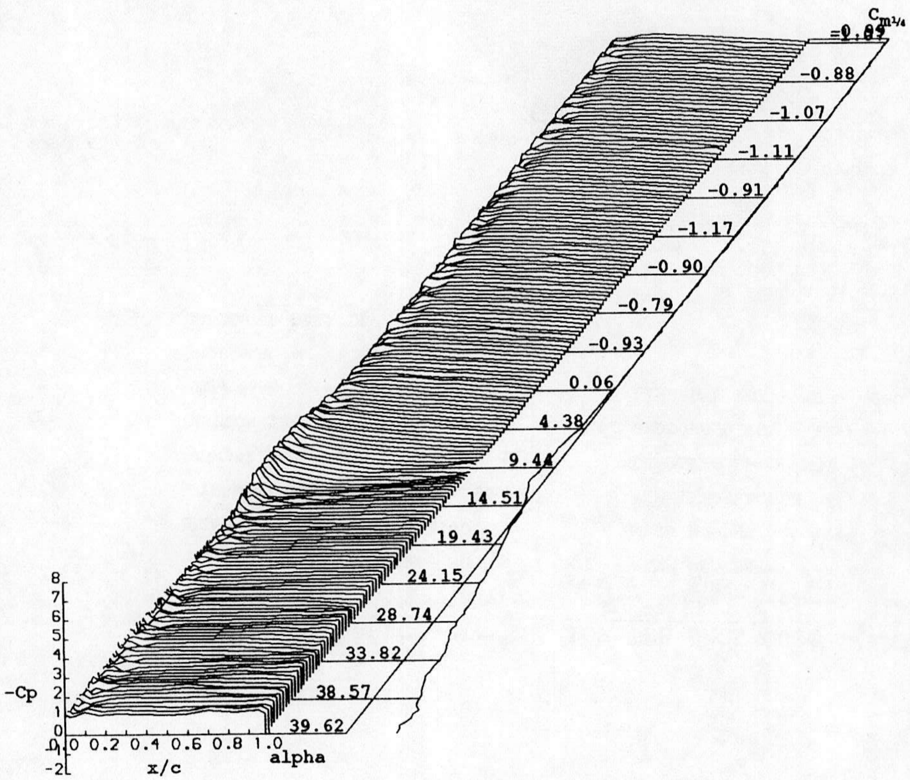


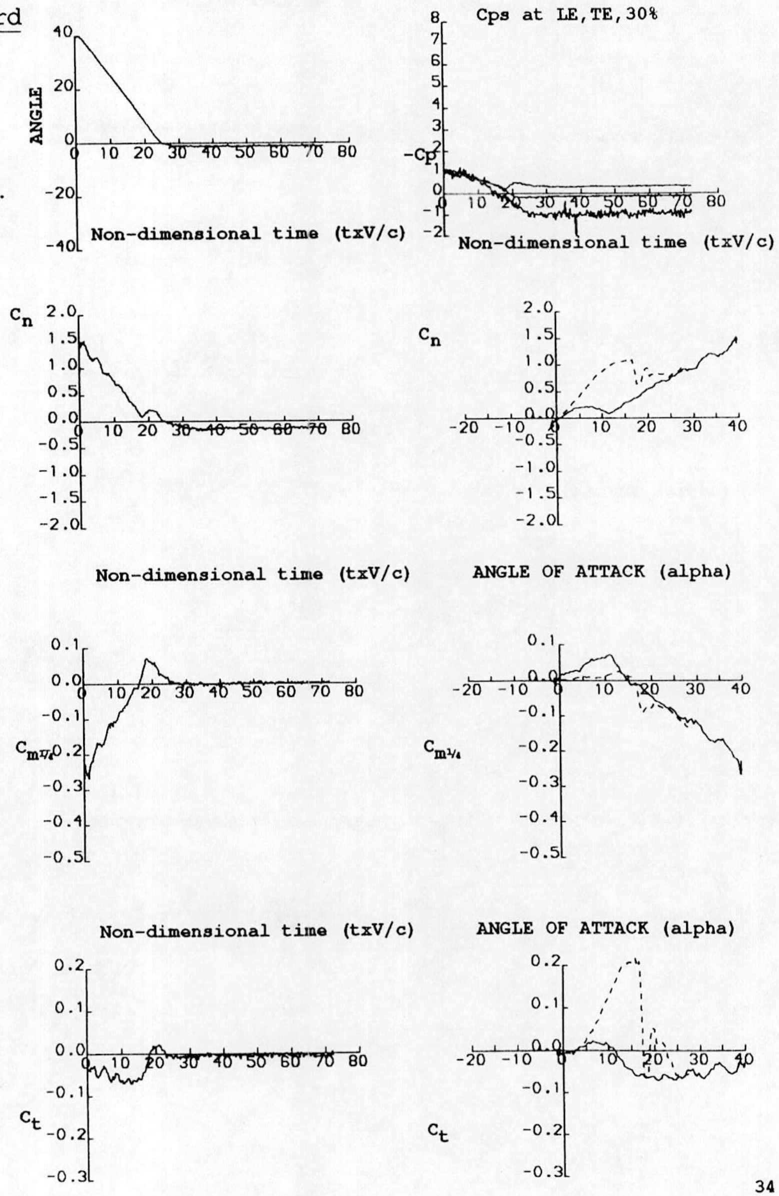


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30343
REYNOLDS NUMBER = 773237.
DYNAMIC PRESSURE = 1084.85 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 5/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 24.0°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = -0.01433
LINEAR PITCH RATE = $-255.88°s^{-1}$

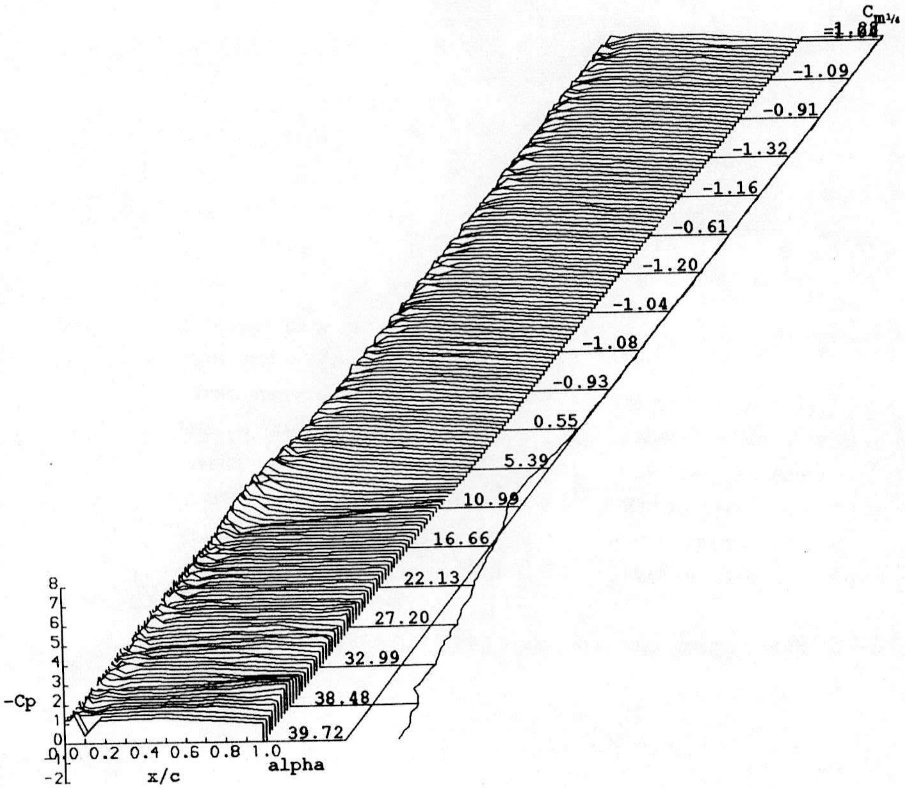


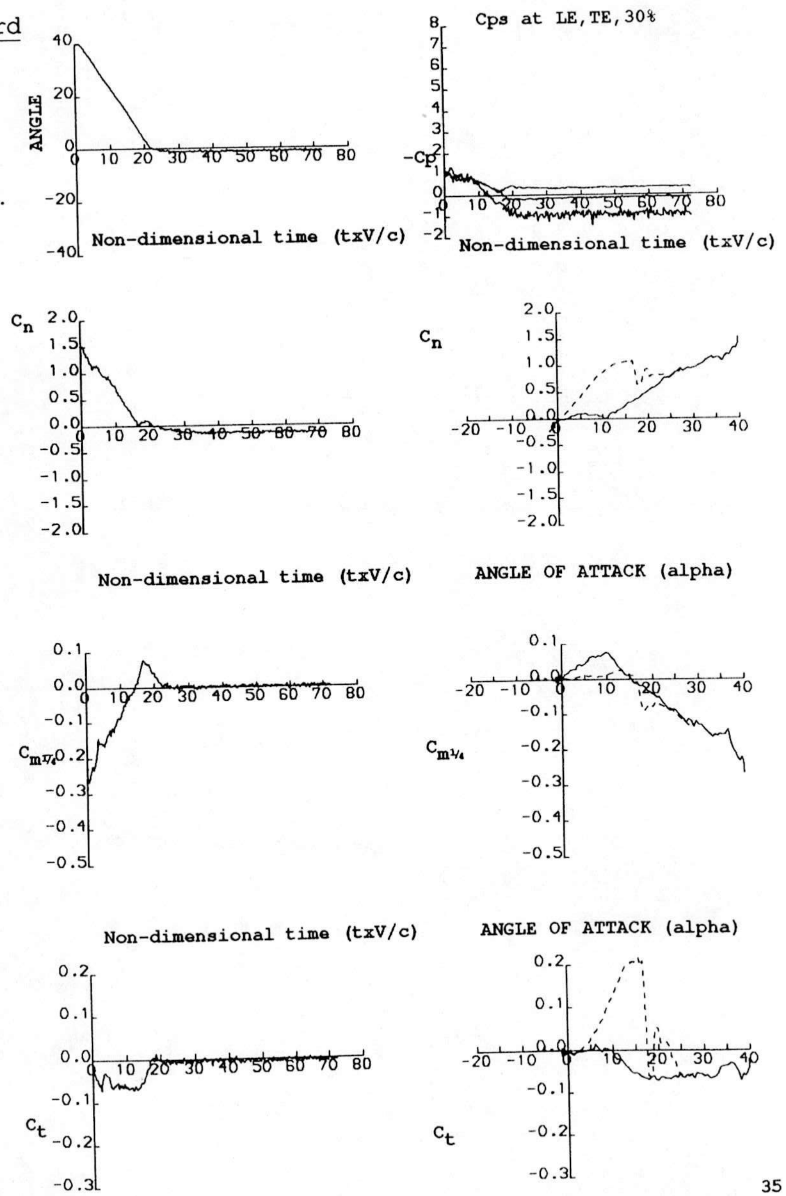


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30353
REYNOLDS NUMBER = 770244.
DYNAMIC PRESSURE = 1084.85 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 5/8/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 24.9°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = -0.01614
LINEAR PITCH RATE = -288.58°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30363

REYNOLDS NUMBER = 768591.

DYNAMIC PRESSURE = 1084.85 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 5/8/91

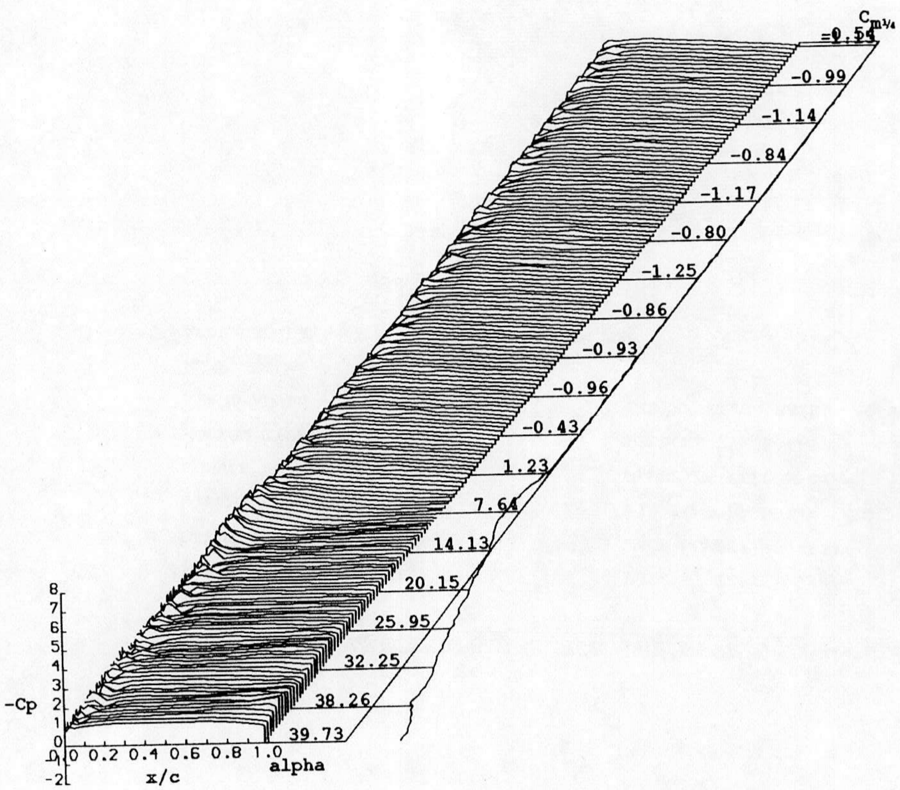
MACH NUMBER = 0.124

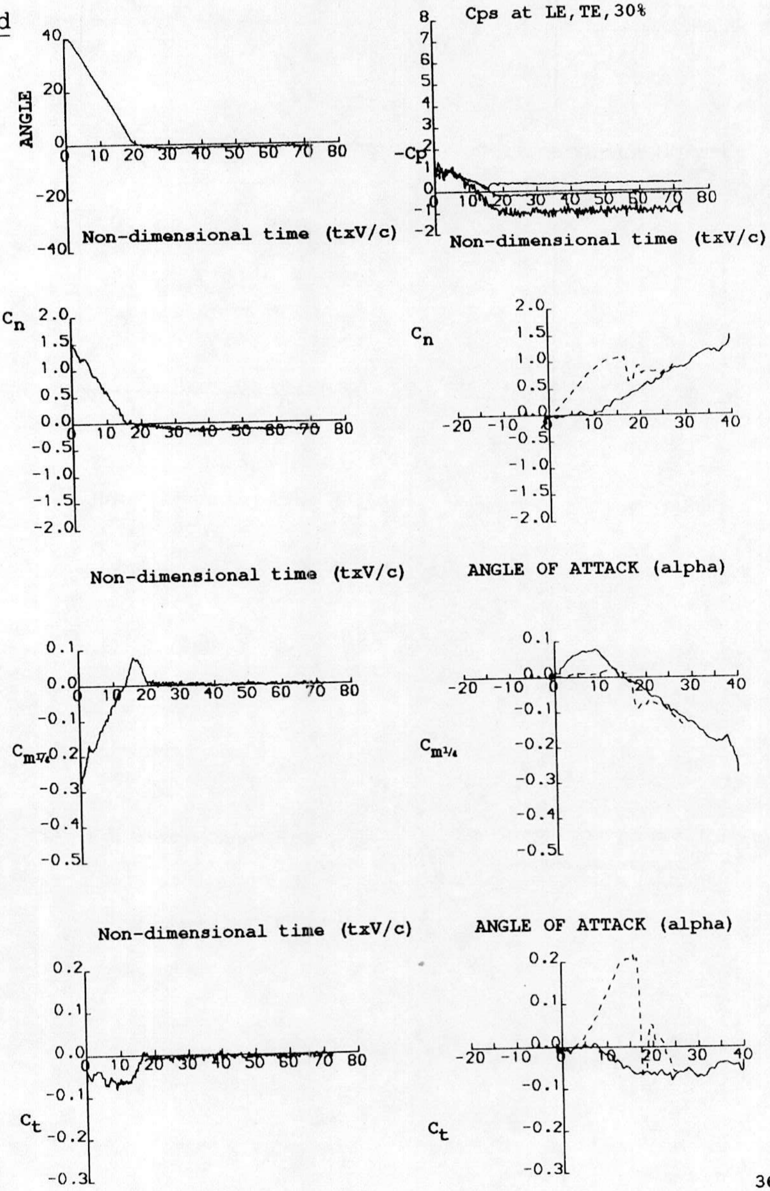
AIR TEMPERATURE = 25.4°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.01826

LINEAR PITCH RATE = -326.85°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30373

REYNOLDS NUMBER = 766945.

DYNAMIC PRESSURE = 1084.85 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 5/8/91

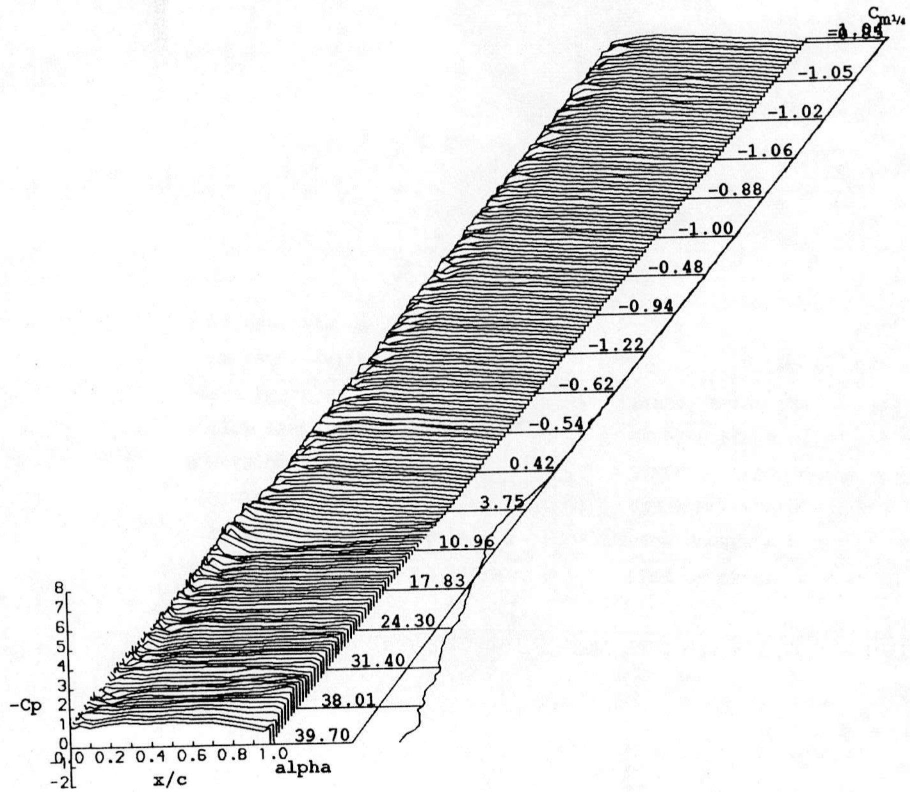
MACH NUMBER = 0.124

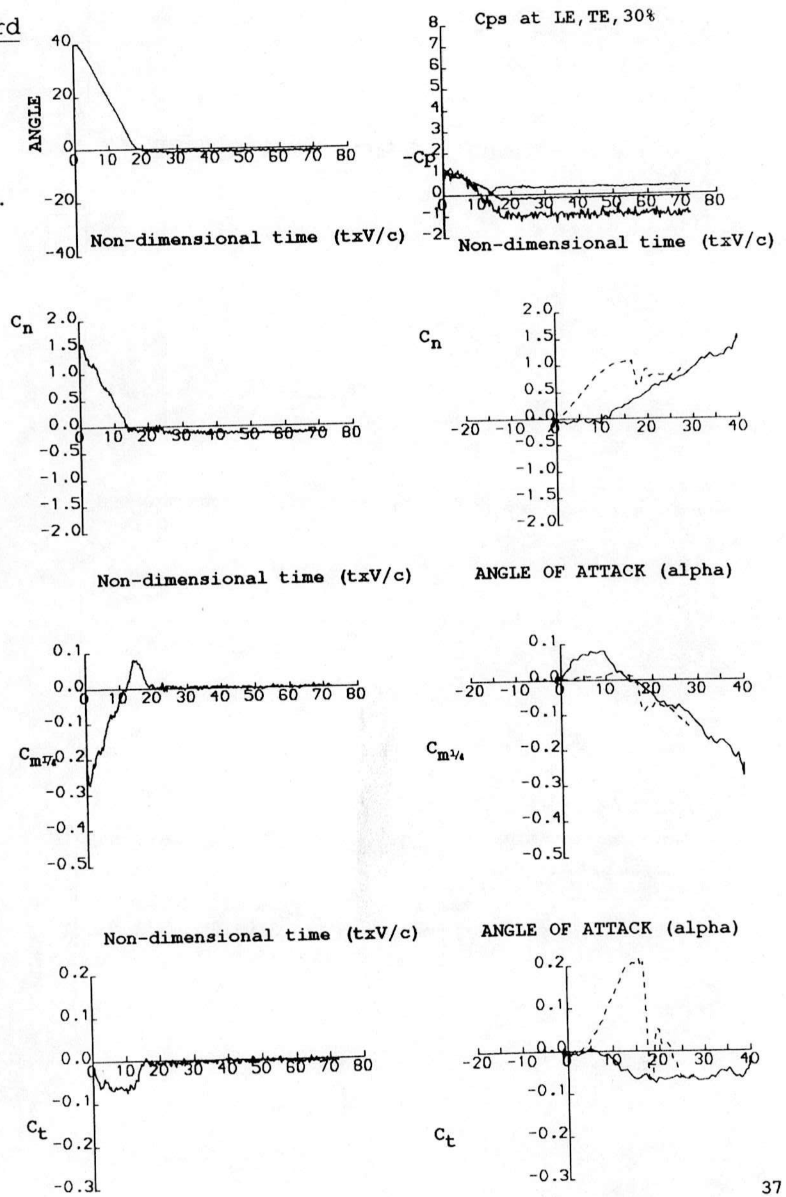
AIR TEMPERATURE = 25.9°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02053

LINEAR PITCH RATE = -367.76°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30383

REYNOLDS NUMBER = 754805.

DYNAMIC PRESSURE = 1044.49 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 5/8/91

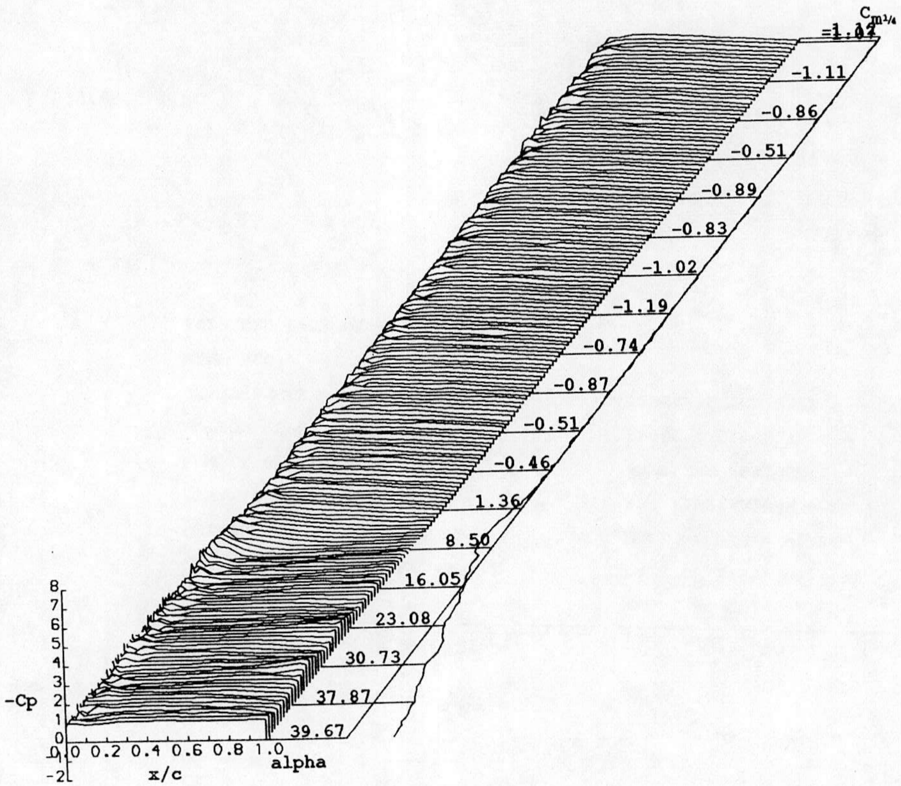
MACH NUMBER = 0.122

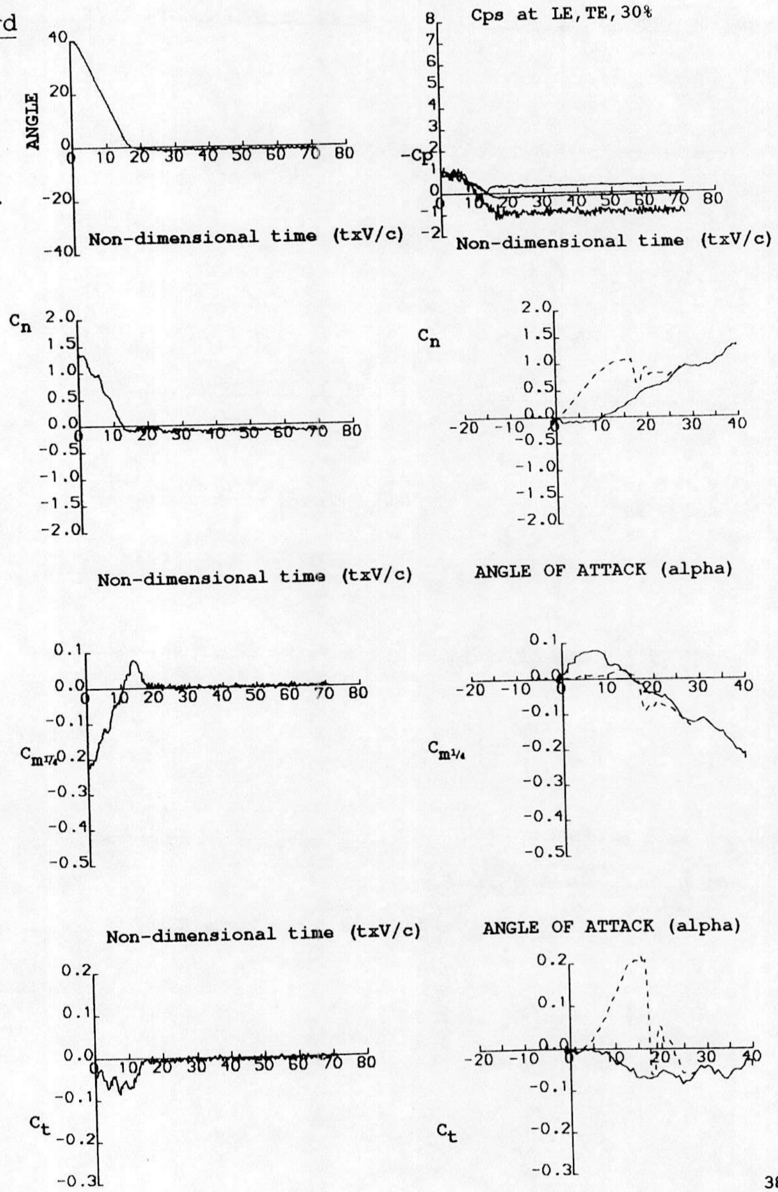
AIR TEMPERATURE = 25.2°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02304

LINEAR PITCH RATE = -404.43°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30394

REYNOLDS NUMBER = 751898.

DYNAMIC PRESSURE = 1044.49 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 5/8/91

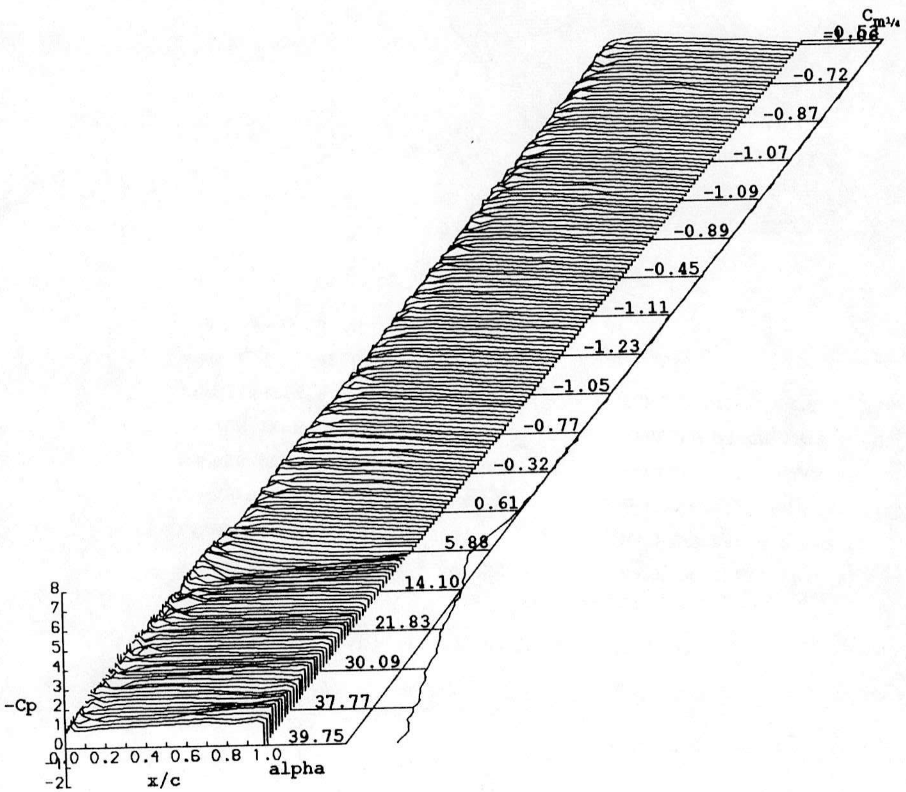
MACH NUMBER = 0.122

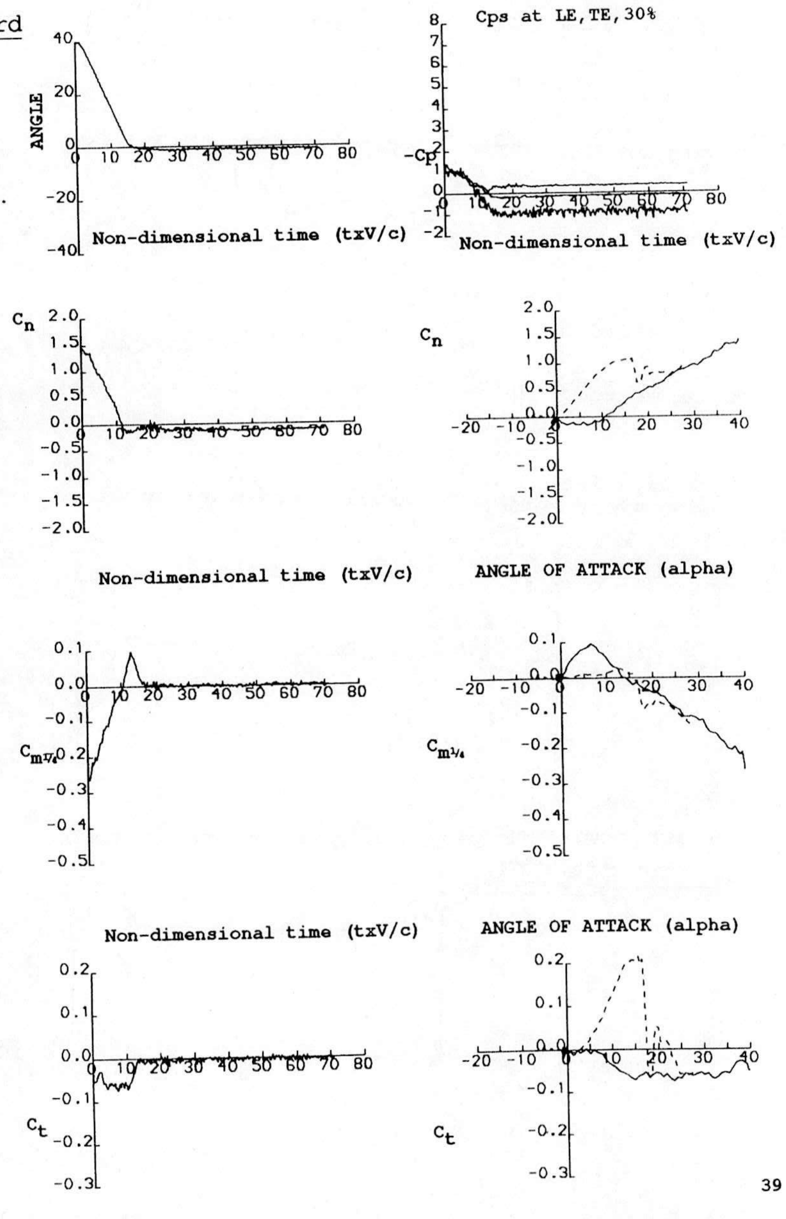
AIR TEMPERATURE = 26.1°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02492

LINEAR PITCH RATE = -438.06°S^{-1}

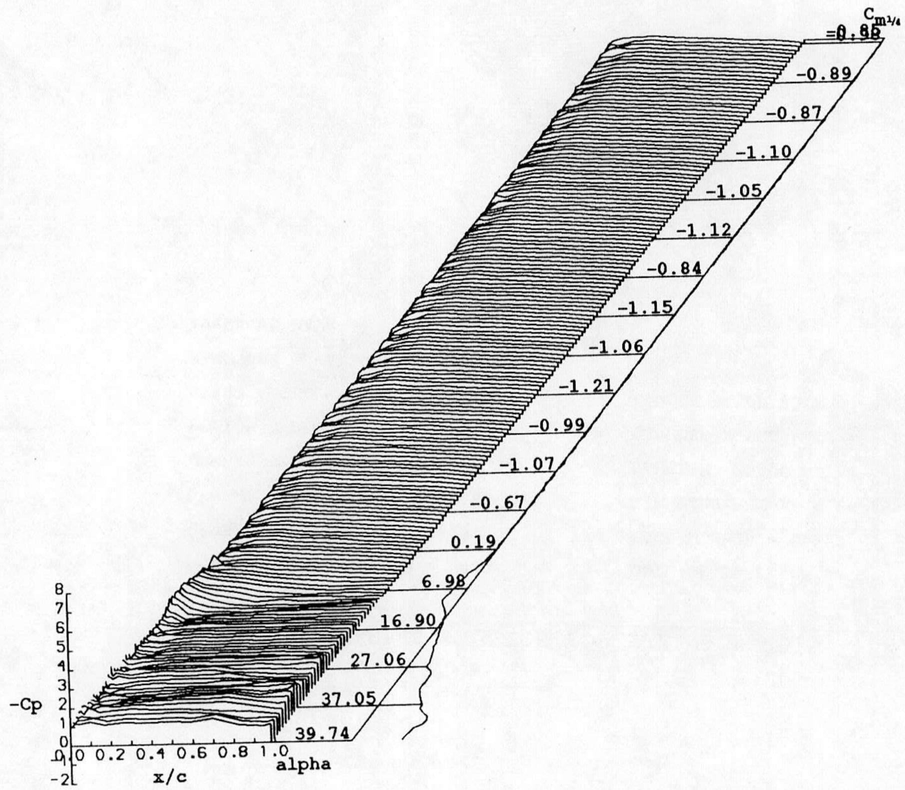


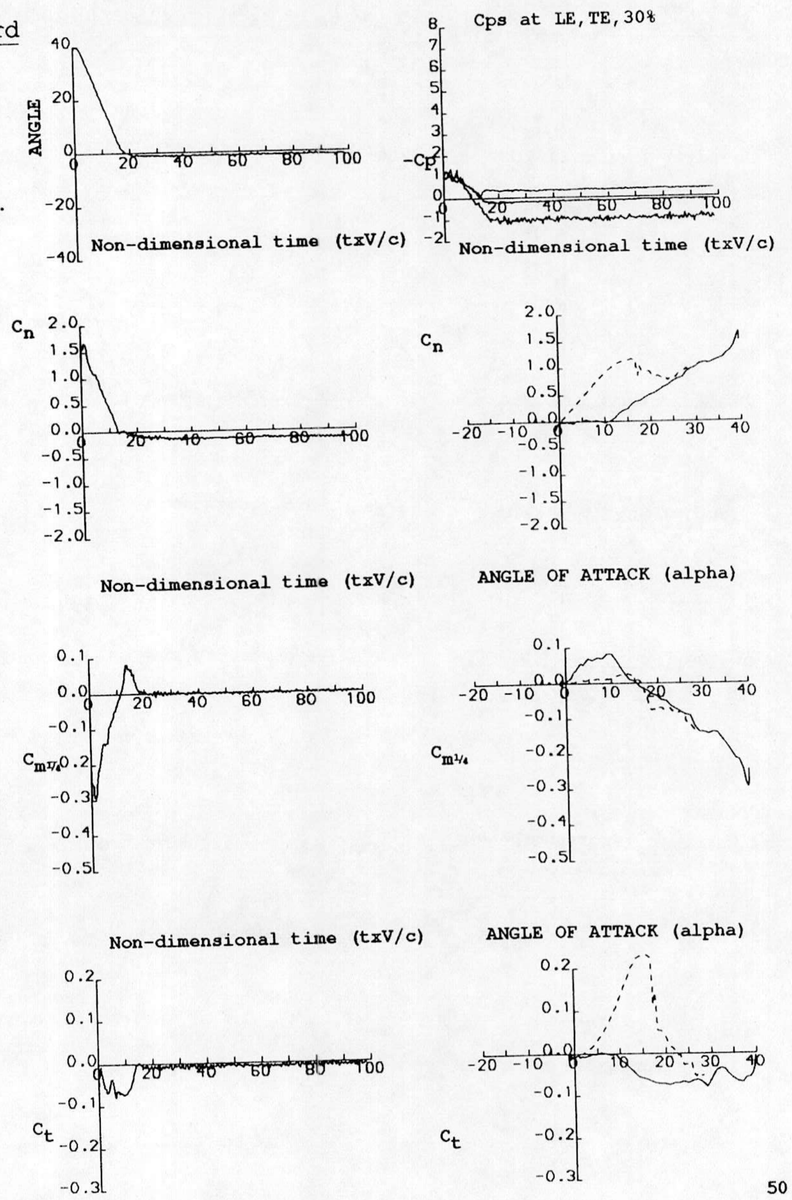


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30501
REYNOLDS NUMBER = 1048906.
DYNAMIC PRESSURE = 2015.82 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -41.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 14/8/91
MACH NUMBER = 0.168
AIR TEMPERATURE = 25.9°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = -0.02239
LINEAR PITCH RATE = -544.98°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30521

REYNOLDS NUMBER = 949276.

DYNAMIC PRESSURE = 1698.11 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 14/8/91

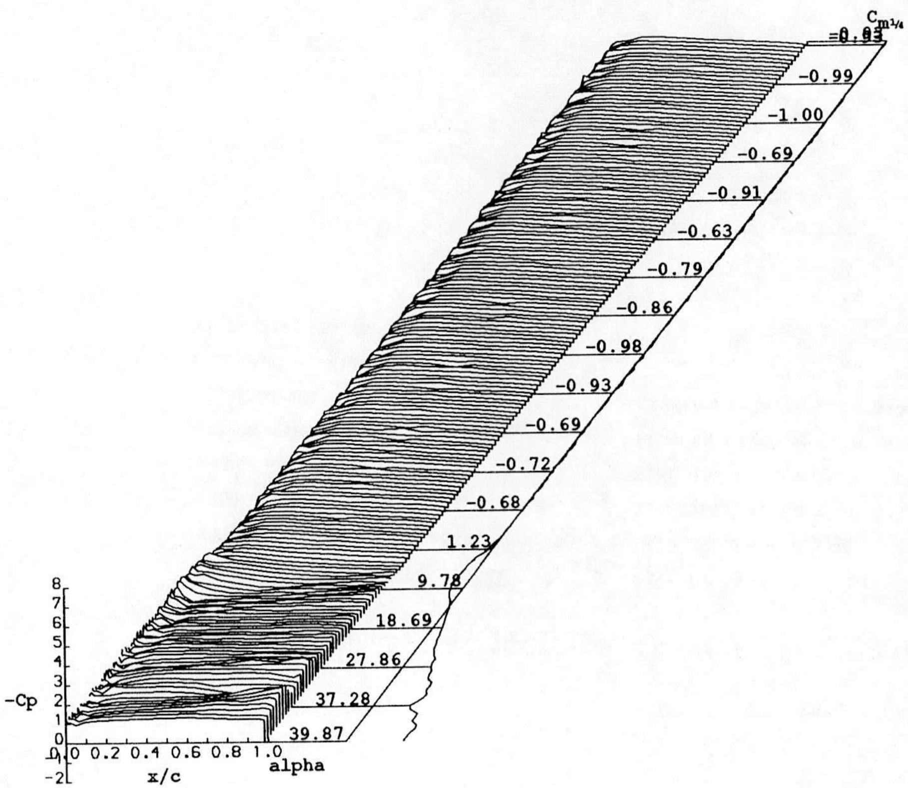
MACH NUMBER = 0.155

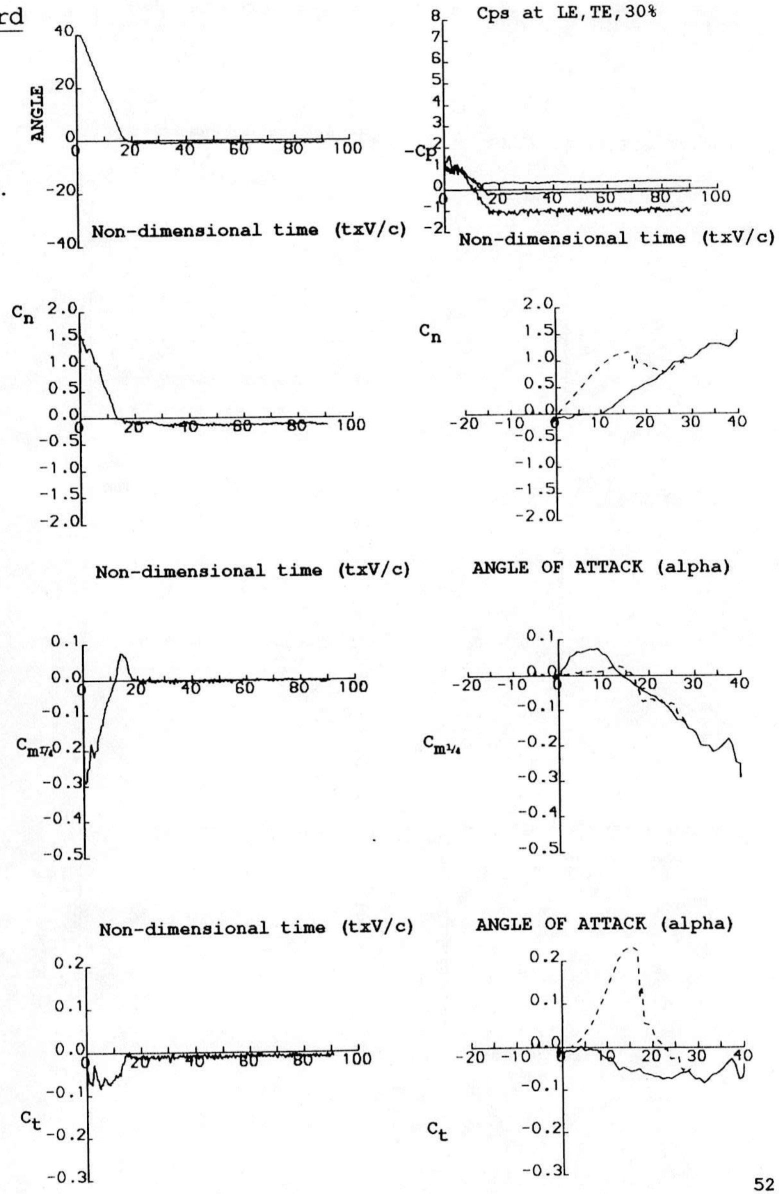
AIR TEMPERATURE = 29.2°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02183

LINEAR PITCH RATE = -490.28°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30541

REYNOLDS NUMBER = 849530.

DYNAMIC PRESSURE = 1371.53 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 14/8/91

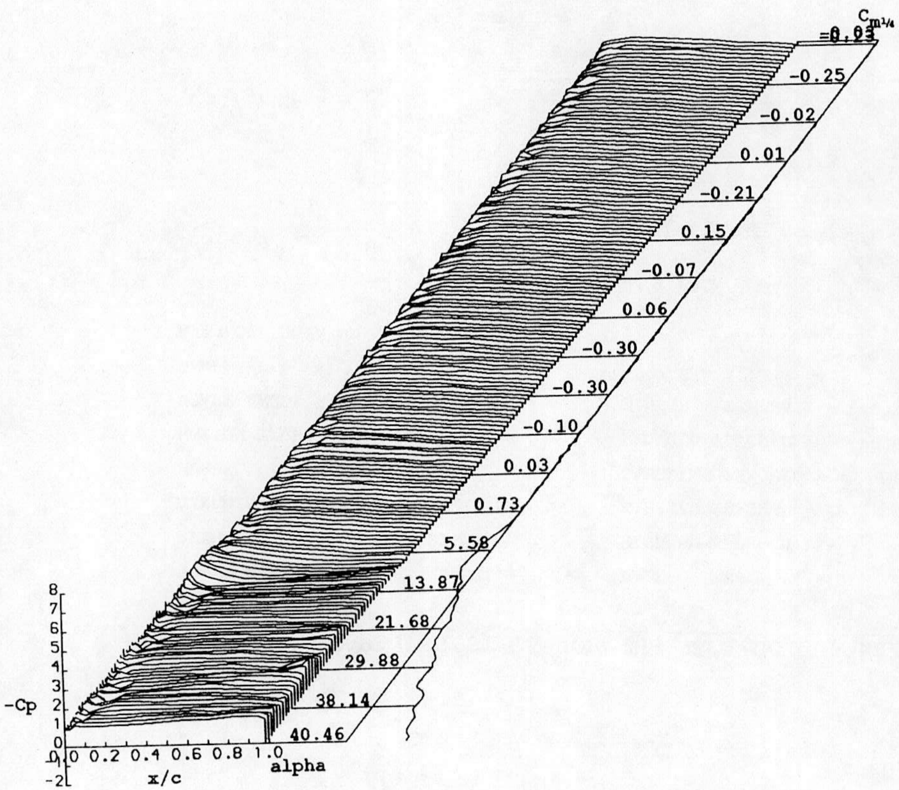
MACH NUMBER = 0.139

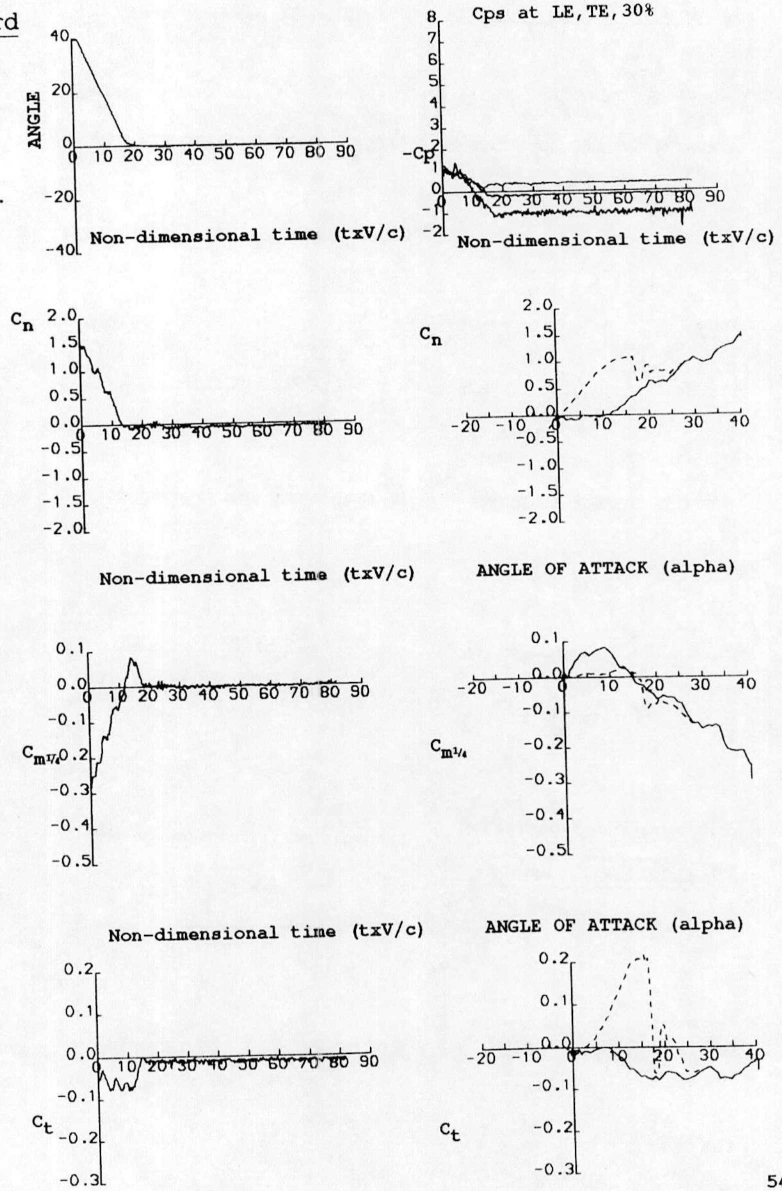
AIR TEMPERATURE = 30.2°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02201

LINEAR PITCH RATE = -445.02°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30561

REYNOLDS NUMBER = 756381.

DYNAMIC PRESSURE = 1042.86 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 14/8/91

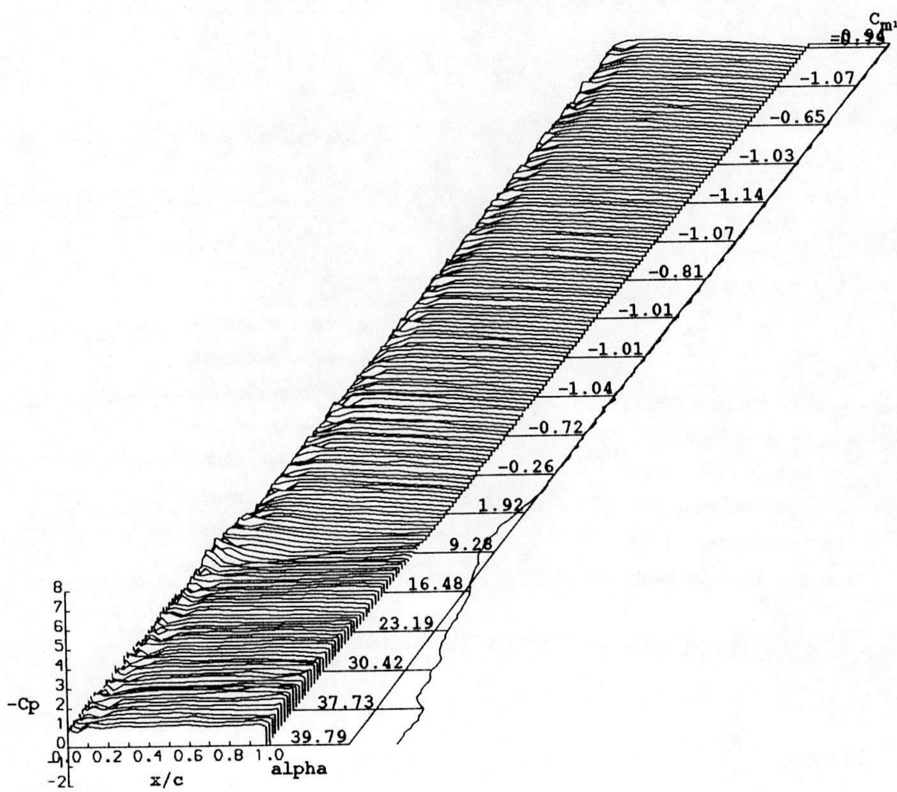
MACH NUMBER = 0.121

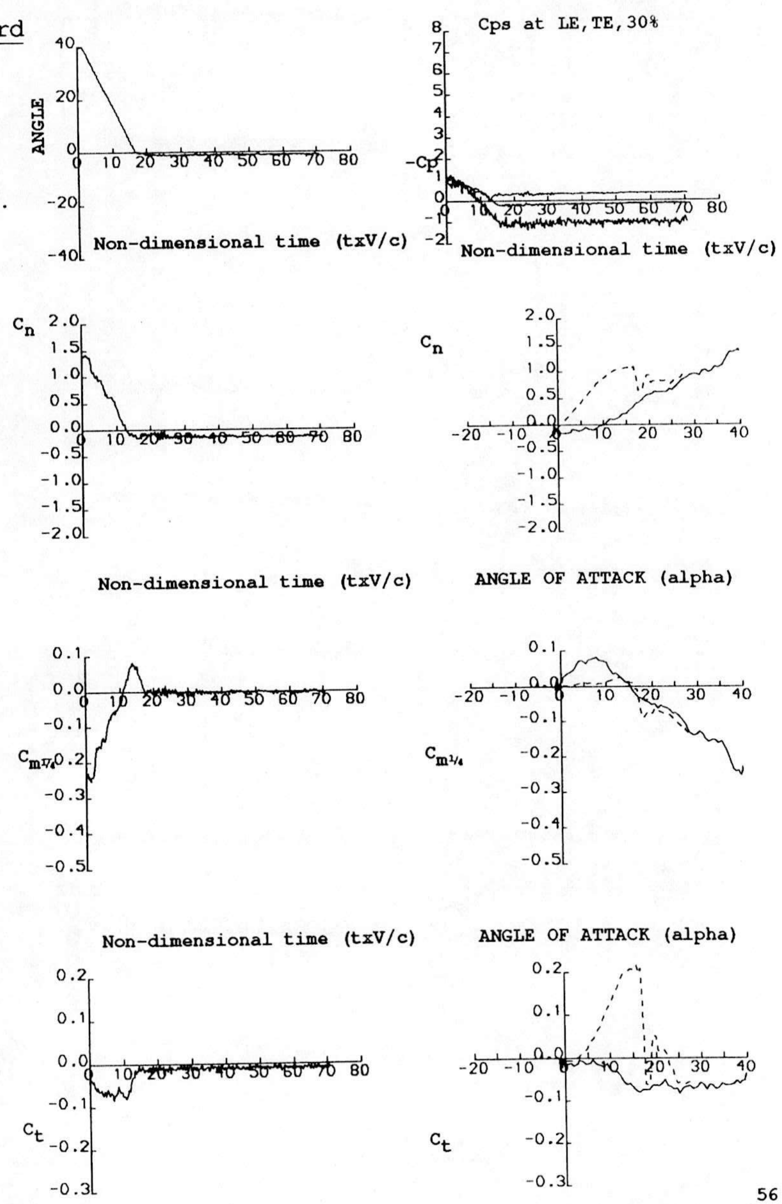
AIR TEMPERATURE = 25.3°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02189

LINEAR PITCH RATE = -382.85°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30581

REYNOLDS NUMBER = 652919.

DYNAMIC PRESSURE = 781.75 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 14/8/91

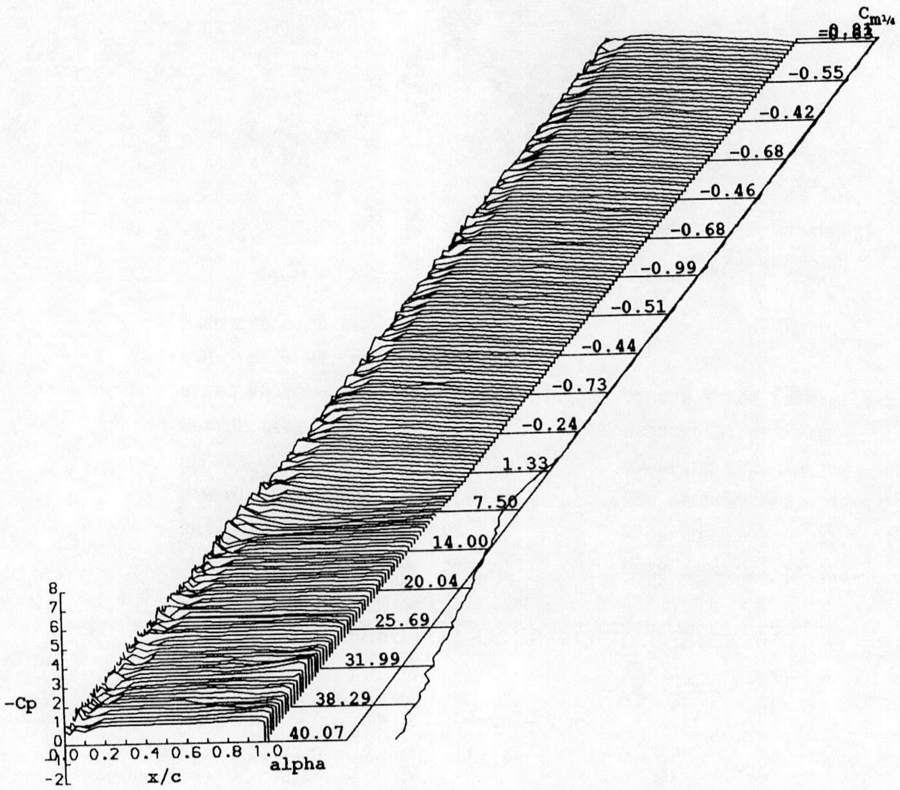
MACH NUMBER = 0.105

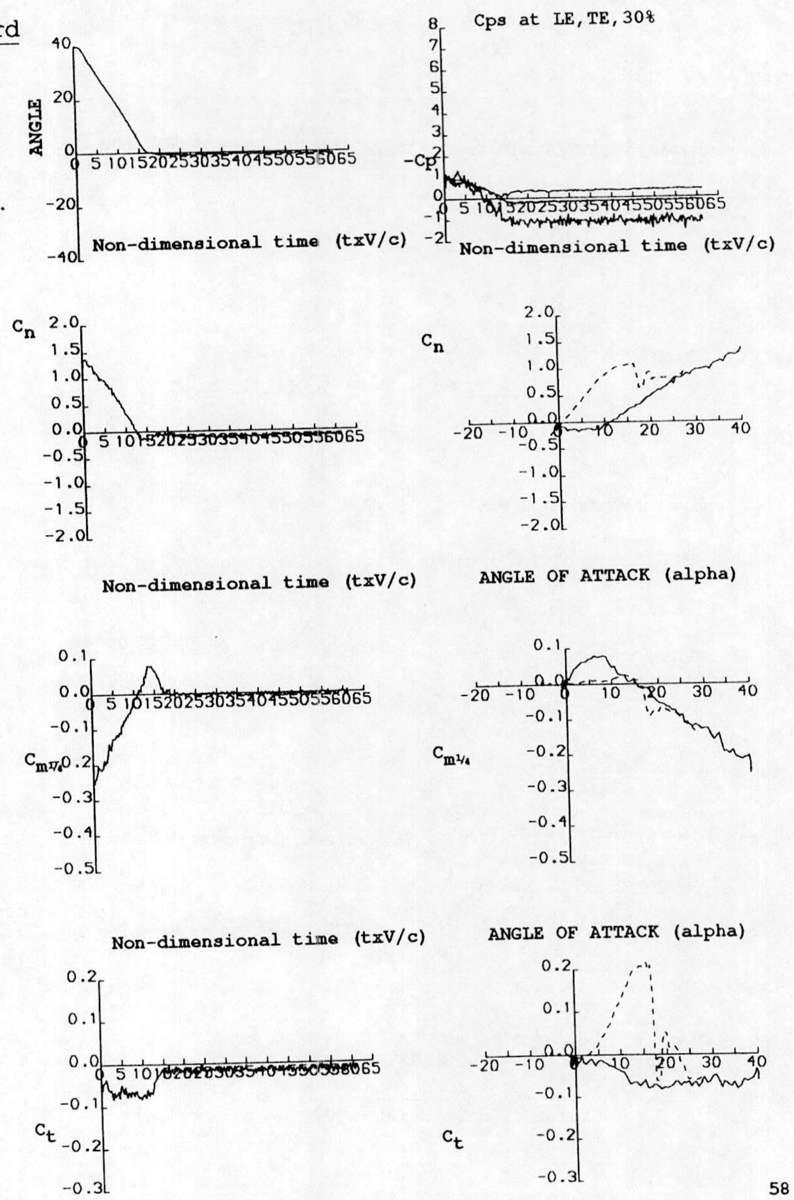
AIR TEMPERATURE = 26.0°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02135

LINEAR PITCH RATE = -323.56°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30601

REYNOLDS NUMBER = 545962.

DYNAMIC PRESSURE = 545.67 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -41.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 14/8/91

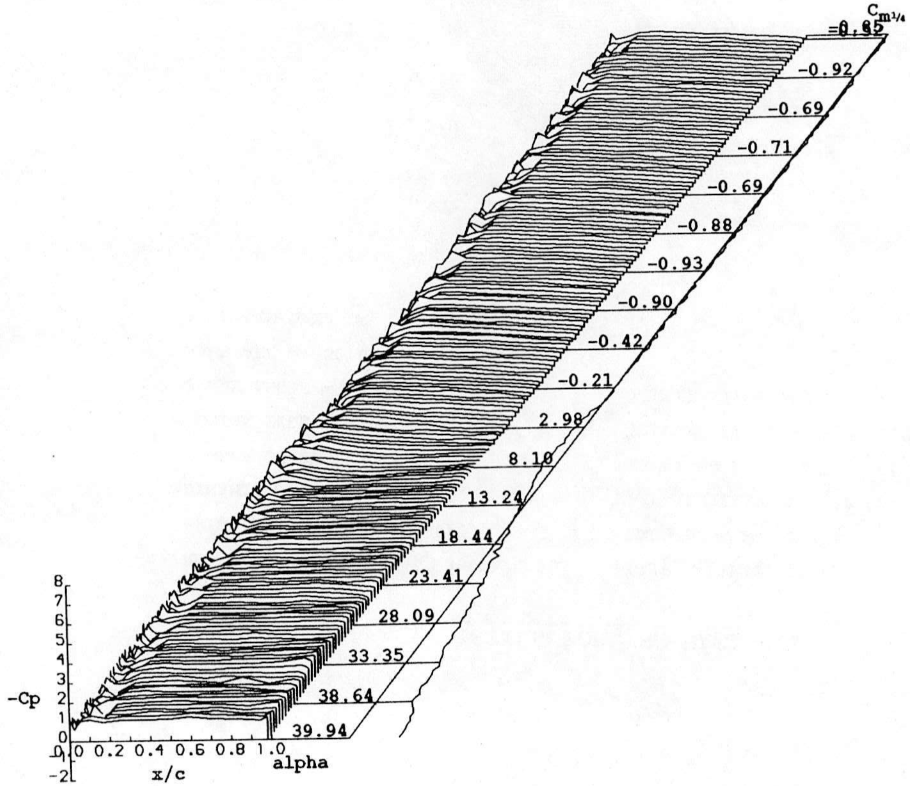
MACH NUMBER = 0.088

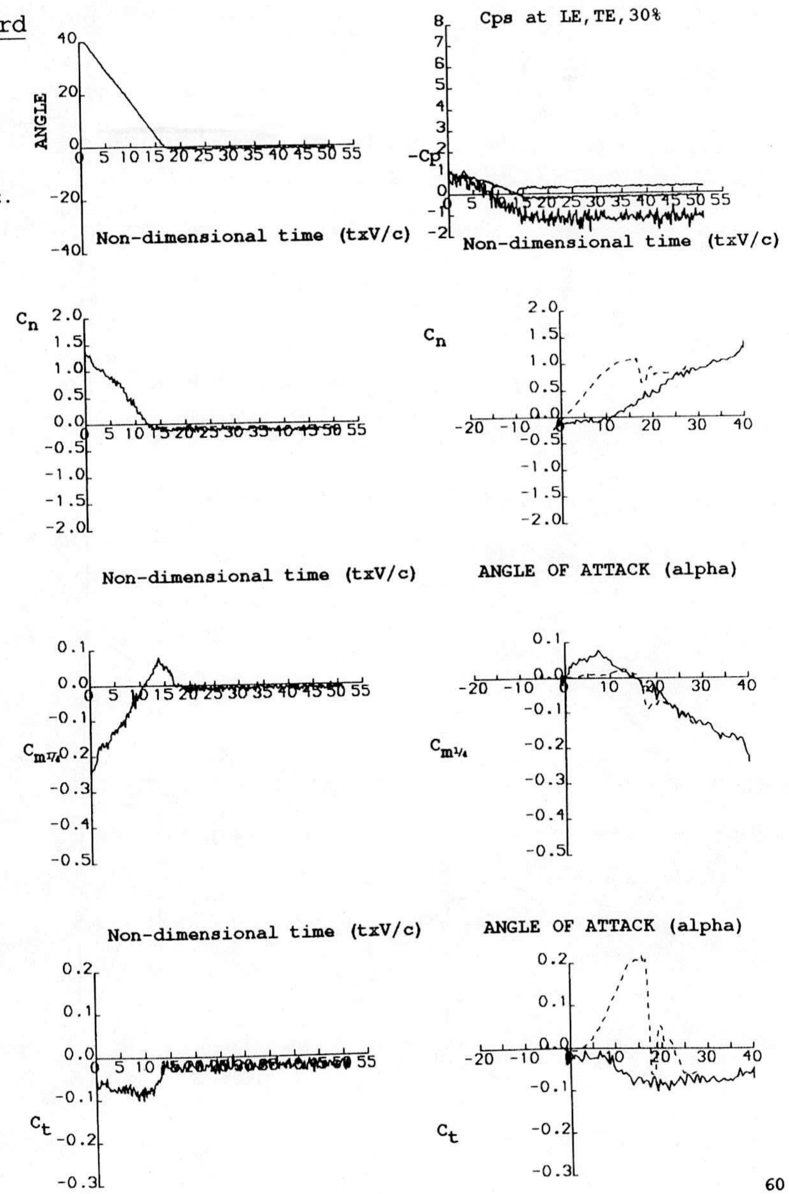
AIR TEMPERATURE = 25.8°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02069

LINEAR PITCH RATE = -261.95°S^{-1}

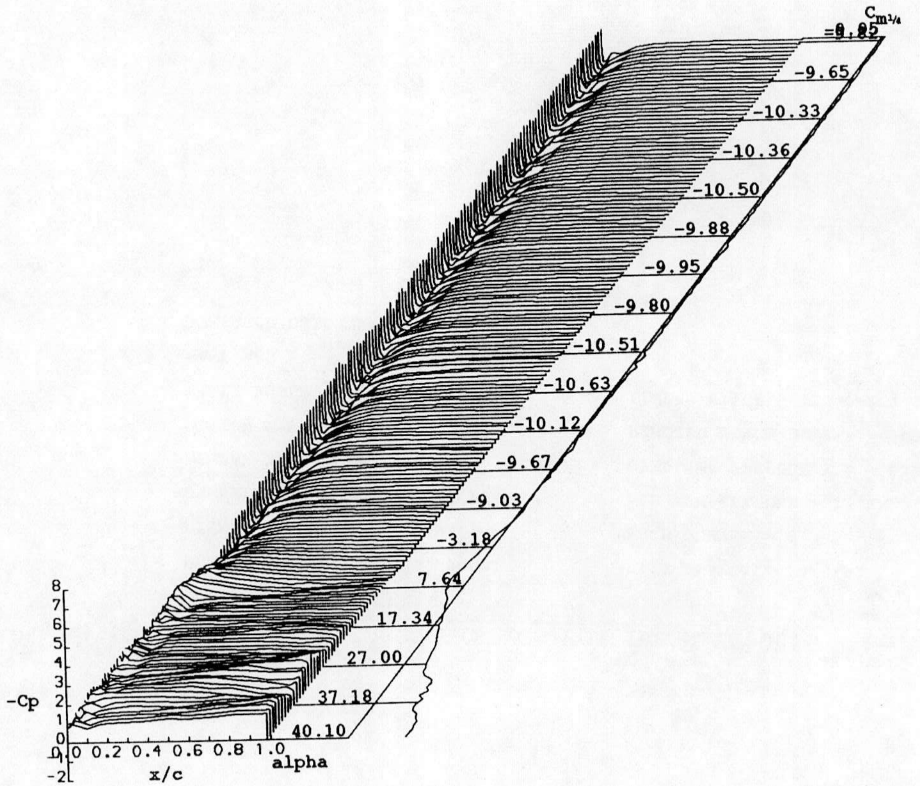


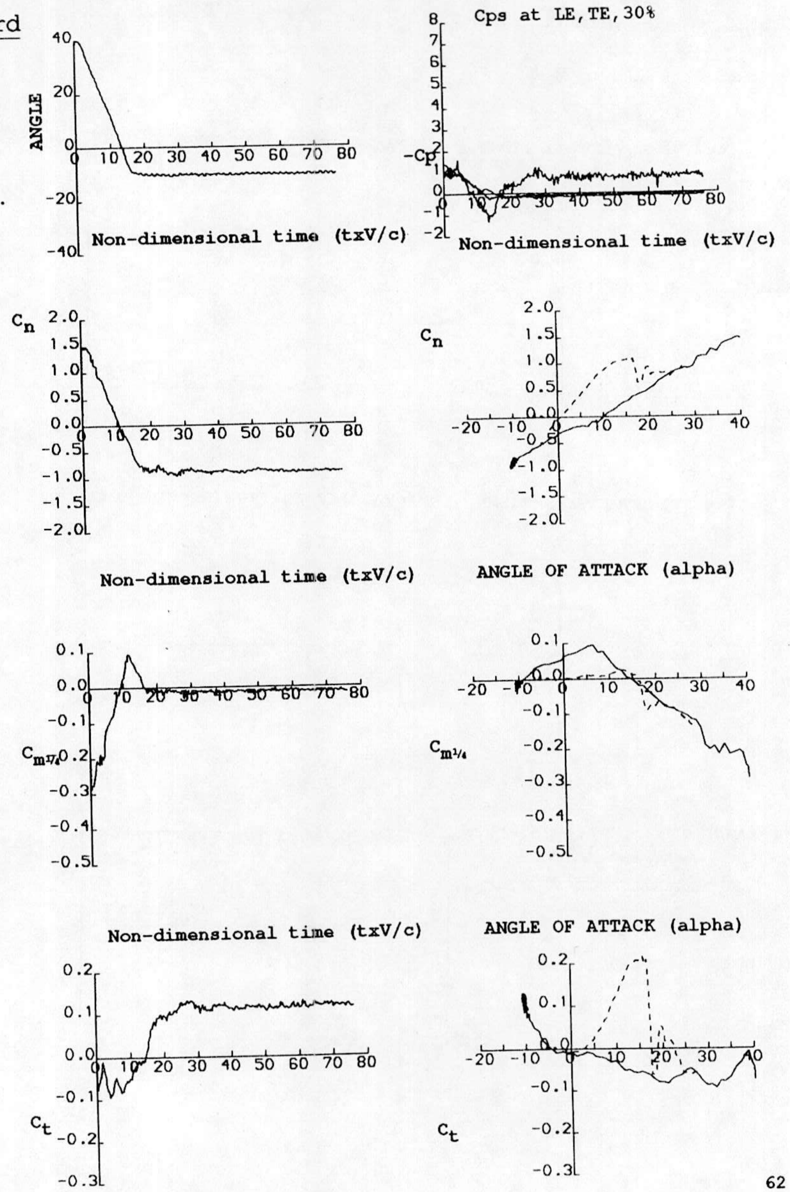


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30621
REYNOLDS NUMBER = 820017.
DYNAMIC PRESSURE = 1208.19 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 15/8/91
MACH NUMBER = 0.131
AIR TEMPERATURE = 22.6°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = -0.02876
LINEAR PITCH RATE = -541.27°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30631

REYNOLDS NUMBER = 816473.

DYNAMIC PRESSURE = 1208.19 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 35.00°

RAMP ARC = -45.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 15/8/91

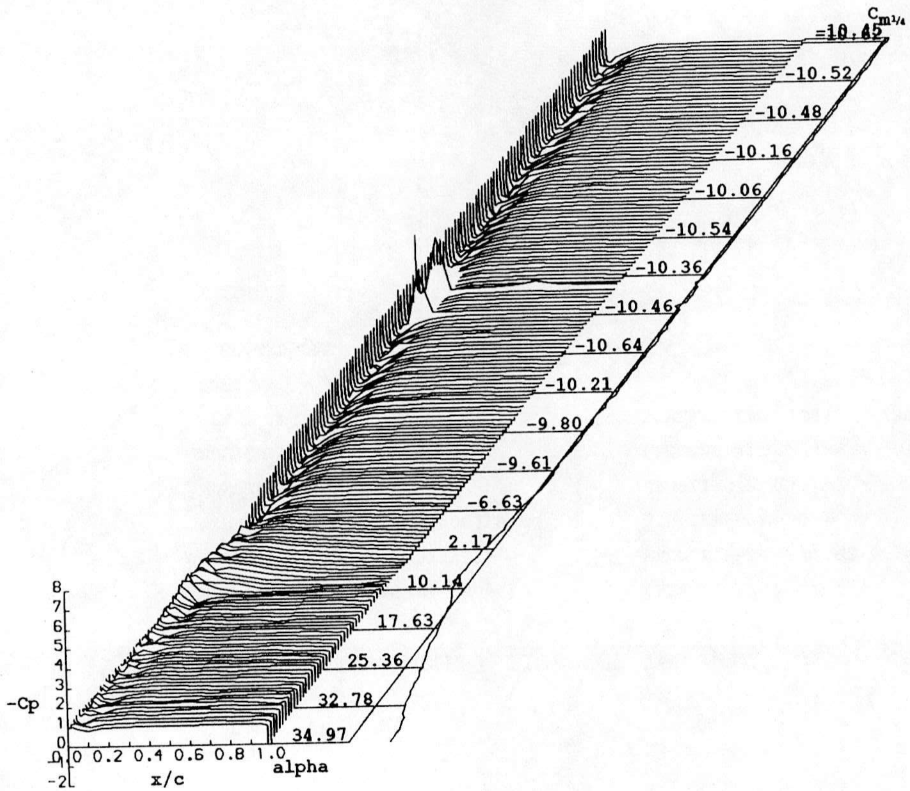
MACH NUMBER = 0.131

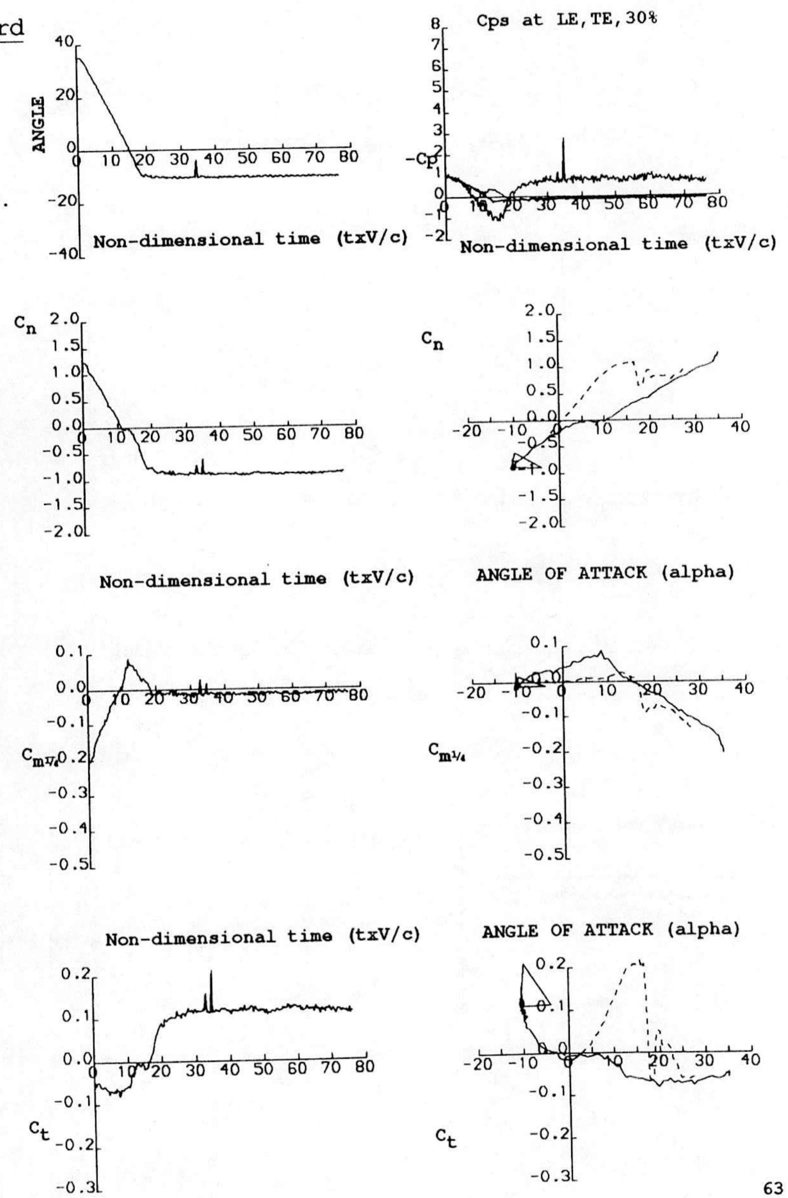
AIR TEMPERATURE = 23.6°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02167

LINEAR PITCH RATE = -408.58°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30641

REYNOLDS NUMBER = 814712.

DYNAMIC PRESSURE = 1208.19 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 30.00°

RAMP ARC = -40.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 15/8/91

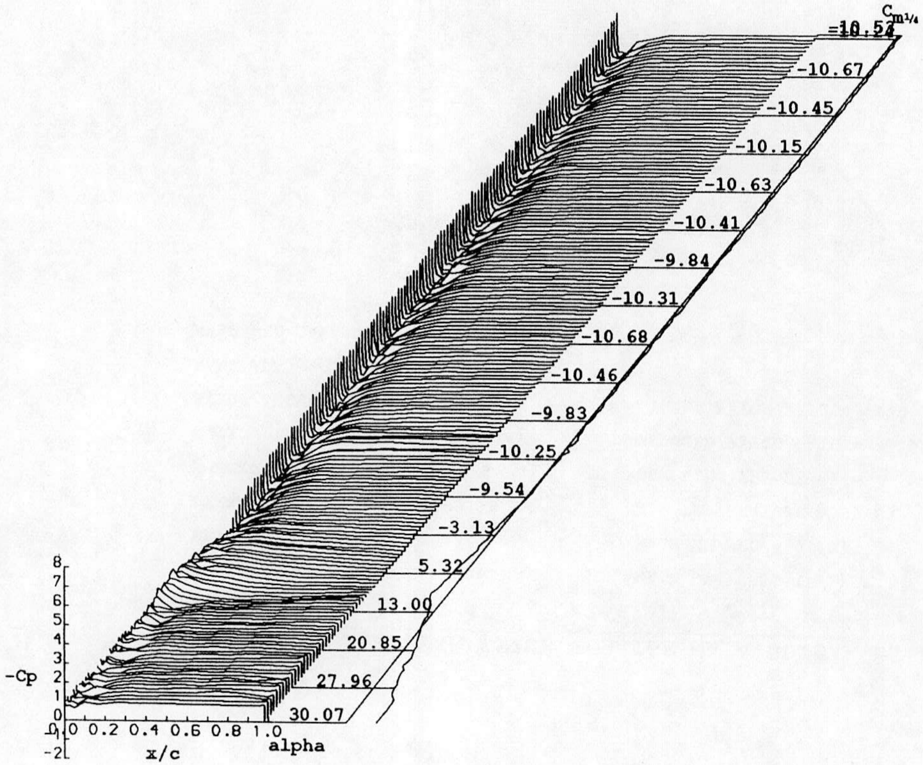
MACH NUMBER = 0.131

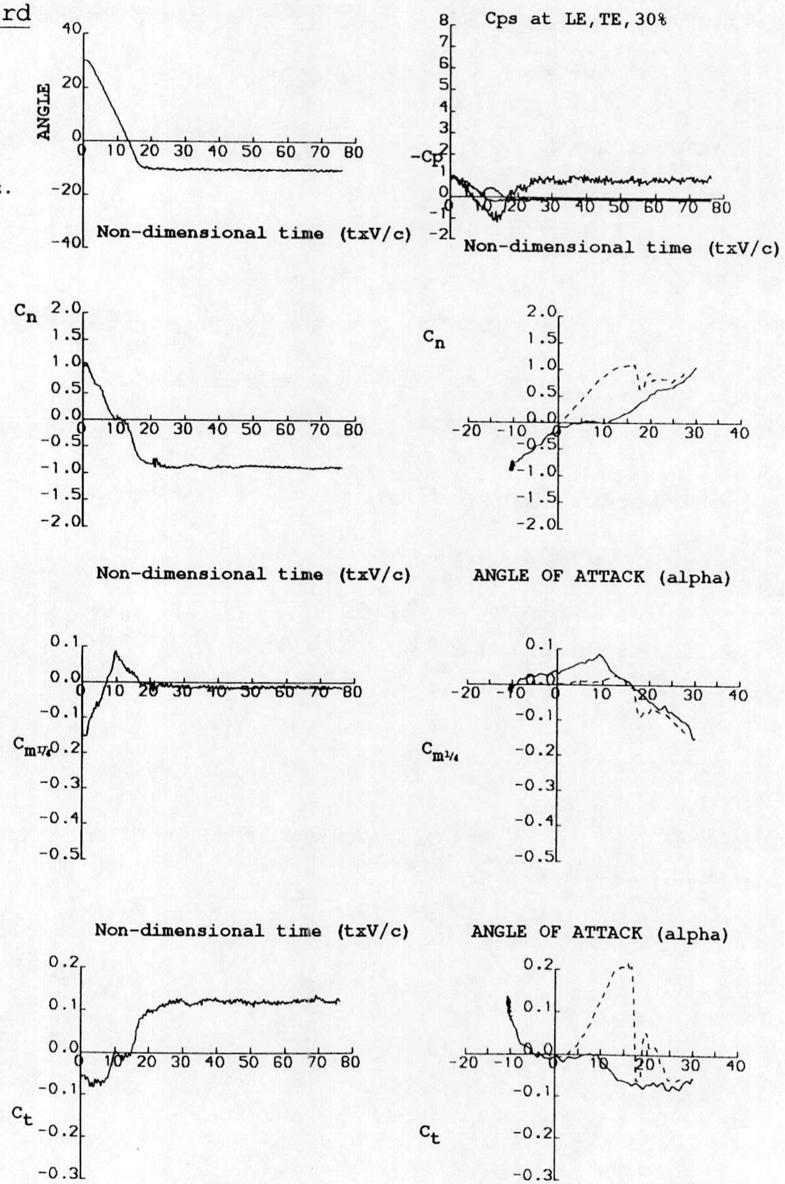
AIR TEMPERATURE = 24.1°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02281

LINEAR PITCH RATE = -430.29°s^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30651

REYNOLDS NUMBER = 812958.

DYNAMIC PRESSURE = 1208.19 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 28.00°

RAMP ARC = -38.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 15/8/91

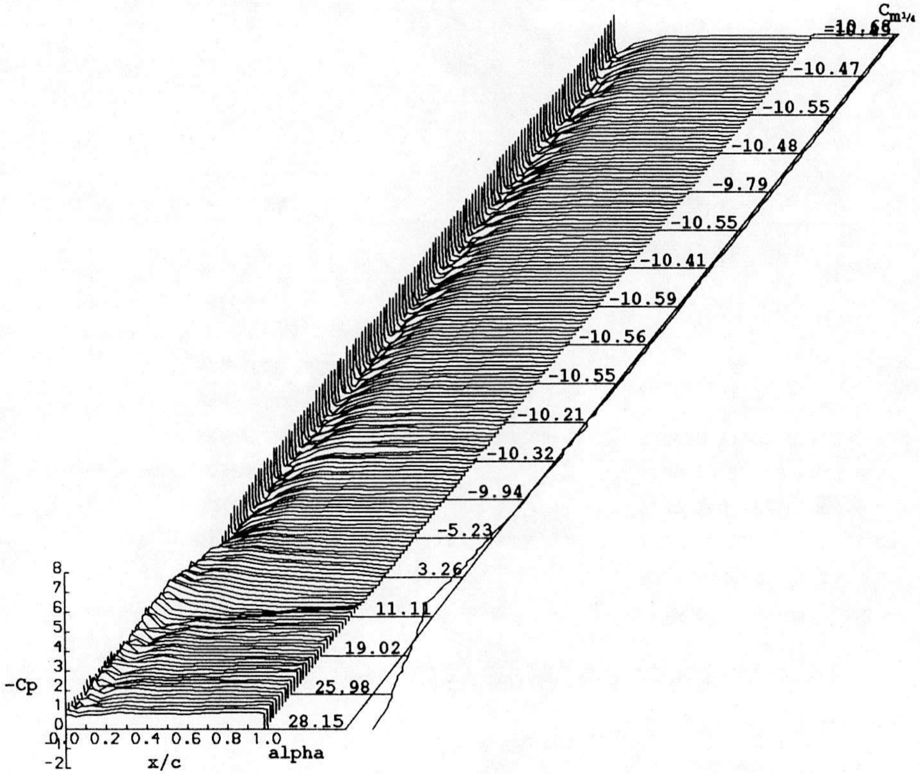
MACH NUMBER = 0.131

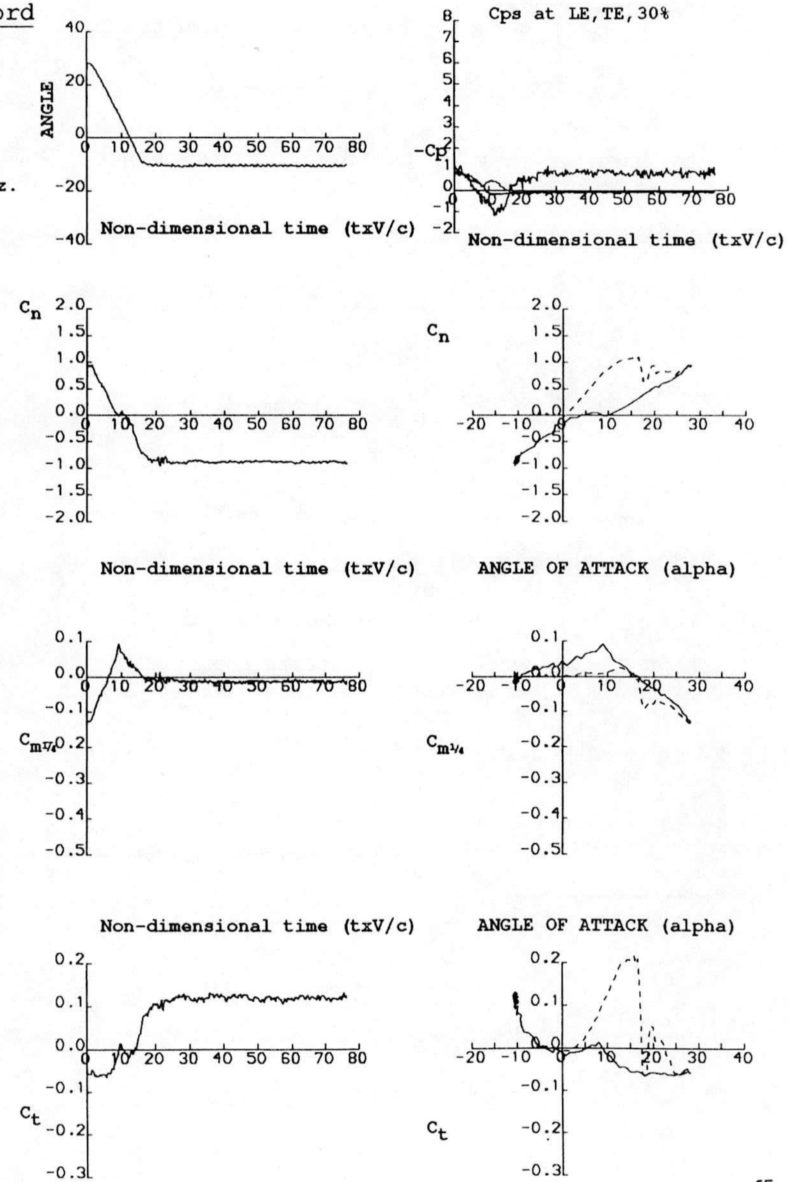
AIR TEMPERATURE = 24.6°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02252

LINEAR PITCH RATE = $-425.25°S^{-1}$





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30661

REYNOLDS NUMBER = 809043.

DYNAMIC PRESSURE = 1192.46 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 26.00°

RAMP ARC = -36.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 15/8/91

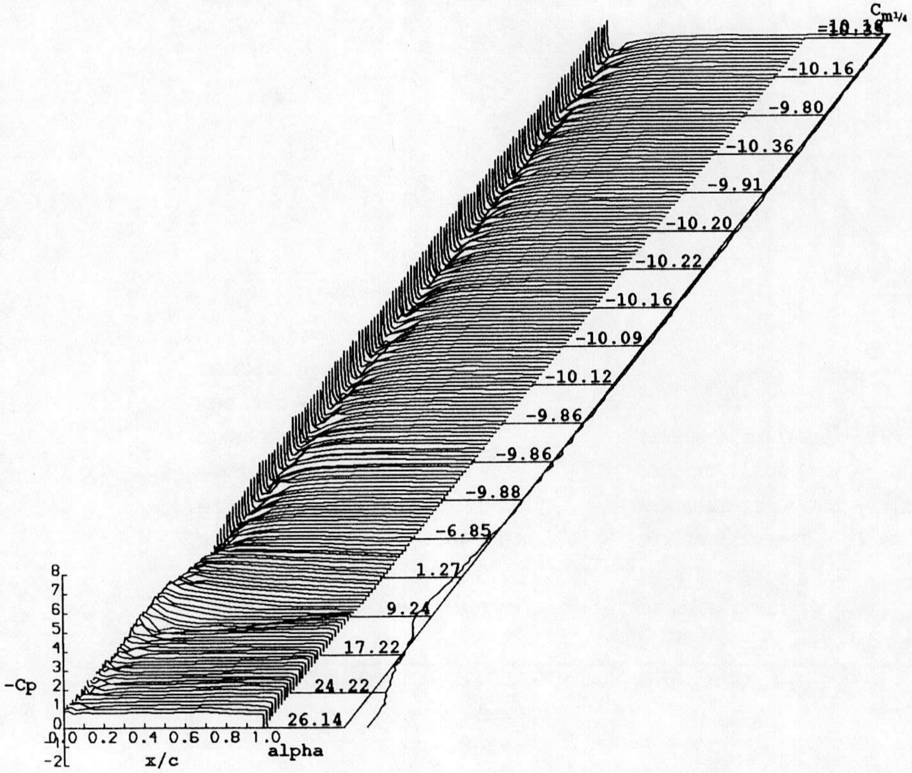
MACH NUMBER = 0.130

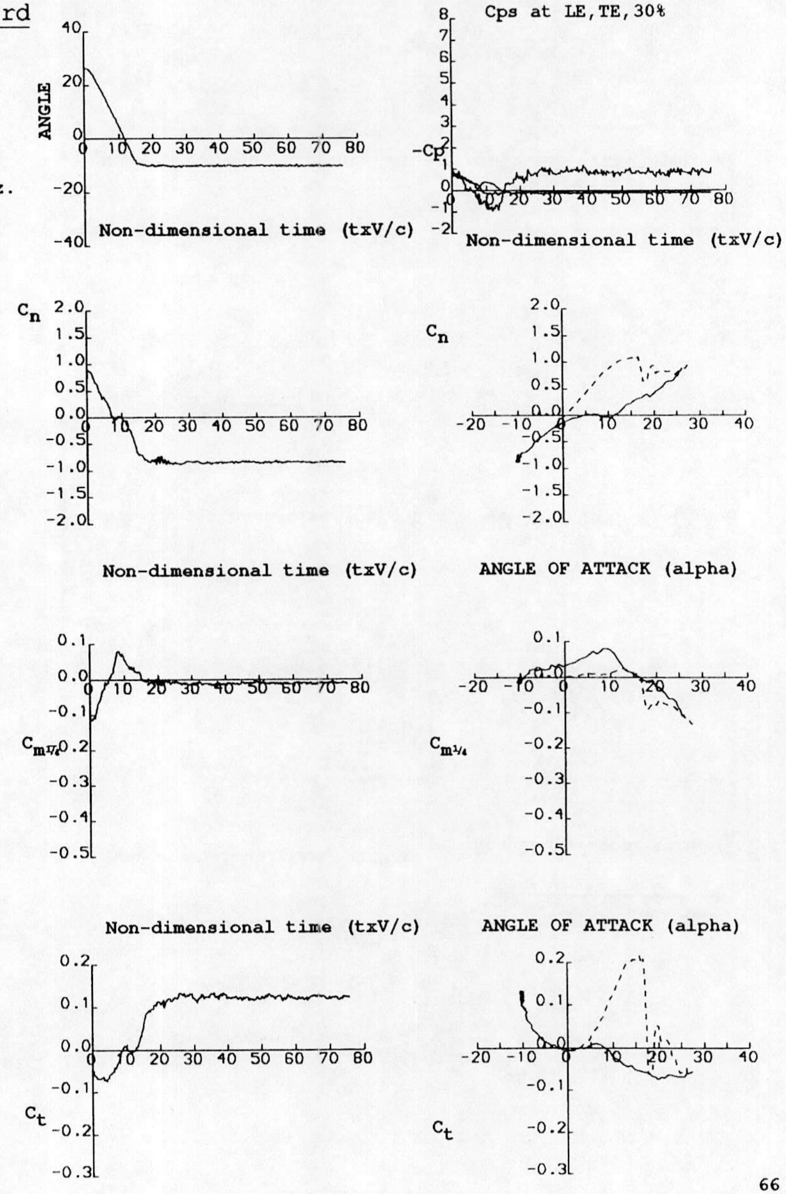
AIR TEMPERATURE = 24.2°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02311

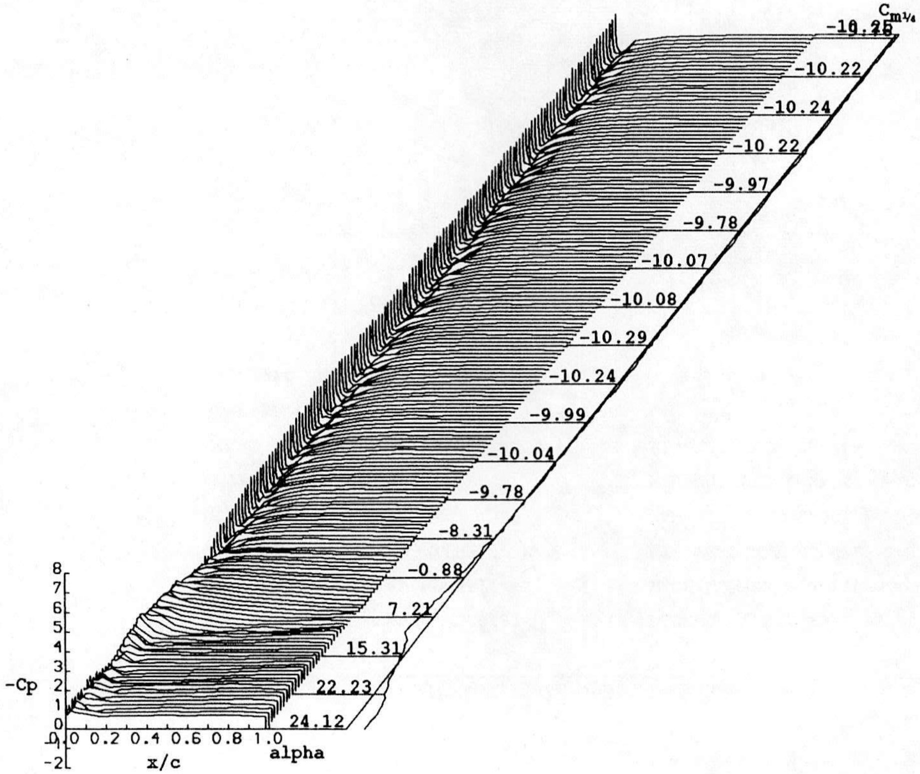
LINEAR PITCH RATE = -433.32°S^{-1}

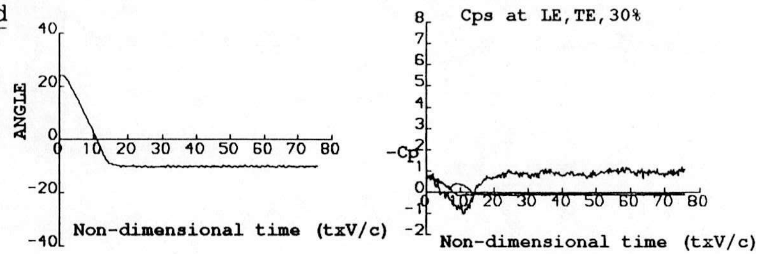


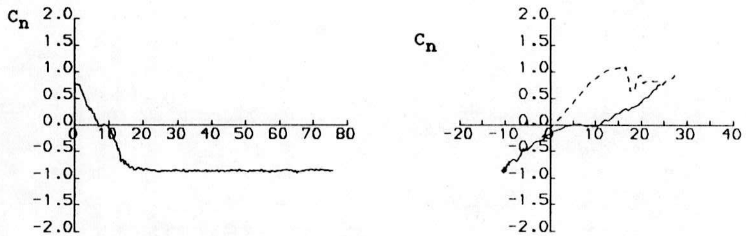


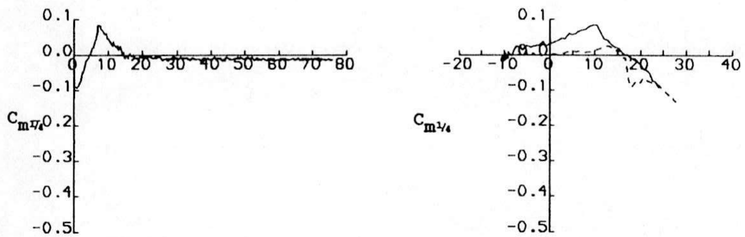
DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

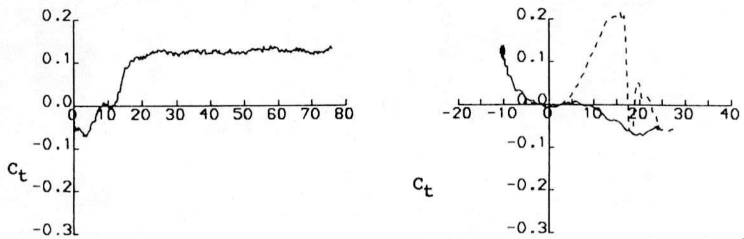
RUN REFERENCE NUMBER: 30671	DATE OF TEST: 15/8/91
REYNOLDS NUMBER = 806261.	MACH NUMBER = 0.130
DYNAMIC PRESSURE = 1192.46 Nm^{-2}	AIR TEMPERATURE = 25.0°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 550.05 Hz.
MOTION TYPE: RAMP DOWN	REDUCED PITCH RATE = -0.02388
START ANGLE = 24.00°	LINEAR PITCH RATE = -448.33°S^{-1}
RAMP ARC = -34.000°	
AVERAGED DATA OF 5 CYCLES	











DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30681

REYNOLDS NUMBER = 804531.

DYNAMIC PRESSURE = 1192.46 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 22.00°

RAMP ARC = -32.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 15/8/91

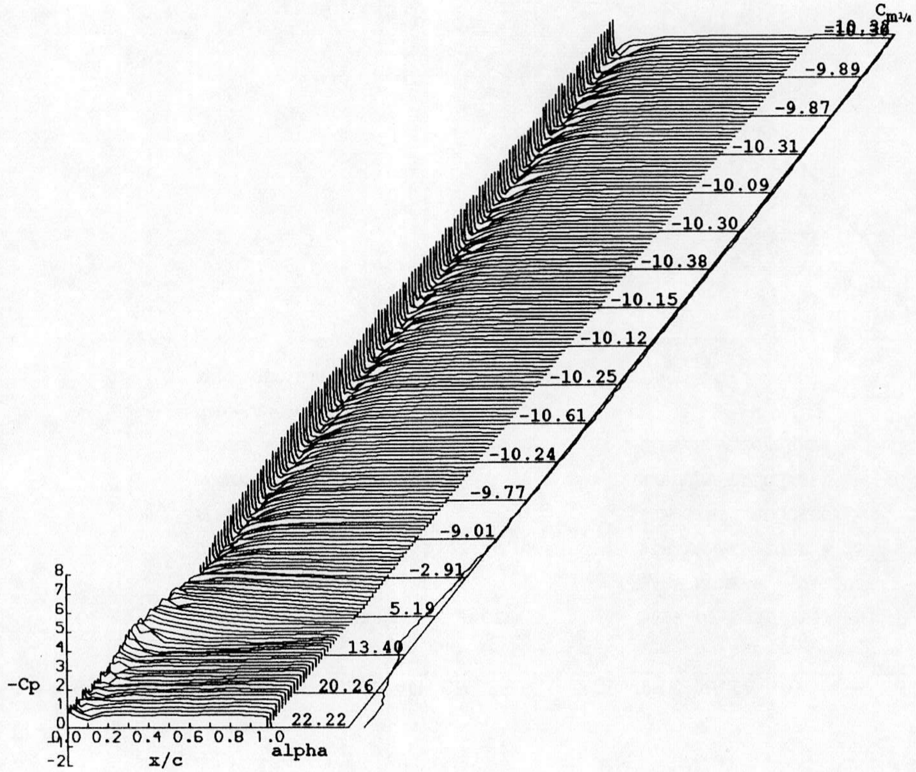
MACH NUMBER = 0.130

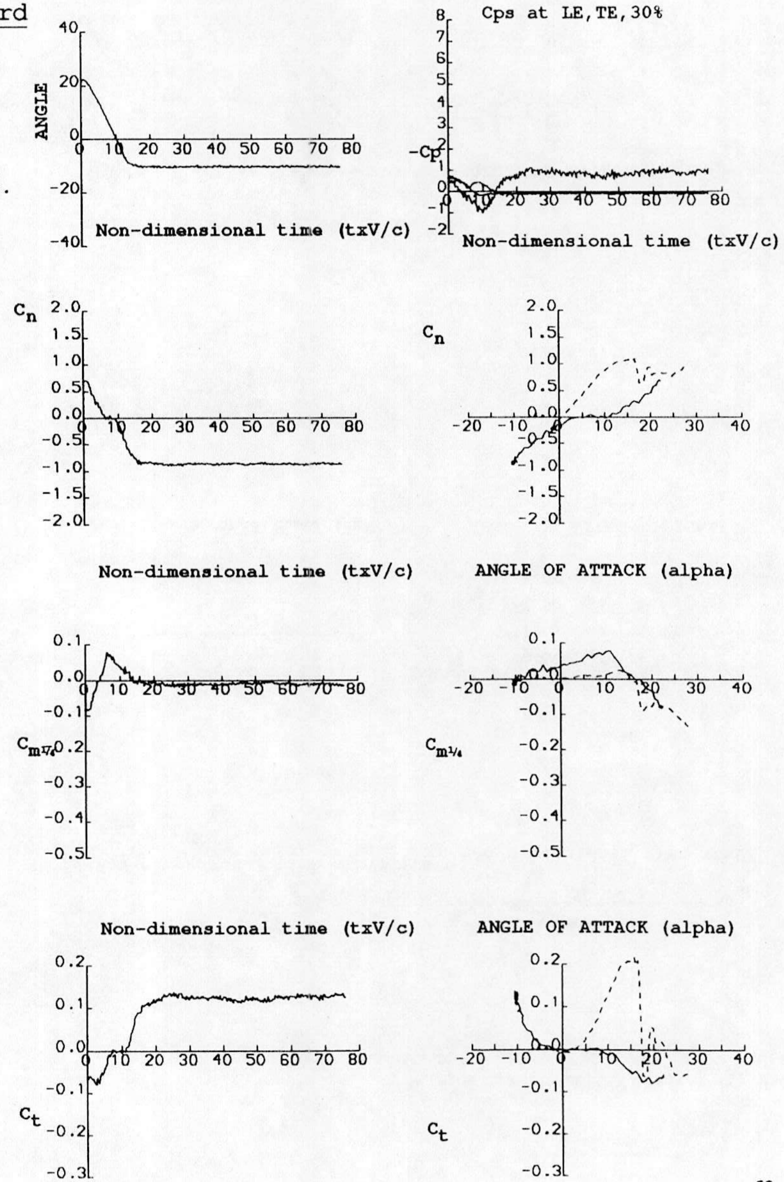
AIR TEMPERATURE = 25.5°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02369

LINEAR PITCH RATE = -445.18°S^{-1}

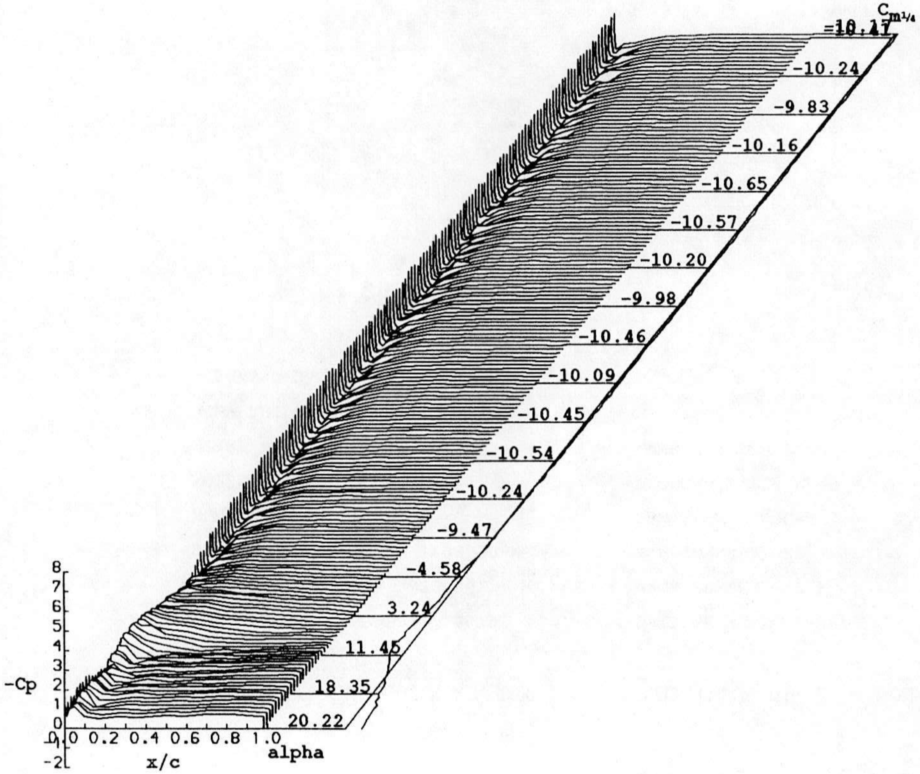


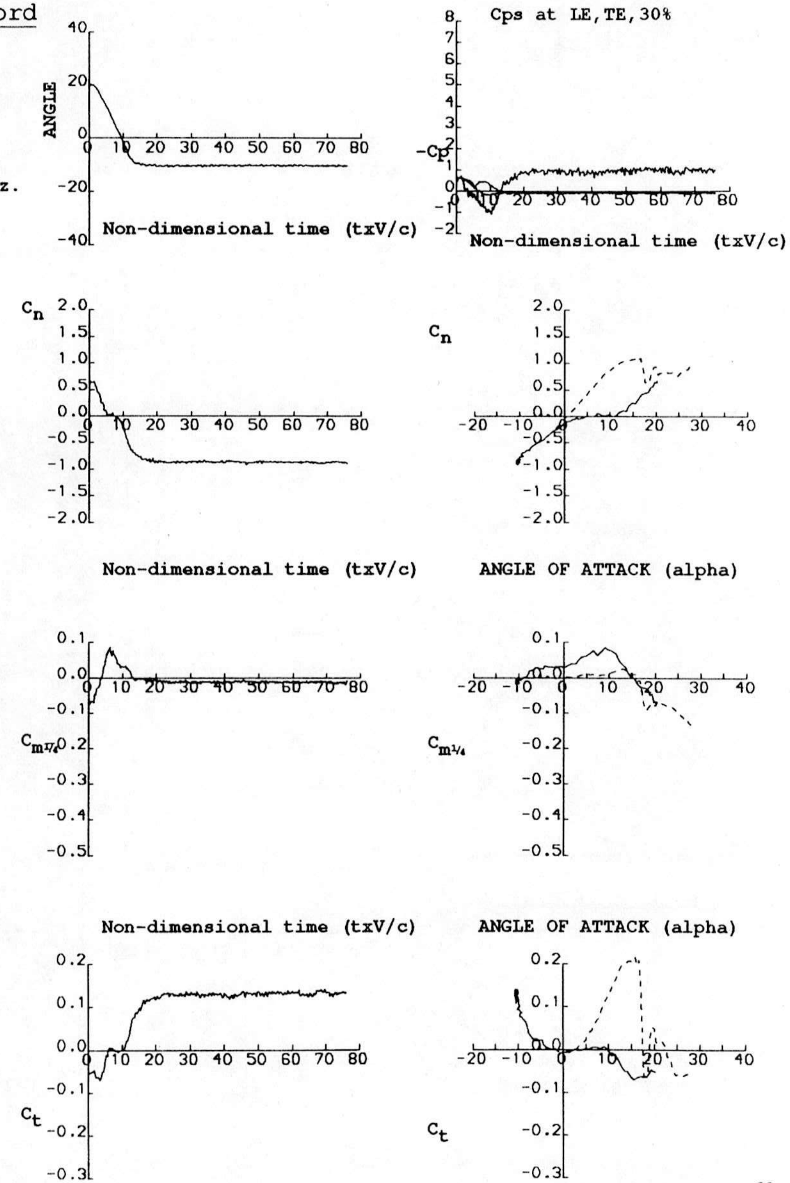


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30691
REYNOLDS NUMBER = 803152.
DYNAMIC PRESSURE = 1192.46 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 20.00°
RAMP ARC = -30.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 15/8/91
MACH NUMBER = 0.130
AIR TEMPERATURE = 25.9°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = -0.02413
LINEAR PITCH RATE = -453.70°S^{-1}

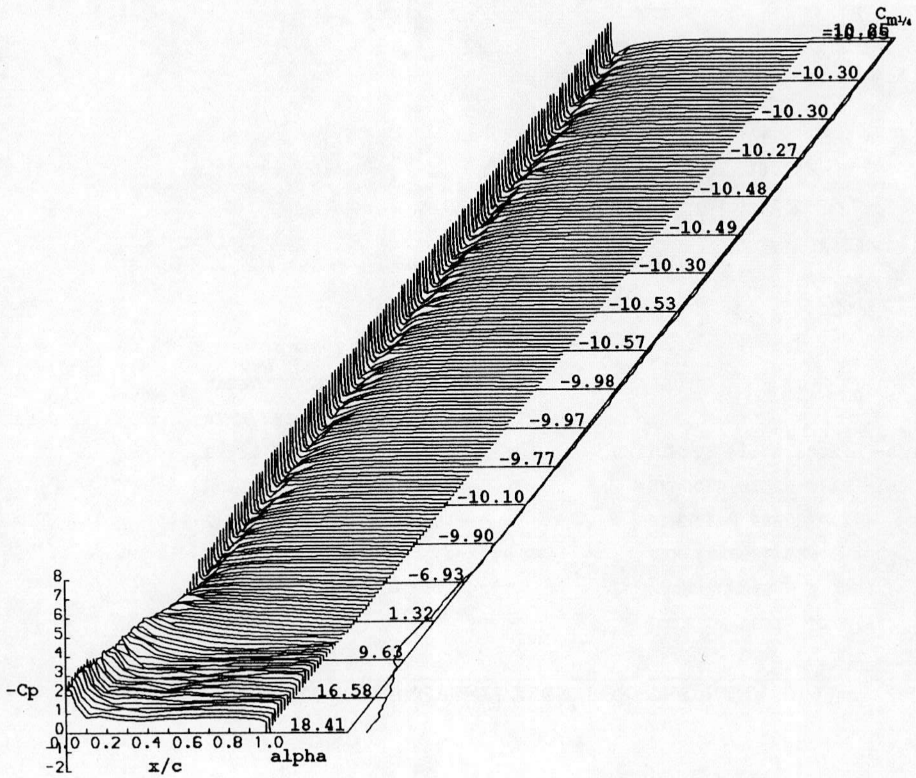


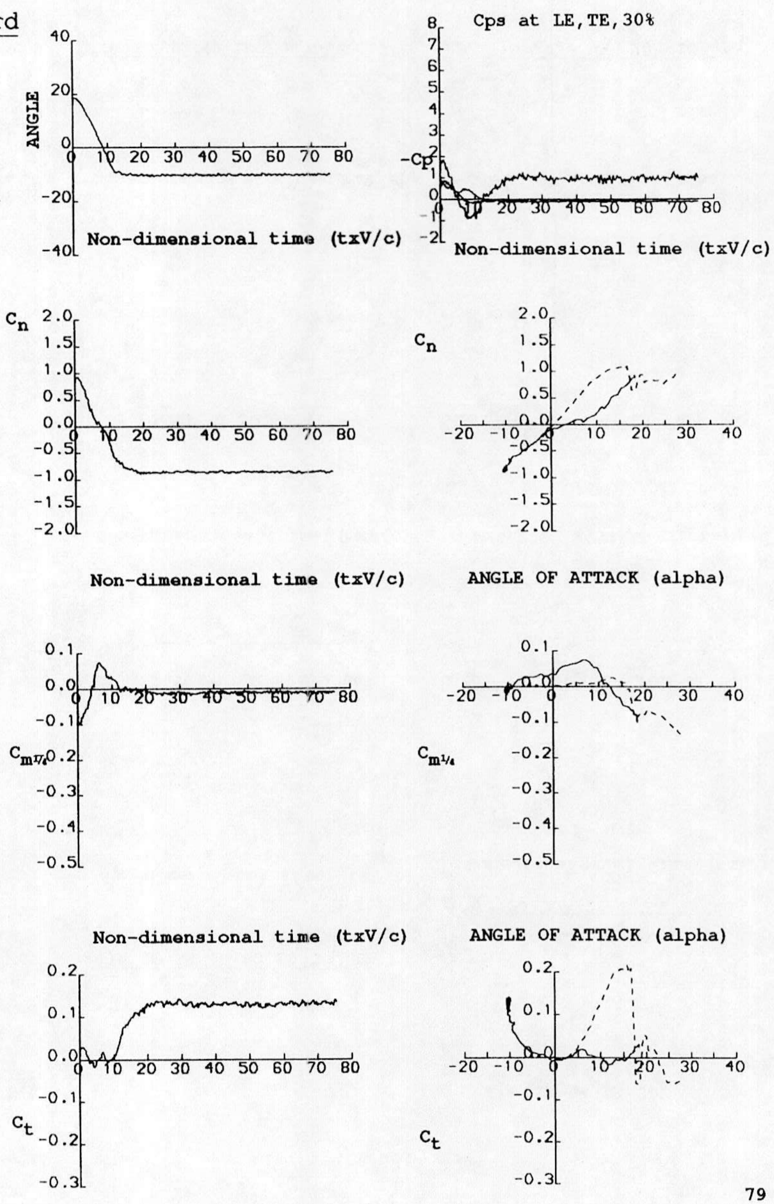


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30791
REYNOLDS NUMBER = 822486.
DYNAMIC PRESSURE = 1204.39 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 18.00°
RAMP ARC = -28.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 26/8/91
MACH NUMBER = 0.130
AIR TEMPERATURE = 23.1°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = -0.02385
LINEAR PITCH RATE = -445.46°S^{-1}

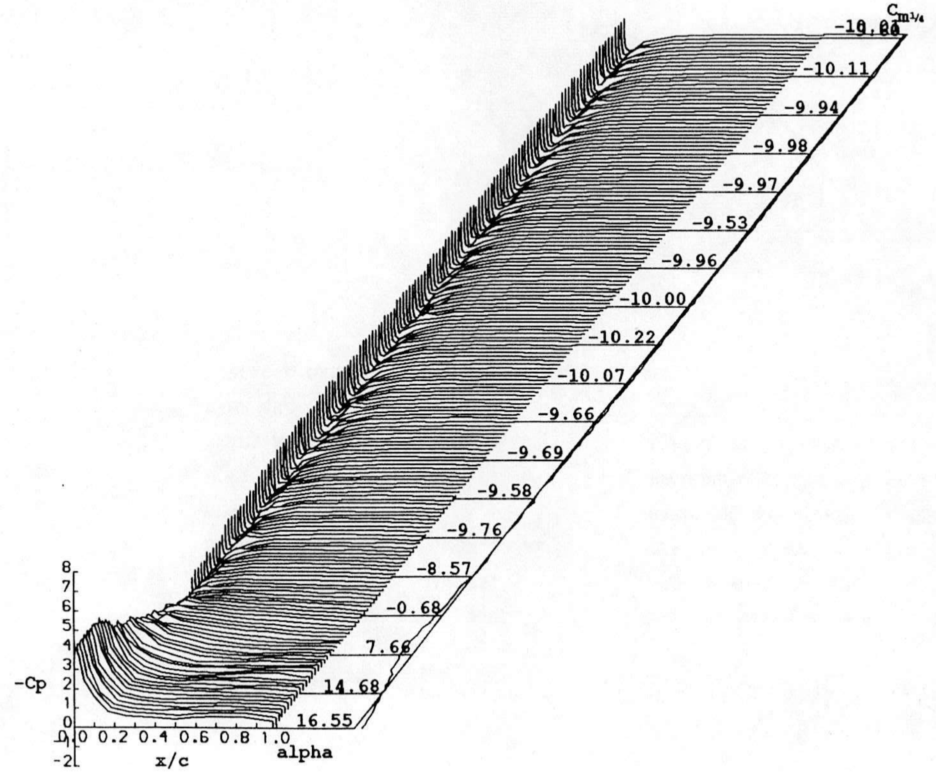


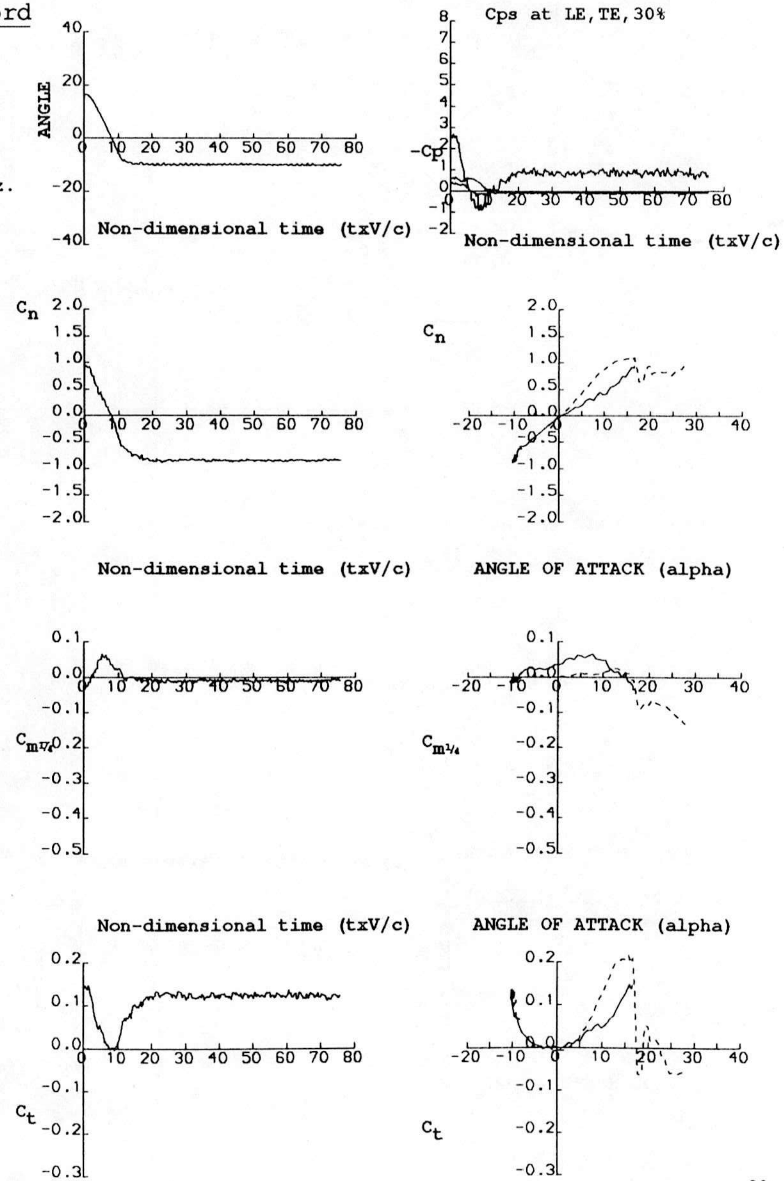


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30801
REYNOLDS NUMBER = 819645.
DYNAMIC PRESSURE = 1204.39 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 16.00°
RAMP ARC = -26.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 26/8/91
MACH NUMBER = 0.130
AIR TEMPERATURE = 23.9°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = -0.02303
LINEAR PITCH RATE = -430.85°S^{-1}





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DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30811

REYNOLDS NUMBER = 816283.

DYNAMIC PRESSURE = 1203.83 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 14.00°

RAMP ARC = -24.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 26/8/91

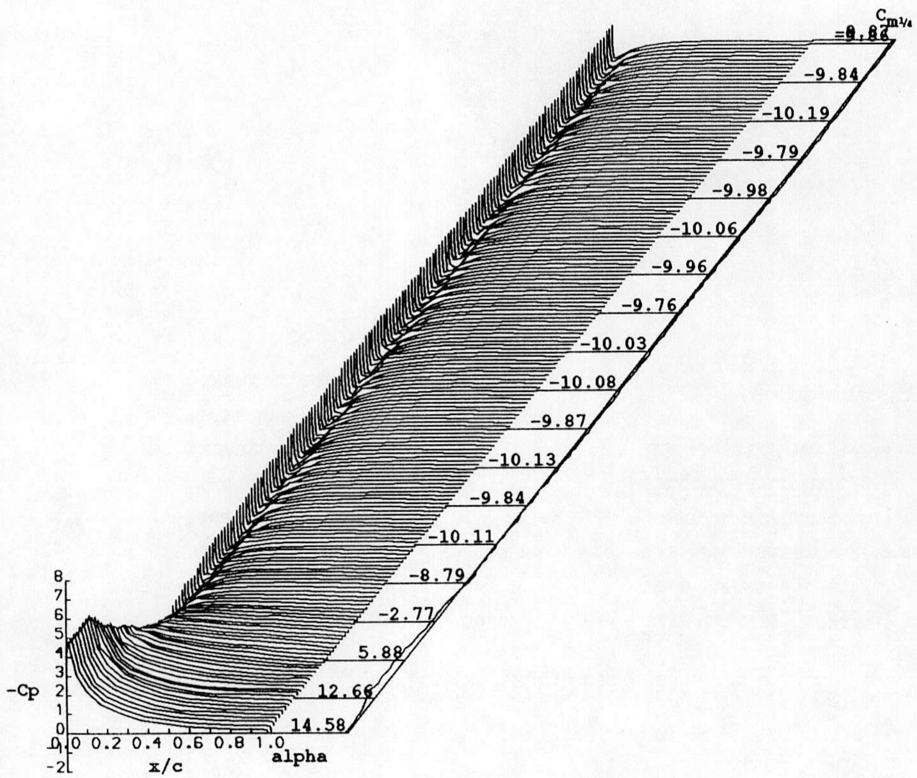
MACH NUMBER = 0.130

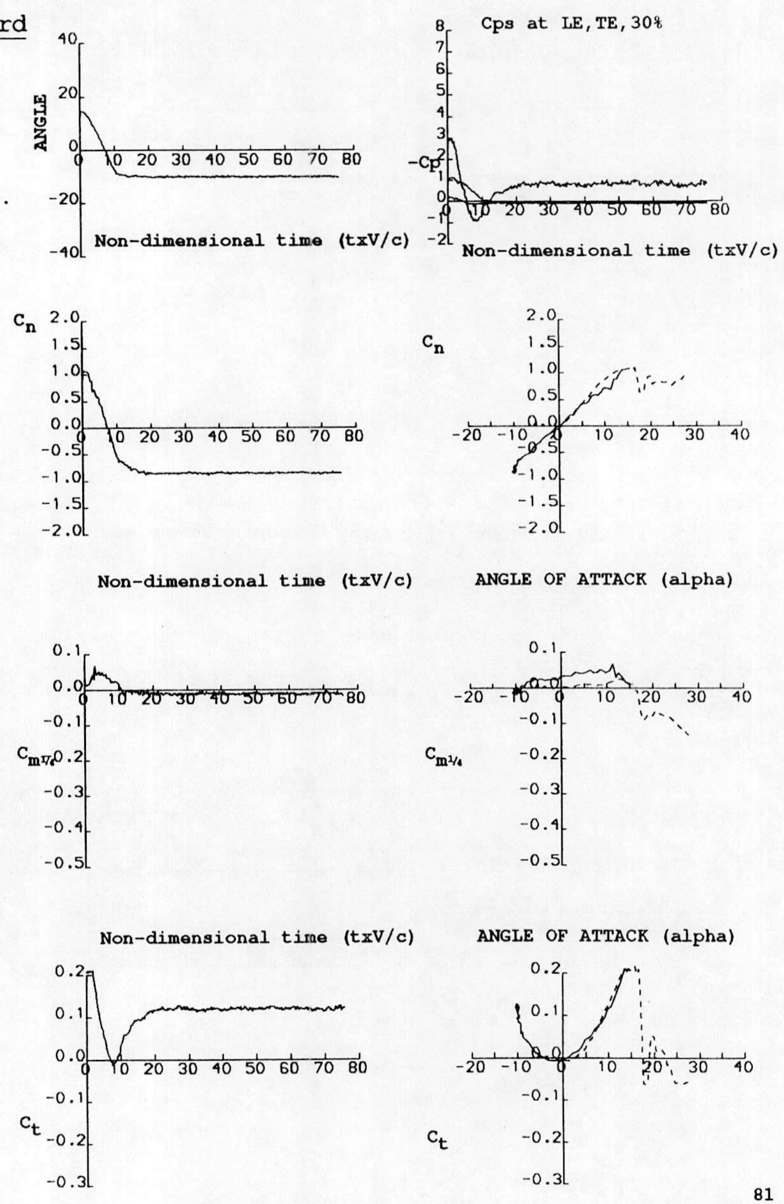
AIR TEMPERATURE = 24.8°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED PITCH RATE = -0.02276

LINEAR PITCH RATE = -426.35°S^{-1}

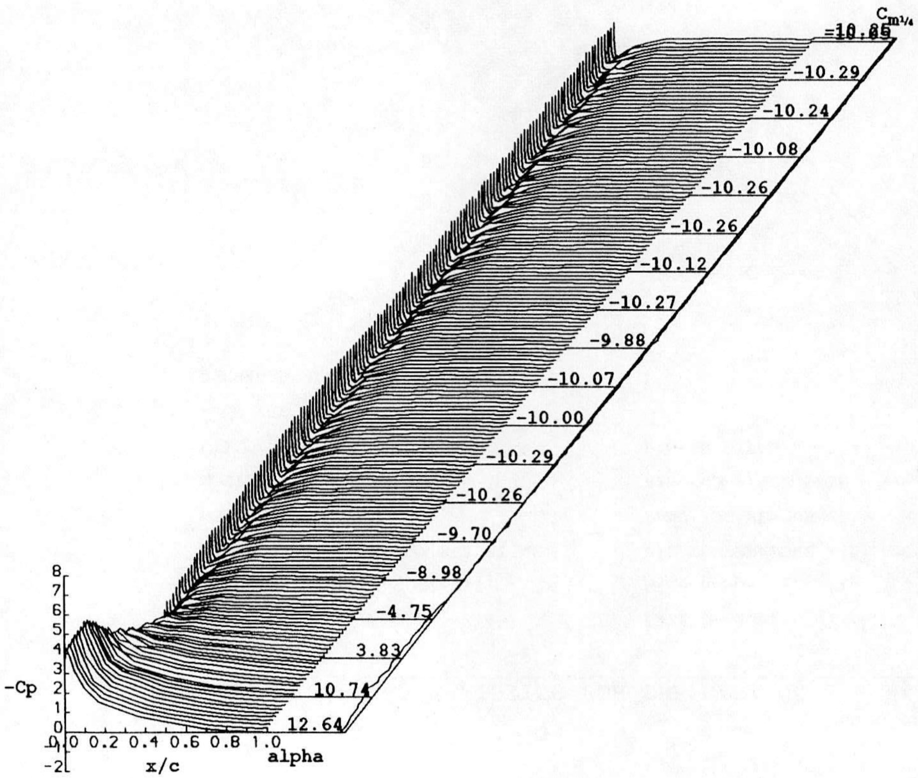


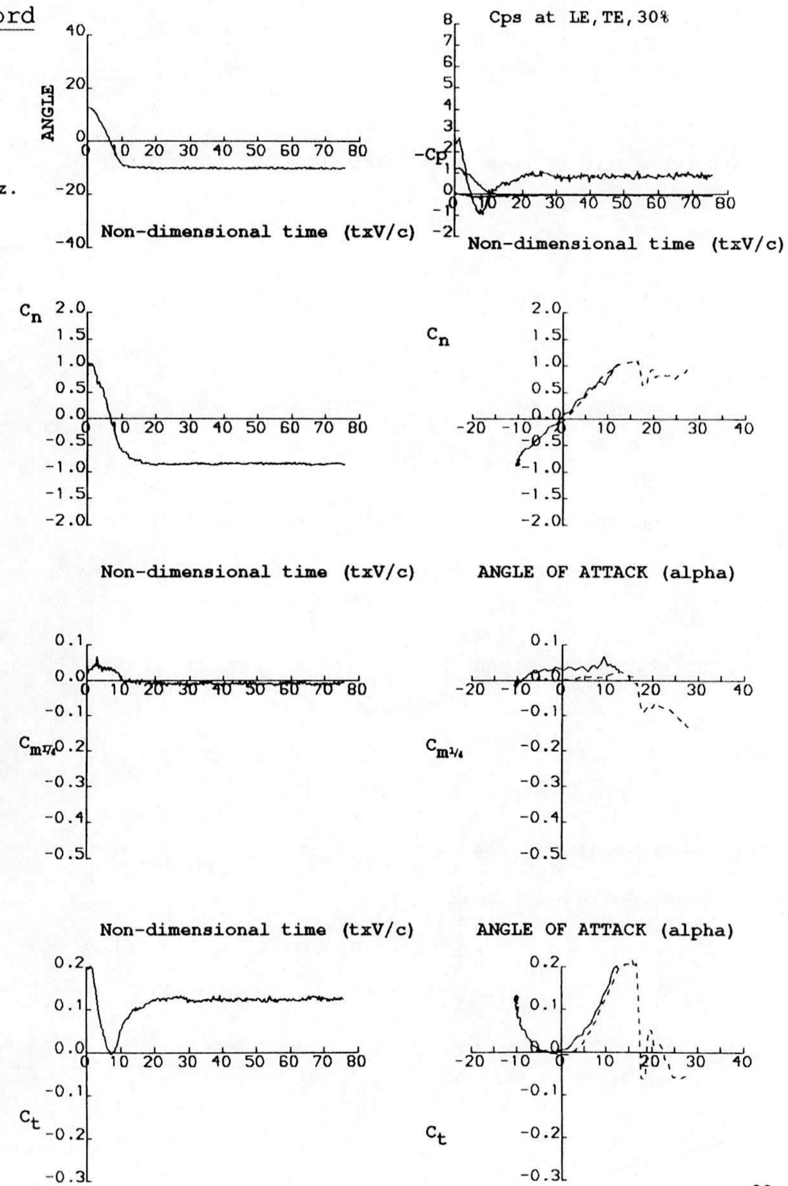


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 30821
REYNOLDS NUMBER = 816121.
DYNAMIC PRESSURE = 1204.39 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 12.00°
RAMP ARC = -22.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 26/8/91
MACH NUMBER = 0.130
AIR TEMPERATURE = 24.9°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED PITCH RATE = -0.02192
LINEAR PITCH RATE = -410.65°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31451

REYNOLDS NUMBER = 706898.

DYNAMIC PRESSURE = 864.51 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

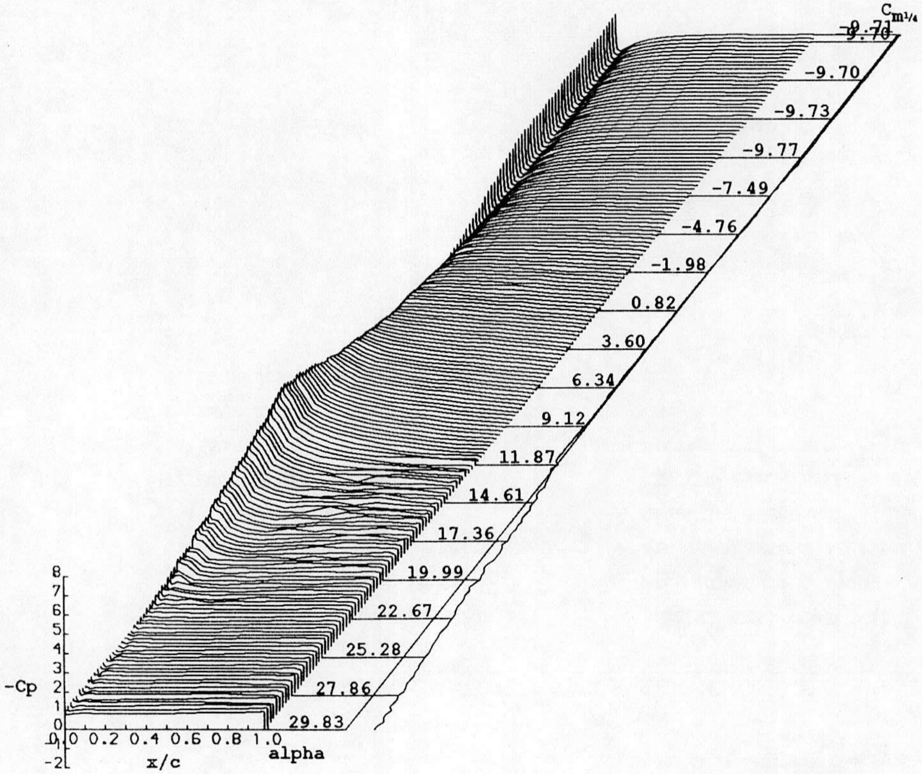
MACH NUMBER = 0.110

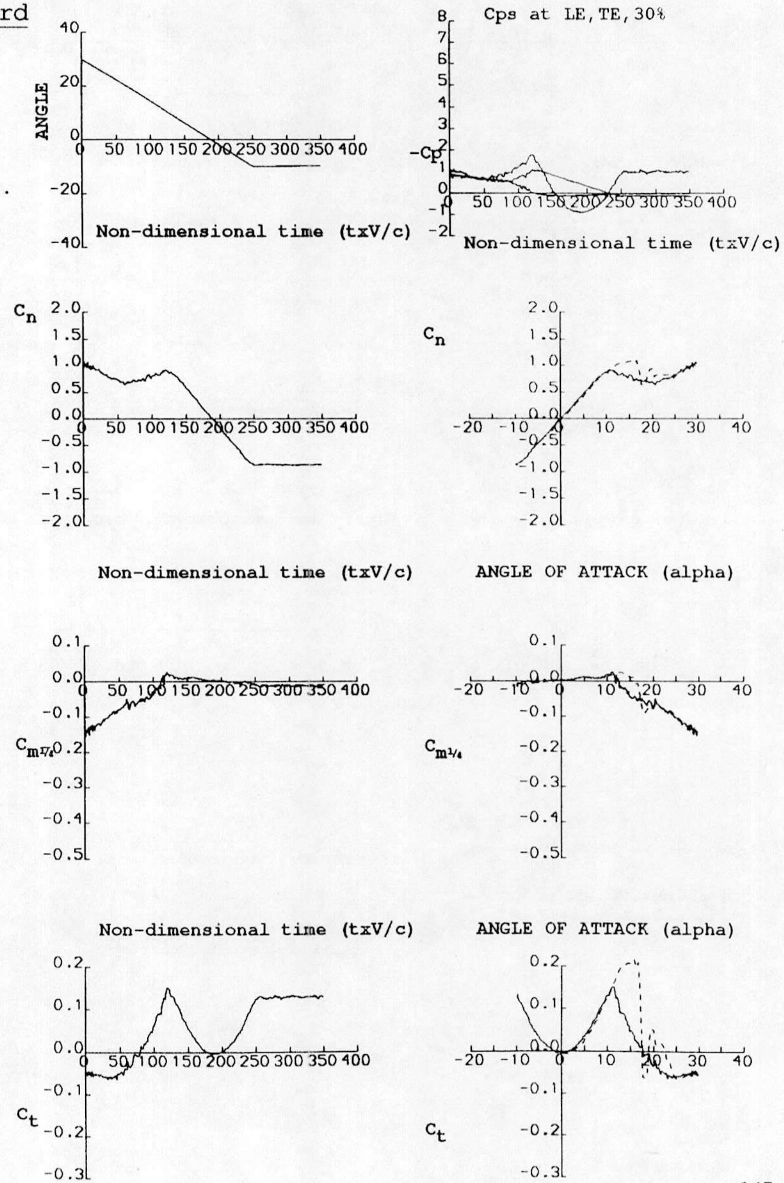
AIR TEMPERATURE = 21.0°C

SAMPLING FREQUENCY = 400.00 Hz.

REDUCED PITCH RATE = -0.00139

LINEAR PITCH RATE = -21.73°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31461

REYNOLDS NUMBER = 717208.

DYNAMIC PRESSURE = 890.53 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

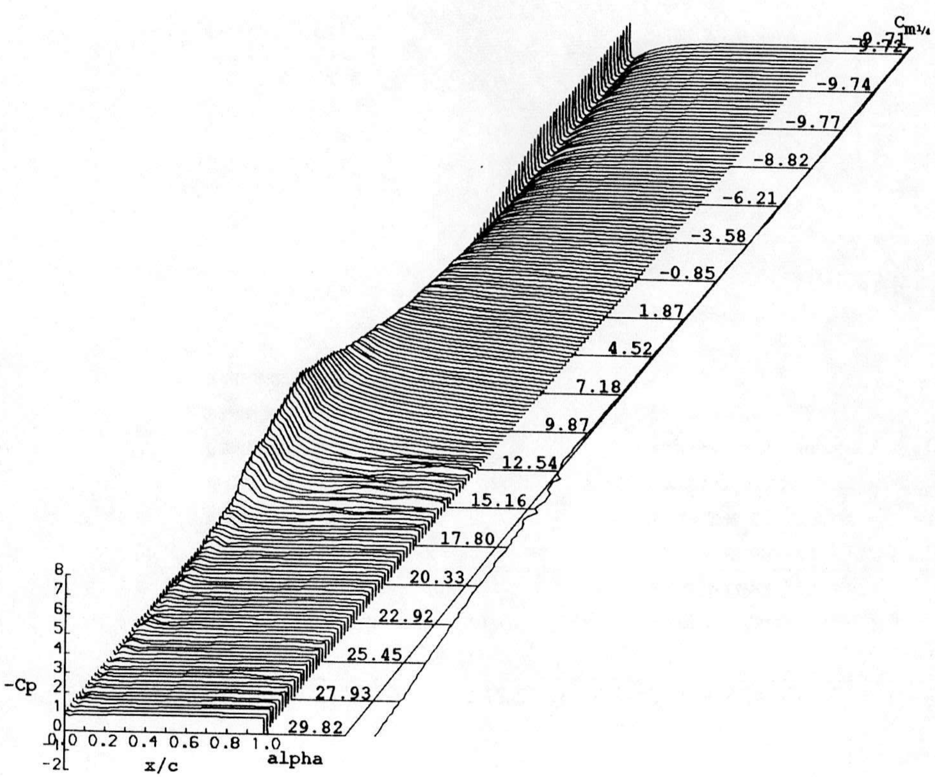
MACH NUMBER = 0.111

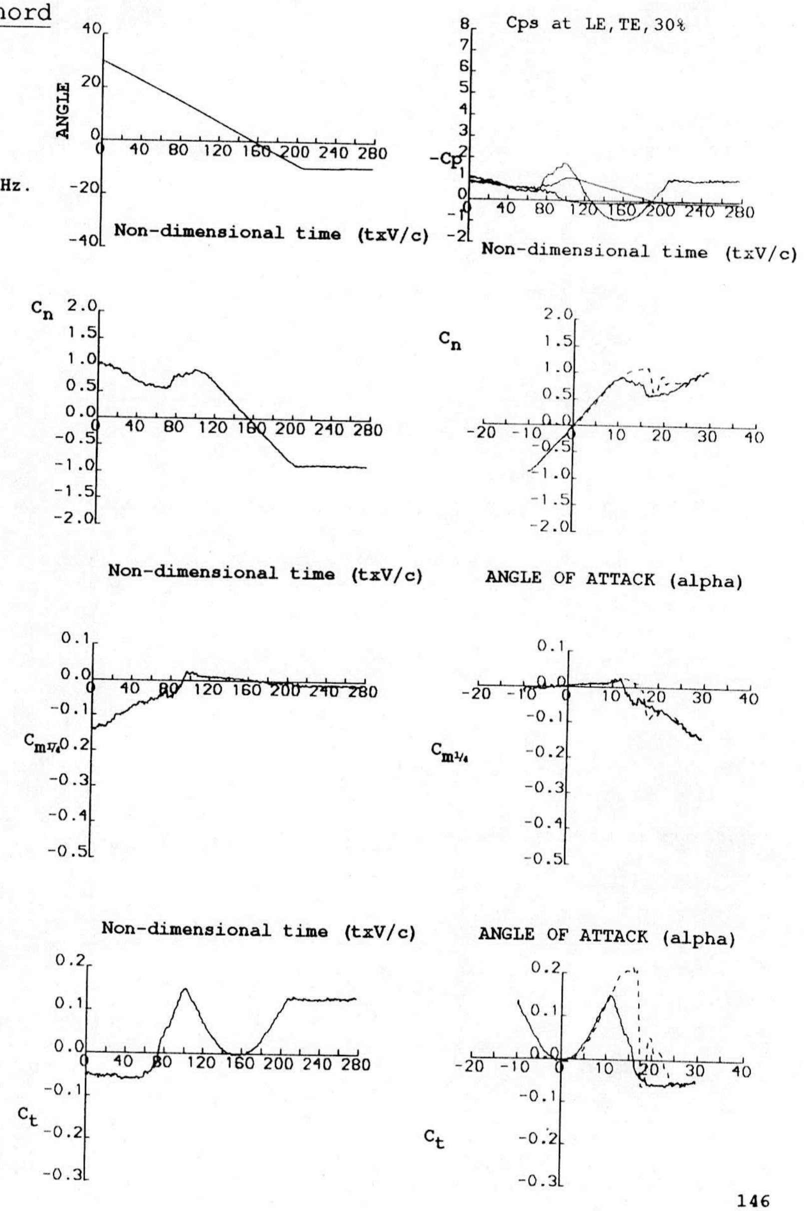
AIR TEMPERATURE = 21.1°C

SAMPLING FREQUENCY = 510.20 Hz.

REDUCED PITCH RATE = -0.00168

LINEAR PITCH RATE = -26.71°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31471

REYNOLDS NUMBER = 707363.

DYNAMIC PRESSURE = 877.03 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

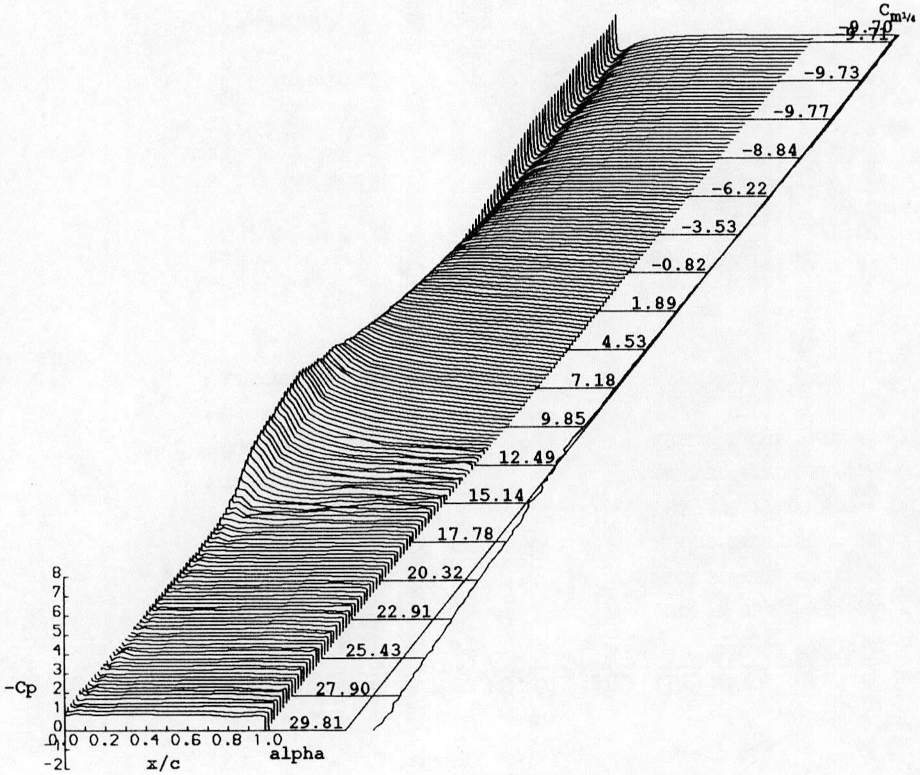
MACH NUMBER = 0.110

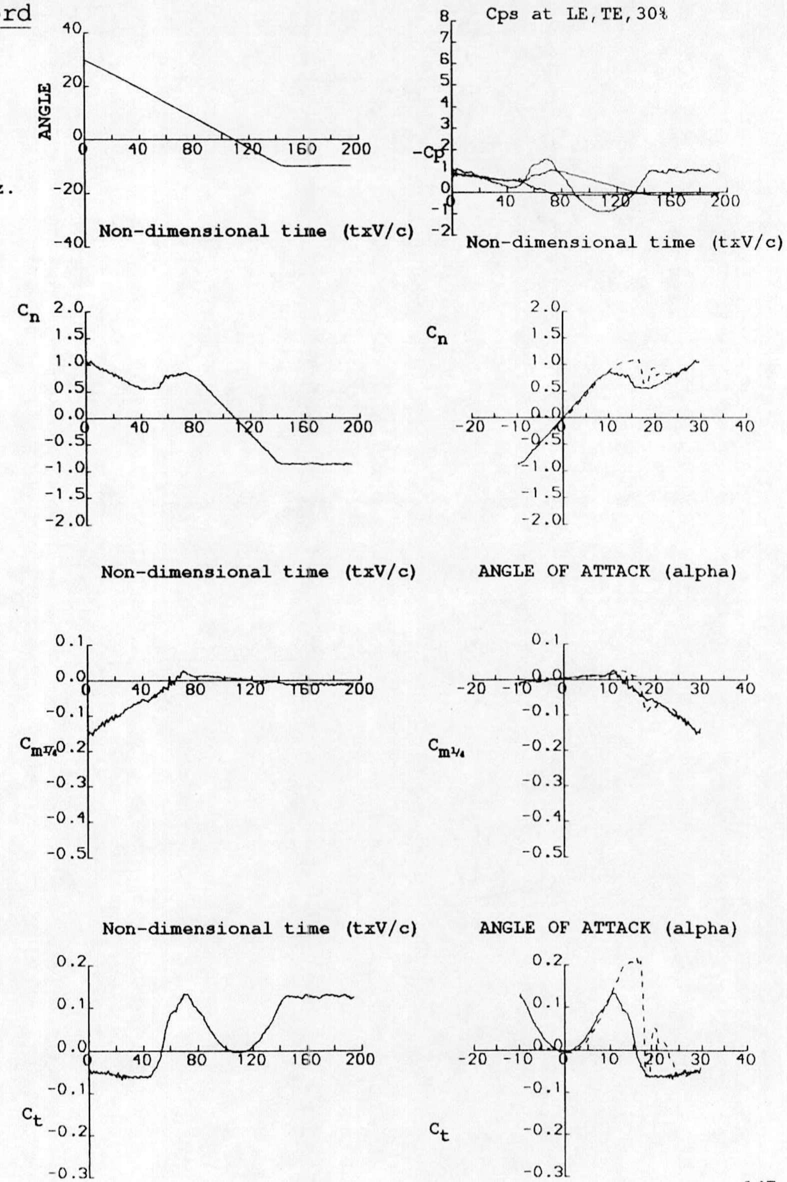
AIR TEMPERATURE = 22.5°C

SAMPLING FREQUENCY = 725.10 Hz.

REDUCED PITCH RATE = -0.00240

LINEAR PITCH RATE = -38.04°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31481

REYNOLDS NUMBER = 699238.

DYNAMIC PRESSURE = 862.21 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

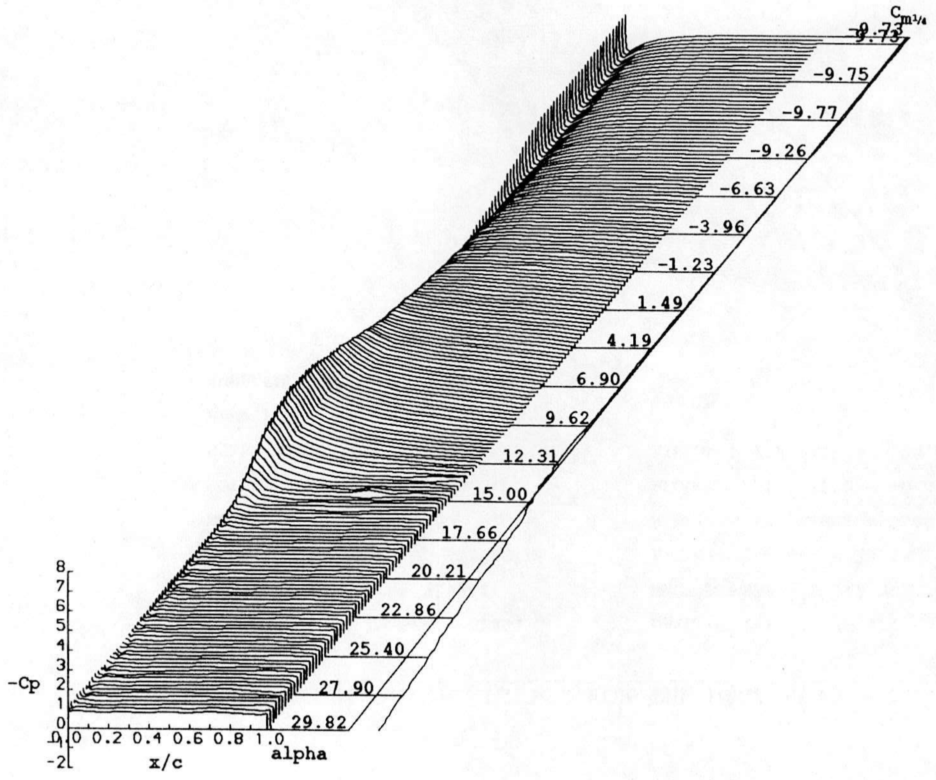
MACH NUMBER = 0.109

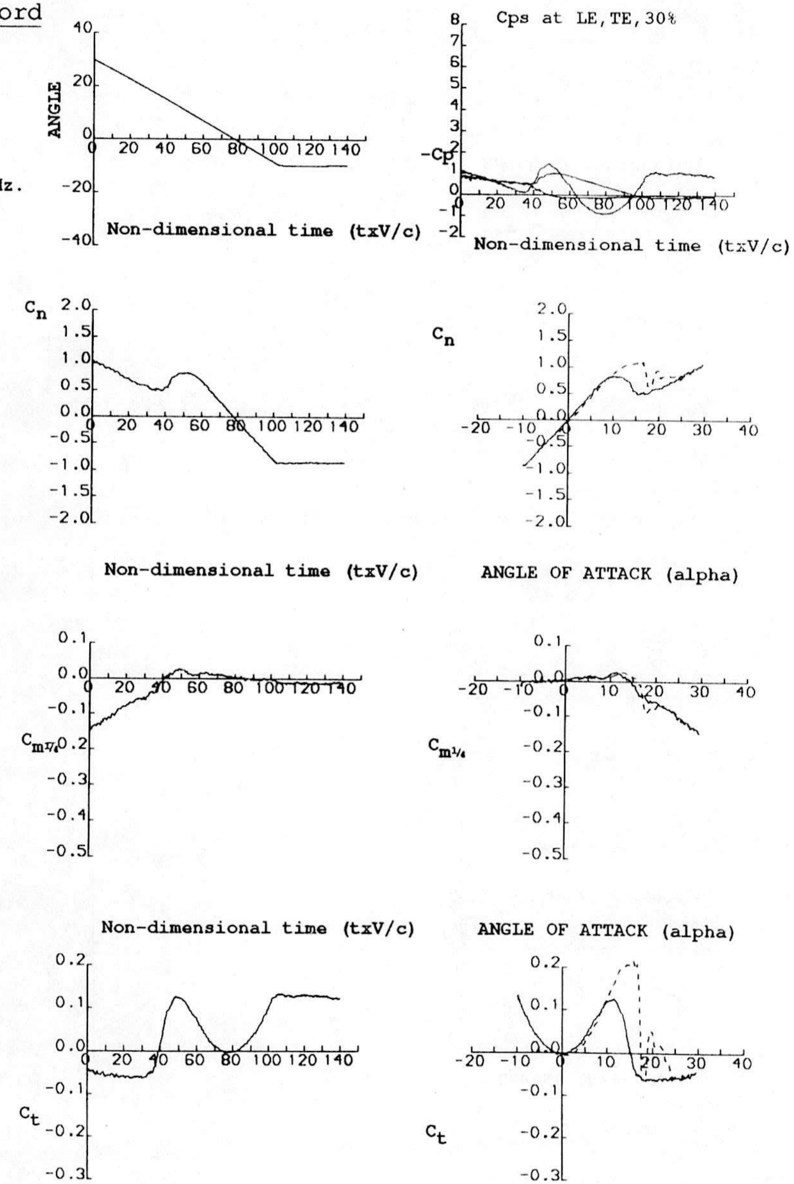
AIR TEMPERATURE = 23.2°C

SAMPLING FREQUENCY = 1000.00 Hz.

REDUCED PITCH RATE = -0.00337

LINEAR PITCH RATE = $-53.01°s^{-1}$





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31491

REYNOLDS NUMBER = 716964.

DYNAMIC PRESSURE = 911.20 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

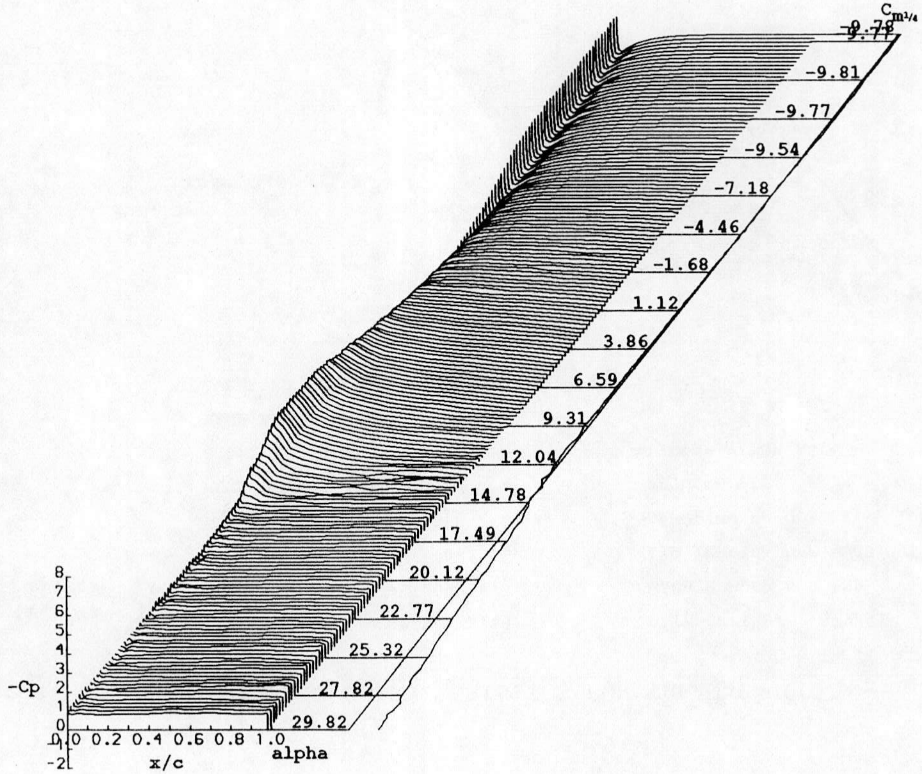
MACH NUMBER = 0.112

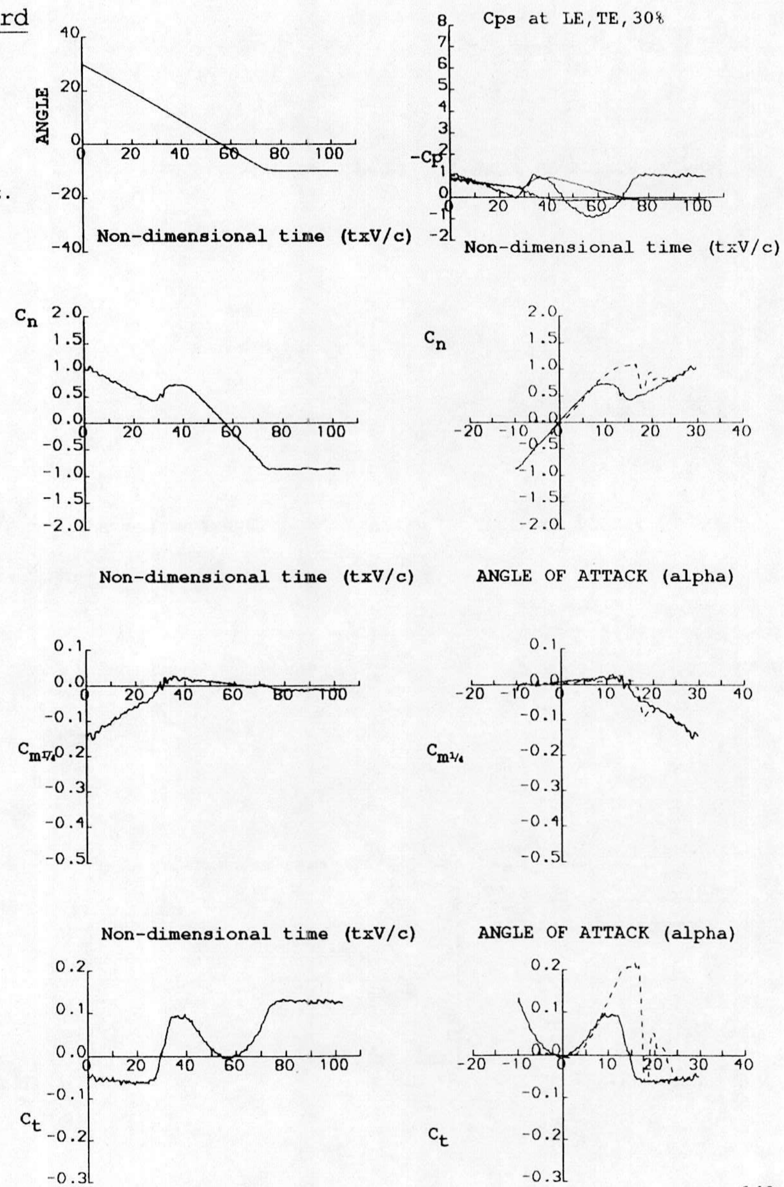
AIR TEMPERATURE = 23.8°C

SAMPLING FREQUENCY = 1400.00 Hz.

REDUCED PITCH RATE = -0.00467

LINEAR PITCH RATE = -75.58°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31501

REYNOLDS NUMBER = 704726.

DYNAMIC PRESSURE = 884.16 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

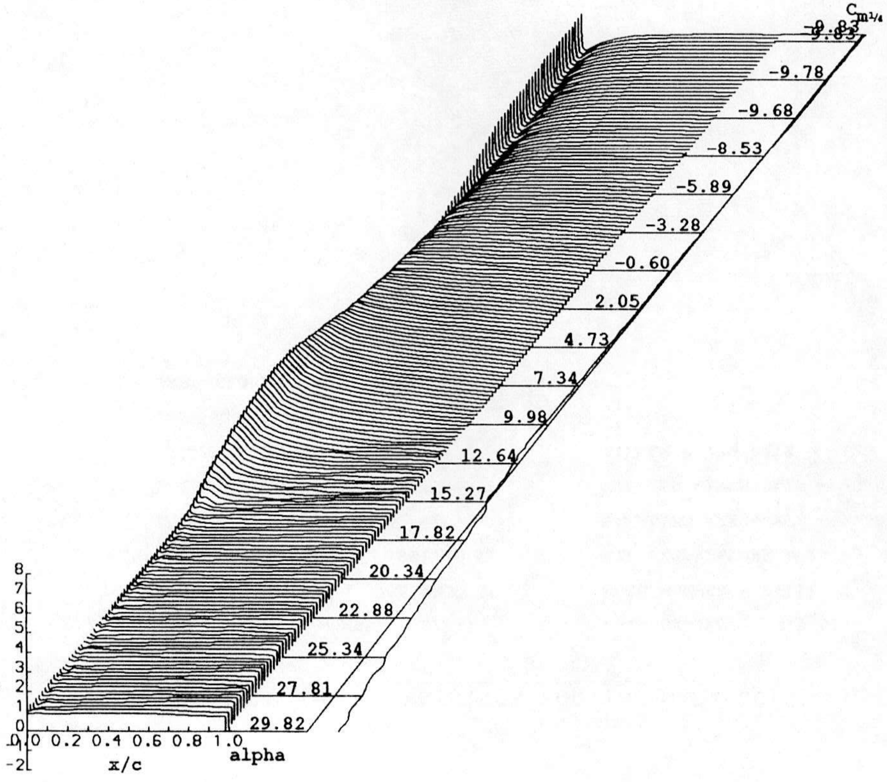
MACH NUMBER = 0.111

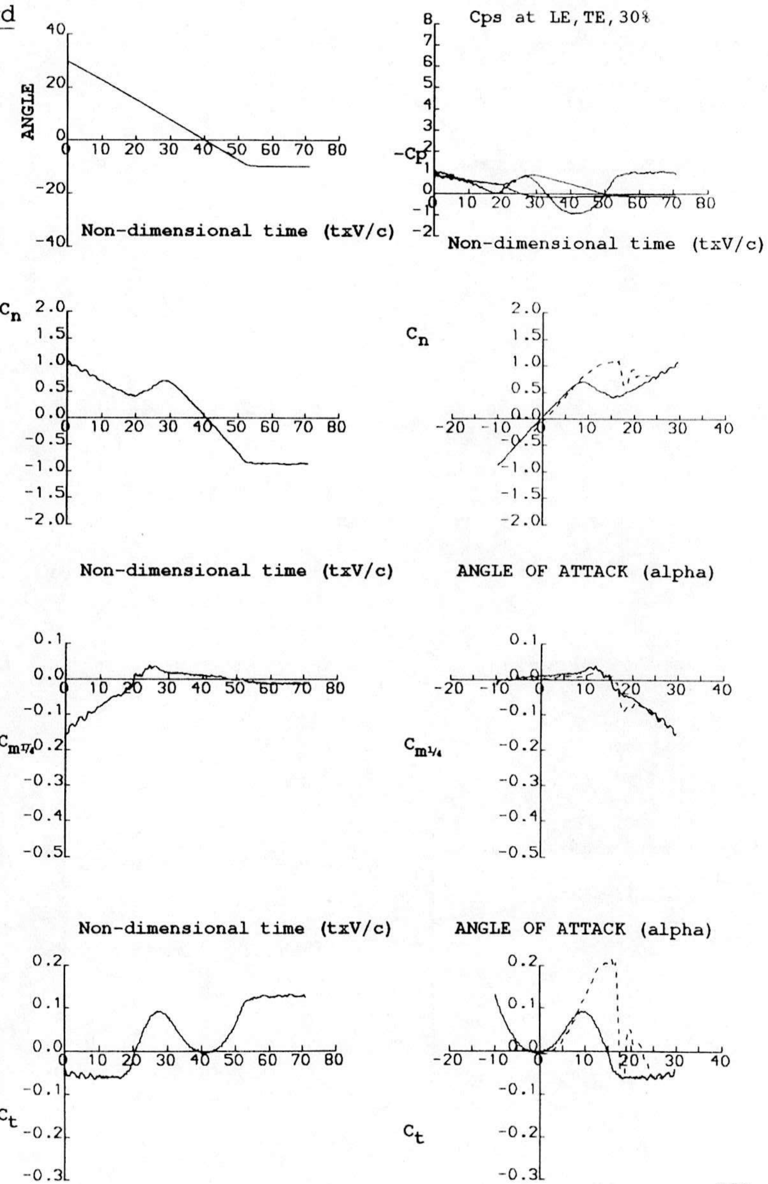
AIR TEMPERATURE = 24.3°C

SAMPLING FREQUENCY = 2000.00 Hz.

REDUCED PITCH RATE = -0.00650

LINEAR PITCH RATE = -103.72°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31511

REYNOLDS NUMBER = 706028.

DYNAMIC PRESSURE = 891.26 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

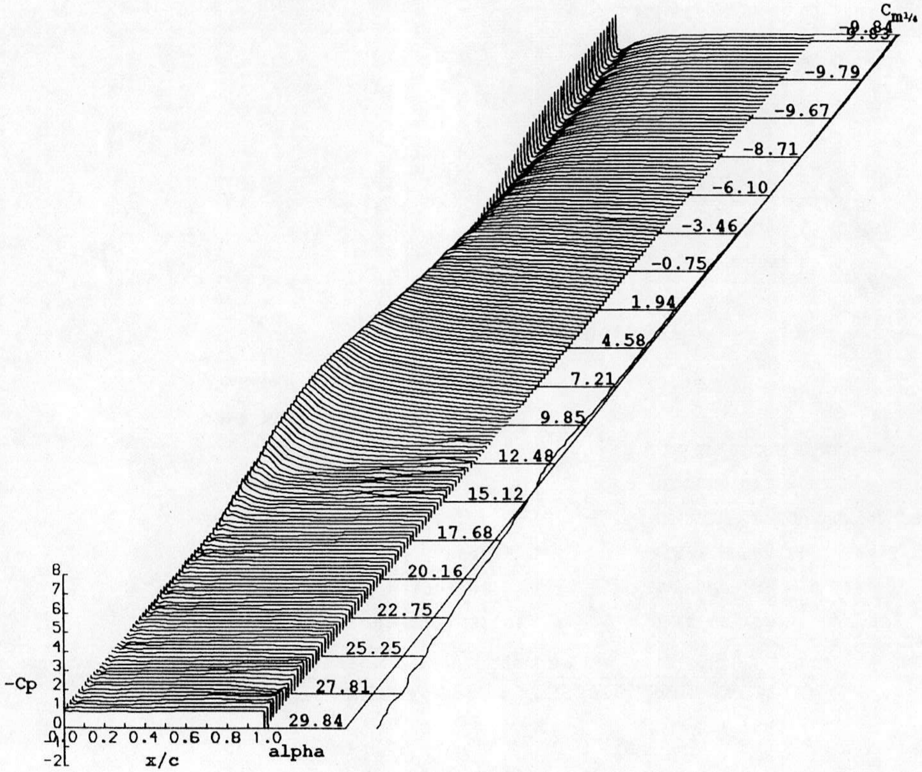
MACH NUMBER = 0.111

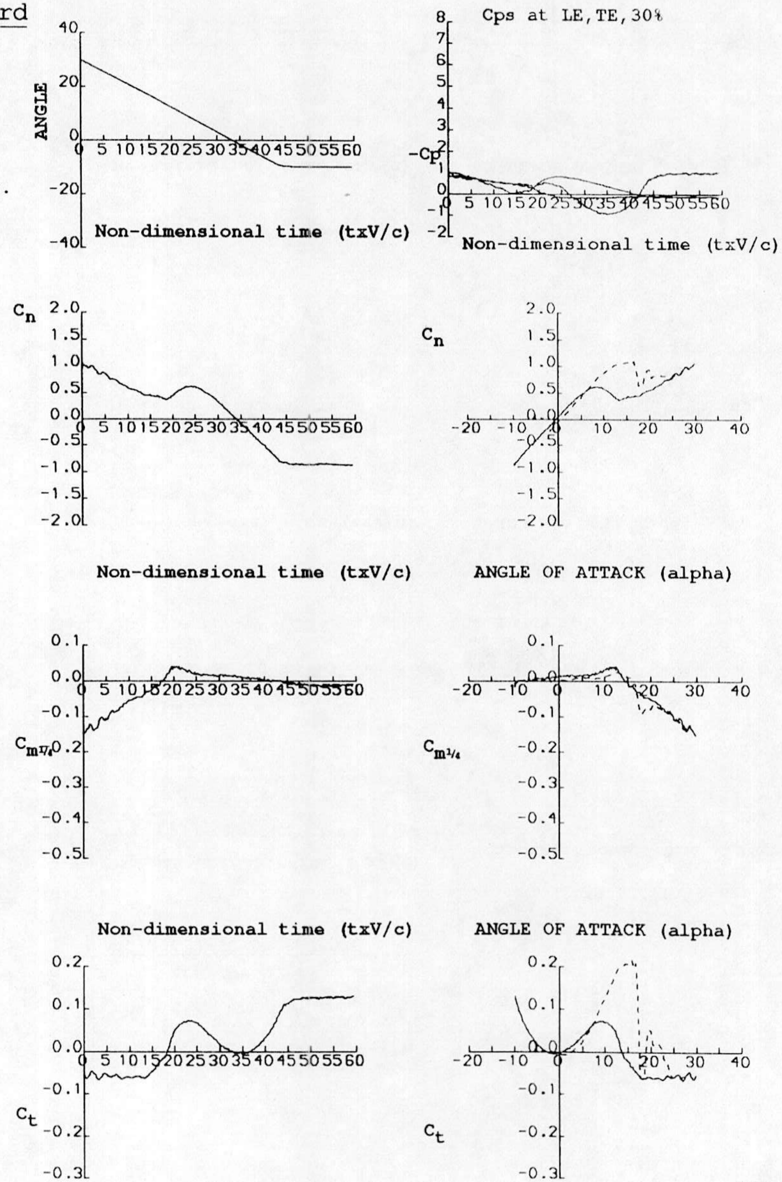
AIR TEMPERATURE = 24.8°C

SAMPLING FREQUENCY = 2400.00 Hz.

REDUCED PITCH RATE = -0.00773

LINEAR PITCH RATE = -123.93°S^{-1}





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DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31521

REYNOLDS NUMBER = 707763.

DYNAMIC PRESSURE = 898.73 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

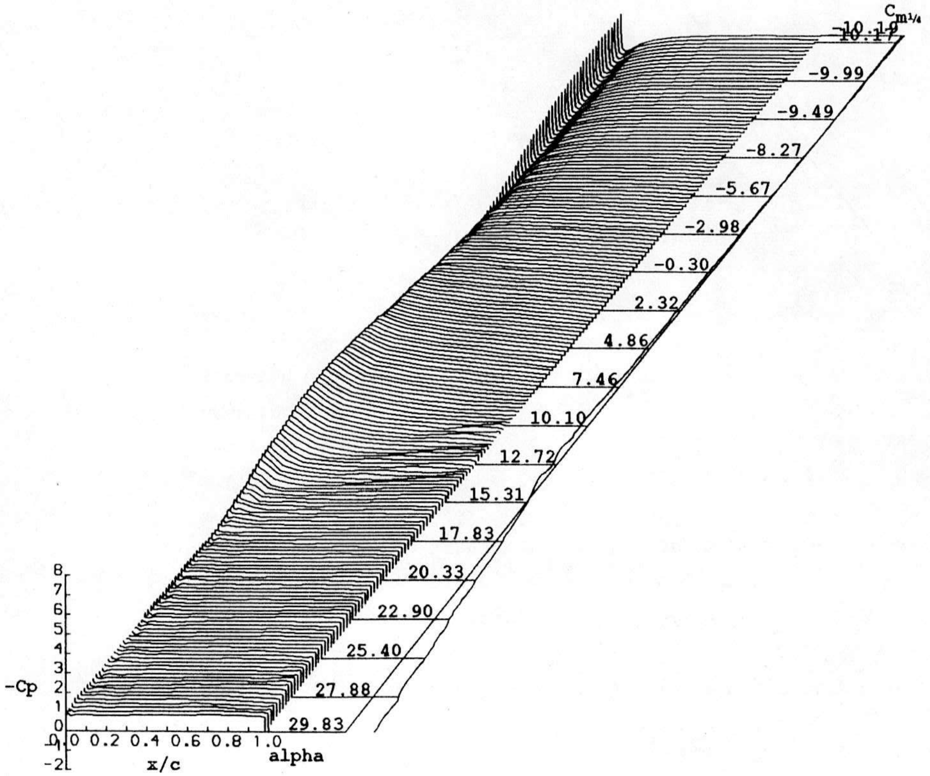
MACH NUMBER = 0.112

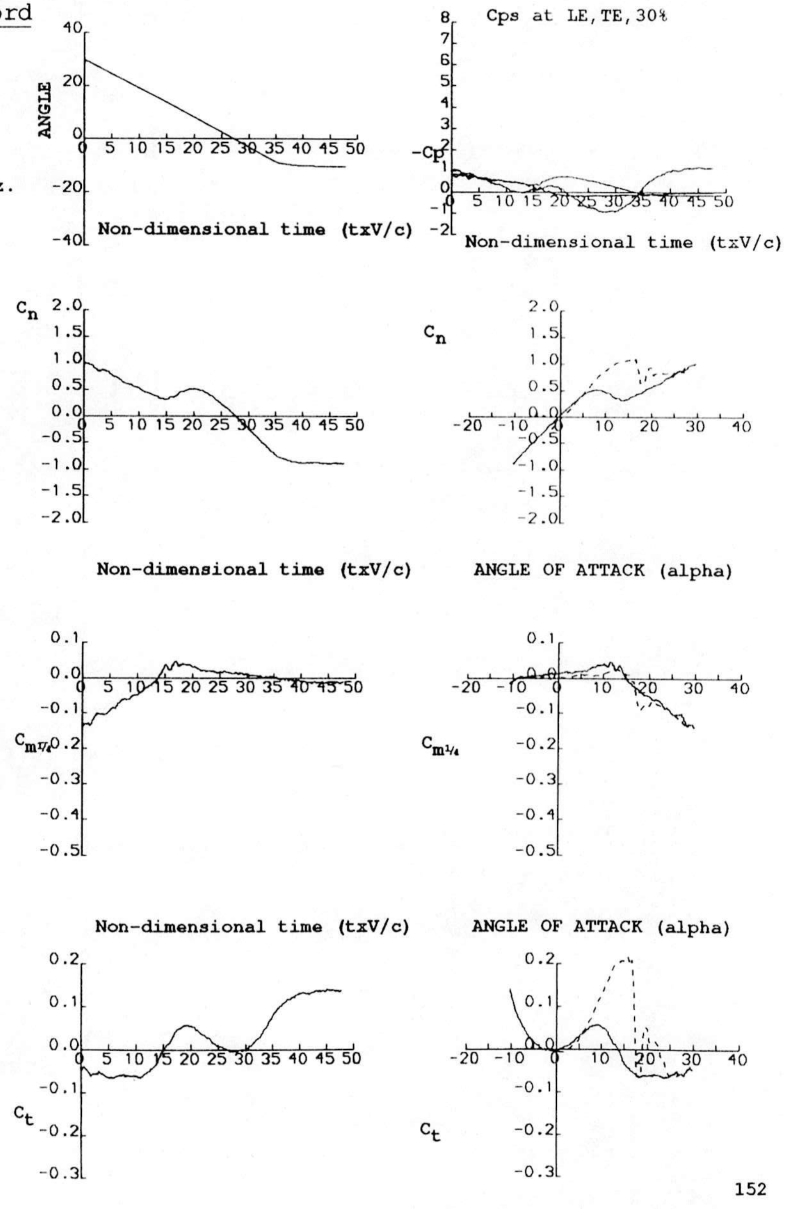
AIR TEMPERATURE = 25.2°C

SAMPLING FREQUENCY = 3000.00 Hz.

REDUCED PITCH RATE = -0.00954

LINEAR PITCH RATE = -153.71°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31531

REYNOLDS NUMBER = 702578.

DYNAMIC PRESSURE = 889.42 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

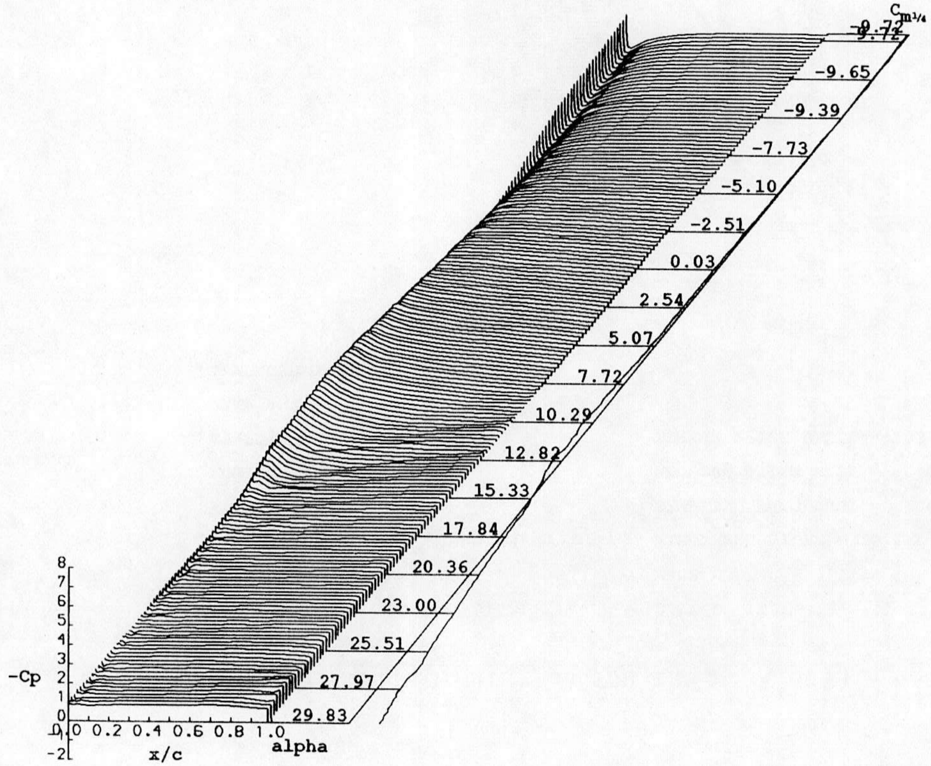
MACH NUMBER = 0.111

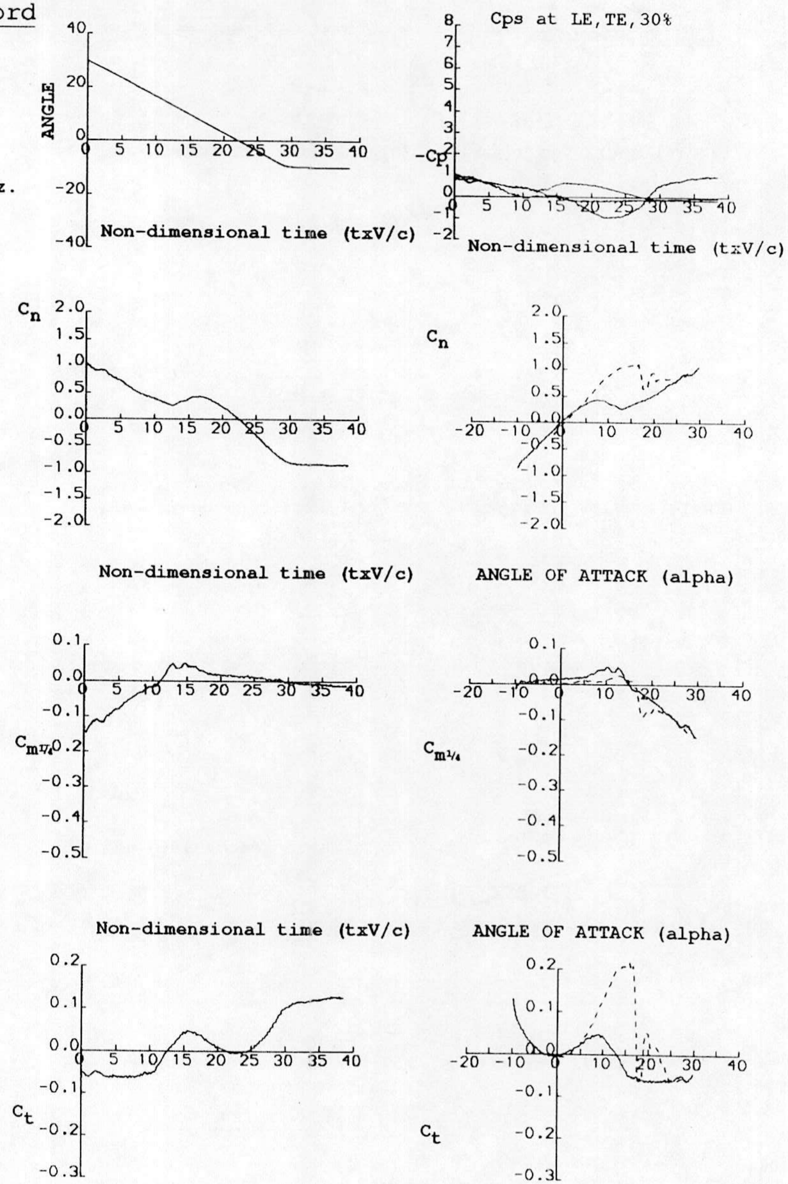
AIR TEMPERATURE = 25.7°C

SAMPLING FREQUENCY = 3703.00 Hz.

REDUCED PITCH RATE = -0.01160

LINEAR PITCH RATE = -186.09°s^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31541

REYNOLDS NUMBER = 717182.

DYNAMIC PRESSURE = 930.76 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

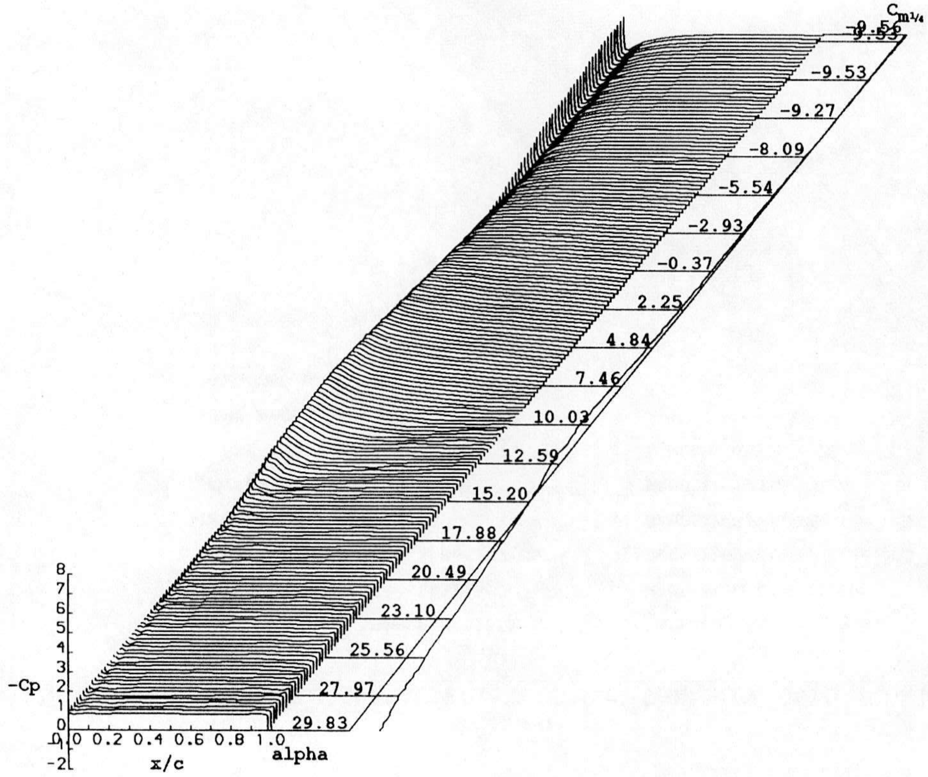
MACH NUMBER = 0.114

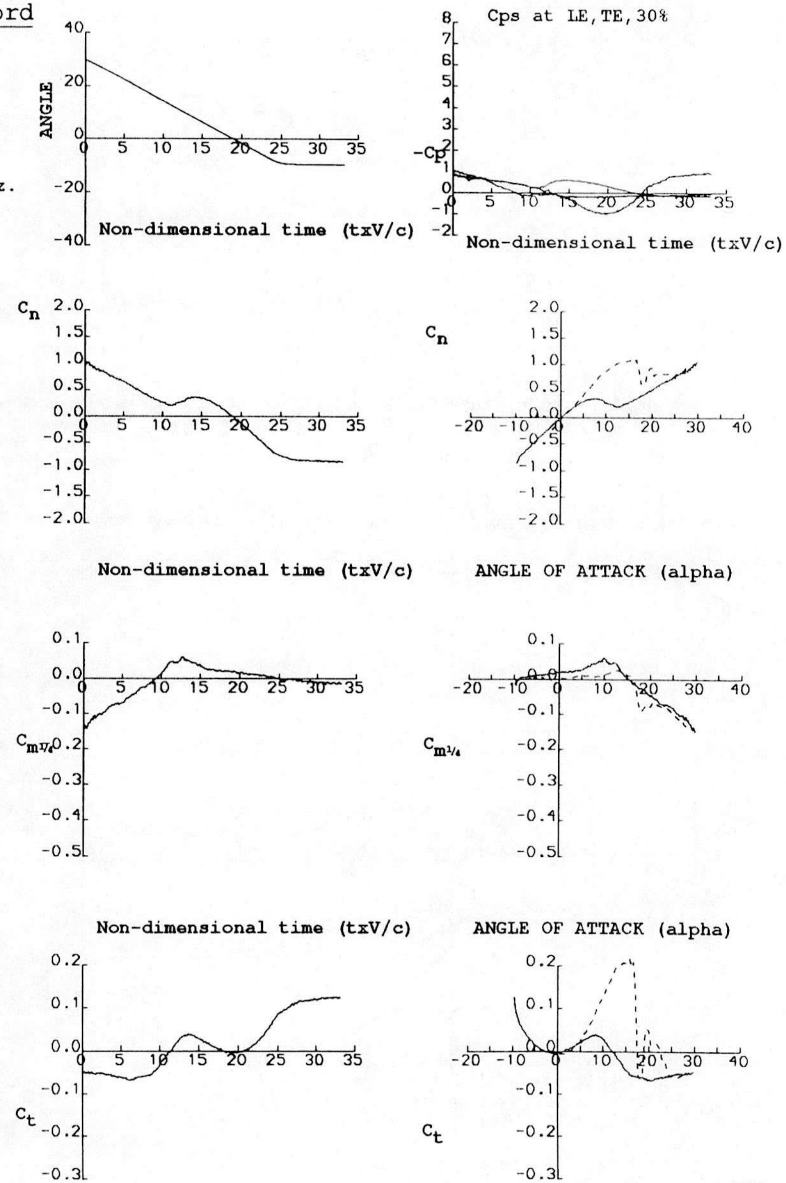
AIR TEMPERATURE = 26.2°C

SAMPLING FREQUENCY = 4405.00 Hz.

REDUCED PITCH RATE = -0.01403

LINEAR PITCH RATE = $-230.37°s^{-1}$

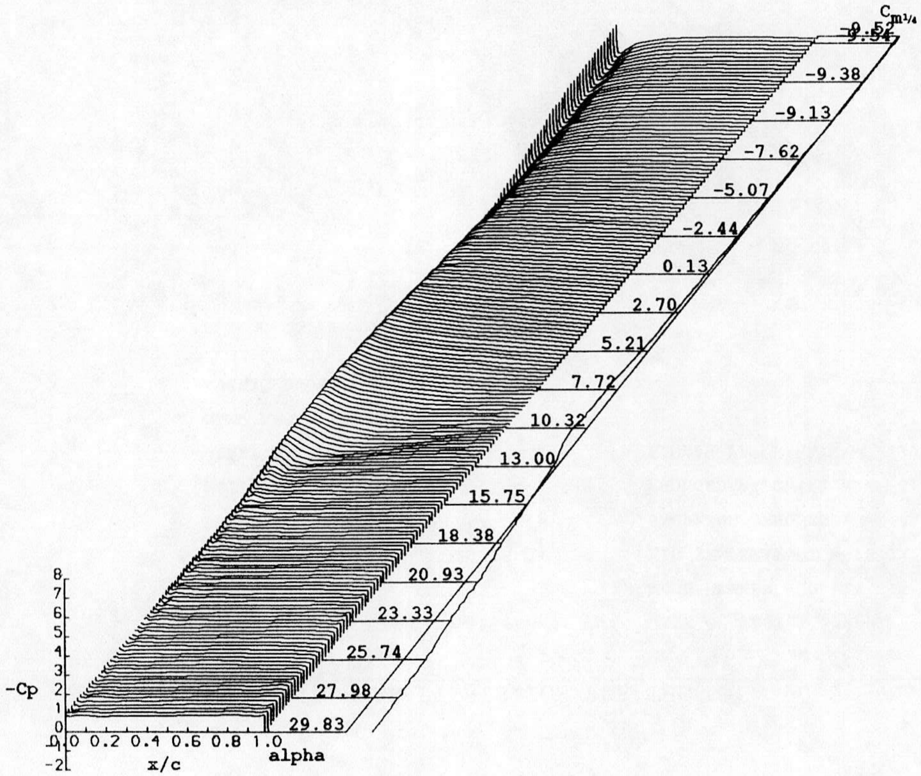


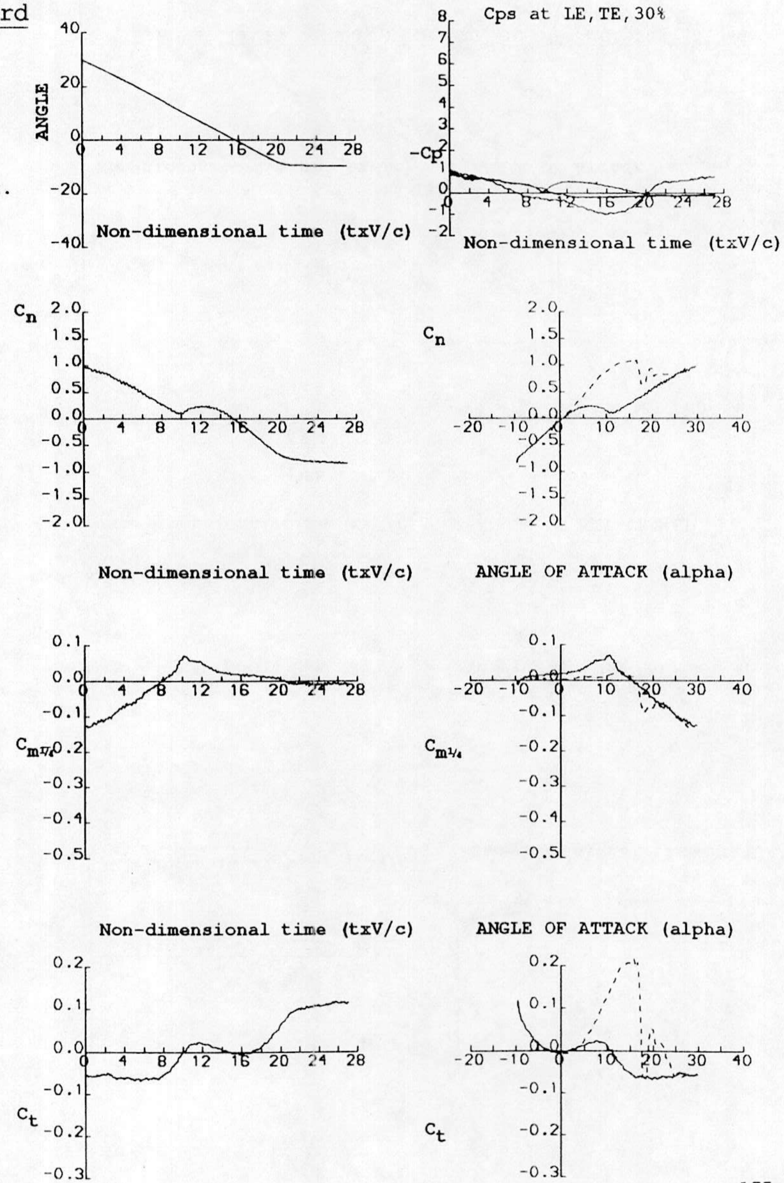


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31551
REYNOLDS NUMBER = 691123.
DYNAMIC PRESSURE = 866.57 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

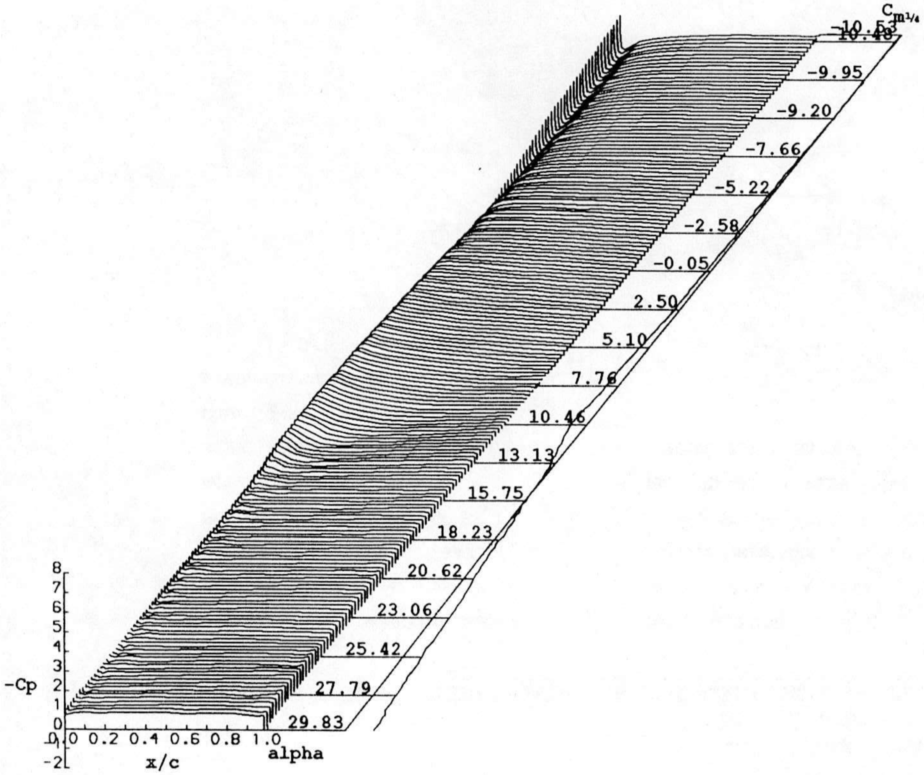
DATE OF TEST: 3/9/91
MACH NUMBER = 0.110
AIR TEMPERATURE = 26.5°C
SAMPLING FREQUENCY = 5208.00 Hz.
REDUCED PITCH RATE = -0.01744
LINEAR PITCH RATE = $-276.53°s^{-1}$

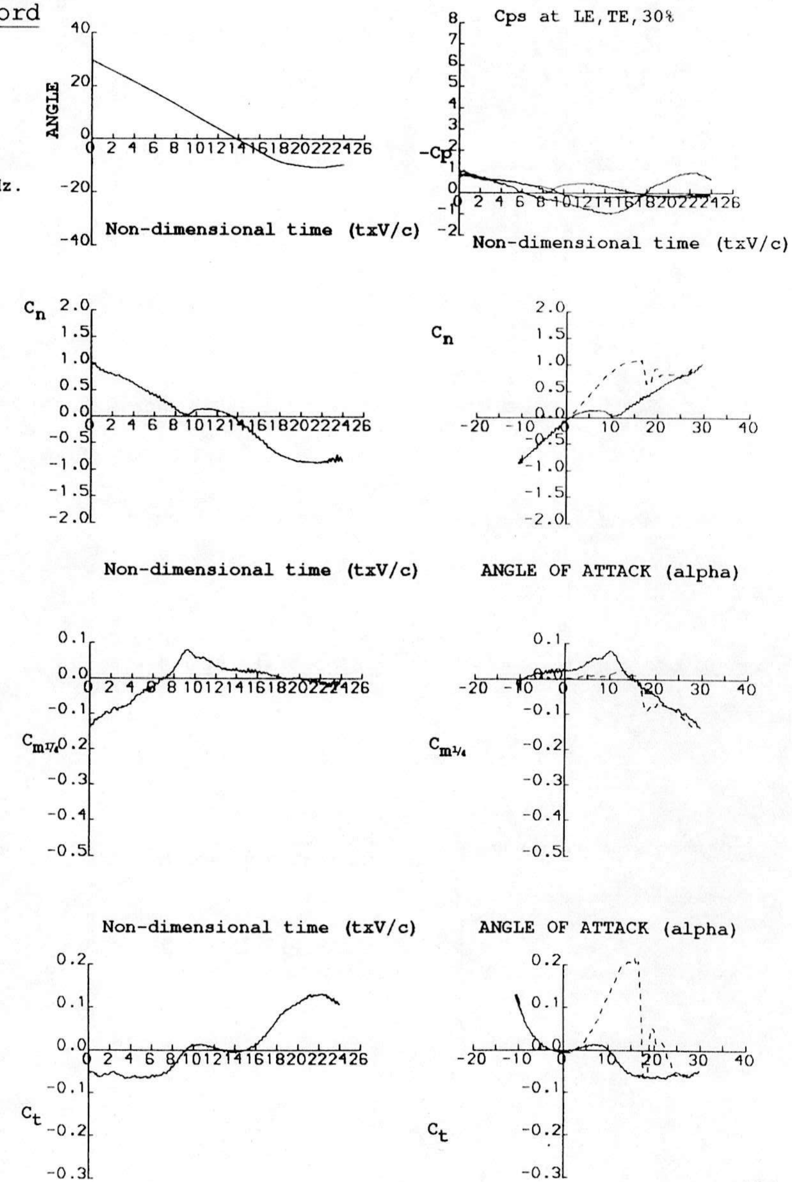




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31561	**DATE OF TEST:** 3/9/91
REYNOLDS NUMBER = 696330.	**MACH NUMBER =** 0.110
DYNAMIC PRESSURE = 878.93 Nm^{-2}	**AIR TEMPERATURE =** 26.4°C
NUMBER OF CYCLES = 5	**SAMPLING FREQUENCY =** 5917.00 Hz.
MOTION TYPE: RAMP DOWN	**REDUCED PITCH RATE =** -0.01892
START ANGLE = 40.00°	**LINEAR PITCH RATE =** $-302.06°S^{-1}$
RAMP ARC = -50.000°	
AVERAGED DATA OF 5 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31571

REYNOLDS NUMBER = 696473.

DYNAMIC PRESSURE = 883.05 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

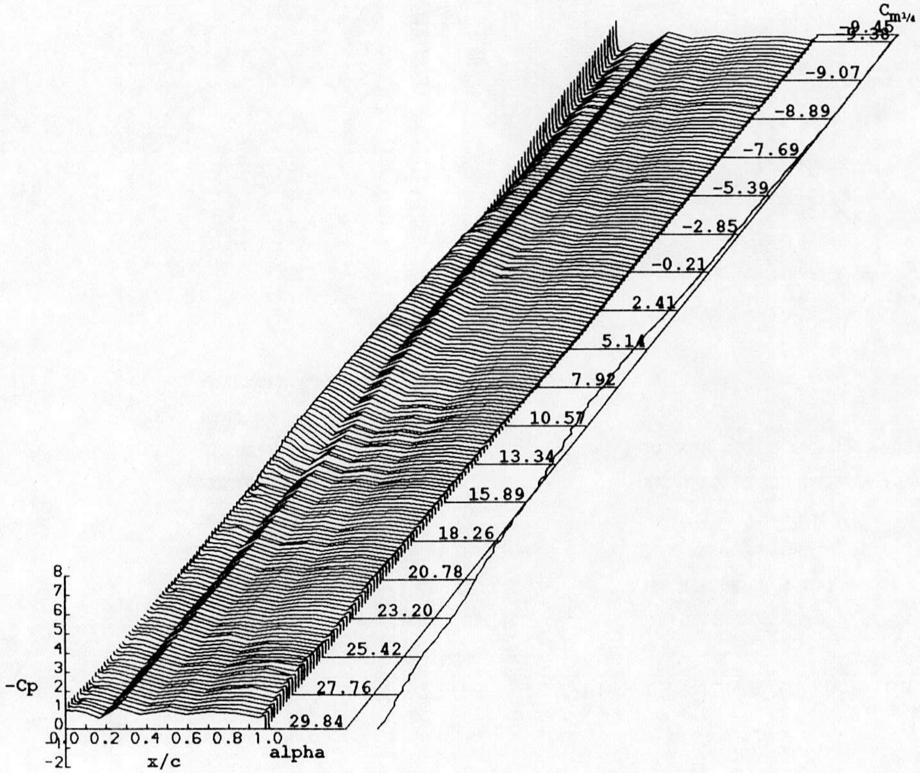
MACH NUMBER = 0.111

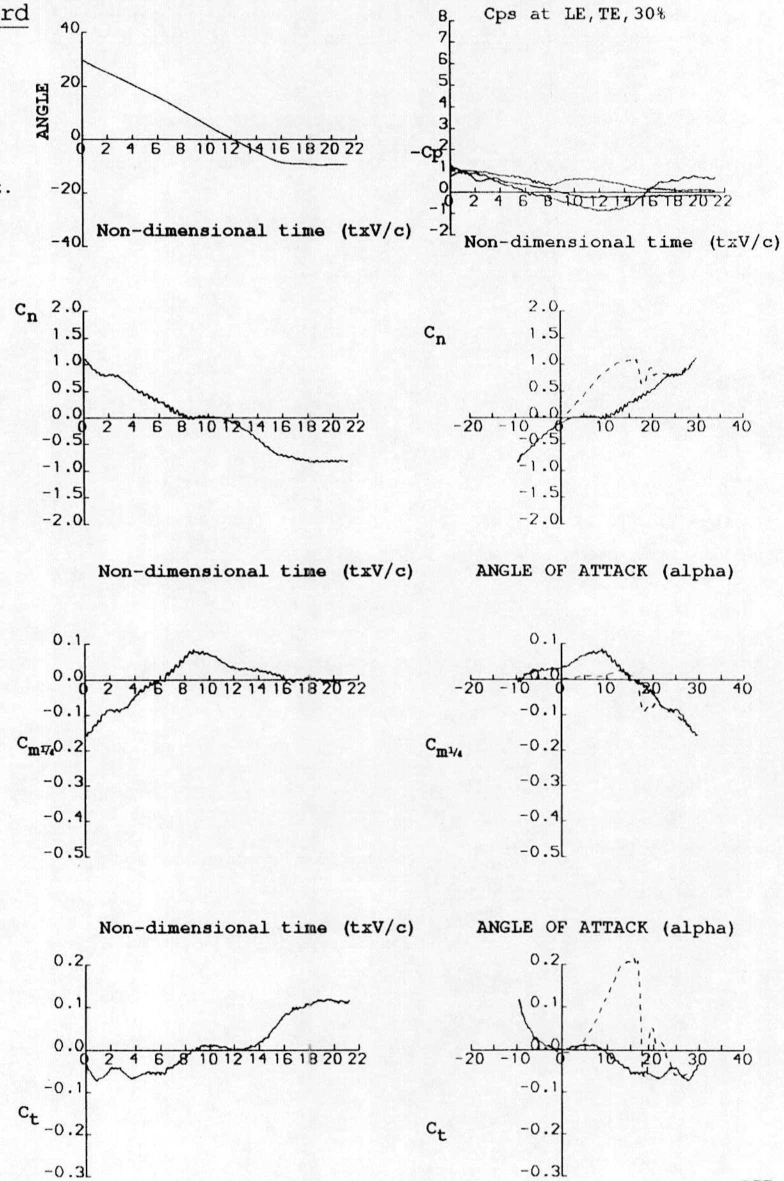
AIR TEMPERATURE = 26.9°C

SAMPLING FREQUENCY = 6711.00 Hz.

REDUCED PITCH RATE = -0.02139

LINEAR PITCH RATE = -342.53°S^{-1}





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DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31581

REYNOLDS NUMBER = 667820.

DYNAMIC PRESSURE = 756.58 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91

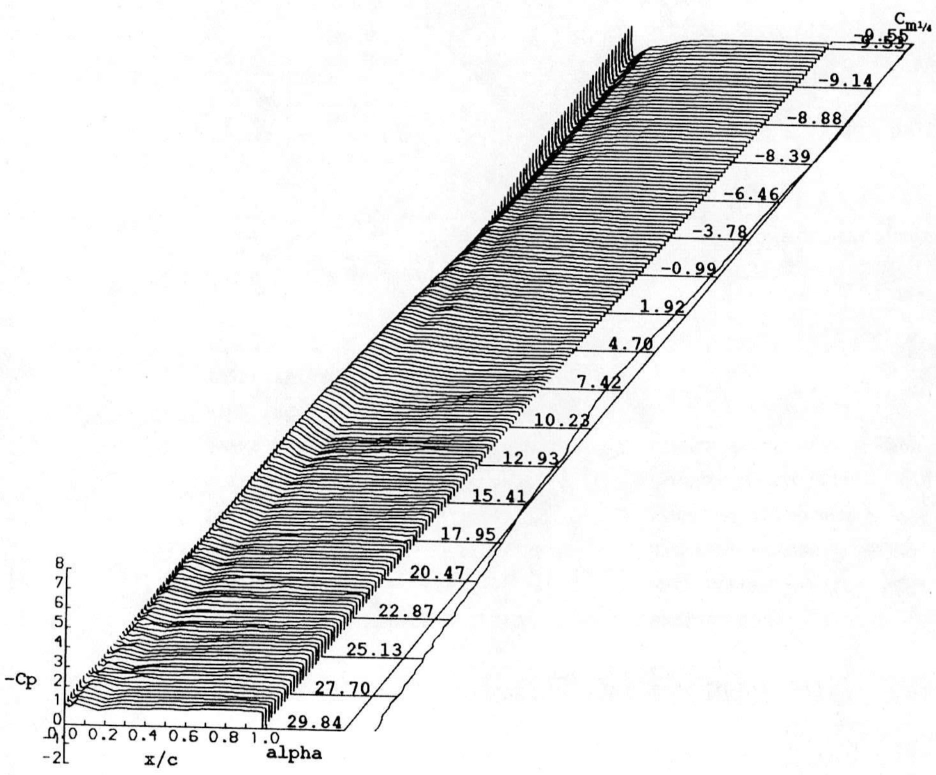
MACH NUMBER = 0.102

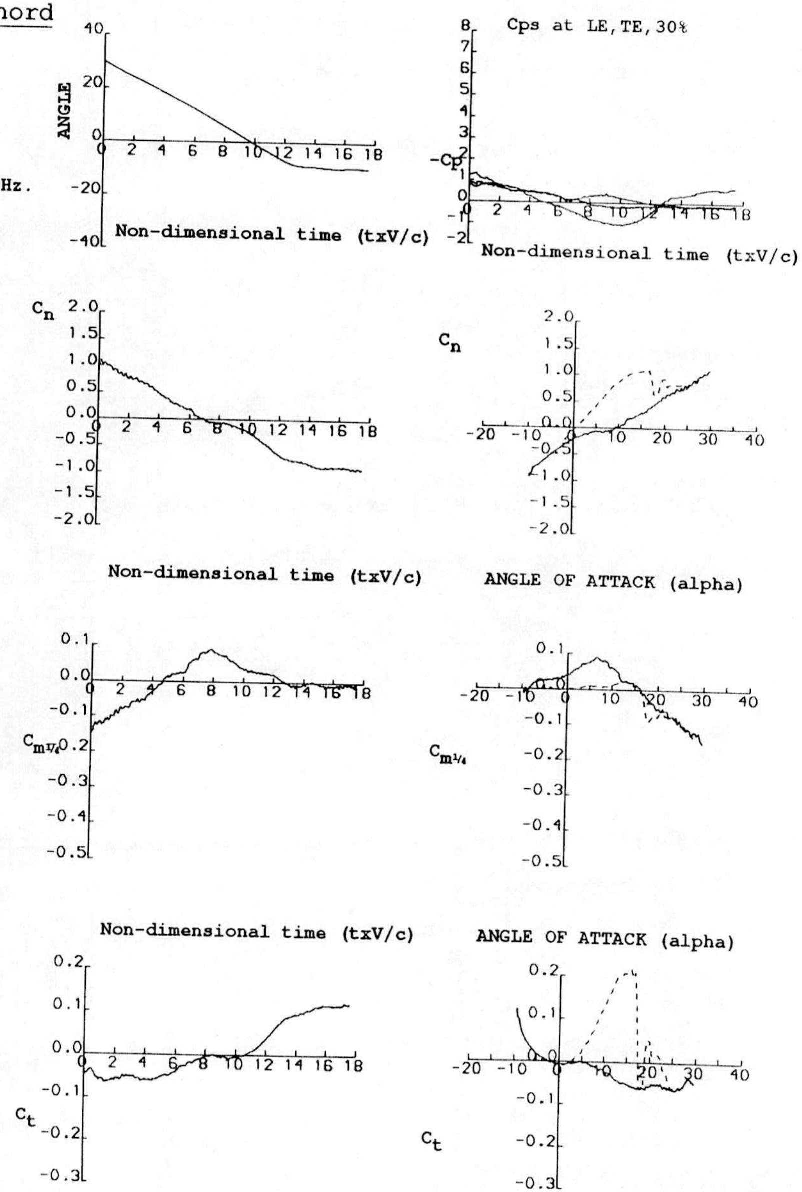
AIR TEMPERATURE = 18.8°C

SAMPLING FREQUENCY = 7407.00 Hz.

REDUCED PITCH RATE = -0.02596

LINEAR PITCH RATE = $-379.51°s^{-1}$

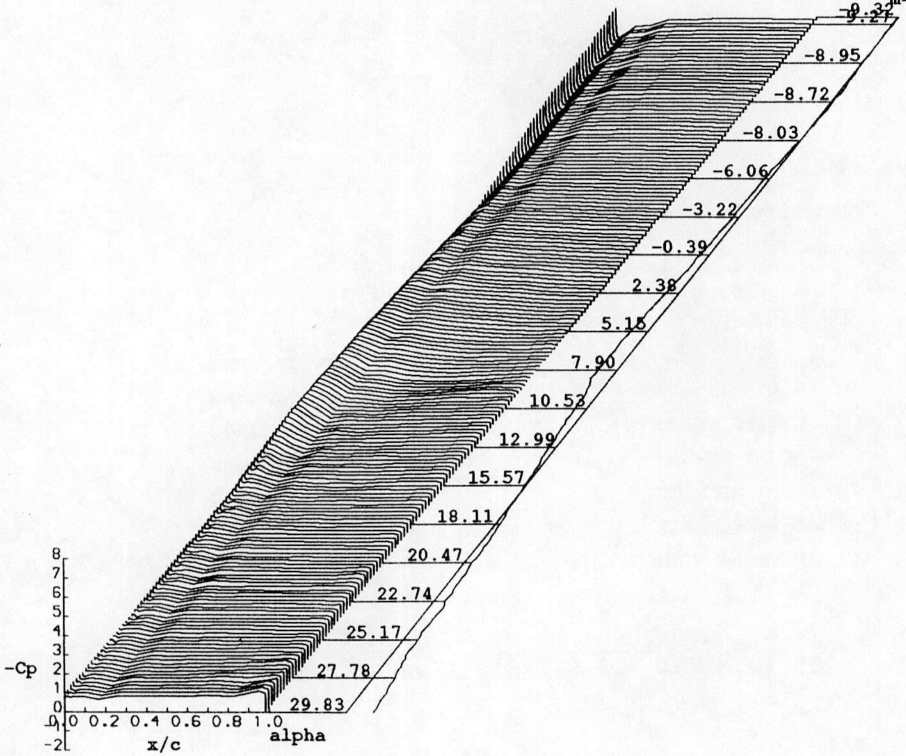


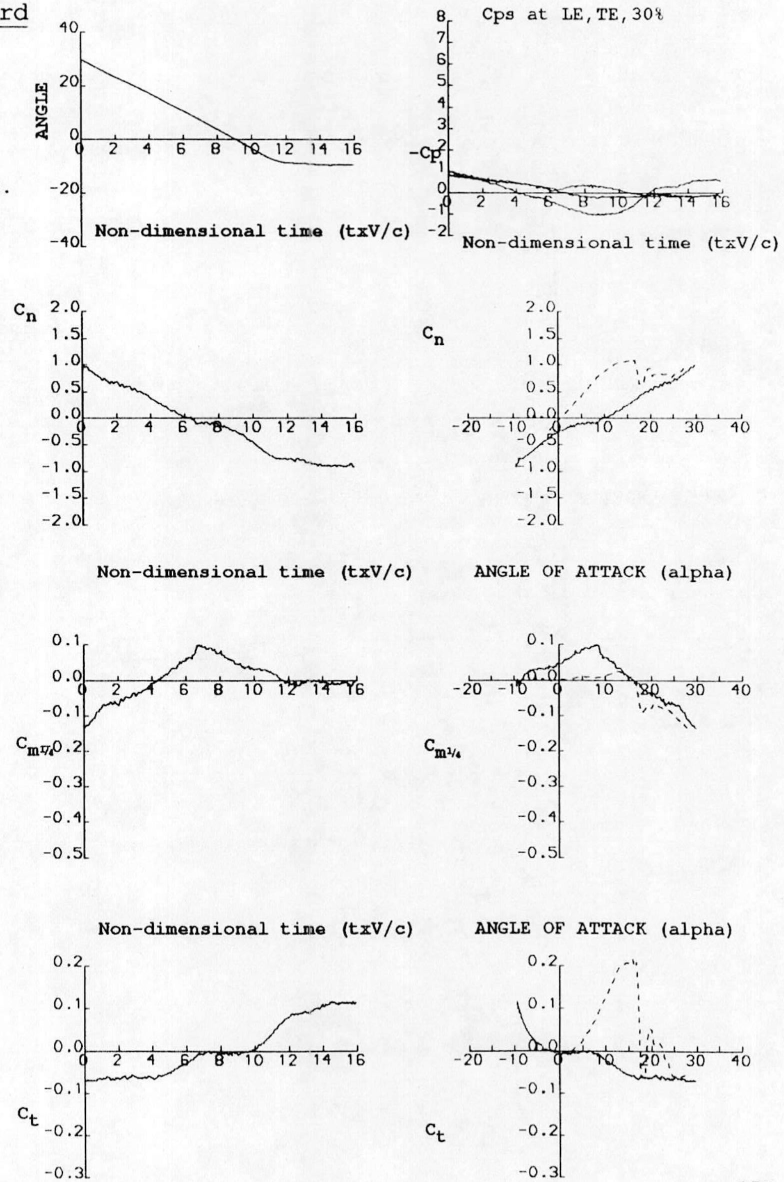


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31591
REYNOLDS NUMBER = 669153.
DYNAMIC PRESSURE = 764.96 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/9/91
MACH NUMBER = 0.103
AIR TEMPERATURE = 19.6°C
SAMPLING FREQUENCY = 8219.00 Hz.
REDUCED PITCH RATE = -0.02783
LINEAR PITCH RATE = -409.71 $°S^{-1}$





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31601

REYNOLDS NUMBER = 663417.

DYNAMIC PRESSURE = 755.87 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 4/9/91

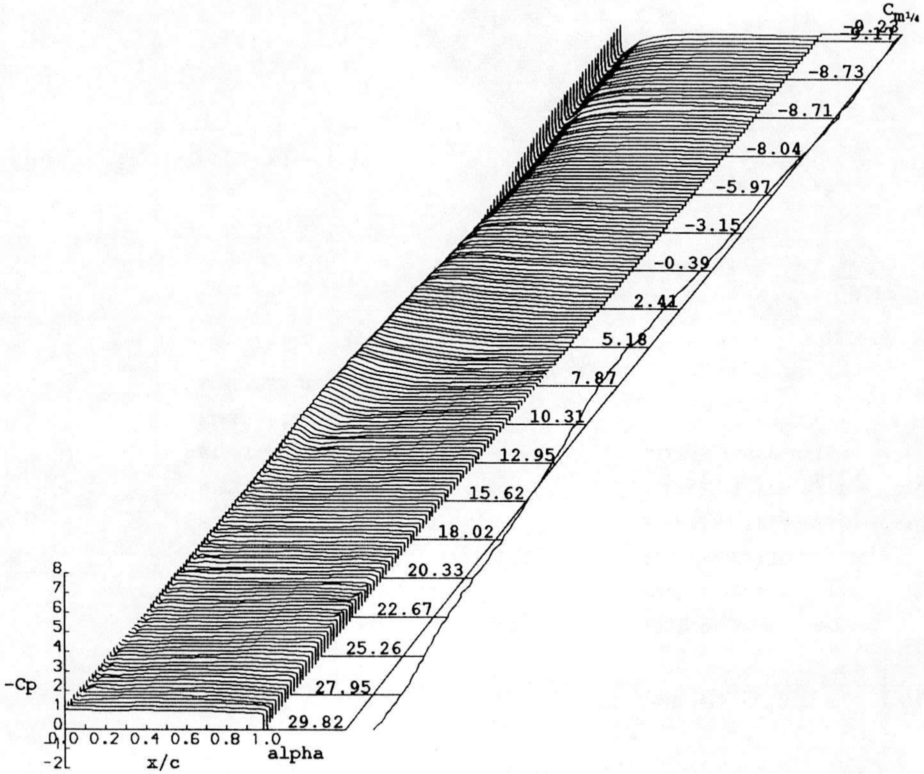
MACH NUMBER = 0.102

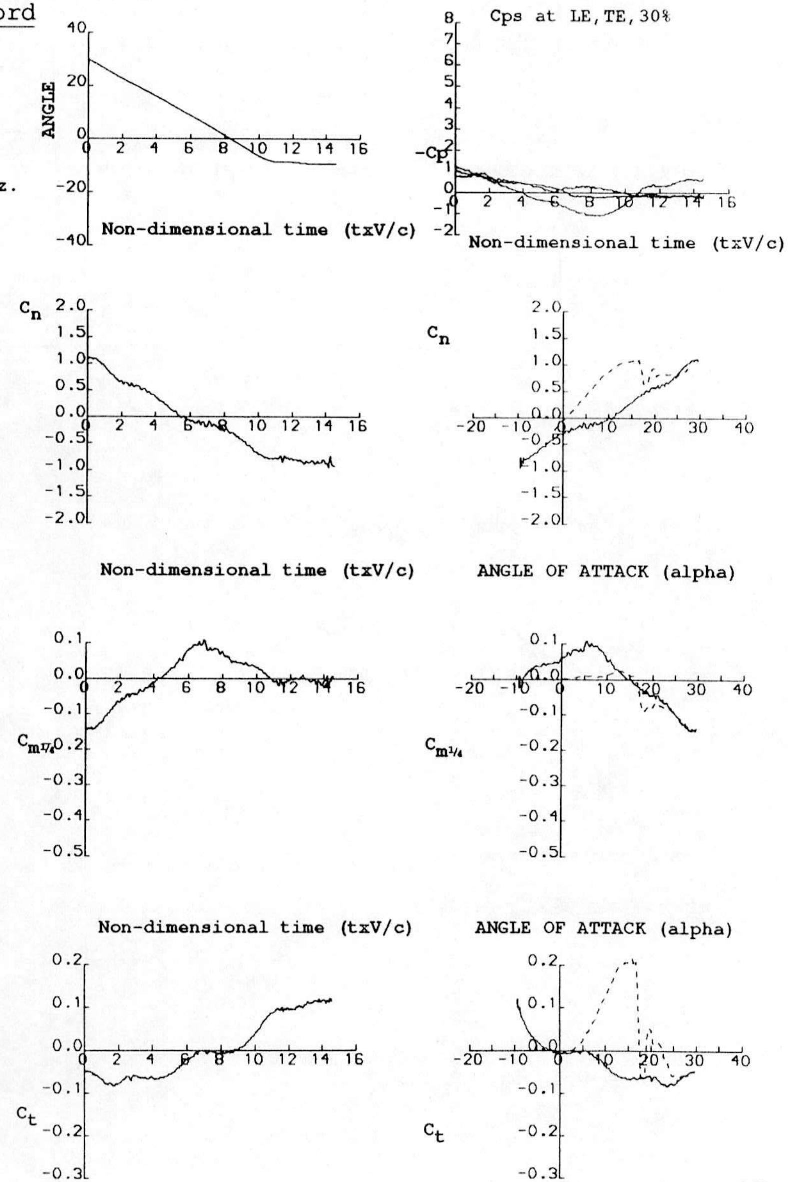
AIR TEMPERATURE = 20.2°C

SAMPLING FREQUENCY = 8928.00 Hz.

REDUCED PITCH RATE = -0.03058

LINEAR PITCH RATE = $-447.87°S^{-1}$





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31611

REYNOLDS NUMBER = 668071.

DYNAMIC PRESSURE = 770.55 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 4/9/91

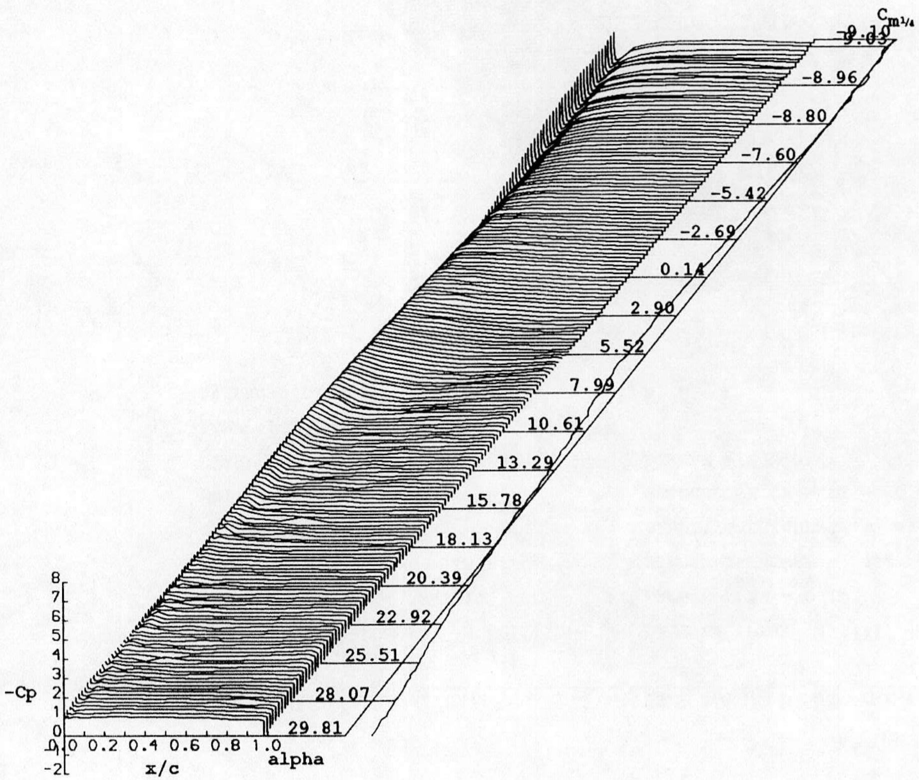
MACH NUMBER = 0.103

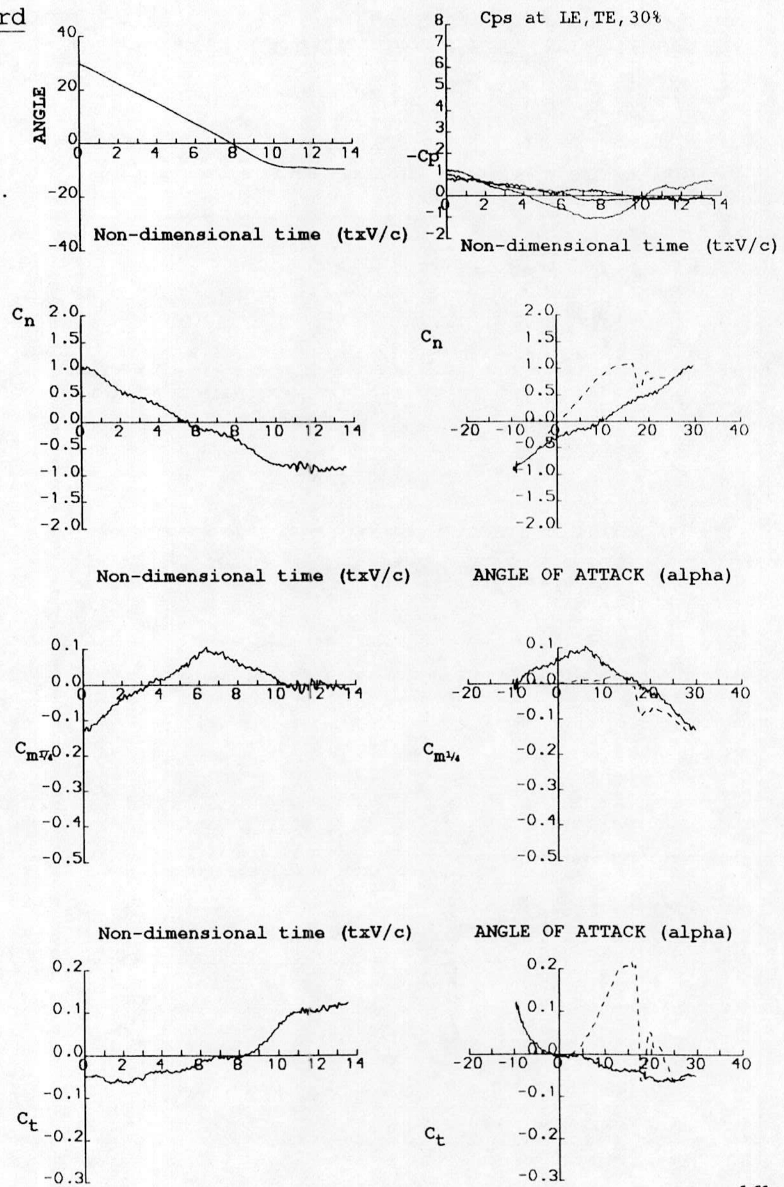
AIR TEMPERATURE = 20.8°C

SAMPLING FREQUENCY = 9708.00 Hz.

REDUCED PITCH RATE = -0.03220

LINEAR PITCH RATE = -476.76°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31621

REYNOLDS NUMBER = 670540.

DYNAMIC PRESSURE = 778.97 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 4/9/91

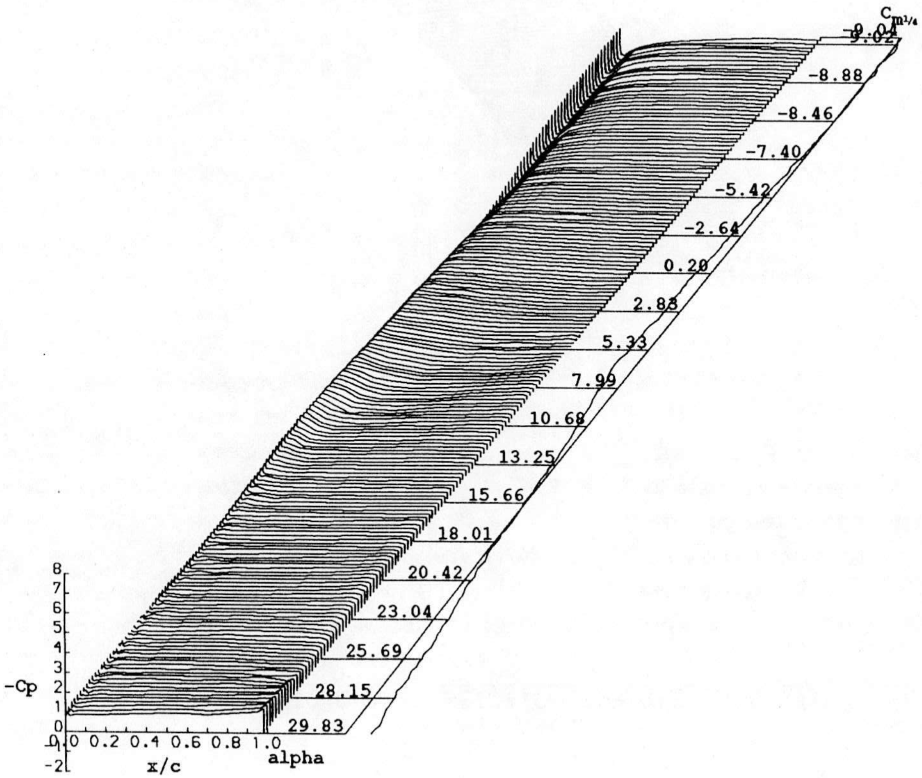
MACH NUMBER = 0.104

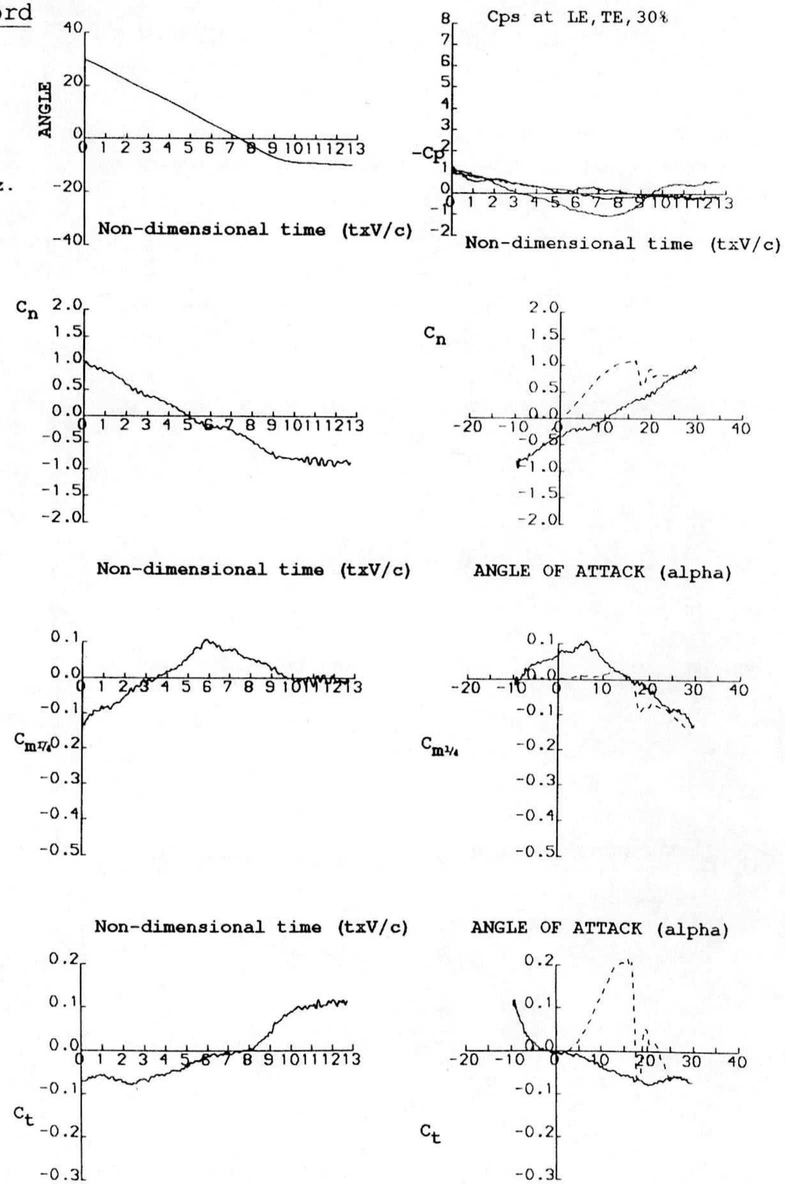
AIR TEMPERATURE = 21.2°C

SAMPLING FREQUENCY = 10410.00 Hz.

REDUCED PITCH RATE = -0.03408

LINEAR PITCH RATE = $-507.61°s^{-1}$





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31631

REYNOLDS NUMBER = 671382.

DYNAMIC PRESSURE = 784.34 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 4/9/91

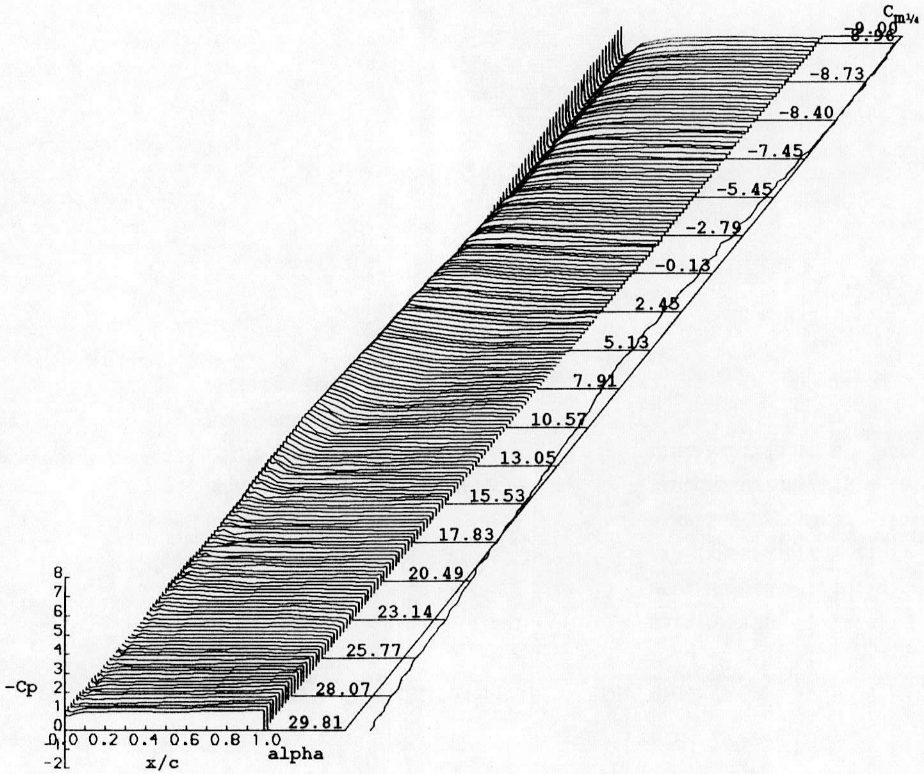
MACH NUMBER = 0.104

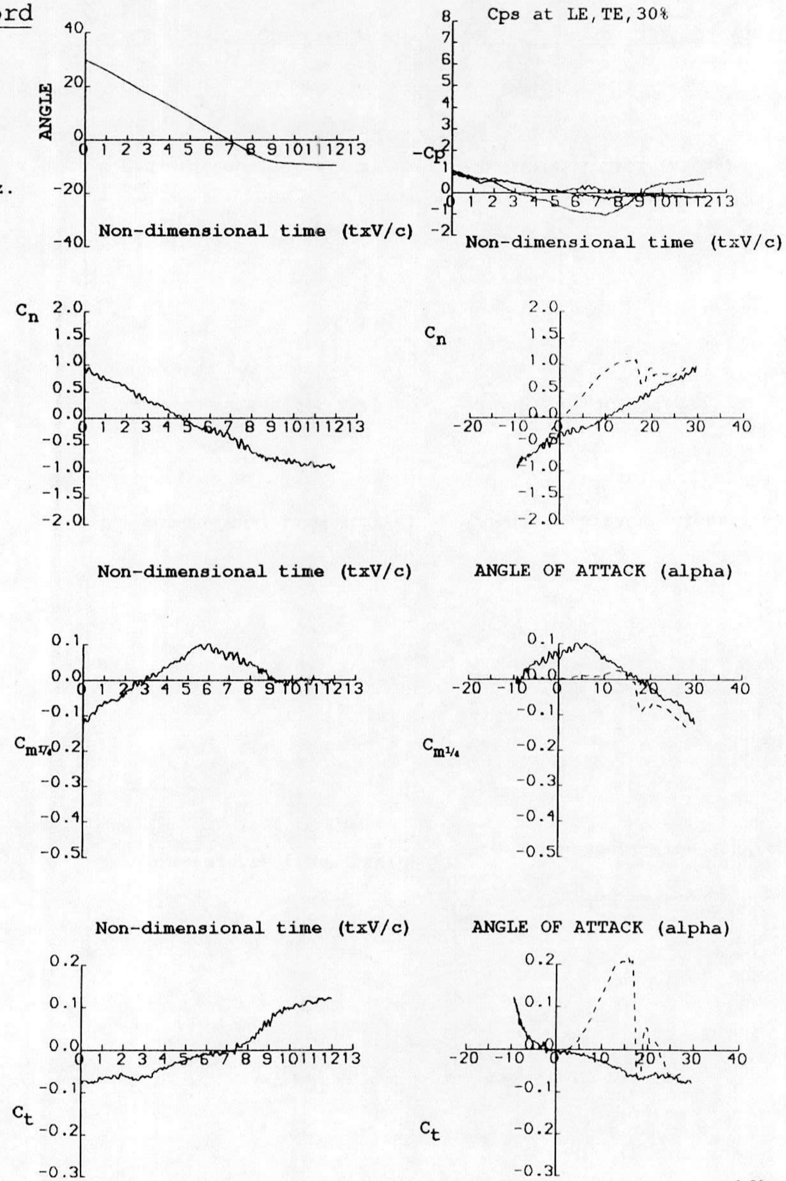
AIR TEMPERATURE = 21.7°C

SAMPLING FREQUENCY = 11110.00 Hz.

REDUCED PITCH RATE = -0.03673

LINEAR PITCH RATE = -549.47°S^{-1}

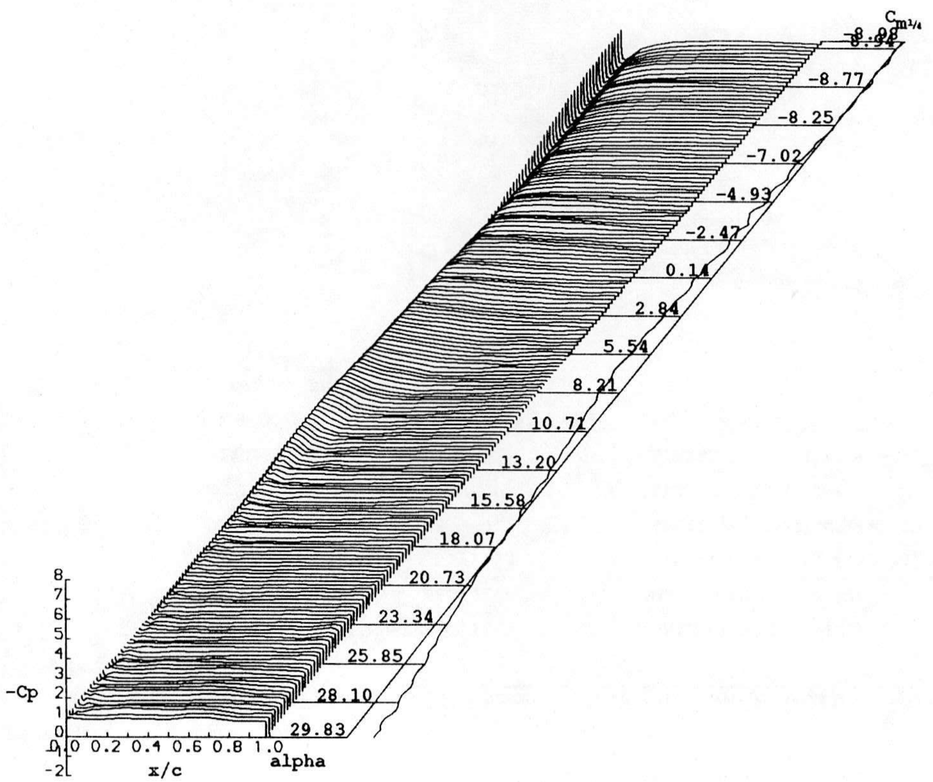


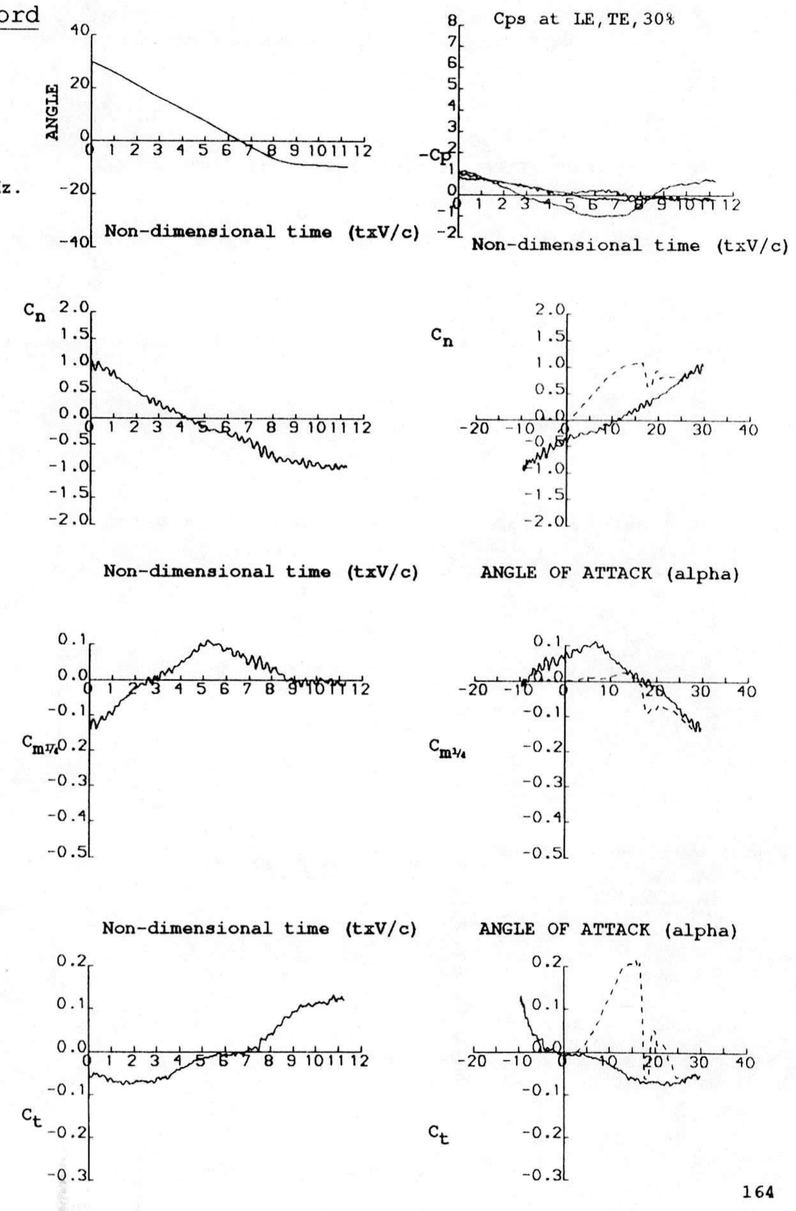


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31641
REYNOLDS NUMBER = 674847.
DYNAMIC PRESSURE = 796.61 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 4/9/91
MACH NUMBER = 0.105
AIR TEMPERATURE = 22.3°C
SAMPLING FREQUENCY = 11900.00 Hz.
REDUCED PITCH RATE = -0.03943
LINEAR PITCH RATE = -595.04°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31651

REYNOLDS NUMBER = 666542.

DYNAMIC PRESSURE = 779.82 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 4/9/91

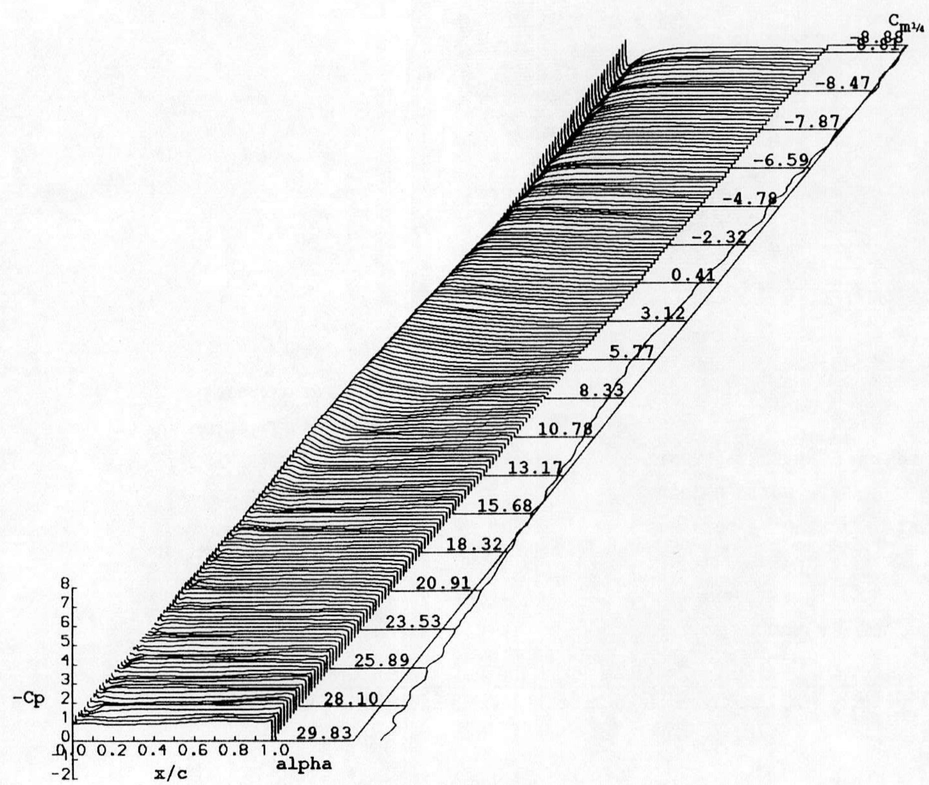
MACH NUMBER = 0.104

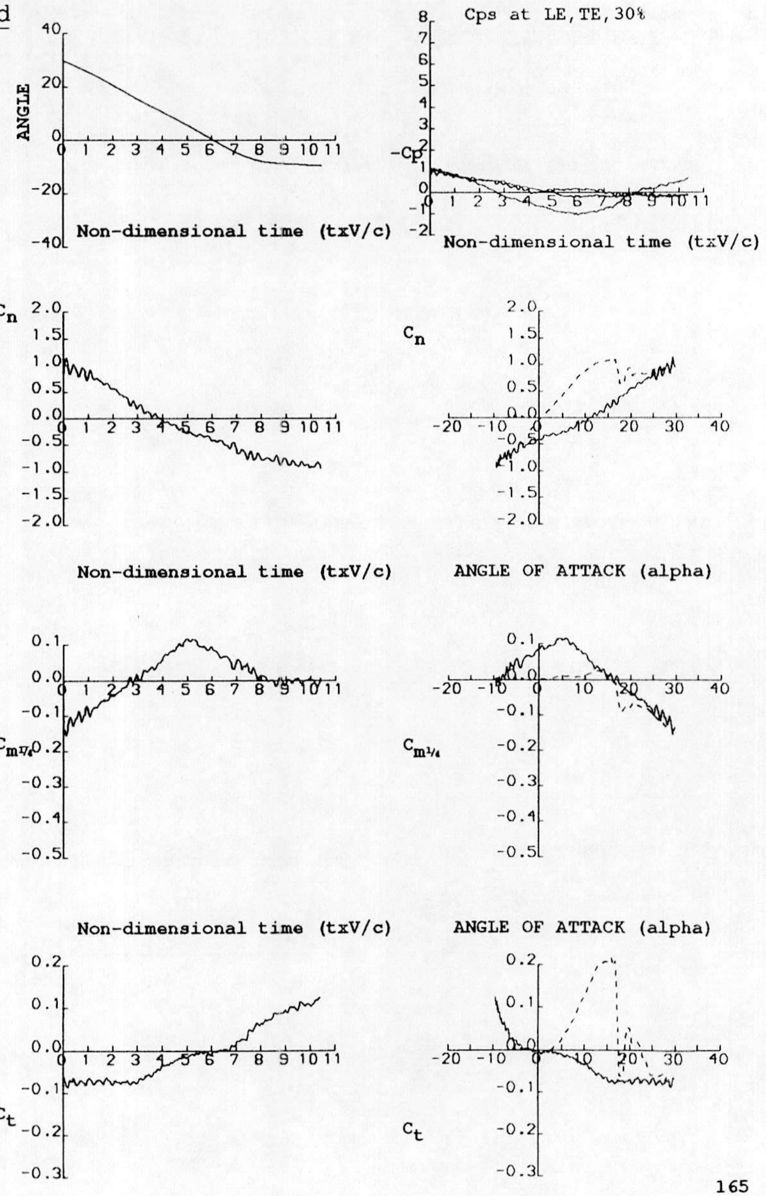
AIR TEMPERATURE = 22.7°C

SAMPLING FREQUENCY = 12760.00 Hz.

REDUCED PITCH RATE = -0.04320

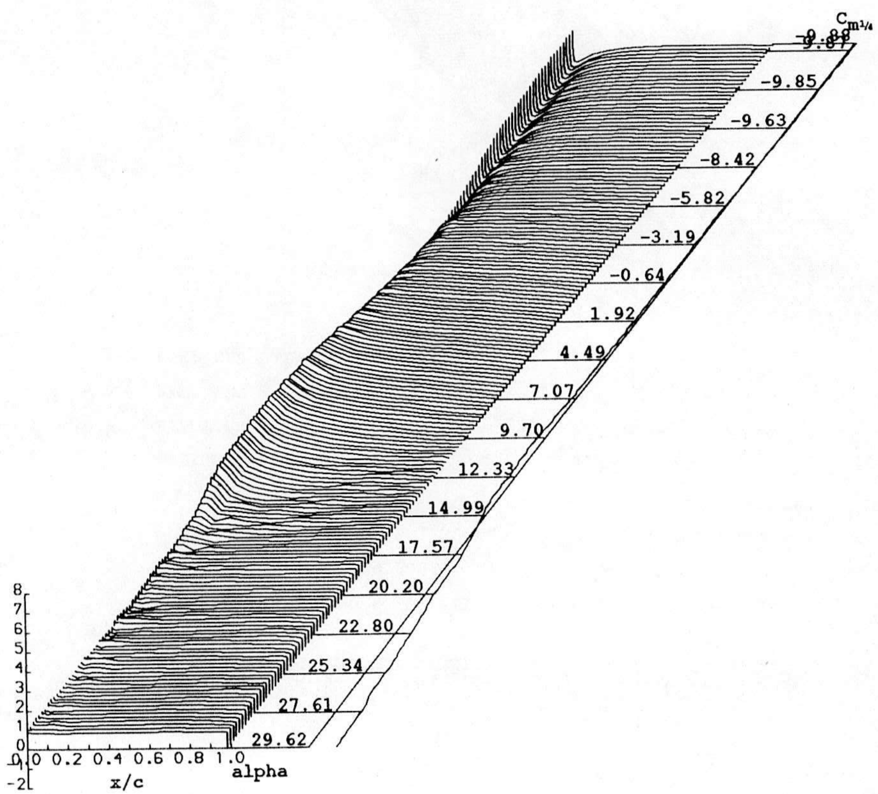
LINEAR PITCH RATE = -645.41°S^{-1}

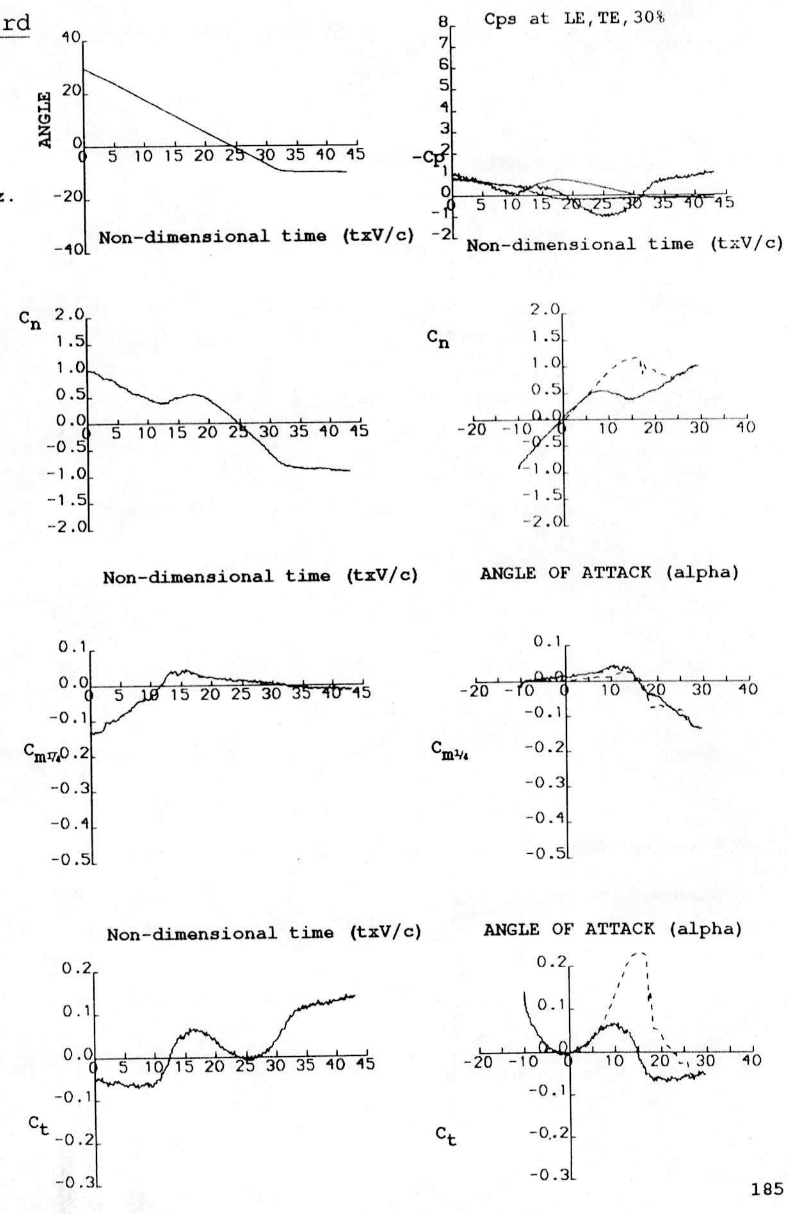




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31851	**DATE OF TEST:** 24/9/91
REYNOLDS NUMBER = 914123.	**MACH NUMBER =** 0.149
DYNAMIC PRESSURE = 1529.06 Nm^{-2}	**AIR TEMPERATURE =** 22.7°C
NUMBER OF CYCLES = 5	**SAMPLING FREQUENCY =** 4405.00 Hz.
MOTION TYPE: RAMP DOWN	**REDUCED PITCH RATE =** -0.01083
START ANGLE = 40.00°	**LINEAR PITCH RATE =** -231.44°S^{-1}
RAMP ARC = -50.000°	
AVERAGED DATA OF 5 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31861

REYNOLDS NUMBER = 912436.

DYNAMIC PRESSURE = 1551.32 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

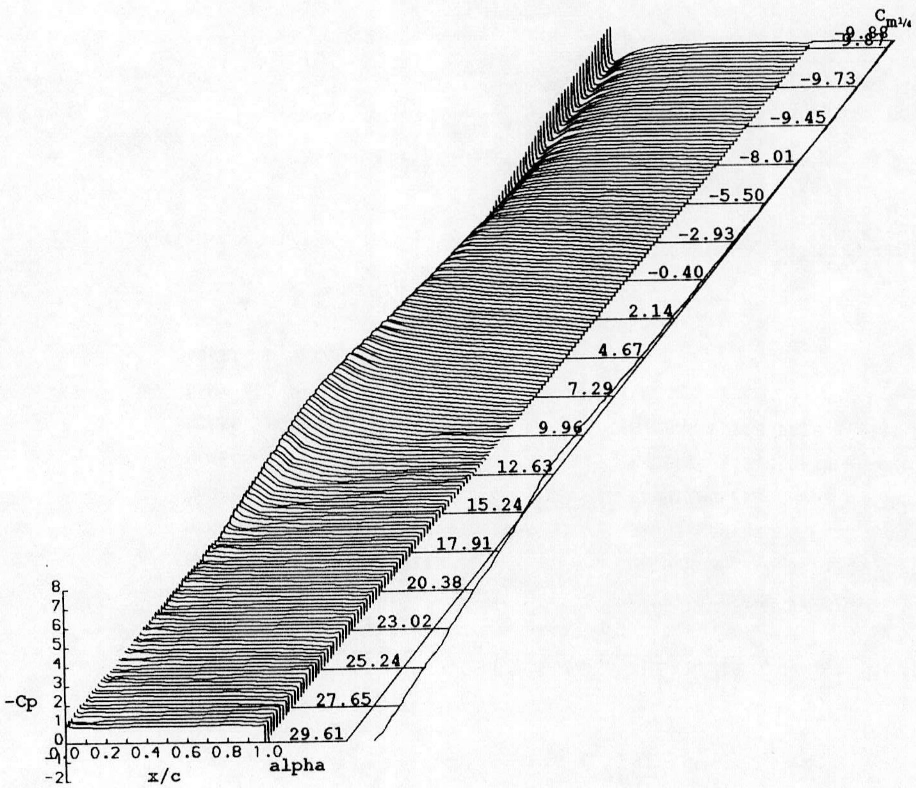
MACH NUMBER = 0.150

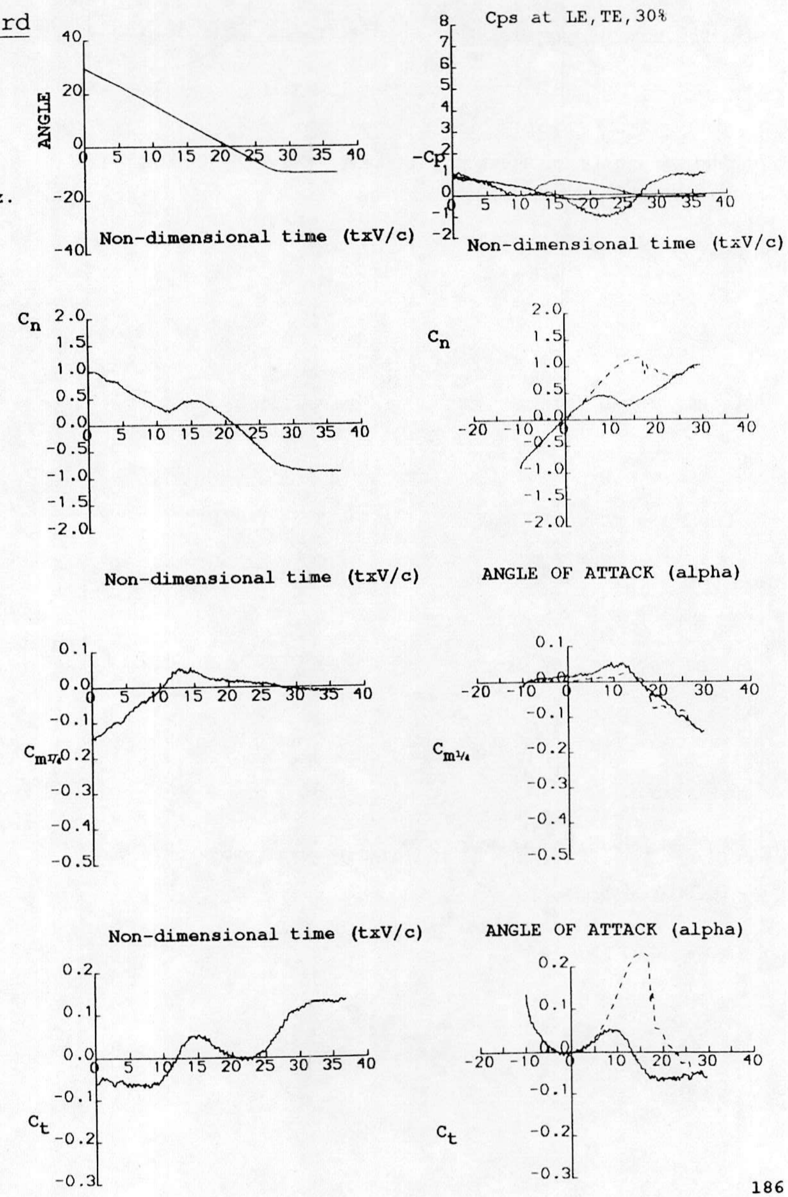
AIR TEMPERATURE = 24.8°C

SAMPLING FREQUENCY = 5208.00 Hz.

REDUCED PITCH RATE = -0.01261

LINEAR PITCH RATE = $-272.22°S^{-1}$

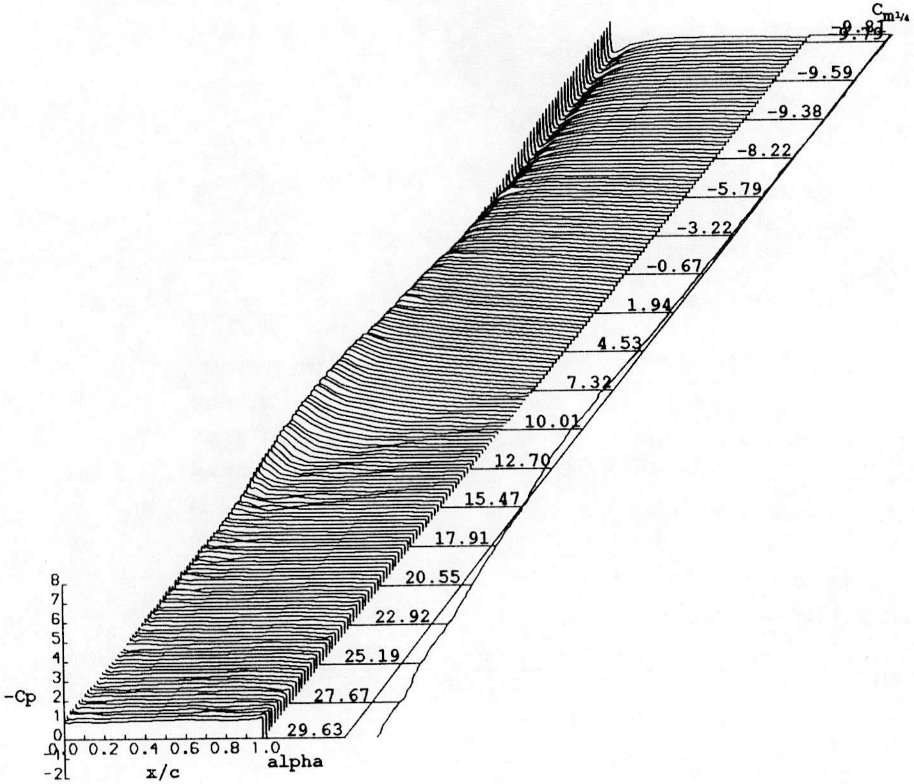


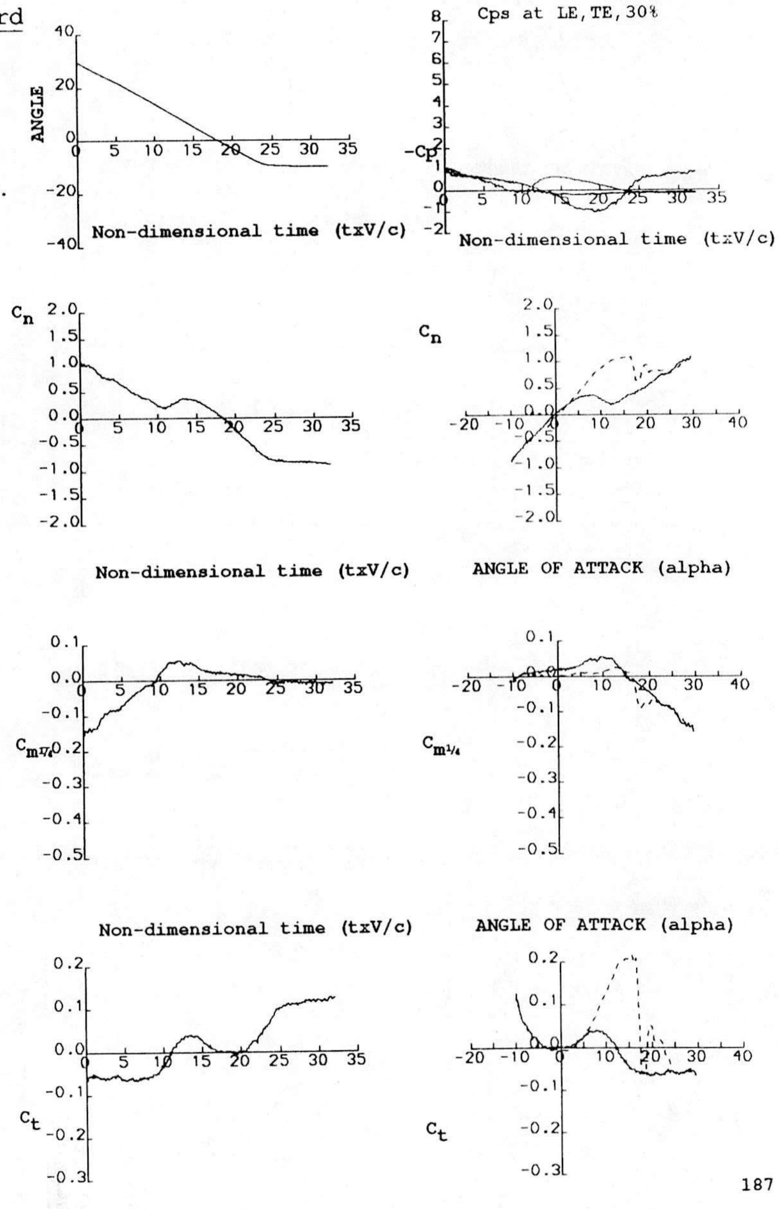


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31871
REYNOLDS NUMBER = 895134.
DYNAMIC PRESSURE = 1511.09 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91
MACH NUMBER = 0.148
AIR TEMPERATURE = 26.2°C
SAMPLING FREQUENCY = 5917.00 Hz.
REDUCED PITCH RATE = -0.01458
LINEAR PITCH RATE = -311.35°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31881

REYNOLDS NUMBER = 882844.

DYNAMIC PRESSURE = 1486.28 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

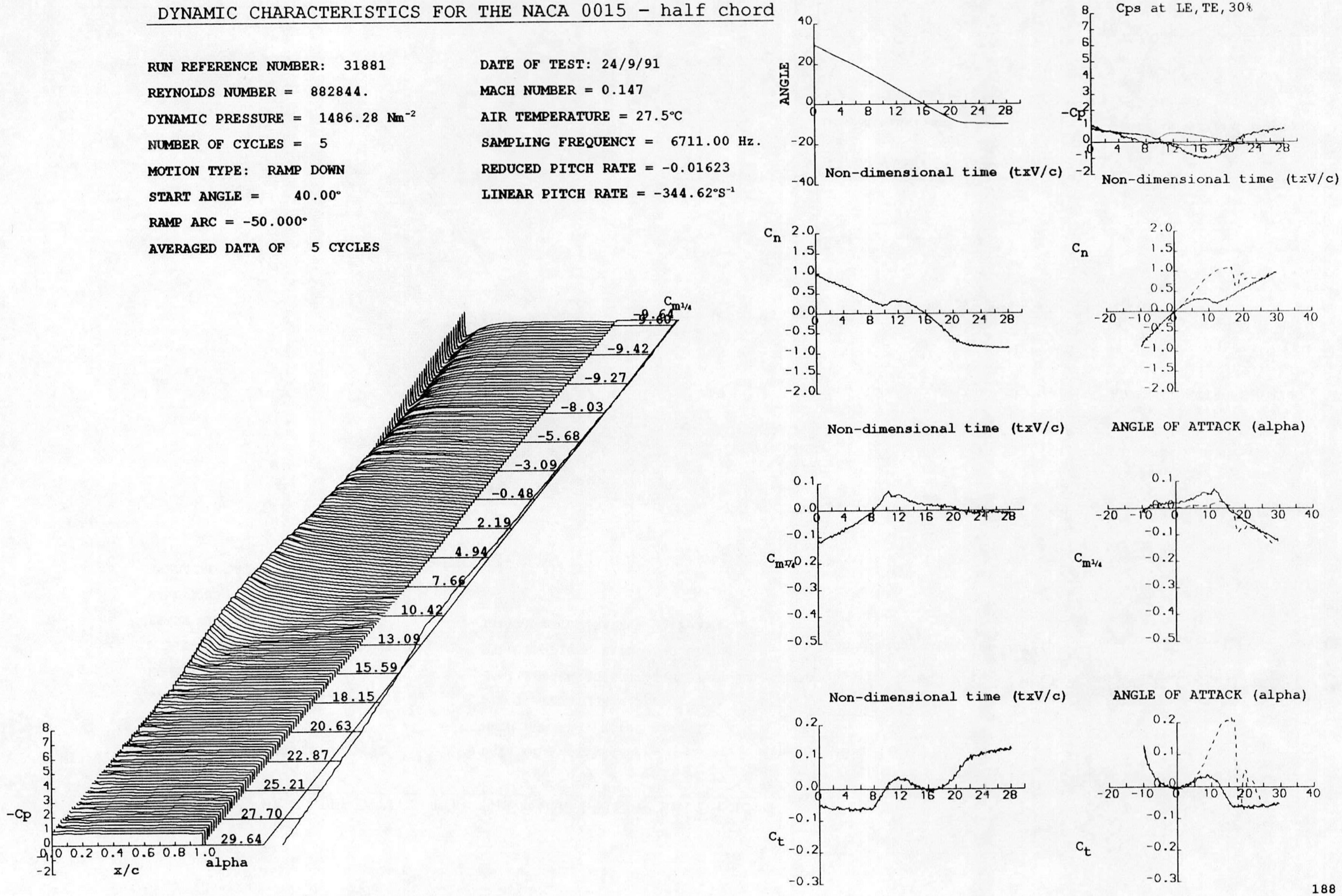
MACH NUMBER = 0.147

AIR TEMPERATURE = 27.5°C

SAMPLING FREQUENCY = 6711.00 Hz.

REDUCED PITCH RATE = -0.01623

LINEAR PITCH RATE = $-344.62°S^{-1}$



DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31891

REYNOLDS NUMBER = 872547.

DYNAMIC PRESSURE = 1462.97 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

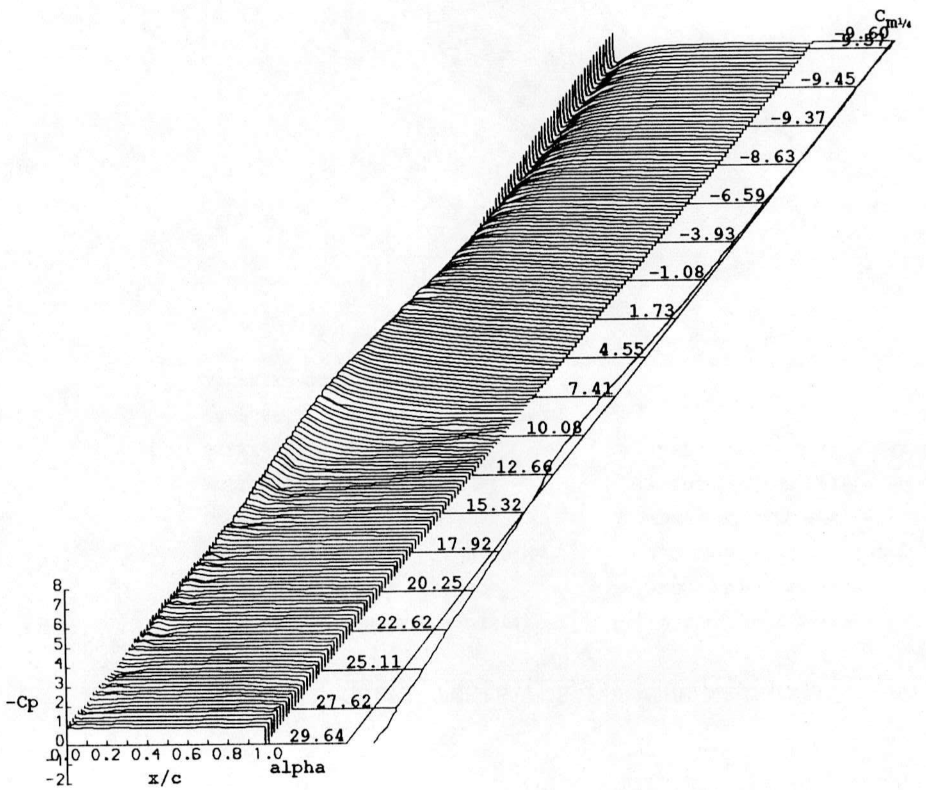
MACH NUMBER = 0.145

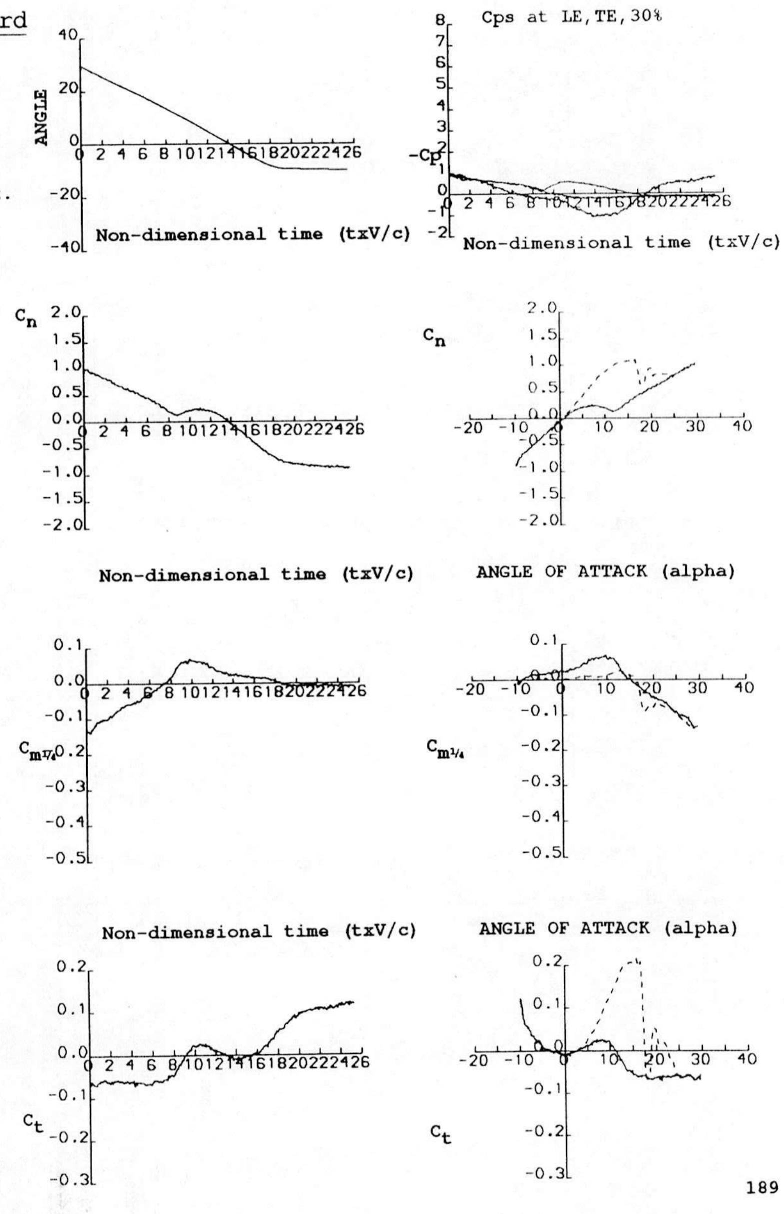
AIR TEMPERATURE = 28.4°C

SAMPLING FREQUENCY = 7407.00 Hz.

REDUCED PITCH RATE = -0.01798

LINEAR PITCH RATE = -379.18°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31901

REYNOLDS NUMBER = 881993.

DYNAMIC PRESSURE = 1507.53 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

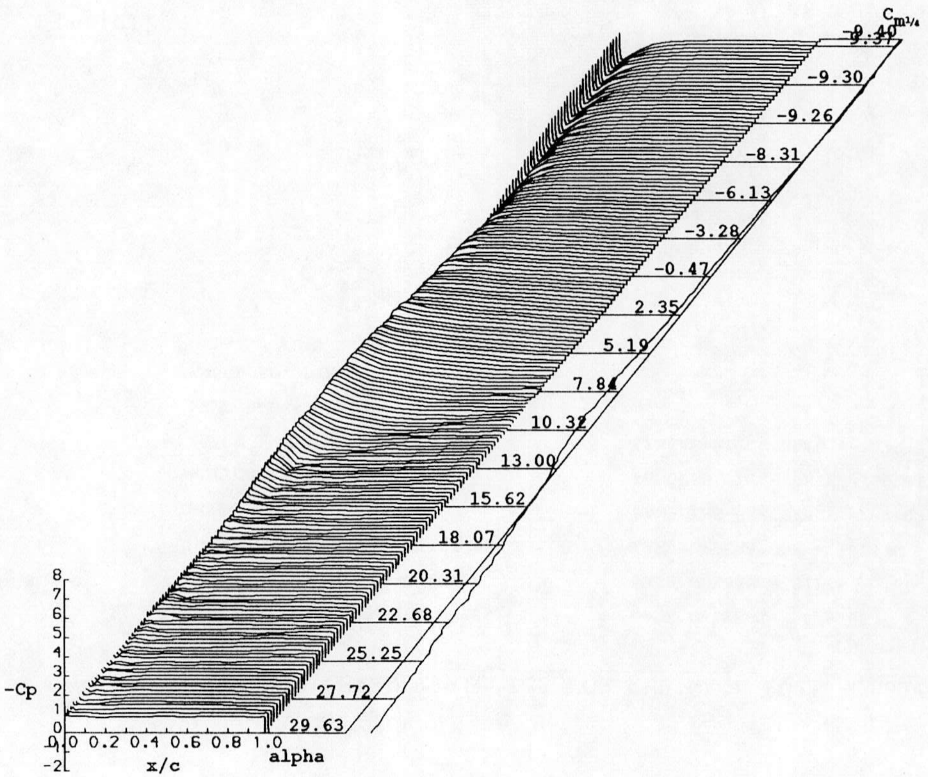
MACH NUMBER = 0.148

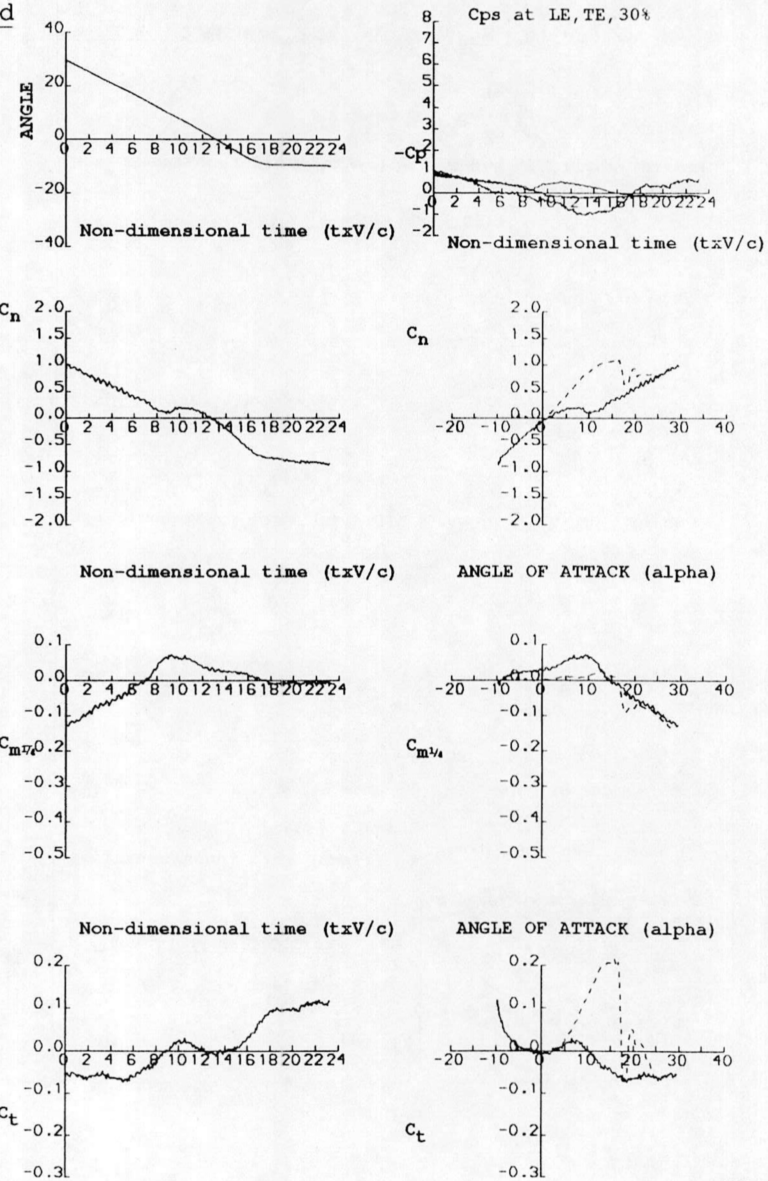
AIR TEMPERATURE = 29.4°C

SAMPLING FREQUENCY = 8219.00 Hz.

REDUCED PITCH RATE = -0.01917

LINEAR PITCH RATE = -411.28°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31911

REYNOLDS NUMBER = 864072.

DYNAMIC PRESSURE = 1456.69 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

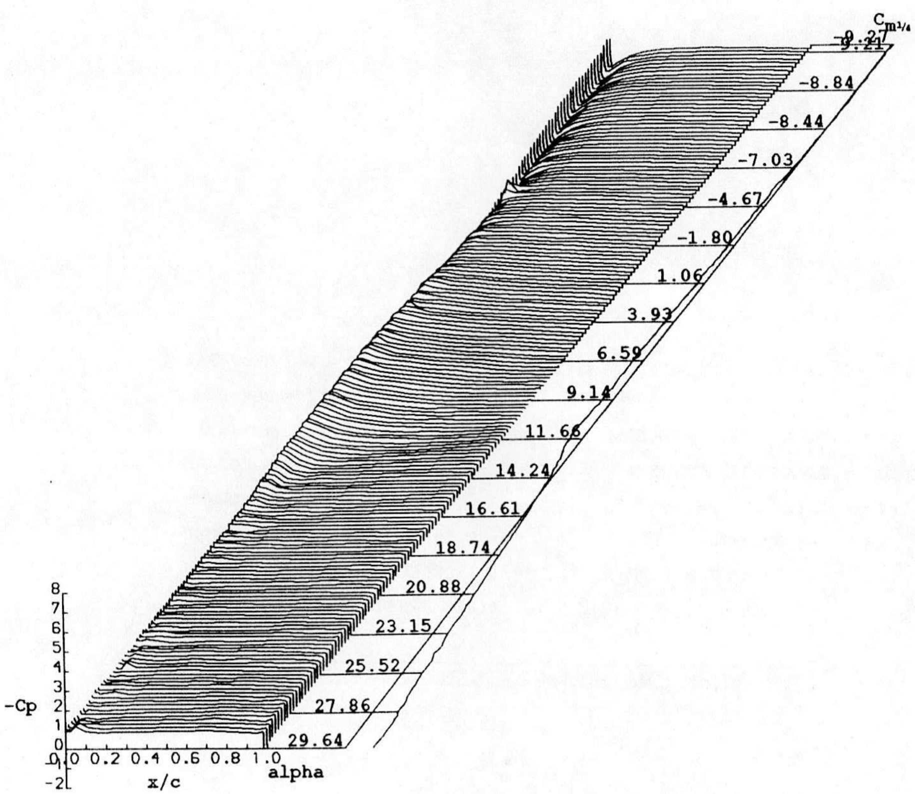
MACH NUMBER = 0.145

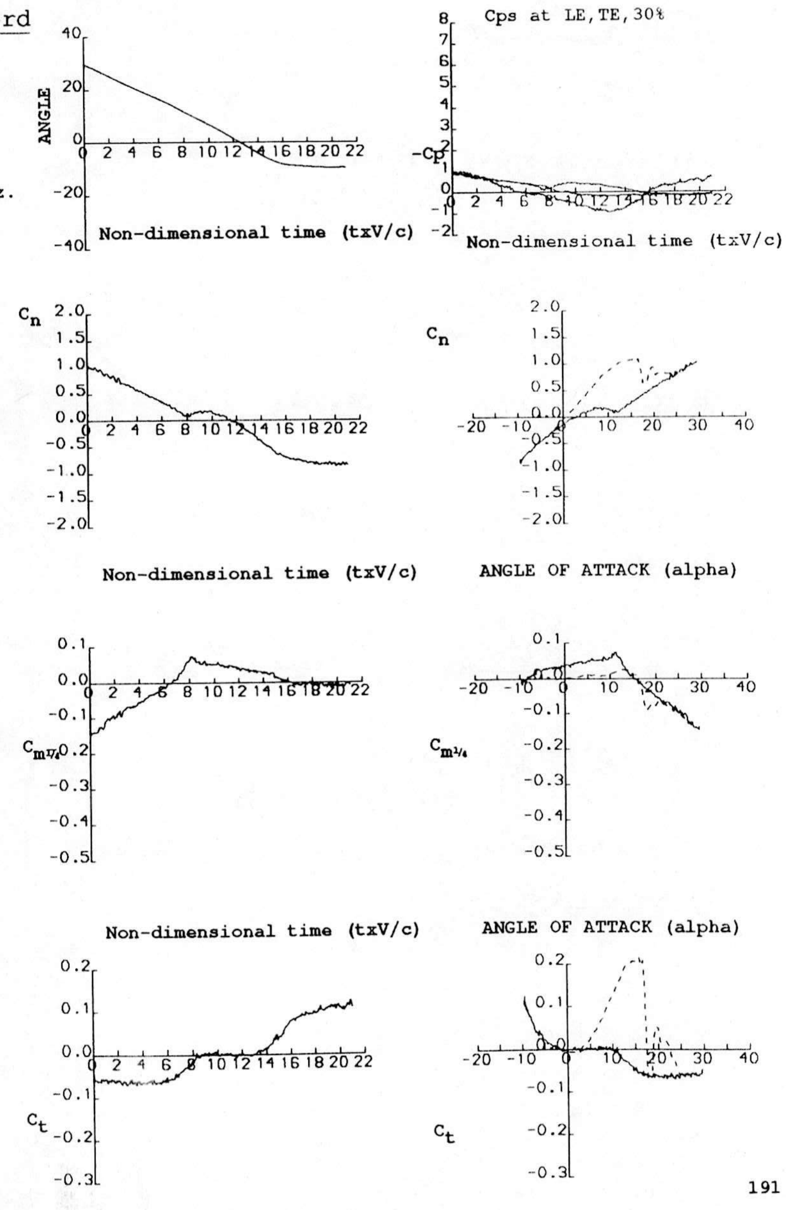
AIR TEMPERATURE = 30.2°C

SAMPLING FREQUENCY = 8928.00 Hz.

REDUCED PITCH RATE = -0.01989

LINEAR PITCH RATE = -419.95°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31921

REYNOLDS NUMBER = 878371.

DYNAMIC PRESSURE = 1483.32 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

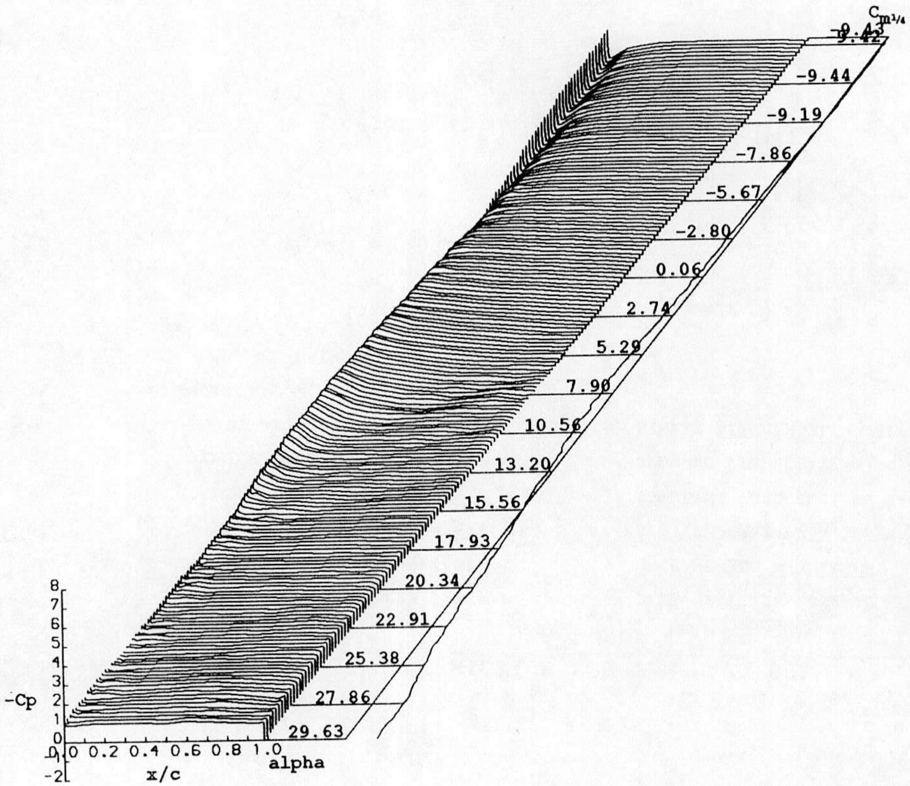
MACH NUMBER = 0.146

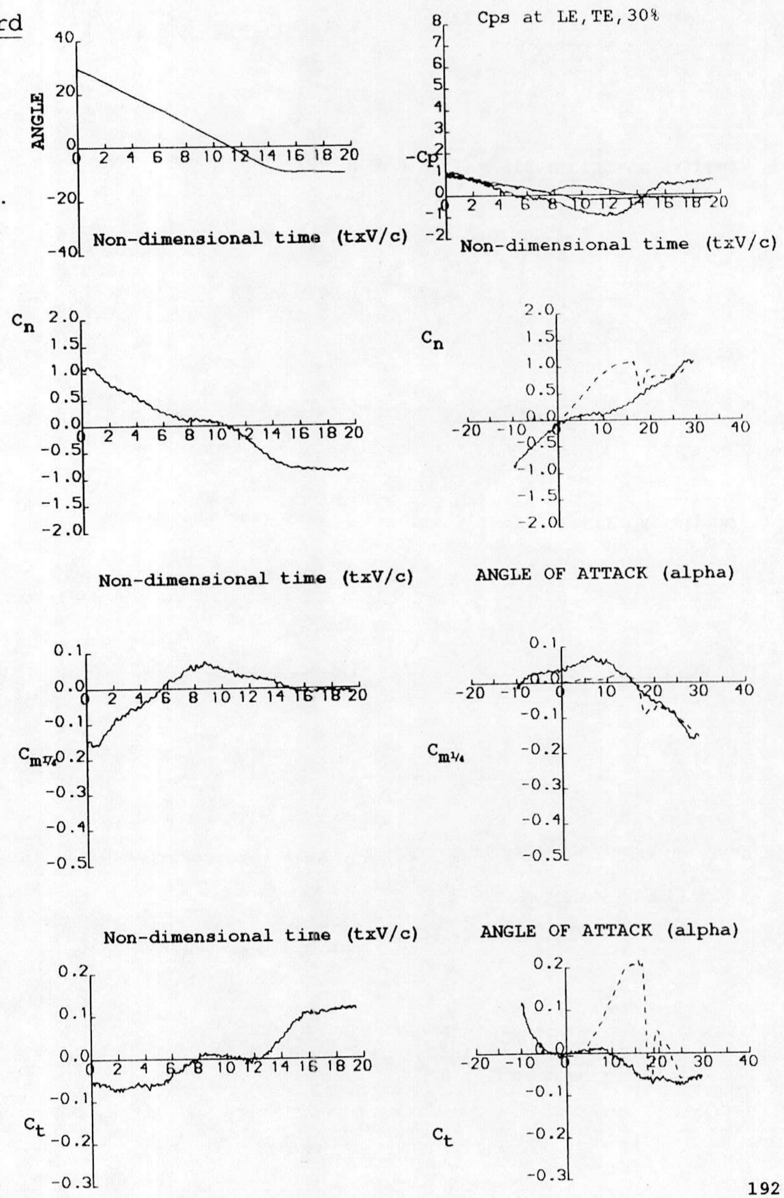
AIR TEMPERATURE = 28.5°C

SAMPLING FREQUENCY = 9708.00 Hz.

REDUCED PITCH RATE = -0.02251

LINEAR PITCH RATE = -478.08°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31931

REYNOLDS NUMBER = 889282.

DYNAMIC PRESSURE = 1541.11 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

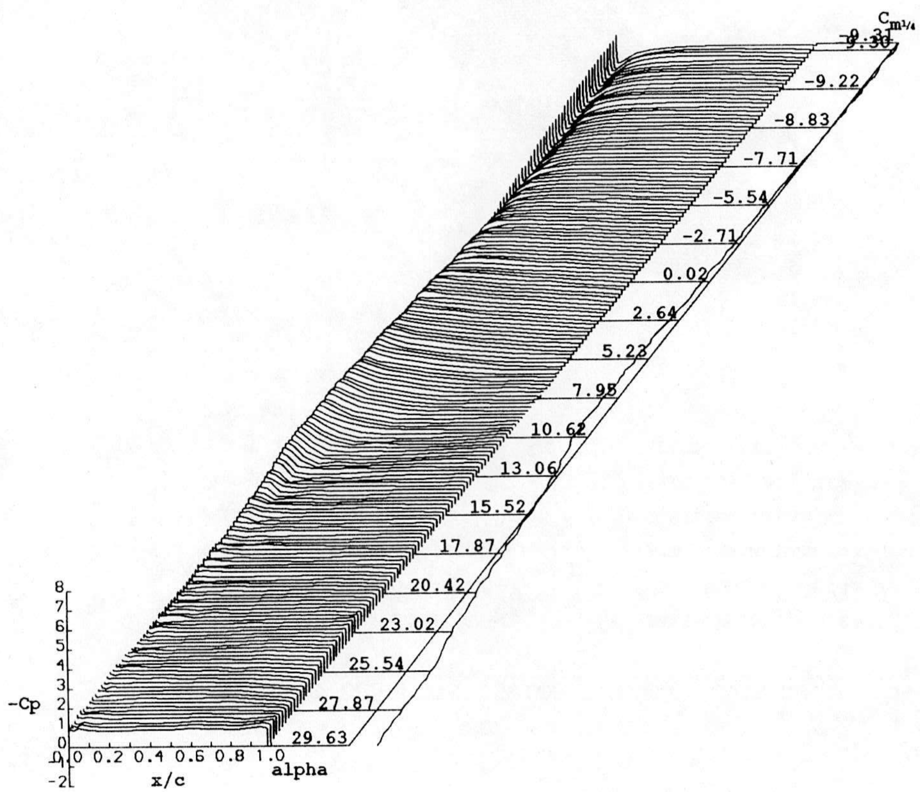
MACH NUMBER = 0.149

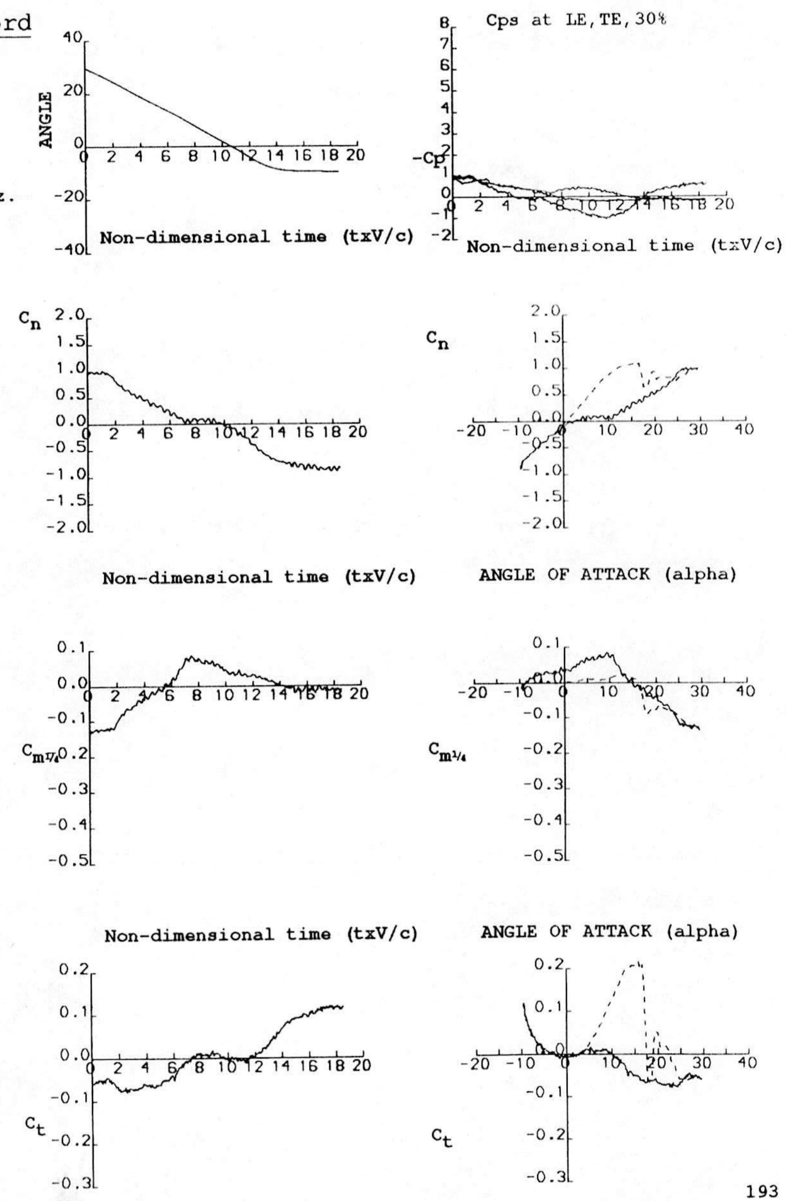
AIR TEMPERATURE = 30.1°C

SAMPLING FREQUENCY = 10410.00 Hz.

REDUCED PITCH RATE = -0.02352

LINEAR PITCH RATE = -510.49°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31941

REYNOLDS NUMBER = 868982.

DYNAMIC PRESSURE = 1483.99 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91

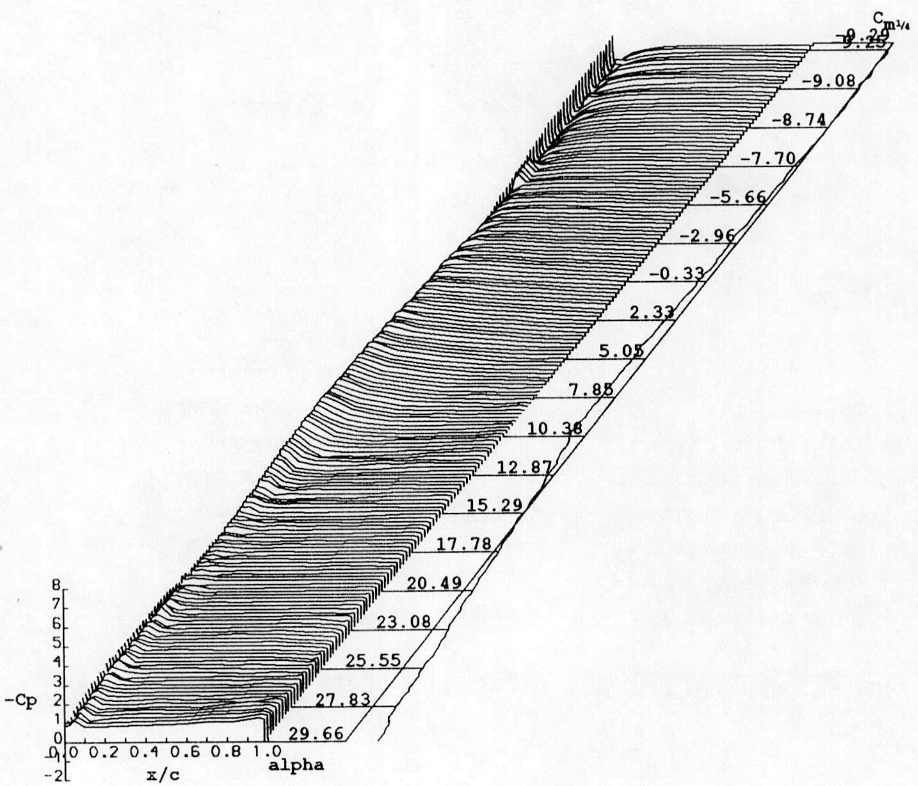
MACH NUMBER = 0.146

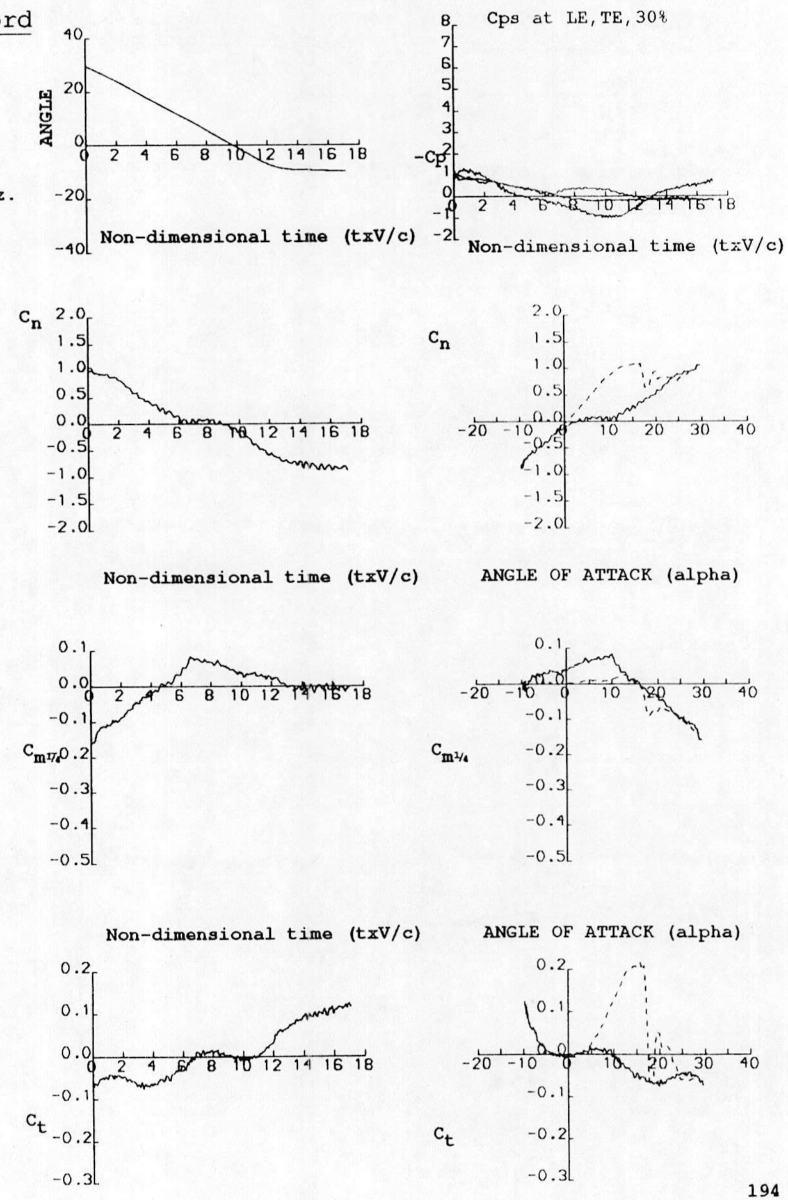
AIR TEMPERATURE = 31.1°C

SAMPLING FREQUENCY = 11110.00 Hz.

REDUCED PITCH RATE = -0.02619

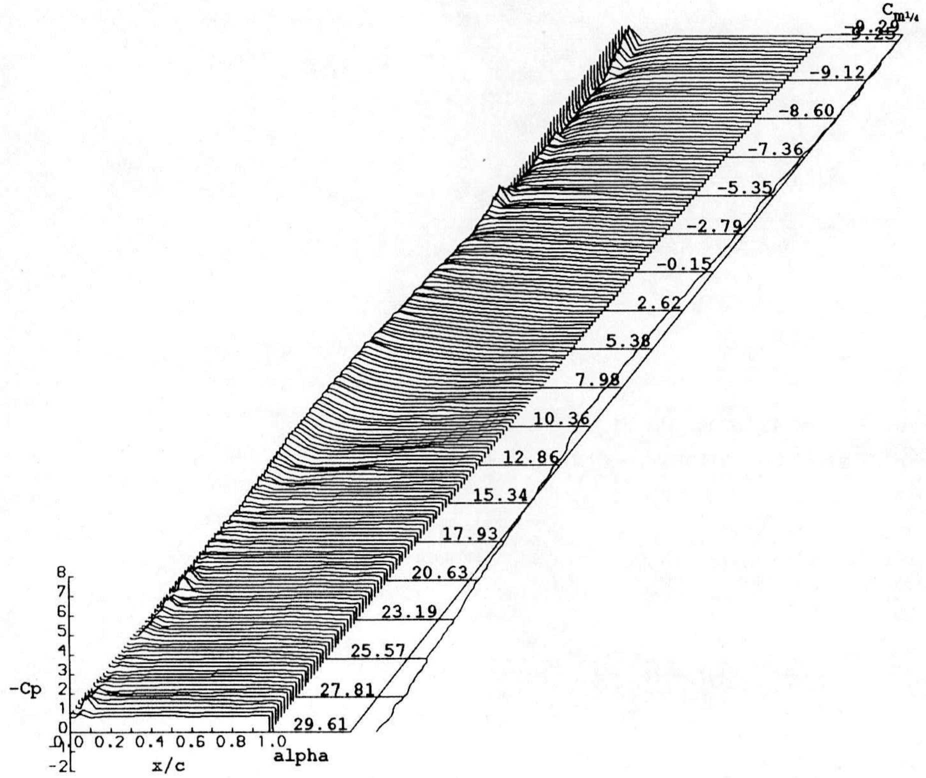
LINEAR PITCH RATE = -558.83°S^{-1}

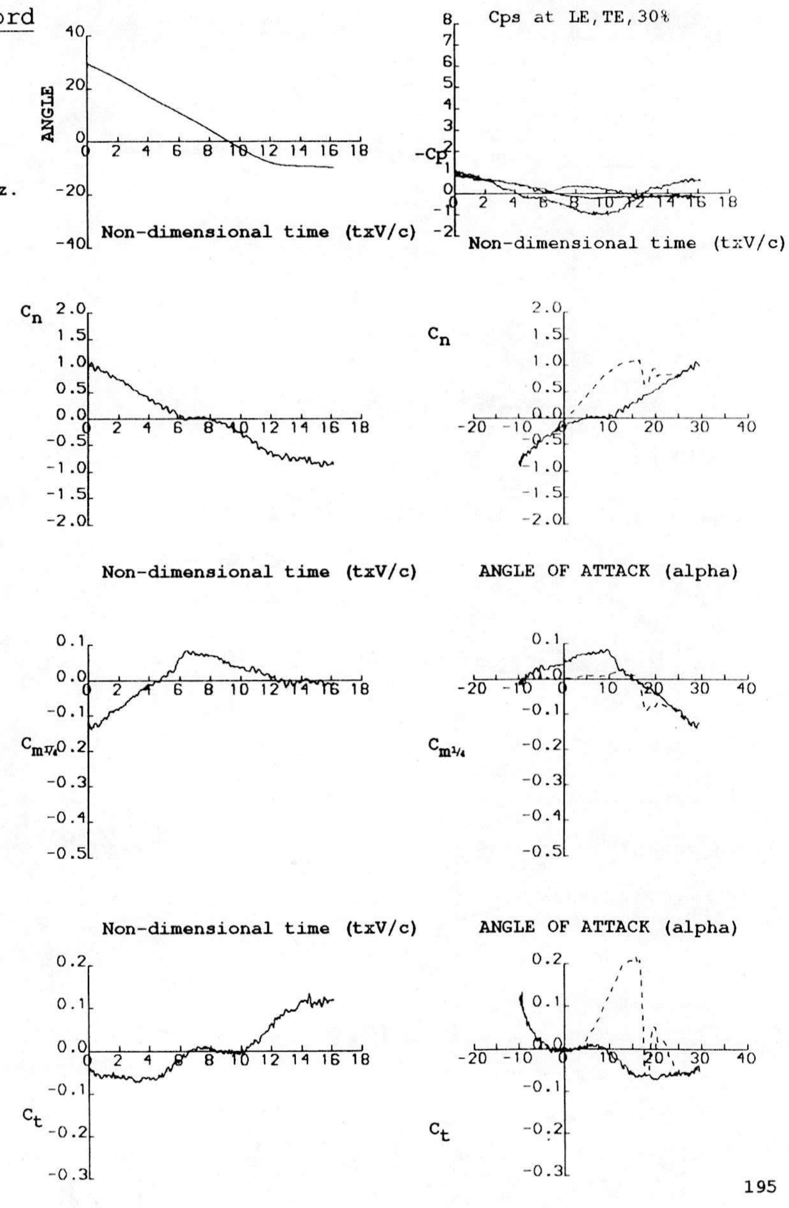




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31951	DATE OF TEST: 24/9/91
REYNOLDS NUMBER = 877780.	MACH NUMBER = 0.148
DYNAMIC PRESSURE = 1521.84 Nm^{-2}	AIR TEMPERATURE = 31.7°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 11900.00 Hz.
MOTION TYPE: RAMP DOWN	REDUCED PITCH RATE = -0.02809
START ANGLE = 40.00°	LINEAR PITCH RATE = -607.65°S^{-1}
RAMP ARC = -50.000°	
AVERAGED DATA OF 5 CYCLES	

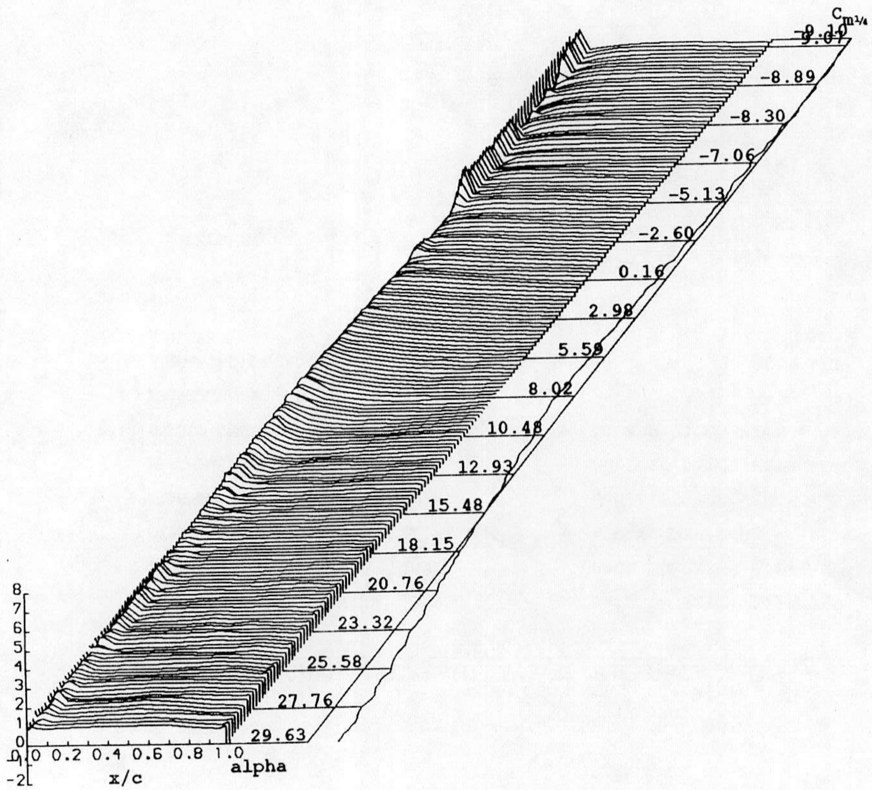


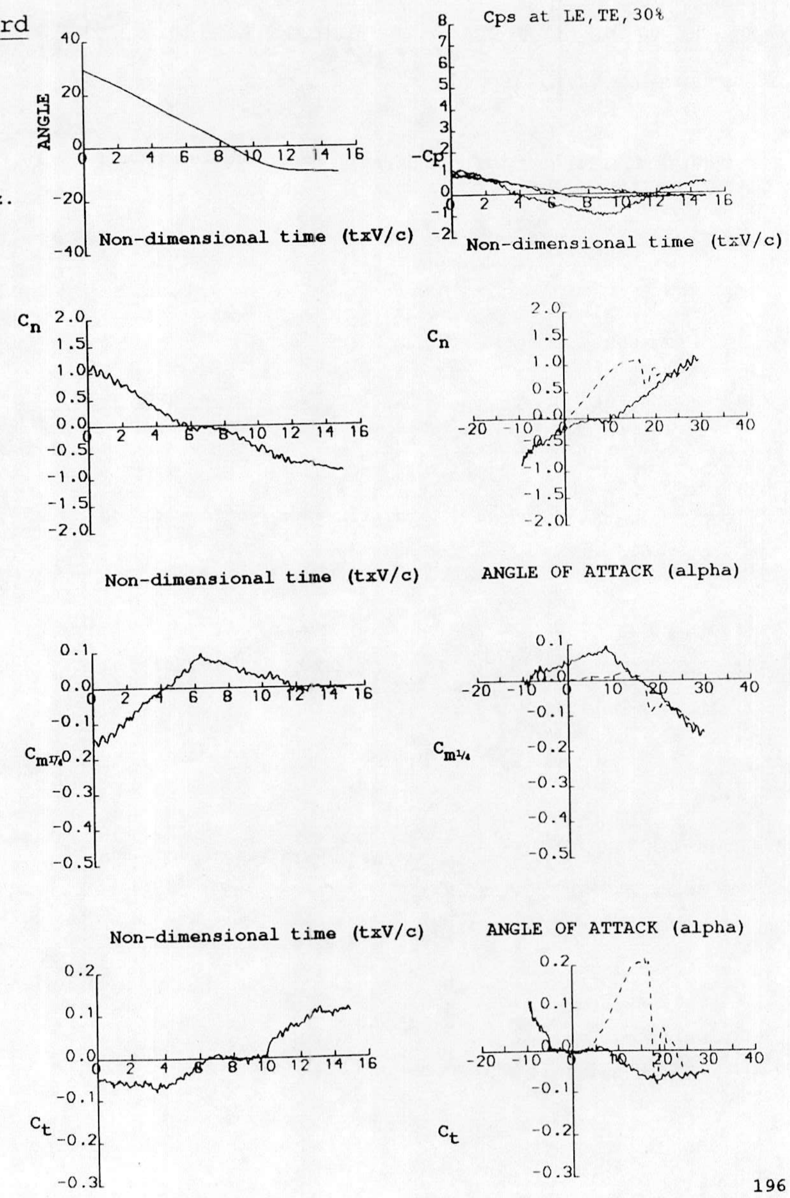


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 31961
REYNOLDS NUMBER = 865024.
DYNAMIC PRESSURE = 1487.85 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 24/9/91
MACH NUMBER = 0.147
AIR TEMPERATURE = 32.5°C
SAMPLING FREQUENCY = 12760.00 Hz.
REDUCED PITCH RATE = -0.03058
LINEAR PITCH RATE = -654.93°S^{-1}

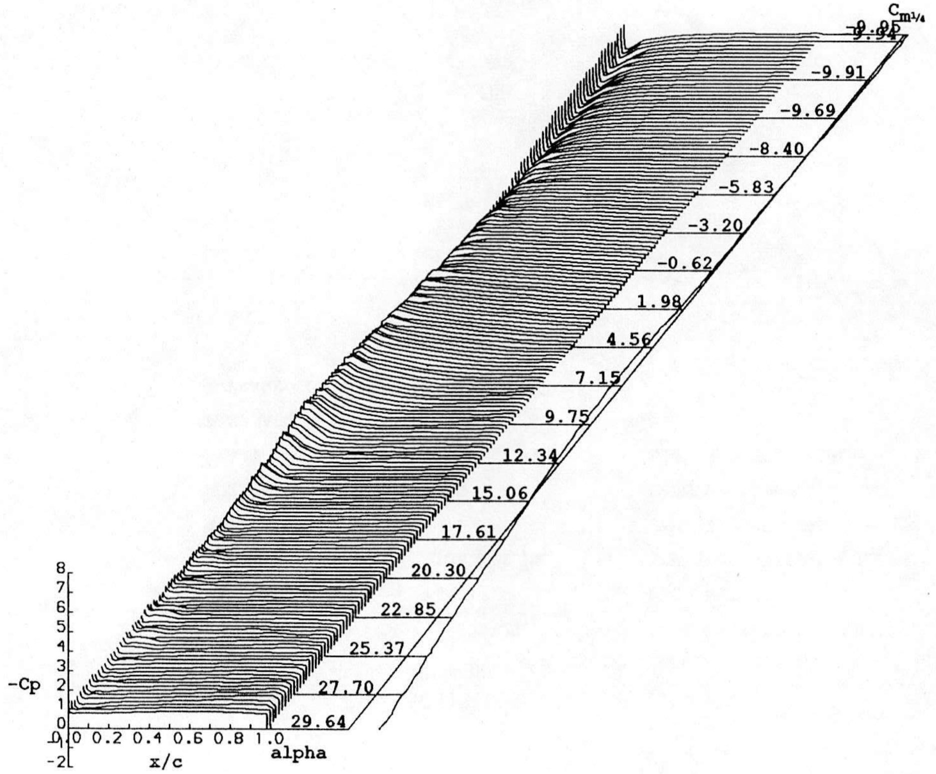


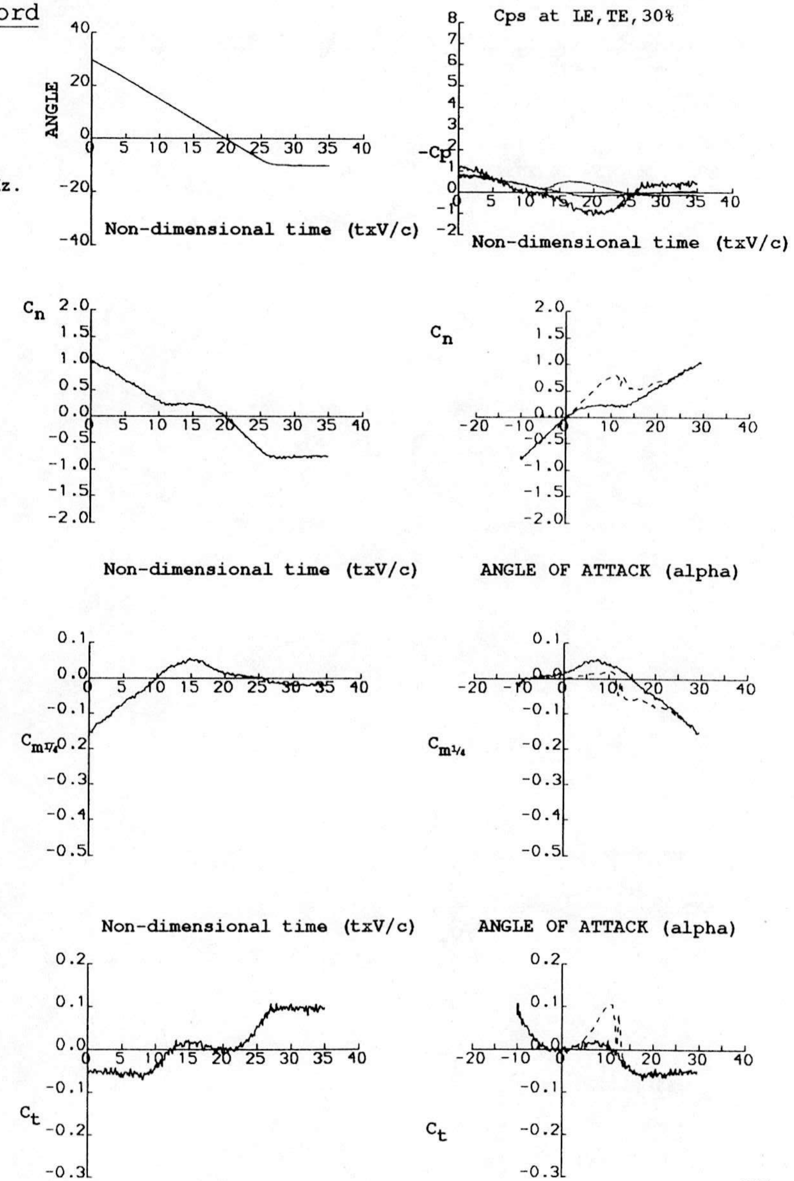


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832111
REYNOLDS NUMBER = 749832.
DYNAMIC PRESSURE = 1013.10 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91
MACH NUMBER = 0.121
AIR TEMPERATURE = 21.2°C
SAMPLING FREQUENCY = 4405.00 Hz.
REDUCED PITCH RATE = -0.01344
LINEAR PITCH RATE = $-232.79°S^{-1}$

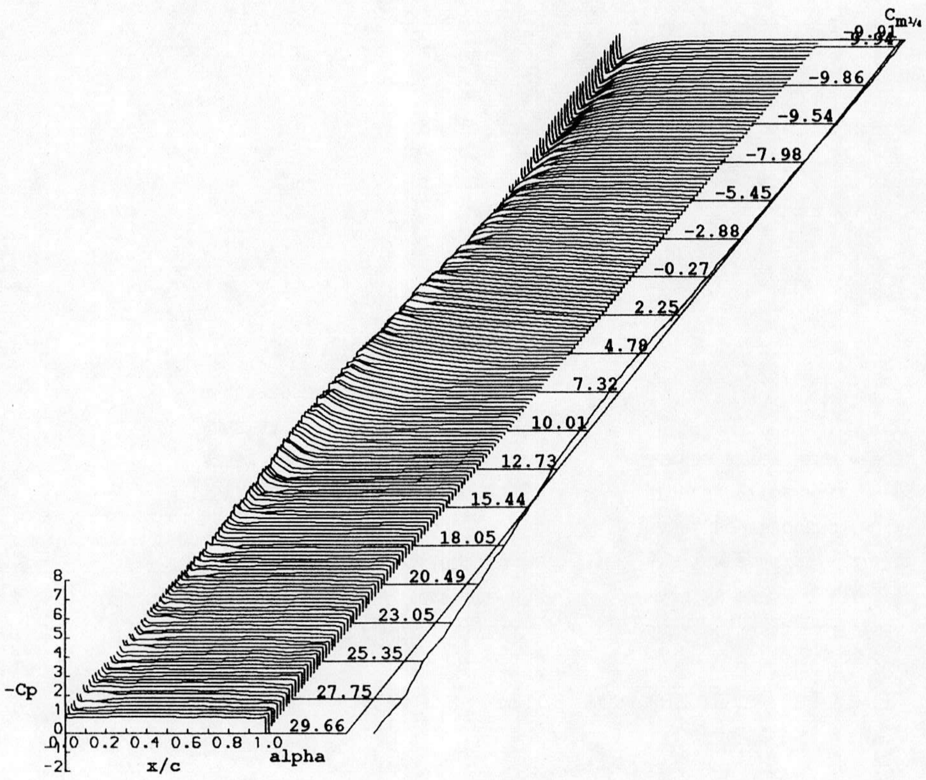


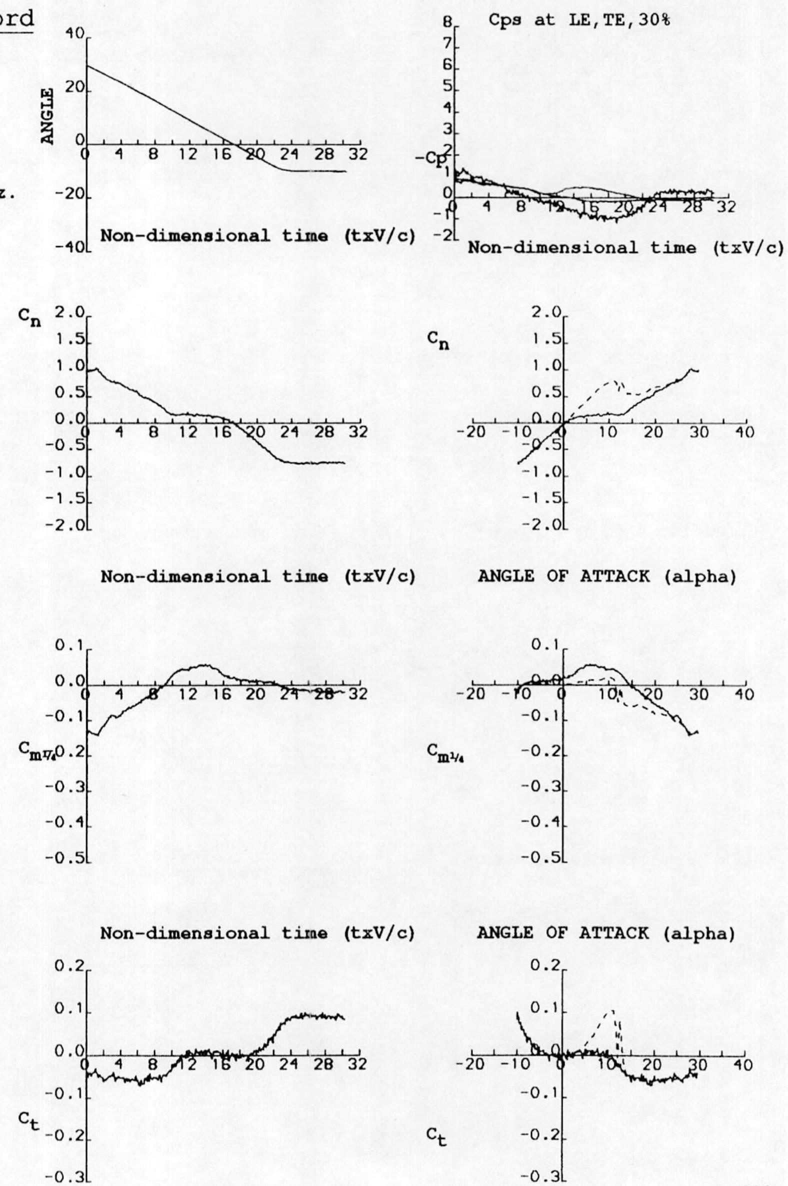


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832121
REYNOLDS NUMBER = 765610.
DYNAMIC PRESSURE = 1061.72 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 21.8°C
SAMPLING FREQUENCY = 5208.00 Hz.
REDUCED PITCH RATE = -0.01540
LINEAR PITCH RATE = -273.41°S^{-1}

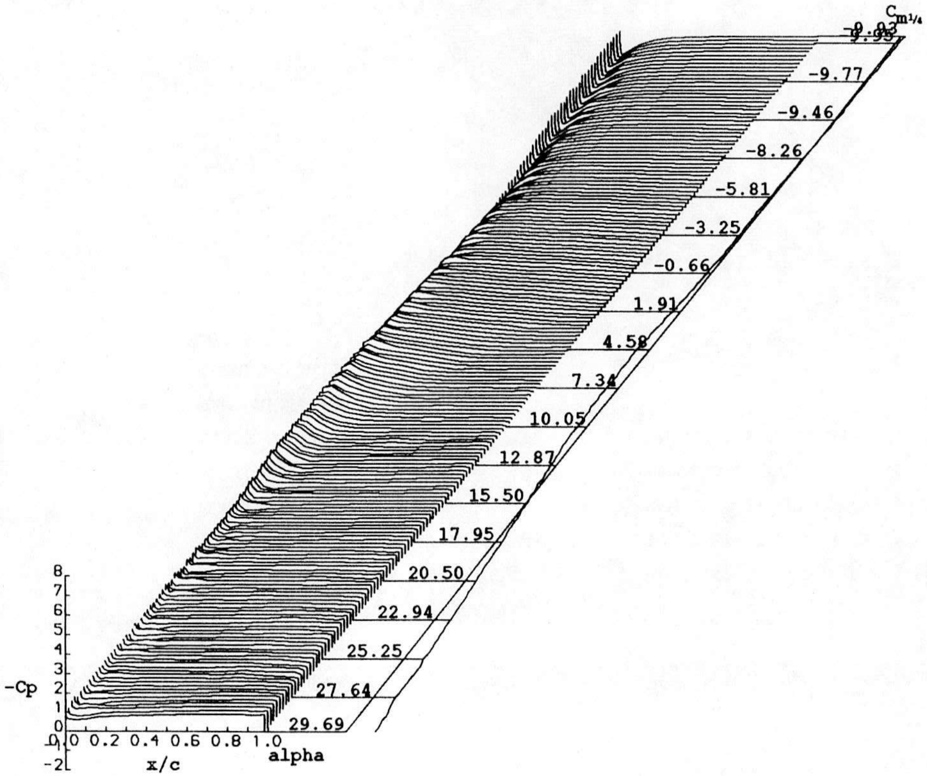


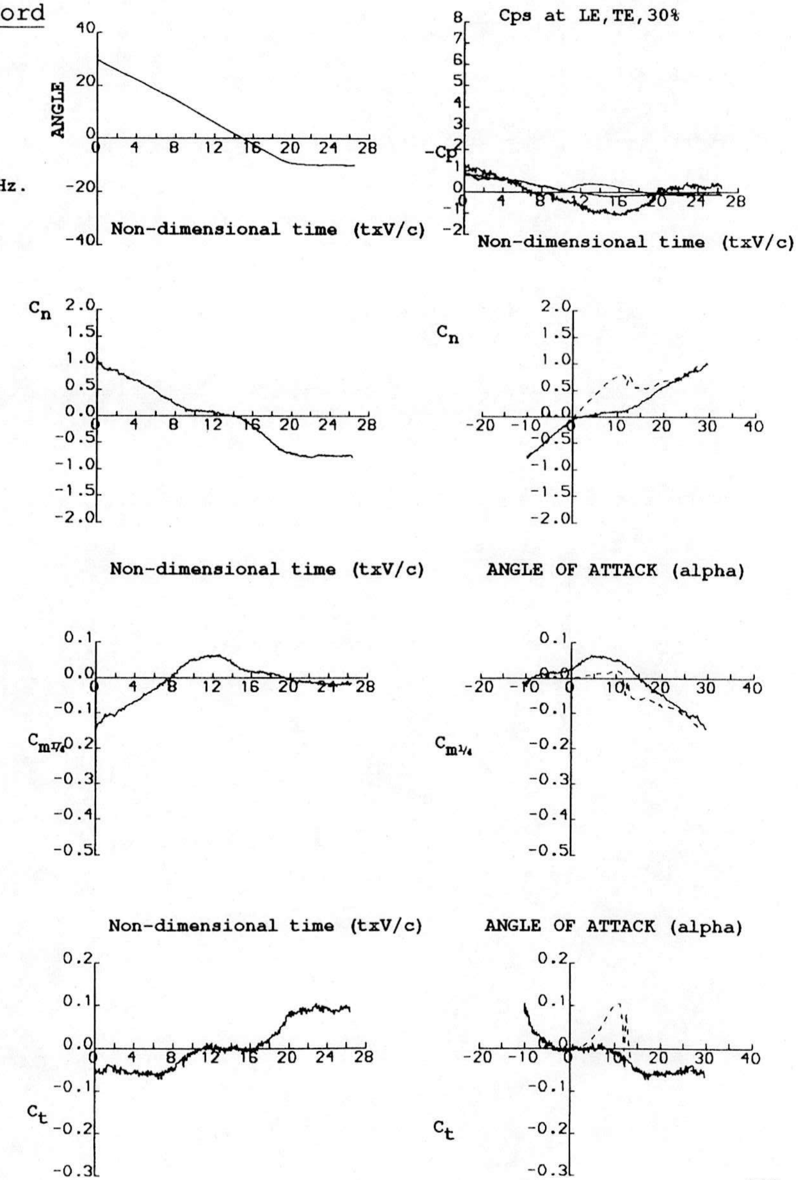


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832131
REYNOLDS NUMBER = 755488.
DYNAMIC PRESSURE = 1037.44 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = −50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91
MACH NUMBER = 0.122
AIR TEMPERATURE = 22.2°C
SAMPLING FREQUENCY = 5917.00 Hz.
REDUCED PITCH RATE = -0.01761
LINEAR PITCH RATE = $-309.15°S^{-1}$





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832141

REYNOLDS NUMBER = 744474.

DYNAMIC PRESSURE = 1011.79 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91

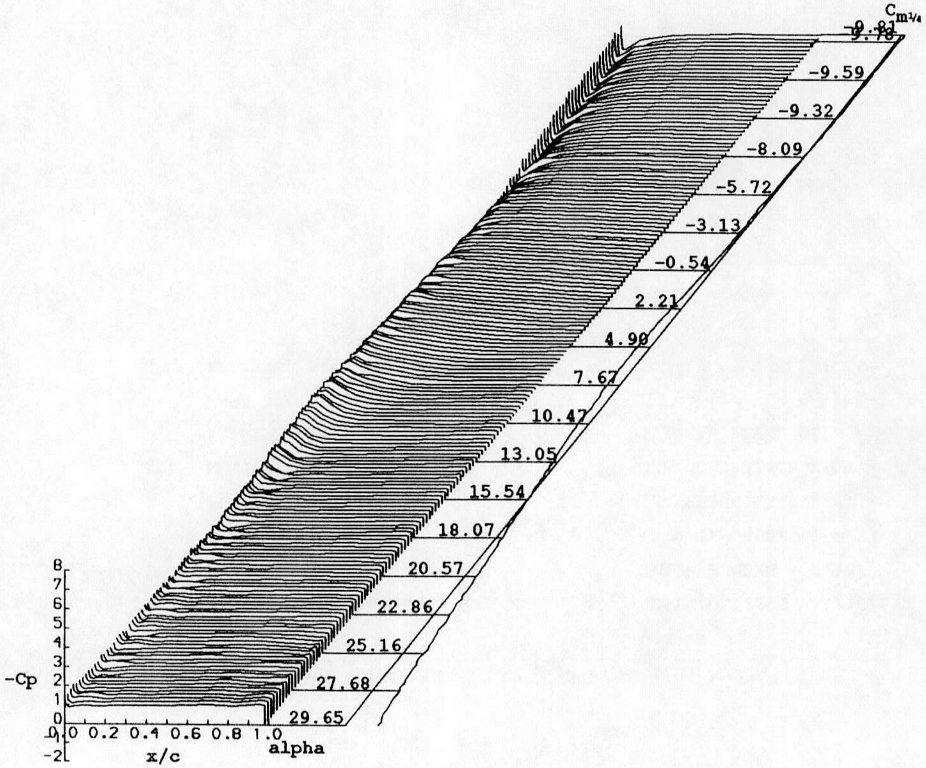
MACH NUMBER = 0.121

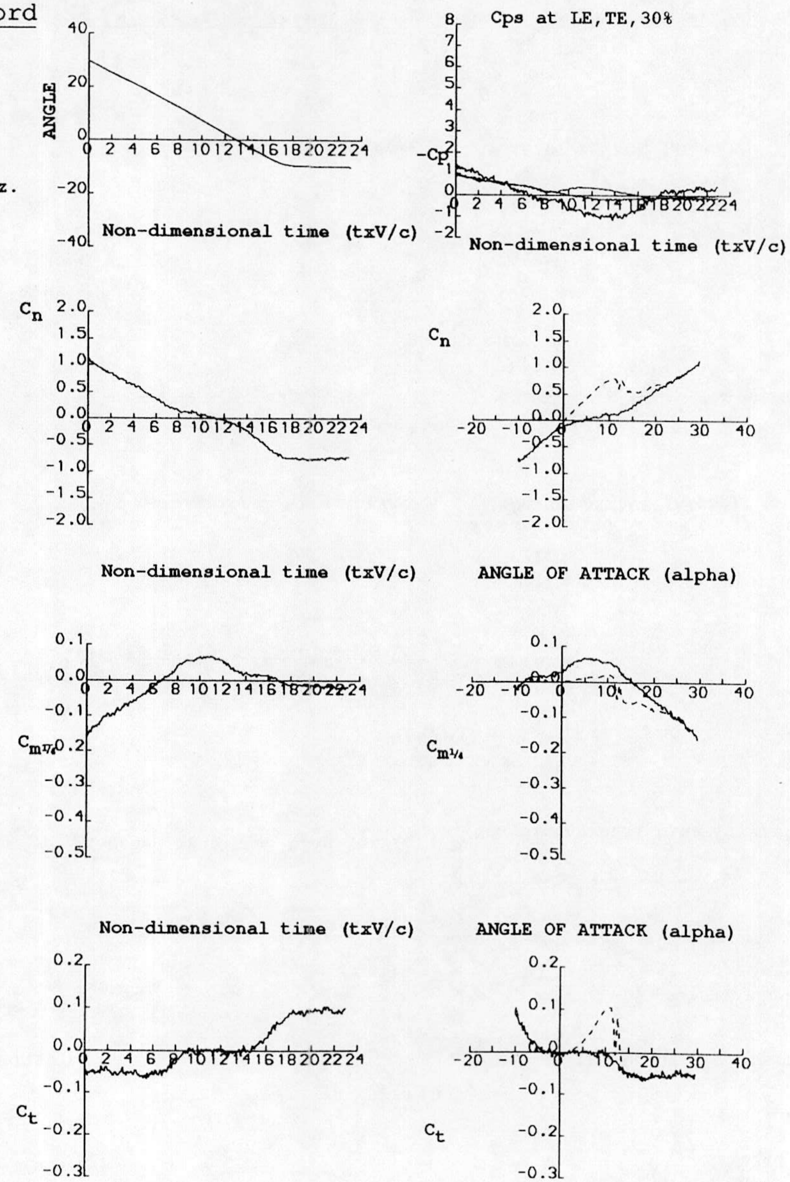
AIR TEMPERATURE = 22.7°C

SAMPLING FREQUENCY = 6711.00 Hz.

REDUCED PITCH RATE = -0.01970

LINEAR PITCH RATE = -341.85°S^{-1}

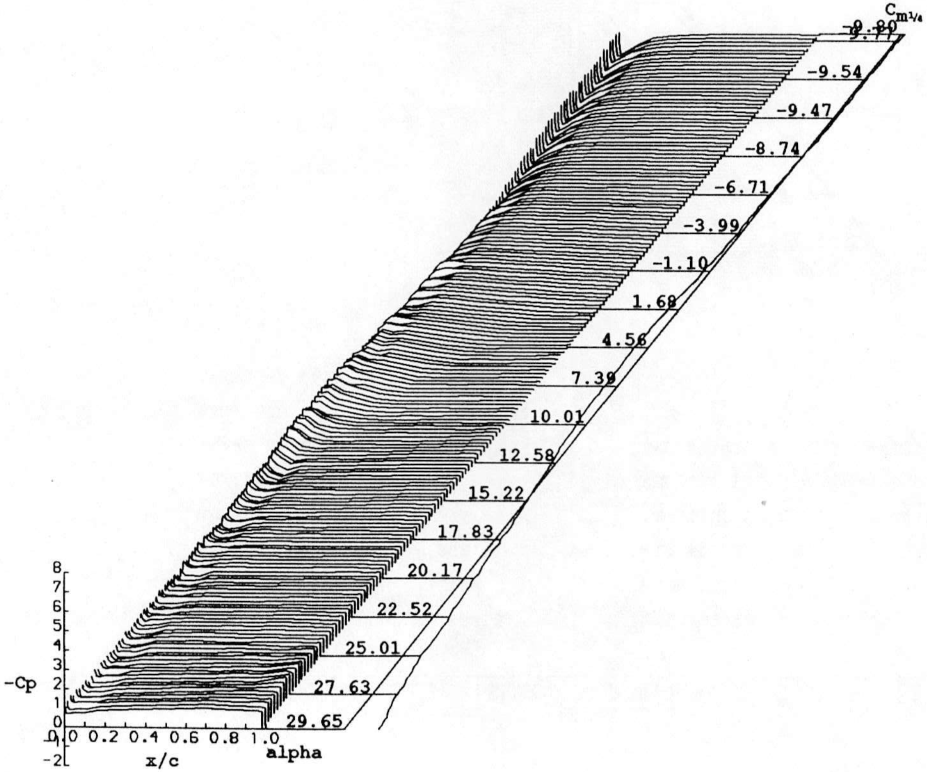


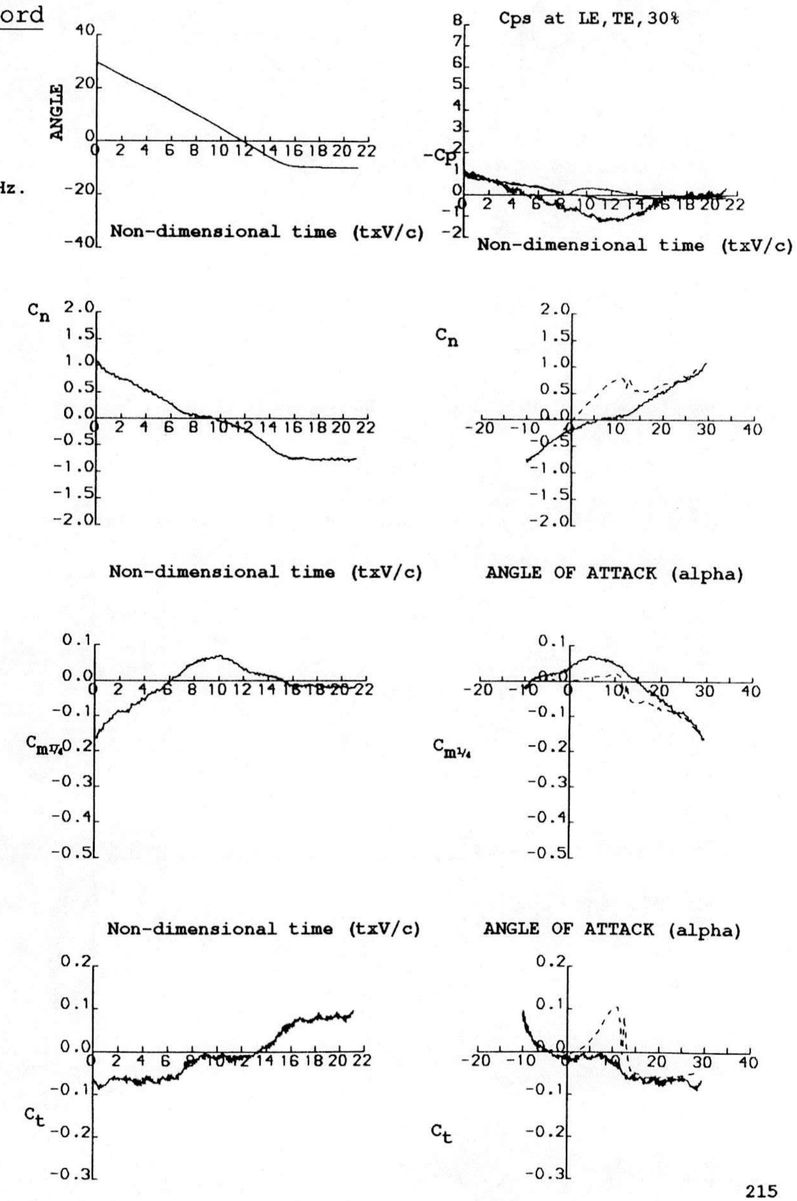


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832151
REYNOLDS NUMBER = 752410.
DYNAMIC PRESSURE = 1037.07 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

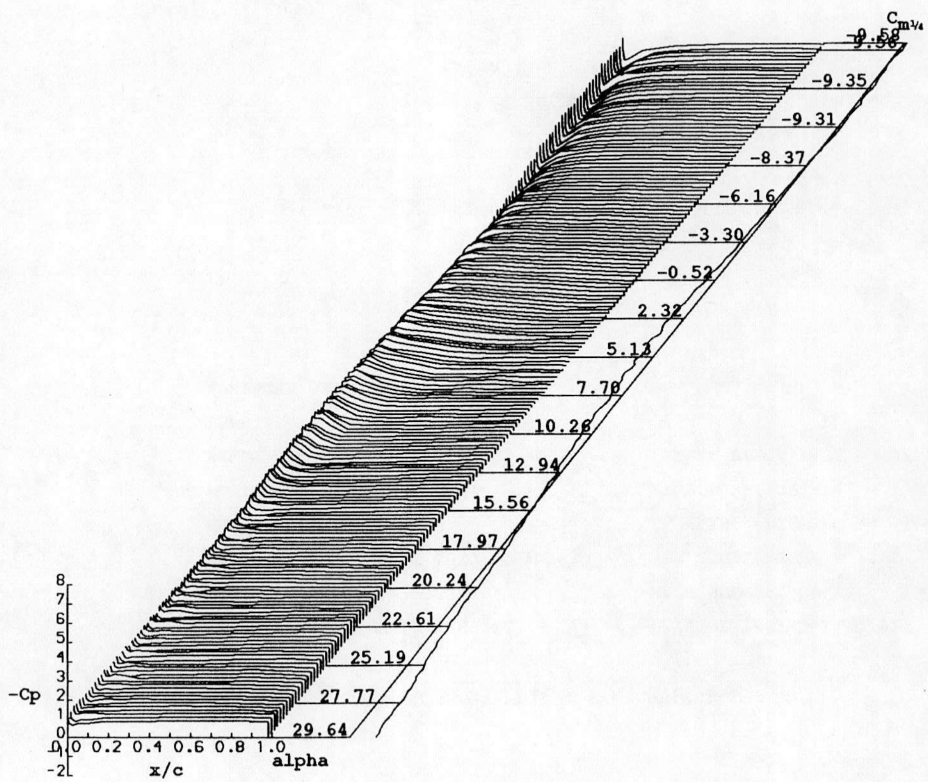
DATE OF TEST: 1/10/91
MACH NUMBER = 0.122
AIR TEMPERATURE = 23.1°C
SAMPLING FREQUENCY = 7407.00 Hz.
REDUCED PITCH RATE = -0.02145
LINEAR PITCH RATE = -377.17°S^{-1}

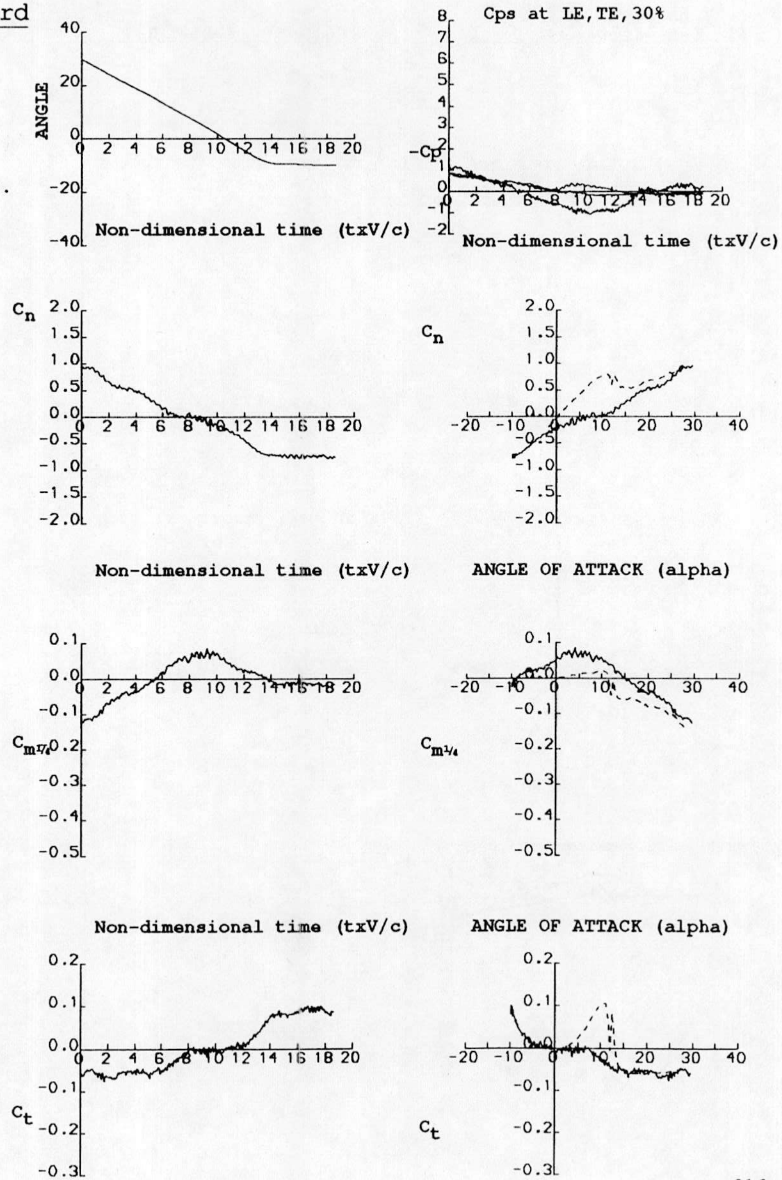




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832161	DATE OF TEST: 1/10/91
REYNOLDS NUMBER = 735189.	MACH NUMBER = 0.120
DYNAMIC PRESSURE = 992.71 Nm^{-2}	AIR TEMPERATURE = 23.4°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 8219.00 Hz.
MOTION TYPE: RAMP DOWN	REDUCED PITCH RATE = -0.02396
START ANGLE = 40.00°	LINEAR PITCH RATE = -412.35°S^{-1}
RAMP ARC = -50.000°	
AVERAGED DATA OF 5 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832171

REYNOLDS NUMBER = 746280.

DYNAMIC PRESSURE = 1026.43 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91

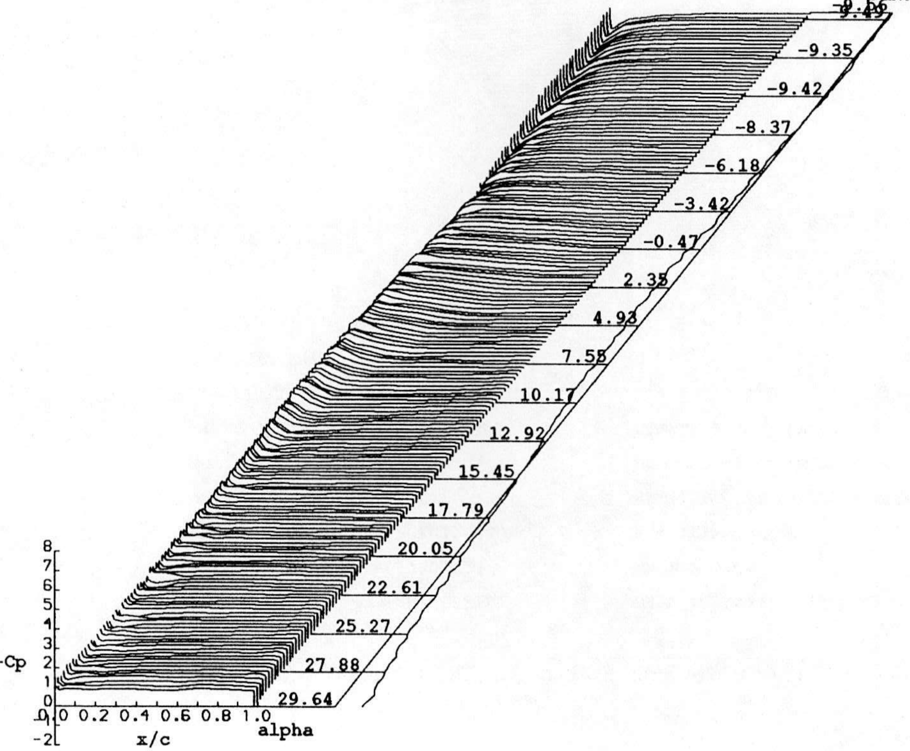
MACH NUMBER = 0.122

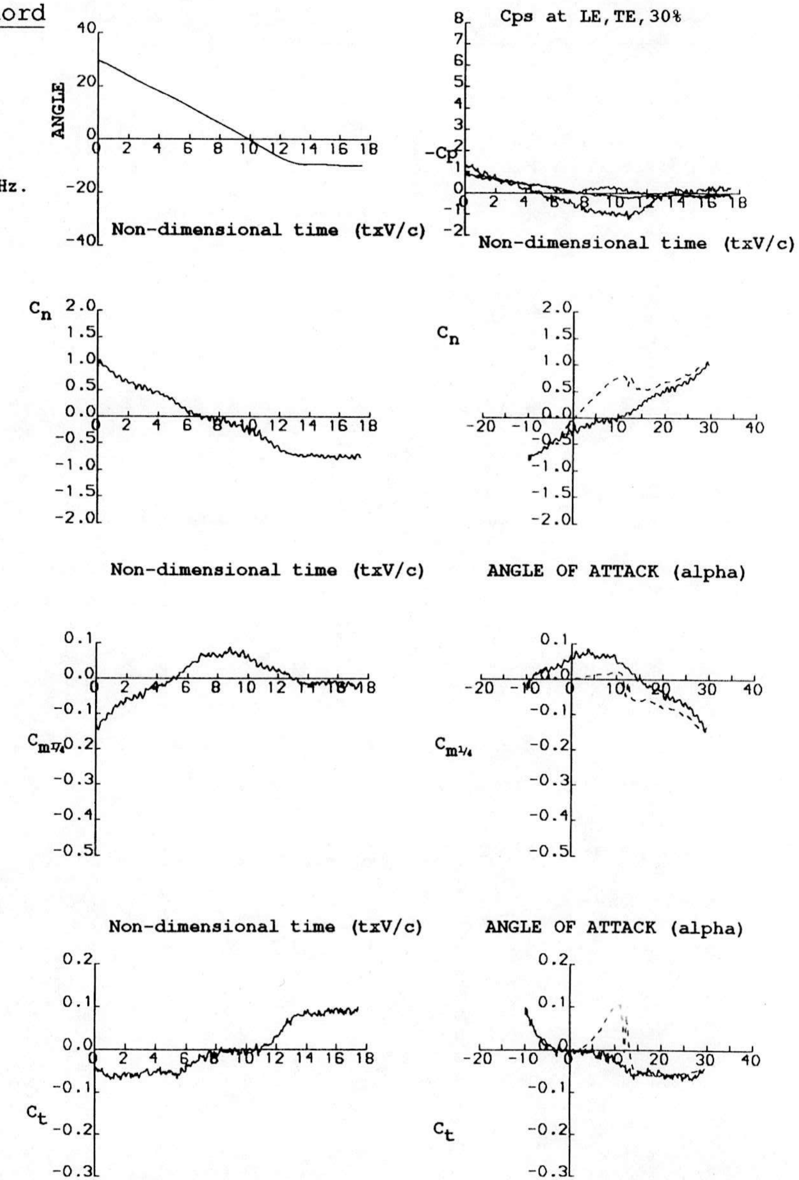
AIR TEMPERATURE = 23.8°C

SAMPLING FREQUENCY = 8928.00 Hz.

REDUCED PITCH RATE = -0.02515

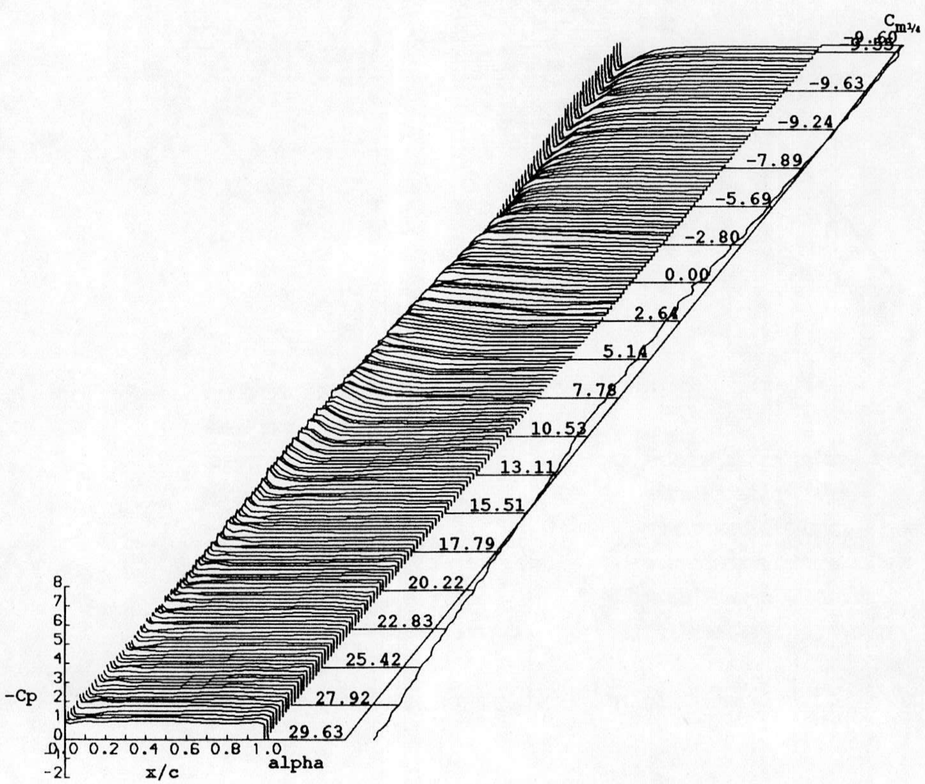
LINEAR PITCH RATE = -440.53°s^{-1}

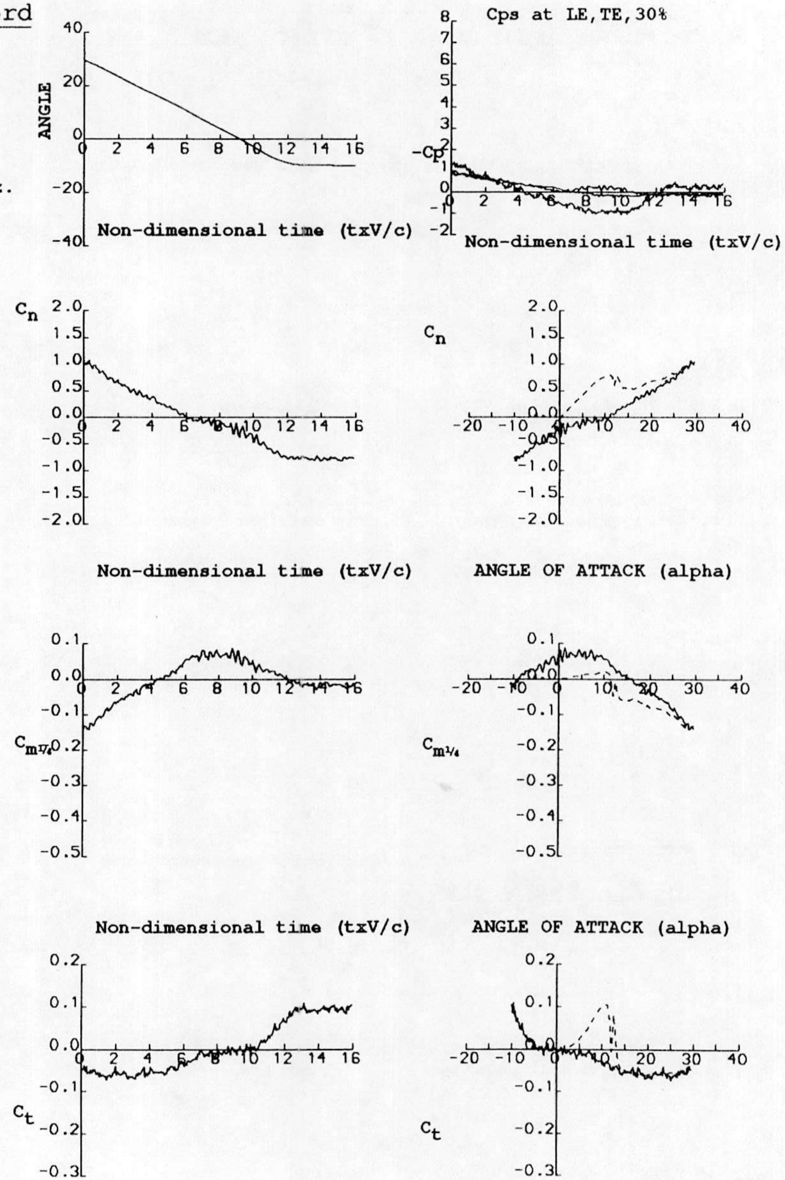




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832181	DATE OF TEST: 1/10/91
REYNOLDS NUMBER = 740172.	MACH NUMBER = 0.121
DYNAMIC PRESSURE = 1011.45 Nm^{-2}	AIR TEMPERATURE = 24.0°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 9708.00 Hz.
MOTION TYPE: RAMP DOWN	REDUCED PITCH RATE = -0.02721
START ANGLE = 40.00°	LINEAR PITCH RATE = -473.23°S^{-1}
RAMP ARC = -50.000°	
AVERAGED DATA OF 5 CYCLES	

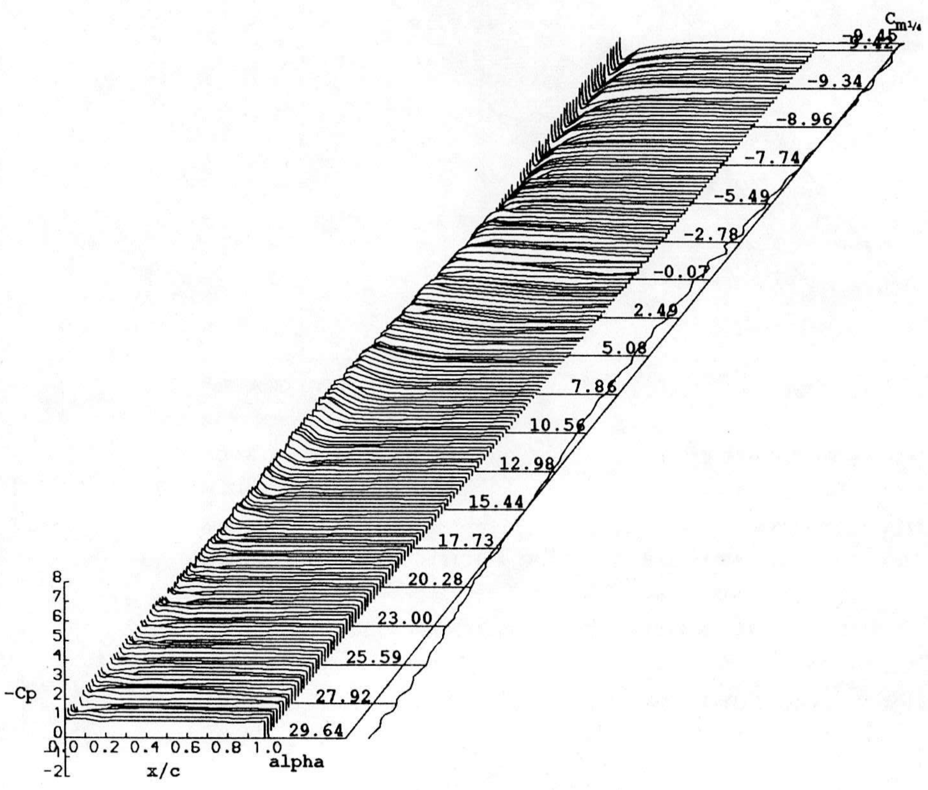


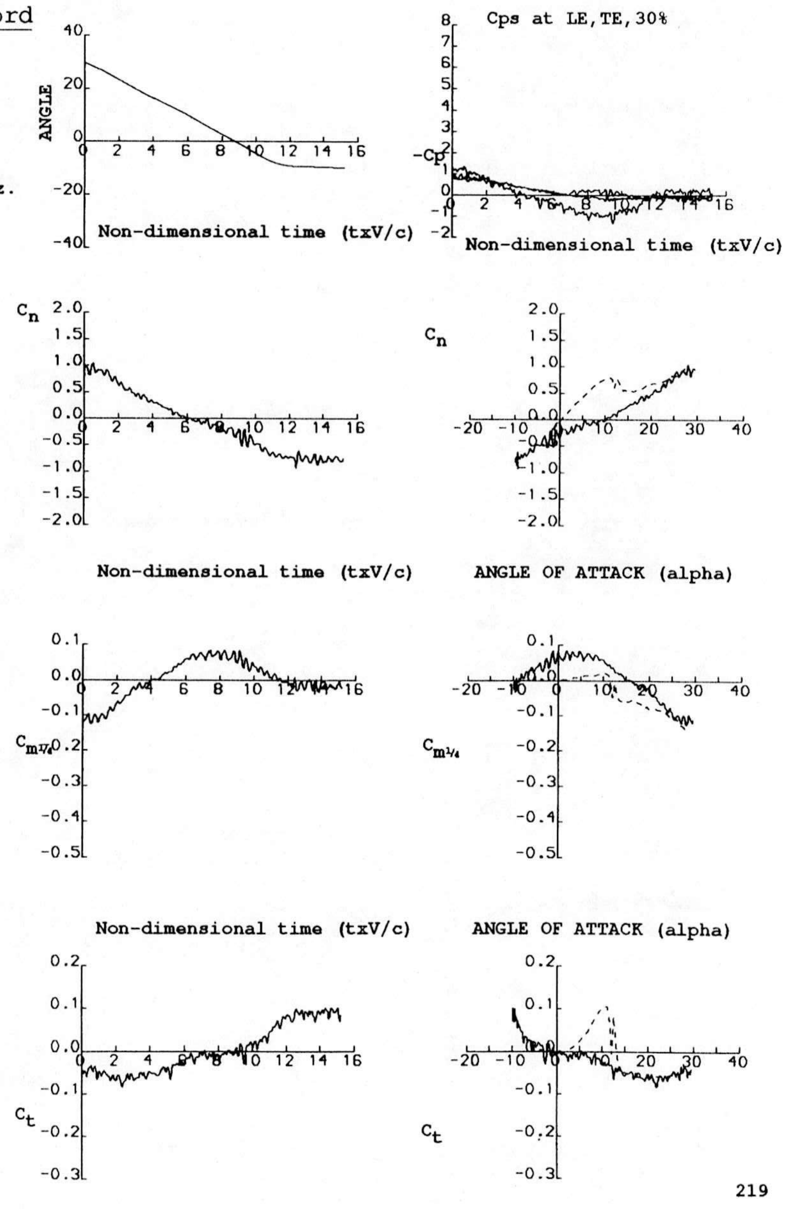


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832191
REYNOLDS NUMBER = 757625.
DYNAMIC PRESSURE = 1061.54 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91
MACH NUMBER = 0.124
AIR TEMPERATURE = 24.2°C
SAMPLING FREQUENCY = 10410.00 Hz.
REDUCED PITCH RATE = -0.02843
LINEAR PITCH RATE = -506.67°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832201

REYNOLDS NUMBER = 738874.

DYNAMIC PRESSURE = 1013.13 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91

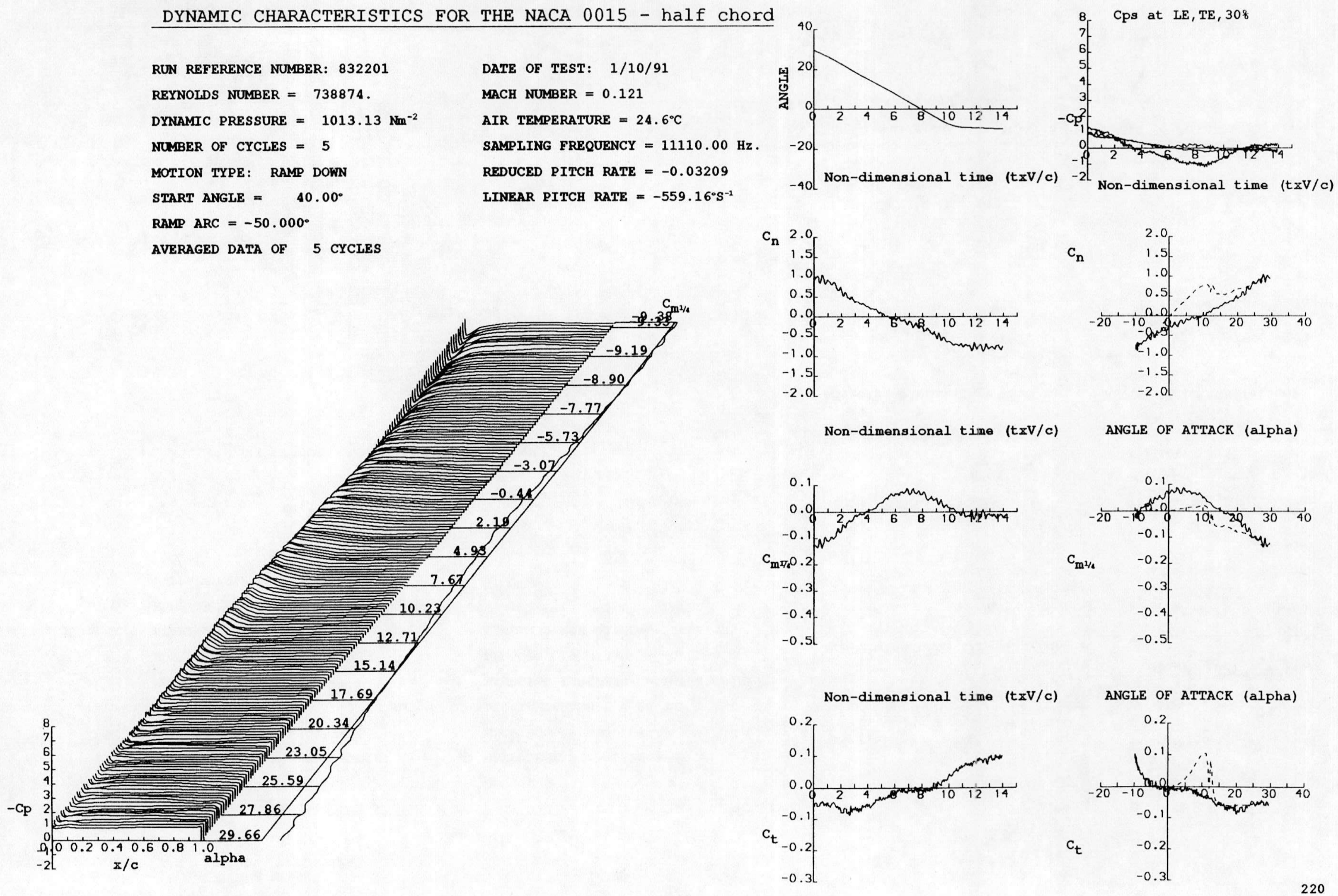
MACH NUMBER = 0.121

AIR TEMPERATURE = 24.6°C

SAMPLING FREQUENCY = 11110.00 Hz.

REDUCED PITCH RATE = -0.03209

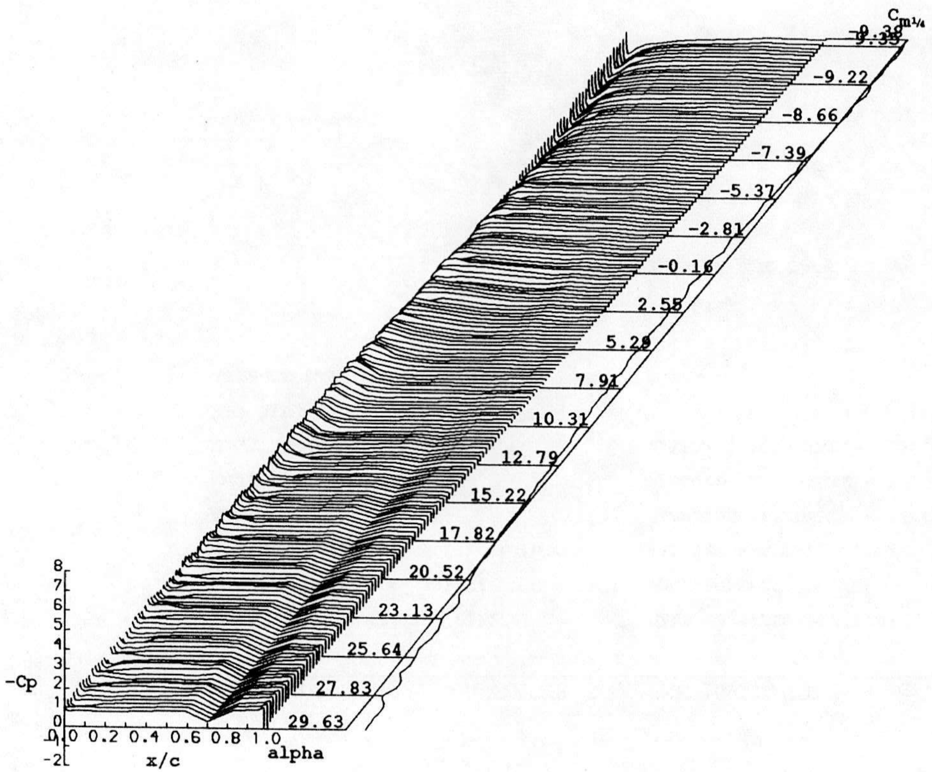
LINEAR PITCH RATE = -559.16°S^{-1}

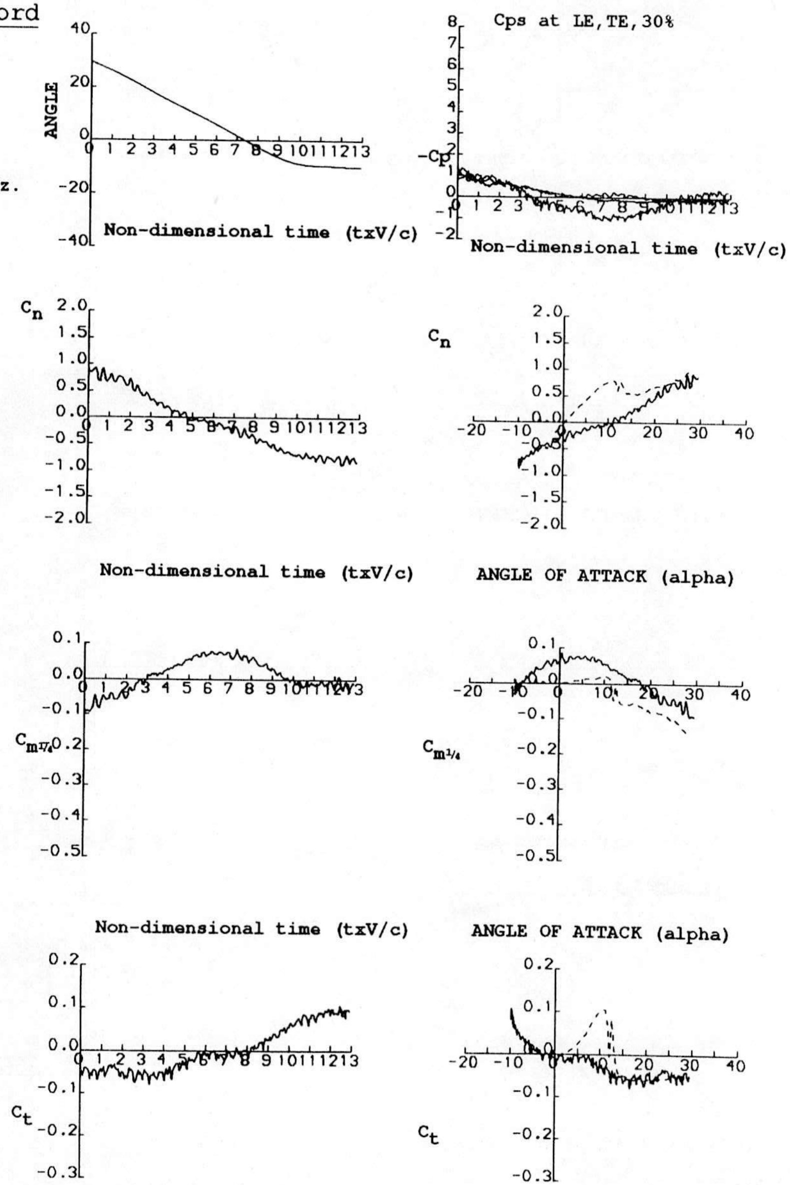


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832211
REYNOLDS NUMBER = 732286.
DYNAMIC PRESSURE = 996.86 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91
MACH NUMBER = 0.120
AIR TEMPERATURE = 24.8°C
SAMPLING FREQUENCY = 11900.00 Hz.
REDUCED PITCH RATE = -0.03508
LINEAR PITCH RATE = -606.39°s^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832221

REYNOLDS NUMBER = 721594.

DYNAMIC PRESSURE = 971.30 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 1/10/91

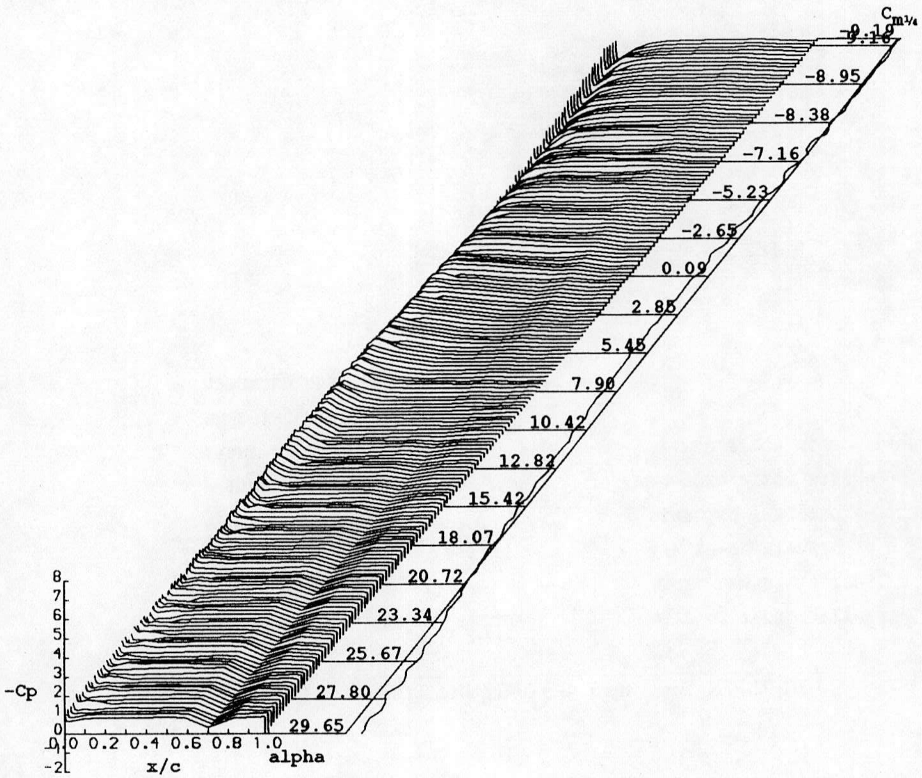
MACH NUMBER = 0.118

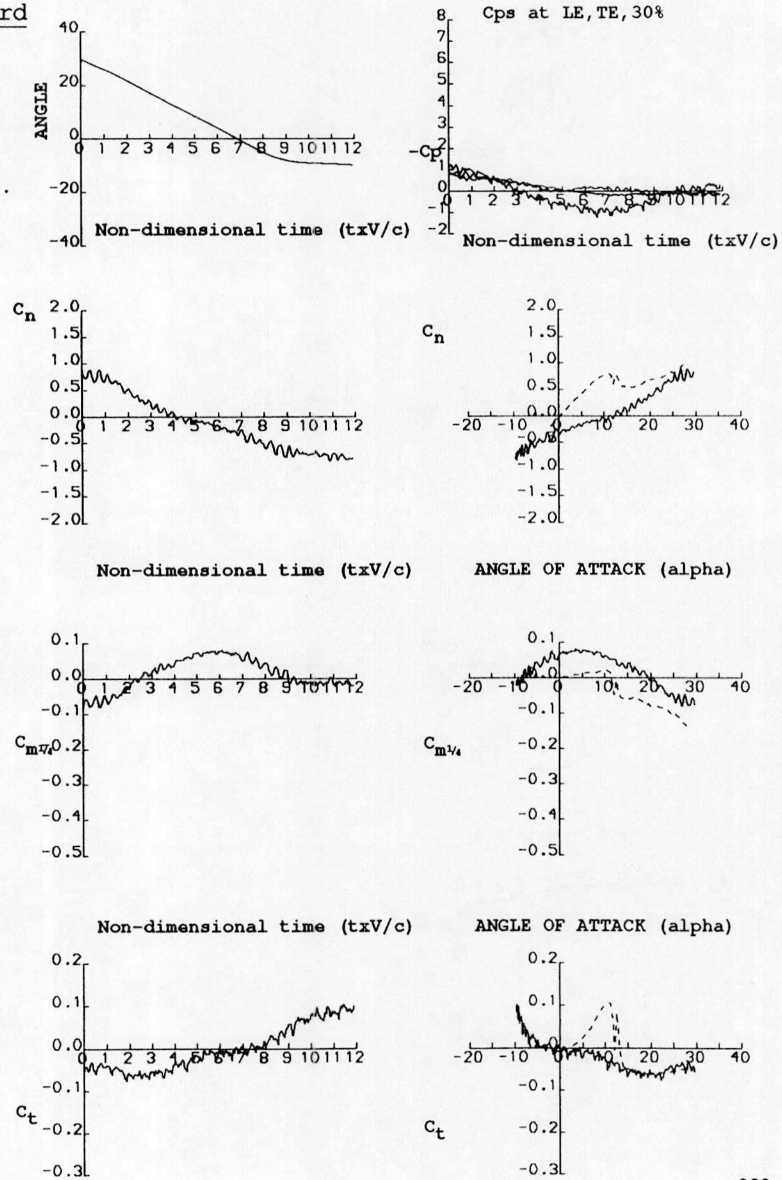
AIR TEMPERATURE = 25.2°C

SAMPLING FREQUENCY = 12760.00 Hz.

REDUCED PITCH RATE = -0.03859

LINEAR PITCH RATE = -658.91°S^{-1}

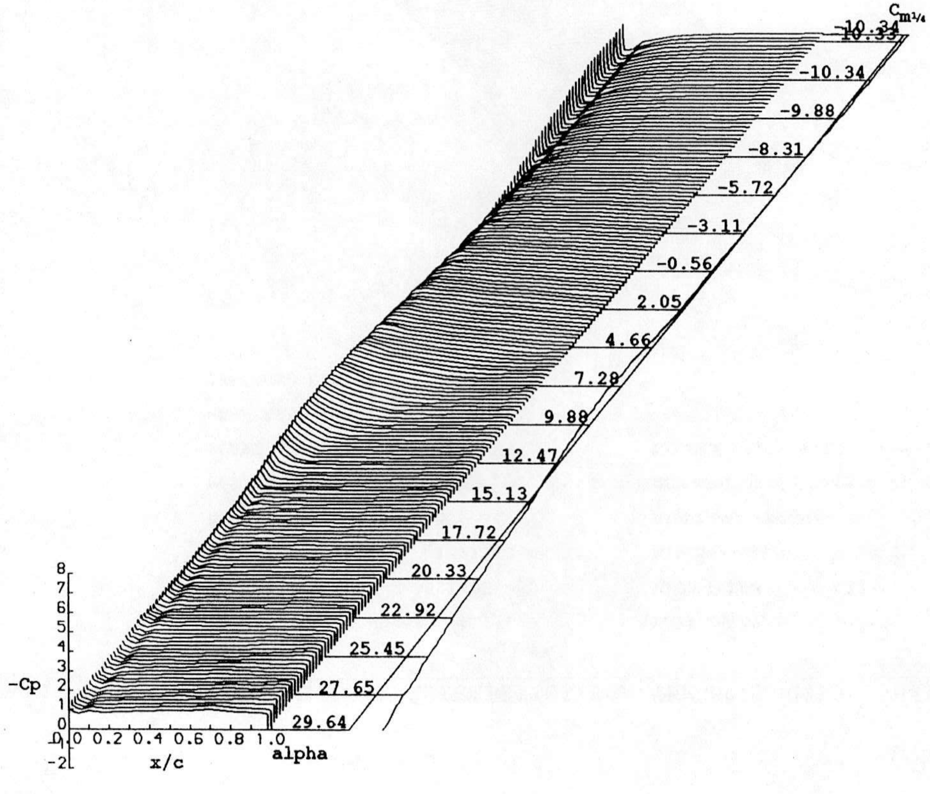


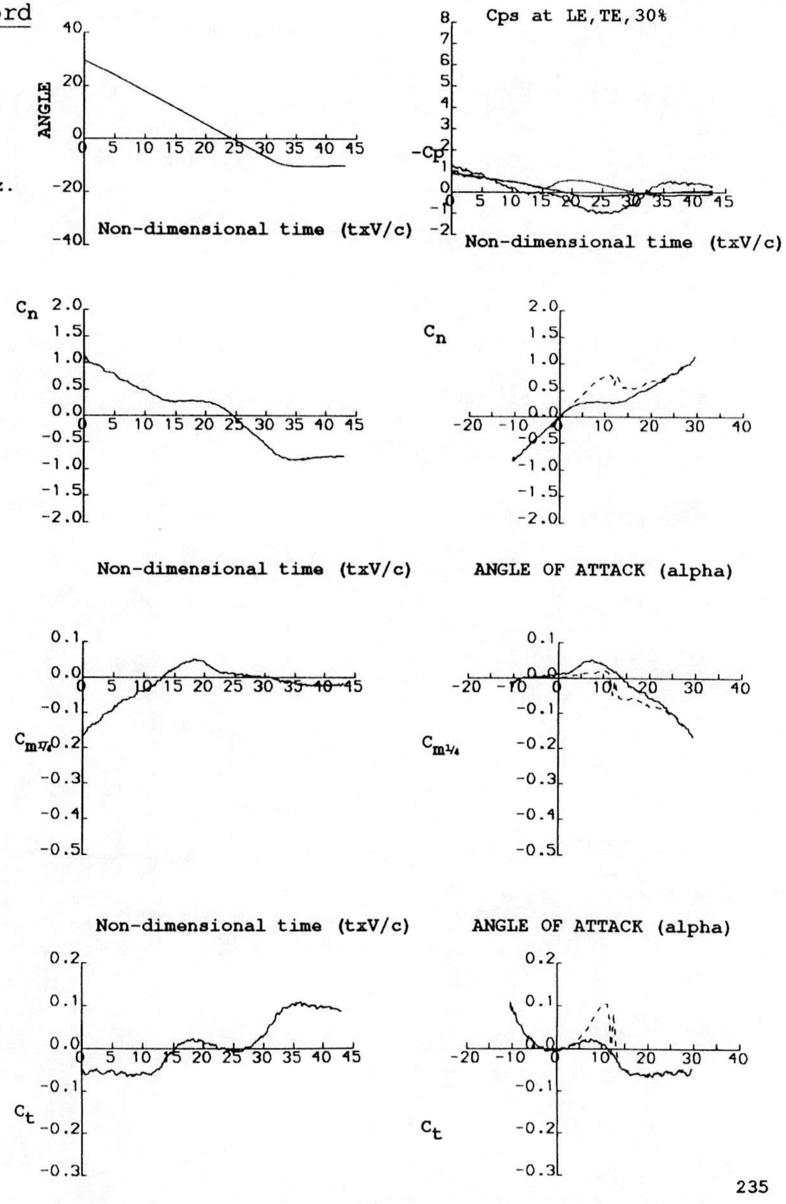


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832351
REYNOLDS NUMBER = 895184.
DYNAMIC PRESSURE = 1522.50 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91
MACH NUMBER = 0.147
AIR TEMPERATURE = 29.7°C
SAMPLING FREQUENCY = 4405.00 Hz.
REDUCED PITCH RATE = -0.01078
LINEAR PITCH RATE = $-229.89°S^{-1}$

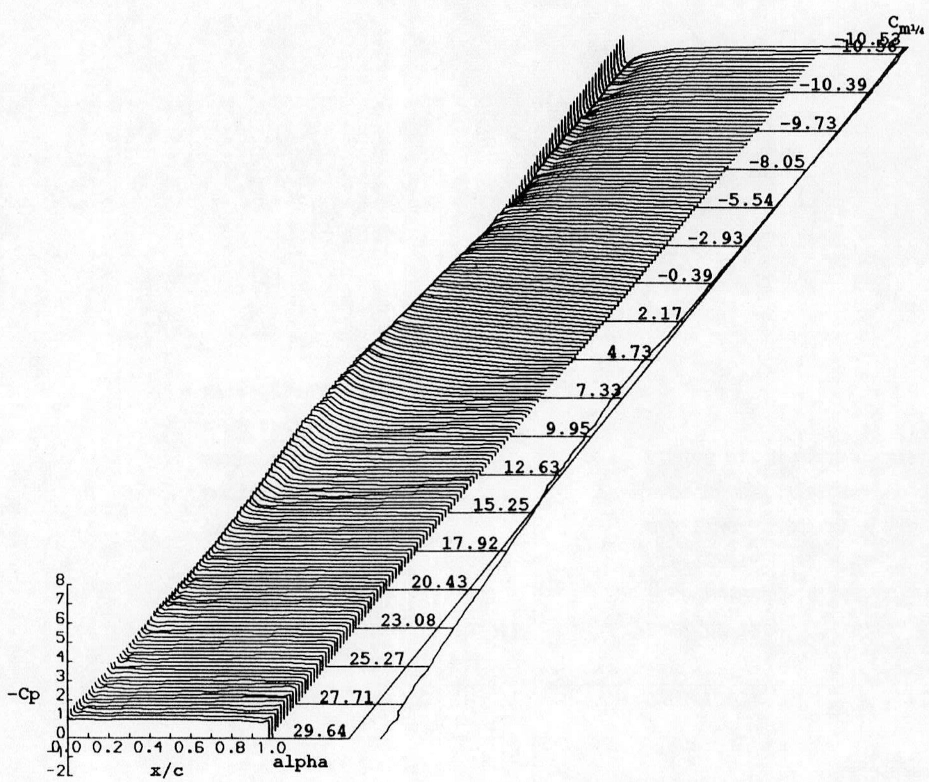


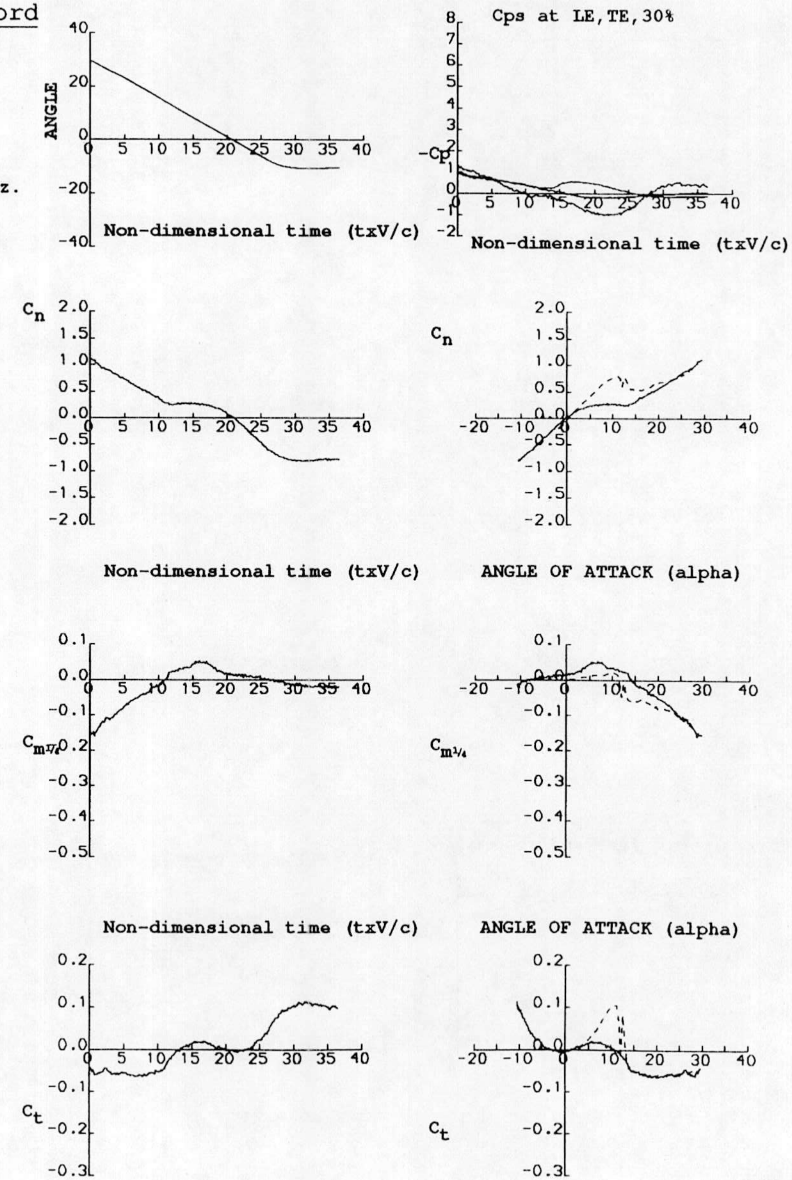


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832361
REYNOLDS NUMBER = 891405.
DYNAMIC PRESSURE = 1521.17 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91
MACH NUMBER = 0.147
AIR TEMPERATURE = 30.6°C
SAMPLING FREQUENCY = 5208.00 Hz.
REDUCED PITCH RATE = -0.01280
LINEAR PITCH RATE = -273.28°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832371

REYNOLDS NUMBER = 874470.

DYNAMIC PRESSURE = 1473.79 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 41.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91

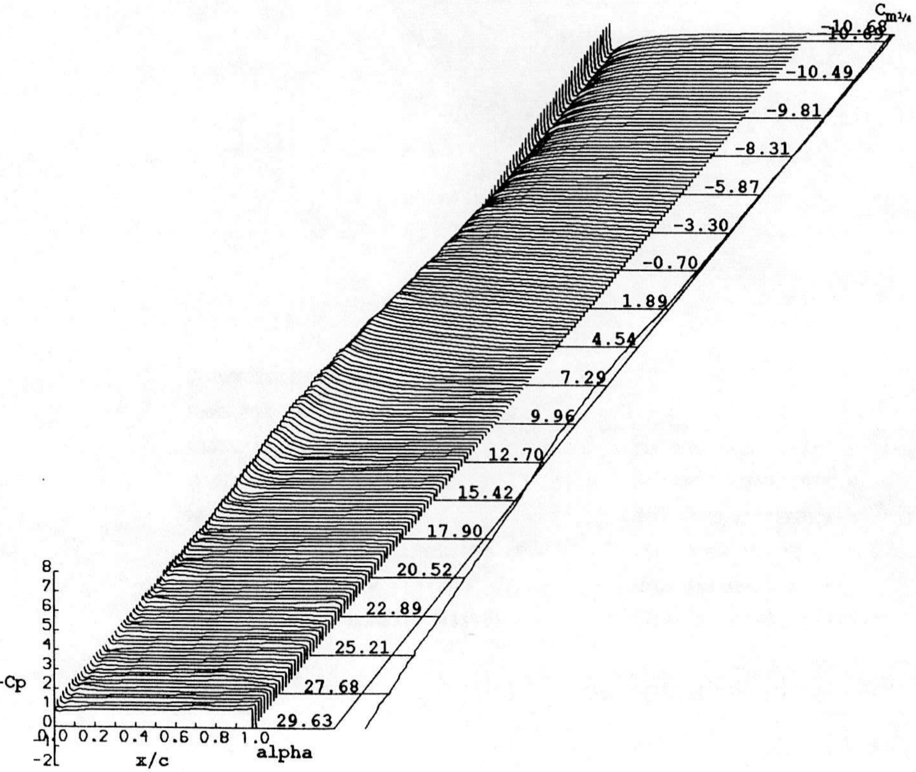
MACH NUMBER = 0.144

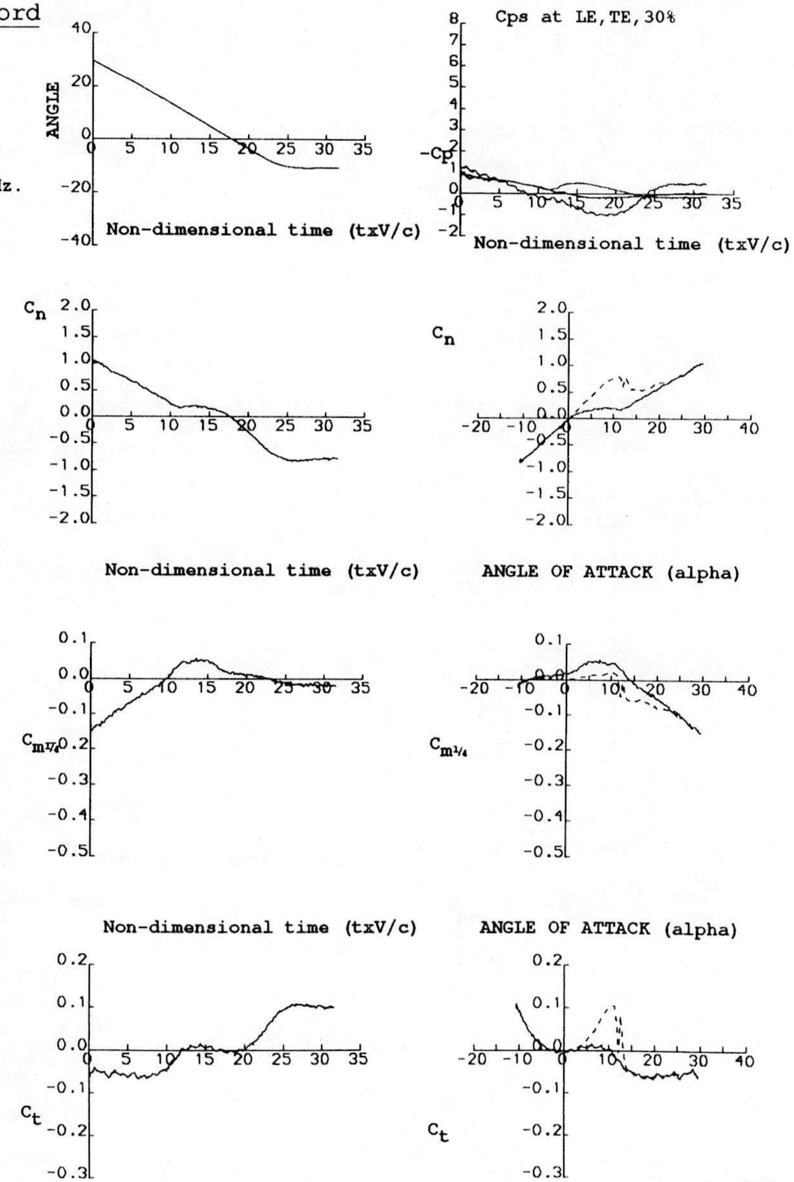
AIR TEMPERATURE = 31.4°C

SAMPLING FREQUENCY = 5917.00 Hz.

REDUCED PITCH RATE = -0.01487

LINEAR PITCH RATE = -312.83°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832381

REYNOLDS NUMBER = 886508.

DYNAMIC PRESSURE = 1522.28 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91

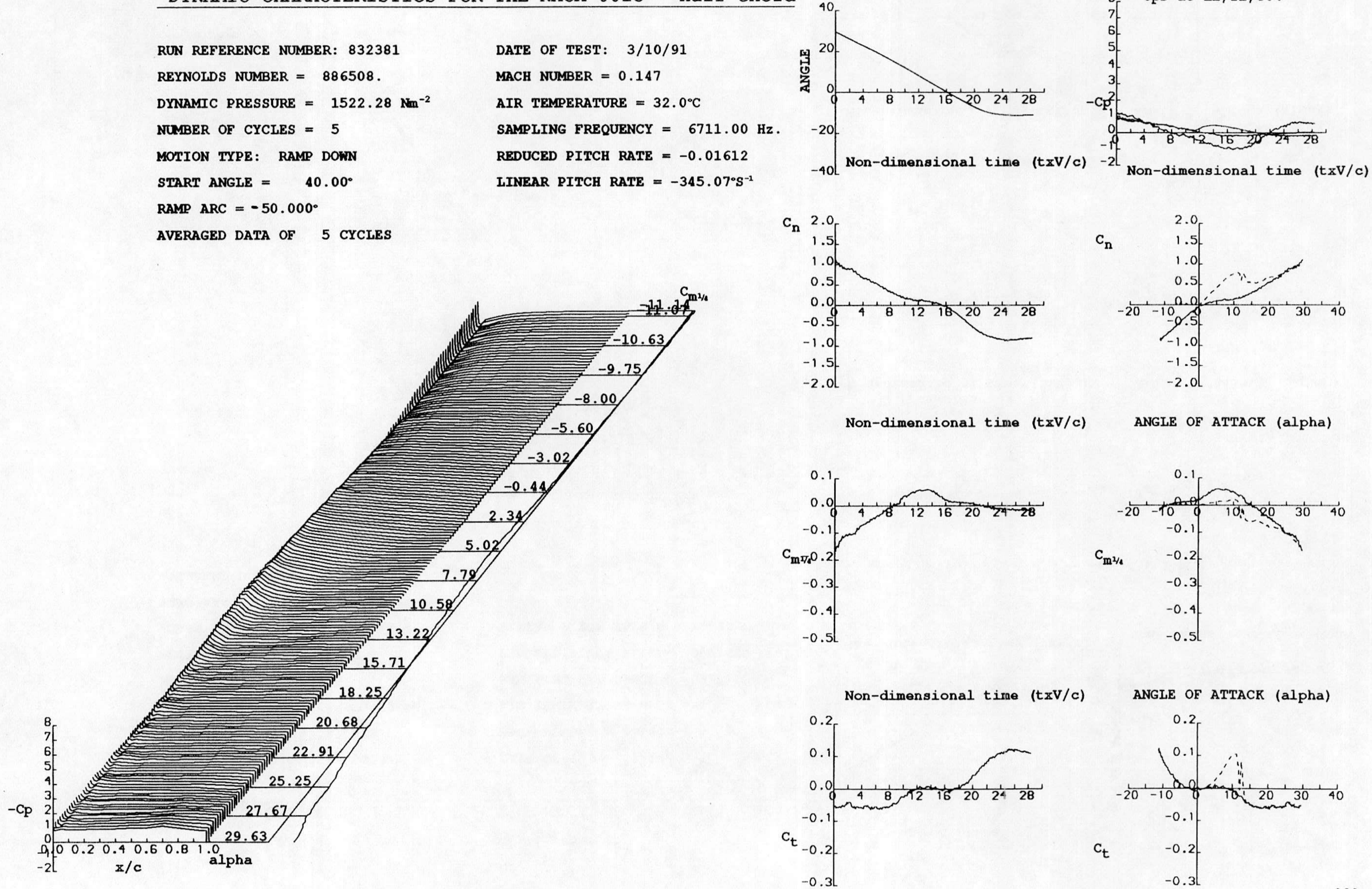
MACH NUMBER = 0.147

AIR TEMPERATURE = 32.0°C

SAMPLING FREQUENCY = 6711.00 Hz.

REDUCED PITCH RATE = -0.01612

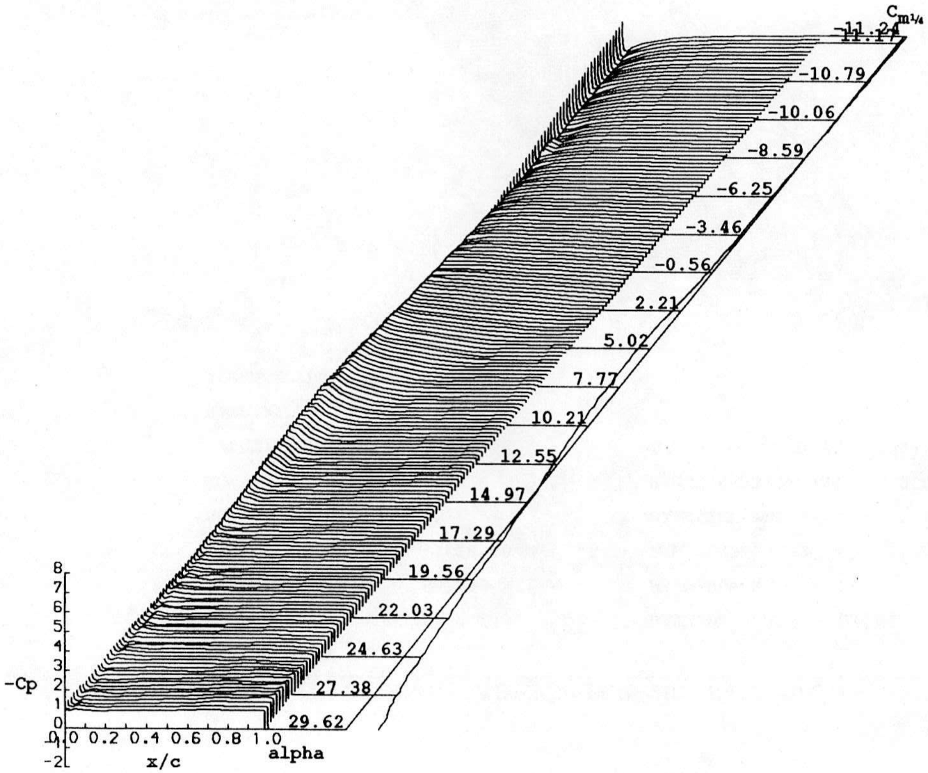
LINEAR PITCH RATE = -345.07°s^{-1}

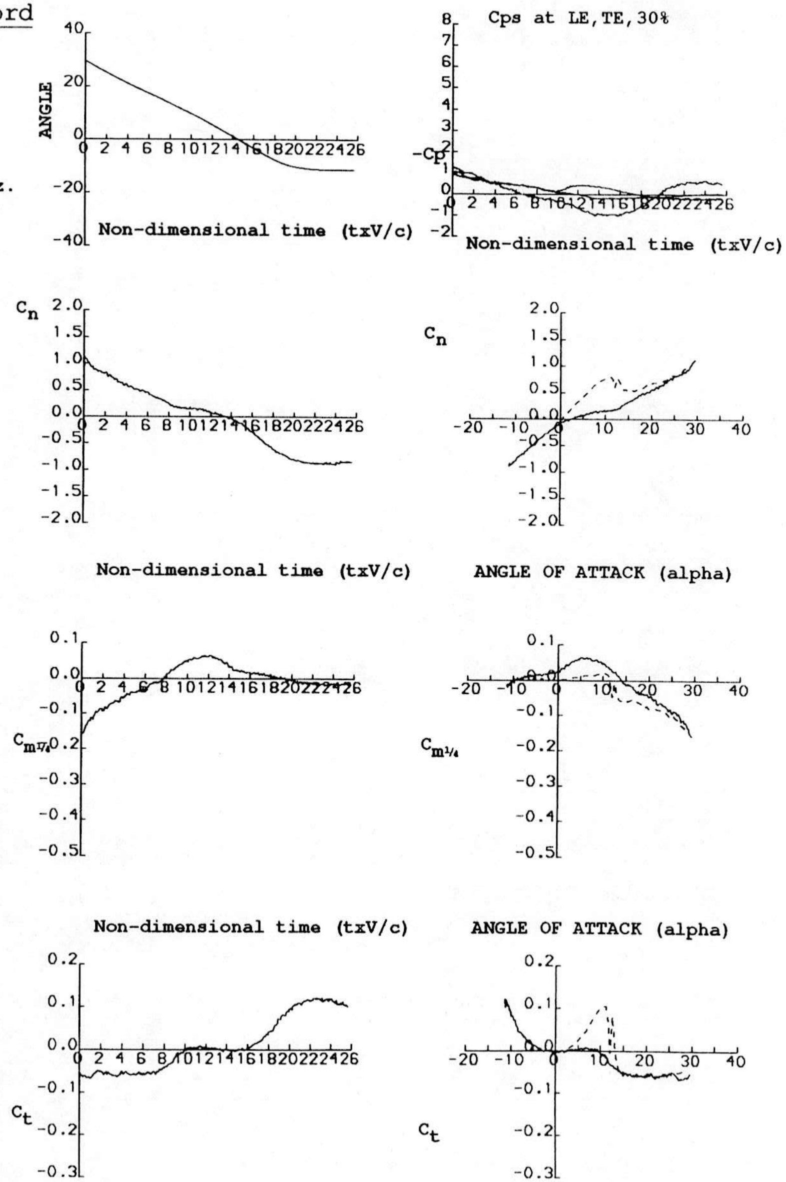


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832391
REYNOLDS NUMBER = 882755.
DYNAMIC PRESSURE = 1513.21 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = −50.000°
AVERAGED DATA OF 5 CYCLES

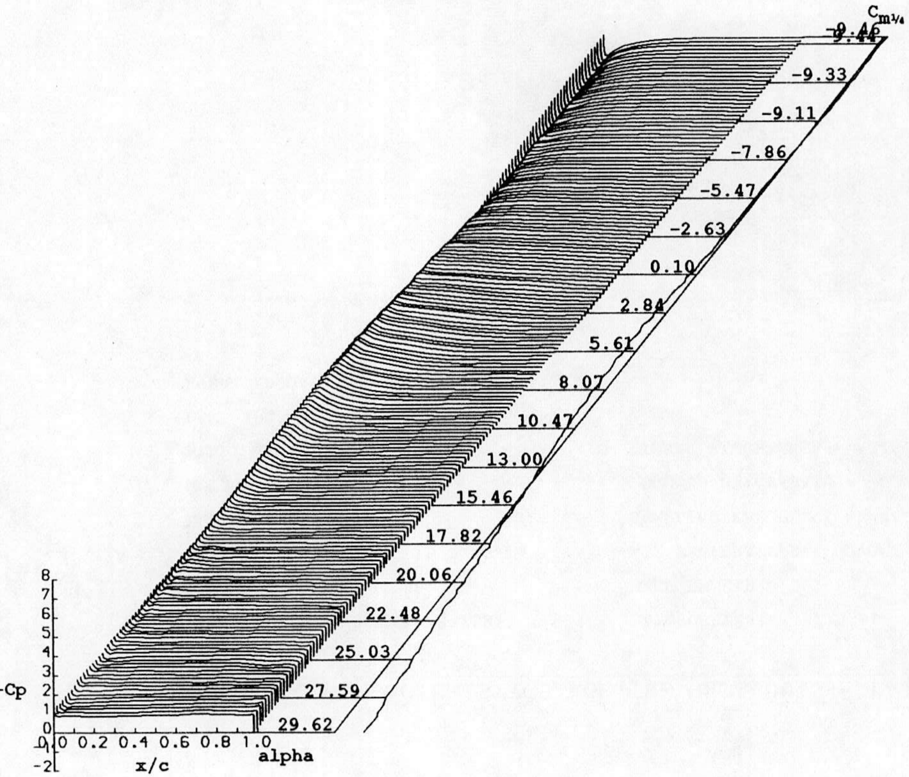
DATE OF TEST: 3/10/91
MACH NUMBER = 0.146
AIR TEMPERATURE = 32.3°C
SAMPLING FREQUENCY = 7407.00 Hz.
REDUCED PITCH RATE = -0.01621
LINEAR PITCH RATE = -346.17°s^{-1}

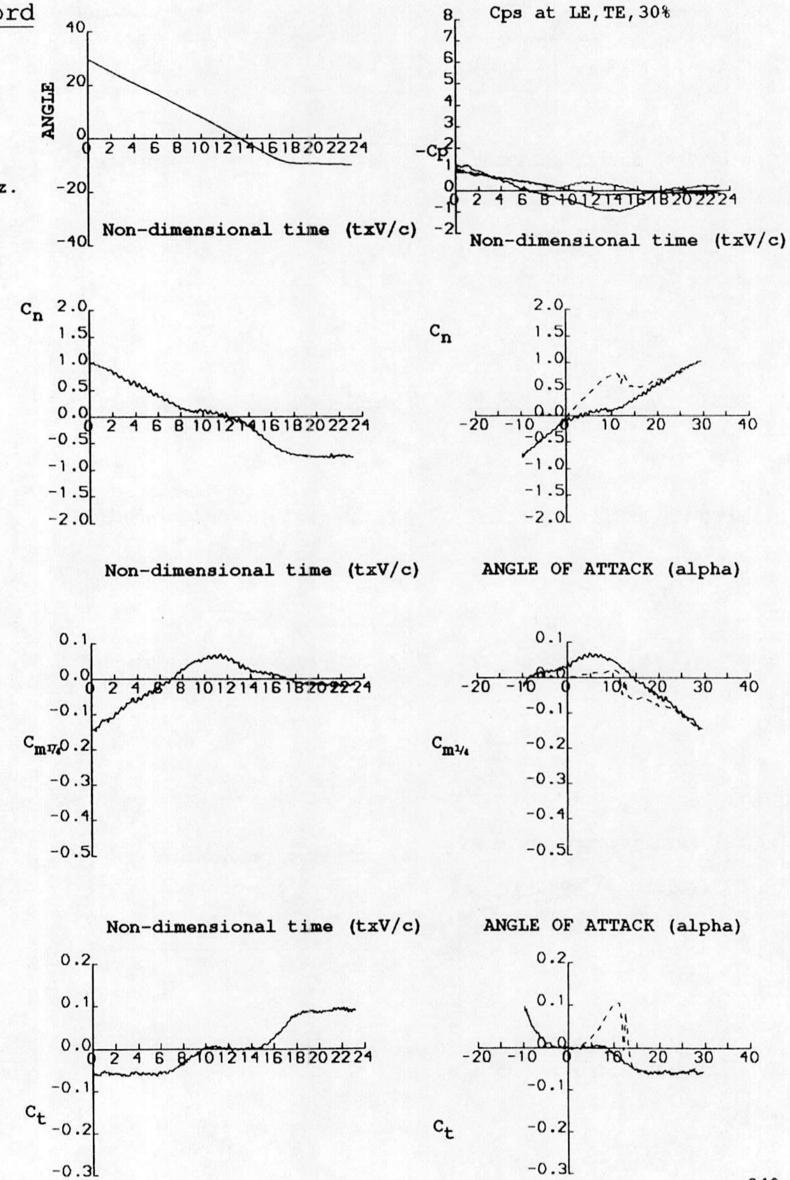




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832401	DATE OF TEST: 3/10/91
REYNOLDS NUMBER = 882169.	MACH NUMBER = 0.147
DYNAMIC PRESSURE = 1518.80 Nm^{-2}	AIR TEMPERATURE = 32.9°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 8219.00 Hz.
MOTION TYPE: RAMP DOWN	REDUCED PITCH RATE = -0.01844
START ANGLE = 40.00°	LINEAR PITCH RATE = -394.76°S^{-1}
RAMP ARC = -50.000°	
AVERAGED DATA OF 5 CYCLES	

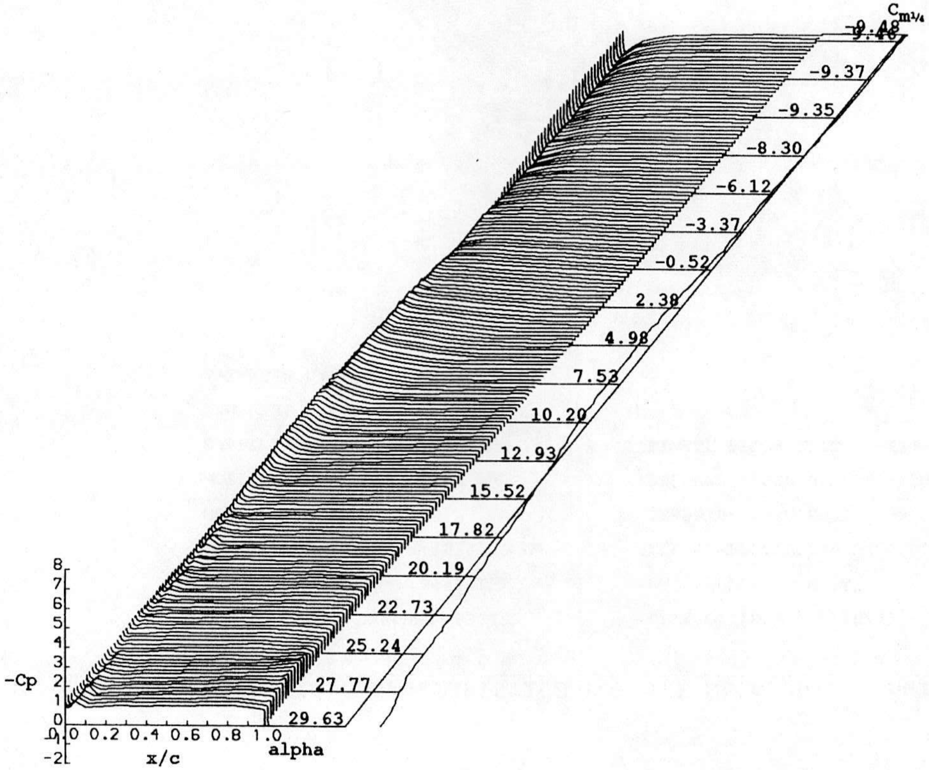


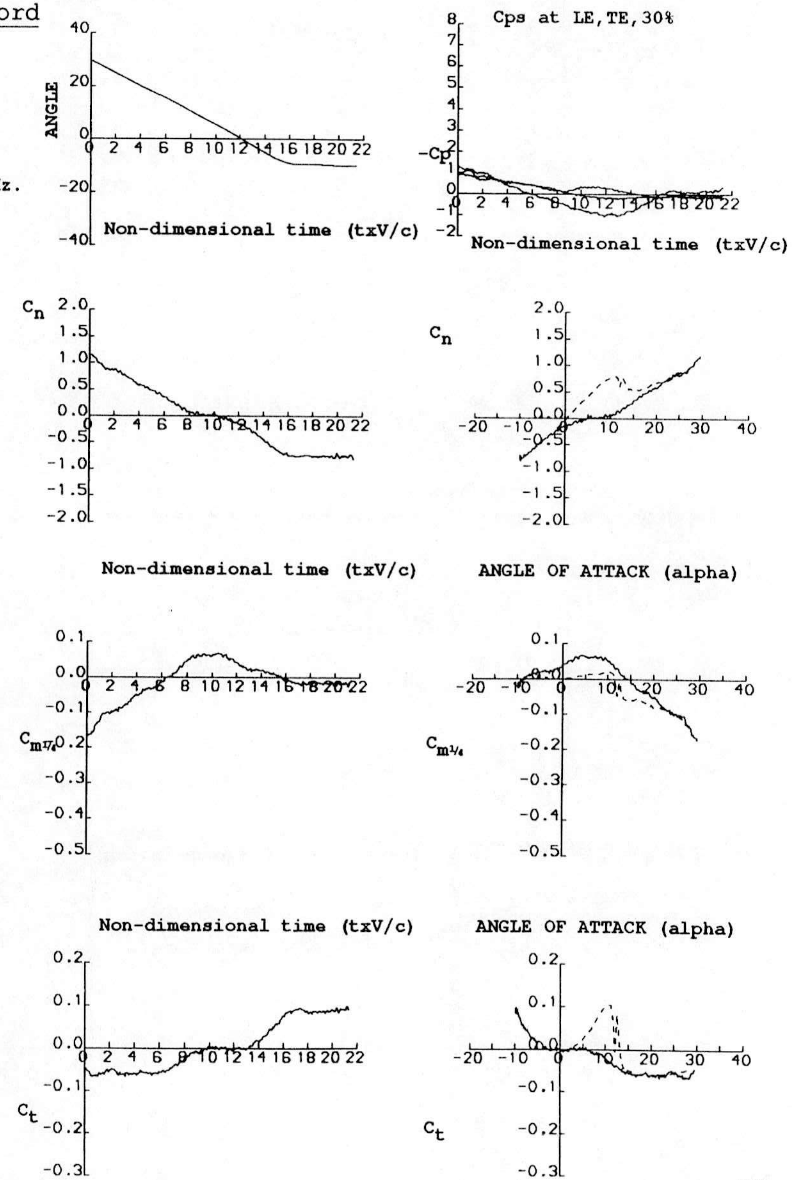


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832411
REYNOLDS NUMBER = 880325.
DYNAMIC PRESSURE = 1518.77 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

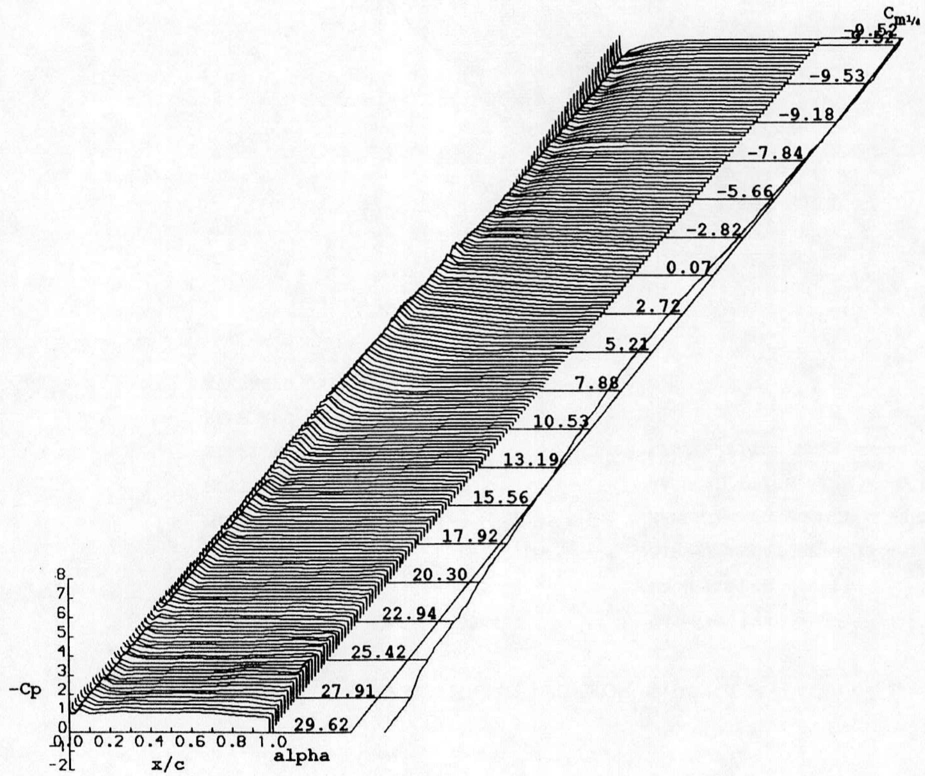
DATE OF TEST: 3/10/91
MACH NUMBER = 0.147
AIR TEMPERATURE = 33.4°C
SAMPLING FREQUENCY = 8928.00 Hz.
REDUCED PITCH RATE = -0.02076
LINEAR PITCH RATE = -444.96°S^{-1}

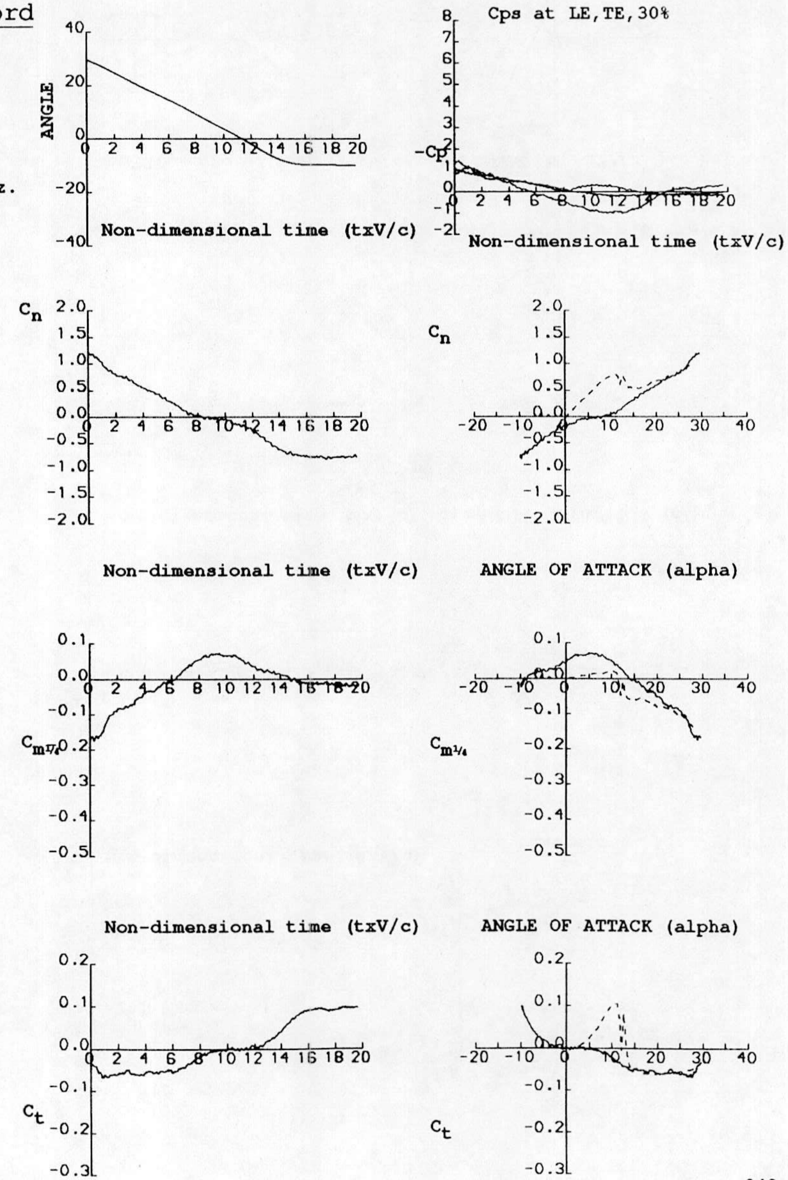




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832421	DATE OF TEST: 3/10/91
REYNOLDS NUMBER = 879171.	MACH NUMBER = 0.147
DYNAMIC PRESSURE = 1522.37 Nm^{-2}	AIR TEMPERATURE = 34.0°C
NUMBER OF CYCLES = 5	SAMPLING FREQUENCY = 9708.00 Hz.
MOTION TYPE: RAMP DOWN	REDUCED PITCH RATE = -0.02225
START ANGLE = 40.00°	LINEAR PITCH RATE = -477.92°S^{-1}
RAMP ARC = -50.000°	
AVERAGED DATA OF 5 CYCLES	

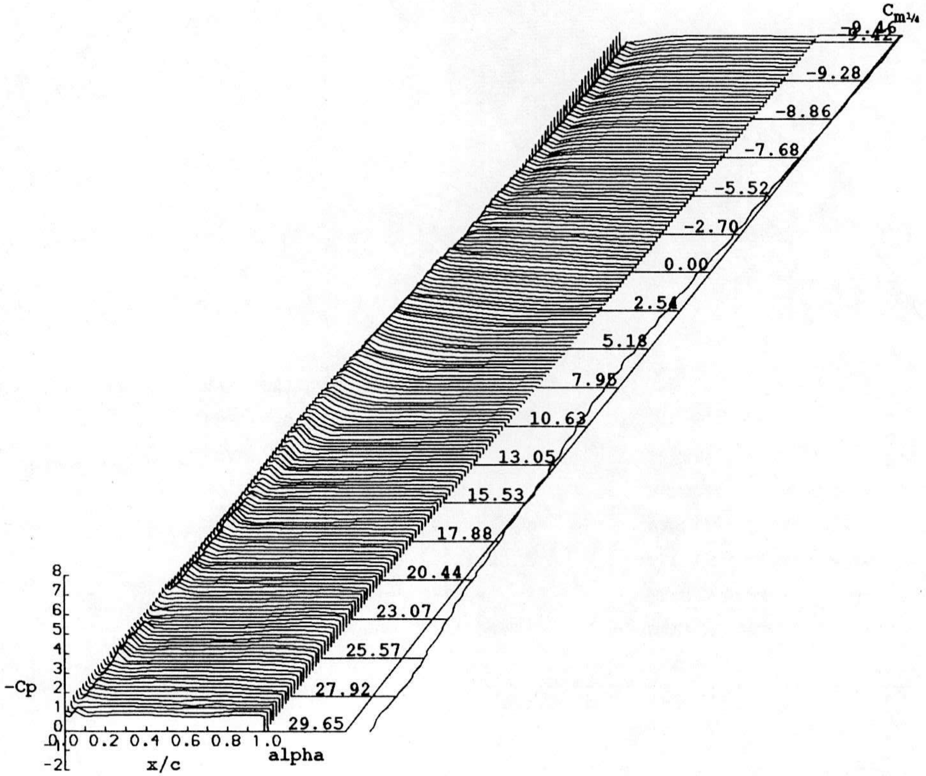


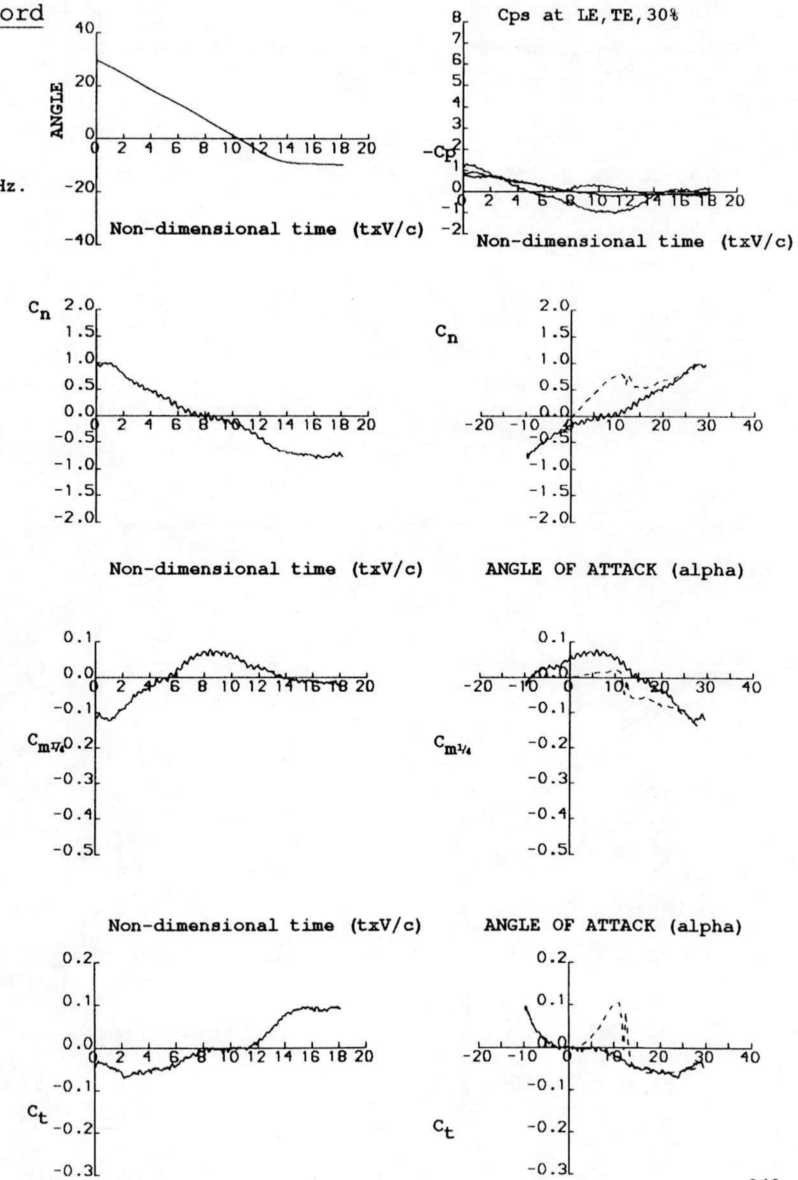


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832431
REYNOLDS NUMBER = 864402.
DYNAMIC PRESSURE = 1481.45 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = - 50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91
MACH NUMBER = 0.145
AIR TEMPERATURE = 34.8°C
SAMPLING FREQUENCY = 10410.00 Hz.
REDUCED PITCH RATE = -0.02401
LINEAR PITCH RATE = -509.29°S^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832441

REYNOLDS NUMBER = 891174.

DYNAMIC PRESSURE = 1578.55 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91

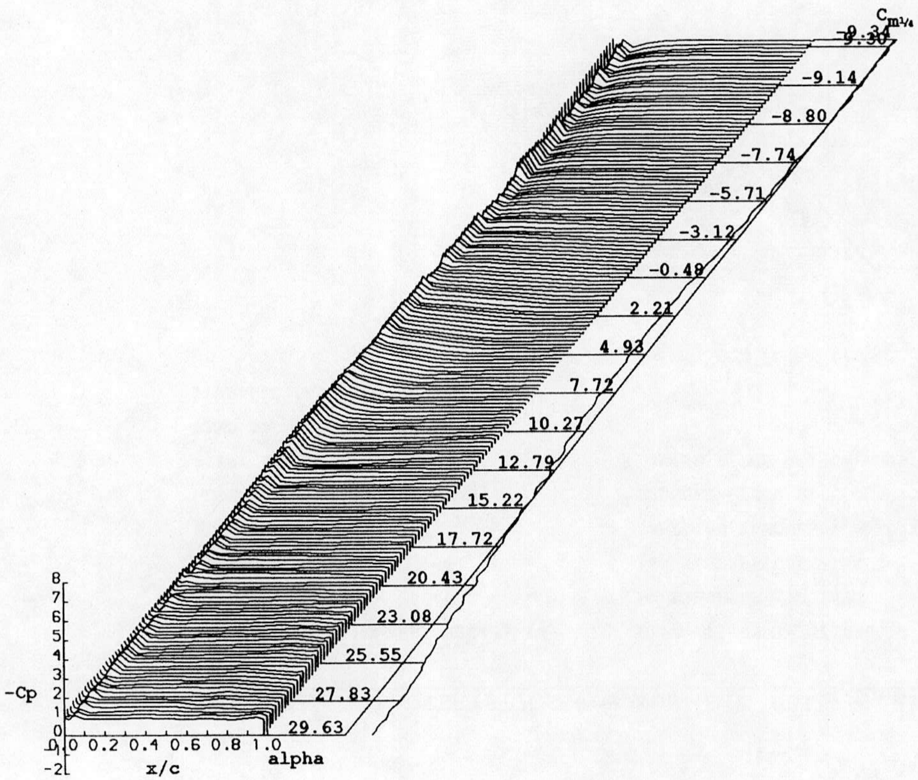
MACH NUMBER = 0.149

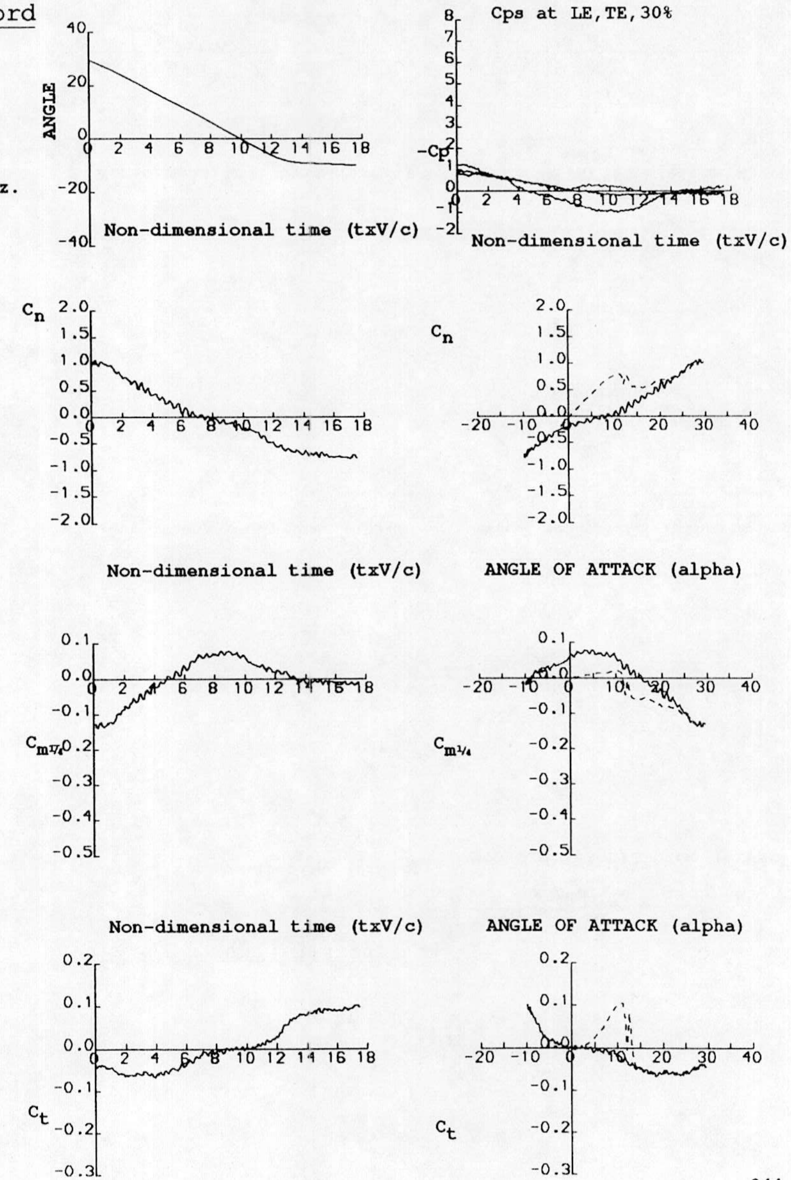
AIR TEMPERATURE = 35.1°C

SAMPLING FREQUENCY = 11110.00 Hz.

REDUCED PITCH RATE = -0.02566

LINEAR PITCH RATE = -562.18°S^{-1}

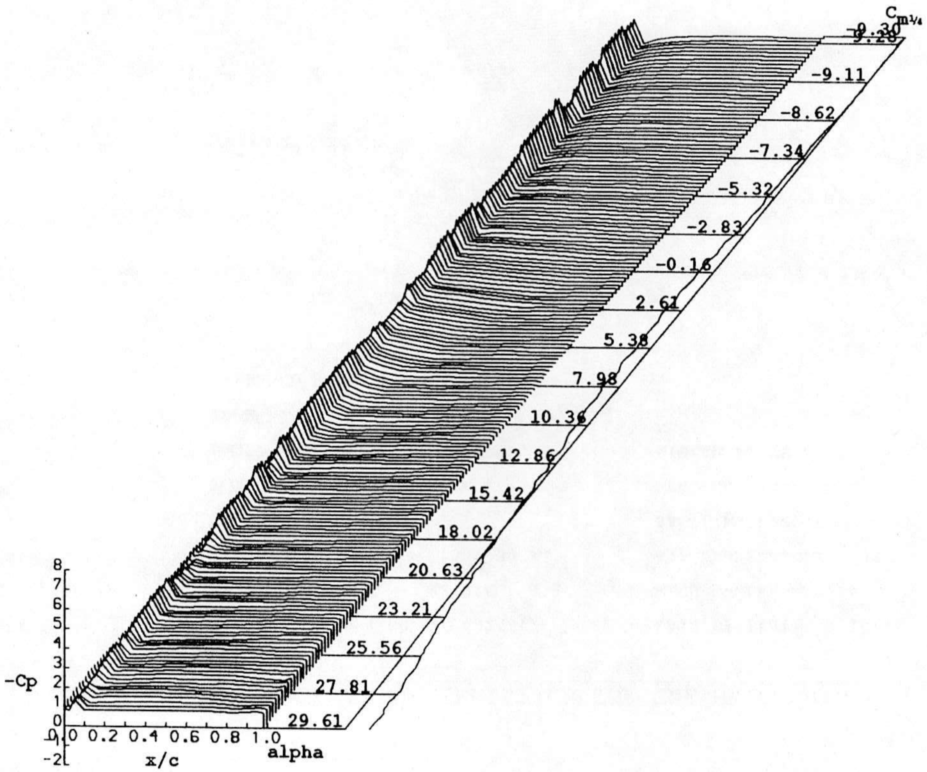


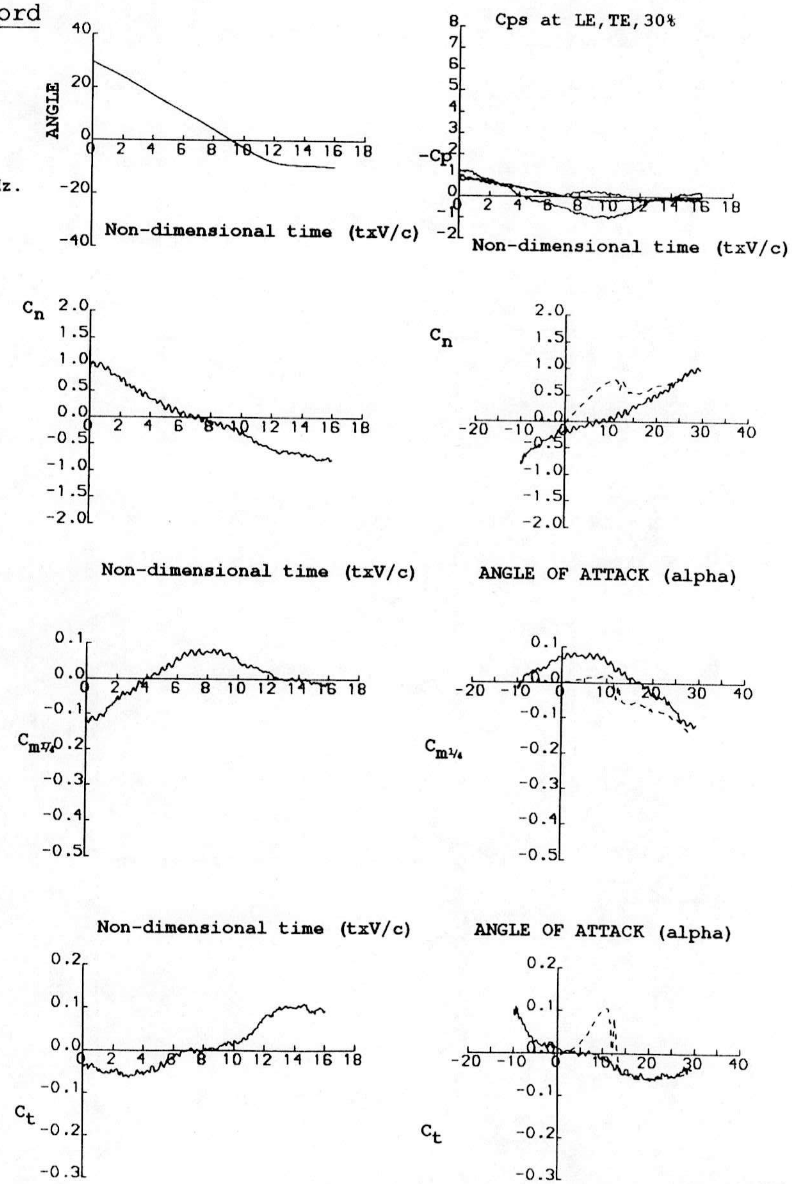


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832451
REYNOLDS NUMBER = 869928.
DYNAMIC PRESSURE = 1509.16 Nm^{-2}
NUMBER OF CYCLES = 5
MOTION TYPE: RAMP DOWN
START ANGLE = 40.00°
RAMP ARC = -50.000°
AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91
MACH NUMBER = 0.146
AIR TEMPERATURE = 35.5°C
SAMPLING FREQUENCY = 11900.00 Hz.
REDUCED PITCH RATE = -0.02864
LINEAR PITCH RATE = -613.98°s^{-1}





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 832461

REYNOLDS NUMBER = 867816.

DYNAMIC PRESSURE = 1509.30 Nm^{-2}

NUMBER OF CYCLES = 5

MOTION TYPE: RAMP DOWN

START ANGLE = 40.00°

RAMP ARC = -50.000°

AVERAGED DATA OF 5 CYCLES

DATE OF TEST: 3/10/91

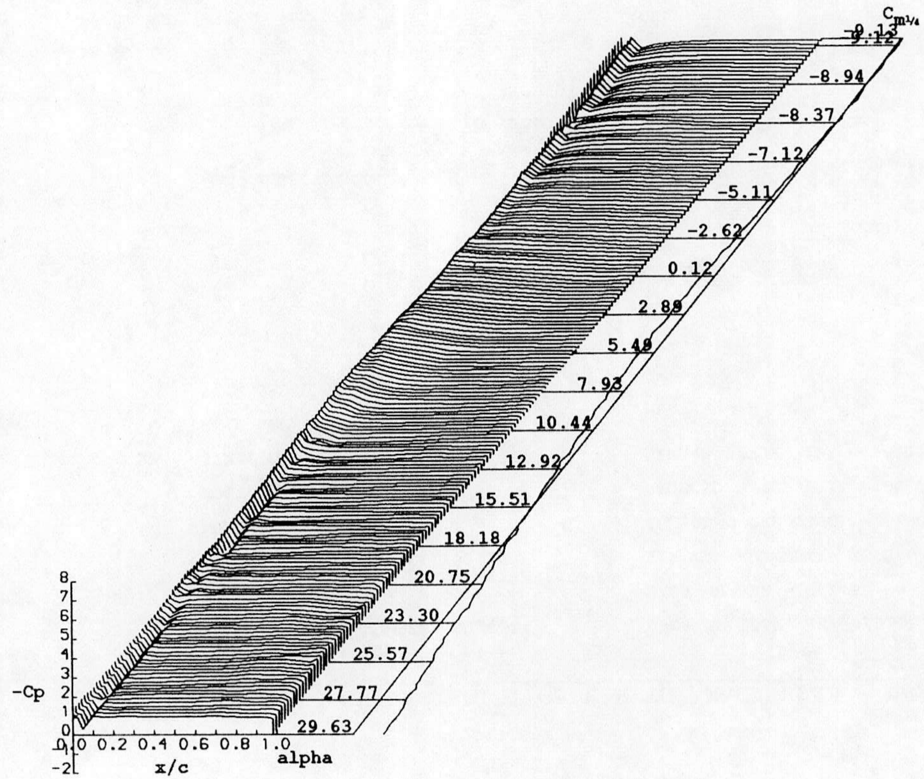
MACH NUMBER = 0.146

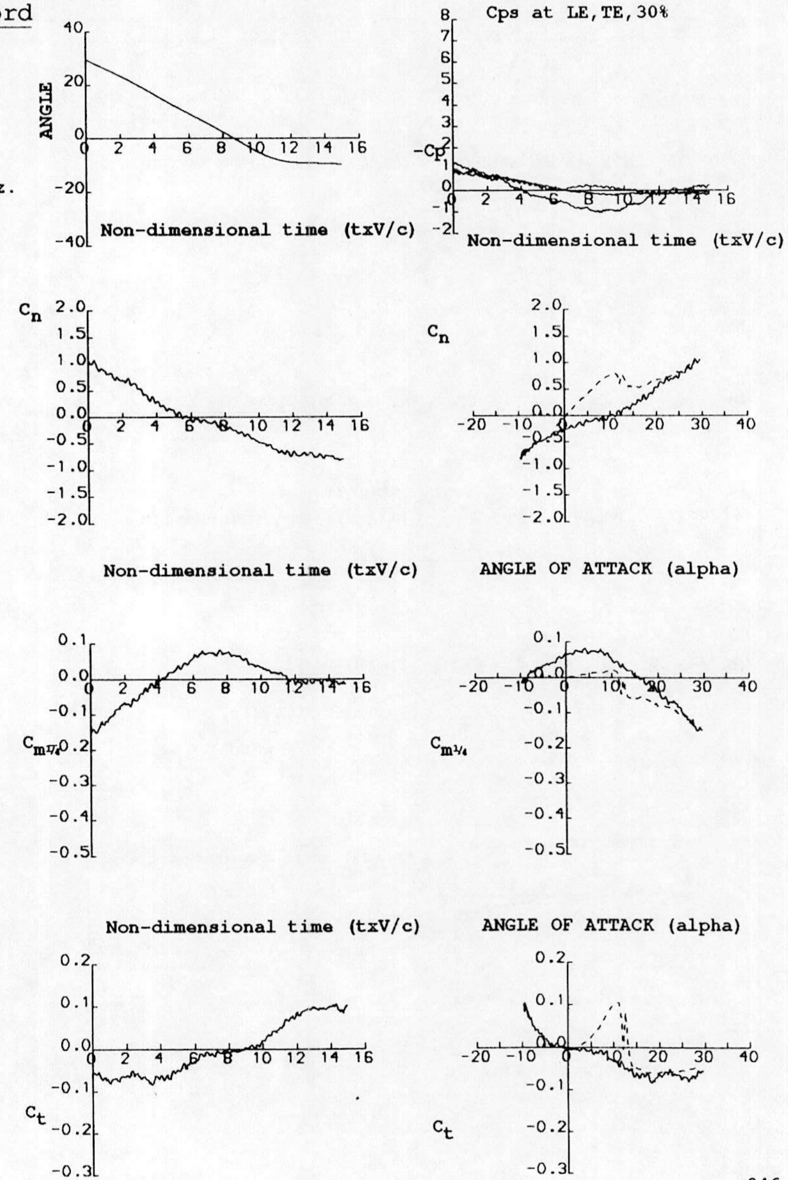
AIR TEMPERATURE = 36.1°C

SAMPLING FREQUENCY = 12760.00 Hz.

REDUCED PITCH RATE = -0.03085

LINEAR PITCH RATE = -661.89°S^{-1}





G.U. Aero Report 9209

UNIVERSITY OF GLASGOW

DEPARTMENT OF AEROSPACE ENGINEERING

PRESSURE DATA FROM

SINUSOIDAL EXPERIMENTS

DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 10702

REYNOLDS NUMBER = 828489.

DYNAMIC PRESSURE = 1209.63 Nm^{-2}

NUMBER OF CYCLES = 10

MOTION TYPE: SINUSOIDAL

MEAN ANGLE = 4.00°

OSCILLATION FREQUENCY = 8.700 Hz.

AVERAGED DATA OF 10 CYCLES

DATE OF TEST: 26/8/91

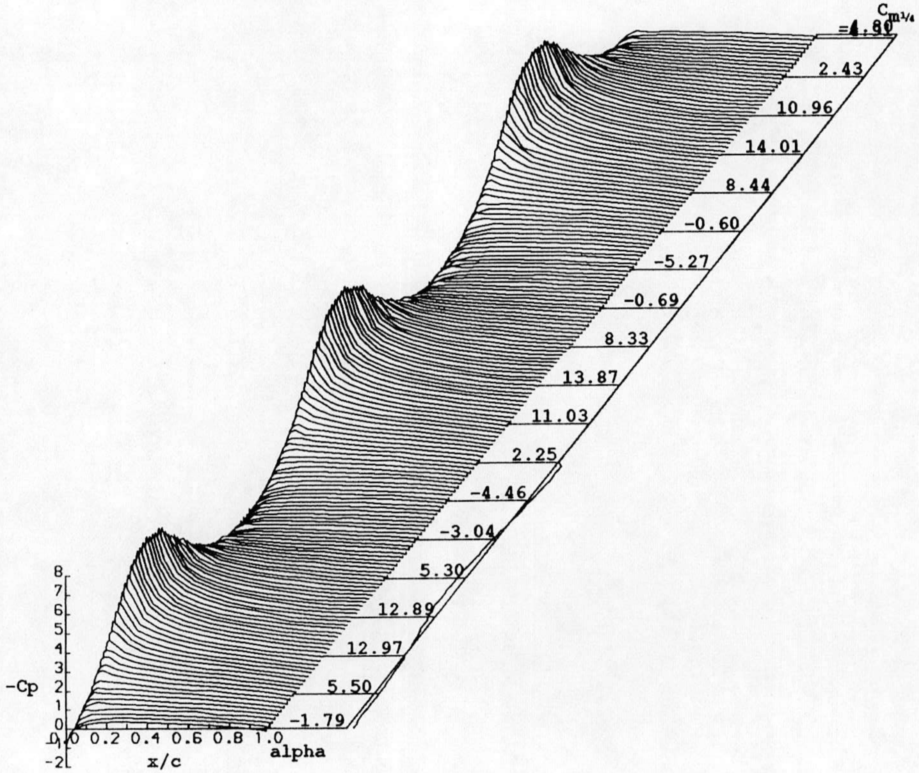
MACH NUMBER = 0.130

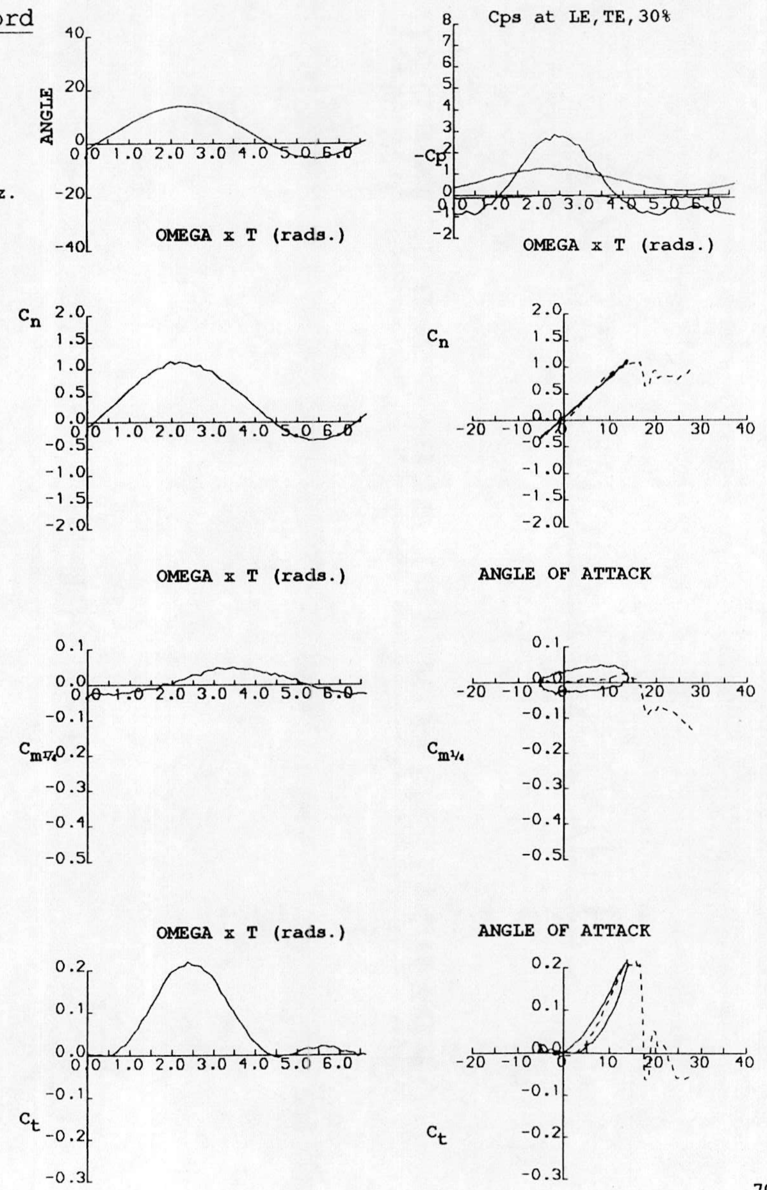
AIR TEMPERATURE = 22.0°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED FREQUENCY = 0.168

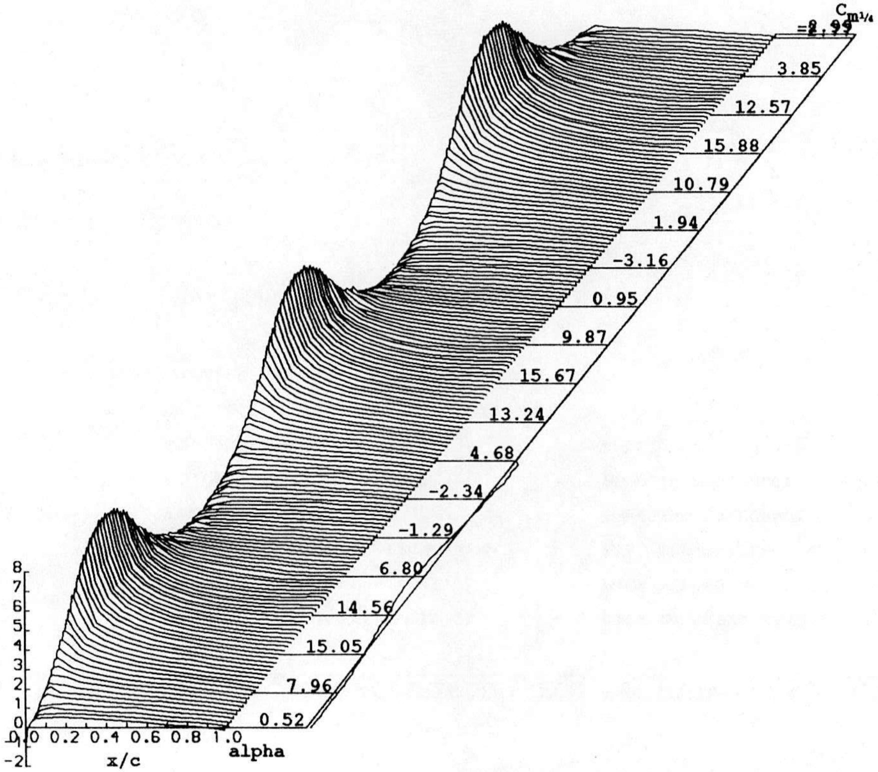
AMPLITUDE = 10.00°

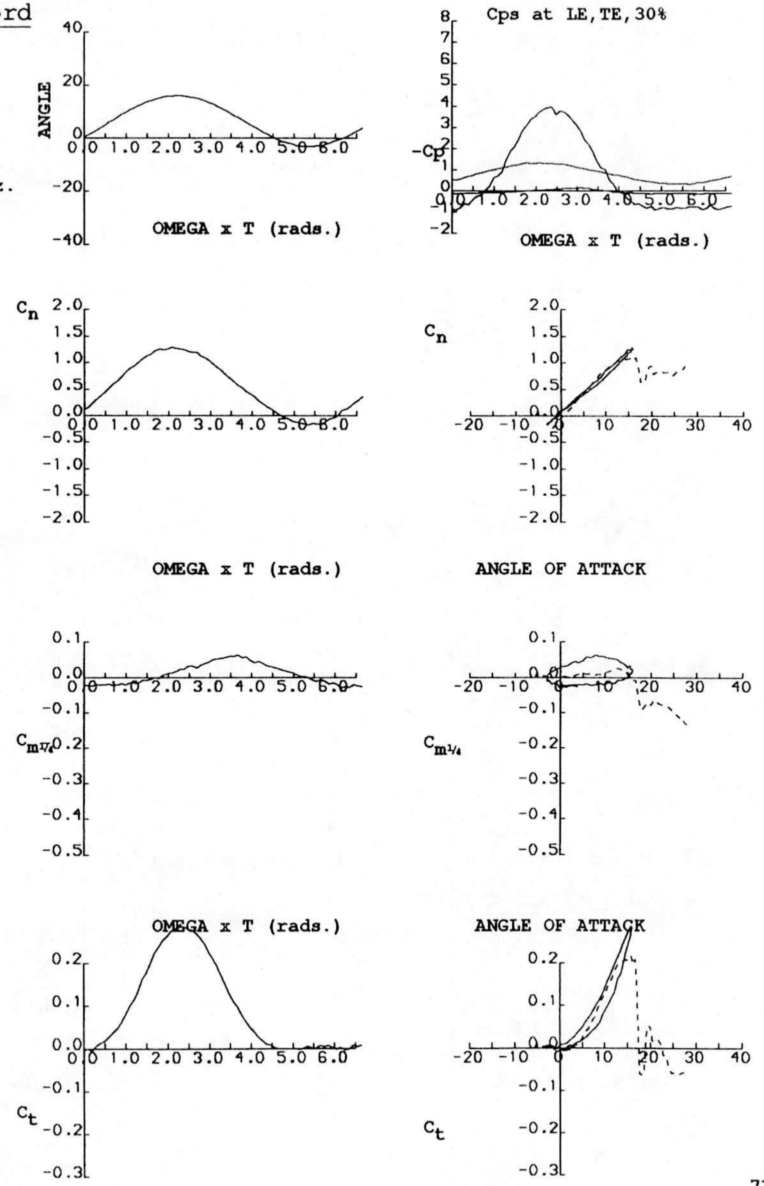




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 10712	DATE OF TEST: 26/8/91
REYNOLDS NUMBER = 825615.	MACH NUMBER = 0.130
DYNAMIC PRESSURE = 1209.63 Nm^{-2}	AIR TEMPERATURE = 22.8°C
NUMBER OF CYCLES = 10	SAMPLING FREQUENCY = 550.05 Hz.
MOTION TYPE: SINUSOIDAL	REDUCED FREQUENCY = 0.167
MEAN ANGLE = 6.00°	AMPLITUDE = 10.00°
OSCILLATION FREQUENCY = 8.700 Hz.	
AVERAGED DATA OF 10 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 10722

REYNOLDS NUMBER = 824542.

DYNAMIC PRESSURE = 1209.63 Nm^{-2}

NUMBER OF CYCLES = 10

MOTION TYPE: SINUSOIDAL

MEAN ANGLE = 8.00°

OSCILLATION FREQUENCY = 8.700 Hz.

AVERAGED DATA OF 10 CYCLES

DATE OF TEST: 26/8/91

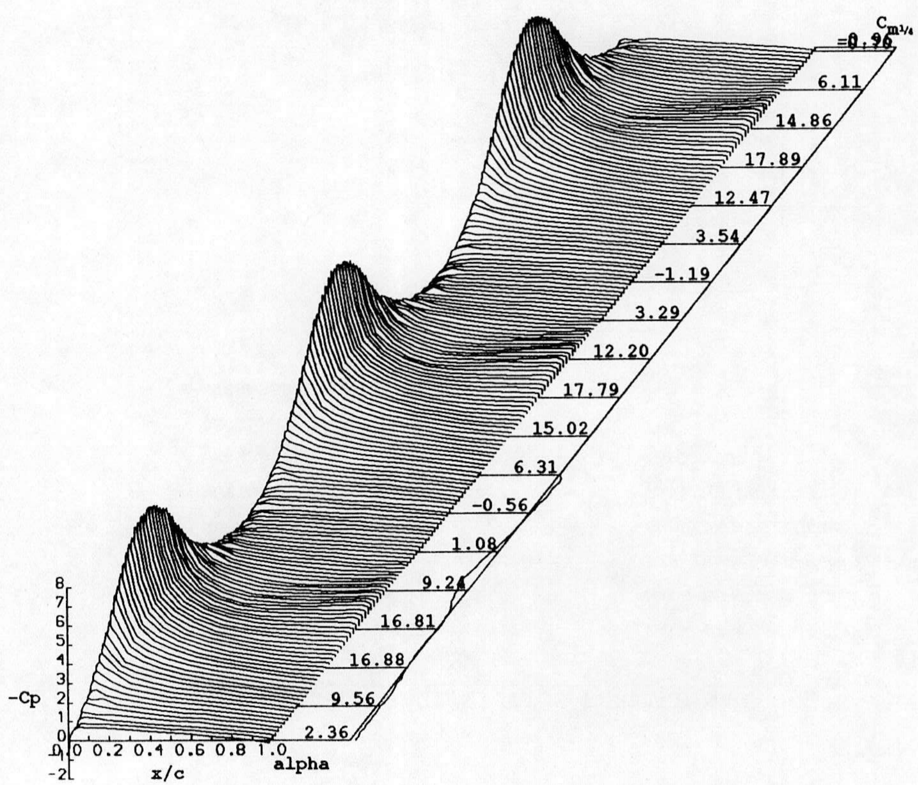
MACH NUMBER = 0.130

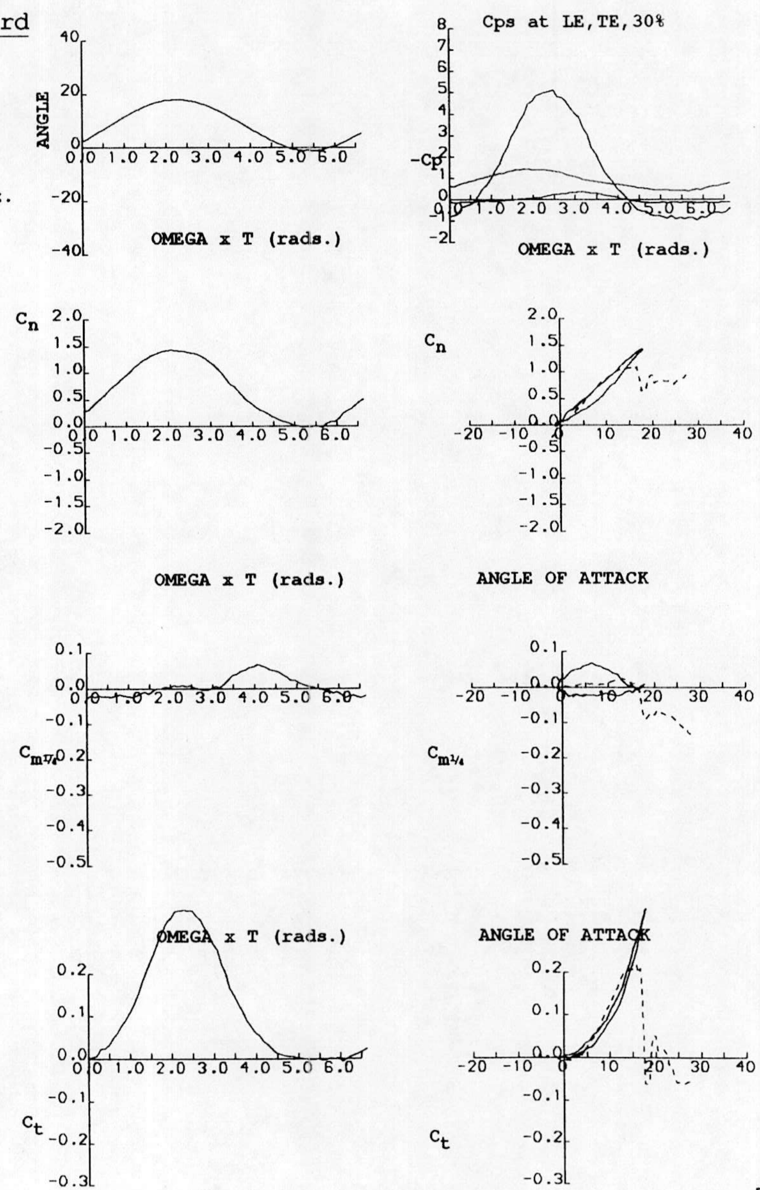
AIR TEMPERATURE = 23.1°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED FREQUENCY = 0.167

AMPLITUDE = 10.00°

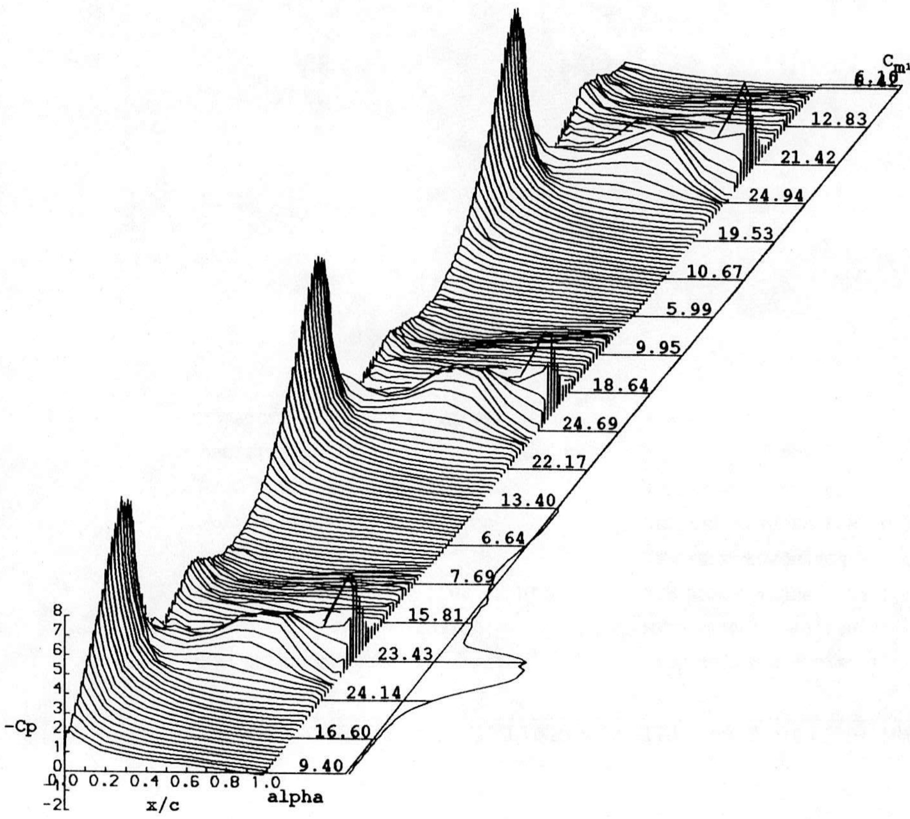


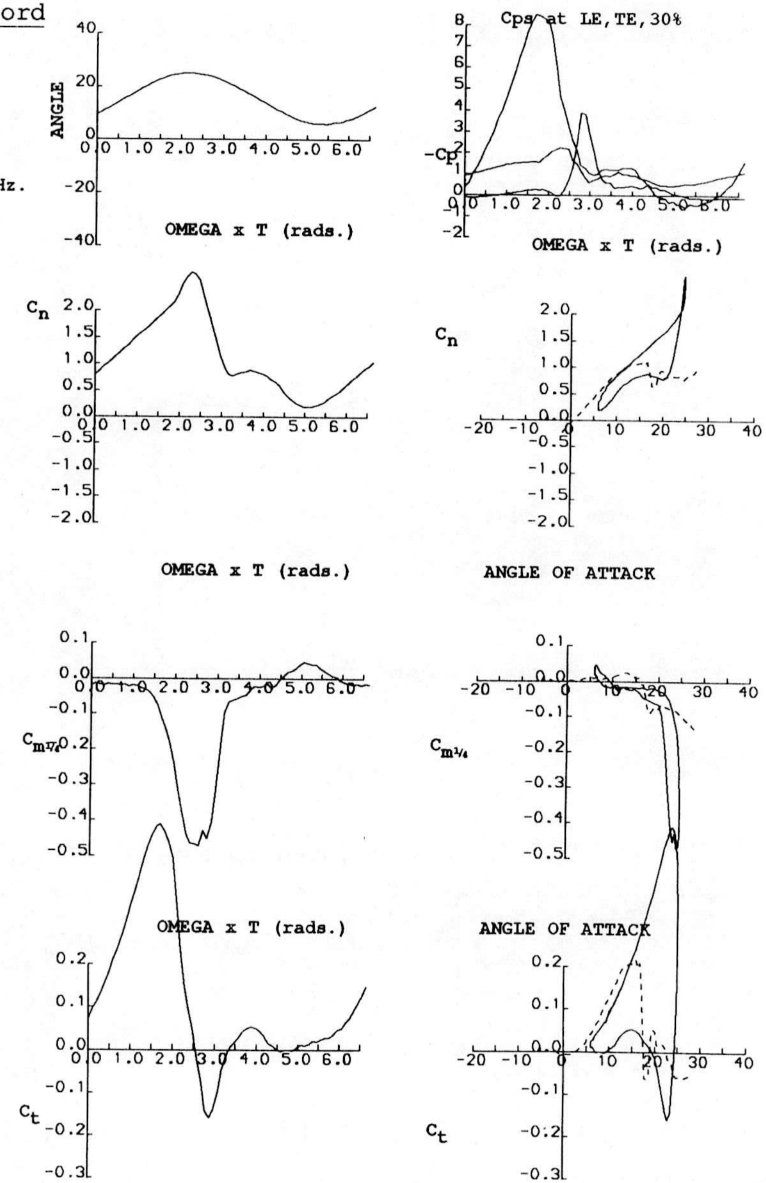


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 10732
REYNOLDS NUMBER = 823829.
DYNAMIC PRESSURE = 1209.63 Nm^{-2}
NUMBER OF CYCLES = 10
MOTION TYPE: SINUSOIDAL
MEAN ANGLE = 15.00°
OSCILLATION FREQUENCY = 8.700 Hz.
AVERAGED DATA OF 10 CYCLES

DATE OF TEST: 26/8/91
MACH NUMBER = 0.130
AIR TEMPERATURE = 23.3°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED FREQUENCY = 0.167
AMPLITUDE = 10.00°

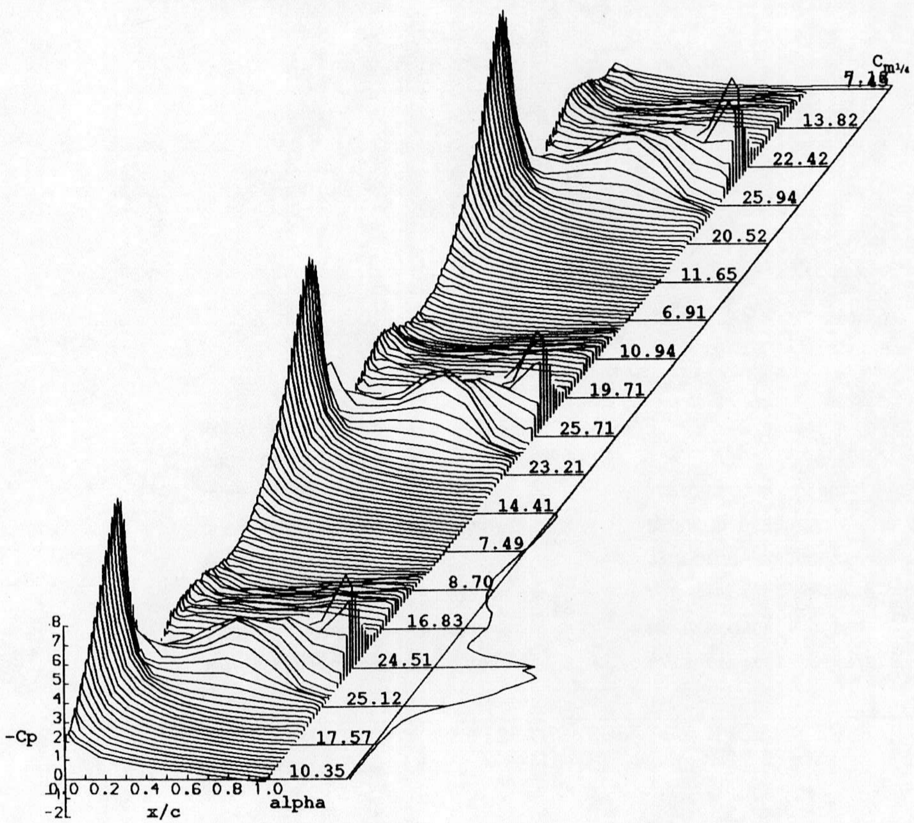


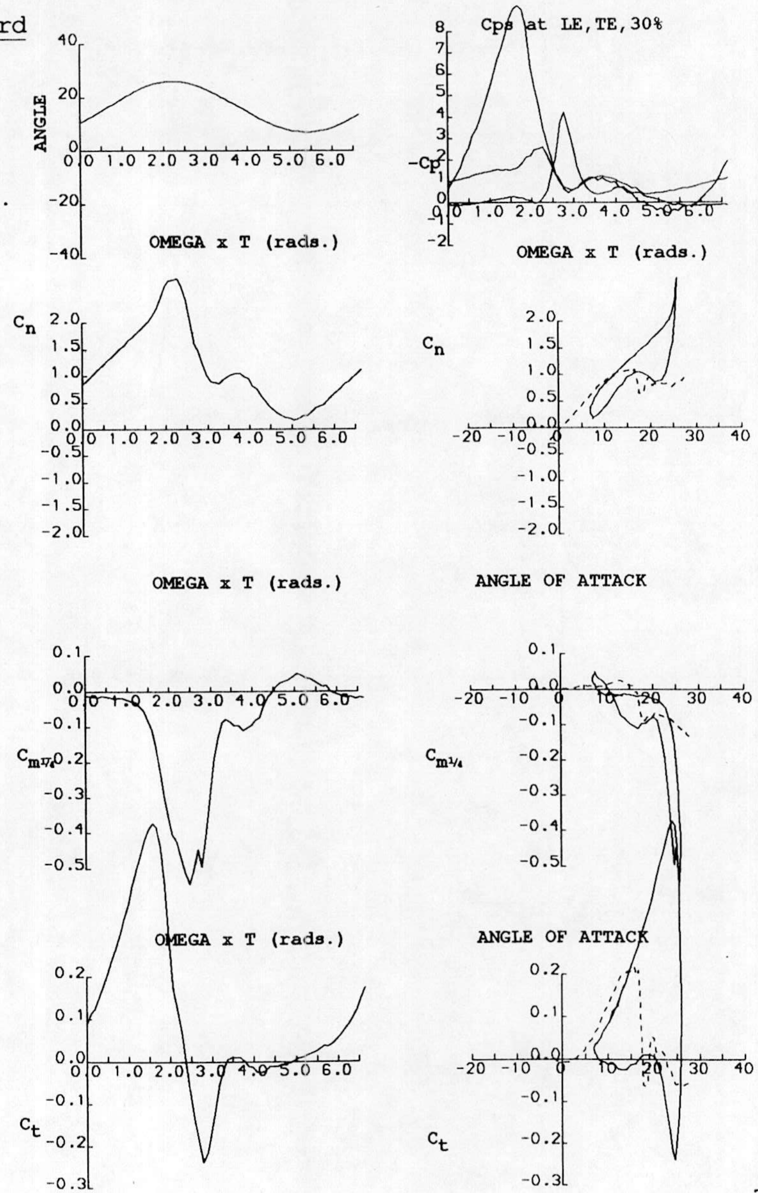


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 10742
REYNOLDS NUMBER = 823116.
DYNAMIC PRESSURE = 1209.63 Nm^{-2}
NUMBER OF CYCLES = 10
MOTION TYPE: SINUSOIDAL
MEAN ANGLE = 16.00°
OSCILLATION FREQUENCY = 8.700 Hz.
AVERAGED DATA OF 10 CYCLES

DATE OF TEST: 26/8/91
MACH NUMBER = 0.130
AIR TEMPERATURE = 23.5°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED FREQUENCY = 0.167
AMPLITUDE = 10.00°

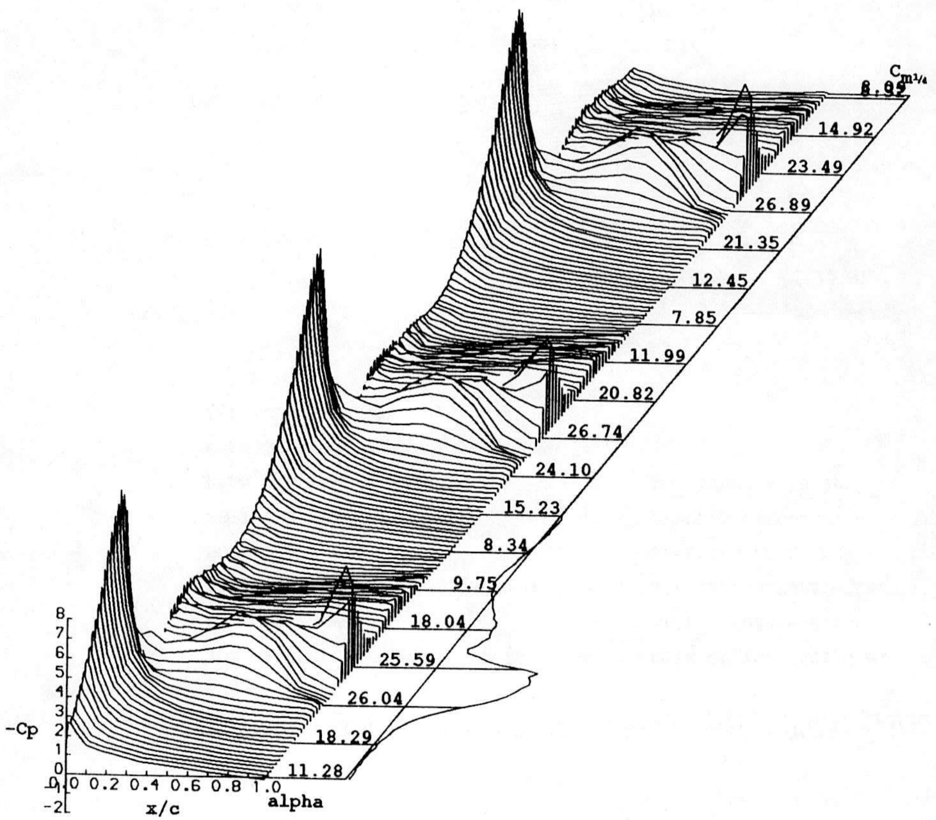


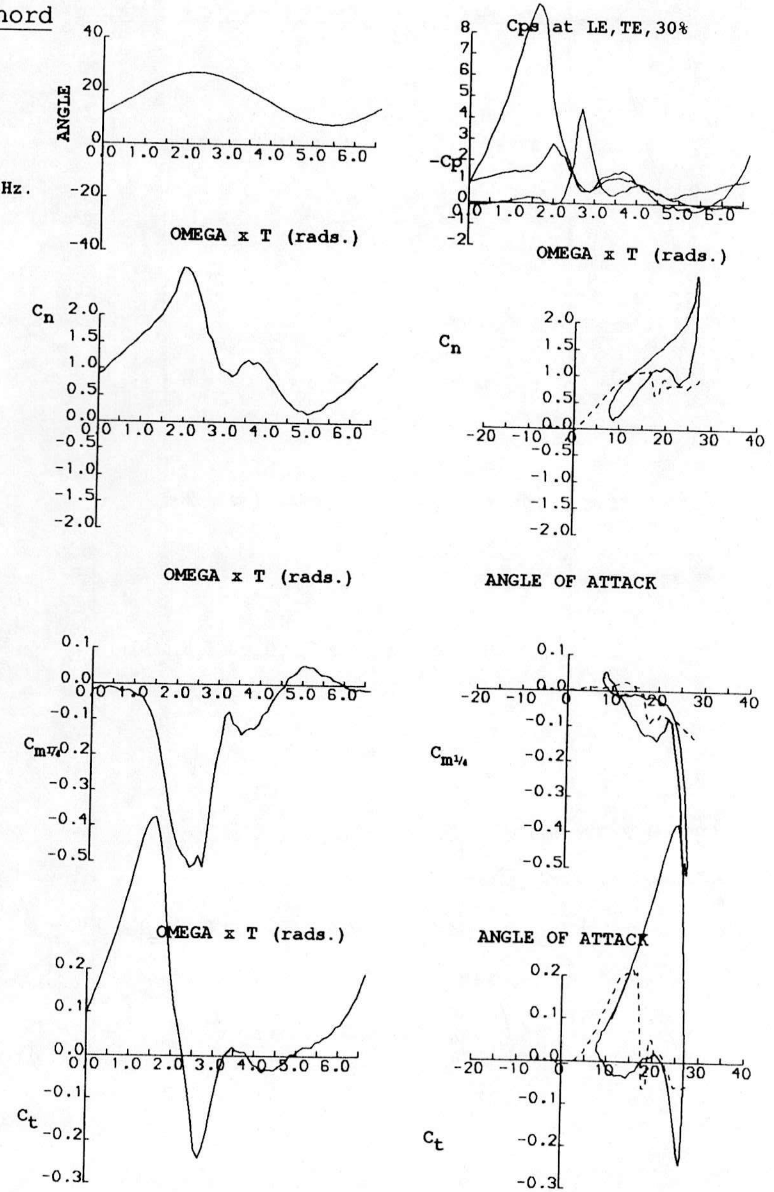


DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 10752
REYNOLDS NUMBER = 822050.
DYNAMIC PRESSURE = 1209.63 Nm^{-2}
NUMBER OF CYCLES = 10
MOTION TYPE: SINUSOIDAL
MEAN ANGLE = 17.00°
OSCILLATION FREQUENCY = 8.700 Hz.
AVERAGED DATA OF 10 CYCLES

DATE OF TEST: 26/8/91
MACH NUMBER = 0.130
AIR TEMPERATURE = 23.8°C
SAMPLING FREQUENCY = 550.05 Hz.
REDUCED FREQUENCY = 0.167
AMPLITUDE = 10.00°





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 10762

REYNOLDS NUMBER = 821340.

DYNAMIC PRESSURE = 1209.63 Nm^{-2}

NUMBER OF CYCLES = 10

MOTION TYPE: SINUSOIDAL

MEAN ANGLE = 18.00°

OSCILLATION FREQUENCY = 8.700 Hz.

AVERAGED DATA OF 10 CYCLES

DATE OF TEST: 26/8/91

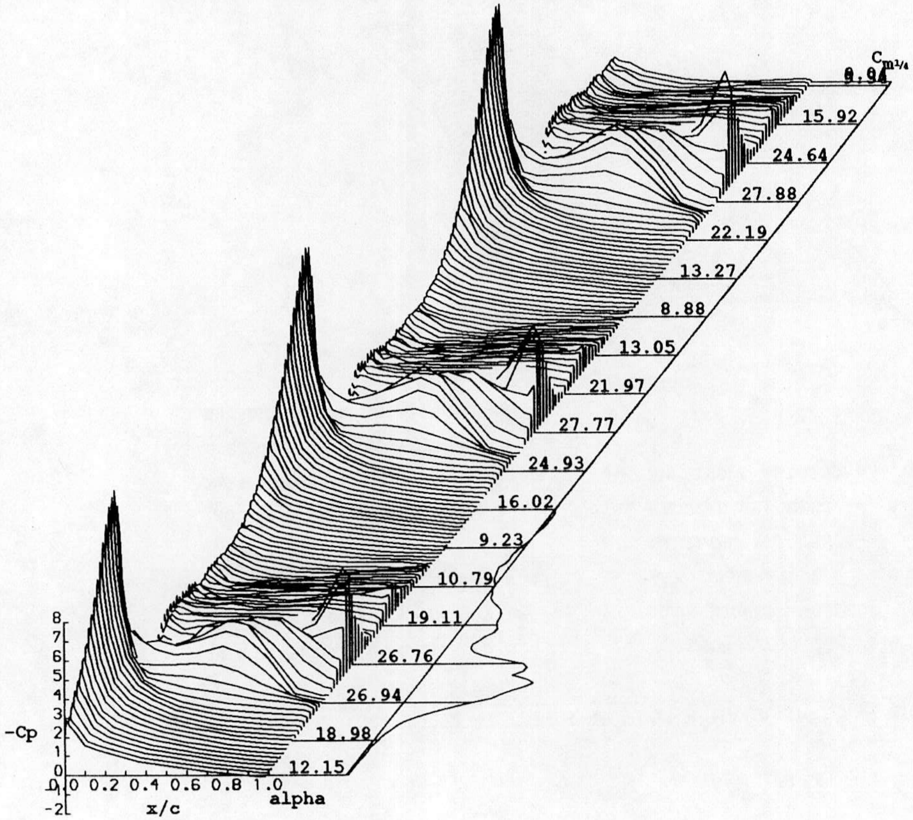
MACH NUMBER = 0.130

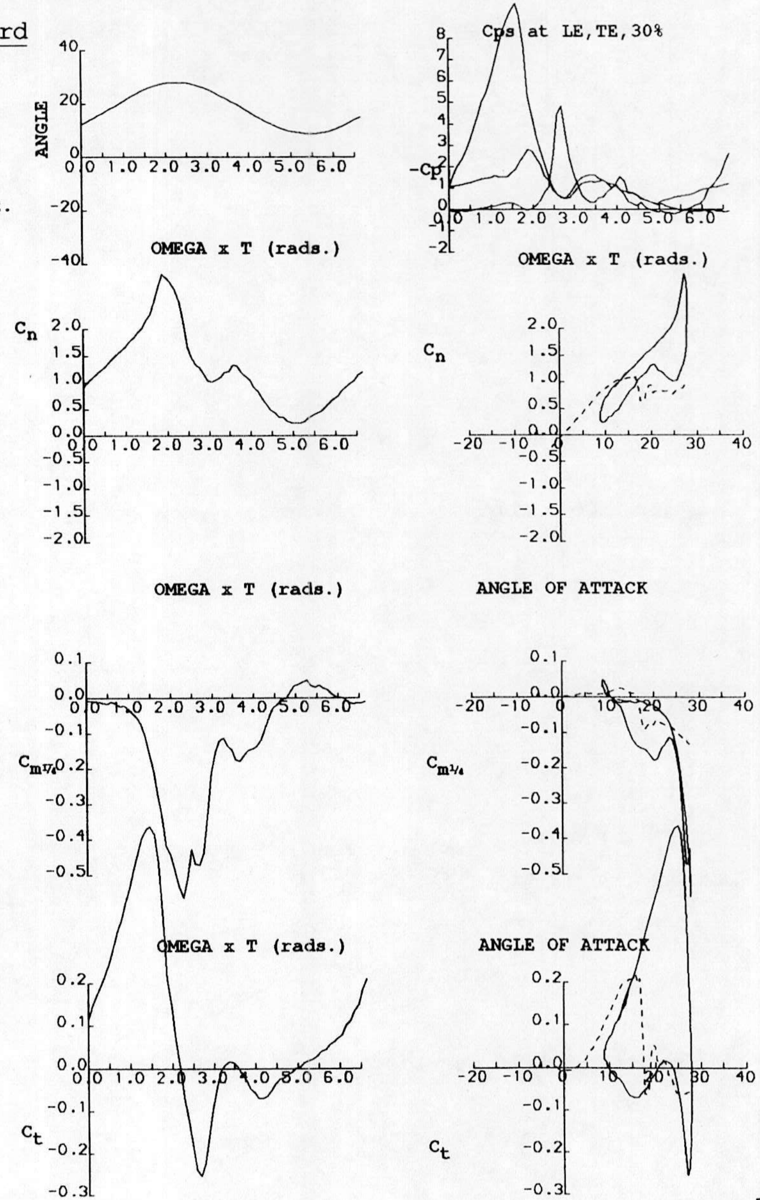
AIR TEMPERATURE = 24.0°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED FREQUENCY = 0.167

AMPLITUDE = 10.00°





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 10772

REYNOLDS NUMBER = 820632.

DYNAMIC PRESSURE = 1209.63 Nm^{-2}

NUMBER OF CYCLES = 10

MOTION TYPE: SINUSOIDAL

MEAN ANGLE = 20.00°

OSCILLATION FREQUENCY = 8.700 Hz.

AVERAGED DATA OF 10 CYCLES

DATE OF TEST: 26/8/91

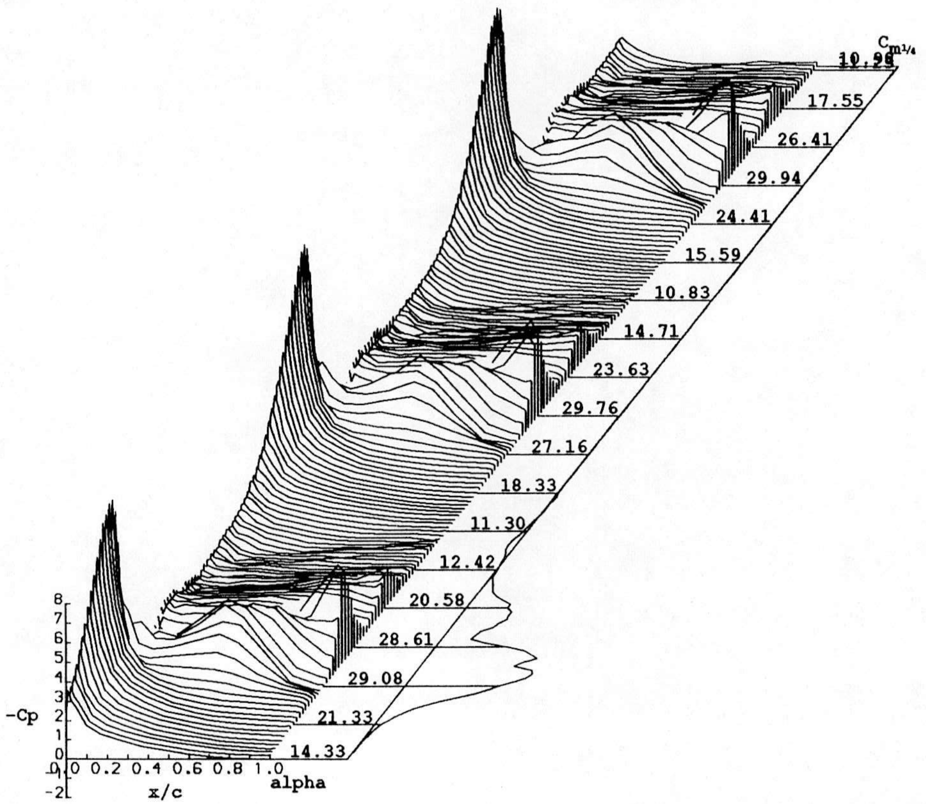
MACH NUMBER = 0.130

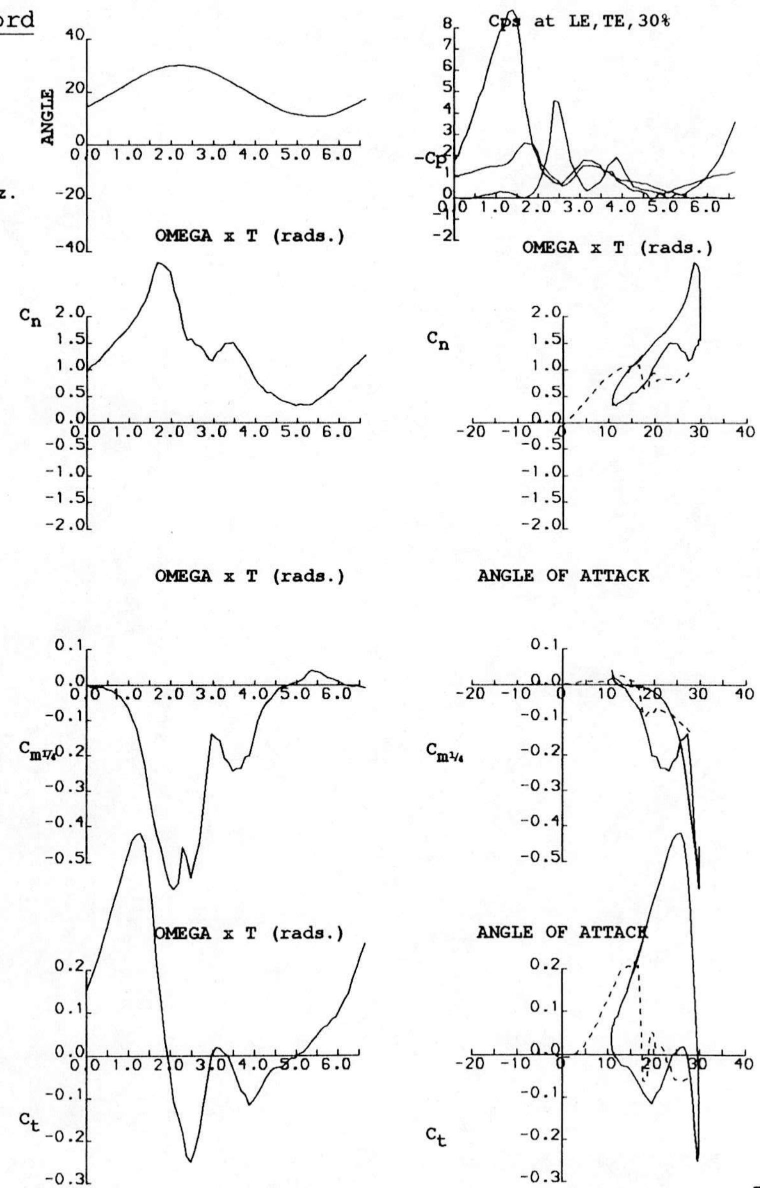
AIR TEMPERATURE = 24.2°C

SAMPLING FREQUENCY = 550.05 Hz.

REDUCED FREQUENCY = 0.167

AMPLITUDE = 10.00°





G.U. Aero Report 9210

UNIVERSITY OF GLASGOW

DEPARTMENT OF AEROSPACE ENGINEERING

PRESSURE DATA FROM

VAWT EXPERIMENTS

DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 51671

REYNOLDS NUMBER = 1578778.

DYNAMIC PRESSURE = 1095.30 Nm^{-2}

NUMBER OF CYCLES = 10

MOTION TYPE: VAWT FUNCTION

MEAN ANGLE = 0.00°

OSCILLATION FREQUENCY = 3.570 Hz.

AVERAGED DATA OF 10 CYCLES

DATE OF TEST: 5/9/91

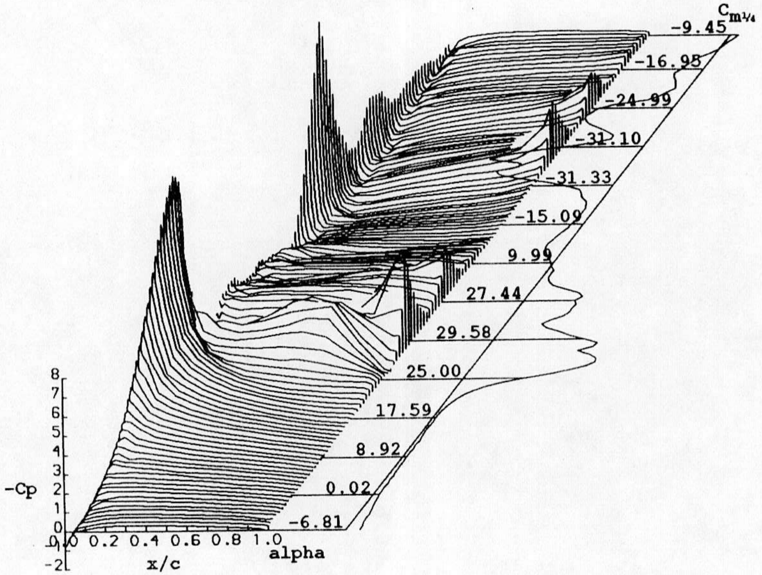
MACH NUMBER = 0.123

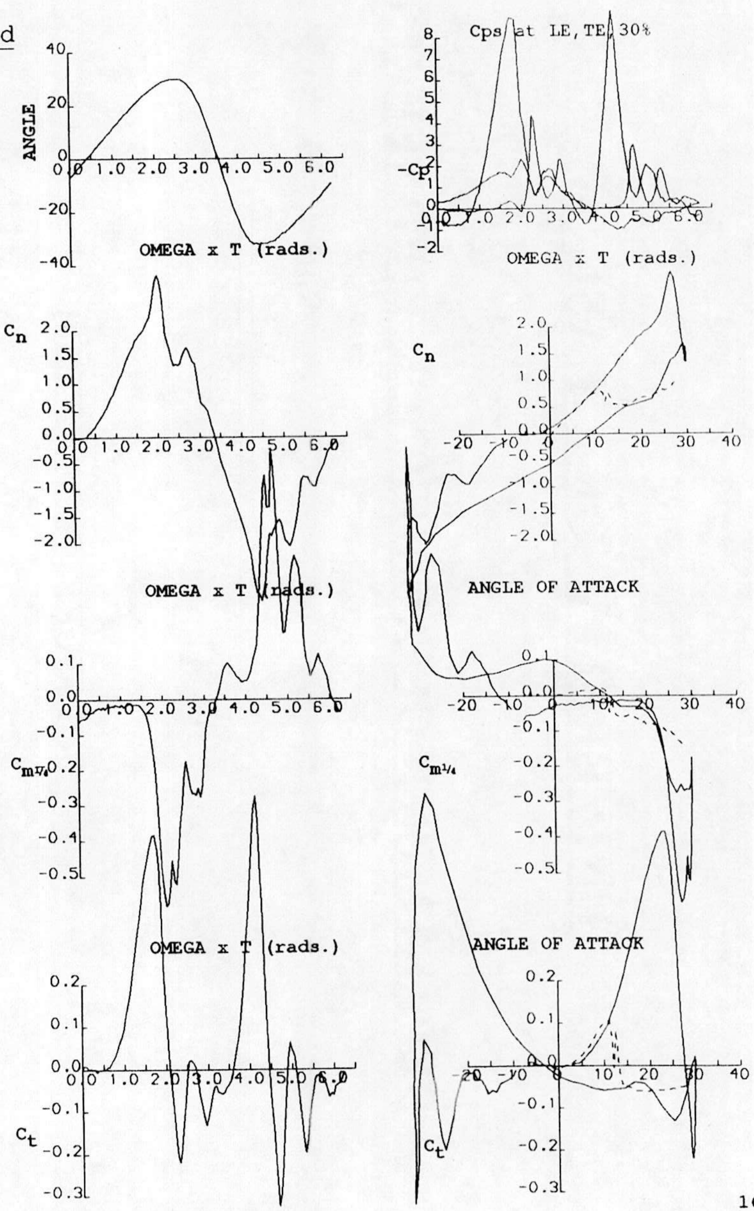
AIR TEMPERATURE = 22.6°C

SAMPLING FREQUENCY = 457.04 Hz.

REDUCED FREQUENCY = 0.145

AMPLITUDE = 32.80°





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 51681

REYNOLDS NUMBER = 1574729.

DYNAMIC PRESSURE = 1091.58 Nm^{-2}

NUMBER OF CYCLES = 10

MOTION TYPE: VAWT FUNCTION

MEAN ANGLE = 0.00°

OSCILLATION FREQUENCY = 2.900 Hz.

AVERAGED DATA OF 10 CYCLES

DATE OF TEST: 5/9/91

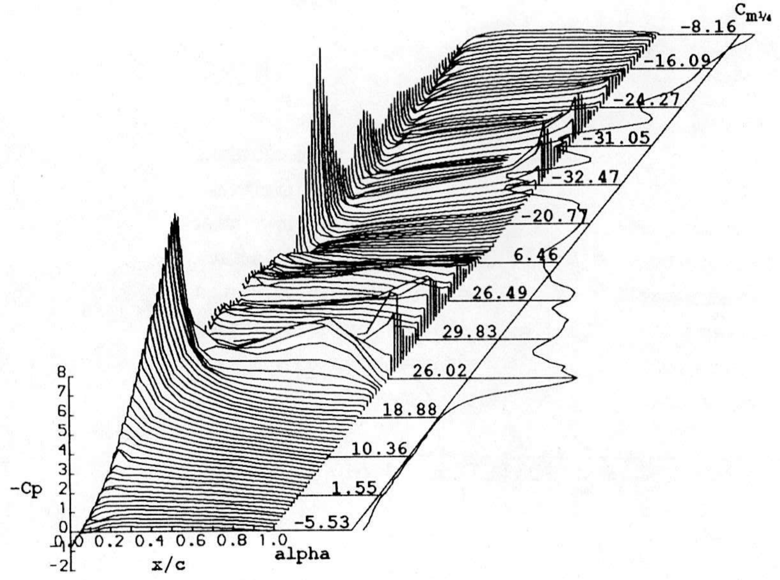
MACH NUMBER = 0.123

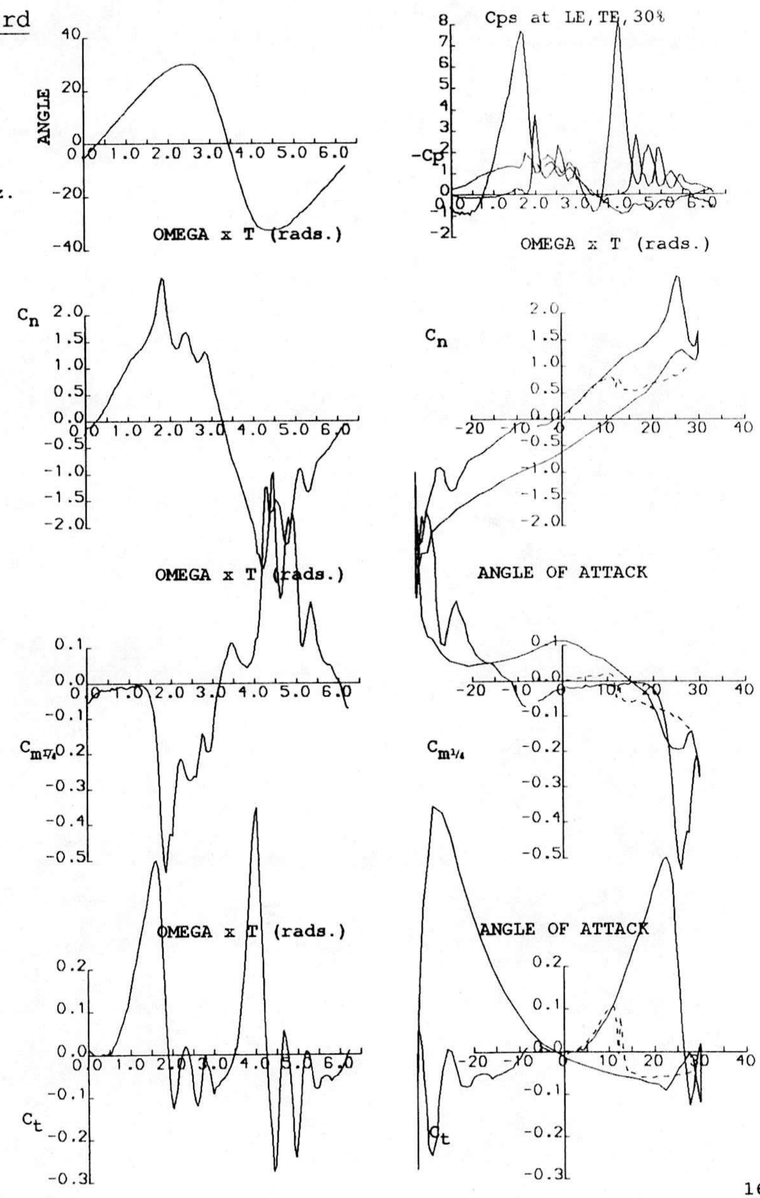
AIR TEMPERATURE = 22.8°C

SAMPLING FREQUENCY = 371.20 Hz.

REDUCED FREQUENCY = 0.118

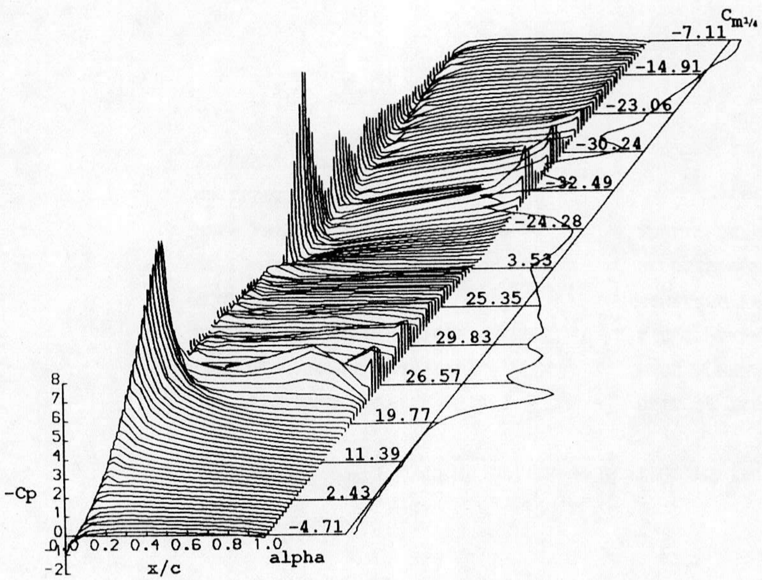
AMPLITUDE = 32.00°

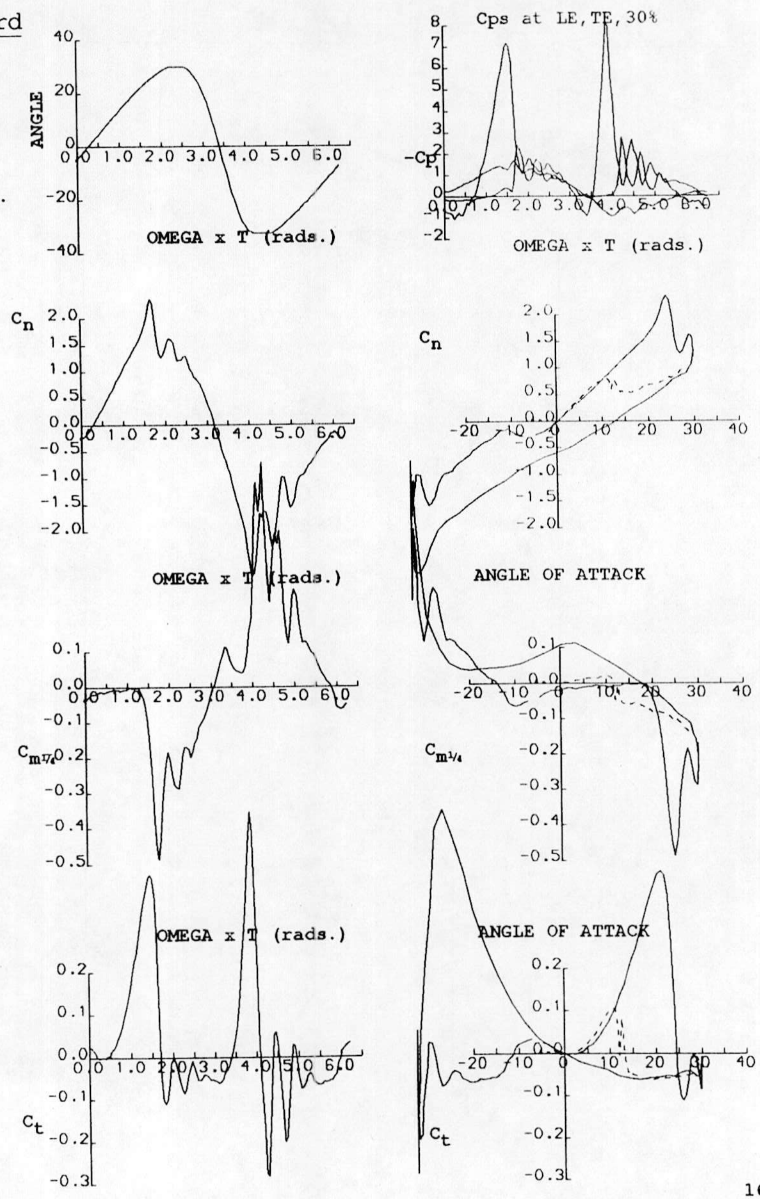




DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 51691	DATE OF TEST: 5/9/91
REYNOLDS NUMBER = 1570522.	MACH NUMBER = 0.123
DYNAMIC PRESSURE = 1089.52 Nm^{-2}	AIR TEMPERATURE = 23.2°C
NUMBER OF CYCLES = 10	SAMPLING FREQUENCY = 304.60 Hz.
MOTION TYPE: VAWT FUNCTION	REDUCED FREQUENCY = 0.097
MEAN ANGLE = 0.00°	AMPLITUDE = 32.80°
OSCILLATION FREQUENCY = 2.380 Hz.	
AVERAGED DATA OF 10 CYCLES	





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 51701

REYNOLDS NUMBER = 1578187.

DYNAMIC PRESSURE = 1094.48 Nm^{-2}

NUMBER OF CYCLES = 10

MOTION TYPE: VAWT FUNCTION

MEAN ANGLE = 0.00°

OSCILLATION FREQUENCY = 1.870 Hz.

AVERAGED DATA OF 10 CYCLES

DATE OF TEST: 5/9/91

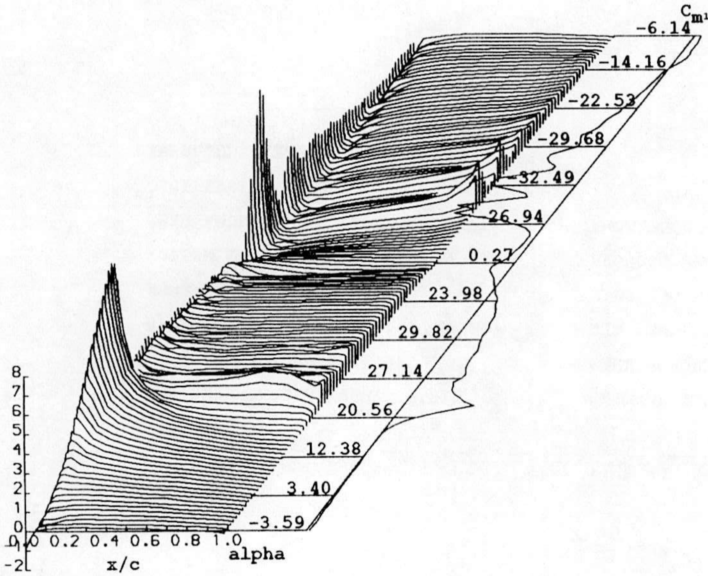
MACH NUMBER = 0.123

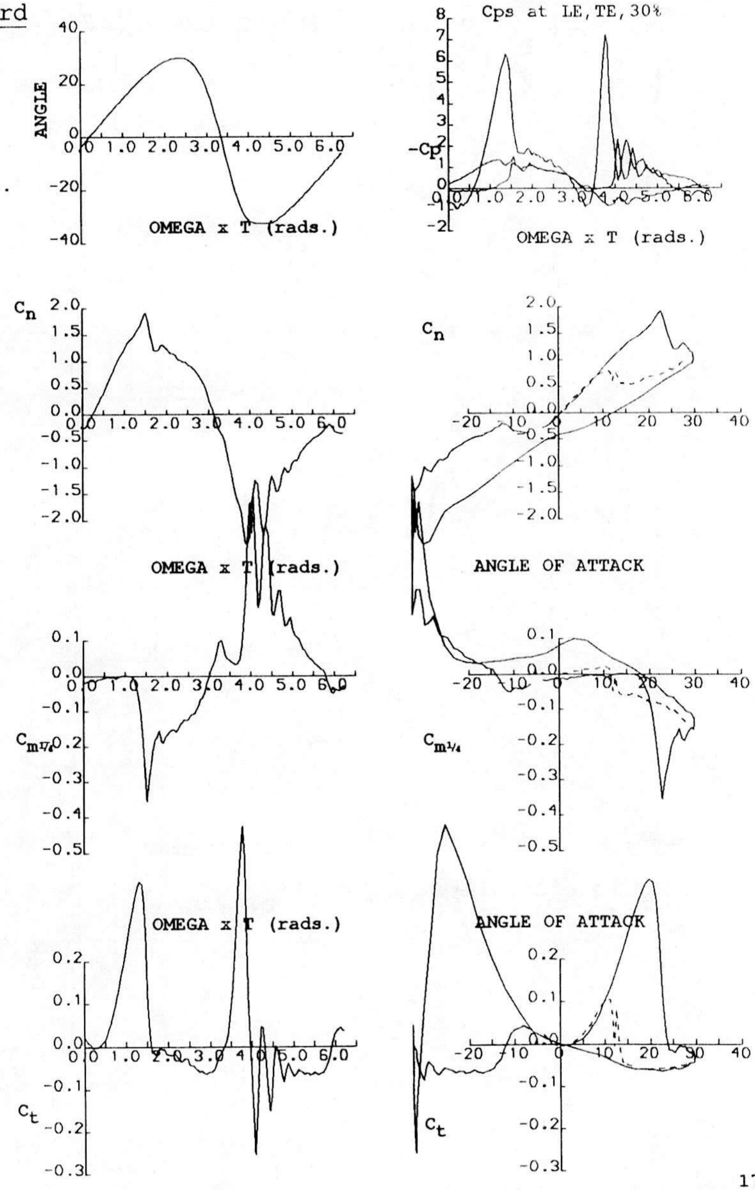
AIR TEMPERATURE = 22.6°C

SAMPLING FREQUENCY = 239.35 Hz.

REDUCED FREQUENCY = 0.076

AMPLITUDE = 32.80°





DYNAMIC CHARACTERISTICS FOR THE NACA 0015 - half chord

RUN REFERENCE NUMBER: 51711

REYNOLDS NUMBER = 1579272.

DYNAMIC PRESSURE = 1107.43 Nm^{-2}

NUMBER OF CYCLES = 10

MOTION TYPE: VAWT FUNCTION

MEAN ANGLE = 0.00°

OSCILLATION FREQUENCY = 0.930 Hz.

AVERAGED DATA OF 10 CYCLES

DATE OF TEST: 5/9/91

MACH NUMBER = 0.124

AIR TEMPERATURE = 23.8°C

SAMPLING FREQUENCY = 119.03 Hz.

REDUCED FREQUENCY = 0.037

AMPLITUDE = 32.80°