H

DOCKET NO. **SA-510**

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C.

Flight Data Recorder Information; Boeing Post-Accident Flight Tests

Boeing Commercial Airplane Group
P.O. Box 3707
Seattle, WA 98124-2207

February 20, 1995
B-U01B-15150-ASI

Mr. Thomas Haueter, AS-10
National Transportation Safety Board
490 L'Enfant Plaza East SW
Washington DC 20594-2000

Subject: USAir 737-300 Accident, N513AU/PP033, Near Pittsburgh, September 8, 1994 - FDR Post-Accident Flight Test Data

BOEING

Reference: Public Hearing Action Item List distributed January 27, 1995 in Pittsburgh

Dear Mr. Haueter:

The following is in response to the reference item:

Flight data recorder information from all post-accident flight tests.

Flight data recorder information for two post-accident flight tests is enclosed. Figures 1-9 show FDR data from a Boeing 737-300 flight test on October 7, 1994. The primary purpose of this flight test was to evaluate response to a rudder input while in a banked turn for simulator validation. Figure 8 shows a constant heading steady sideslip and figure 9 shows a wings level steady sideslip.

Figures 10-16 show FDR data from a Boeing 737-300 on November 22, 1994. The purpose of this flight test was to assess the effects of a simulated yaw damper hardover on roll and yaw characteristics relative to the Continental Airlines incident on April 11, 1994 near San Pedro Sula, Honduras.

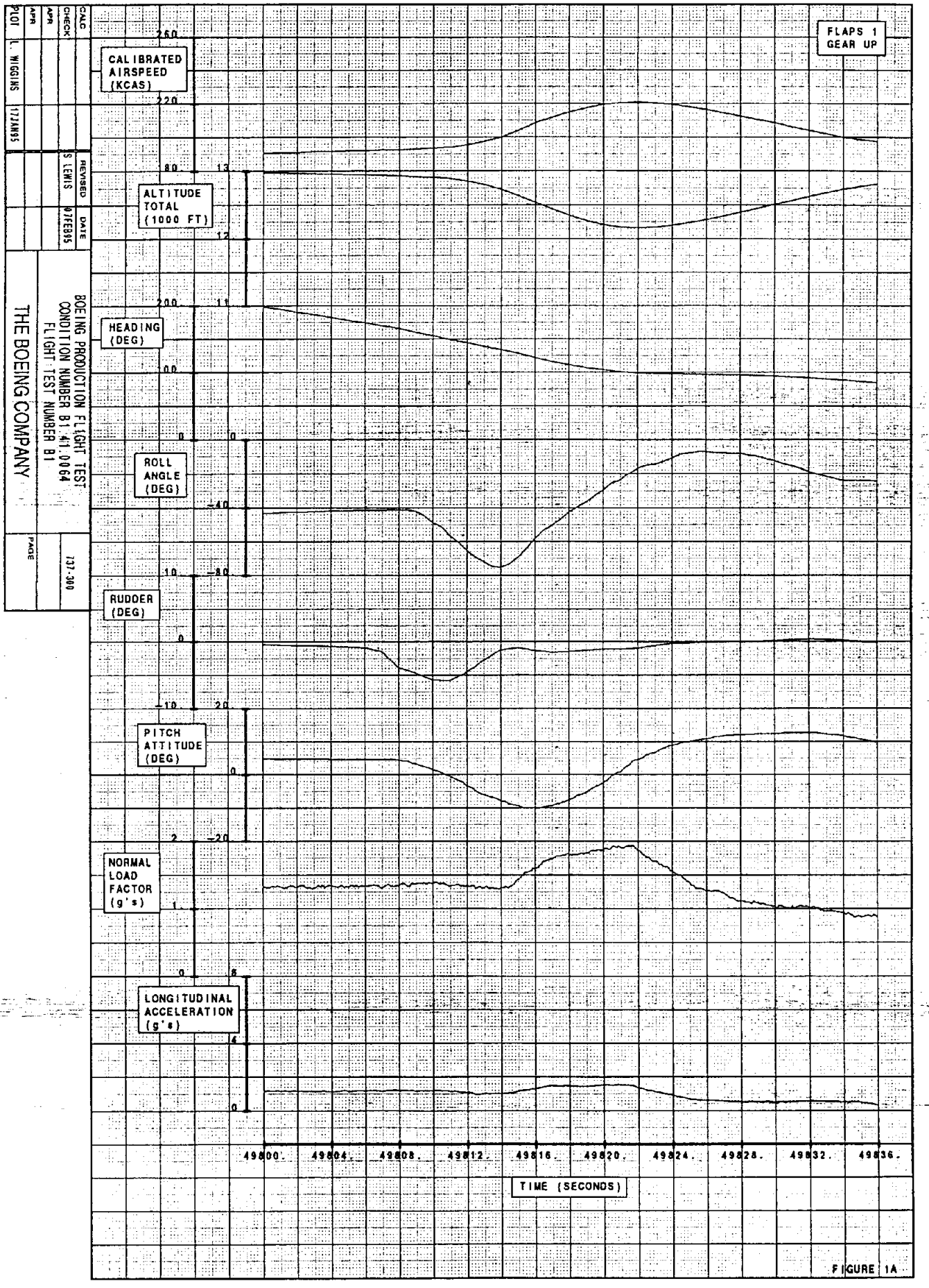
If you have questions, please contact Rick Howes, [redacted] or me.

Very truly yours,

FLIGHT TEST

[redacted]
for John W. Purvis
Director, Air Safety Investigation
Org. B-U01B, M/S 14-HM
Telex 32-9430, STA DIR PURVIS
[redacted]

Enclosures: Boeing data plots, 32 sheets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CONDITION NUMBER B1.411.0064
FLIGHT TEST NUMBER B1
737-300
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PLOT
L. WIGGINS
17JAN95
CALC
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S LEWIS
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DATE
FLAPS 1
GEAR UP
CALIBRATED AIRSPEED (KCAS)
260
220
ALTITUDE TOTAL (1000 FT)
80
13
12
HEADING (DEG)
200
11
00
ROLL ANGLE (DEG)
0
0
-40
RUDDER (DEG)
10
-80
0
PITCH ATTITUDE (DEG)
20
0
-10
-20
NORMAL LOAD FACTOR (g's)
2
1
0
LONGITUDINAL ACCELERATION (g's)
8
4
0
49800.
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49808.
49812.
49816.
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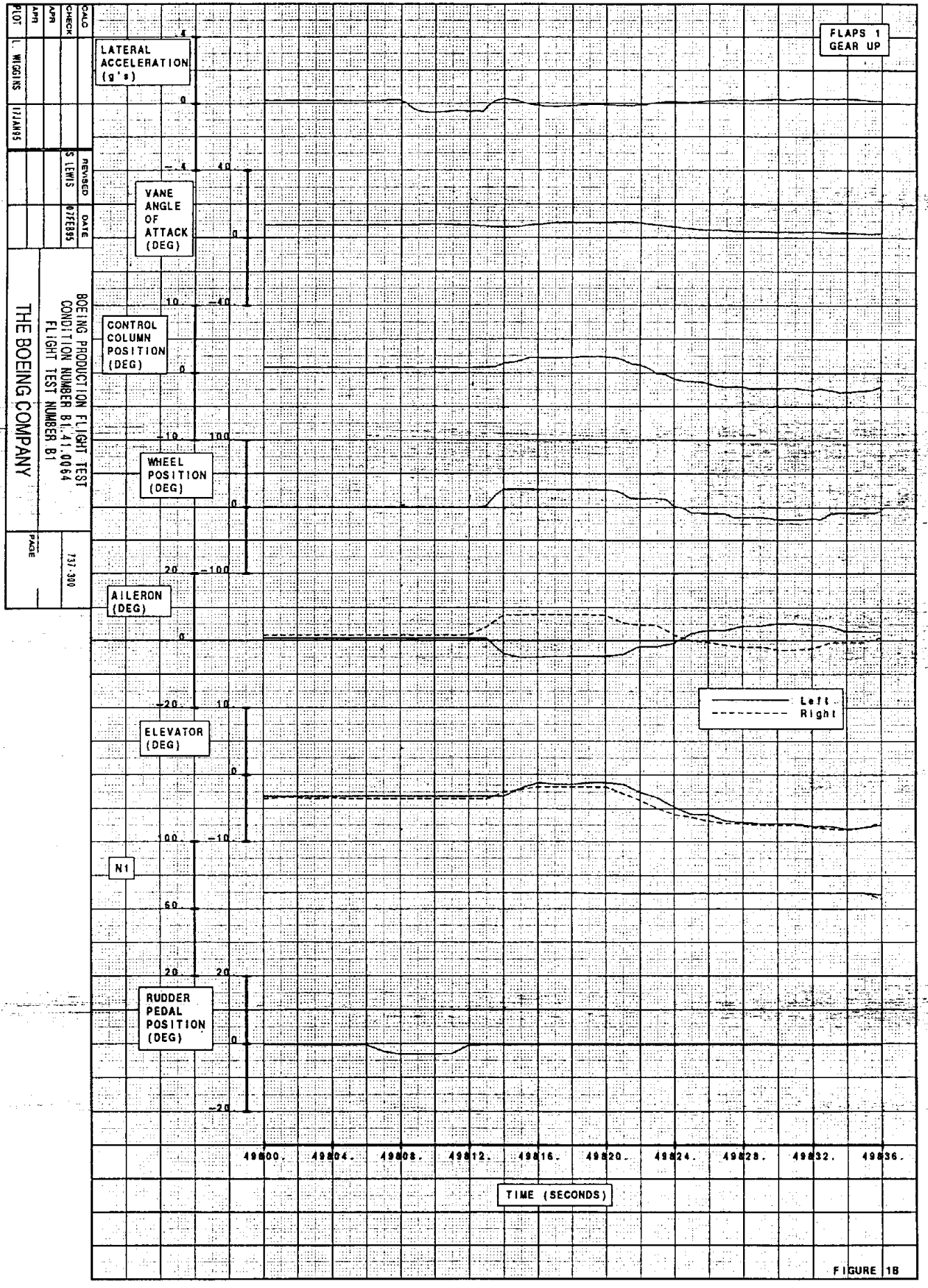
49824.
49828.
49832.
49836.
TIME (SECONDS)

FIGURE 1A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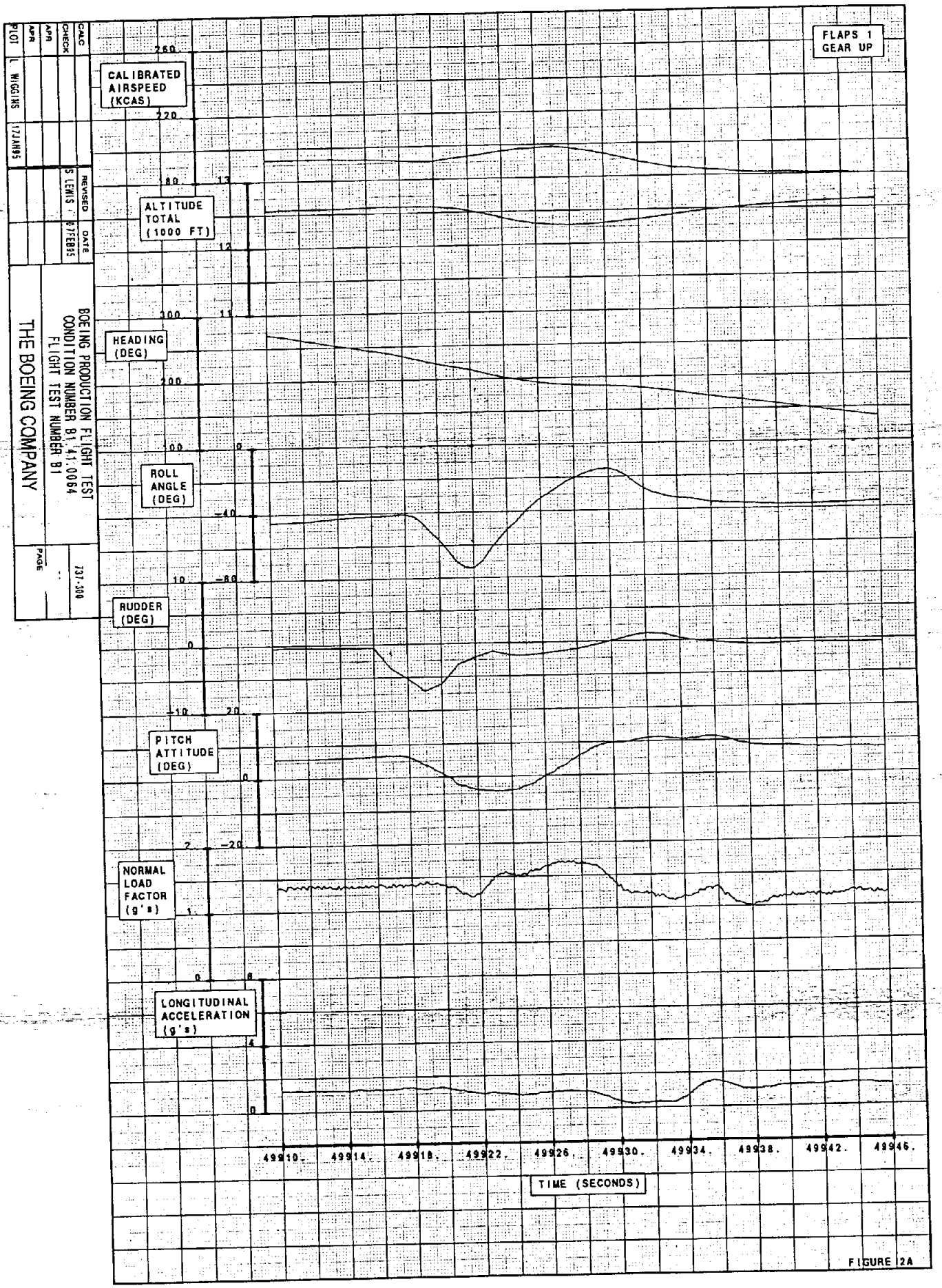
07FEB95
REVISED
DATE
FLAPS 1
GEAR UP
LATERAL ACCELERATION (g's)
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
Left
Right
49600.
49604.
49608.
49612.
49616.
49620.
49624.
49628.
49632.
49636.
TIME (SECONDS)

FIGURE 18


FLAPS 1
GEAR UP
CALIBRATED AIRSPEED (KCAS)
260
220
ALTITUDE TOTAL (1000 FT)
180
13
12
HEADING (DEG)
100
11
200
ROLL ANGLE (DEG)
100
0
-40
RUDDER (DEG)
10
-80
0
PITCH ATTITUDE (DEG)
-10
20
0
NORMAL LOAD FACTOR (g's)
2
-20
1
LONGITUDINAL ACCELERATION (g's)
0
8
4
0
49910.
49914.
49918.
49922.
49926.
49930.
49934.
49938.
49942.
49946.
TIME (SECONDS)
PLOT L WIGGINS 17JAN95
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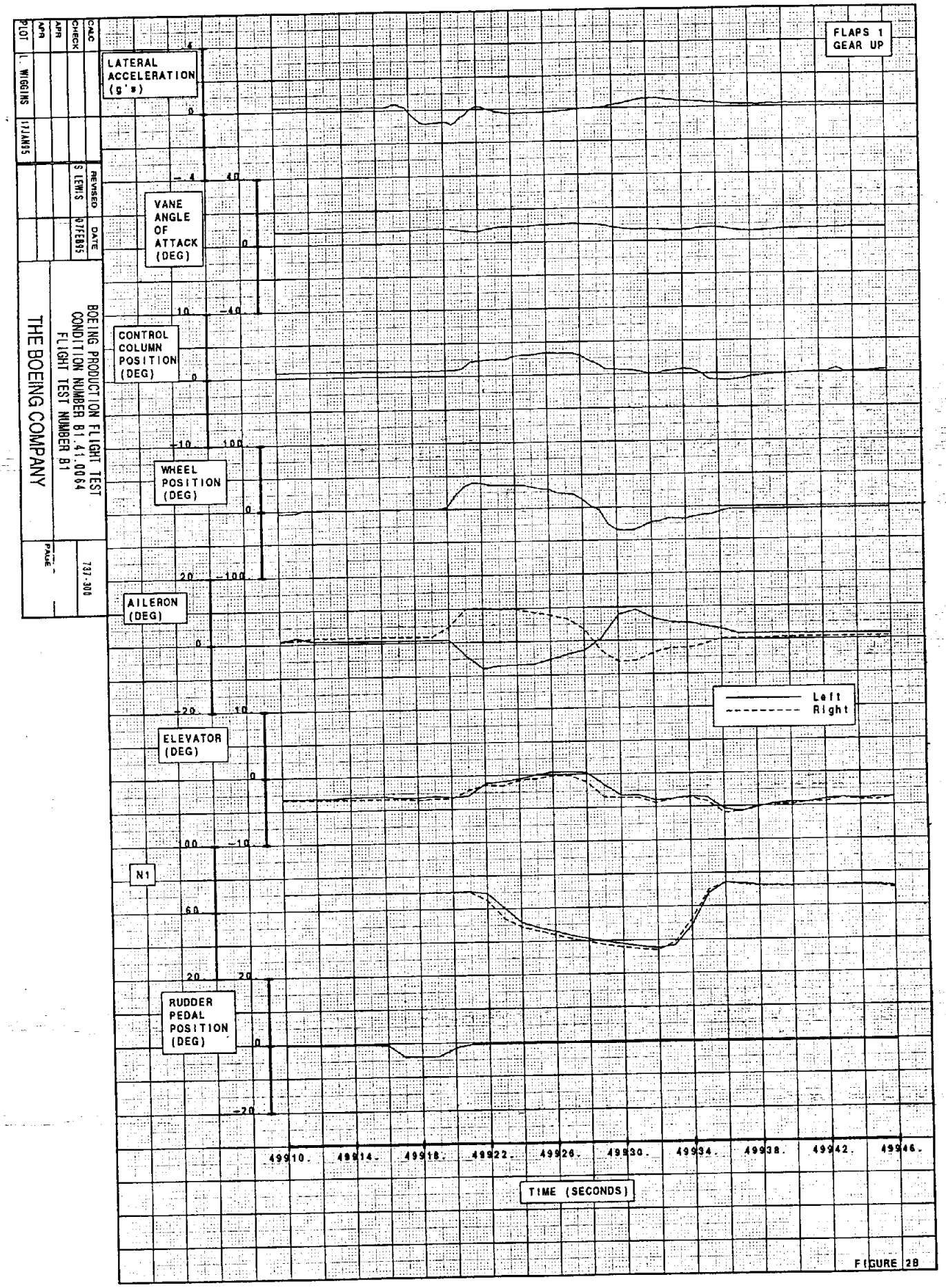
DATE
BOEING PRODUCTION FLIGHT TEST
CONDITION NUMBER B1.41.0064
FLIGHT TEST NUMBER B1
THE BOEING COMPANY
PAGE
737-300

FIGURE 2A


FLAPS 1
GEAR UP
LATERAL ACCELERATION (g's)
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
Left
Right
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
49910.
49914.
49918.
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49926.
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49946.
TIME (SECONDS)
PLOT L. WIGGINS 17JAN95
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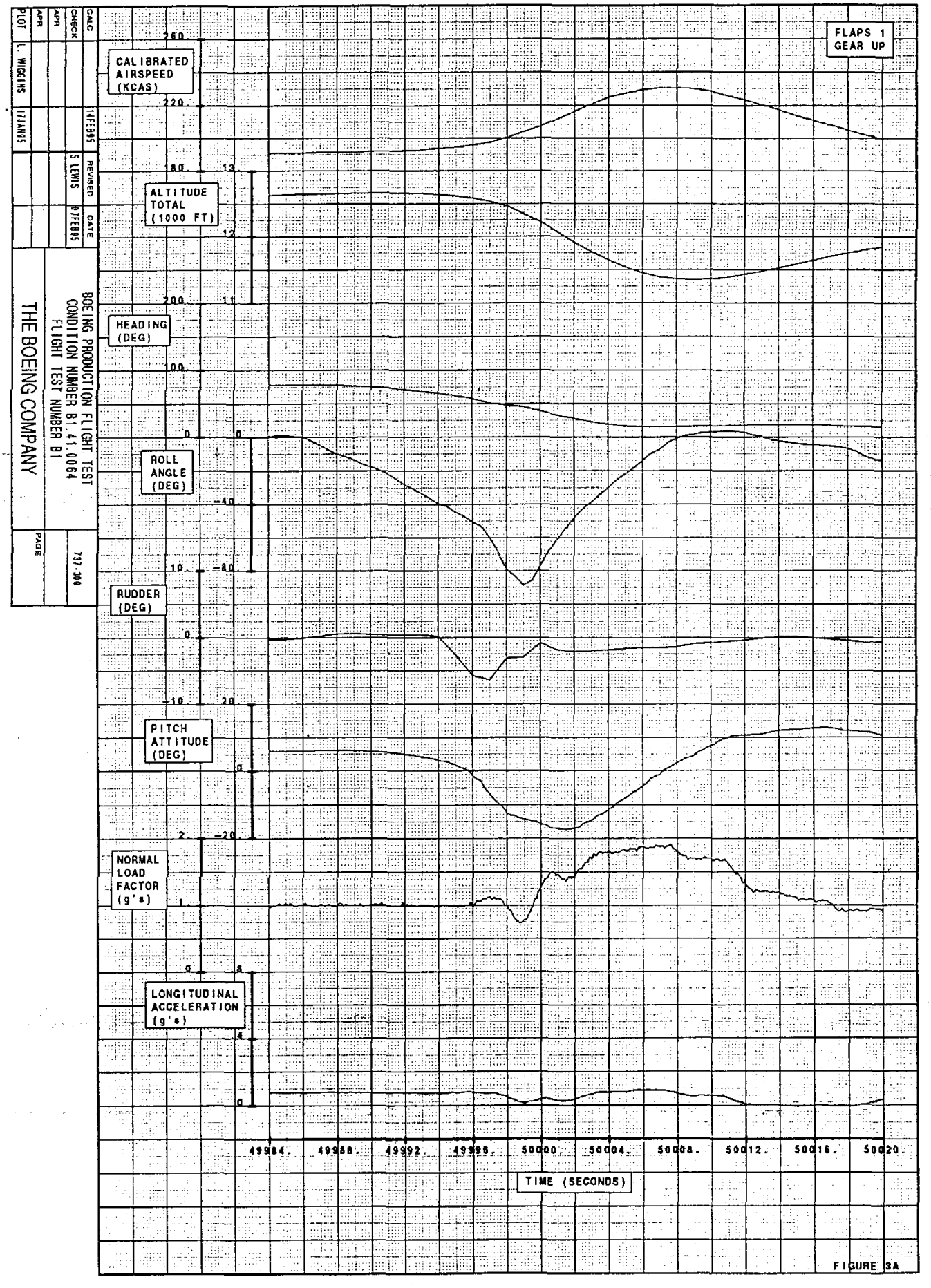
DATE
BOEING PRODUCTION FLIGHT TEST
CONDITION NUMBER B1.41.0064
FLIGHT TEST NUMBER B1
THE BOEING COMPANY
PAGE
737-300

FIGURE 28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CALIBRATED AIRSPEED (KCAS)
260
220
ALTITUDE TOTAL (1000 FT)
80
13
12
HEADING (DEG)
200
11
100
ROLL ANGLE (DEG)
0
0
-40
RUDDER (DEG)
10
-80
0
PITCH ATTITUDE (DEG)
-10
20
0
NORMAL LOAD FACTOR (g's)
2
-20
1
LONGITUDINAL ACCELERATION (g's)
0
.8
.4
0
49984.
49988.
49992.
49996.
50000.
50004.
50008.
50012.
50016.
50020.
TIME (SECONDS)
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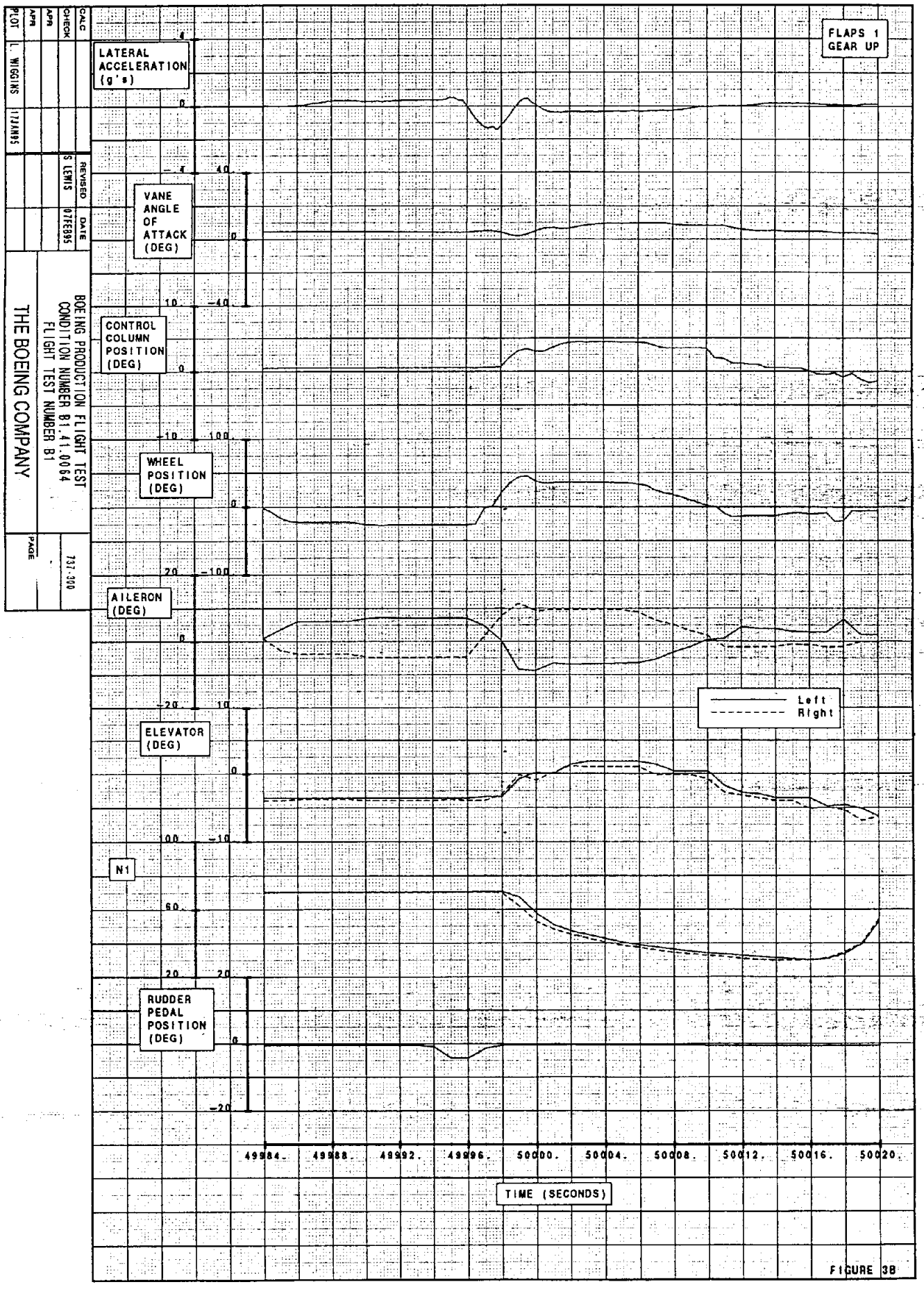
CONDITION NUMBER B1.41.0064
FLIGHT TEST NUMBER B1
737-300
PAGE

FIGURE 3A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DATE
FLAPS 1
GEAR UP
LATERAL ACCELERATION (g's)
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
Left
Right
49984.
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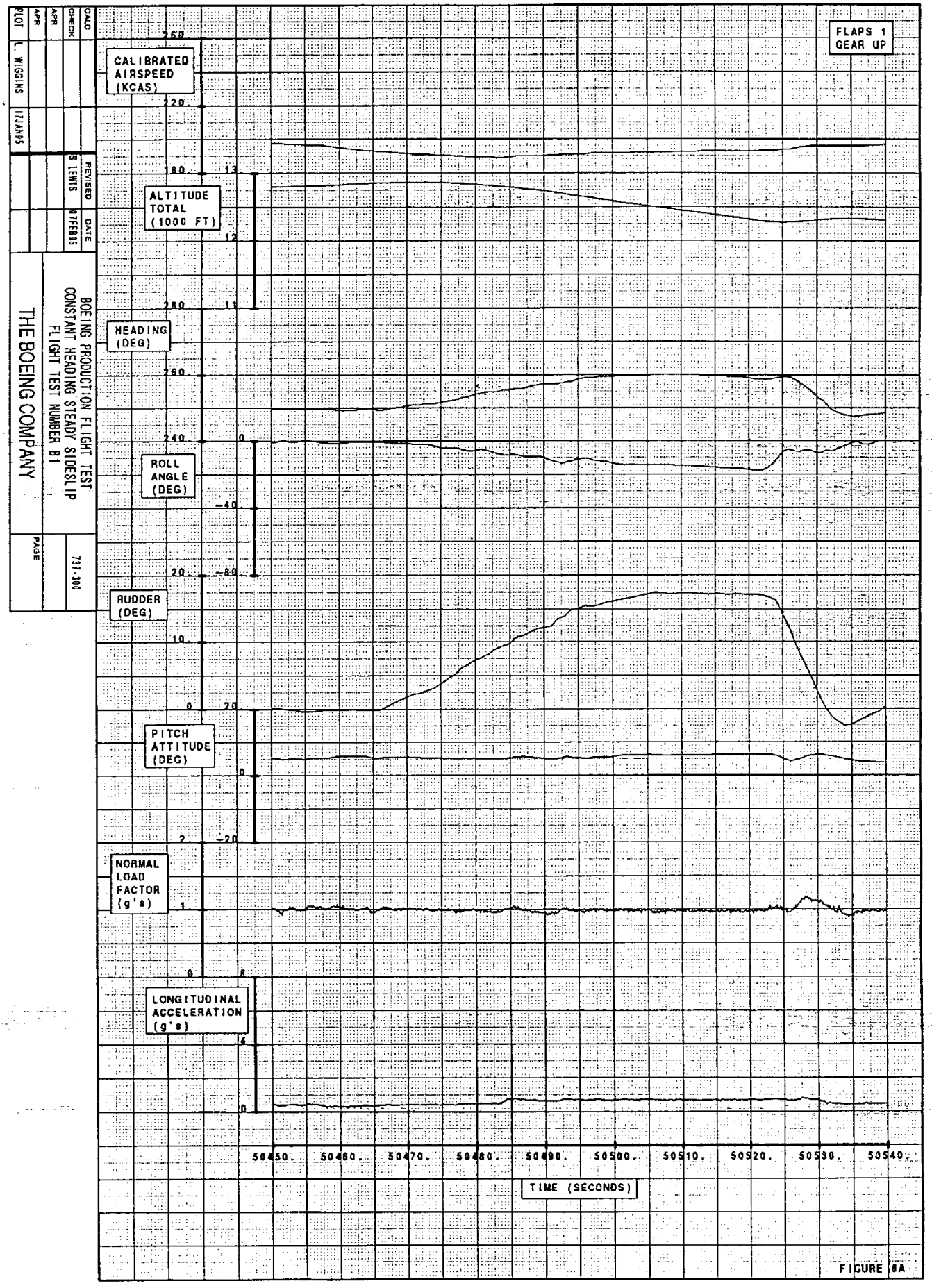
TIME (SECONDS)

FIGURE 38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GEAR UP
CALIBRATED AIRSPEED (KCAS)
250
220
ALTITUDE TOTAL (1000 FT)
180
13
12
HEADING (DEG)
280
260
240
ROLL ANGLE (DEG)
0
-40
-80
RUDDER (DEG)
20
10
0
PITCH ATTITUDE (DEG)
20
0
-20
NORMAL LOAD FACTOR (g's)
2
1
0
LONGITUDINAL ACCELERATION (g's)
8
4
0
50450.
50460.
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FLIGHT TEST NUMBER B1
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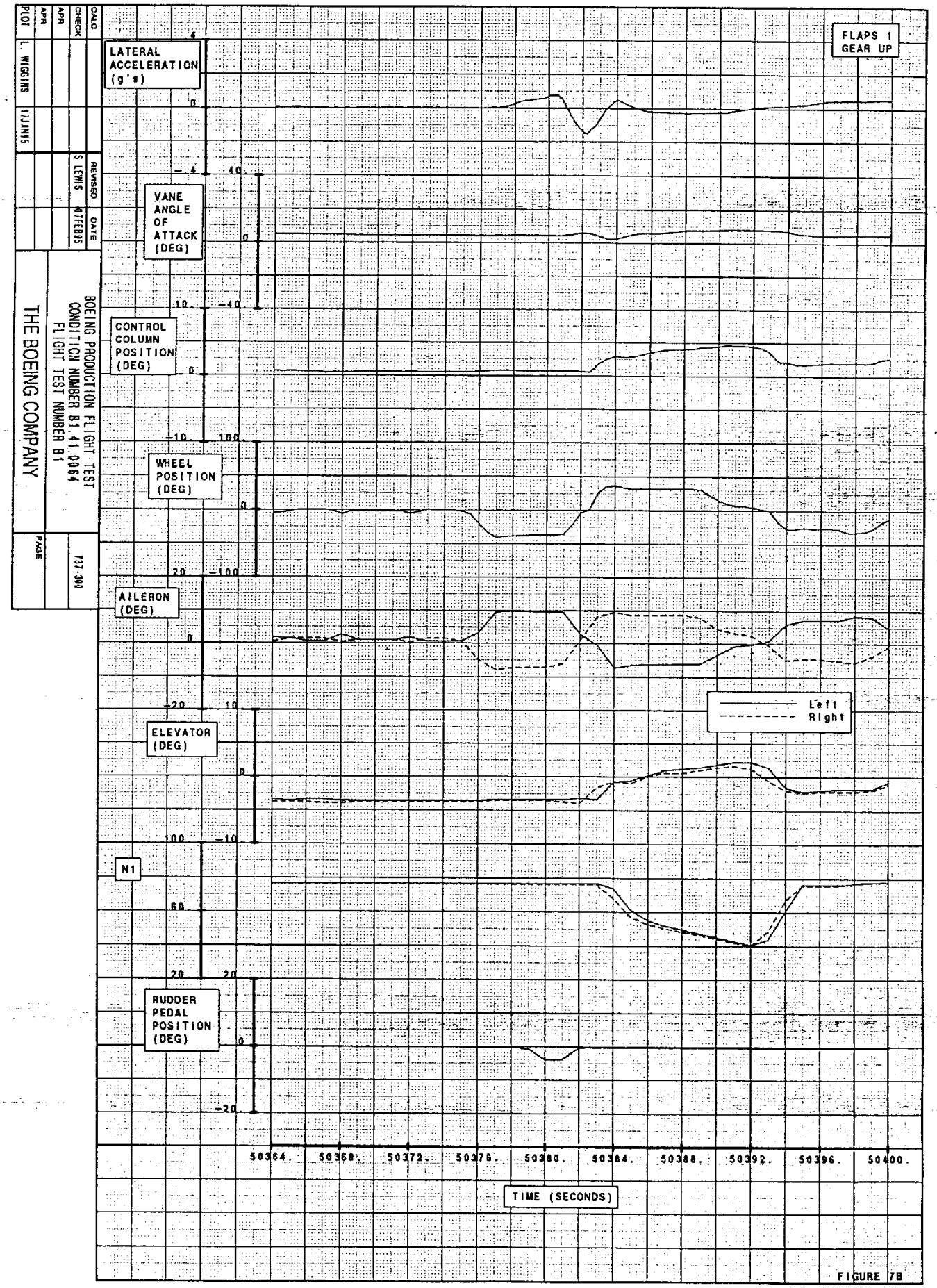
FIGURE 6A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CONDITION NUMBER B1.41.0064
FLIGHT TEST NUMBER B1
PAGE
737-300
FLAPS 1
GEAR UP
LATERAL ACCELERATION (g's)
4
0
VANE ANGLE OF ATTACK (DEG)
4
40
0
10
-40
CONTROL COLUMN POSITION (DEG)
0
WHEEL POSITION (DEG)
-10
100
0
20
-100
AILERON (DEG)
0
Left
Right
ELEVATOR (DEG)
-20
10
0
100
-10
N1
60
RUDDER PEDAL POSITION (DEG)
20
20
0
-20
50364.
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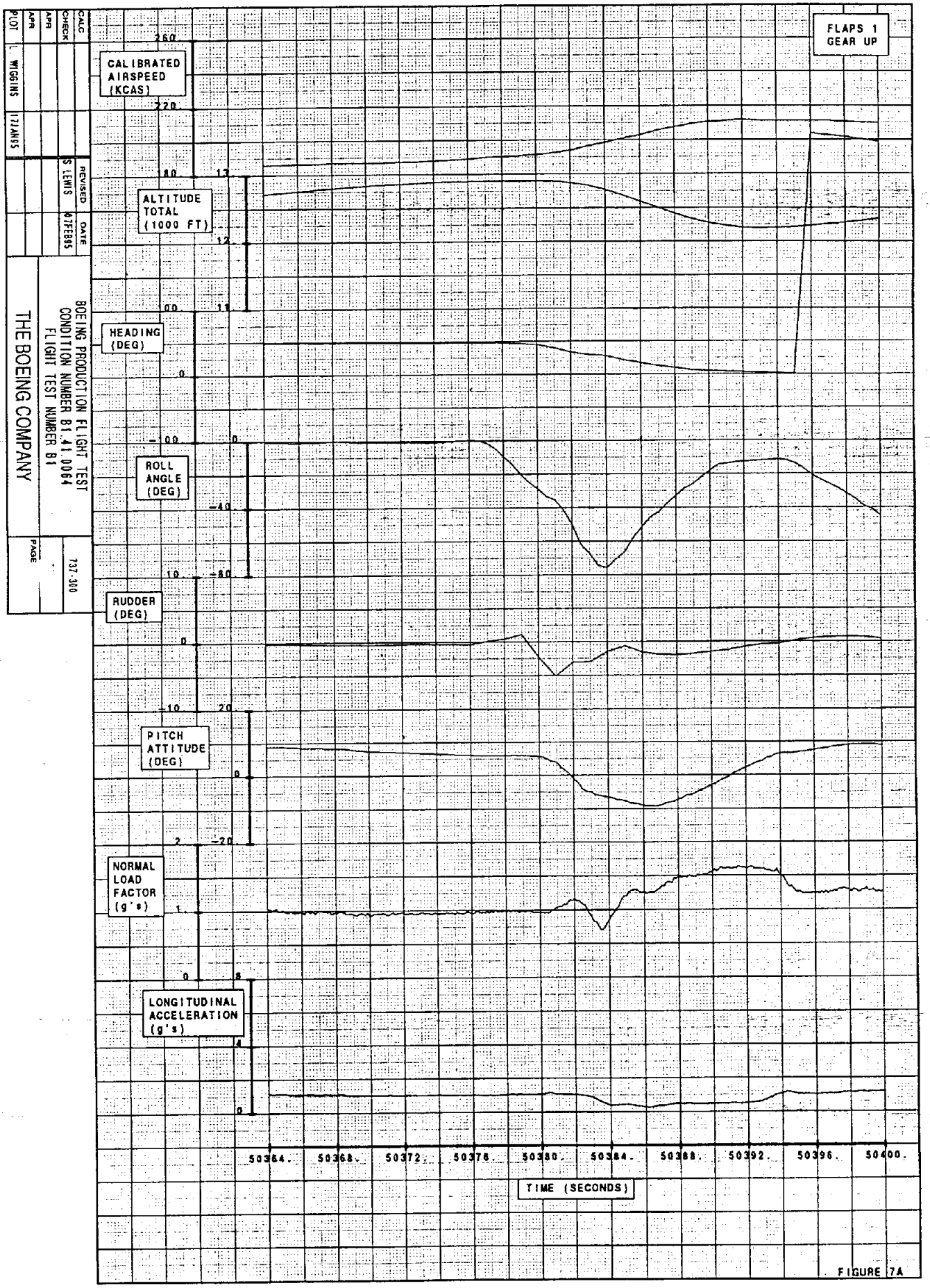
TIME (SECONDS)

FIGURE 7B


FLAPS 1
GEAR UP
CALIBRATED AIRSPEED (KCAS)
260
220
ALTITUDE TOTAL (1000 FT)
13
12
HEADING (DEG)
360
0
ROLL ANGLE (DEG)
40
0
-40
-80
RUDDER (DEG)
10
0
-10
PITCH ATTITUDE (DEG)
20
0
-20
NORMAL LOAD FACTOR (g's)
2
1
0
LONGITUDINAL ACCELERATION (g's)
8
4
0
50364.
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50380.
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50400.
TIME (SECONDS)
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NUMBER B1.41.0064
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737-300
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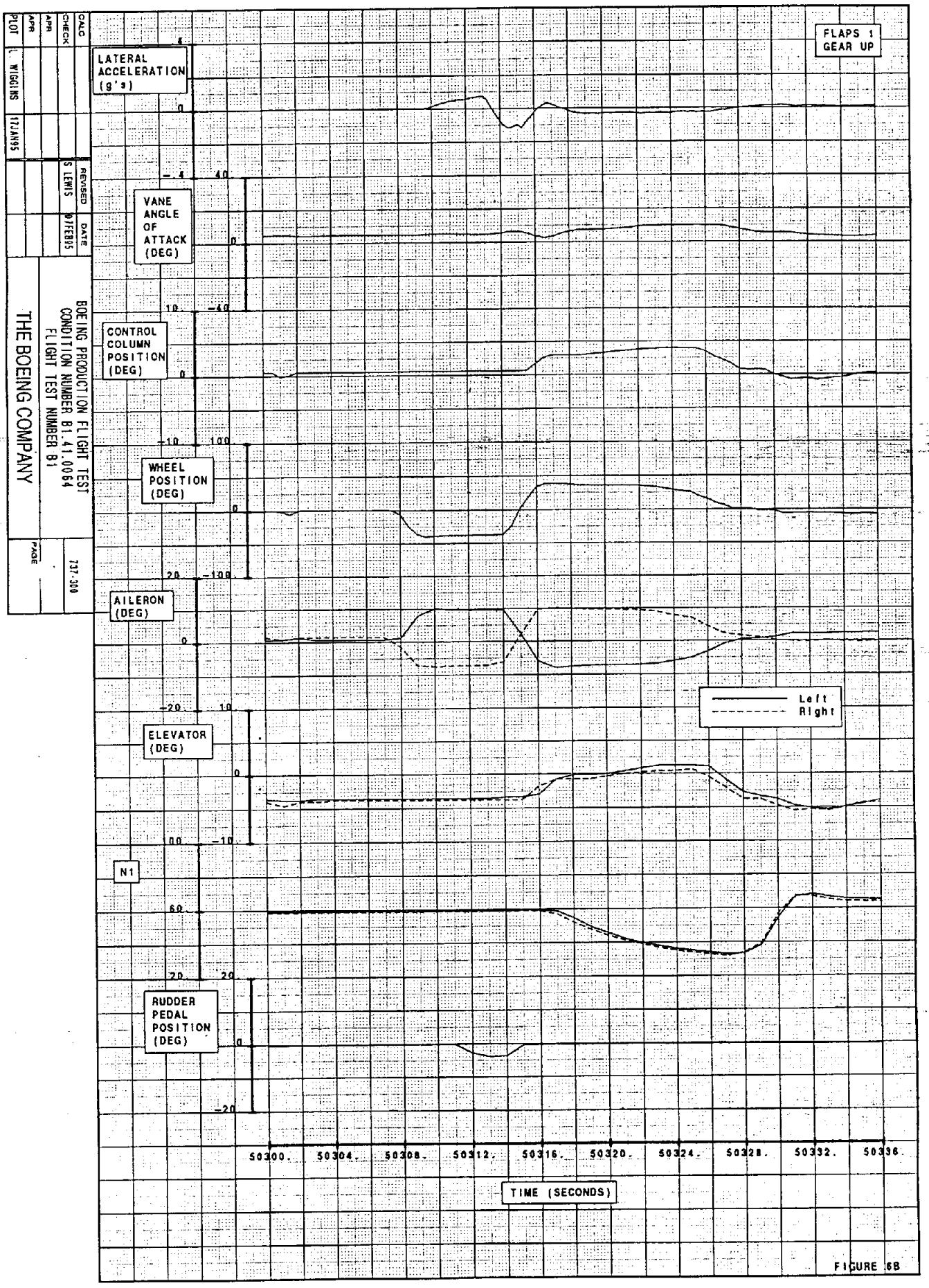
FIGURE 7A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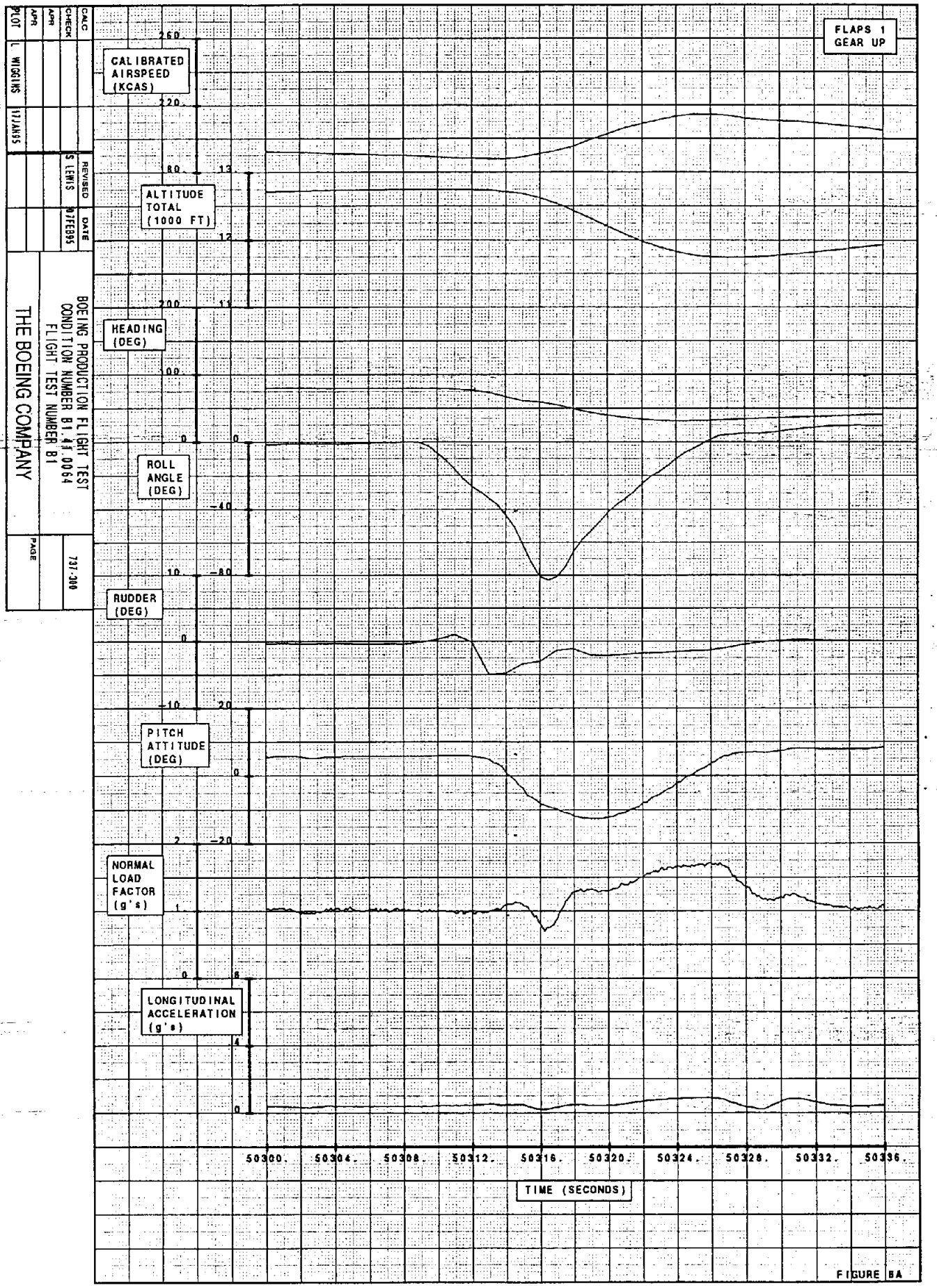
FLIGHT TEST NUMBER B1
737-300
PAGE
FLAPS 1
GEAR UP
LATERAL ACCELERATION (g's)
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
Left
Right
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
50300.
50304.
50308.
50312.
50316.
50320.
50324.
50328.
50332.
50336.
TIME (SECONDS)

FIGURE 6B


FLAPS 1
GEAR UP
CALIBRATED AIRSPEED (KCAS)
260
220
ALTITUDE TOTAL (1000 FT)
13
12
HEADING (DEG)
200
100
ROLL ANGLE (DEG)
0
-40
-80
RUDDER (DEG)
10
0
-10
PITCH ATTITUDE (DEG)
20
0
-20
NORMAL LOAD FACTOR (g's)
2
1
0
LONGITUDINAL ACCELERATION (g's)
8
4
0
50300.
50304.
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50312.
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50328.
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TIME (SECONDS)
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NUMBER B1.4.F.0064
FLIGHT TEST NUMBER B1
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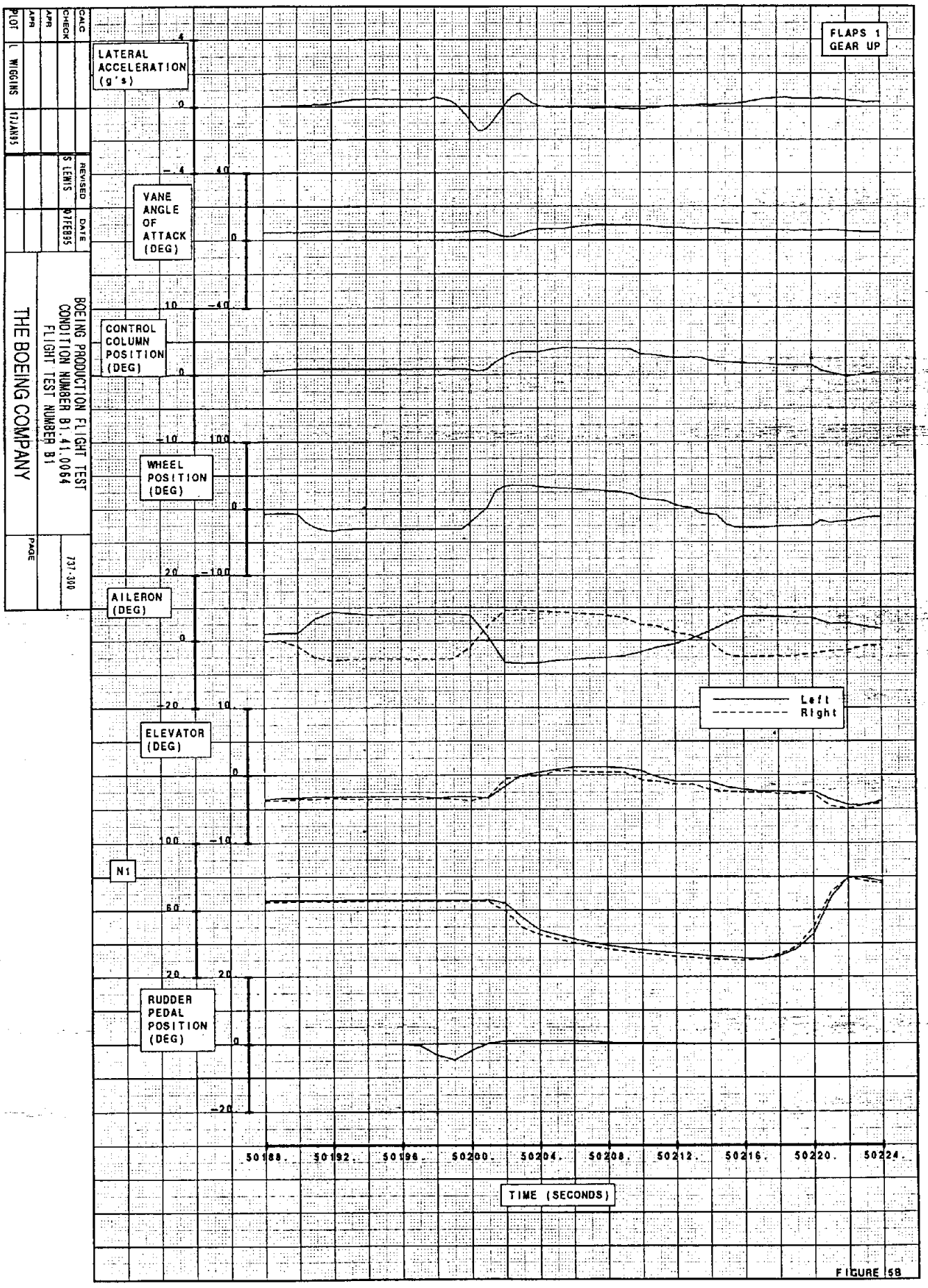
FIGURE 8A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FLIGHT TEST NUMBER B1
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07FEB95
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DATE
PAGE
FLAPS 1
GEAR UP
LATERAL ACCELERATION (g's)
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
Left
Right
50188.
50192.
50196.
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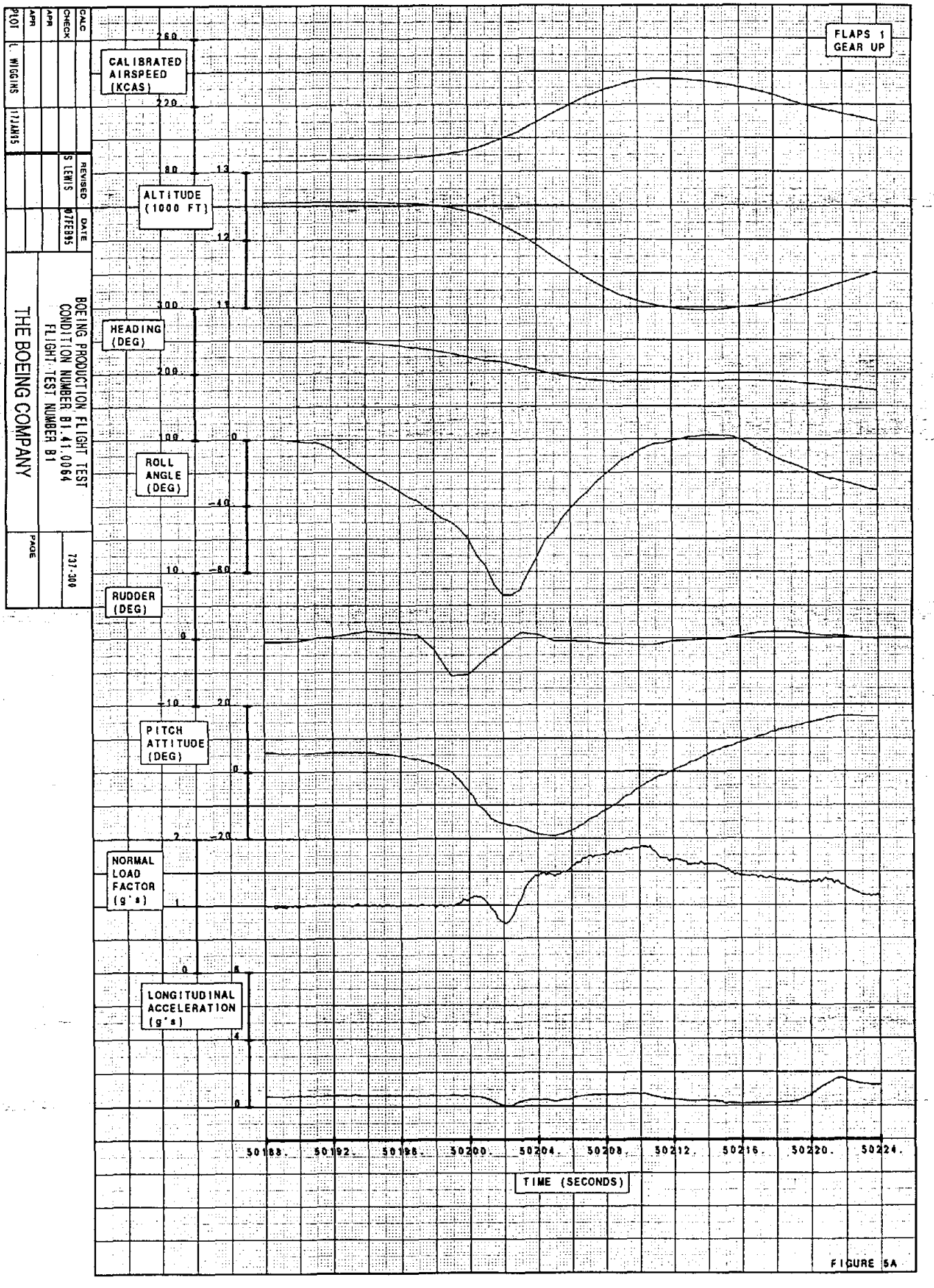
50224.
TIME (SECONDS)

FIGURE 58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DATE
FLAPS 1
GEAR UP
CALIBRATED AIRSPEED (KCAS)
ALTITUDE (1000 FT)
HEADING (DEG)
ROLL ANGLE (DEG)
RUDDER (DEG)
PITCH ATTITUDE (DEG)
NORMAL LOAD FACTOR (g's)
LONGITUDINAL ACCELERATION (g's)
260
220
80
13
12
11
300
200
100
0
-40
-80
10
0
-10
20
0
-20
2
1
0
8
4
0
50188.
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50196.
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50204.
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50216.
50220.
50224.
TIME (SECONDS)

FIGURE 5A

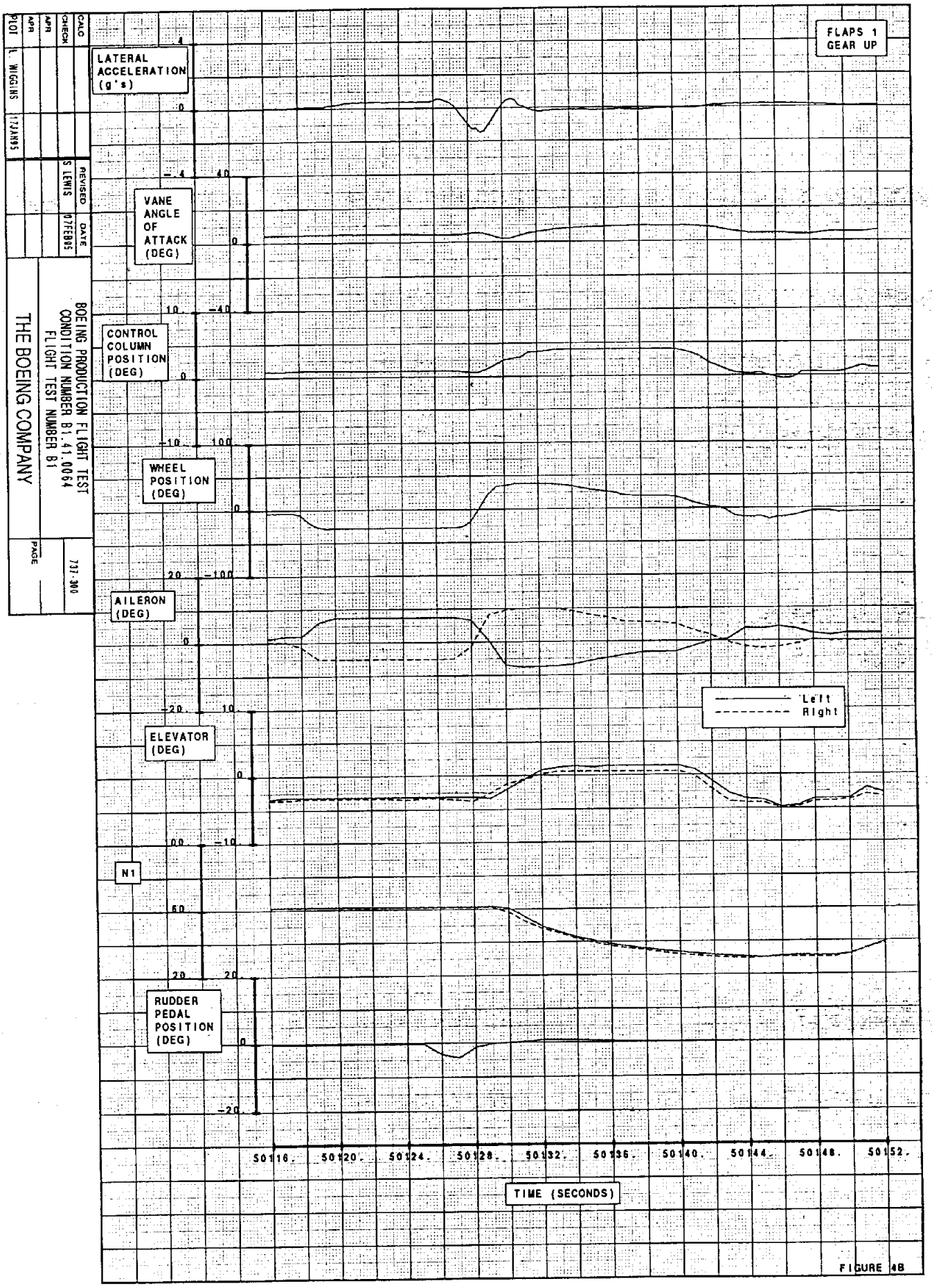
FLAPS 1
GEAR UP
LATERAL ACCELERATION (g's)
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
Left
Right
50116.
50120.
50124.
50128.
50132.
50136.
50140.
50144.
50148.
50152.
TIME (SECONDS)
BOEING PRODUCTION FLIGHT TEST
CONDITION NUMBER B1.41.0064
FLIGHT TEST NUMBER B1
737-300
THE BOEING COMPANY
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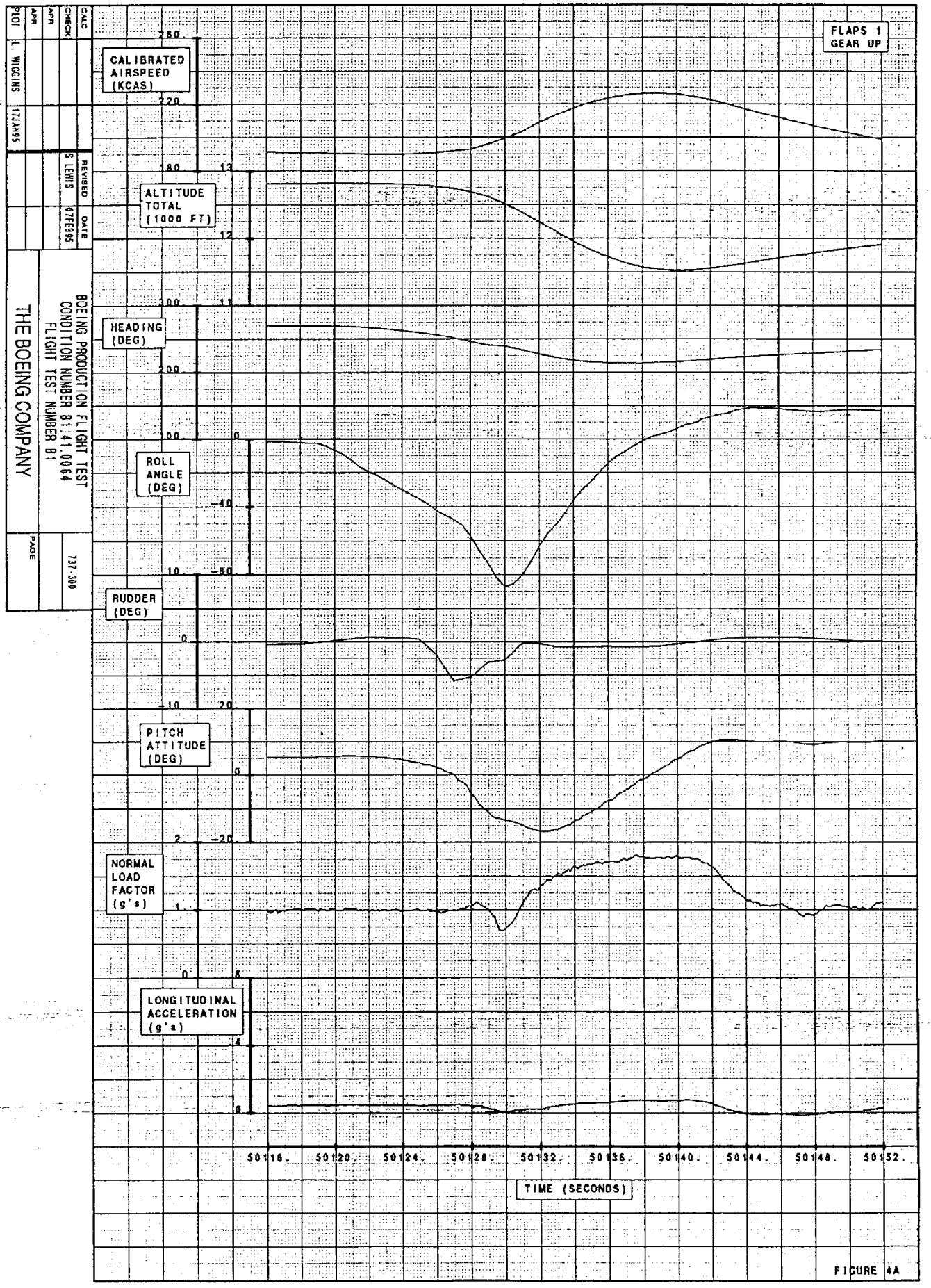
FIGURE 4B


FLAPS 1
GEAR UP
CALIBRATED AIRSPEED (KCAS)
260
220
180
ALTITUDE TOTAL (1000 FT)
13
12
HEADING (DEG)
300
200
100
ROLL ANGLE (DEG)
0
-40
-80
RUDDER (DEG)
10
0
-10
PITCH ATTITUDE (DEG)
20
0
-20
NORMAL LOAD FACTOR (g's)
2
1
LONGITUDINAL ACCELERATION (g's)
.8
0
-.4
50116.
50120.
50124.
50128.
50132.
50136.
50140.
50144.
50148.
50152.
TIME (SECONDS)
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NUMBER B1.41.0064
FLIGHT TEST NUMBER B1
737-300
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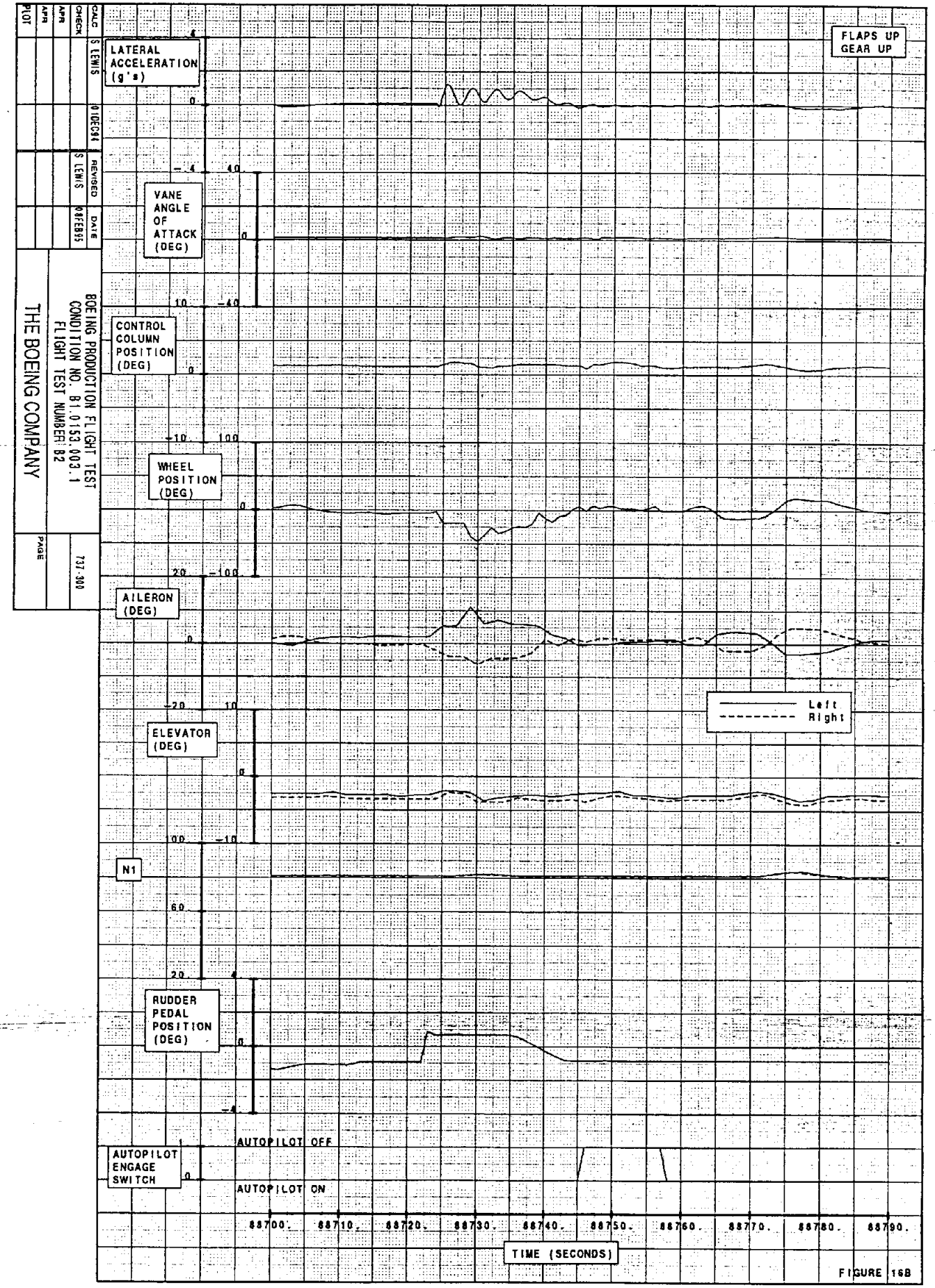
PAGE

FIGURE 4A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DATE
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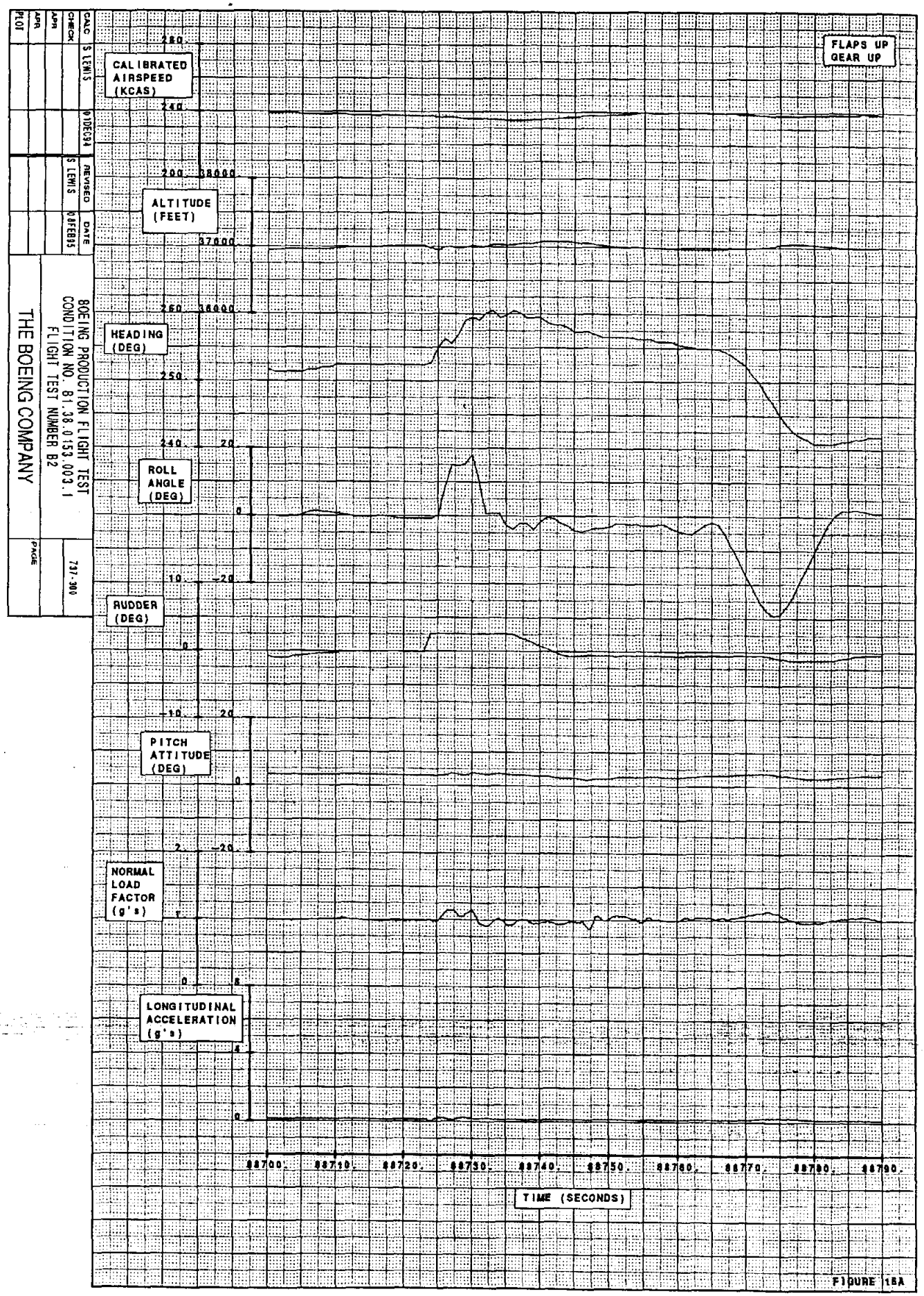
CONDITION NO. B1.0153.003.1
FLIGHT TEST NUMBER: B2
PAGE
737-300
LATERAL ACCELERATION (g's)
FLAPS UP
GEAR UP
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
Left
Right
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
AUTOPILOT ENGAGE SWITCH
AUTOPILOT OFF
AUTOPILOT ON
88700.
88710.
88720.
88730.
88740.
88750.
88760.
88770.
88780.
88790.
TIME (SECONDS)

FIGURE 16B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FLIGHT TEST NUMBER B2
PAGE
737-300
FLAPS UP
GEAR UP
CALIBRATED AIRSPEED (KCAS)
280
240
200
ALTITUDE (FEET)
38000
37000
HEADING (DEG)
260
250
240
ROLL ANGLE (DEG)
20
0
RUDDER (DEG)
10
0
-10
-20
PITCH ATTITUDE (DEG)
20
0
-20
NORMAL LOAD FACTOR (g's)
2
1
0
LONGITUDINAL ACCELERATION (g's)
.8
0
88700.
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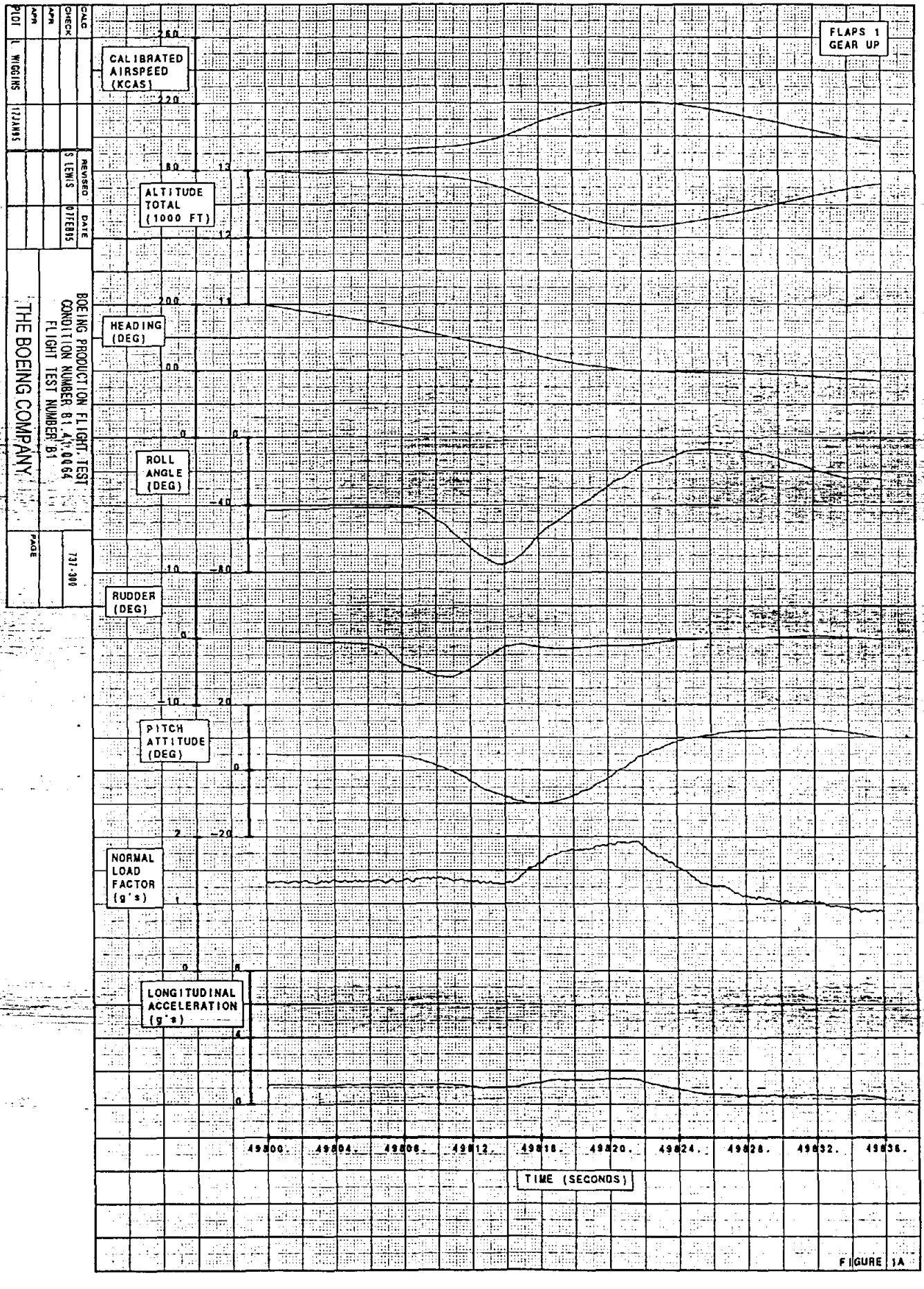
TIME (SECONDS)

FIGURE 15A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CALIBRATED AIRSPEED (KCAS)
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220
ALTITUDE TOTAL (1000 FT)
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HEADING (DEG)
200
ROLL ANGLE (DEG)
0
-40
RUDDER (DEG)
10
-10
PITCH ATTITUDE (DEG)
20
-20
NORMAL LOAD FACTOR (g's)
2
1
LONGITUDINAL ACCELERATION (g's)
.4
0
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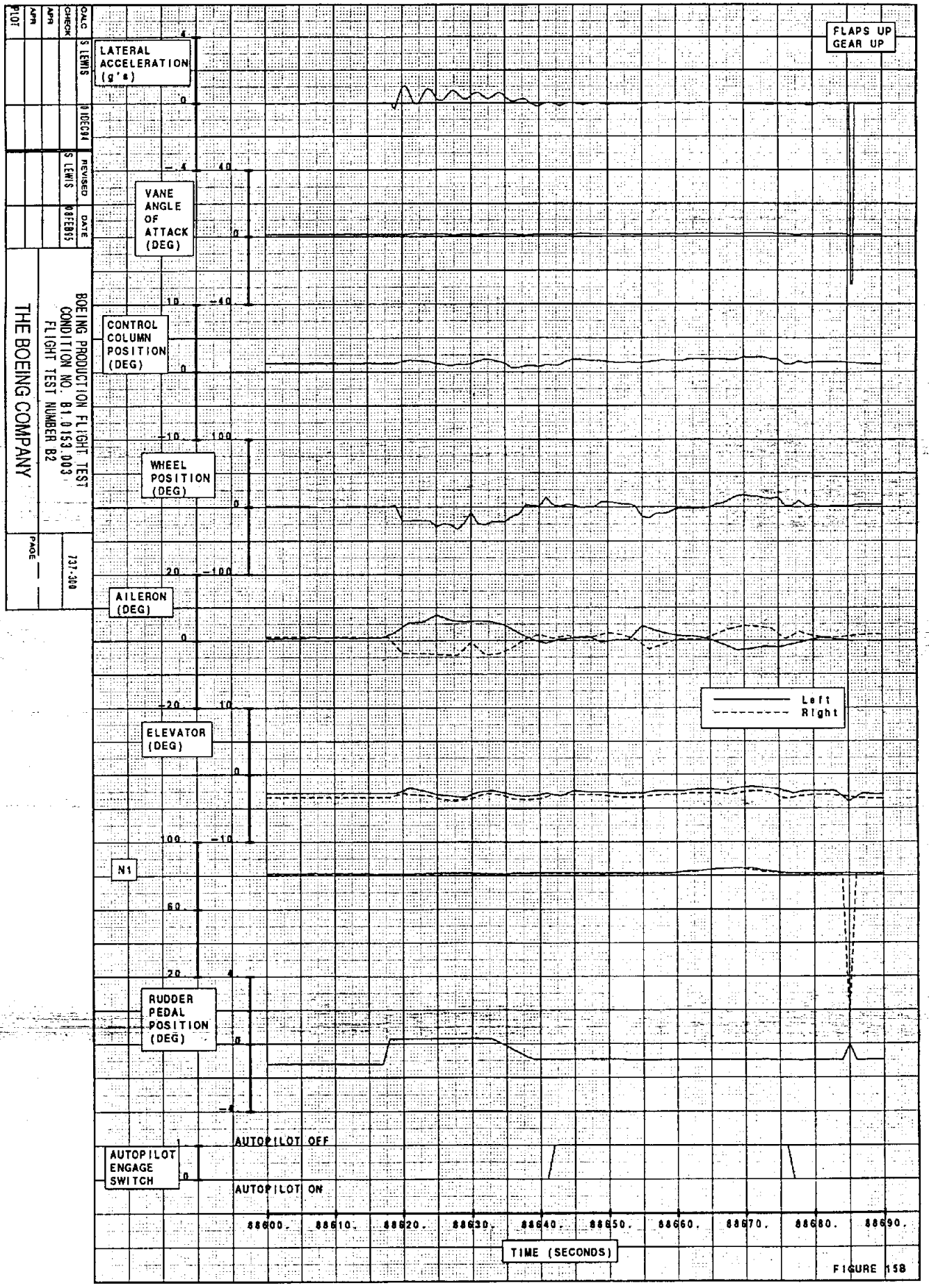
49804.
49808.
49812.
49816.
49820.
49824.
49828.
49832.
49836.
TIME (SECONDS)
CALC
CHECK
APR
APR
APR
PILOT
L WIGGINS
17JAN85
REVISED
S LEWIS
DATE
07FEB85
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NUMBER B1.4A.0064
FLIGHT TEST NUMBER B1
PAGE
737-300

FIGURE 1A


PLOT
APR
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CALC
S LEWIS
10DEC94
REVISED
S LEWIS
08FEB95
DATE
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NO. B1.0153.003
FLIGHT TEST NUMBER B2
737-300
PAGE
FLAPS UP
GEAR UP
LATERAL ACCELERATION (g's)
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
Left
Right
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
AUTOPILOT OFF
AUTOPILOT ON
AUTOPILOT ENGAGE SWITCH
88600.
88610.
88620.
88630.
88640.
88650.
88660.
88670.
88680.
88690.
TIME (SECONDS)

FIGURE 158

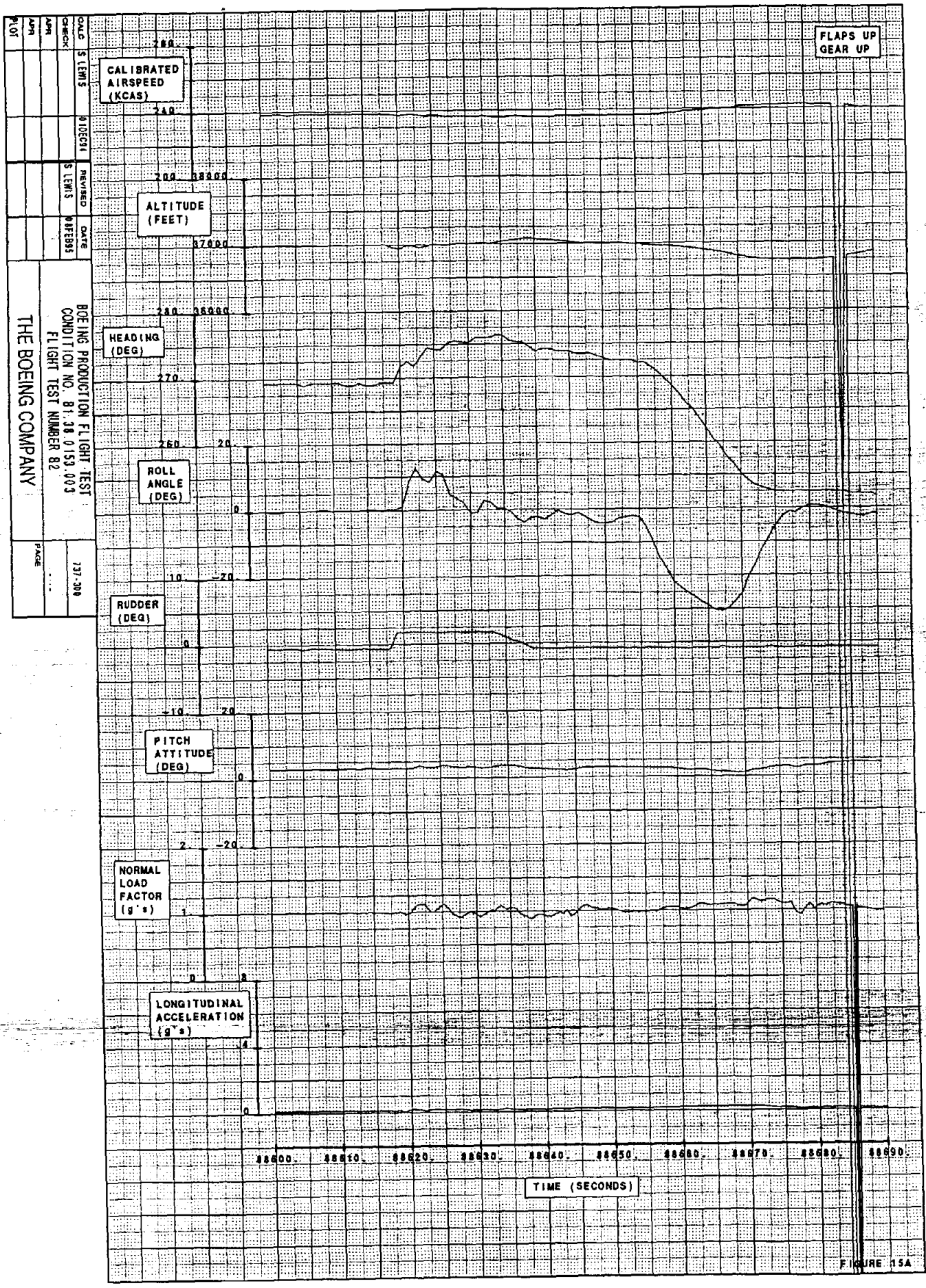
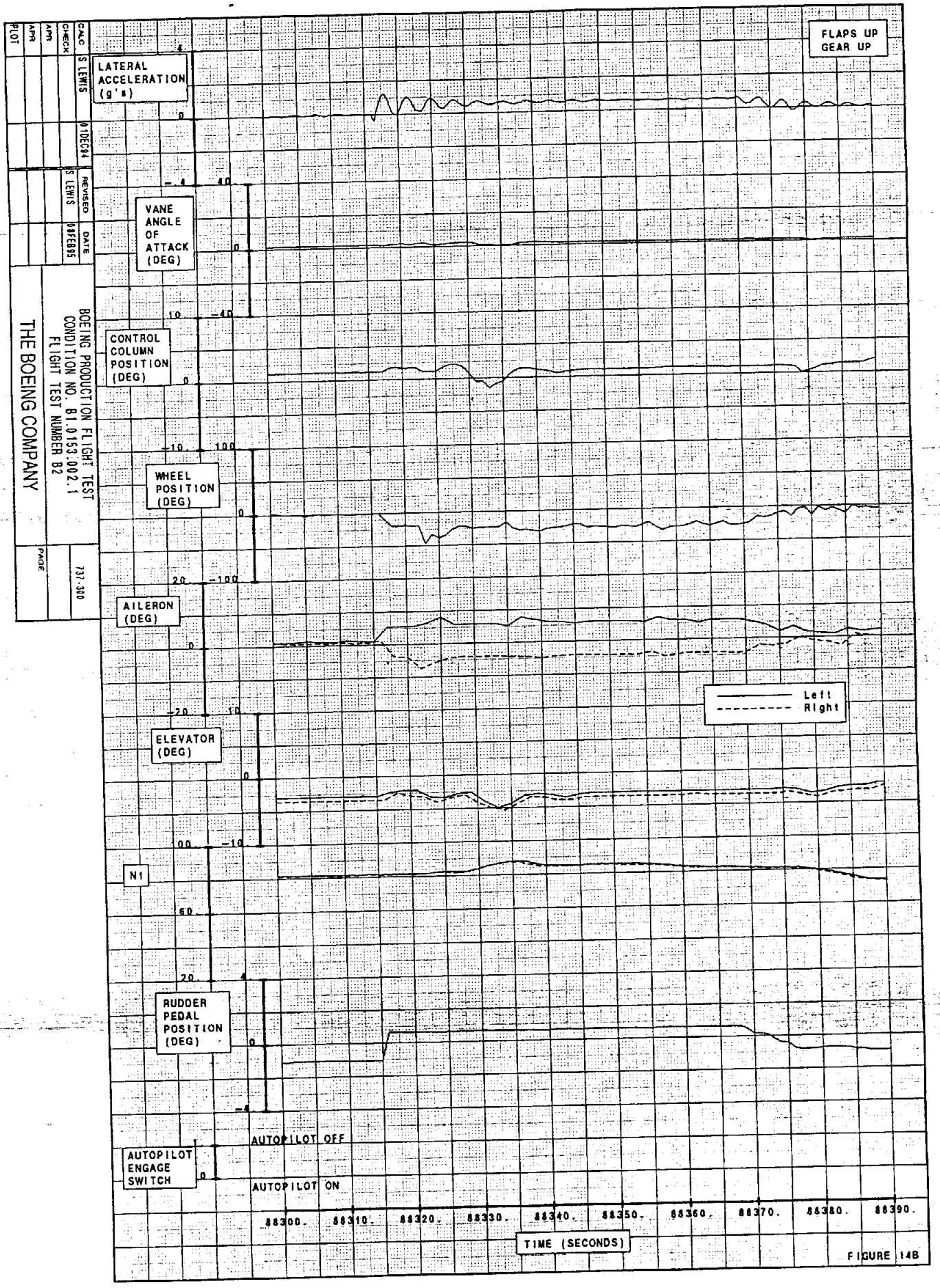

FLAPS UP
GEAR UP
CALIBRATED AIRSPEED (KCAS)
280
240
ALTITUDE (FEET)
38000
37000
35000
HEADING (DEG)
280
270
260
ROLL ANGLE (DEG)
20
0
RUDDER (DEG)
10
-20
PITCH ATTITUDE (DEG)
20
0
-10
NORMAL LOAD FACTOR (g's)
2
1
0
LONGITUDINAL ACCELERATION (g's)
.8
.4
0
88600
88610
88620
88630
88640
88650
88660
88670
88680
88690
TIME (SECONDS)
PLOT
APP
APP
CHECK
CALC
S LEWIS
10DEC91
REVISED
S LEWIS
10FEB93
DATE
BOEING PRODUCTION FLIGHT TEST
CONDITION NO. 81.38.0153.003
FLIGHT TEST NUMBER 82
THE BOEING COMPANY
PAGE
737-300

FIGURE 15A


PLOT
APP
APP
CHECK
CALC
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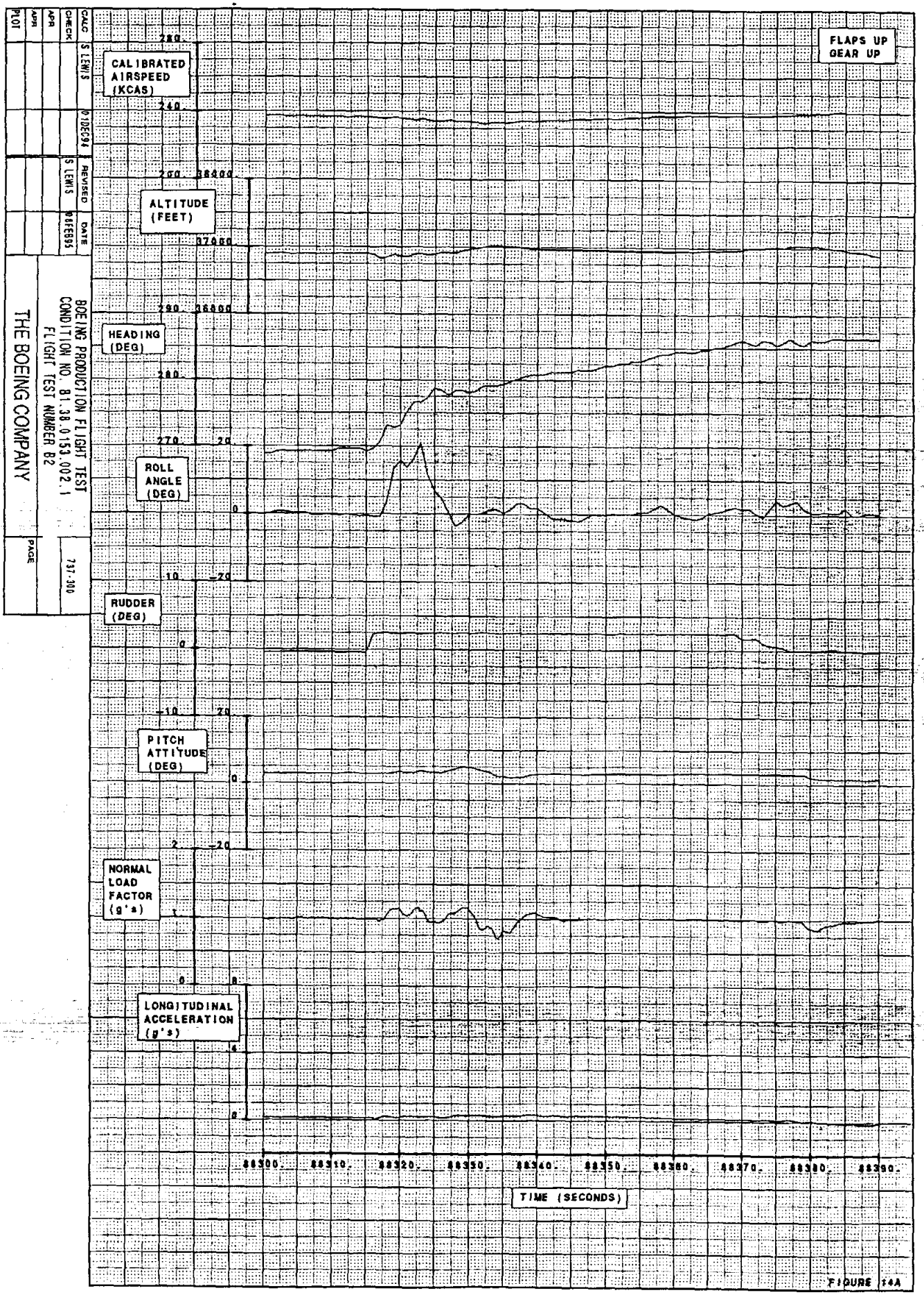
10EC94
REVISED
S LEWIS
DATE
08FEB95
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NO. B1.0153.002.1
FLIGHT TEST NUMBER B2
PAGE
737-300
FLAPS UP
GEAR UP
LATERAL ACCELERATION (g's)
4
0
-4
VANE ANGLE OF ATTACK (DEG)
40
0
-40
CONTROL COLUMN POSITION (DEG)
10
0
-10
WHEEL POSITION (DEG)
100
0
-100
AILERON (DEG)
20
0
-20
Left
Right
ELEVATOR (DEG)
10
0
-10
N1
100
60
20
RUDDER PEDAL POSITION (DEG)
4
0
-4
AUTOPILOT ENGAGE SWITCH
AUTOPILOT OFF
0
AUTOPILOT ON
88300.
88310.
88320.
88330.
88340.
88350.
88360.
88370.
88380.
88390.
TIME (SECONDS)

FIGURE 14B


PLOT
APR
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CALC
S LEWIS
CHECK
10DEC94
REVISED
S LEWIS
05FEB95
DATE
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NO. 81.38.0153.002.1
FLIGHT TEST NUMBER B2
PAGE
737-300
FLAPS UP
GEAR UP
CALIBRATED AIRSPEED (KCAS)
ALTITUDE (FEET)
HEADING (DEG)
ROLL ANGLE (DEG)
RUDDER (DEG)
PITCH ATTITUDE (DEG)
NORMAL LOAD FACTOR (g's)
LONGITUDINAL ACCELERATION (g's)
TIME (SECONDS)
88300.
88310.
88320.
88330.
88340.
88350.
88360.
88370.
88380.
88390.

FIGURE 14A

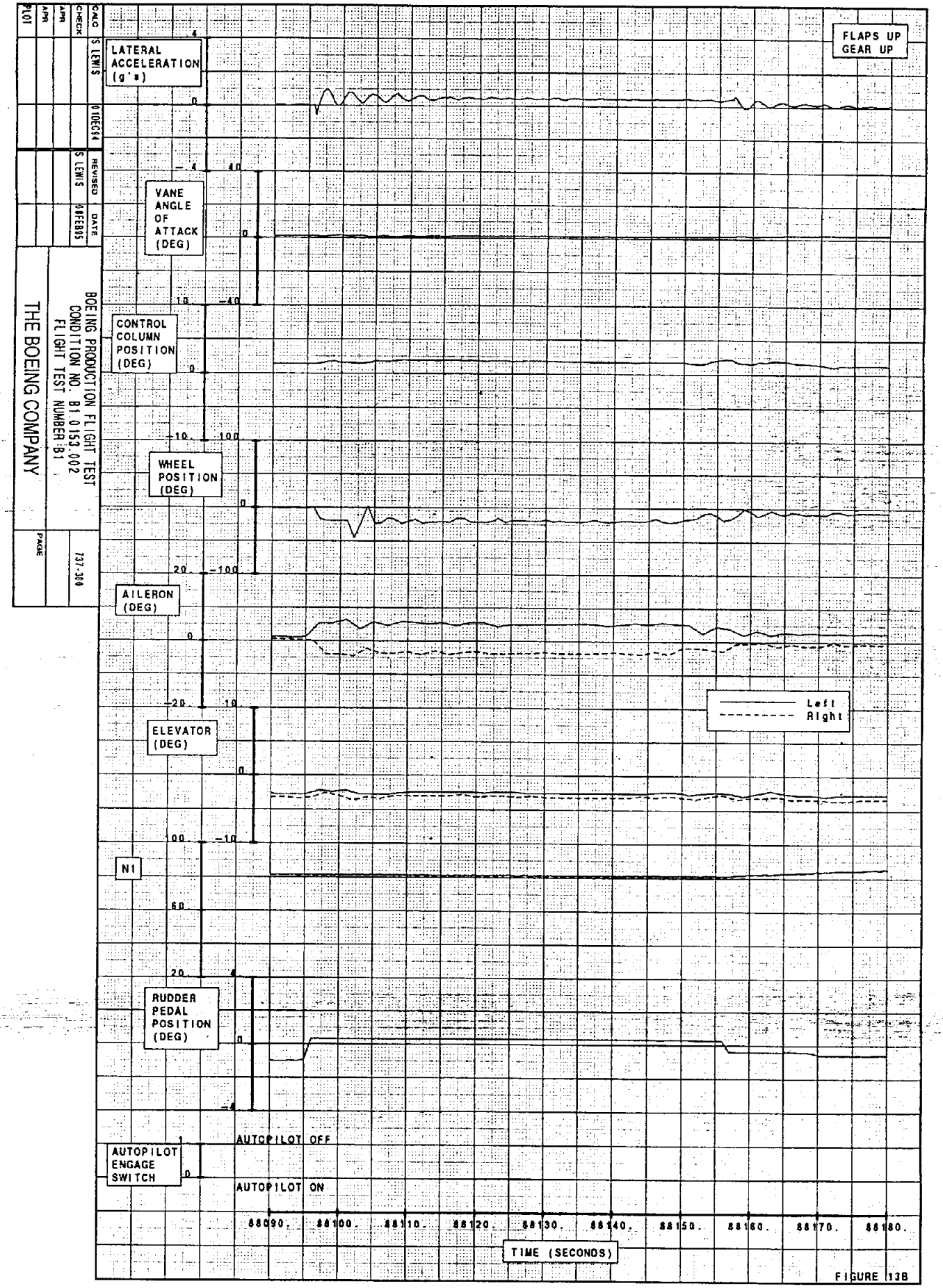

THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NO. B1.0153.002
FLIGHT TEST NUMBER :B1
737-300
PAGE
CALC S LEWIS 0 DEC 94
CHECK
APP
APP
PLOT
REVISED S LEWIS 0 FEB 95
DATE
FLAPS UP
GEAR UP
LATERAL ACCELERATION (g's)
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
Left
Right
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
AUTOPILOT ENGAGE SWITCH
AUTOPILOT OFF
AUTOPILOT ON
88090.
88100.
88110.
88120.
88130.
88140.
88150.
88160.
88170.
88180.
TIME (SECONDS)

FIGURE 13B

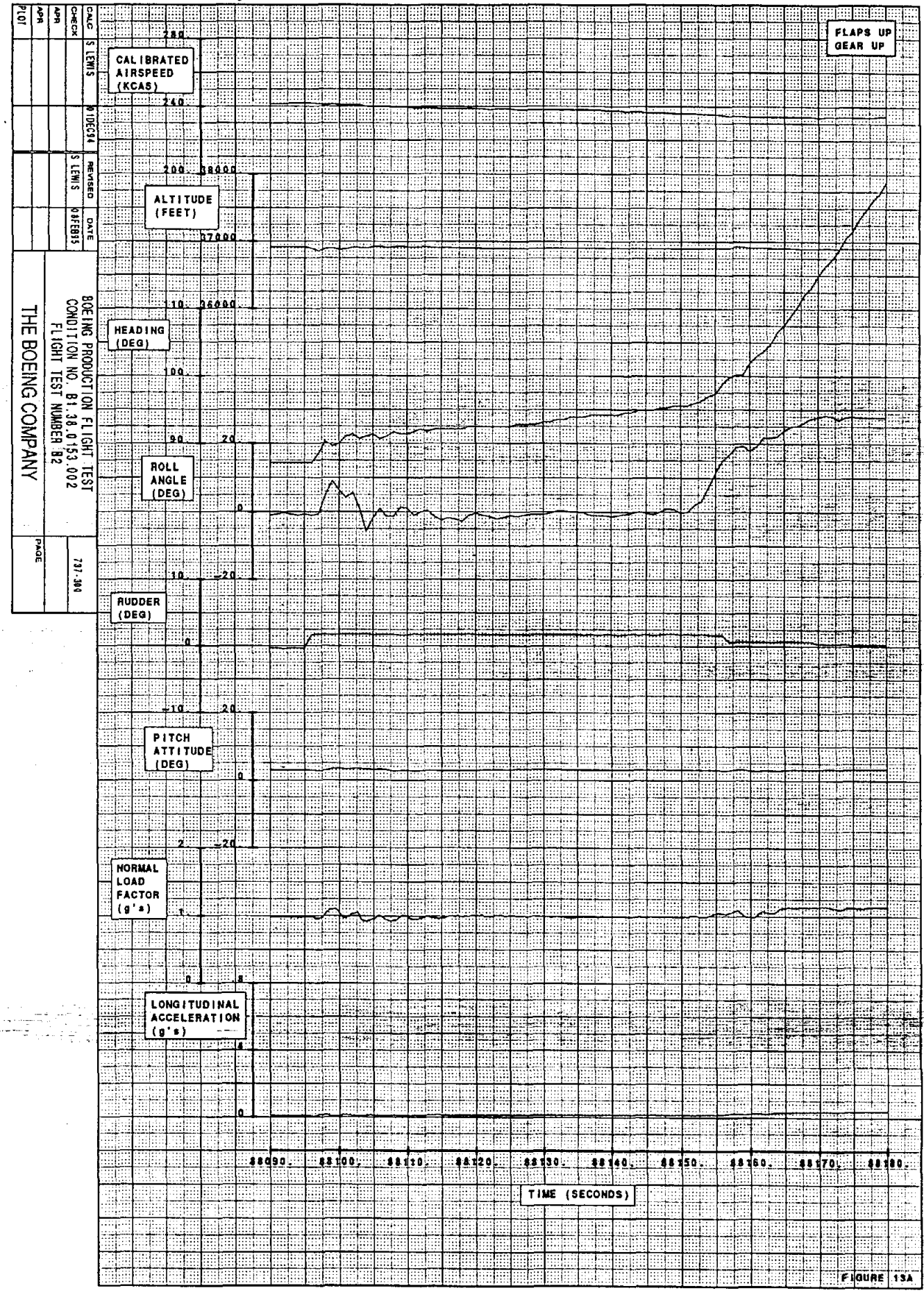

FLAPS UP
GEAR UP
CALIBRATED AIRSPEED (KCAS)
280
240
200
ALTITUDE (FEET)
38000
37000
HEADING (DEG)
360
100
90
ROLL ANGLE (DEG)
20
0
RUDDER (DEG)
10
-20
0
PITCH ATTITUDE (DEG)
-10
20
0
NORMAL LOAD FACTOR (g's)
2
-20
1
0
LONGITUDINAL ACCELERATION (g's)
.5
0
-.5
88090.
88100.
88110.
88120.
88130.
88140.
88150.
88160.
88170.
88180.
TIME (SECONDS)
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NO. B1.38.0153.002
FLIGHT TEST NUMBER B2
737-300
PAGE
PLOT
APR
APR
CHECK
CALC
S LEWIS
10DEC94
S LEWIS
REVISED
06FEB95
DATE

FIGURE 13A

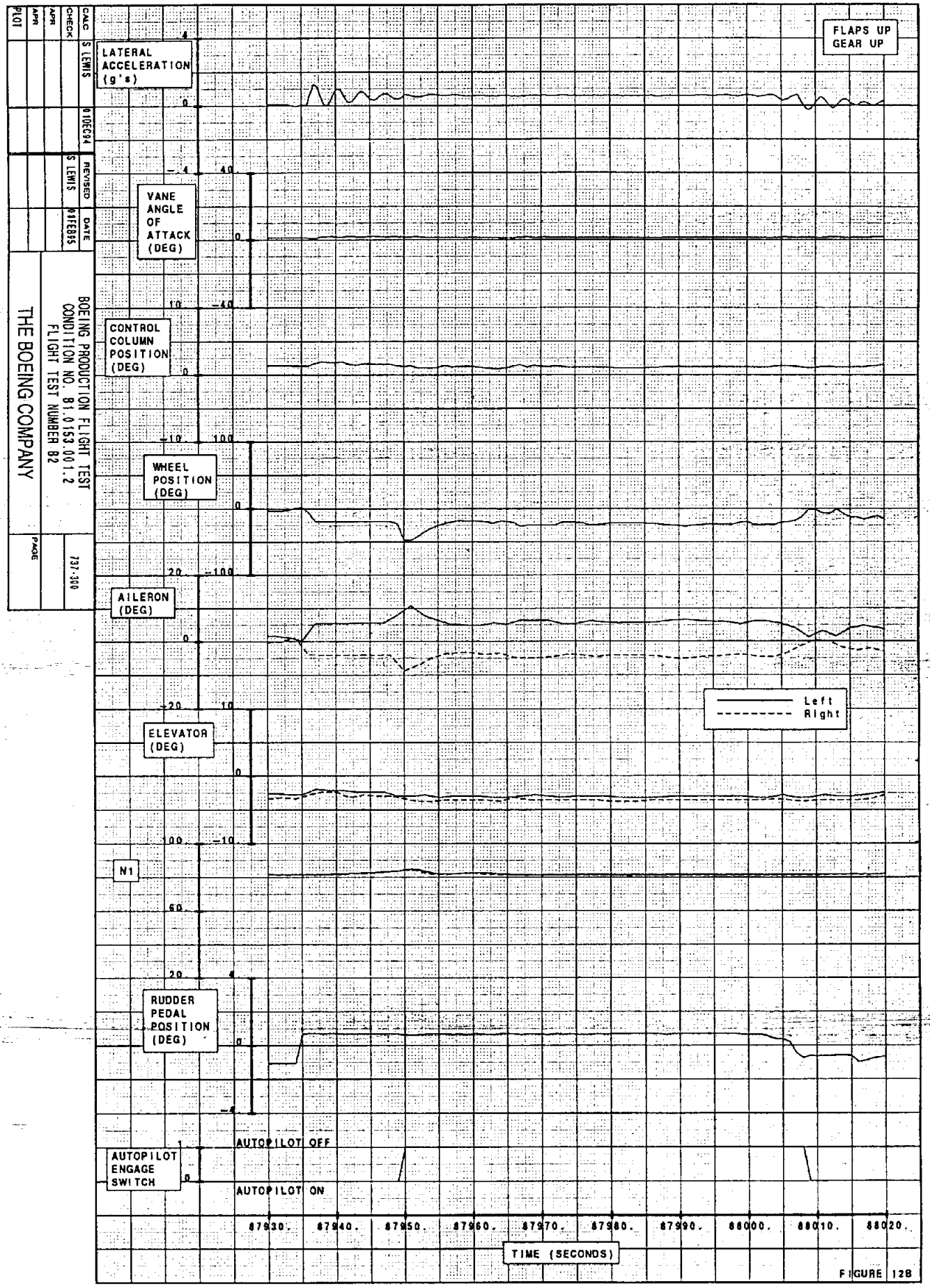
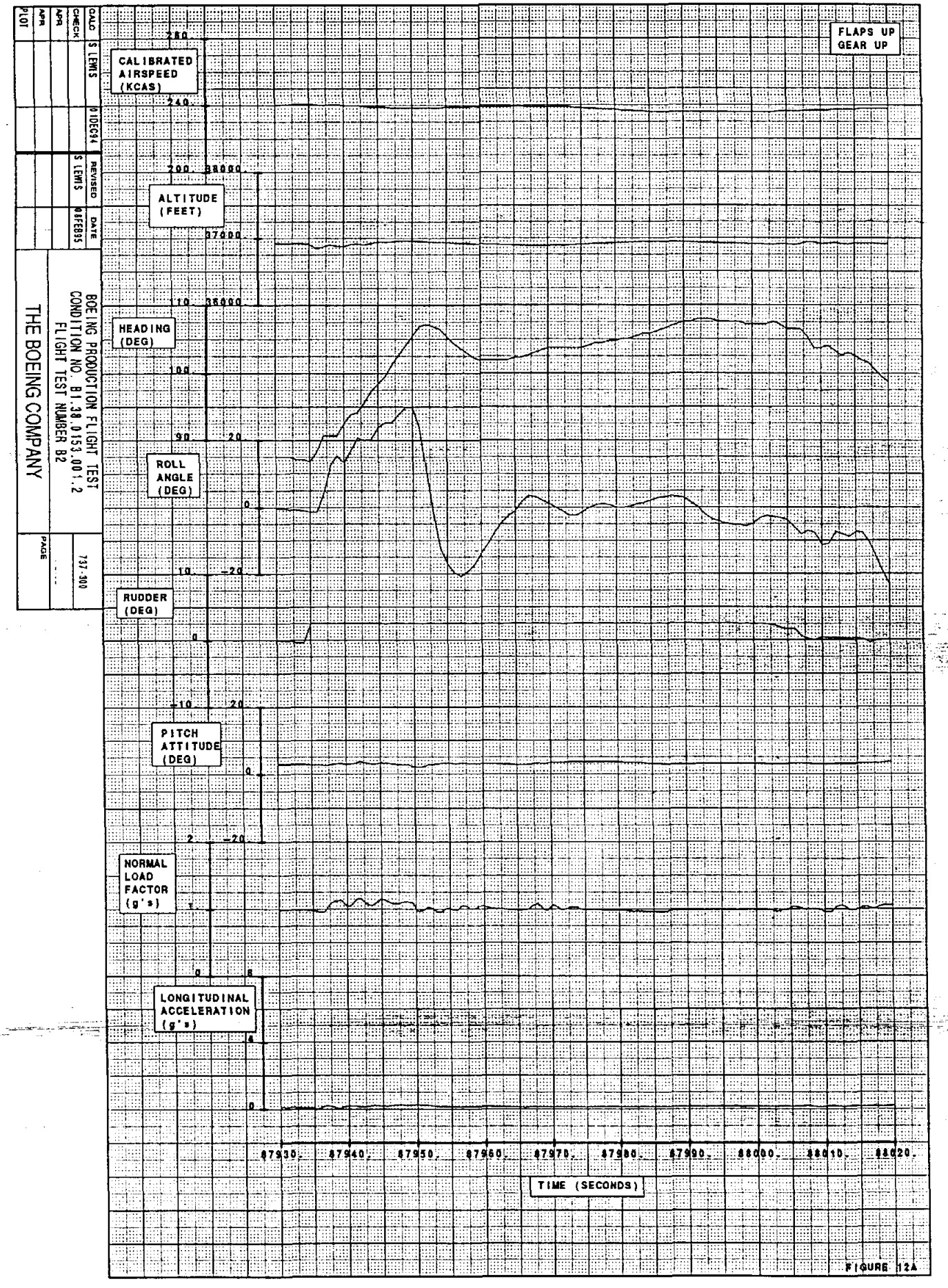

PLOT
APP
APP
CHECK
CALC
S LEWIS
10DEC94
REVISED
S LEWIS
01FEB95
DATE
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NO. B1.0153.001.2
FLIGHT TEST NUMBER B2
PAGE
737-300
LATERAL ACCELERATION (g's)
FLAPS UP
GEAR UP
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
Left
Right
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
AUTOPILOT ENGAGE SWITCH
AUTOPILOT OFF
AUTOPILOT ON
87930.
87940.
87950.
87960.
87970.
87980.
87990.
88000.
88010.
88020.
TIME (SECONDS)

FIGURE 128


FLAPS UP
GEAR UP
CALIBRATED AIRSPEED (KCAS)
280
240
200
ALTITUDE (FEET)
38000
37000
110
35000
HEADING (DEG)
100
90
20
ROLL ANGLE (DEG)
0
10
-20
RUDDER (DEG)
0
-10
20
PITCH ATTITUDE (DEG)
0
2
-20
NORMAL LOAD FACTOR (g's)
1
0
.6
LONGITUDINAL ACCELERATION (g's)
.4
0
37930.
37940.
37950.
37960.
37970.
37980.
37990.
38000.
38010.
38020.
TIME (SECONDS)
FIGURE 12A
PLOT
APR
APR
CHECK
CALC
S LEWIS
10DEC94
REVISED
S LEWIS
08FEB95
DATE
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NO. B1.38.0153.001.2
FLIGHT TEST NUMBER B2
PAGE
737-300

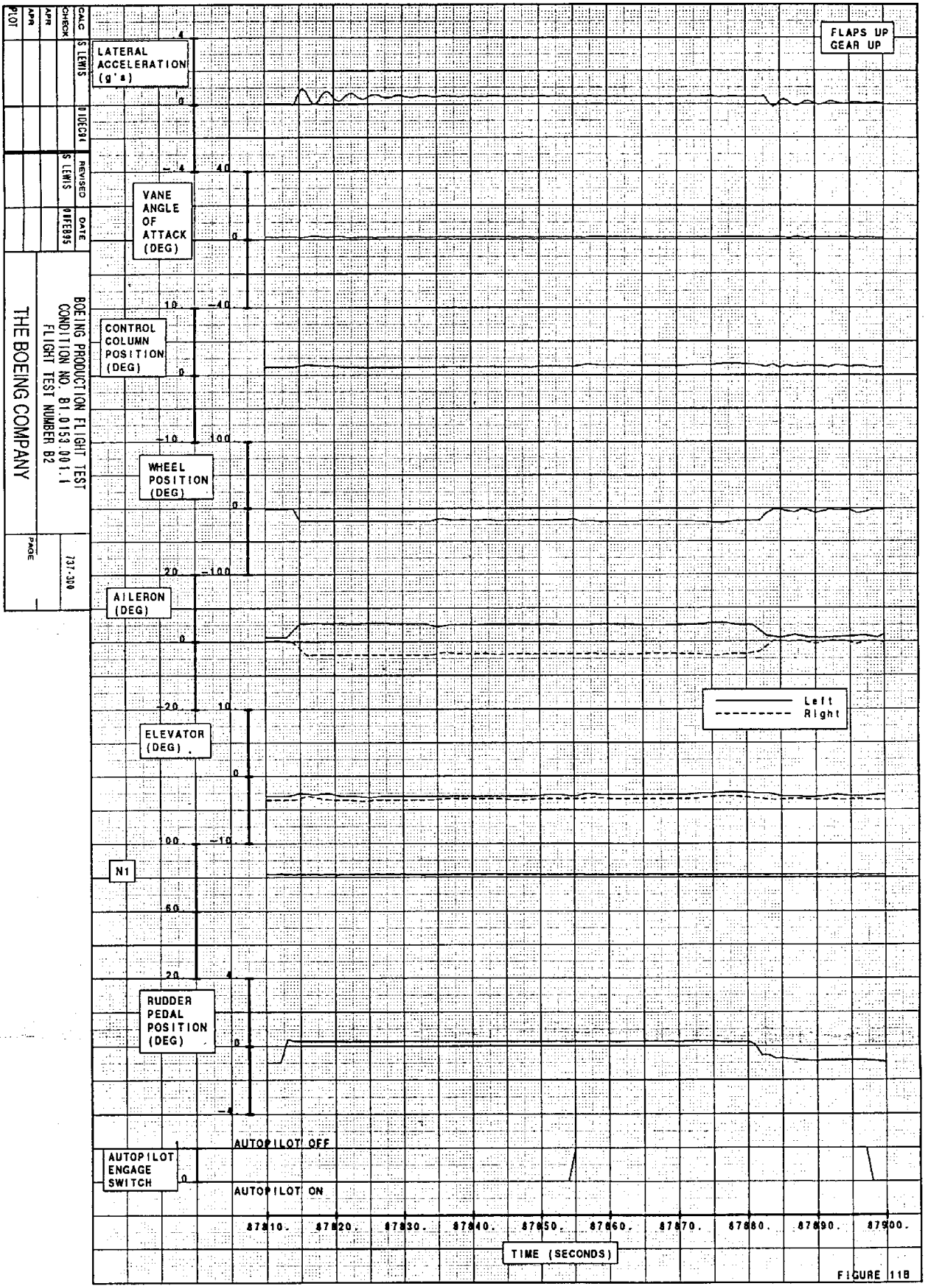
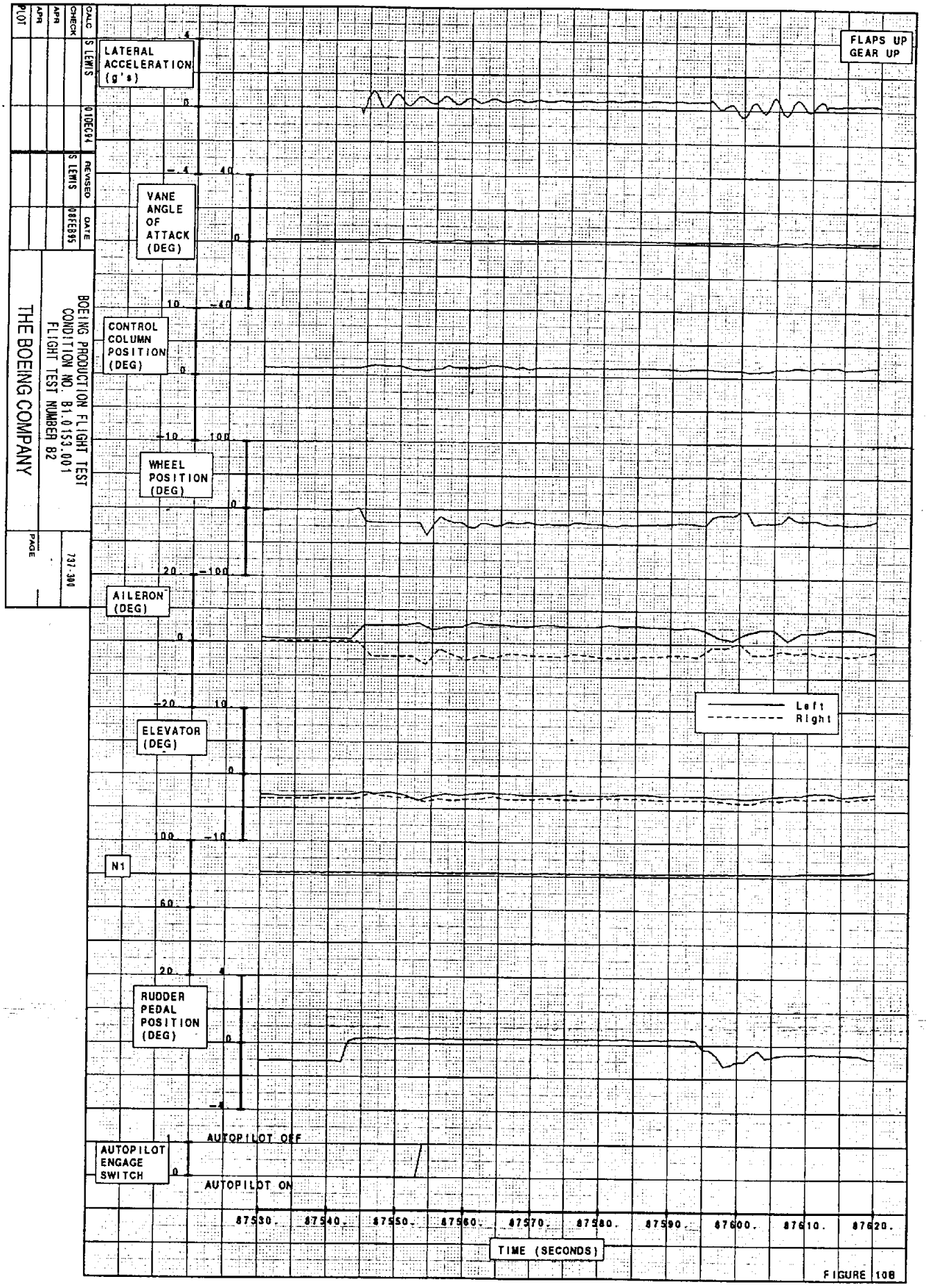

PLOT
APR
APR
CHECK
CALC
S LEWIS
DIDECK
REVISED
S LEWIS
DATE
08FEB95
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NO. B1.0153.001.1
FLIGHT TEST NUMBER B2
PAGE
737-300
LATERAL ACCELERATION (g's)
4
0
-4
FLAPS UP
GEAR UP
VANE ANGLE OF ATTACK (DEG)
40
0
-40
CONTROL COLUMN POSITION (DEG)
10
0
-10
WHEEL POSITION (DEG)
100
0
-100
AILERON (DEG)
20
0
-20
Left
Right
ELEVATOR (DEG)
10
0
-10
N1
100
60
20
RUDDER PEDAL POSITION (DEG)
4
0
-4
AUTOPILOT ENGAGE SWITCH
1
0
AUTOPILOT OFF
AUTOPILOT ON
87810.
87820.
87830.
87840.
87850.
87860.
87870.
87880.
87890.
87900.
TIME (SECONDS)

FIGURE 118

CALC	S LEWIS	01DEC94	REVISED	DATE	BOEING PRODUCTION FLIGHT TEST CONDITION NO. B1.38.0153.001.1 FLIGHT TEST NUMBER B2
CHECK			S LEWIS	08FEB95	
APR					
APR					THE BOEING COMPANY
PLOT					

737-300

PAGE


PLOT
APR
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CHECK
CALC
S LEMIS
01DEC94
REVISED
S LEMIS
08FEB95
DATE
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NO. B1.0153.001
FLIGHT TEST NUMBER 82
PAGE
737-300
FLAPS UP
GEAR UP
LATERAL ACCELERATION (g's)
4
0
-4
VANE ANGLE OF ATTACK (DEG)
40
0
-40
CONTROL COLUMN POSITION (DEG)
10
0
-10
WHEEL POSITION (DEG)
100
0
-100
AILERON (DEG)
20
0
-20
ELEVATOR (DEG)
10
0
-10
N1
100
60
20
RUDDER PEDAL POSITION (DEG)
4
0
-4
AUTOPILOT ENGAGE SWITCH
1
0
AUTOPILOT OFF
AUTOPILOT ON
Left
Right
87530.
87540.
87550.
87560.
87570.
87580.
87590.
87600.
87610.
87620.
TIME (SECONDS)

FIGURE 108

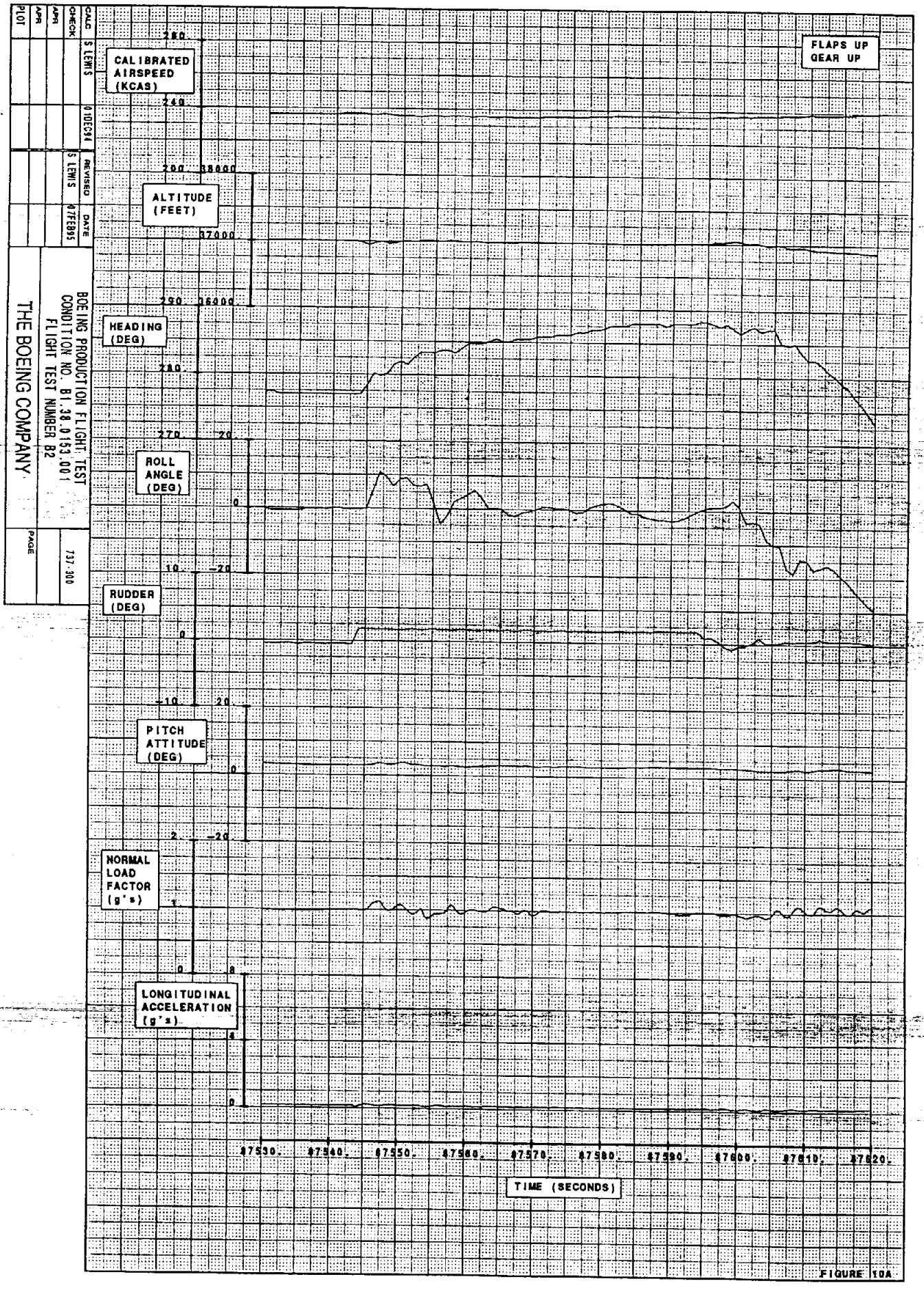
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONDITION NO. B1.38.0153.001
FLIGHT TEST NUMBER B2
737-300
PAGE
PLOT
APR
APR
CHECK
CALC
S LEWIS
10DEC94
S LEWIS
07FEB95
REVISED
DATE
FLAPS UP
GEAR UP
CALIBRATED AIRSPEED (KCAS)
280
240
200
ALTITUDE (FEET)
38000
37000
36000
HEADING (DEG)
290
280
270
ROLL ANGLE (DEG)
20
0
-20
RUDDER (DEG)
10
0
-10
PITCH ATTITUDE (DEG)
20
0
-20
NORMAL LOAD FACTOR (g's)
2
1
0
LONGITUDINAL ACCELERATION (g's)
.8
.4
0
37530.
37540.
37550.
37560.
37570.
37580.
37590.
37600.
37610.
37620.
TIME (SECONDS)

FIGURE 10A

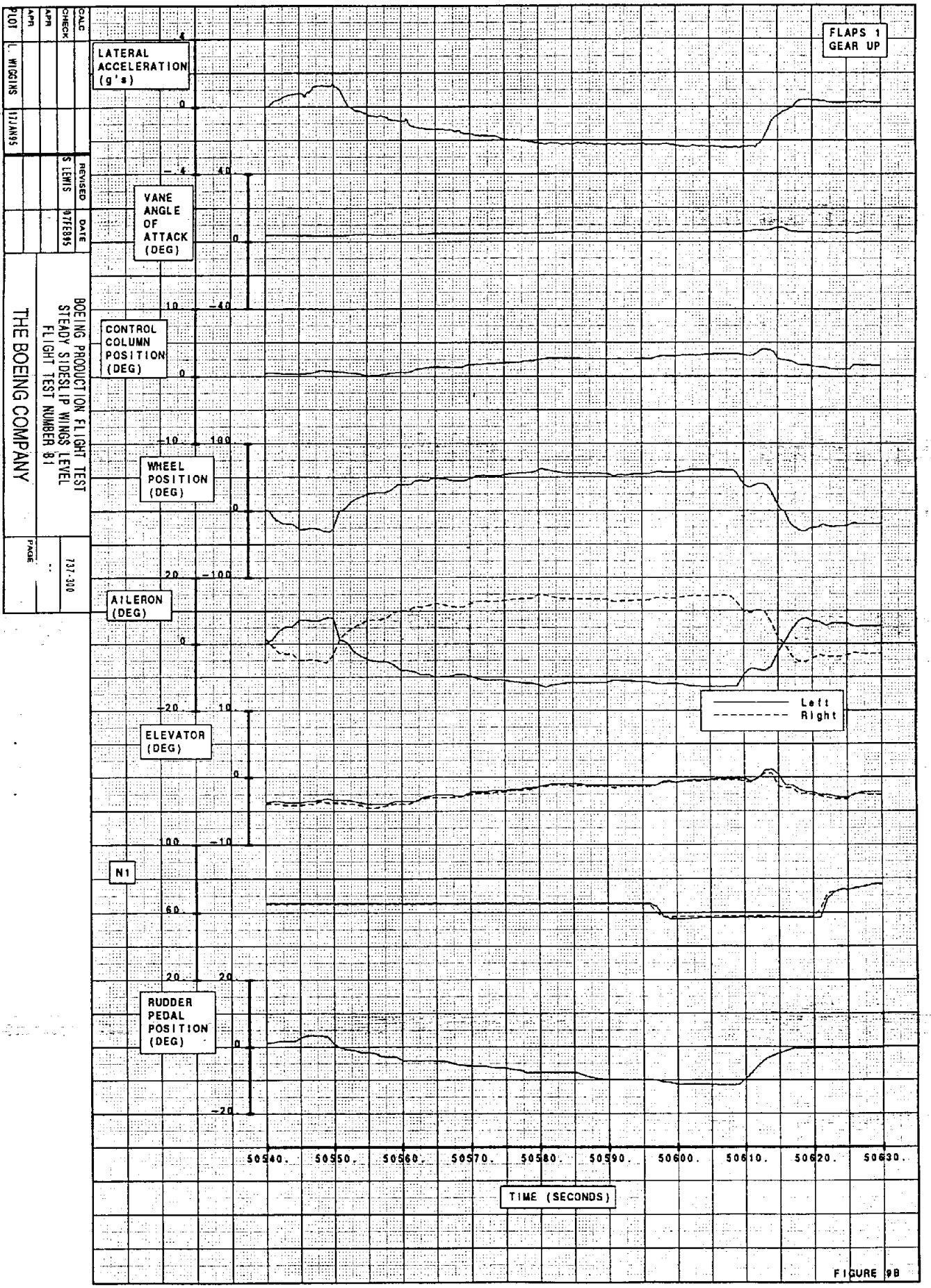
PLOT
APR
APR
CHECK
CALC
L. WIGGINS
11JAN95
S LEWIS
17FEB95
REVISED
DATE
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
STEADY SIDESLIP WINGS LEVEL
FLIGHT TEST NUMBER 81
737-300
PAGE
FLAPS 1
GEAR UP
LATERAL ACCELERATION (g's)
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
Left
Right
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
50540.
50550.
50560.
50570.
50580.
50590.
50600.
50610.
50620.
50630.
TIME (SECONDS)

FIGURE 9B

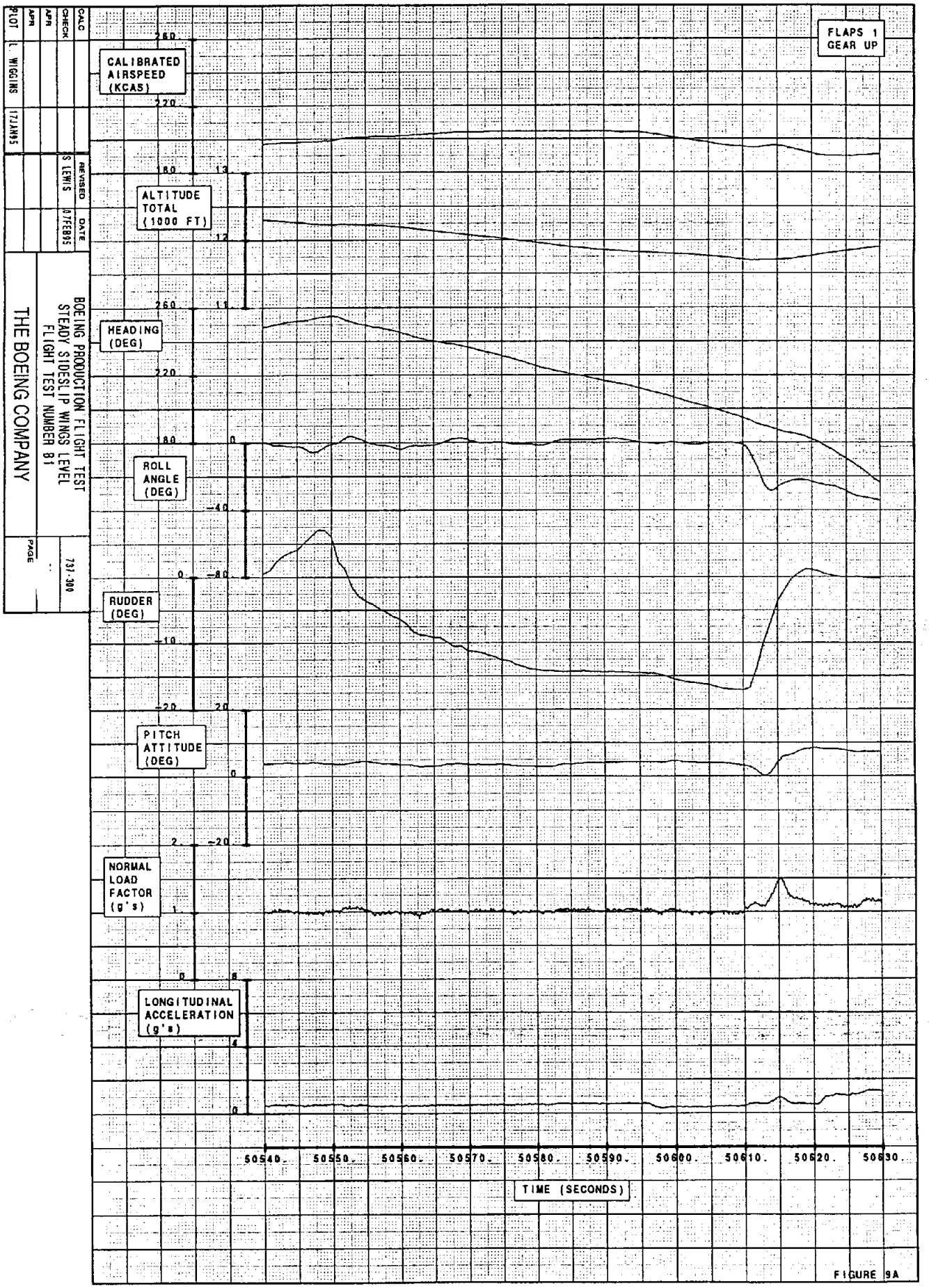
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
STEADY SIDESLIP WINGS LEVEL
FLIGHT TEST NUMBER 81
737-300
PLOT
APR
CHECK
CALC
L WIGGINS
17JAN95
S LEWIS
07FEB95
REVISED
DATE
PAGE
FLAPS 1
GEAR UP
CALIBRATED AIRSPEED (KCAS)
260
220
ALTITUDE TOTAL (1000 FT)
180
13
12
HEADING (DEG)
260
11
220
ROLL ANGLE (DEG)
180
0
-40
RUDDER (DEG)
0
-80
-10
PITCH ATTITUDE (DEG)
-20
20
0
NORMAL LOAD FACTOR (g's)
2
-20
1
LONGITUDINAL ACCELERATION (g's)
0
.8
-.4
0
50540.
50550.
50560.
50570.
50580.
50590.
50600.
50610.
50620.
50630.
TIME (SECONDS)

FIGURE 9A

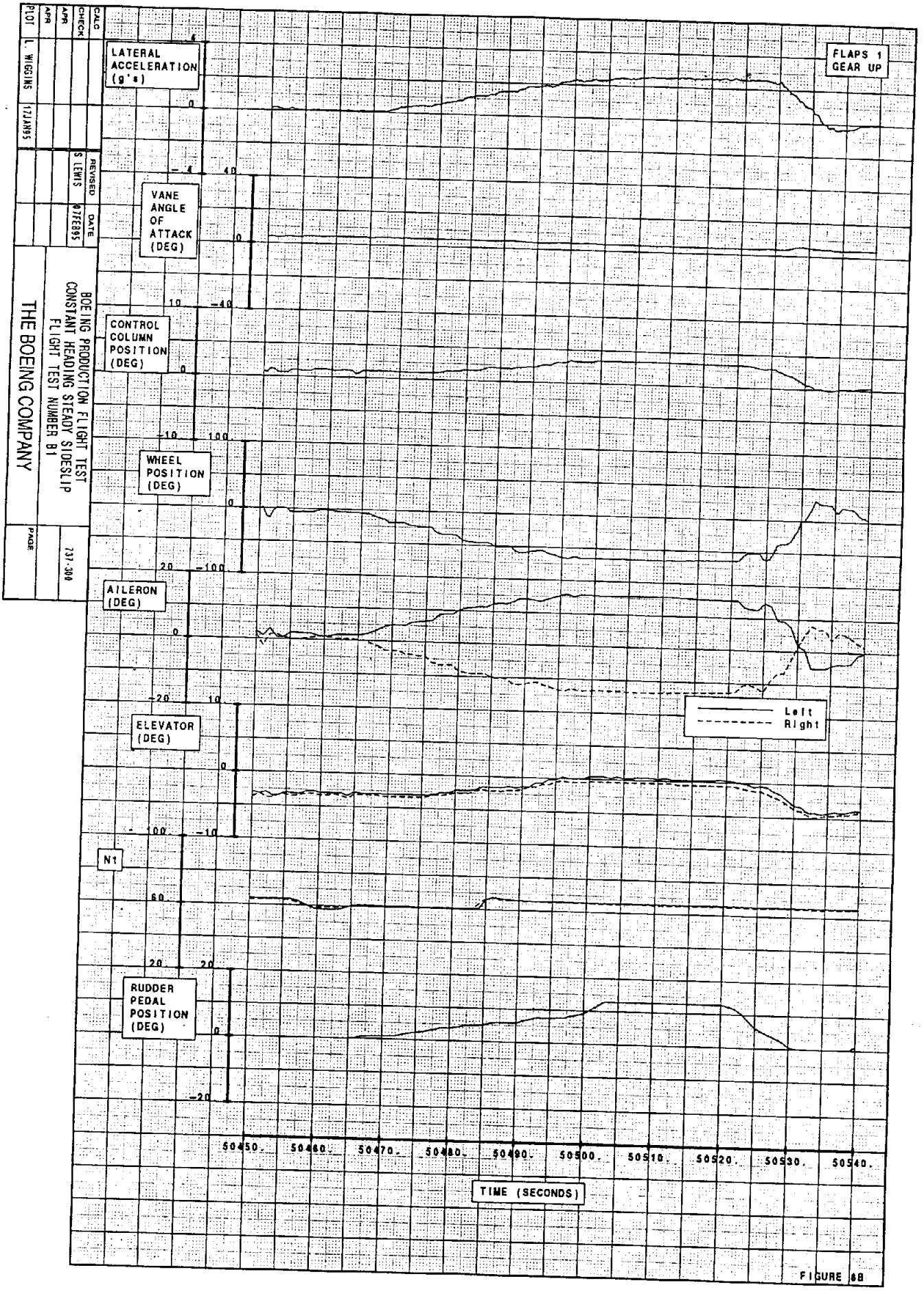
PLOT
L. WIGGINS
17JAN95
APR
APR
CHECK
CALC
S LEWIS
07FEB95
REVISED
DATE
THE BOEING COMPANY
BOEING PRODUCTION FLIGHT TEST
CONSTANT HEADING STEADY SIDESLIP
FLIGHT TEST NUMBER B1
737-300
PAGE
LATERAL ACCELERATION (g's)
FLAPS 1
GEAR UP
VANE ANGLE OF ATTACK (DEG)
CONTROL COLUMN POSITION (DEG)
WHEEL POSITION (DEG)
AILERON (DEG)
Left
Right
ELEVATOR (DEG)
N1
RUDDER PEDAL POSITION (DEG)
50450.
50460.
50470.
50480.
50490.
50500.
50510.
50520.
50530.
50540.
TIME (SECONDS)

FIGURE 68