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**THE NASA DIGITAL VGH PROGRAM -
EXPLORATION OF METHODS AND FINAL RESULTS**

Volume IV - B 747 Data 1978-1980: 1689 HOURS

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**Contract NASW 4430
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FOREWORD

This report was prepared by Eagle Engineering, Inc., Hampton Division, under contract NASW 4430, sponsored by NASA Langley Research Center and the Federal Aviation Administration Technical Center under the FAA-NASA Interagency Agreement No. DTFA03-890-A-00019 of 13 June 1989. This report fulfills the requirement of the Program Plan for the National Aging Aircraft Research Program, DOT/FAA/CT-88/32, August 1989, Paragraph 2.3.2.1, Flight Loads.

The Eagle Engineering, Inc. effort was performed by Norman L. Crabill and administered under the direction of Joseph W. Stickle (NASA Langley Research Center) and Thomas DeFiore (FAA Technical Center).

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SUMMARY

Data obtained from the Digital Flight Data Recorder system of Boeing 747 aircraft in 442 flights and 1689 hours of airline revenue operations are presented as an extension of the work documented in Volume I of this report. Data on conditions with flap deployment and autopilot use are given. In addition, acceleration statistics are presented from 23 hours on nonrevenue flights. No discussion of the data is presented.

INTRODUCTION

This document presents the results of the NASA DVGH Program obtained during 1978-1980 operations of Boeing B 747 aircraft. This volume is an extension of the work and methods documented in Volume I. The data reduction analysis and methods and data presentation are essentially the same as those reported in Volume I. However, this report does contain additional data on autopilot usage and some limited acceleration-derived exceedance data obtained from non-revenue flights.

AIRCRAFT AND INSTRUMENTATION

Aircraft

The aircraft type was the Boeing B 747-100 with four Pratt and Whitney JT9D-3A and -7 turbofan engines. Characteristics of the aircraft used in the data reduction process are given in Table I. The configuration is shown in figure 1.

Instrumentation

The data were obtained from the Digital Flight Data Recorder system described in Volume I. Measurements were:

<u>Parameter</u>	<u>Range and Units</u>	<u>Samples per Second</u>
$a_n + 1$	-3g to +6g	4
a_y	-1g to +1g	4
CAS	100 to 450 kts	1
HP	-1,000 to 50,000 ft	1
FLP	-5° to 60°	1
Cabin Pressure	0 to 15 psia	1
Autopilot Status	Off or On	Discrete

Note that Spoiler data are not reported here, although they were in Volume I. The cabin pressure data type is the same as reported in Volume II.

SCOPE OF DATA

Data were collected from five aircraft operating in regular airline service over the area shown in figure 2 during 1978 through 1980: Almost all of the data (442 flights and 1689 hours) were obtained during passenger-carrying revenue service; a small amount (73 flights and 23 hours) was obtained during nonrevenue service (ferry flights mainly, although some training and maintenance flights may have been included). Due to operational difficulties, it was not practical to obtain continuous data from one aircraft as in Volumes I and II; it was therefore decided to obtain the data from any of five 747-100 aircraft being operated by the airline over the service route during the 30 months of the test.

DATA REDUCTION PROCESS

The Data Reduction Process is basically the same as described in Volume I. The filter used to separate maneuver and gust accelerations was similar to that described in Volume I except that the high limit of the band pass was set at 0.75 Hz based on an inspection of representative spectra. Although the results of reference 13 in Volume I indicate that the operation of the autopilot can cause up to a 20 percent reduction in the normal acceleration peak response to continuous turbulence, it was decided, after consultation with the industry, not to account for this in deriving U_{de} , in order to maintain comparability with the earlier VGH results, even though the autopilot status was being monitored in this investigation.

RESULTS

Flight Profile and Acceleration Derived Statistics

Presentation of Flight Profile Statistics results is similar to that described in Volume I. Flight Profile Statistics are given in Percent of Time, and as Maximum Values on a Percent of Flight basis for Entire Flights (flaps up or down) and for Flaps Deflected. For operations reported in this volume, the conditions existing at flap retraction after lift off, and the conditions existing at flap deflection before landing are given.

Acceleration Derived Statistics are also presented as in Volume I, except that with Flaps Deflected, the maximum a_n per flight and the Equivalent Airspeed occurring are presented for the various flap detents in take off and landing. Also new are level crossing counts for the Acceleration Derived quantities for non-revenue flights. All other results are for revenue flights. These Acceleration Derived quantities are subject to the same limitations discussed in Volume I, which indicates that the exceedances derived from the DFDR system at 4 samples per second may be significantly less than if actual peak values were counted.

The detailed Flight Profile and Acceleration Derived Statistics are given in figures 3 through 24 as shown in Table II. No discussion of the data is presented.

Autopilot Usage and Effects

Autopilot status was monitored as off or on without regard to the exact on-mode. The autopilot was on about 92 percent of the time; 7.5 percent of the time that it was on, the low-amplitude

limit cycle in normal acceleration appeared as discussed in Volume I. Its characteristics are summarized in figure 25. This phenomenon is believed to be due to off-nominal autopilot operation in the altitude-hold mode, and it is more fully discussed in Volumes I and II.

Cabin Pressure

Absolute cabin pressure was measured and used to compute the quantity "Maximum Differential Cabin Pressure per Flight" by using the measured absolute cabin pressure and the standard atmosphere based on the indicated pressure altitude. The distribution of this quantity as a function of the percent of flights is shown in figure 26.

CONCLUDING REMARKS

Data obtained from the Digital Flight Data Recorder system of Boeing 747-100 aircraft in 442 flights and 1689 hours of airline revenue operations are presented as an extension of the work documented in Volume I of this report. Some new data on conditions with flap deployment and autopilot use are given. In addition, acceleration statistics are presented from 23 hours of nonrevenue flights. No general discussion of the data is presented.

TABLE I

BOEING B 747-100 CHARACTERISTICS USED IN THE ANALYSIS

O Geometrical Characteristics

- o Wing Area = 5500 ft²
- o Wing Mean Chord = 27.32 ft

O Lift Curve Slope $C_{L\alpha}$ per degree

o Flaps up

<u>M</u>	<u>HP = 0</u>	<u>20 kft</u>	<u>40kft</u>
.2	.0860	.0885	.0902
.4	.0820	.0875	.0910
.5	.0790	.0870	.0922
.6	.0790	.0885	.0970
.7	.0750	.0865	.0970
.8	.0675	.0830	.0960
.85	-	.0860	.1005
.90	-	.0940	.1095

o Flaps down

<u>FLP, deg</u>	<u>HP $\approx$ 0</u>
0	.0860
2	.1000
10	.1050
20	.1050
30	.1018

- o Weight was computed linearly with time from take off to landing as described in Appendix C in Volume I.

TABLE II
INDEX OF FLIGHT PROFILE AND ACCELERATION STATISTICS

FLIGHT PROFILE STATISTICS

o ENTIRE FLIGHTS

Figure Number	Subject	Page Numbers
3	Weight vs. Flight Duration	12-17
4	Altitudes and Gross Weights	18
5	Altitudes and Airspeeds	19-22
6	Altitude Summary	23
7	Maximum Altitudes	24-25

o FLAPS DEFLECTED

8	Flap Detent Use	26
9	Weights, Altitudes and Airspeeds	27-36
10	Flap Deflection Times	37-39
11	Equivalent Airspeeds and Detents	40
12	Flap Use above 10,000 ft	41

TABLE II (continued)
ACCELERATION DERIVED STATISTICS

o ENTIRE FLIGHTS

Figure Number	Subject	Page Numbers
13	Normal Acceleration Exceedances	
(a)	a_n matrix	42
(b)	a_{nM} matrix	43
(c)	a_{nG} matrix	44
(d)-(m)	a_n , a_{nM} , a_{nG} plots	45-54
14	Lateral Acceleration Exceedances	
(a)	a_y matrix	55
(b)-(k)	a_y plots	56-65
15	U_{de} Exceedances	
(a)	U_{de} matrix	66
(b)-(k)	U_{de} plots	67-76
16	Peak Positive and Negative a_n vs. Altitude	
(a)	a_n matrix	77
(b)-(k)	a_n plots	78-87
17	Peak Positive and Negative a_{nM} vs. Altitude	
(a)	a_{nM} matrix	88
(b)-(k)	a_{nM} plots	89-98
18	Peak Positive and Negative a_{nG} vs. Altitude	
(a)	a_{nG} matrix	99
(b)-(k)	a_{nG} plots	100-109

TABLE II (Concluded)

19	Peak Positive and Negative U_{de} vs. Altitude	
(a)	U_{de} matrix	110
(b)-(k)	U_{de} plots	111-120
o	FLAPS DEFLECTED	
	Figure Number	Subject Page Numbers
20	a_n Exceedances with Flaps Deflected	
(a)	Take Off Detents matrix	121
(b)	Take Off Detents plot	122
(c)	Landing Detents matrix	123
(d)	Landing Detents plot	124
21	Peak Positive and Negative a_n per flight and EAS bands	
(a)-(c)	Take Off Detents	125-127
(d)-(i)	Landing Detents	128-133
o	NON-REVENUE FLIGHTS	
	Figure Number	Subject Page Numbers
22	Normal Acceleration Exceedances	
(a)	a_n matrix	134
(b)	a_{nM} matrix	135
(c)	a_{nG} matrix	136
(d)-(m)	a_n, a_{nM}, a_{nG} plots	137-146
23	Lateral Acceleration Exceedances	
(a)	a_y matrix	147
(b)-(k)	a_y plots	148-157
24	U_{de} Exceedances	
(a)	U_{de} matrix	158
(b)-(k)	U_{de} plots	159-168

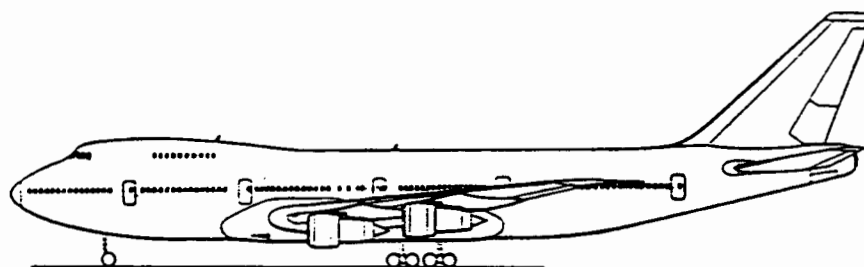
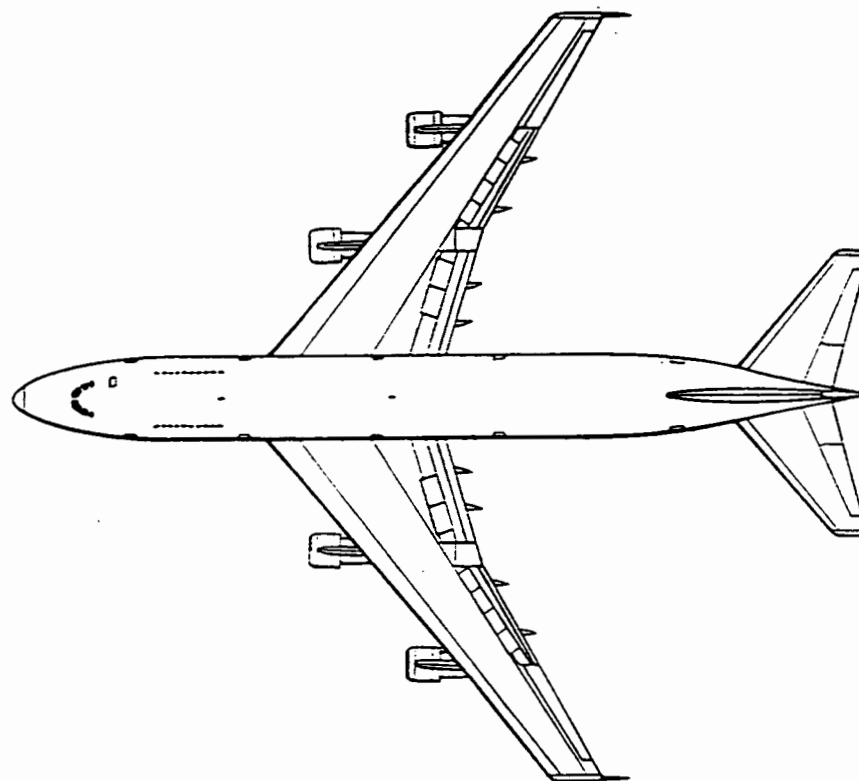
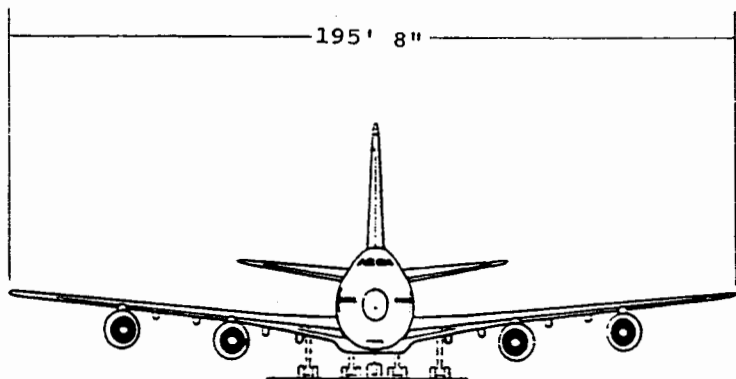
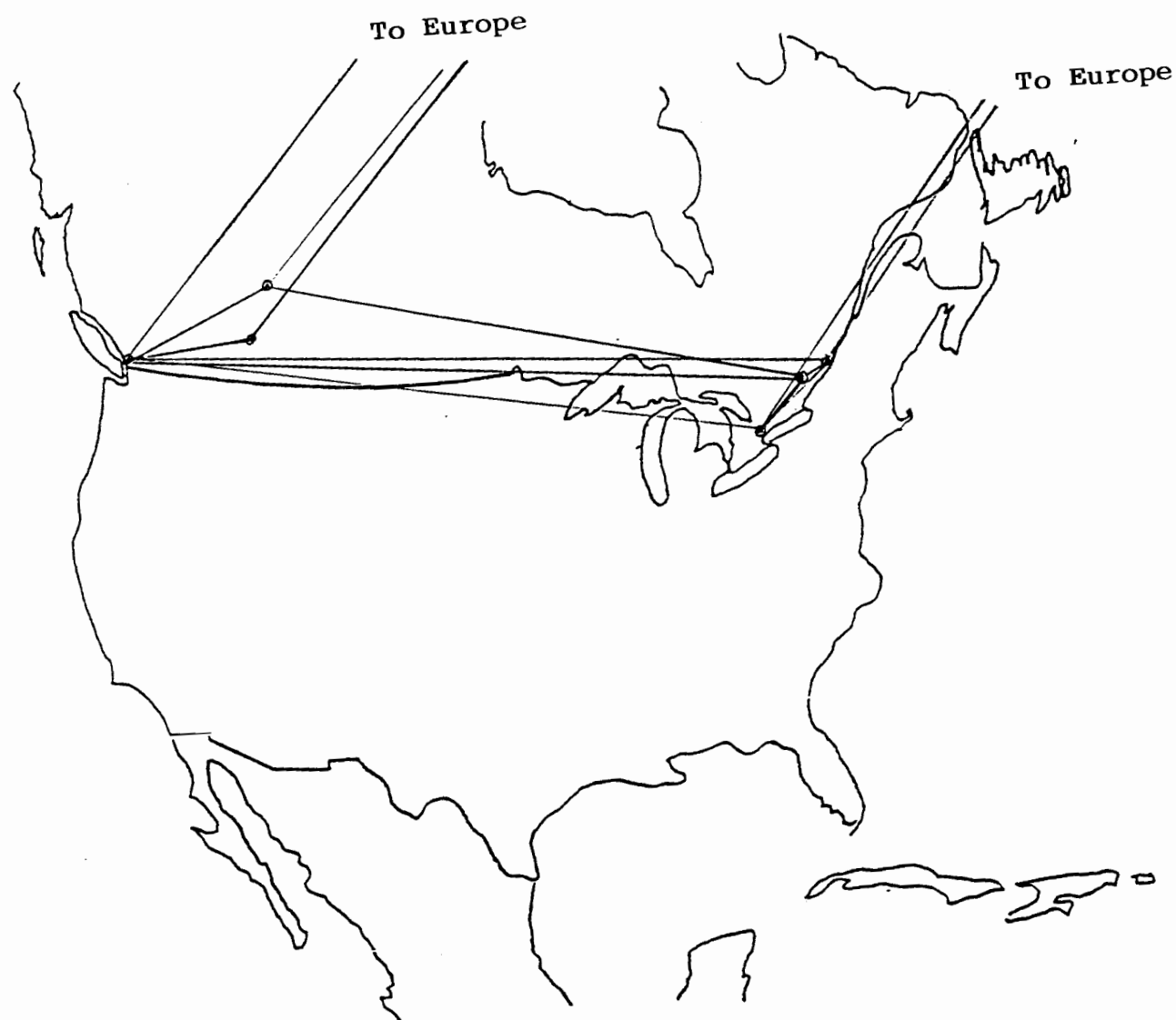


FIGURE 1.- Aircraft three view.



European Terminals
Include Prestwick,
Heathrow, Frankfurt.
Zurich

May 1978-November 1980

442 Flights
1689 Hours
772,613 N.Miles

Figure 1. - Location of service area and scope of data.

PERCENT OF FLIGHTS

DURATION OF FLIGHT, HOURS	330 TO 370 KLBS	370 TO 410 KLBS	410 TO 450 KLBS	450 TO 490 KLBS	490 TO 530 KLBS	530 TO 570 KLBS	570 TO 610 KLBS	610 TO 650 KLBS	650 TO 690 KLBS	690 TO 730 KLBS
8.5-9.0	0	0	0	0	0	0	0	0.7	1.6	0.2
8.0-8.5	0	0	0	0	0	0	0.5	0	1.8	0.7
7.5-8.0	0	0	0	0	0	0	0.2	2.5	1.8	1.1
7.0-7.5	0	0	0	0	0	0	1.4	0.2	1.6	0.7
6.5-7.0	0	0	0	0	0	0	1.1	3.2	1.8	0.5
6.0-6.5	0	0	0	0	0	0.2	0.9	1.1	1.6	0
5.5-6.0	0	0	0	0	0	0	0.5	0.9	0.5	0
5.0-5.5	0	0	0	0	0.2	0.7	0.5	0	0	0
4.5-5.0	0	0	0	0	0	1.6	2.3	0.2	0	0
4.0-4.5	0	0	0	0.2	0.7	3.8	3.8	0.2	0	0
3.5-4.0	0	0	0	0.5	1.8	5.0	2.5	0.2	0.2	0
3.0-3.5	0	0	0	0.9	1.4	1.4	0	0	0.2	0
2.5-3.0	0	0	0.5	1.6	4.8	6.3	0.2	0	0	0
2.0-2.5	0	0	0	0.2	2.3	1.6	0	0	0	0
1.5-2.0	0	0	0	0	0	0	0	0	0	0
1.0-1.5	0	0	2.5	3.6	0.2	0.2	0	0	0	0
.5-1.0	0	2.7	8.6	6.8	1.6	0	0.2	0	0	0
.0- .5	0	0	0	0.7	0	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	0	2.7	11.5	14.5	12.9	20.8	14.0	9.3	11.1	3.2

(a) Gross weight at take off

Figure 3.- Percent of flights; weight vs flight durations.

DURATION OF FLIGHT, HOURS	PERCENT OF FLIGHTS									
	330 TO 370 KLBS	370 TO 410 KLBS	410 TO 450 KLBS	450 TO 490 KLBS	490 TO 530 KLBS	530 TO 570 KLBS	570 TO 610 KLBS	610 TO 650 KLBS	650 TO 690 KLBS	690 TO 730 KLBS
8.5-9.0	0	0	0.7	1.6	0.2	0	0	0	0	0
8.0-8.5	0	0	0.5	2.3	0.2	0	0	0	0	0
7.5-8.0	0	0	1.1	2.7	1.8	0	0	0	0	0
7.0-7.5	0	0	1.6	1.1	1.1	0	0	0	0	0
6.5-7.0	0	0	1.6	3.6	1.4	0	0	0	0	0
6.0-6.5	0	0	0.5	1.8	1.6	0	0	0	0	0
5.5-6.0	0	0	0.5	0.5	0.9	0	0	0	0	0
5.0-5.5	0	0	0.7	0.7	0	0	0	0	0	0
4.5-5.0	0	0	0.5	3.4	0.2	0	0	0	0	0
4.0-4.5	0	0.2	1.4	5.2	2.0	0	0	0	0	0
3.5-4.0	0	0.5	1.8	5.9	1.8	0.2	0	0	0	0
3.0-3.5	0	0.7	1.1	1.8	0	0	0.2	0	0	0
2.5-3.0	0	0.9	2.7	8.1	1.6	0	0	0	0	0
2.0-2.5	0	0	0.5	2.7	0.9	0	0	0	0	0
1.5-2.0	0	0	0	0	0	0	0	0	0	0
1.0-1.5	0	0.9	3.2	2.3	0	0.2	0	0	0	0
.5-1.0	0.2	7.2	7.2	4.5	0.5	0.2	0	0	0	0
.0-.5	0	0	0.2	0.5	0	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	0.2	10.4	25.6	48.6	14.3	0.7	0.2	0	0	0

(b) Gross weight at landing

Figure 3.- Continued.

PERCENT OF FLIGHTS

DURATION OF FLIGHT, HOURS	0 TO 30 KLBS	30 TO 60 KLBS	60 TO 90 KLBS	90 TO 120 KLBS	120 TO 150 KLBS	150 TO 180 KLBS	180 TO 210 KLBS	210 TO 240 KLBS	240 TO 270 KLBS	270 TO 300 KLBS
8.5-9.0	0	0	0	0	0	0	0	1.8	0.7	0
8.0-8.5	0	0	0	0	0	0	0	2.5	0.5	0
7.5-8.0	0	0	0	0	0	0	0.2	5.0	0.5	0
7.0-7.5	0	0	0	0	0	0	1.6	2.0	0.2	0
6.5-7.0	0	0	0	0	0	0.2	5.4	0.9	0	0
6.0-6.5	0	0	0	0	0	0.9	2.9	0	0	0
5.5-6.0	0	0	0	0	0	0.9	0.9	0	0	0
5.0-5.5	0	0	0	0	0.9	0.5	0	0	0	0
4.5-5.0	0	0	0	0	3.4	0.7	0	0	0	0
4.0-4.5	0	0	0	2.3	6.1	0.5	0	0	0	0
3.5-4.0	0	0	0	7.0	2.7	0.5	0	0	0	0
3.0-3.5	0	0	0.5	2.9	0.2	0	0	0.2	0	0
2.5-3.0	0	0	7.0	5.0	1.4	0	0	0	0	0
2.0-2.5	0	0	2.3	1.4	0.5	0	0	0	0	0
1.5-2.0	0	0	0	0	0	0	0	0	0	0
1.0-1.5	0	4.3	2.0	0.2	0	0	0	0	0	0
.5-1.0	0	17.9	1.8	0	0	0.2	0	0	0	0
.0-.5	0	0.7	0	0	0	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	0	22.9	13.6	18.8	15.2	4.3	11.1	12.4	1.8	0

(c) Fuel weight at take off

Figure 3.- Continued.

PERCENT OF FLIGHTS

DURATION OF FLIGHT, HOURS	0 TO 30 KLBS	30 TO 60 KLBS	60 TO 90 KLBS	90 TO 120 KLBS	120 TO 150 KLBS	150 TO 180 KLBS	180 TO 210 KLBS	210 TO 240 KLBS	240 TO 270 KLBS	270 TO 300 KLBS
8.5-9.0	1.8	0.7	0	0	0	0	0	0	0	0
8.0-8.5	1.4	1.4	0.2	0	0	0	0	0	0	0
7.5-8.0	1.4	4.3	0	0	0	0	0	0	0	0
7.0-7.5	1.1	2.7	0	0	0	0	0	0	0	0
6.5-7.0	2.0	4.5	0	0	0	0	0	0	0	0
6.0-6.5	1.1	2.7	0	0	0	0	0	0	0	0
5.5-6.0	0.7	1.1	0	0	0	0	0	0	0	0
5.0-5.5	0.7	0.7	0	0	0	0	0	0	0	0
4.5-5.0	1.6	2.5	0	0	0	0	0	0	0	0
4.0-4.5	4.5	4.3	0	0	0	0	0	0	0	0
3.5-4.0	4.8	5.0	0.5	0	0	0	0	0	0	0
3.0-3.5	1.1	2.3	0.2	0	0.2	0	0	0	0	0
2.5-3.0	5.9	6.1	1.4	0	0	0	0	0	0	0
2.0-2.5	1.6	1.8	0.7	0	0	0	0	0	0	0
1.5-2.0	0	0	0	0	0	0	0	0	0	0
1.0-1.5	3.8	2.5	0.2	0	0	0	0	0	0	0
.5-1.0	12.7	7.0	0	0	0	0.2	0	0	0	0
.0-.5	0.5	0.2	0	0	0	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	46.6	49.8	3.2	0	0.2	0.2	0	0	0	0

(d) Fuel weight at landing

Figure 3.- Continued.

DURATION OF FLIGHT, HOURS	PERCENT OF FLIGHTS									
	0 TO 25 KLBS	25 TO 50 KLBS	50 TO 75 KLBS	75 TO 100 KLBS	100 TO 125 KLBS	125 TO 150 KLBS	150 TO 175 KLBS	175 TO 200 KLBS	200 TO 225 KLBS	225 TO 250 KLBS
8.5-9.0	0	0	0	0	0	0	0	0.9	1.6	0
8.0-8.5	0	0	0	0	0	0	0	1.1	1.8	0
7.5-8.0	0	0	0	0	0	0	0.7	4.3	0.7	0
7.0-7.5	0	0	0	0	0	0	1.6	2.0	0.2	0
6.5-7.0	0	0	0	0	0.2	0.2	5.7	0.2	0.2	0
6.0-6.5	0	0	0	0	0	1.4	2.5	0	0	0
5.5-6.0	0	0	0	0	0	1.1	0.7	0	0	0
5.0-5.5	0	0	0	0	1.1	0.2	0	0	0	0
4.5-5.0	0	0	0	0.5	3.6	0	0	0	0	0
4.0-4.5	0	0	0.2	5.7	2.9	0	0	0	0	0
3.5-4.0	0	0	0.5	9.5	0.2	0	0	0	0	0
3.0-3.5	0	0	3.2	0.7	0	0	0	0	0	0
2.5-3.0	0	0	13.3	0	0	0	0	0	0	0
2.0-2.5	0	0.7	3.4	0	0	0	0	0	0	0
1.5-2.0	0	0	0	0	0	0	0	0	0	0
1.0-1.5	2.0	4.5	0	0	0	0	0	0	0	0
.5-1.0	18.8	1.1	0	0	0	0	0	0	0	0
.0-.5	0.7	0	0	0	0	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	21.5	6.3	20.6	16.3	8.1	2.9	11.1	8.6	4.5	0

(e) Fuel burn vs flight duration

Figure 3.- Continued.

DURATION OF FLIGHT, HOURS	PERCENT OF FLIGHTS									
	0 TO 20 KLBS	20 TO 40 KLBS	40 TO 60 KLBS	60 TO 80 KLBS	80 TO 100 KLBS	100 TO 120 KLBS	120 TO 140 KLBS	140 TO 160 KLBS	160 TO 180 KLBS	180 TO 200 KLBS
8.5-9.0	0	0.5	0.2	0.5	1.4	0	0	0	0	0
8.0-8.5	0.2	0.2	0.2	0.2	2.0	0	0	0	0	0
7.5-8.0	0	0.2	1.4	1.6	1.1	1.4	0	0	0	0
7.0-7.5	0	0.5	0.9	0.2	1.6	0.7	0	0	0	0
6.5-7.0	0	0	1.4	1.8	2.5	0.9	0	0	0	0
6.0-6.5	0	0.2	0.2	1.4	0.2	1.1	0.7	0	0	0
5.5-6.0	0	0	0	0.9	0	0.5	0.5	0	0	0
5.0-5.5	0	0.2	0.5	0.5	0.2	0	0	0	0	0
4.5-5.0	0	0.2	0	2.0	1.6	0.2	0	0	0	0
4.0-4.5	0.2	0.2	1.4	2.3	3.2	1.4	0.2	0	0	0
3.5-4.0	0.5	0.7	1.1	3.4	2.7	1.8	0	0	0	0
3.0-3.5	0.5	1.1	0.7	1.4	0.2	0	0	0	0	0
2.5-3.0	0.9	1.8	2.0	3.2	5.2	0.2	0	0	0	0
2.0-2.5	0	0	0.9	1.8	1.4	0	0	0	0	0
1.5-2.0	0	0	0	0	0	0	0	0	0	0
1.0-1.5	0.9	2.0	2.5	0.7	0.5	0	0	0	0	0
.5-1.0	5.7	6.1	3.6	2.3	2.0	0.2	0	0	0	0
.0-.5	0	0	0.2	0.2	0.2	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	8.8	14.0	17.2	24.2	26.0	8.4	1.4	0	0	0

(f) Payload weight vs flight duration

Figure 3.- Concluded.

PRESSURE ALTITUDE BANDS

GROSS WEIGHT KILBS	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
CLIMB										
330-370	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
370-410	0.0227	0.0257	0.0302	0.0355	0.0477	0.0563	0.0239	0.0068	0.0000	0.2488
410-450	0.0770	0.1076	0.1193	0.1232	0.1518	0.1637	0.1249	0.0705	0.0030	0.9410
450-490	0.1151	0.1339	0.1552	0.1488	0.1711	0.1822	0.1627	0.1341	0.0224	1.2254
490-530	0.1398	0.1498	0.1931	0.2148	0.2592	0.2982	0.3604	0.9995	0.0000	2.6150
530-570	0.2398	0.2099	0.2564	0.2593	0.3172	0.3652	0.4928	0.4855	0.0000	2.6262
570-610	0.1719	0.1751	0.2106	0.2356	0.2854	0.3246	0.4038	0.3051	0.0000	2.1120
610-650	0.1139	0.1380	0.1602	0.1784	0.2476	0.2894	0.4603	0.1031	0.0000	1.6909
650-690	0.1224	0.1900	0.2227	0.2423	0.3074	0.3615	0.3019	0.0049	0.0000	1.7532
690-730	0.0325	0.0515	0.0395	0.0408	0.0355	0.0188	0.0023	0.0000	0.0000	0.2209
PERCENT TOTAL TIME	1.0350	1.1816	1.3873	1.4788	1.8228	2.0600	2.3329	2.1096	0.0254	13.4334
AVE GROSS WEIGHT IN ALTITUDE BAND	557.94	563.00	560.81	562.40	563.11	563.28	568.57	531.41	465.28	
LEVEL										
330-370	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
370-410	0.0287	0.0064	0.0312	0.0000	0.0072	0.1072	0.1988	0.1789	0.0804	0.6388
410-450	0.0597	0.1086	0.0467	0.0138	0.0287	0.1263	0.5925	1.8736	0.2630	3.1127
450-490	0.1214	0.1142	0.1473	0.0476	0.0459	0.1032	0.4698	10.9362	0.1368	12.1224
490-530	0.0370	0.0842	0.0588	0.0144	0.0034	0.3214	1.0448	21.5848	0.0000	23.1486
530-570	0.0000	0.0039	0.0000	0.0000	0.0051	0.3631	2.2103	15.2523	0.0000	17.8346
570-610	0.0000	0.0019	0.0000	0.0000	0.0121	0.2565	3.2357	7.3599	0.0000	10.8661
610-650	0.0000	0.0009	0.0000	0.0000	0.0000	0.2651	3.4656	2.5799	0.0000	6.3114
650-690	0.0000	0.0014	0.0000	0.0000	0.0014	0.1528	1.6954	0.1147	0.0000	1.9657
690-730	0.0000	0.0000	0.0000	0.0000	0.0000	0.0113	0.0047	0.0000	0.0000	0.0161
PERCENT TOTAL TIME	0.2468	0.3215	0.2840	0.0757	0.1038	1.7068	12.9175	59.8802	0.4802	76.0165
AVE GROSS WEIGHT IN ALTITUDE BAND	457.02	468.34	462.90	470.32	475.44	548.95	583.18	525.33	434.70	
DESCENT										
330-370	0.0019	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0019
370-410	0.2351	0.1848	0.1461	0.0923	0.0844	0.0835	0.0474	0.0308	0.0016	0.9060
410-450	0.5154	0.4345	0.3484	0.2057	0.2006	0.1844	0.1570	0.1627	0.0094	2.2182
450-490	1.0300	0.9478	0.7696	0.5047	0.4564	0.4396	0.4521	0.5704	0.0048	5.1754
490-530	0.3360	0.3191	0.2894	0.1984	0.1925	0.1924	0.2308	0.2848	0.0000	2.0434
530-570	0.0102	0.0178	0.0206	0.0166	0.0101	0.0126	0.0157	0.0278	0.0000	0.1314
570-610	0.0048	0.0044	0.0046	0.0021	0.0021	0.0020	0.0244	0.0197	0.0000	0.0641
610-650	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0077	0.0021	0.0000	0.0097
650-690	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
690-730	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PERCENT TOTAL TIME	2.1334	1.9084	1.5787	1.0198	0.9462	0.9145	0.9351	1.0983	0.0158	10.5501
AVE GROSS WEIGHT IN ALTITUDE BAND	458.37	460.85	462.50	464.02	463.64	464.41	474.89	476.69	438.12	
* HOURS IN ALTITUDE & CLIMB (LEVEL, DESCENT) & GROSS WEIGHT BANDS										
PERCENT TIME =							x 100			
TOTAL TIME, HOURS										
TOTAL FLIGHTS 442.00										
TOTAL TIME 1688.83										
TOTAL AIRMILES 772612.98										

Figure 4.- Percent time in altitude and gross weight bands.

PRESSURE ALTITUDE BANDS										
CAS INTERVAL, KTS	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
120-130	0.0016	0	0	0	0	0	0	0	0	0.0016
130-140	0	0	0	0	0	0	0	0	0	0
140-150	0.0077	0.0004	0	0	0	0	0	0	0	0.0081
150-160	0.0603	0.0013	0	0	0	0	0	0	0	0.0617
160-170	0.0844	0.0020	0	0	0	0	0	0	0	0.0864
170-180	0.0779	0.0041	0	0	0	0	0	0	0	0.0820
180-190	0.0627	0.0078	0	0.0020	0	0	0	0	0	0.0705
190-200	0.0764	0.0120	0	0.0005	0	0	0	0	0	0.0892
200-210	0.1095	0.0175	0	0.0008	0	0	0	0	0	0.1270
210-220	0.1167	0.0245	0	0.0013	0	0	0	0	0	0.1412
220-230	0.1207	0.0453	0.0008	0.0026	0	0	0	0	0	0.1668
230-240	0.1086	0.0660	0.0050	0.0024	0.0023	0.0024	0.0064	0.0008	0	0.1939
240-250	0.1232	0.3204	0.0589	0.0094	0.0101	0.0150	0.0119	0.0204	0.0070	0.5763
250-260	0.0753	0.4540	0.1404	0.0054	0.0008	0.0024	0.0074	0.1936	0.0171	0.8964
260-270	0.0081	0.1013	0.1250	0.0155	0.0110	0.0110	0.0093	0.5933	0.0013	0.8757
270-280	0.0014	0.0282	0.1160	0.0218	0.0230	0.0140	0.0916	0.8085	0	1.1045
280-290	0.0004	0.0188	0.1365	0.0438	0.0405	0.0383	0.4892	0.4407	0	1.2082
290-300	0	0.0242	0.3145	0.5484	0.7125	0.7924	1.0504	0.0521	0	3.4946
300-310	0	0.0238	0.2453	0.3638	0.4197	0.4516	0.5069	0	0	2.0111
310-320	0	0.0175	0.1449	0.3018	0.3908	0.5005	0.1441	0	0	1.4946
320-330	0	0.0080	0.0860	0.1531	0.1869	0.1930	0.0013	0	0	0.6414
330-340	0	0.0013	0.0109	0.0089	0.0123	0.0243	0	0	0	0.0589
340-350	0	0.0015	0.0027	0.0037	0.0089	0.0100	0	0	0	0.0268
350-360	0	0.0004	0.0005	0.0007	0.0040	0.0050	0	0	0	0.0107
360-370	0	0.0004	0	0	0	0	0	0	0	0.0005
370-380	0	0.0001	0	0	0	0	0	0	0	0.0001
380-390	0	0	0	0	0	0	0	0	0	0
390-400	0	0	0	0	0	0	0	0	0	0
AV CAS	209.6386	252.0451	289.3584	303.5816	304.2868	304.7590	295.0667	272.6291	252.7250	
TOTAL HOURS IN ALT & CLIMB	17.4792	19.9560	23.4294	24.9742	30.7847	34.7896	39.3981	35.6275	0.4283	226.8669
PERCENT TIME IN ALT & CLIMB	1.0350	1.1816	1.3873	1.4788	1.8228	2.0600	2.3329	2.1096	0.0254	13.4334
* HOURS IN ALTITUDE & AIRSPEED BANDS										
PERCENT TIME = $\frac{\text{HOURS IN ALTITUDE \& AIRSPEED BANDS}}{\text{TOTAL TIME}} \times 100 = \frac{\text{TH CAS}}{T} \times 100$										
									TOTAL FLIGHTS	442
									TOTAL HOURS	1689

(a) Climb

Figure 5.- Percent time in altitude and airspeed bands.

PRESSURE ALTITUDE BANDS

CAS INTERVAL, KTS	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
120-130	0	0	0	0	0	0	0	0	0	0
130-140	0.0004	0.0007	0	0	0	0	0	0	0	0.0011
140-150	0.0032	0.0097	0	0	0	0	0	0	0	0.0128
150-160	0.0186	0.0051	0	0	0	0	0	0	0	0.0237
160-170	0.0478	0.0128	0	0	0	0	0	0	0	0.0606
170-180	0.0860	0.0197	0	0	0	0	0	0	0	0.1057
180-190	0.0468	0.0339	0.0022	0	0	0	0	0	0	0.0829
190-200	0.0171	0.0367	0.0033	0	0	0	0	0	0	0.0571
200-210	0.0116	0.0510	0.0088	0	0	0	0	0	0	0.0714
210-220	0.0085	0.0427	0.0163	0	0	0	0	0	0	0.0674
220-230	0.0033	0.0292	0.0122	0.0002	0	0.0007	0.0060	0.0067	0	0.0583
230-240	0.0017	0.0185	0.0195	0.0037	0	0.0039	0.0024	0.0124	0.0005	0.0624
240-250	0.0010	0.0226	0.0307	0.0034	0	0.0025	0.0088	0.1517	0.1487	0.3694
250-260	0.0007	0.0186	0.0465	0.0015	0	0.0094	0.0587	3.8186	0.3301	4.2842
260-270	0.0002	0.0035	0.0212	0.0009	0	0.3338	0.1554	14.5623	0.0010	15.0781
270-280	0	0.0022	0.0133	0.0010	0.0002	0.4389	0.1354	24.0853	0	24.6763
280-290	0	0.0027	0.0137	0.0012	0.0010	0.2799	0.8662	14.4968	0	15.6615
290-300	0	0.0021	0.0132	0.0024	0.0027	0.0514	3.6018	2.7457	0	6.4192
300-310	0	0.0024	0.0106	0.0032	0.0024	0.0054	6.1344	0	0	6.1593
310-320	0	0.0023	0.0135	0.0051	0.0153	0.0158	1.9064	0	0	1.9583
320-330	0	0.0011	0.0136	0.0139	0.0091	0.2221	0.0421	0	0	0.3019
330-340	0	0.0034	0.0321	0.0161	0.0266	0.2008	0	0	0	0.2790
340-350	0	0.0006	0.0123	0.0158	0.0313	0.0988	0	0	0	0.1589
350-360	0	0.0001	0.0008	0.0057	0.0132	0.0413	0	0	0	0.0610
360-370	0	0	0	0.0017	0.0021	0.0022	0	0	0	0.0059
370-380	0	0	0	0	0	0	0	0	0	0
380-390	0	0	0	0	0	0	0	0	0	0
390-400	0	0	0	0	0	0	0	0	0	0
AV CAS	178.8609	212.1336	272.4721	320.3210	334.9873	295.1497	301.2984	274.5413	251.9030	
TOTAL HOURS IN ALT & LEVEL	4.1681	5.4294	4.7956	1.2786	1.7533	28.8244	218.1544	1011.2767	8.1103	1283.7908
PERCENT TIME IN ALT & LEVEL	0.2468	0.3215	0.2840	0.0757	0.1038	1.7068	12.9175	59.8802	0.4802	76.0165

$$* \text{ PERCENT TIME} = \frac{\text{HOURS IN ALTITUDE \& AIRSPEED BANDS}}{\text{TOTAL TIME}} \times 100 = \frac{\text{TH CAS}}{\text{T}} \times 100$$

TOTAL FLIGHTS 442
TOTAL HOURS 1689

(b) Level

Figure 5.- Continued.

PRESSURE ALTITUDE BANDS

CAS INTERVAL, KTS	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
120-130	0.0235	0	0	0	0	0	0	0	0	0.0235
130-140	0.2671	0.0033	0	0	0	0	0	0	0	0.2704
140-150	0.4302	0.0217	0.0013	0	0	0	0	0	0	0.4532
150-160	0.2980	0.0287	0.0010	0	0	0	0	0	0	0.3277
160-170	0.3034	0.0529	0.0004	0	0	0	0	0	0	0.3567
170-180	0.3260	0.1295	0.0037	0	0	0	0	0	0	0.4592
180-190	0.2171	0.1530	0.0085	0.0020	0	0	0	0	0	0.3807
190-200	0.1077	0.1679	0.0143	0.0005	0	0	0	0	0	0.2905
200-210	0.0690	0.2238	0.0270	0.0008	0	0	0	0	0	0.3207
210-220	0.0352	0.1929	0.0329	0.0013	0	0	0	0	0	0.2823
220-230	0.0252	0.1471	0.0375	0.0024	0	0.0018	0.0017	0	0	0.2158
230-240	0.0187	0.1644	0.0395	0.0021	0.0018	0.0023	0.0025	0.0017	0	0.2331
240-250	0.0079	0.2959	0.1251	0.0122	0.0040	0.0033	0.0033	0.0081	0.0041	0.4639
250-260	0.0020	0.2242	0.1523	0.0189	0.0065	0.0038	0.0035	0.0561	0.0082	0.4762
260-270	0.0003	0.0412	0.1002	0.0142	0.0111	0.0079	0.0047	0.2393	0.0035	0.4224
270-280	0.0006	0.0148	0.0942	0.0125	0.0088	0.0076	0.0197	0.3565	0	0.5148
280-290	0.0004	0.0102	0.0822	0.0168	0.0077	0.0039	0.0749	0.3518	0	0.5524
290-300	0.0003	0.0097	0.0994	0.0417	0.0263	0.0164	0.2450	0.0837	0	0.5226
300-310	0.0002	0.0063	0.0988	0.0547	0.0322	0.0420	0.2883	0.0010	0	0.5235
310-320	0.0002	0.0066	0.1090	0.0594	0.0497	0.0841	0.2097	0	0	0.5187
320-330	0.0003	0.0060	0.0350	0.1027	0.0884	0.2312	0.0719	0	0	0.6355
330-340	0	0.0041	0.2272	0.3242	0.2483	0.2897	0.0055	0	0	1.0990
340-350	0	0.0032	0.1584	0.3087	0.3609	0.1920	0	0	0	1.0233
350-360	0	0.0009	0.0266	0.0405	0.0943	0.0285	0	0	0	0.1907
360-370	0	0	0.0023	0.0033	0.0052	0.0002	0	0	0	0.0109
370-380	0	0	0.0009	0.0007	0.0009	0	0	0	0	0.0025
380-390	0	0	0	0	0	0	0	0	0	0
390-400	0	0	0	0	0	0	0	0	0	0
AV CAS	164.4177	219.4184	291.6416	327.3398	333.9858	328.8281	303.0824	276.2697	254.6155	
TOTAL HOURS IN ALT BAND	36.0296	32.2292	26.6611	17.2225	15.9795	15.4443	15.7916	18.5490	0.2673	178.1742
PERCENT TIME IN ALT & DESCENT	2.1334	1.9084	1.5787	1.0198	0.9462	0.9145	0.9351	1.0983	0.0158	10.5501

$$* \text{ PERCENT TIME} = \frac{\text{HOURS IN ALTITUDE \& AIRSPEED BANDS}}{\text{TOTAL TIME}} \times 100 = \frac{\text{TH CAS}}{\text{T}} \times 100$$

TOTAL FLIGHTS 442
TOTAL HOURS 1689

(c) Descent

Figure 5.- Continued.

PRESSURE ALTITUDE BANDS

	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
CAS INTERVAL, KTS										
120-130	0.0251	0	0	0	0	0	0	0	0	0.0251
130-140	0.2675	0.0041	0	0	0	0	0	0	0	0.2715
140-150	0.4410	0.0318	0.0013	0	0	0	0	0	0	0.4741
150-160	0.3770	0.0351	0.0010	0	0	0	0	0	0	0.4131
160-170	0.4356	0.0677	0.0004	0	0	0	0	0	0	0.5037
170-180	0.4899	0.1533	0.0037	0	0	0	0	0	0	0.6469
180-190	0.3266	0.1984	0.0108	0.0020	0	0	0	0	0	0.5341
190-200	0.2012	0.2174	0.0176	0.0005	0	0	0	0	0	0.4368
200-210	0.1902	0.2923	0.0359	0.0008	0	0	0	0	0	0.5192
210-220	0.1603	0.2601	0.0492	0.0013	0	0	0	0	0	0.4709
220-230	0.1492	0.2216	0.0506	0.0026	0	0.0026	0.0076	0.0067	0	0.4409
230-240	0.1290	0.2489	0.0640	0.0082	0.0041	0.0086	0.0112	0.0150	0.0005	0.4894
240-250	0.1321	0.6389	0.2148	0.0250	0.0140	0.0207	0.0240	0.1802	0.1598	1.4096
250-260	0.0780	0.6968	0.3401	0.0257	0.0074	0.0156	0.0696	4.0683	0.3554	5.6568
260-270	0.0087	0.1460	0.2463	0.0306	0.0222	0.3526	0.1694	15.3949	0.0057	16.3764
270-280	0.0020	0.0452	0.2236	0.0353	0.0320	0.4606	0.2466	25.2504	0	26.2956
280-290	0.0008	0.0317	0.2324	0.0619	0.0492	0.3221	1.4348	15.2893	0	17.4221
290-300	0.0003	0.0360	0.4271	0.5925	0.7415	0.8602	4.8972	2.8815	0	10.4363
300-310	0.0002	0.3250	0.3547	0.4217	0.4543	0.4989	6.9296	0.0019	0	8.6939
310-320	0.0002	0.0264	0.2673	0.3663	0.4557	0.6004	2.2602	0	0	3.9765
320-330	0.0003	0.0150	0.2346	0.2698	0.2844	0.6463	0.1284	0	0	1.5788
330-340	0	0.0088	0.2702	0.3492	0.2873	0.5147	0.0068	0	0	1.4369
340-350	0	0.0053	0.1734	0.3282	0.4012	0.3008	0	0	0	1.2089
350-360	0	0.0014	0.0279	0.0470	0.1114	0.0748	0	0	0	0.2624
360-370	0	0.0004	0.0023	0.0050	0.0073	0.0024	0	0	0	0.0173
370-380	0	0.0001	0.0009	0.0007	0.0009	0	0	0	0	0.0026
380-390	0	0	0	0	0	0	0	0	0	0
390-400	0	0	0	0	0	0	0	0	0	0
AV CAS	179.1658	230.0328	288.9921	313.4856	315.1778	305.9575	300.5032	274.5074	252.0253	
TOTAL HOURS IN ALT BAND	57.6768	57.6147	54.8861	43.4753	48.5176	79.0583	273.3441	1065.4532	8.8058	1688.8319
PERCENT TIME IN ALT AND DESCENT	3.4152	3.4115	3.2499	2.5743	2.8728	4.6812	16.1854	63.0882	0.5214	100.0000
$* \text{ PERCENT TIME} = \frac{\text{HOURS IN ALTITUDE \& AIRSPEED BANDS}}{\text{TOTAL TIME}} \times 100 = \frac{\text{TH CAS}}{T} \times 100$										
									TOTAL FLIGHTS	442
									TOTAL HOURS	1689

(d) All flight modes

Figure 5.- Concluded.

PRESSURE ALTITUDE BANDS

	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT
TIME INTERVAL, HRS IN ALTITUDE BAND									
8.50-9.00	0	0	0	0	0	0	0	0	0
8.00-8.50	0	0	0	0	0	0	0	0	0
7.50-8.00	0	0	0	0	0	0.226	0	0	0
7.00-7.50	0	0	0	0	0	0	0.226	0.679	0
6.50-7.00	0	0	0	0	0	0	0	3.394	0
6.00-6.50	0	0	0	0	0	0.226	0.679	2.489	0
5.50-6.00	0	0	0	0	0	0	0.226	5.882	0
5.00-5.50	0	0	0	0	0	0	1.357	3.394	0
4.50-5.00	0	0	0	0	0	0	1.131	2.036	0
4.00-4.50	0	0	0	0	0	0	2.036	2.036	0
3.50-4.00	0	0	0	0	0	0	0.679	8.371	0
3.00-3.50	0	0	0	0	0	0.226	1.357	8.371	0
2.50-3.00	0	0	0	0	0	0	0.226	6.787	0
2.00-2.50	0	0	0	0	0	0.226	1.131	7.919	0
1.50-2.00	0	0	0	0	0	0	2.036	14.253	0
1.00-1.50	0	0	0	0	0	0	3.846	2.489	0.679
.80-1.00	0	0	0	0	0	0	0.679	1.131	0.226
.70-.80	0	0	0	0	0	0	1.810	0.226	0.226
.60-.70	0	0	0	0	0	0.226	0.679	0.226	0
.50-.60	0	0.452	0	0	0	0.905	2.715	1.810	0
.40-.50	0	0	0	0	0.226	0.679	2.262	2.941	0
.30-.40	0	0.679	0.226	0	0	2.489	2.941	3.846	0
.20-.30	3.167	4.751	2.941	2.036	2.036	6.787	8.145	1.131	0.679
.15-.20	24.887	15.385	12.443	2.489	6.109	13.575	11.086	0.452	0
.10-.15	51.357	57.692	64.027	35.520	48.416	47.059	35.973	0	0
.05-.10	18.778	21.041	20.136	59.050	42.081	25.339	10.181	0	0
.00-.05	1.810	0	0	0	0	0.226	0	0	0
TOTAL HOURS IN ALT BAND	57.6768	57.6147	54.8861	43.4753	48.5176	79.0583	273.3441	1065.4532	8.8058
TOTAL PERCENT TIME IN ALT BAND	3.4152	3.4115	3.2499	2.5743	2.8728	4.6812	16.1854	63.0882	0.5214

Figure 6.- Percent of flights vs time in altitude bands.

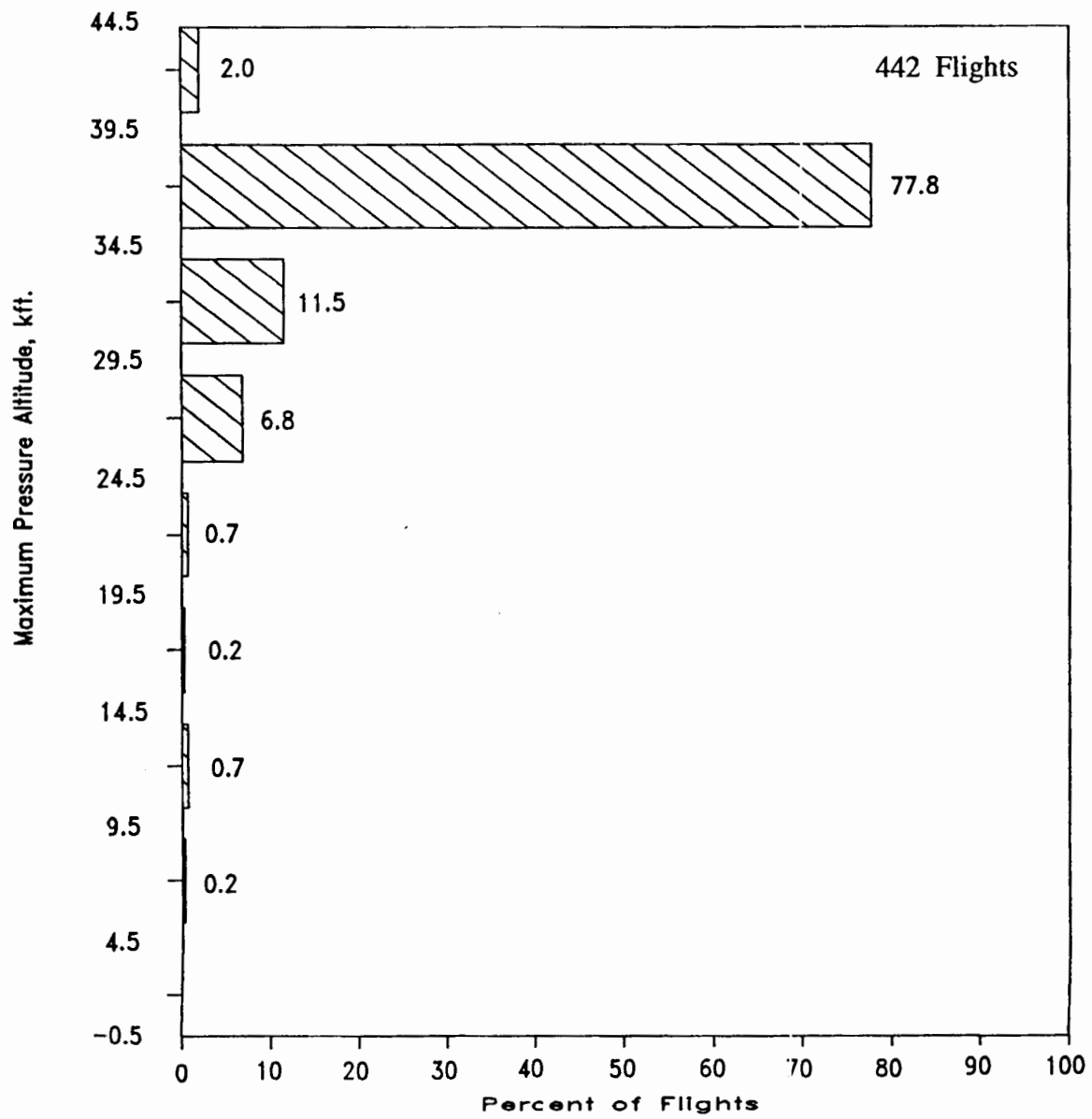
PERCENT OF FLIGHTS

TO MAXIMUM PRESSURE ALTITUDE BAND IN EACH FLIGHT VS DURATION

DURATION OF FLIGHT, HOURS	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT
8.5-9.0	0	0	0	0	0	0.2	0	2.3	0
8.0-8.5	0	0	0	0	0	0	0	2.9	0
7.5-8.0	0	0	0	0	0	0	0	5.4	0.2
7.0-7.5	0	0	0	0	0	0	0	3.8	0
6.5-7.0	0	0	0	0	0	0.2	0	6.3	0
6.0-6.5	0	0	0	0	0	0	0.5	3.4	0
5.5-6.0	0	0	0	0	0	0	0.2	1.6	0
5.0-5.5	0	0	0	0	0	0	0	0.9	0.5
4.5-5.0	0	0	0	0	0	0	0	4.1	0
4.0-4.5	0	0	0	0	0	0	0.2	8.4	0.2
3.5-4.0	0	0	0	0	0	0.2	0.2	8.8	0.9
3.0-3.5	0	0	0	0	0	0	0.5	3.2	0.2
2.5-3.0	0	0	0	0	0	0.2	0	13.1	0
2.0-2.5	0	0	0	0	0	0	0	4.1	0
1.5-2.0	0	0	0	0	0	0	0	0	0
1.0-1.5	0	0	0	0	0	0	1.1	5.4	0
.5-1.0	0	0.2	0.2	0	0.7	5.9	8.8	4.1	0
.0- .5	0	0	0.5	0.2	0	0	0	0	0
TOTAL PERCENTS, ALL FLIGHTS	0	0.2	0.7	0.2	0.7	6.8	11.5	77.8	2.0

(a) Maximum altitude vs flight duration matrix

Figure 7.- Percent of flights to maximum altitude.



(b) Percent of flights to maximum pressure altitude per flight : Plot.

Figure 7.- Concluded.

Time in flap detent in takeoff or landing
 X 100
 Total flight time
 Percent Time =

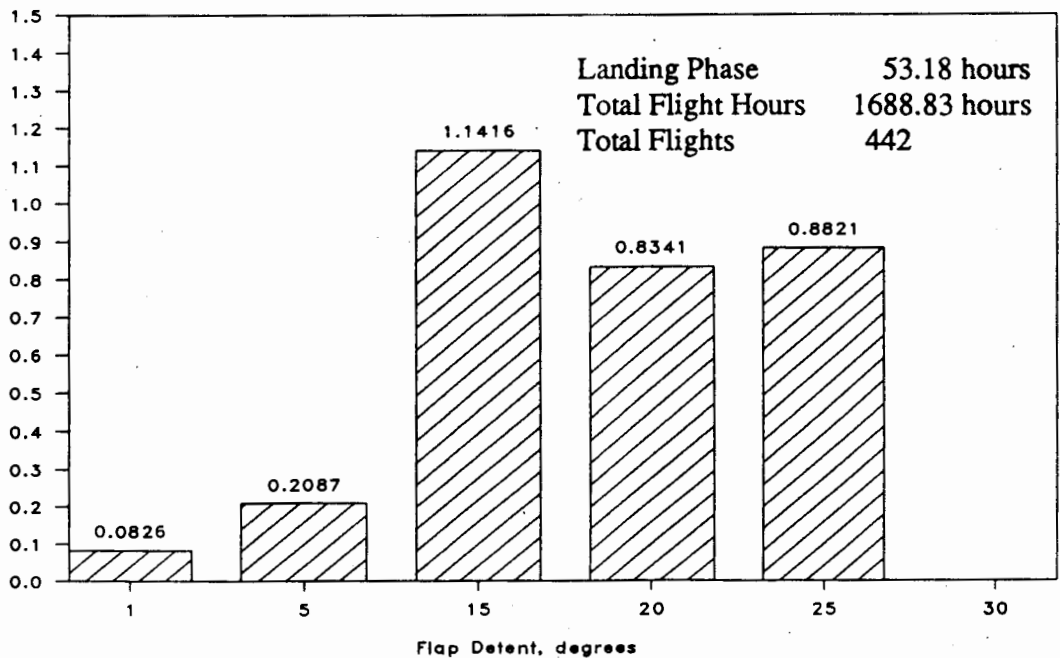
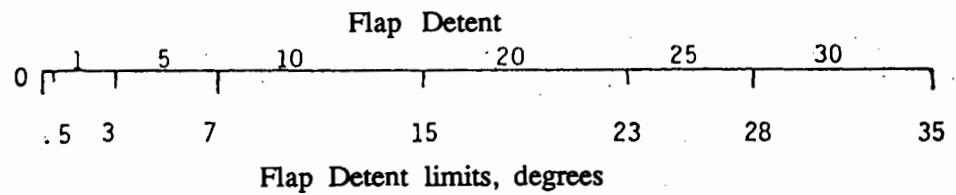
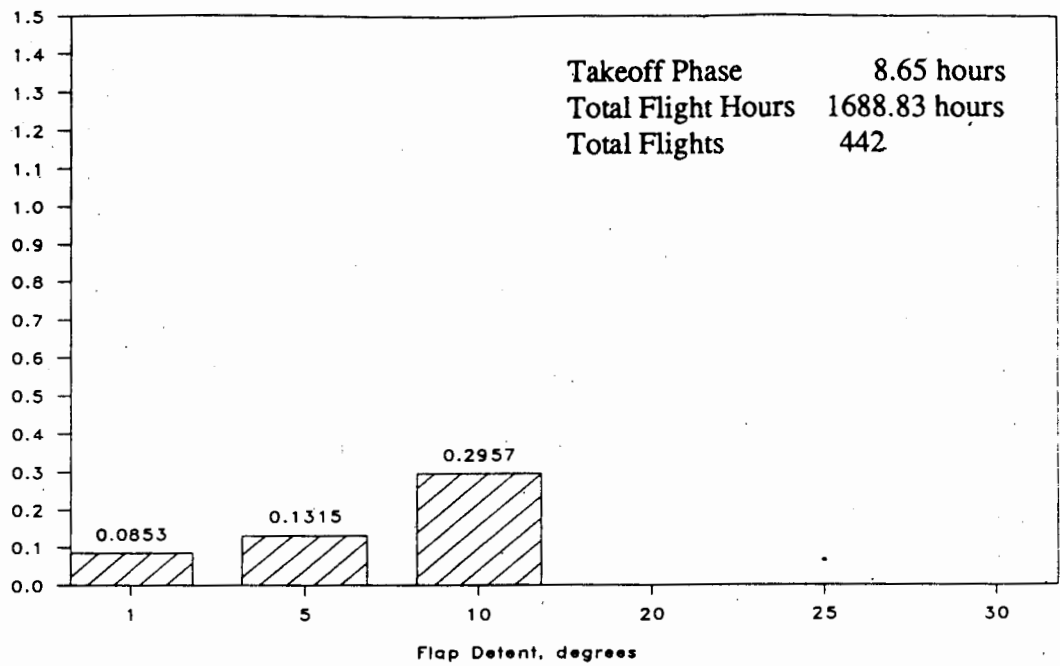
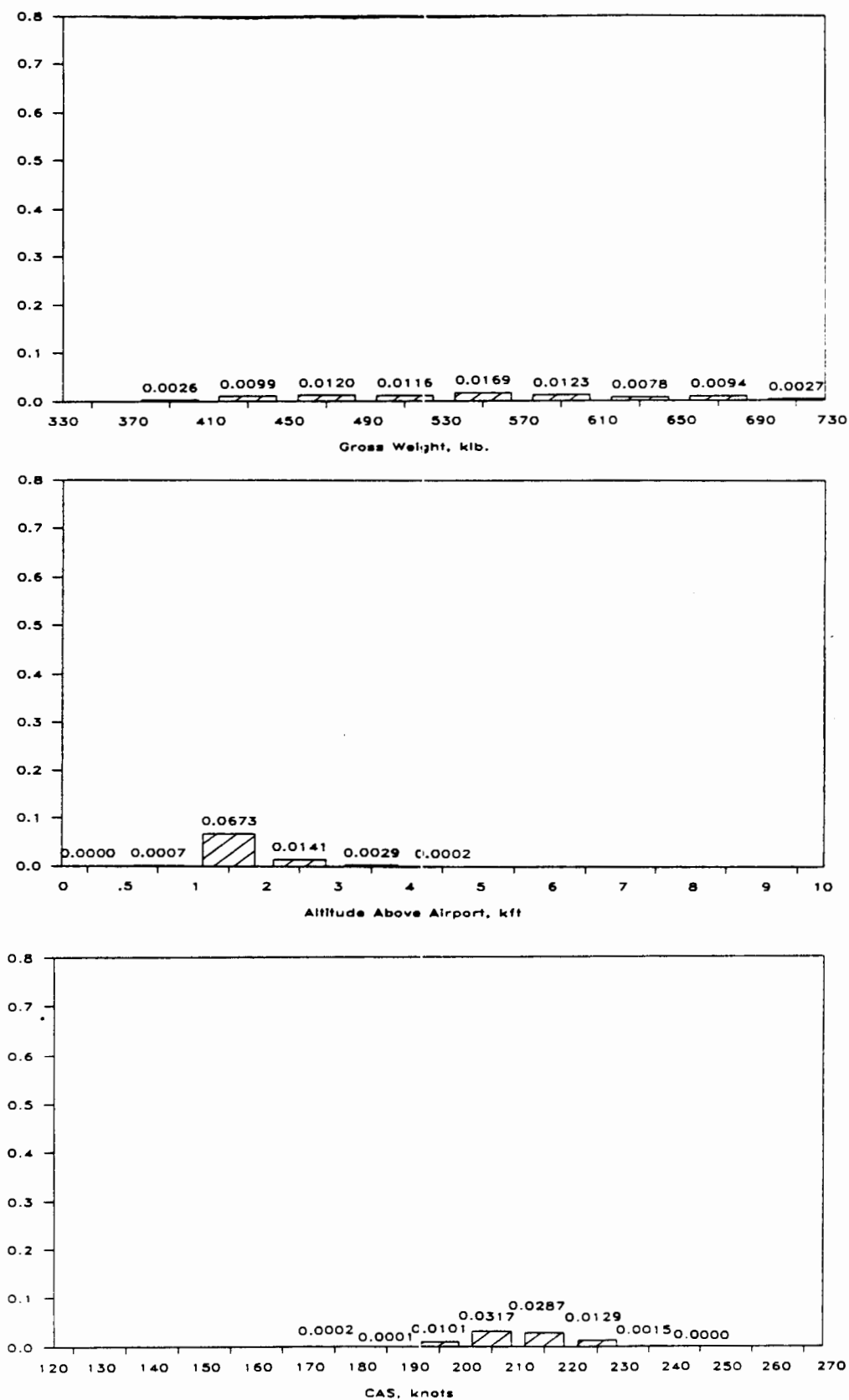


Figure 8.- Percent of total flight time at each flap detent.

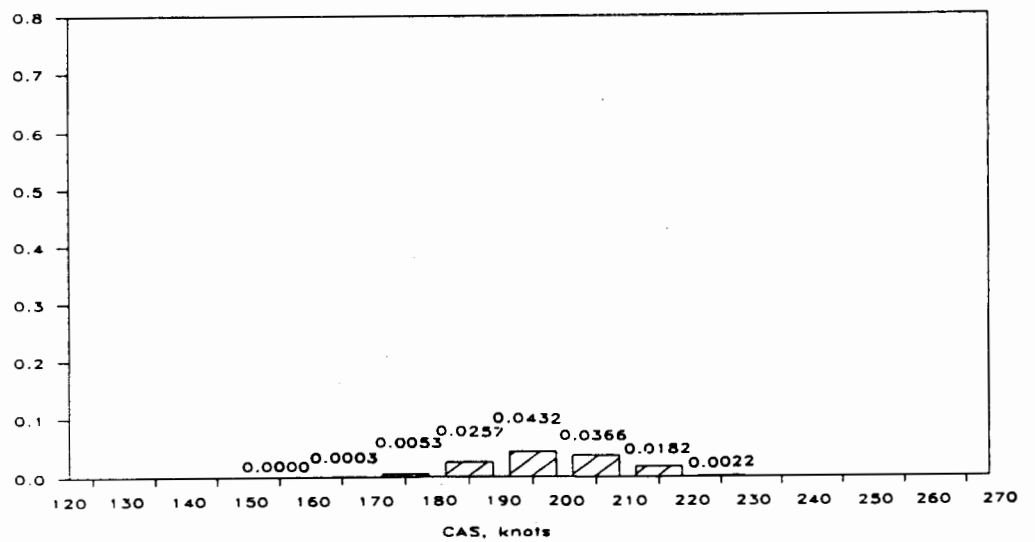
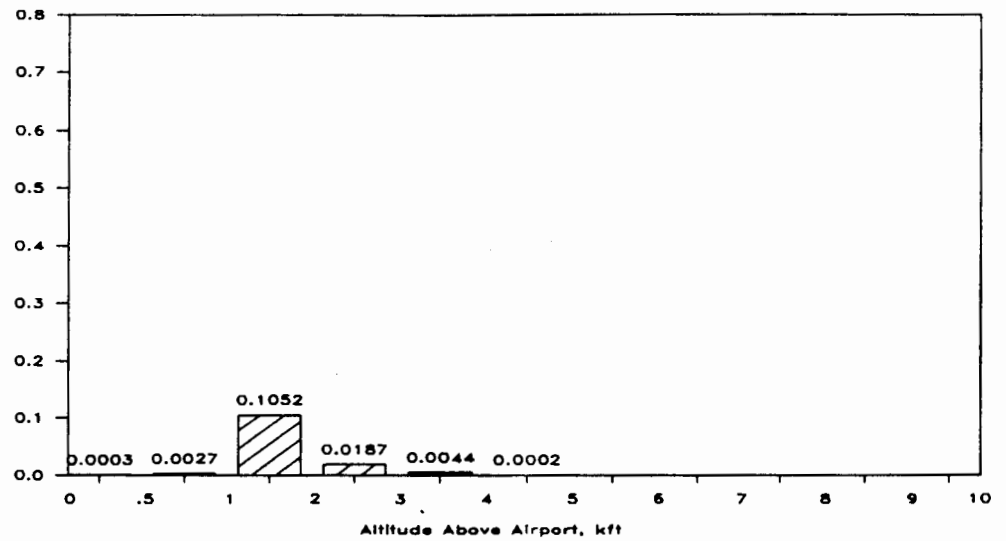
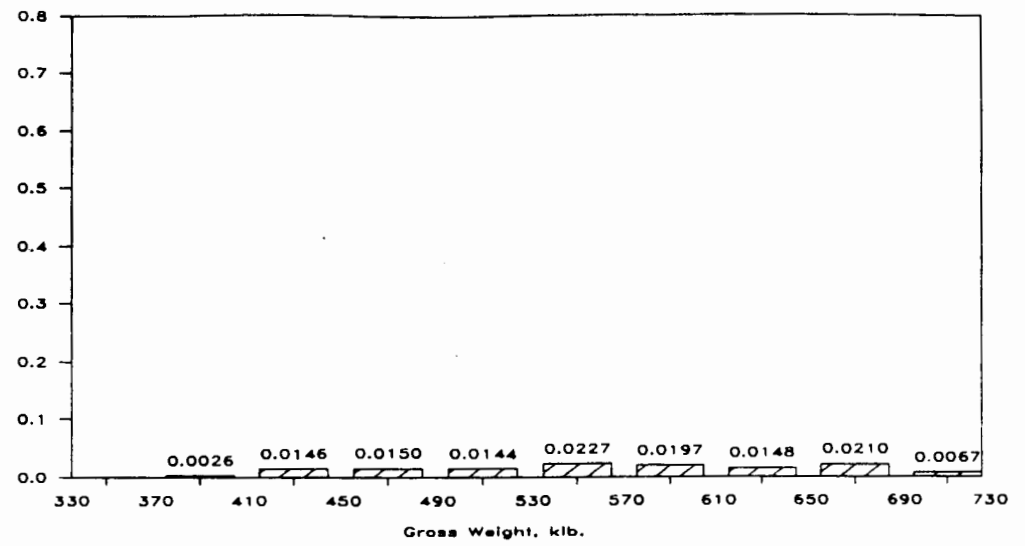
Percent Time = $\frac{\text{Total flight time}}{\text{Time in airspeed or altitude or weight band with flaps} = 1^0} \times 100$



(a) Takeoff, flaps=1°; 1.4399 hours

Figure 9.- Gross weight, altitude above airport, and airspeed time distributions.

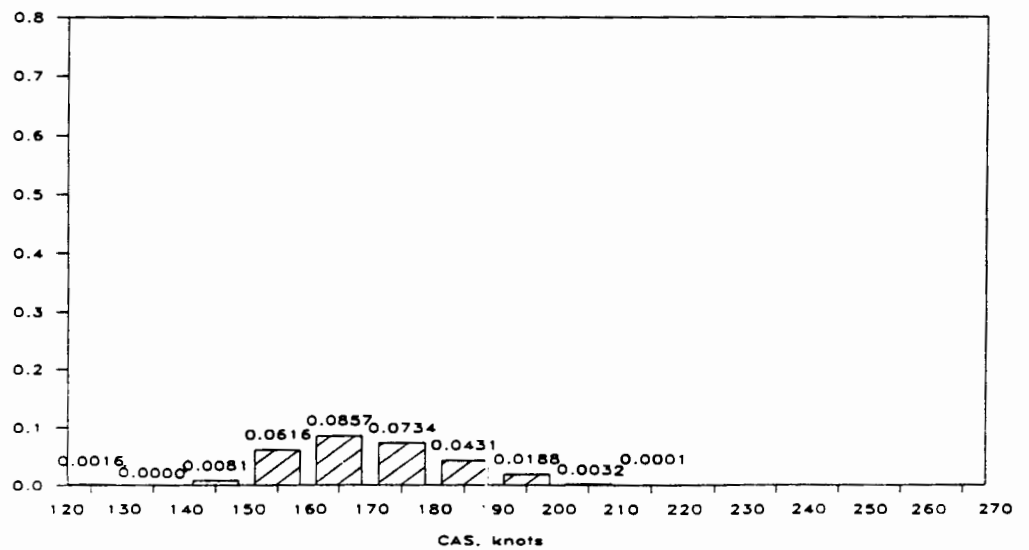
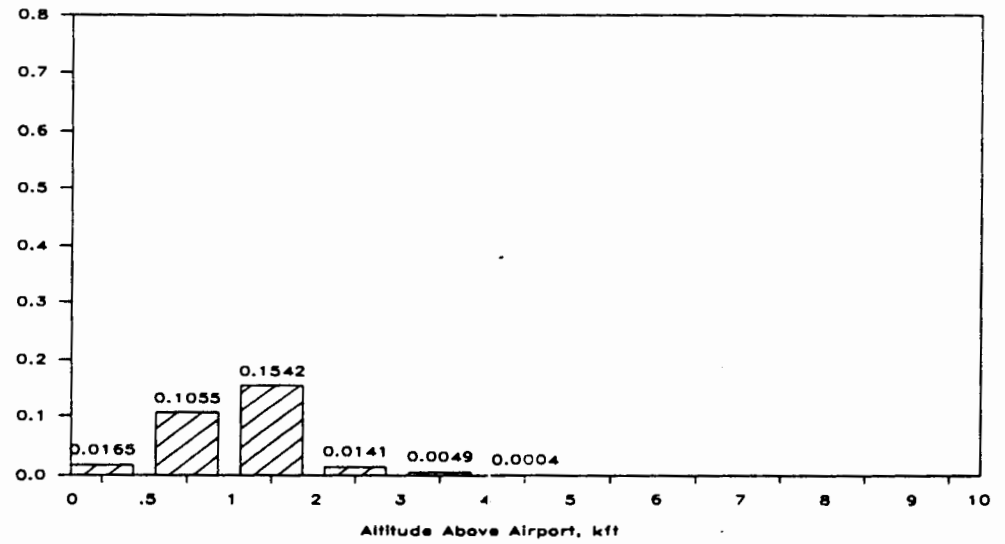
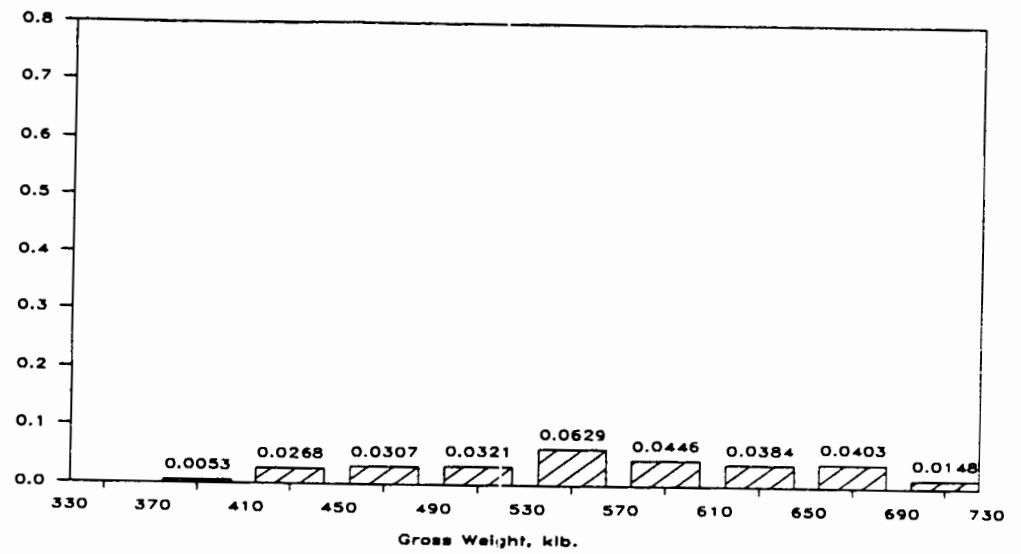
Percent time =
 $\frac{\text{Total flight time}}{\text{Time in airspeed or altitude or weight band with flap } = 5^\circ}$
 X 100



(b) Takeoff, flaps=5°; 2.2216 hours

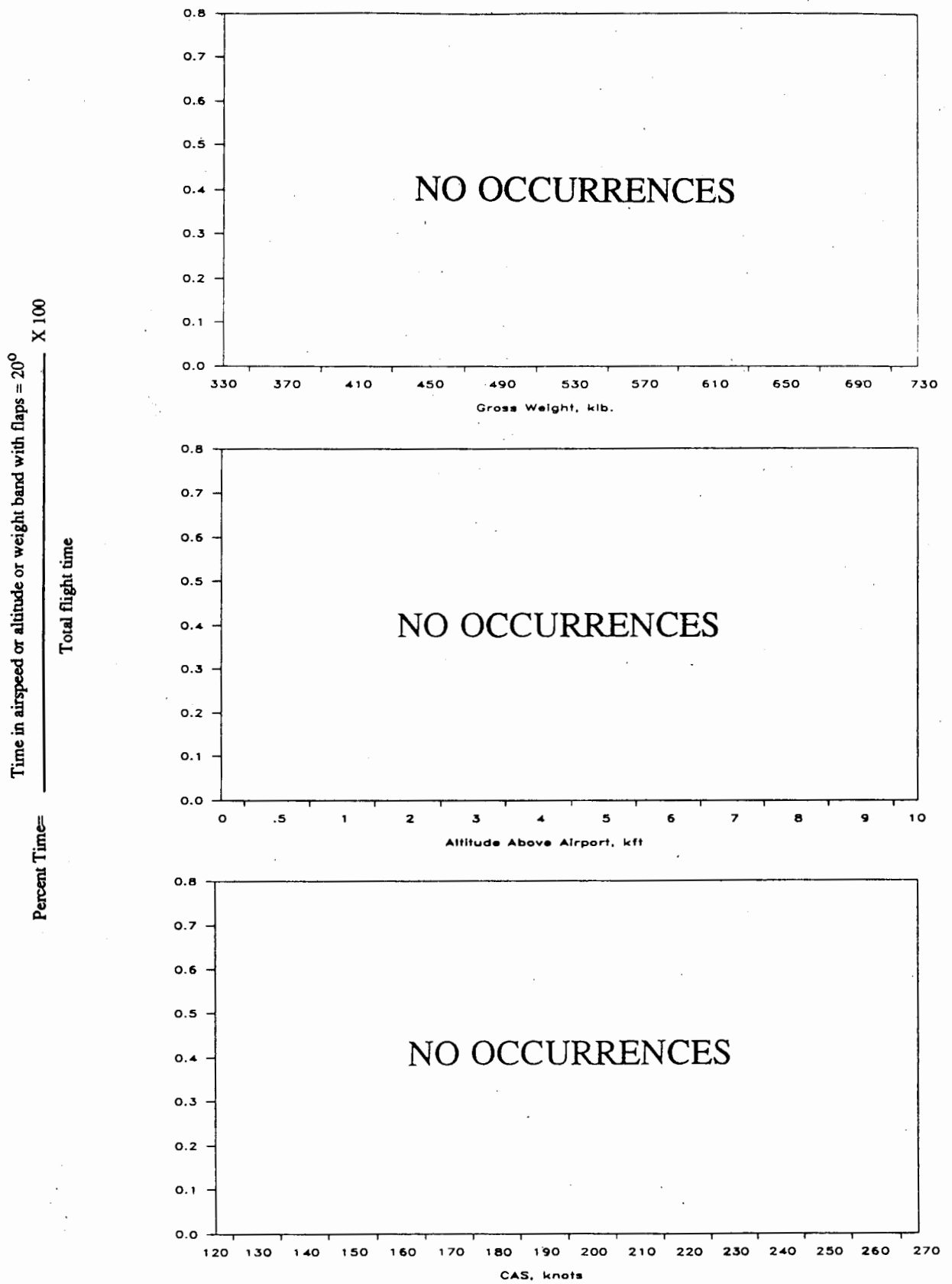
Figure 9.- Continued.

Percent Time=
Total flight time
Time in airspeed or altitude or weight band with flaps = 10^0
X 100



(c) Takeoff, flaps = 10^0 ; 4.9931 hours

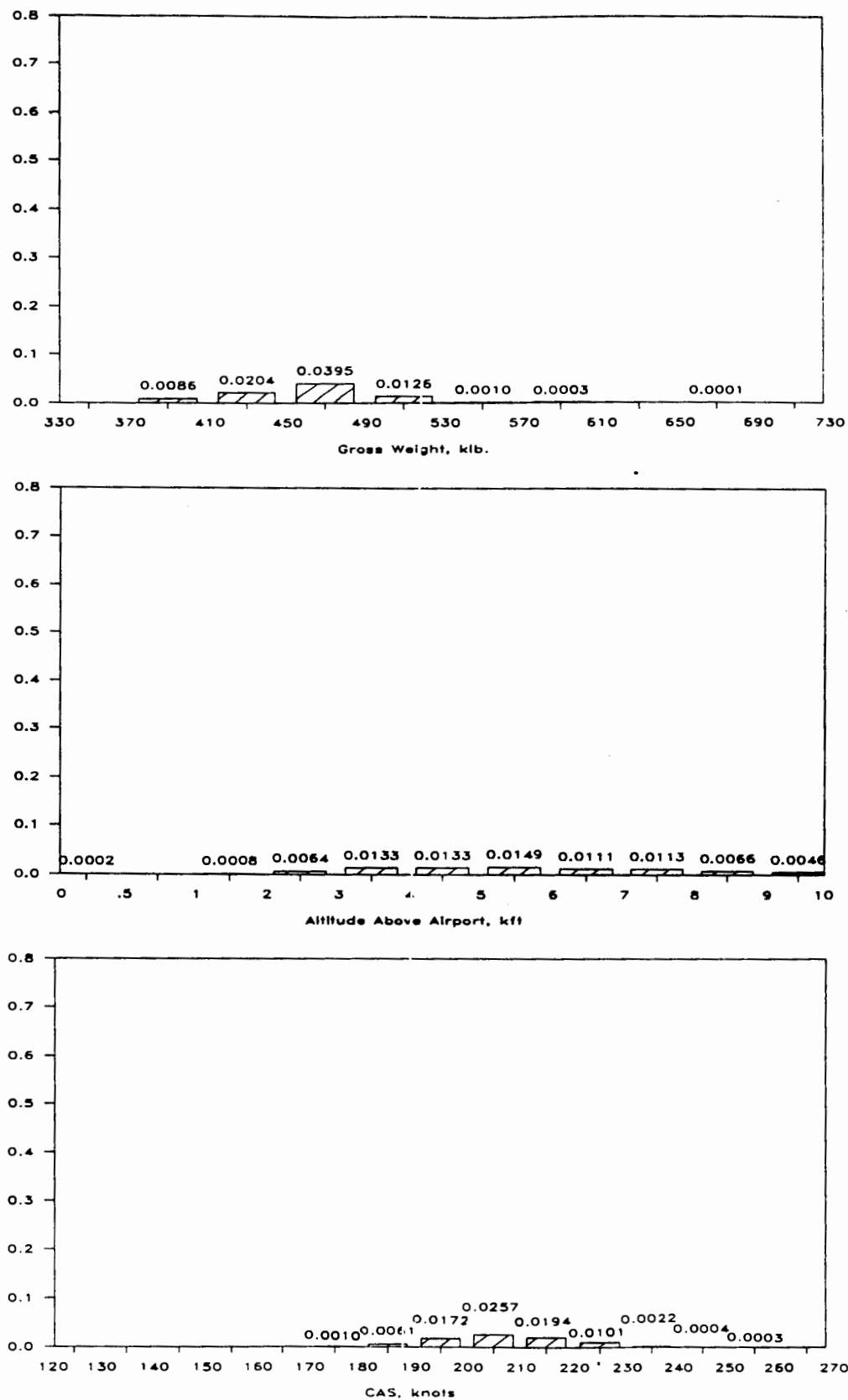
Figure 9.- Continued.



(d) Takeoff, flaps=20⁰; 0.0000 hours

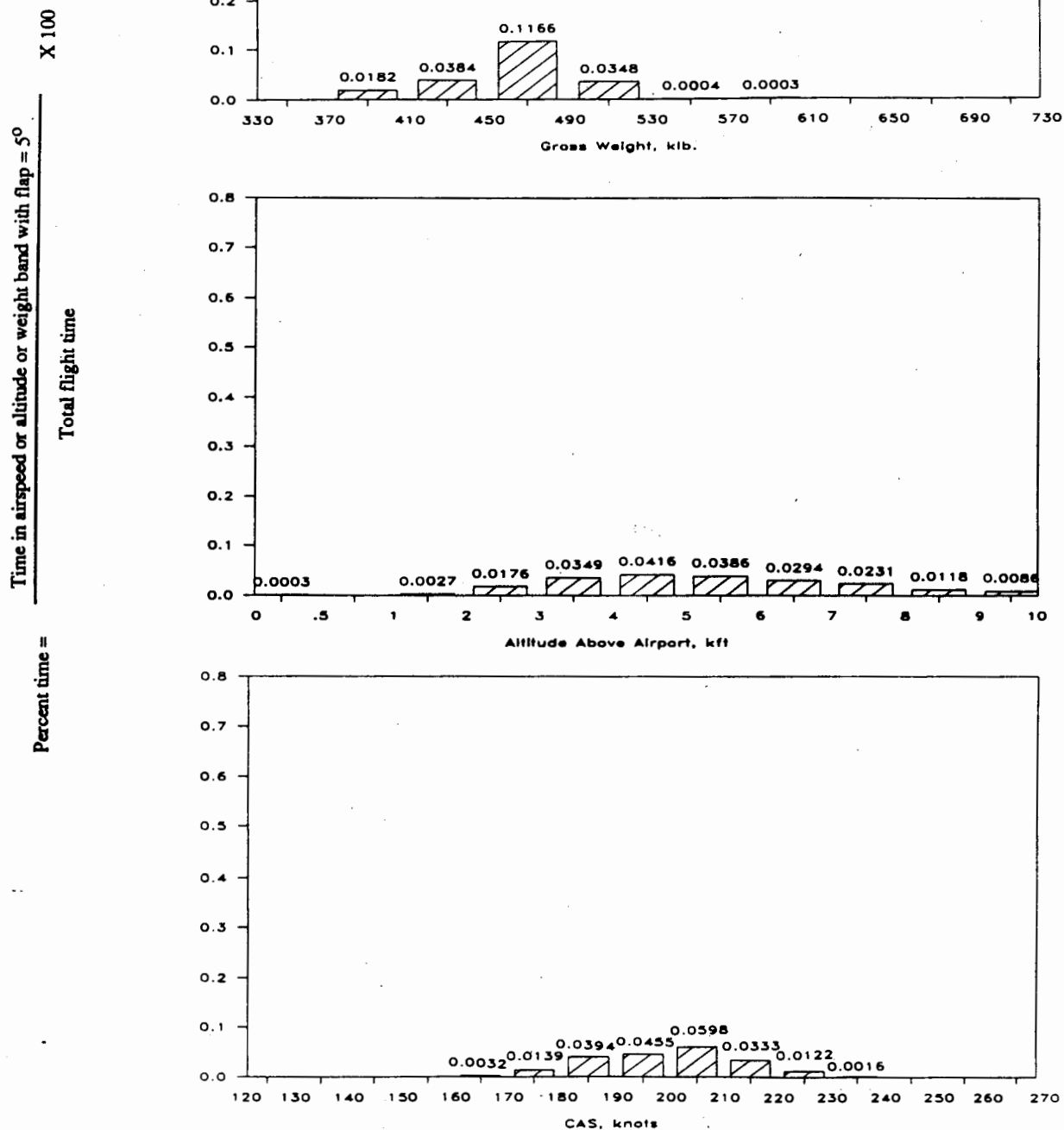
Figure 9.- Continued.

$$\text{Percent Time} = \frac{\text{Time in airspeed or altitude or weight band with flaps} = 1^0}{\text{Total flight time}} \times 100$$



(e) Landing, flaps=1°; 1.3944 hours

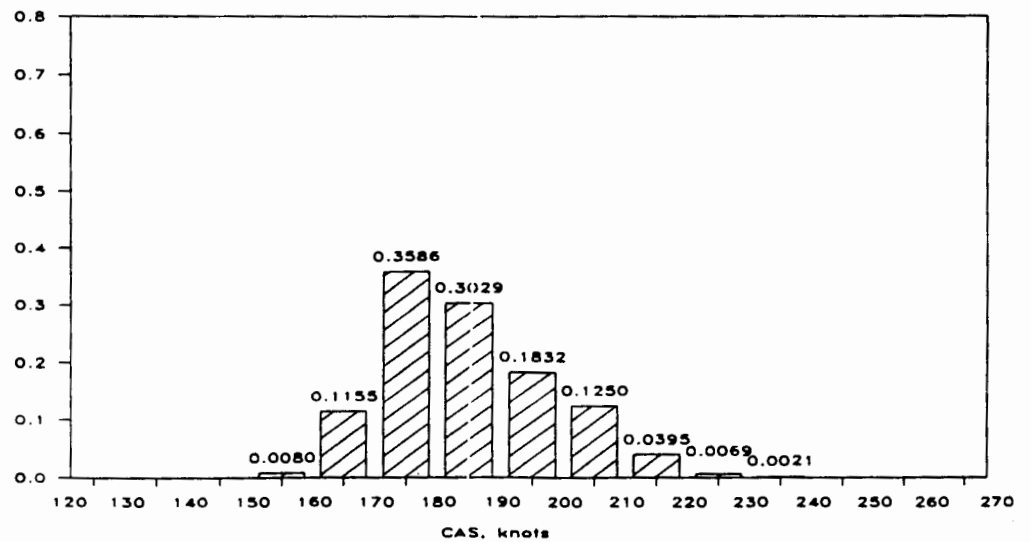
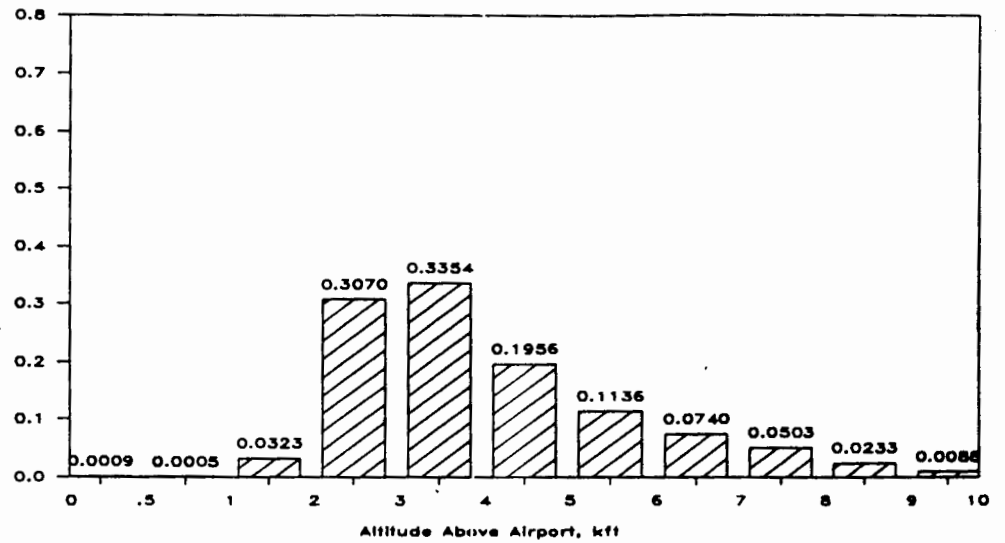
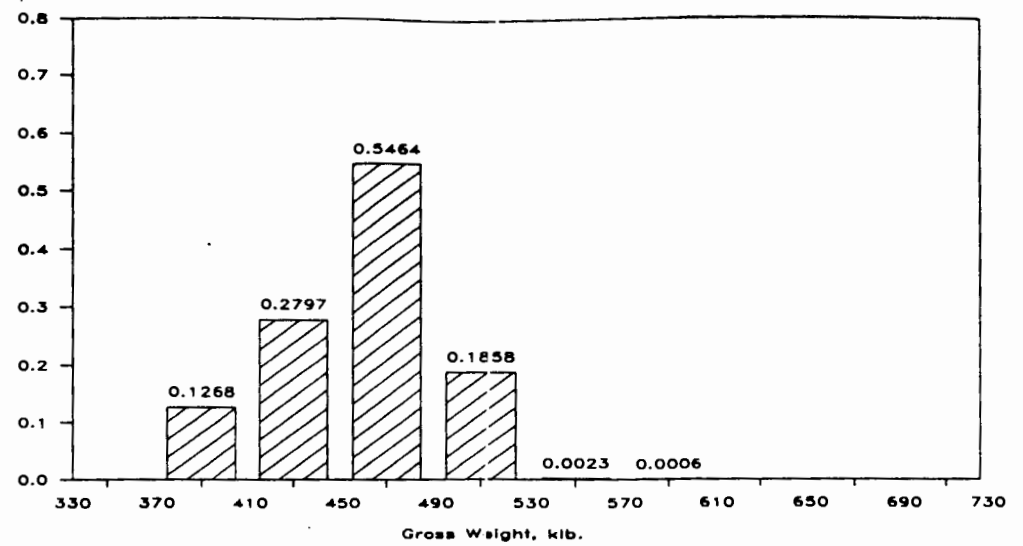
Figure 9.- Continued.



(f) Landing, flaps=5°; 3.5252 hours

Figure 9.- Continued.

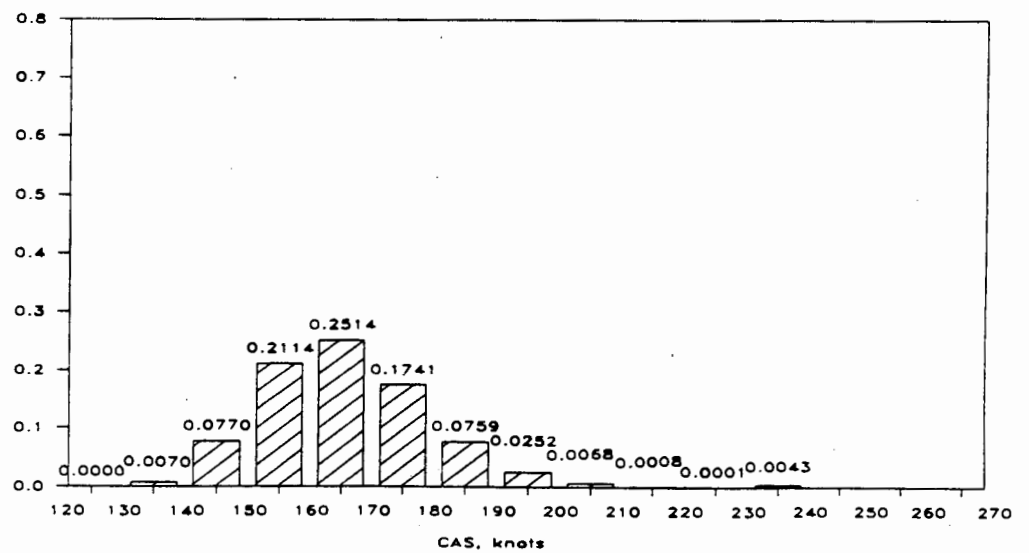
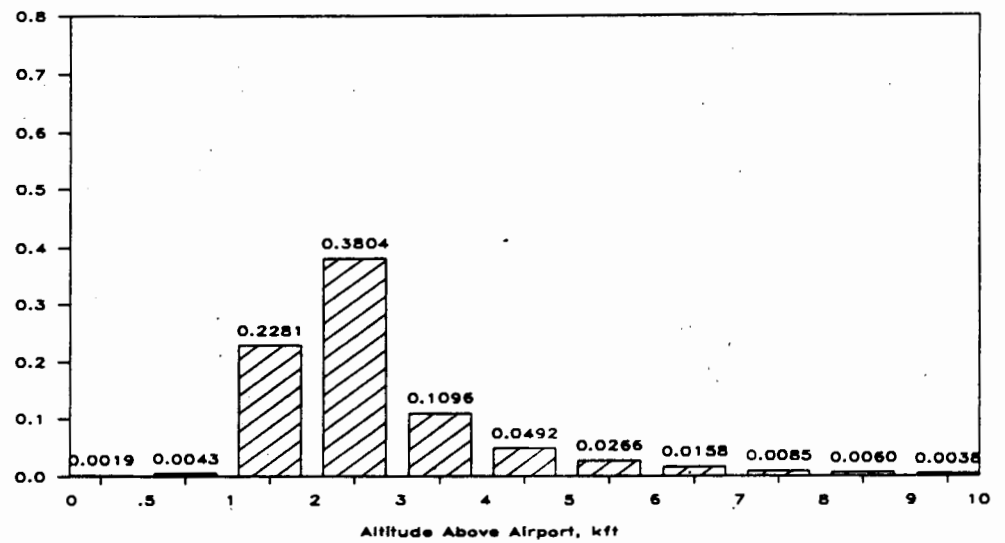
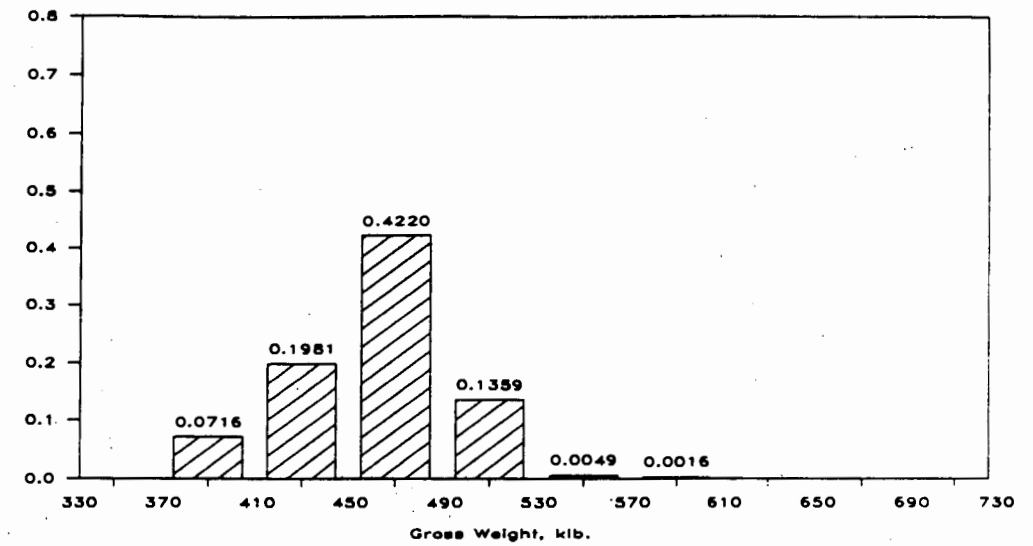
Time in airspeed or altitude or weight band with flaps = 10^0
 X 100
 Total flight time
 Percent Time=



(g) Landing, flaps= 10^0 ; 19.2804 hours

Figure 9.- Continued.

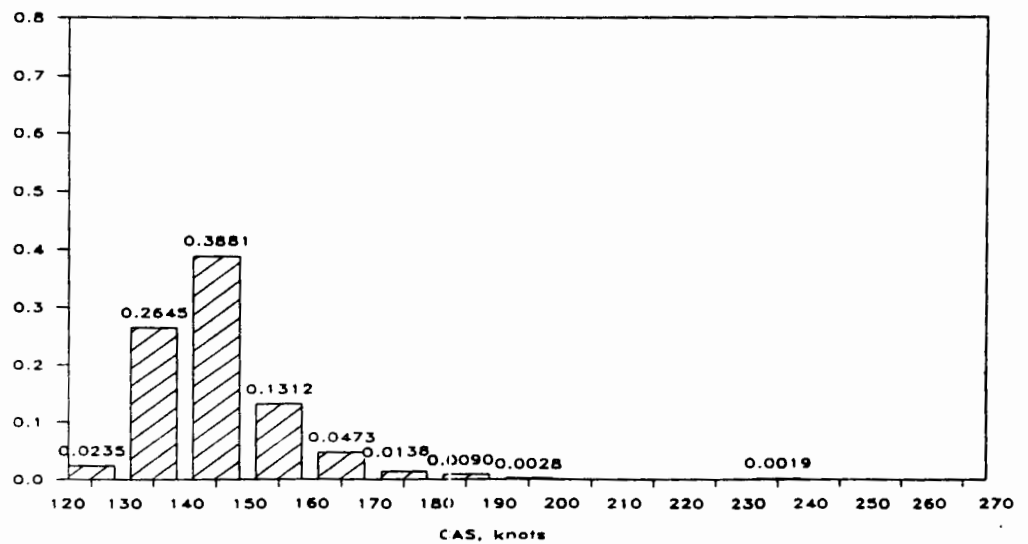
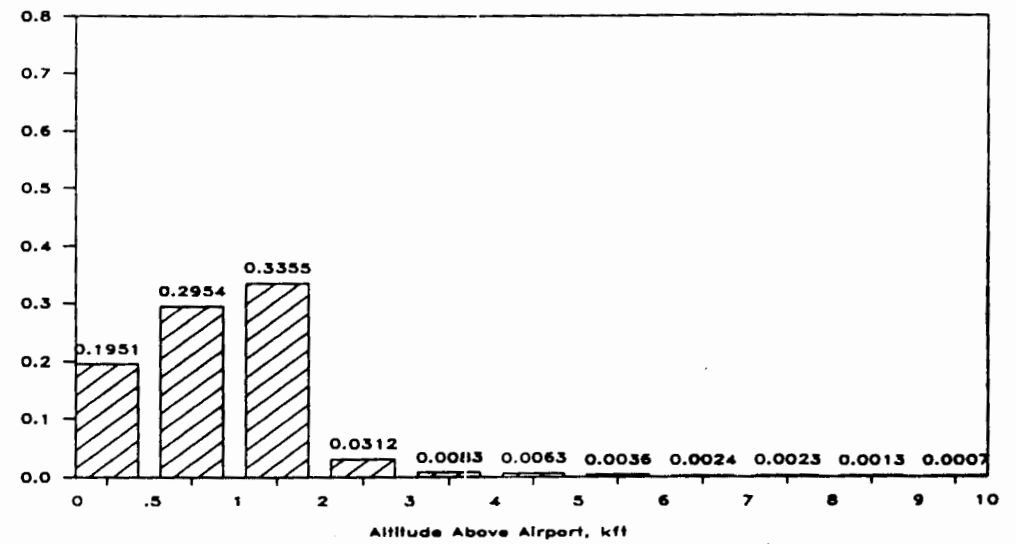
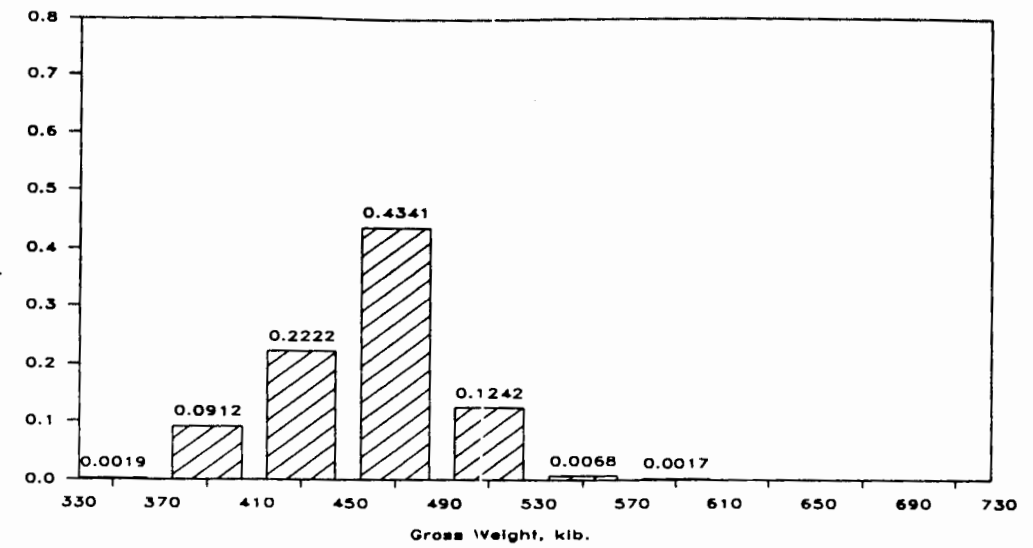
Time in airspeed or altitude or weight band with flaps = 20°
 Total flight time
 Percent Time = X 100



(h) Landing, flaps=20°; 14.0867 hours

Figure 9.- Continued.

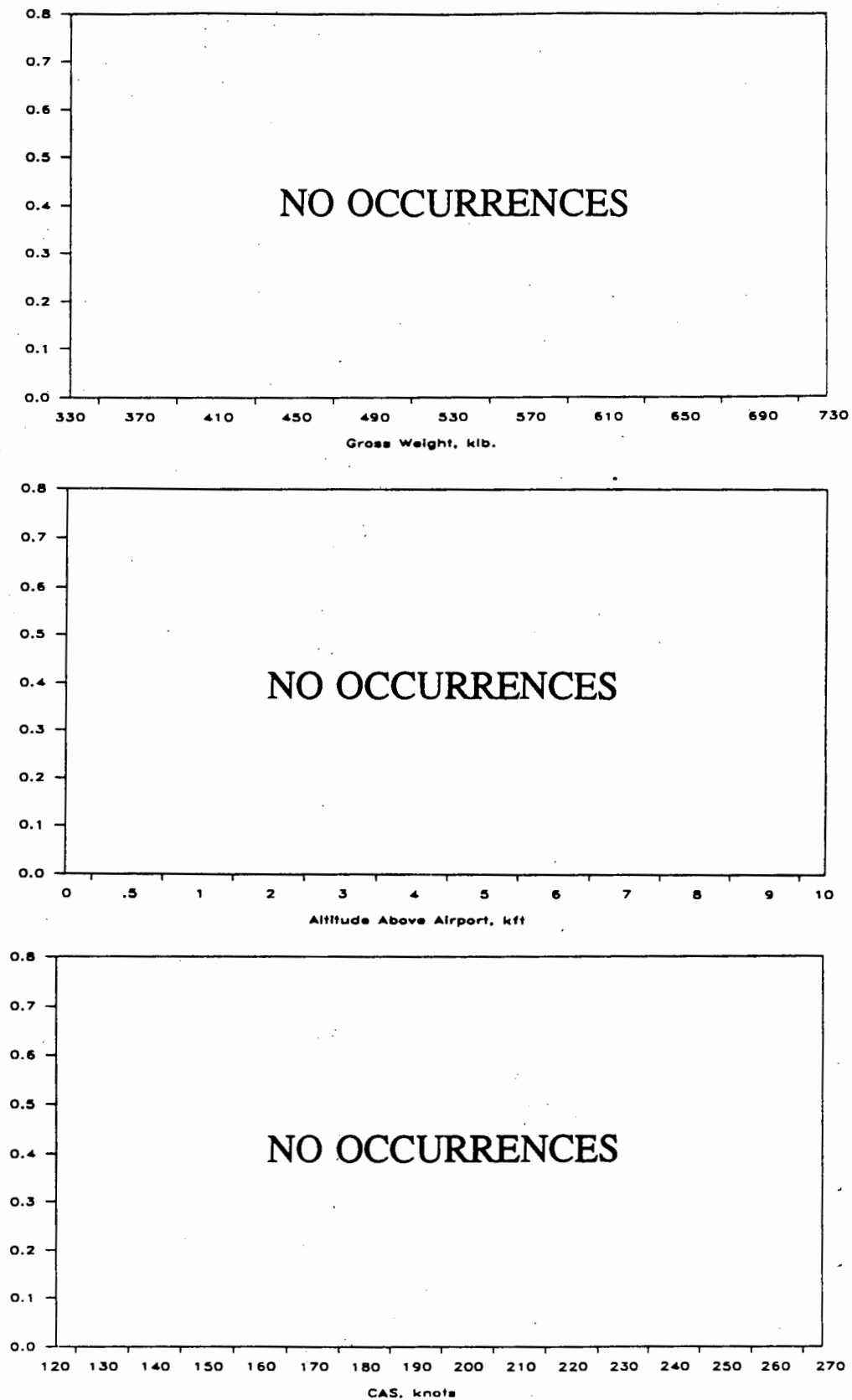
Time in airspeed or altitude or weight band with flaps = 25°
 Total flight time
 Percent Time =
 X 100



(i) Landing, flaps=25°; 14.8968 hours

Figure 9.- Continued.

$$\text{Percent Time} = \frac{\text{Time in airspeed or altitude or weight band with flap} = 30^\circ}{\text{Total flight time}} \times 100$$



(j) Landing, flaps=30⁰; 0.0000 hours

Figure 9.- Concluded.

FLAP DEFLECTION, DEGREES

TIME AFTER LIFTOFF MINUTES	28.0	23.0	15.0	7.0	3.0	0.5
0.0 - .1	0	0	0	1.1	0	0.2
.1 - .2	0	0	0	0.2	0	0
.2 - .3	0	0	0	4.3	0.9	0
.3 - .4	0	0	0	10.2	0.7	0
.4 - .5	0	0	0	15.2	3.8	1.1
.5 - .6	0	0	0	16.5	10.0	0.9
.6 - .8	0	0	0	32.4	24.9	13.3
.8 - 1.0	0	0	0	11.1	25.3	25.6
1.0 - 1.2	0	0	0	4.3	15.2	25.6
1.2 - 1.4	0	0	0	0.9	8.4	14.3
1.4 - 1.6	0	0	0	0.5	3.2	8.1
1.6 - 1.8	0	0	0	0.7	2.3	3.2
1.8 - 2.0	0	0	0	0.2	1.1	2.3
2.0 - 2.2	0	0	0	0.7	0.2	1.1
2.2 - 2.4	0	0	0	0.2	0.5	0.2
2.4 - 2.6	0	0	0	0.2	0.9	0.5
2.6 - 2.8	0	0	0	0	0.7	0.9
2.8 - 3.0	0	0	0	0.7	0	0.7
3.0 - 3.5	0	0	0	0.5	0.2	0.2
3.5 - 4.0	0	0	0	0	0.9	0.7
4.0 - 4.5	0	0	0	0	0.2	0.5
4.5 - 5.0	0	0	0	0	0	0
5.0 - 6.0	0	0	0	0	0	0
6.0 - 7.0	0	0	0	0	0	0
7.0 - 8.0	0	0	0	0	0	0
8.0 - 9.0	0	0	0	0	0	0
9.0 - 10.0	0	0	0	0	0	0
10.0 - 15.0	0	0	0	0	0	0
15.0 - 20.0	0	0	0	0	0	0
20.0 - 25.0	0	0	0	0	0	0
0.0 - 25.0	0	0	0	99.8	99.3	99.3

NOTES

1. 442 flights
2. The first 15 seconds after takeoff on each flight are not included.
3. Flap deflections less than 0.5 degrees were considered to be zero.

(a) Take off: Percent of flights vs times when take off flap deflection is reduced to less than indicated values

Figure 10.- Flap deflection times.

FLAP DEFLECTION, DEGREES

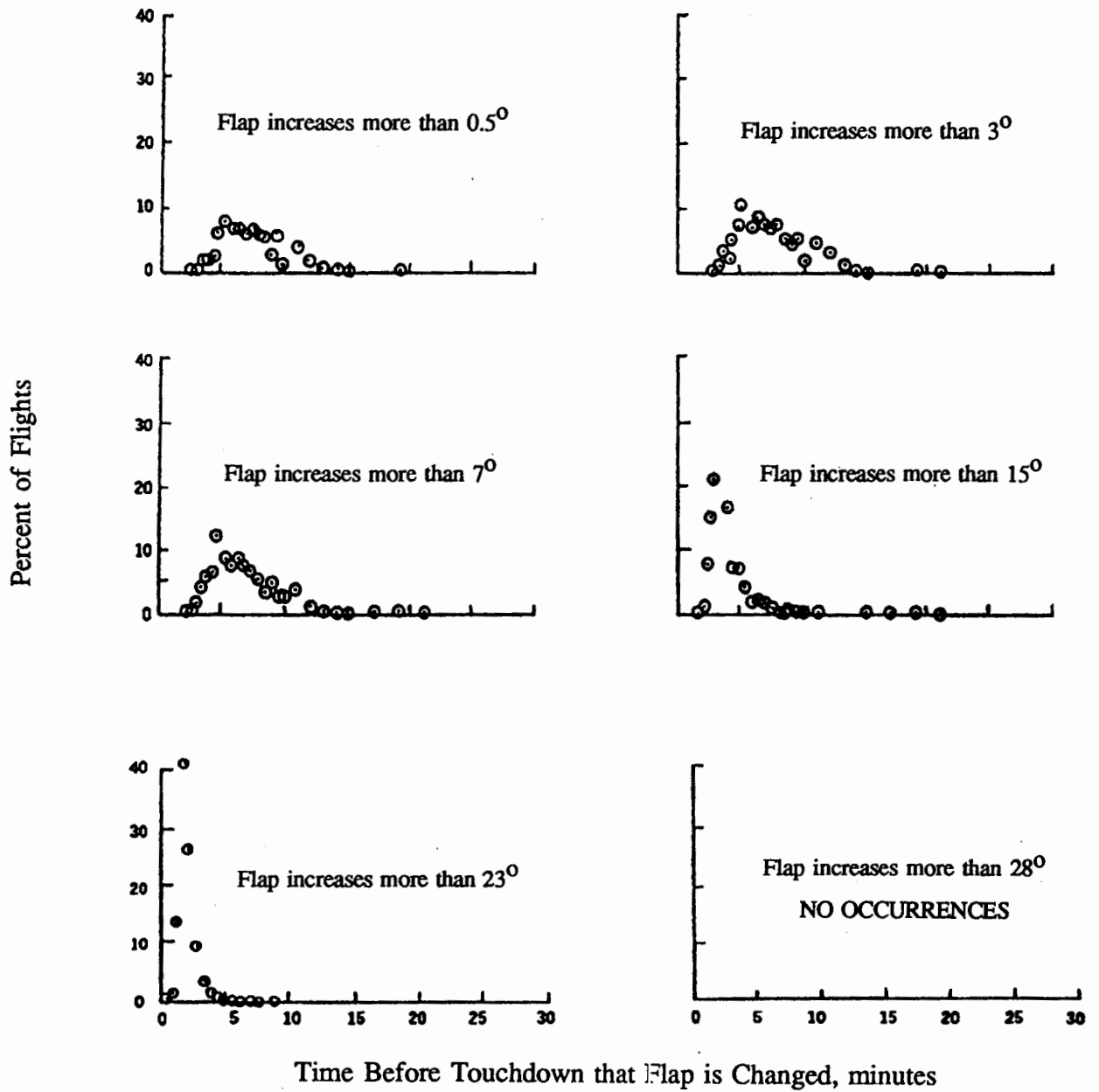
TIME BEFORE TOUCHDOWN MINUTES	0.5	3.0	7.0	15.0	23.0	28.0
0.0 - 0.5	0	0	0	0	0.5	0
0.5 - 1.0	0	0	0	0	1.4	0
1.0 - 1.5	0	0	0	0.2	14.7	0
1.5 - 2.0	0	0	0.2	2.5	41.0	0
2.0 - 2.5	0.2	0.2	0.5	8.1	26.5	0
2.5 - 3.0	0.5	1.1	1.8	15.4	9.3	0
3.0 - 3.5	2.5	3.4	4.1	21.9	3.2	0
3.5 - 4.0	2.7	2.5	5.7	17.9	1.4	0
4.0 - 4.5	3.4	5.0	6.1	7.9	0.7	0
4.5 - 5.0	6.1	6.8	11.1	7.9	0.2	0
5.0 - 5.5	8.1	10.9	8.8	5.4	0.2	0
5.5 - 6.0	7.7	7.0	7.9	2.7	0.2	0
6.0 - 6.5	7.9	9.0	8.8	3.2	0	0
6.5 - 7.0	6.8	7.9	7.5	2.7	0.2	0
7.0 - 7.5	7.7	7.0	7.0	1.1	0.2	0
7.5 - 8.0	6.6	7.9	6.1	0.5	0	0
8.0 - 8.5	6.3	5.4	3.8	0.5	0	0
8.5 - 9.0	3.8	4.1	5.4	0.7	0.2	0
9.0 - 9.5	5.7	5.2	2.7	0.2	0	0
9.5 - 10.0	1.8	1.8	2.7	0.2	0	0
10.0 - 11.0	4.8	4.8	4.3	0.2	0	0
11.0 - 12.0	2.5	2.7	1.6	0	0	0
12.0 - 13.0	0.9	1.4	0.7	0	0	0
13.0 - 14.0	0.5	0.5	0.2	0	0	0
14.0 - 15.0	0.2	0.2	0.2	0.2	0	0
15.0 - 17.0	0	0	0.2	0.2	0	0
17.0 - 19.0	0.5	0.5	0.5	0	0	0
19.0 - 21.0	0	0.2	0.2	0	0	0
21.0 - 23.0	0	0	0	0	0	0
23.0 - 25.0	0	0	0	0	0	0
25.0 - 30.0	0	0	0	0	0	0
30.0 - 35.0	0.2	0	0	0	0	0
35.0 - 40.0	0	0	0	0	0	0
40.0 - 60.0	1.6	0	0	0	0	0
0.0 - 60.0	89.0	95.5	98.2	99.8	99.8	0

NOTES

1. 442 flights
2. The last 15 seconds before touchdown on each flight are not included.
3. Flap deflections less than 0.5 degrees were considered to be zero.

(b) Landing: Percent of flights vs times when landing flap deflection is increased to greater than indicated values

Figure 10.- Continued.



(c) Landing: Plots of data from Figure 10(b)

Figure 10.- Flap deflection times.

EAS, KTS																					
FLAP RANGE	FLAP DETENT	120 TO 130 KTS	130 TO 140 KTS	140 TO 150 KTS	150 TO 160 KTS	160 TO 170 KTS	170 TO 180 KTS	180 TO 190 KTS	190 TO 200 KTS	200 TO 210 KTS	210 TO 220 KTS	220 TO 230 KTS	230 TO 240 KTS	240 TO 250 KTS	250 TO 260 KTS	260 TO 270 KTS	270 TO 280 KTS	280 TO 290 KTS	290 TO 300 KTS	300 TO 310 KTS	310 TO 320 KTS
		130 KTS	140 KTS	150 KTS	160 KTS	170 KTS	180 KTS	190 KTS	200 KTS	210 KTS	220 KTS	230 KTS	240 KTS	250 KTS	260 KTS	270 KTS	280 KTS	290 KTS	300 KTS	310 KTS	320 KTS
28-35	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23-28	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-23	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7-15	10	0	0	0	1	19	33	27	17	3	0	0	0	0	0	0	0	0	0	0	0
3-7	5	0	0	0	0	0	1	18	37	26	16	2	0	0	0	0	0	0	0	0	0
.5-3	1	0	0	0	0	0	0	0	12	36	37	13	1	0	0	0	0	0	0	0	0

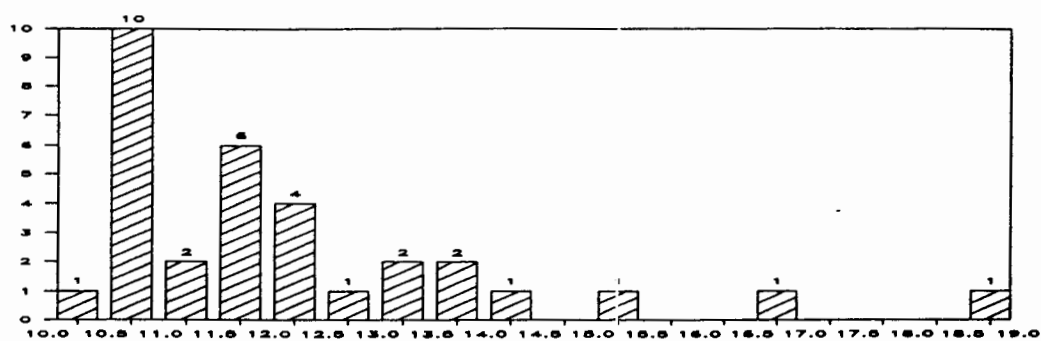
(a) Take off

3-.5	1	0	0	0	0	0	0	3	16	23	24	17	5	4	1	0	0	0	0	0	0
7-3	5	0	0	0	0	0	1	7	22	30	24	10	2	0	0	0	0	0	0	0	0
15-7	10	0	0	0	0	1	5	21	25	27	15	3	0	0	0	0	0	0	0	0	0
23-15	20	0	0	0	2	15	37	24	12	7	2	0	0	0	0	0	0	0	0	0	0
28-23	25	0	3	22	41	22	9	2	1	0	0	0	0	0	0	0	0	0	0	0	0
35-28	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

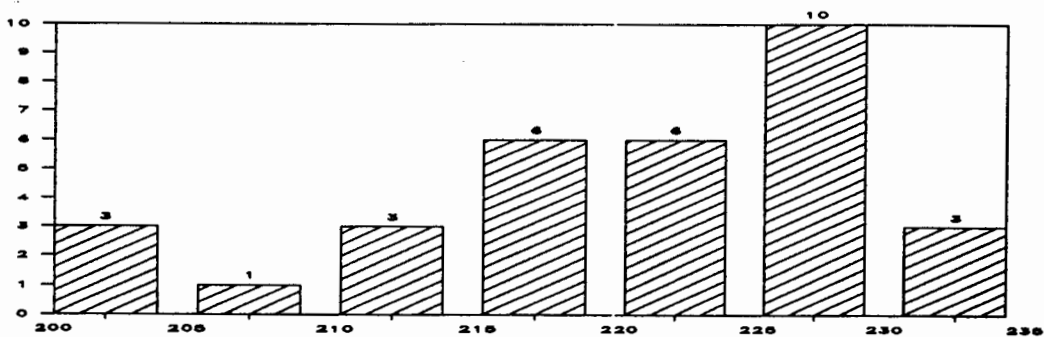
(b) Landing

Figure 11.- Percent of flights vs equivalent airspeed at flap detent change.

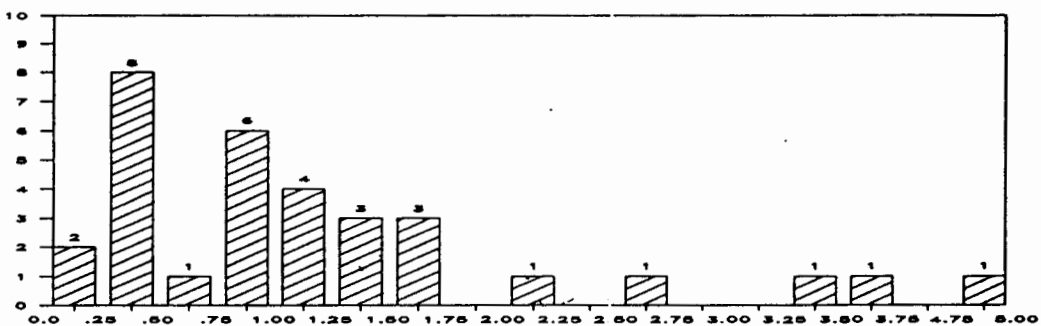
Number of Flights



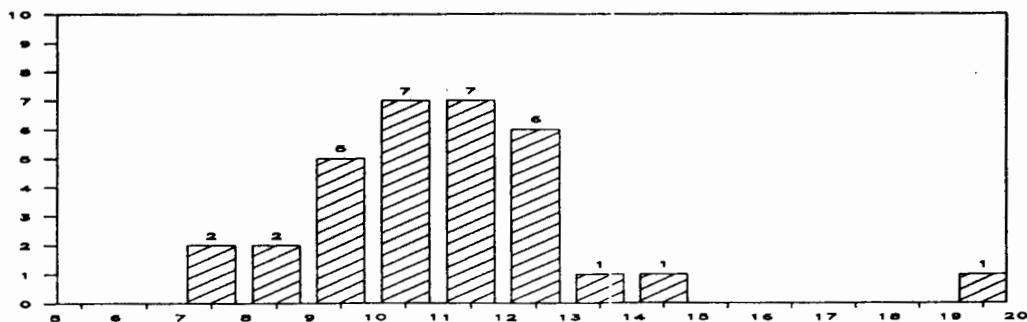
(a) Pressure altitude at initial flap deflection, kft.



(b) Calibrated airspeed at initial flap deflection, kft.



(c) Minutes above 10,000 ft. that flaps deflected > .5 degrees



(d) Minutes before touchdown of initial flap detection

Figure 12.- Flap use above 10,000 feet pressure altitude: 32 flights included.

PRESSURE ALTITUDE BANDS										
a_n	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
LEVEL										
g's										
1.60	0	0	0	0	0	0	0	0	0	0
1.40	0	0	0	0	0	0	0	0	0	0
1.20	0	0	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0	0	0
.80	0	0	0	0	0	0	0	0	0	0
.70	0	0	0	0	0	0	0	0	0	0
.60	0	0	0	0	0	0	0	0	0	0
.50	0	0.02	0	0	0	0	0	0	0	0
.40	0.02	0.03	0.05	0.02	0.02	0	0	0.01	0.23	0.01
.30	0.43	0.54	0.15	0.09	0.02	0.01	0.01	0.03	2.27	0.08
.20	8.67	5.38	1.48	0.67	0.31	0.18	0.10	0.18	7.84	0.73
.15	33.46	19.32	5.27	2.76	1.40	1.15	0.50	0.60	16.24	2.68
.10	108.62	56.79	26.31	13.25	8.24	5.21	2.56	3.01	37.93	9.84
.05	304.47	182.73	126.33	76.55	55.57	38.07	25.99	22.64	120.37	45.20
0	669.40	636.77	653.44	785.69	885.27	983.03	1195.28	1202.38	1008.20	1114.77
-.05	233.94	131.60	82.30	51.91	36.56	32.49	18.45	19.61	103.57	34.96
-.10	60.86	27.06	12.94	7.36	4.68	3.52	2.13	2.46	32.36	5.97
-.15	14.58	7.10	2.86	1.82	0.85	0.68	0.46	0.55	12.38	1.42
-.20	3.35	2.31	0.67	0.60	0.14	0.08	0.11	0.17	6.13	0.39
-.30	0.12	0.26	0.05	0	0	0	0.01	0.02	1.36	0.04
-.40	0	0.02	0	0	0	0	0	0.01	0.57	0.01
-.50	0	0.02	0	0	0	0	0	0	0.11	0
-.60	0	0	0	0	0	0	0	0	0	0
-.70	0	0	0	0	0	0	0	0	0	0
-.80	0	0	0	0	0	0	0	0	0	0
-1.00	0	0	0	0	0	0	0	0	0	0
-1.20	0	0	0	0	0	0	0	0	0	0
-1.40	0	0	0	0	0	0	0	0	0	0
-1.60	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	57.68	57.61	54.89	43.48	48.52	79.06	273.34	1065.45	8.81	1688.83
FLIGHT MILES @ ALT	10712.91	14655.73	18759.60	17393.17	21054.53	36267.12	133304.10	516183.63	4282.14	772612.93
TOTAL FLIGHTS										442
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										1688.83
TOTAL FLIGHT MILES FLAPS UP AND DOWN										772612.93

(a) a_n Level crossing counts per hour within pressure altitude bands

Figure 13.- Normal acceleration exceedances.

PRESSURE ALTITUDE BANDS										
a _{nM} LEVEL g's	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
1.60	0	0	0	0	0	0	0	0	0	0
1.40	0	0	0	0	0	0	0	0	0	0
1.20	0	0	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0	0	0
.80	0	0	0	0	0	0	0	0	0	0
.70	0	0	0	0	0	0	0	0	0	0
.60	0	0	0	0	0	0	0	0	0	0
.50	0	0	0	0	0	0	0	0	0	0
.40	0	0	0	0	0	0	0	0	0	0
.30	0.02	0.03	0	0	0.02	0	0	0	0	0
.20	0.62	0.43	0.15	0.02	0.02	0.01	0	0	0.68	0.05
.15	472.00	2.69	0.42	0.16	0.08	0.08	0.01	0.02	0.79	0.29
.10	17.06	10.33	3.95	1.43	0.58	0.32	0.17	0.15	3.18	1.27
.05	50.54	34.51	25.02	12.17	6.86	5.17	3.03	2.29	14.88	6.48
0	150.88	123.35	114.36	119.33	121.65	117.93	162.15	168.92	180.22	158.92
-.05	32.08	20.53	12.52	5.59	2.82	2.76	1.60	1.41	11.24	3.76
-.10	6.12	2.24	0.86	0.41	0.25	0.16	0.08	0.08	2.50	0.42
-.15	0.64	0.23	0.04	0.02	0.02	0	0	0.02	0.57	0.05
-.20	0.07	0.02	0.02	0	0	0	0	0	0.57	0.01
-.30	0	0	0	0	0	0	0	0	0	0
-.40	0	0	0	0	0	0	0	0	0	0
-.50	0	0	0	0	0	0	0	0	0	0
-.60	0	0	0	0	0	0	0	0	0	0
-.70	0	0	0	0	0	0	0	0	0	0
-.80	0	0	0	0	0	0	0	0	0	0
-1.00	0	0	0	0	0	0	0	0	0	0
-1.20	0	0	0	0	0	0	0	0	0	0
-1.40	0	0	0	0	0	0	0	0	0	0
-1.60	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	57.68	57.61	54.89	43.48	48.52	79.06	273.34	1065.45	8.81	1688.83
FLIGHT MILES @ ALT	10712.91	14655.73	18759.60	17393.17	21054.53	36267.12	133304.10	516183.63	4282.14	772612.93
TOTAL FLIGHTS										442
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										1688.83
TOTAL FLIGHT MILES FLAPS UP AND DOWN										772612.93

(b) a_{nM} Level crossing counts per hour within pressure altitude bands

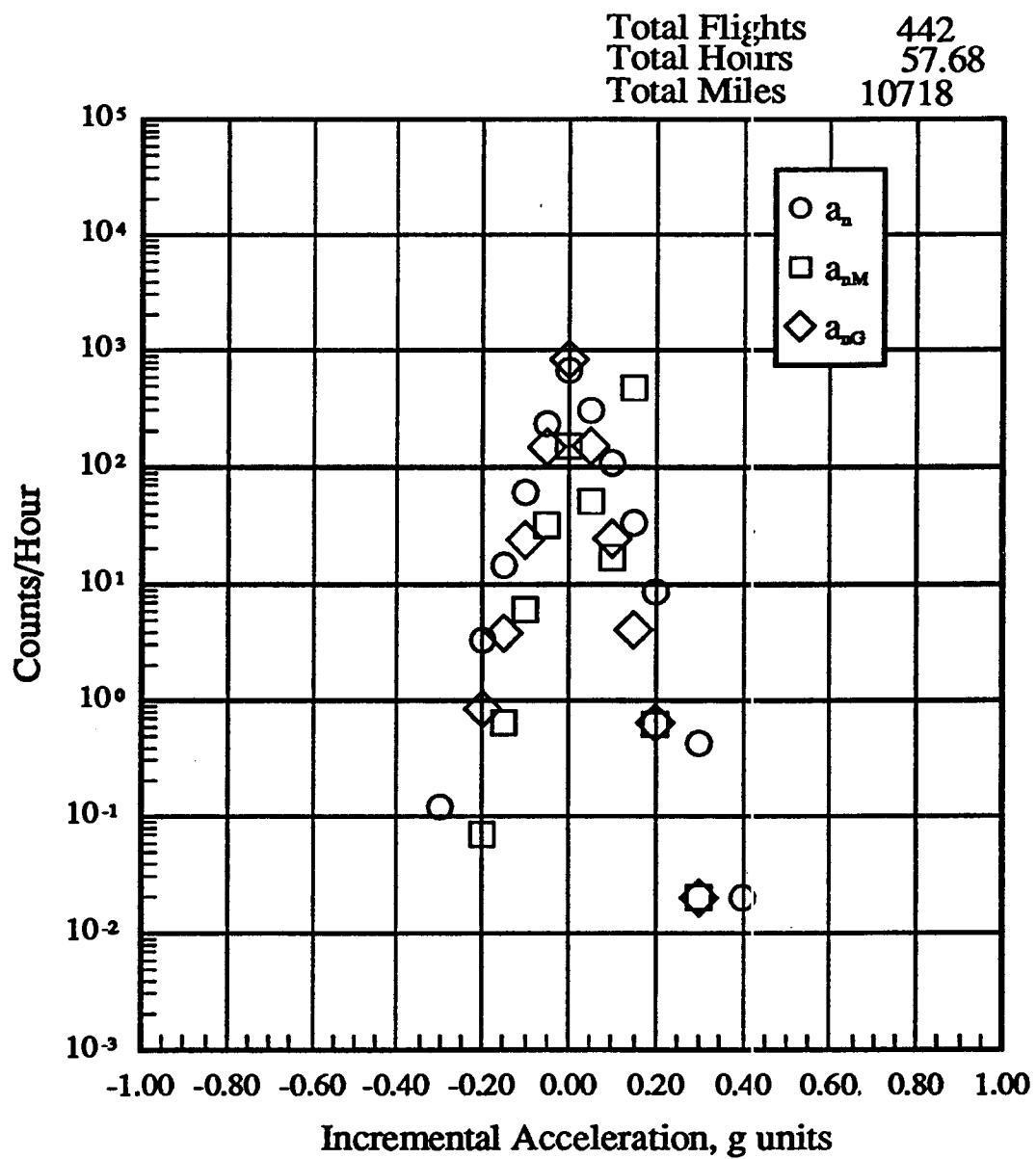
Figure 13.- Continued.

PRESSURE ALTITUDE BANDS

a_{nG} LEVEL g's	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
1.60	0	0	0	0	0	0	0	0	0	0
1.40	0	0	0	0	0	0	0	0	0	0
1.20	0	0	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0	0	0
.80	0	0	0	0	0	0	0	0	0	0
.70	0	0	0	0	0	0	0	0	0	0
.60	0	0	0	0	0	0	0	0	0	0
.50	0	0	0	0	0	0	0	0	0	0
.40	0	0	0	0	0	0	0	0	0	0
.30	0.02	0.05	0.02	0	0	0	0	0.01	0.23	0.01
.20	0.64	0.87	0.29	0.16	0.02	0.03	0.02	0.04	1.59	0.10
.15	4.11	2.79	0.97	0.60	0.25	0.14	0.11	0.14	4.66	0.43
.10	24.52	10.85	4.23	2.58	1.38	0.94	0.48	0.68	13.06	2.07
.05	150.37	63.79	26.51	17.62	11.95	8.90	4.89	6.32	48.60	14.42
0	832.76	849.54	873.74	962.55	1025.26	1085.15	1143.63	1121.41	1088.03	1089.10
-.05	147.62	63.44	26.25	17.48	12.45	8.17	4.99	6.36	48.15	14.32
-.10	23.94	11.75	4.12	2.83	1.48	0.68	0.59	0.72	14.31	2.12
-.15	3.85	2.85	0.97	0.60	0.25	0.11	0.12	0.15	4.43	0.42
-.20	0.85	0.92	0.22	0.14	0	0.03	0.01	0.04	1.48	0.11
-.30	0	0.03	0	0	0	0	0	0.01	0	0.01
-.40	0	0	0	0	0	0	0	0	0	0
-.50	0	0	0	0	0	0	0	0	0	0
-.60	0	0	0	0	0	0	0	0	0	0
-.70	0	0	0	0	0	0	0	0	0	0
-.80	0	0	0	0	0	0	0	0	0	0
-1.00	0	0	0	0	0	0	0	0	0	0
-1.20	0	0	0	0	0	0	0	0	0	0
-1.40	0	0	0	0	0	0	0	0	0	0
-1.60	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	57.68	57.61	54.89	43.48	48.52	79.06	273.34	1065.45	8.81	1688.83
FLIGHT MILES @ ALT	10712.91	14655.73	18759.60	17393.17	21054.53	36267.12	133304.10	516183.63	4282.14	772612.93
TOTAL FLIGHTS										442
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										1688.83
TOTAL FLIGHT MILES FLAPS UP AND DOWN										772612.93

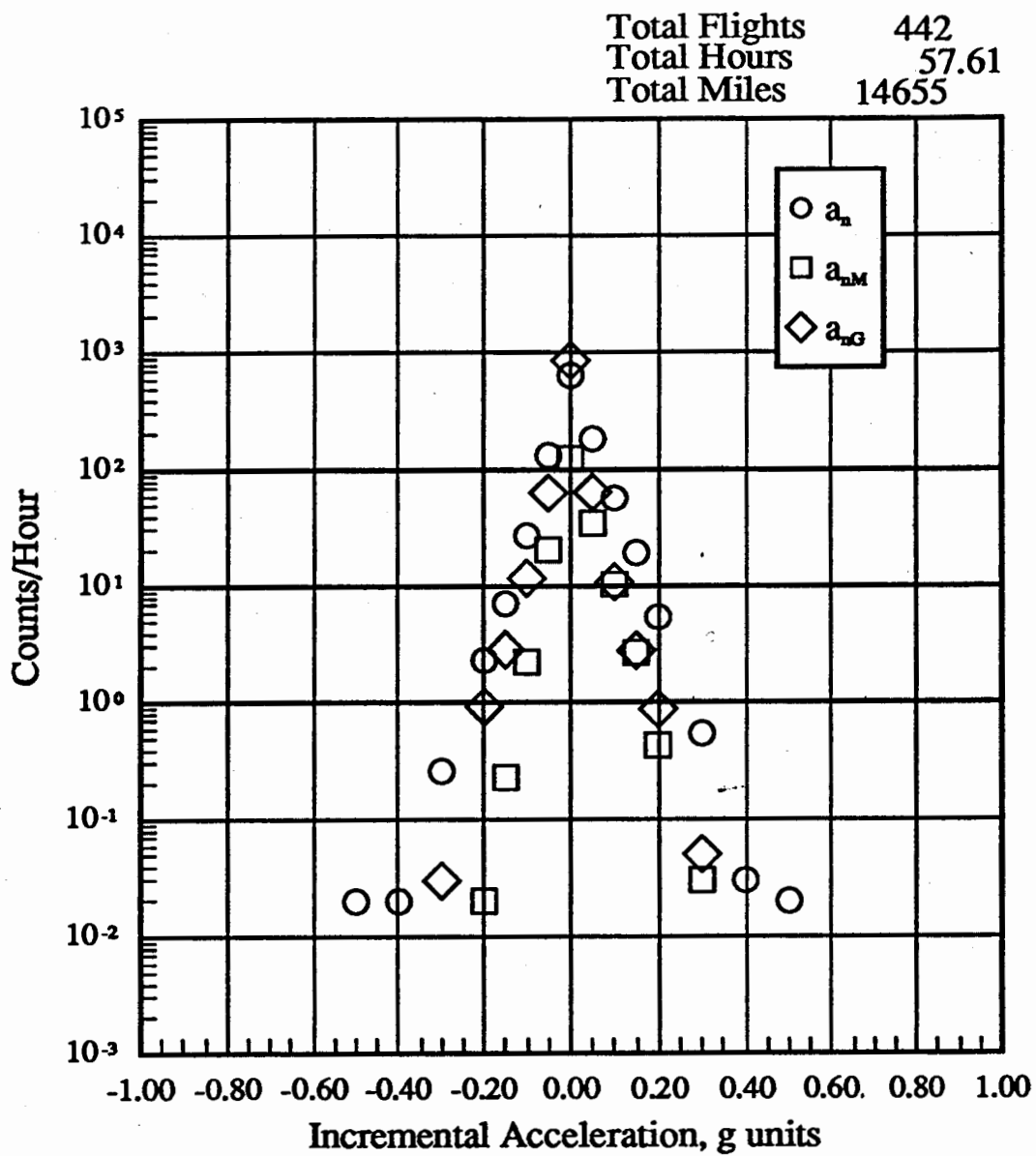
(c) a_{nG} Level crossing counts per hour within pressure altitude bands

Figure 13.- Continued.



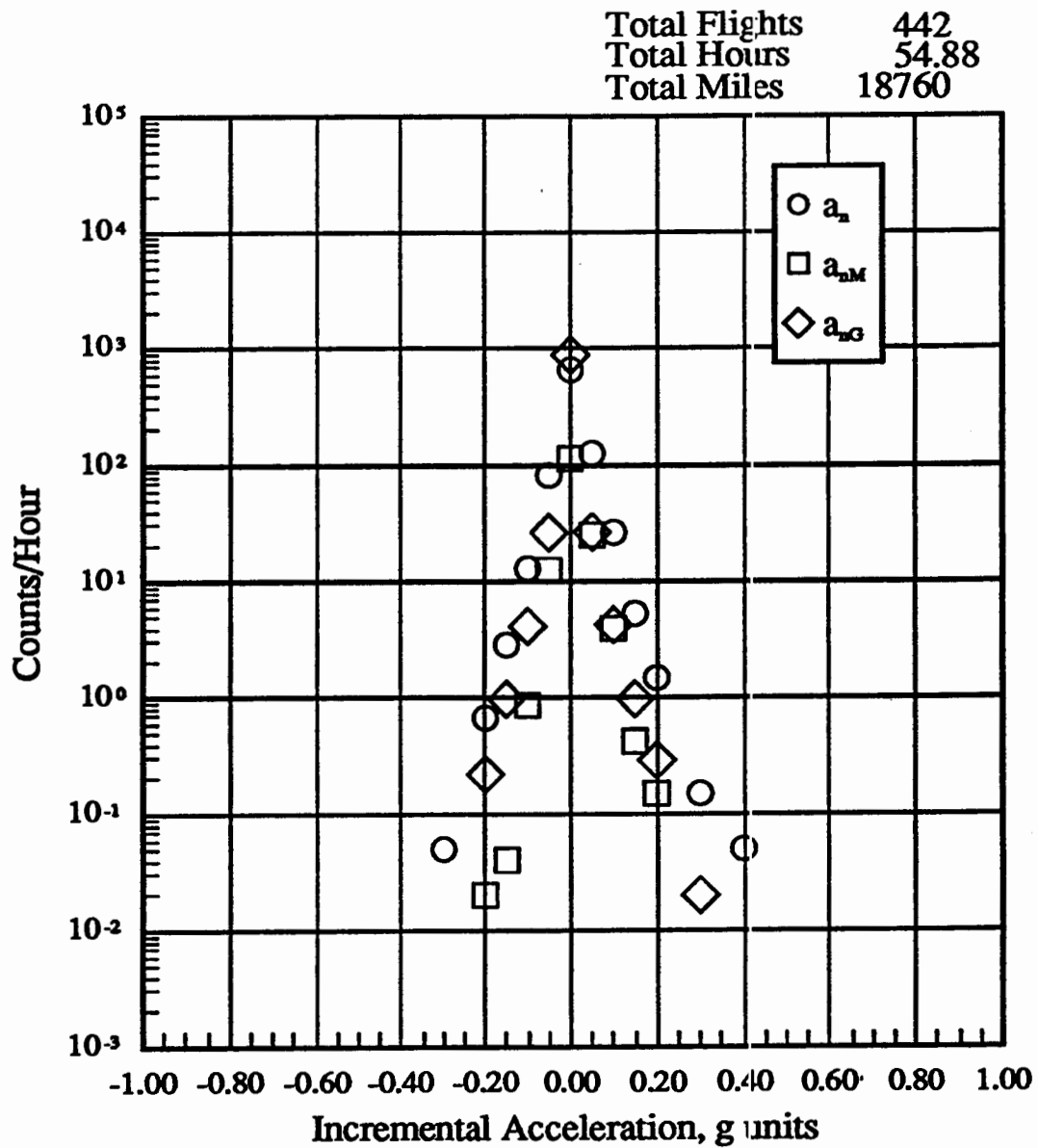
(d) a_n , a_{nM} , a_{nG} , -500 to 4500 feet altitude

Figure 13.- Continued.



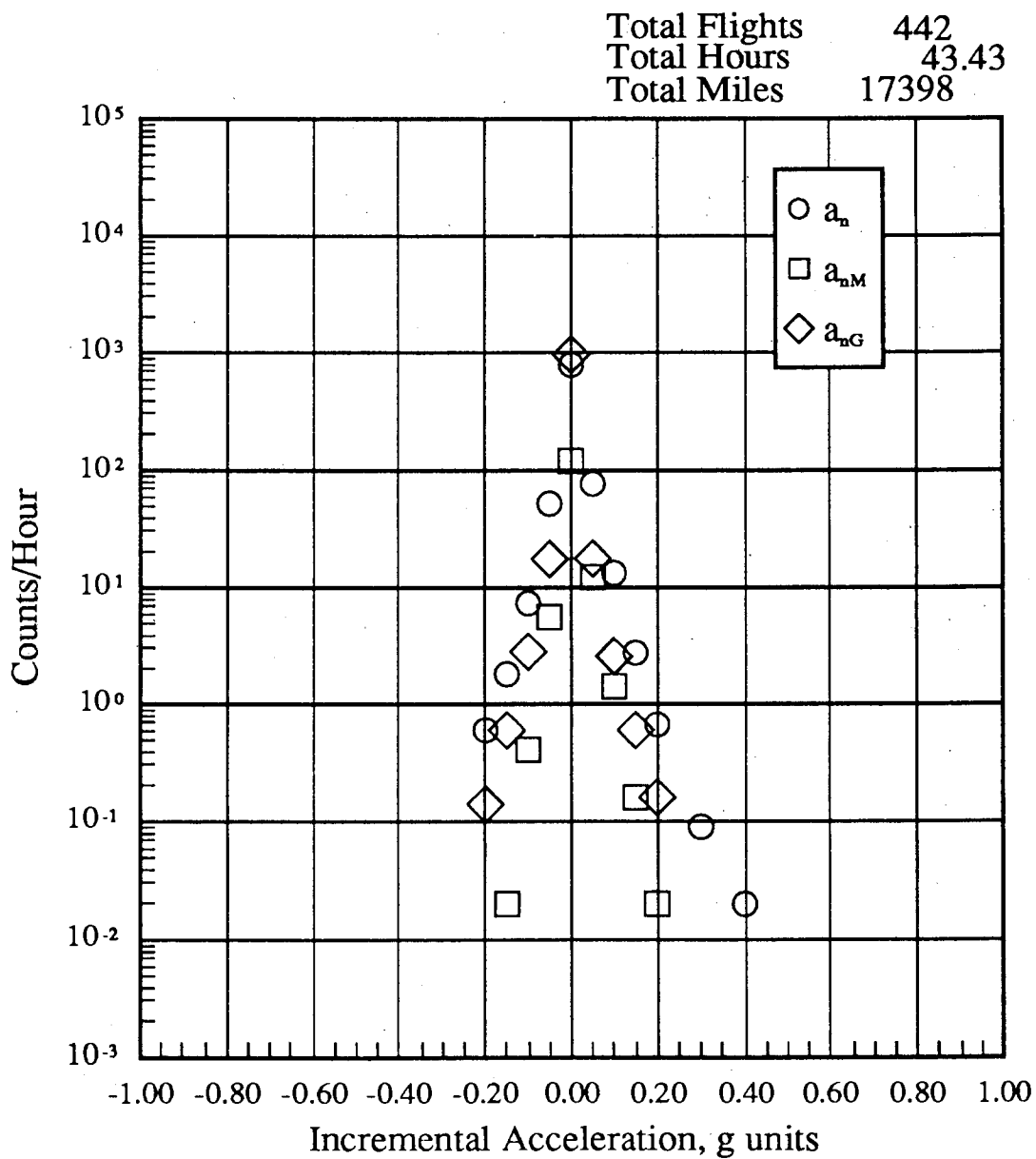
(e) a_n , a_{nM} , a_{nG} , 4500 to 9500 feet altitude

Figure 13.- Continued.



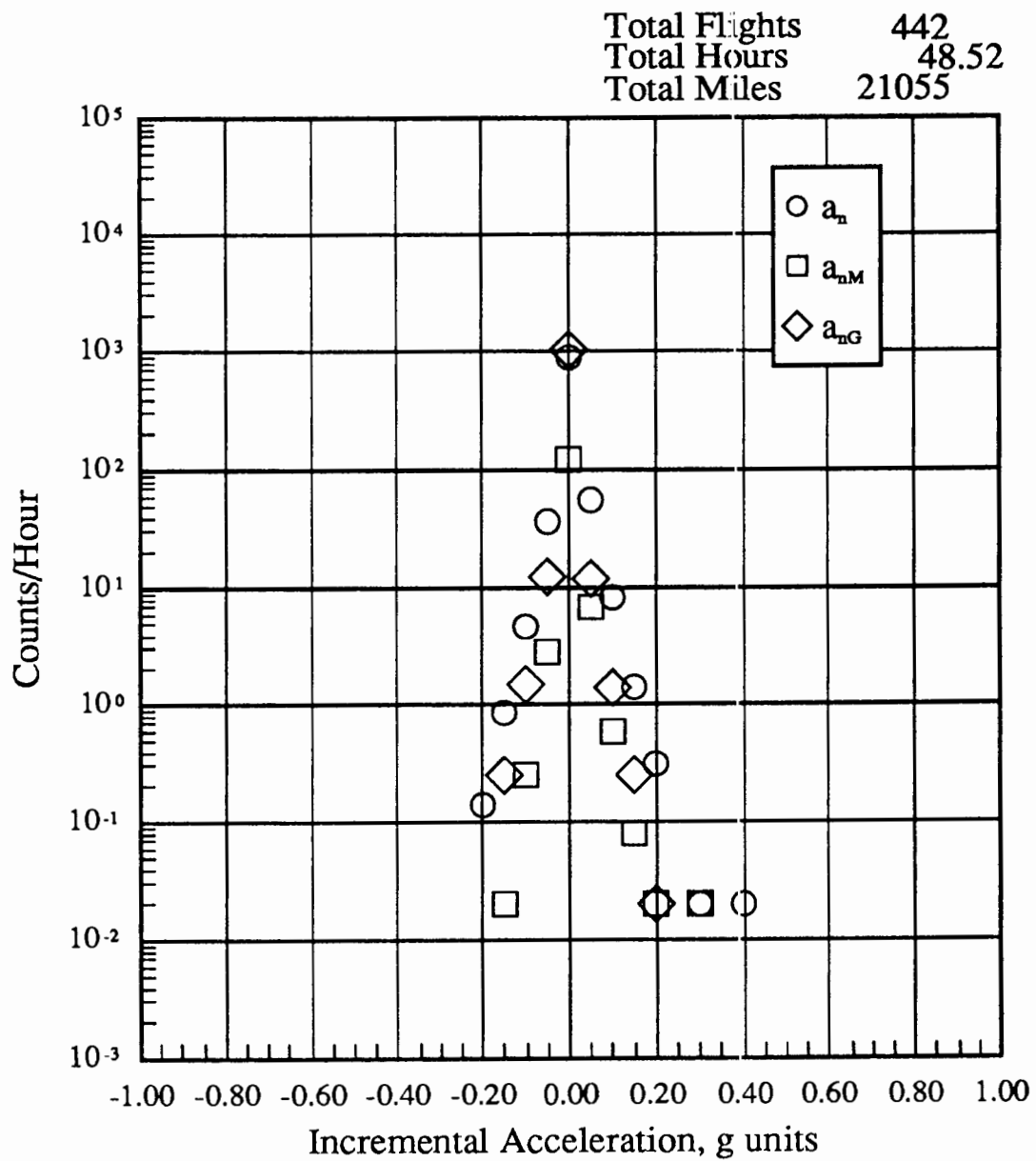
(f) a_n , a_{nM} , a_{nG} , 9500 to 14500 feet altitude

Figure 13.- Continued.



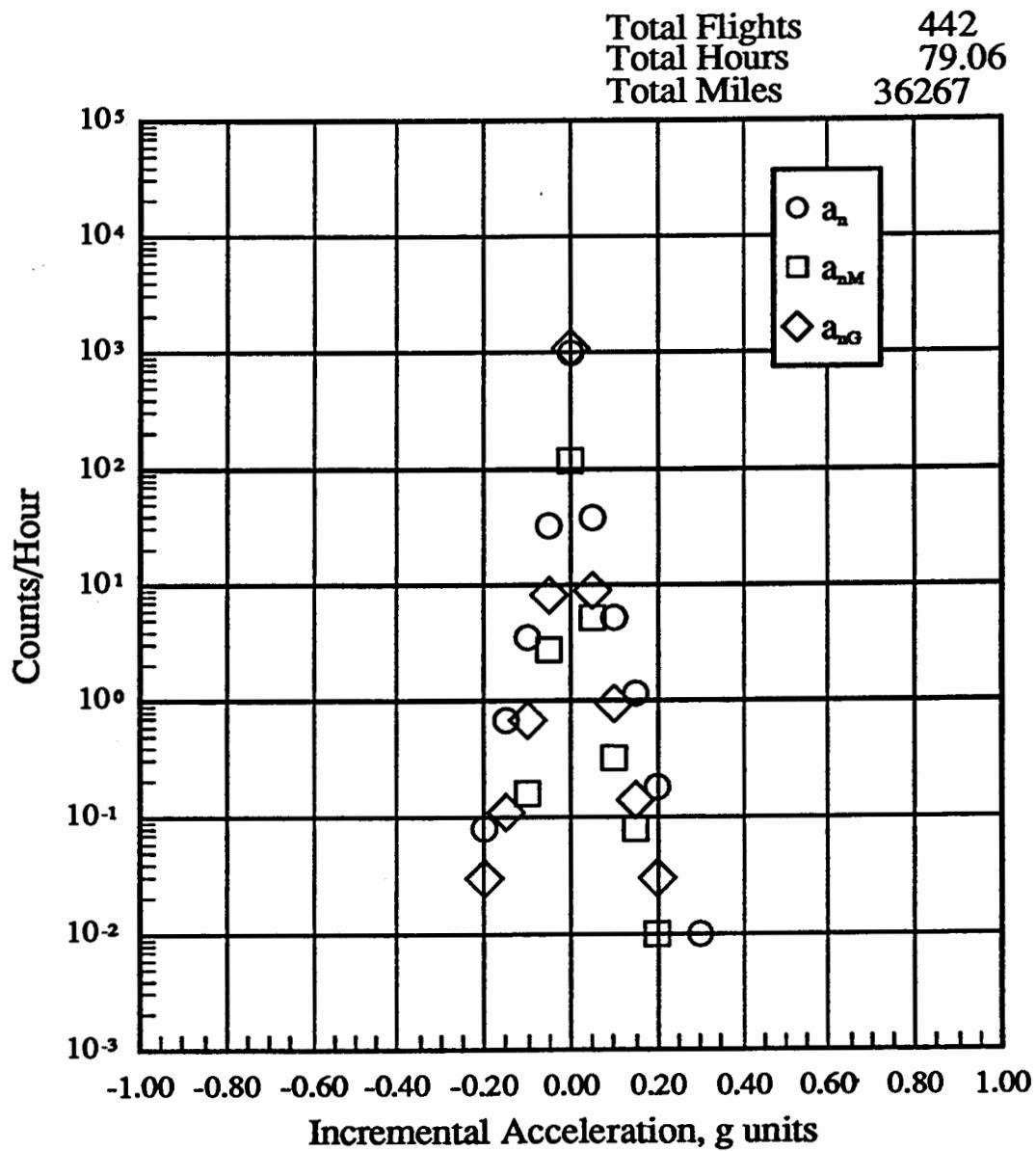
(g) a_n , a_{nM} , a_{nG} , 14500 to 19500 feet altitude

Figure 13.- Continued.



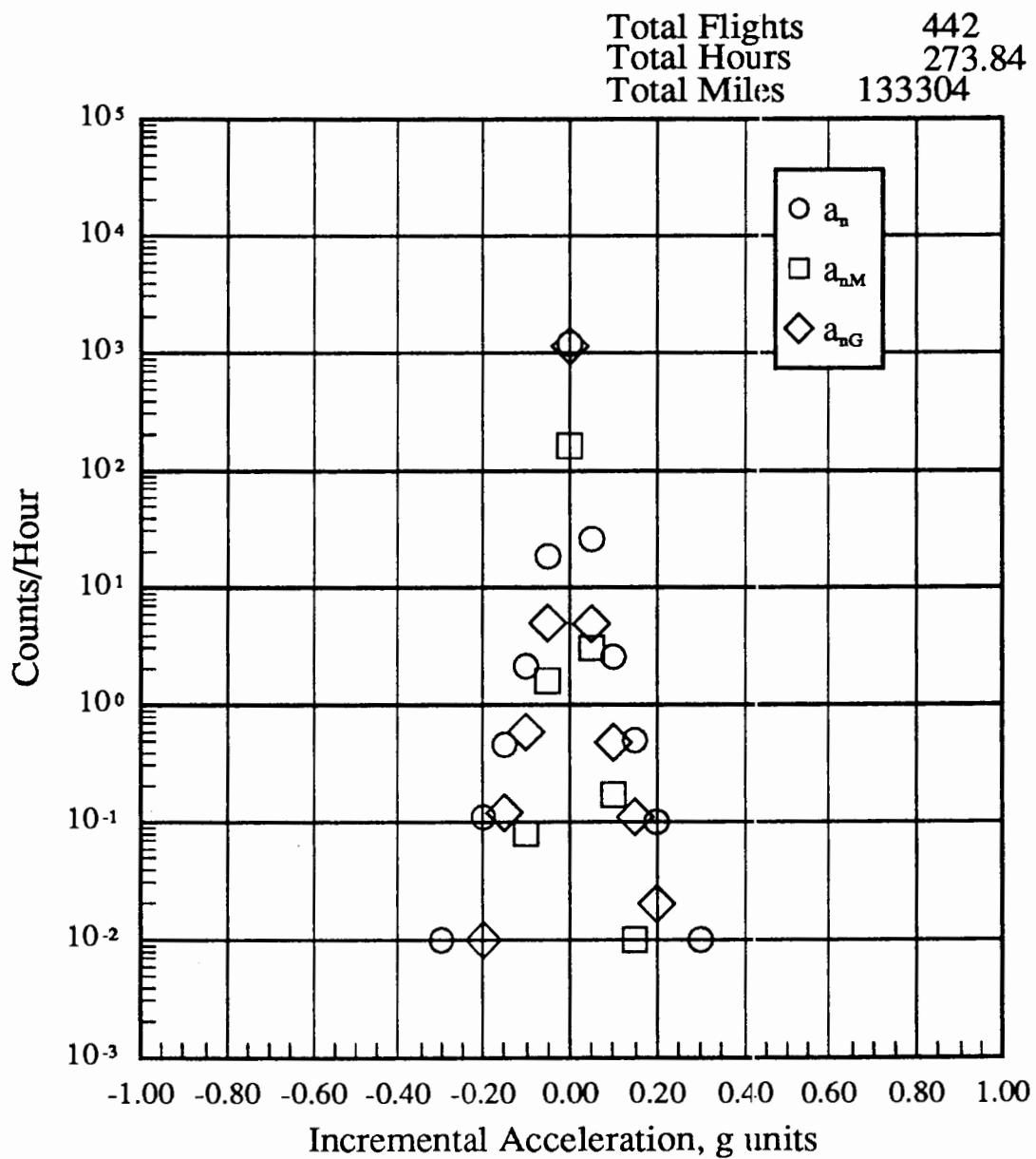
(h) a_n , a_{nM} , a_{nG} , 19500 to 24500 feet altitude

Figure 13.- Continued.



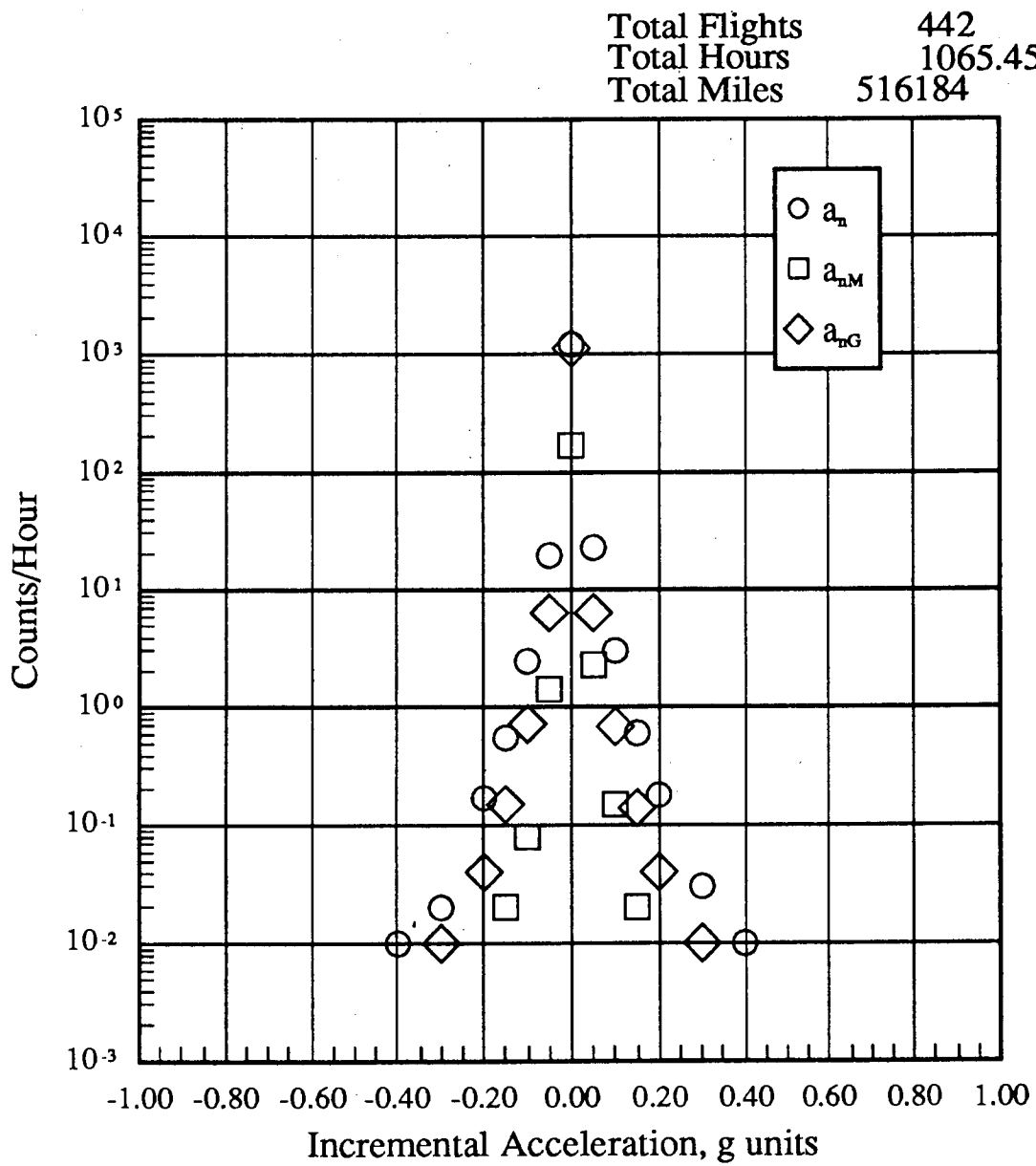
(i) a_n , a_{nM} , a_{nG} , 24500 to 29500 feet altitude

Figure 13.- Continued.



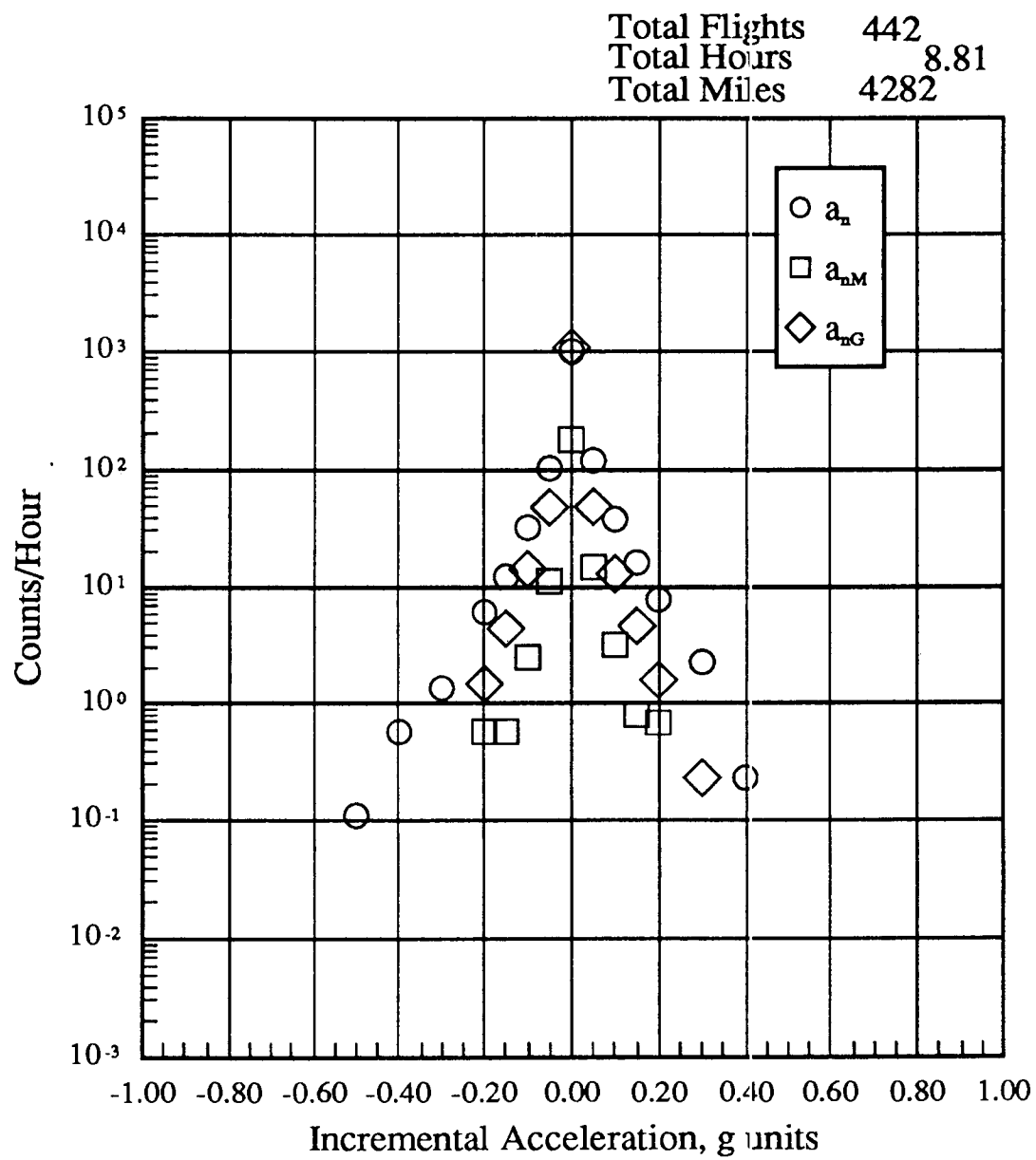
(j) a_n , a_{nM} , a_{nG} , 29500 to 34500 feet altitude

Figure 13.- Continued.



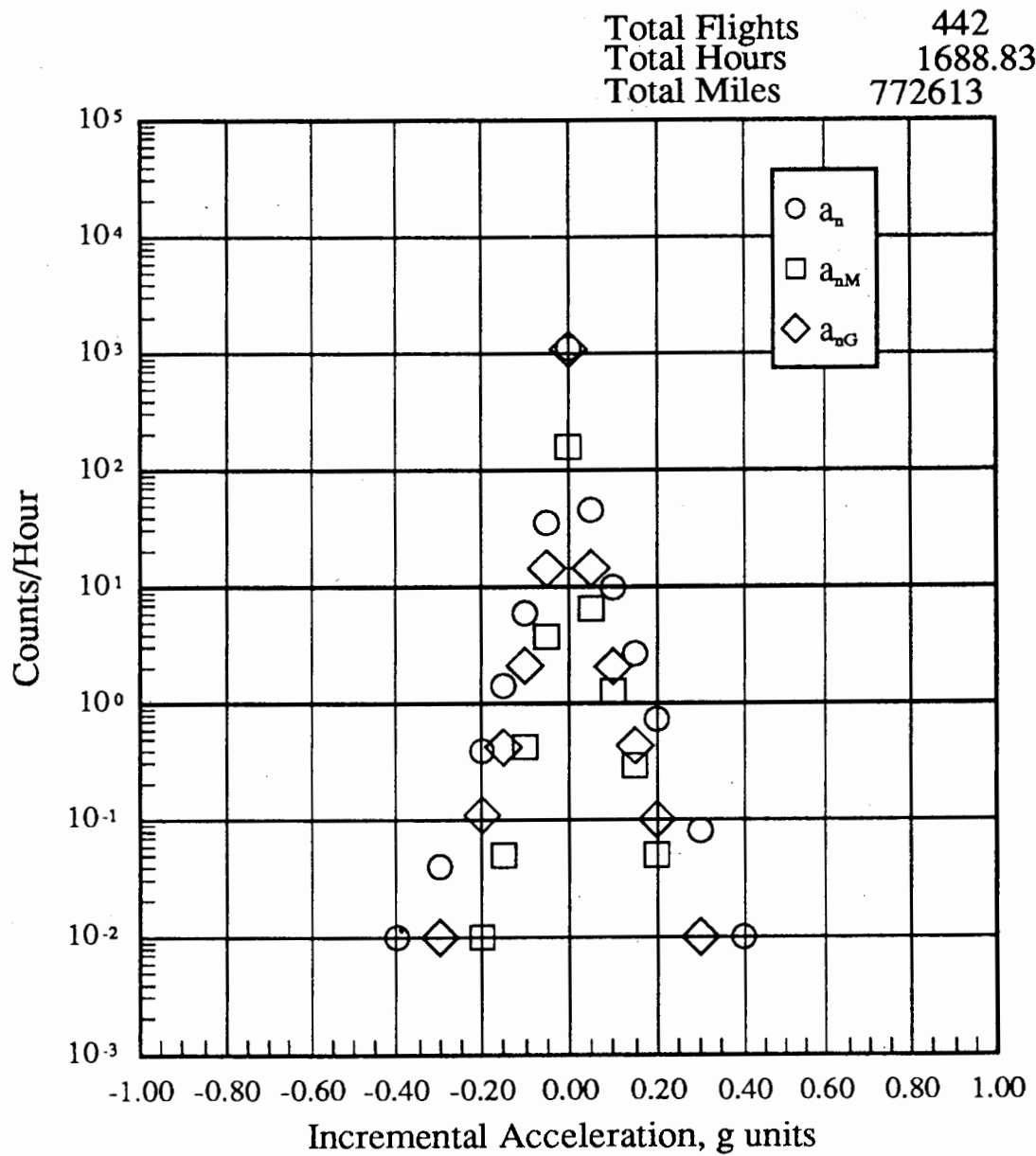
(k) a_n , a_{nM} , a_{nG} , 34500 to 39500 feet altitude

Figure 13.- Continued.



(1) a_n , a_{nM} , a_{nG} , 39500 to 44500 feet altitude

Figure 13.- Continued.



(m) a_n , a_{nM} , a_{nG} , -500 to 44500 feet altitude

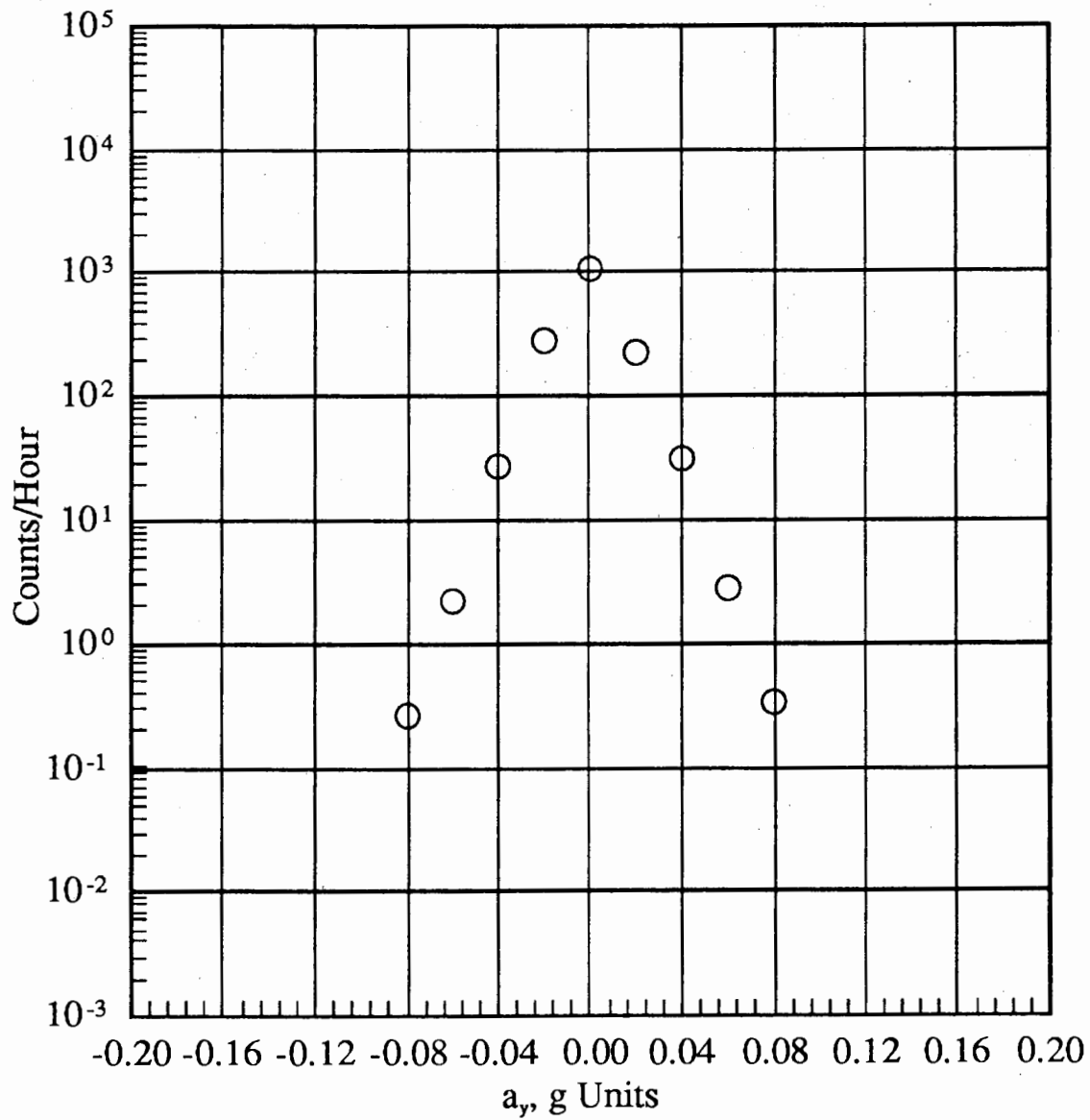
Figure 13.- Concluded.

PRESSURE ALTITUDE BANDS										
a_y LEVEL g's	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
.48	0	0	0	0	0	0	0	0	0	0
.44	0	0	0	0	0	0	0	0	0	0
.40	0	0	0	0	0	0	0	0	0	0
.36	0	0	0	0	0	0	0	0	0	0
.32	0	0	0	0	0	0	0	0	0	0
.28	0	0	0	0	0	0	0	0	0	0
.24	0	0	0	0	0	0	0	0	0	0
.20	0	0	0	0	0	0	0	0	0	0
.16	0	0	0	0	0	0	0	0	0	0
.12	0	0	0	0.02	0	0	0	0	0	0
.08	0.33	0.09	0.09	0.12	0.02	0.03	0.03	0.04	1.25	0.06
.06	2.76	0.94	0.66	0.46	0.41	0.23	0.16	0.20	4.77	0.36
.04	31.59	8.99	2.92	2.23	2.12	1.78	1.03	1.35	19.65	2.80
.02	228.12	84.68	29.02	16.70	20.08	15.96	9.67	13.75	79.72	24.03
0	1077.16	850.24	593.08	569.08	647.19	1022.62	1394.45	1387.04	1368.87	1274.08
-.02	283.44	165.51	123.22	86.83	62.45	37.35	13.86	16.83	102.89	38.51
-.04	27.43	16.68	9.47	6.79	2.68	2.33	0.90	1.40	18.17	3.30
-.06	2.20	2.22	1.55	1.10	0.29	0.27	0.08	0.26	4.66	0.45
-.08	0.26	0.28	0.18	0.48	0.04	0.06	0.02	0.06	1.36	0.09
-.12	0	0.02	0	0.07	0	0	0	0	0.11	0
-.16	0	0	0	0	0	0	0	0	0	0
-.20	0	0	0	0	0	0	0	0	0	0
-.24	0	0	0	0	0	0	0	0	0	0
-.28	0	0	0	0	0	0	0	0	0	0
-.32	0	0	0	0	0	0	0	0	0	0
-.36	0	0	0	0	0	0	0	0	0	0
-.40	0	0	0	0	0	0	0	0	0	0
-.44	0	0	0	0	0	0	0	0	0	0
-.48	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	57.68	57.61	54.89	43.48	48.52	79.06	273.34	1065.45	8.81	1688.83
FLIGHT MILES @ ALT	10712.91	14655.73	18759.60	17393.17	21054.53	36267.12	133304.10	516183.63	4282.14	772612.93
TOTAL FLIGHTS										442
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										1688.83
TOTAL FLIGHT MILES FLAPS UP AND DOWN										772612.93

(a) a_y Level crossing counts per hour within pressure altitude bands

Figure 14.- Lateral acceleration exceedances.

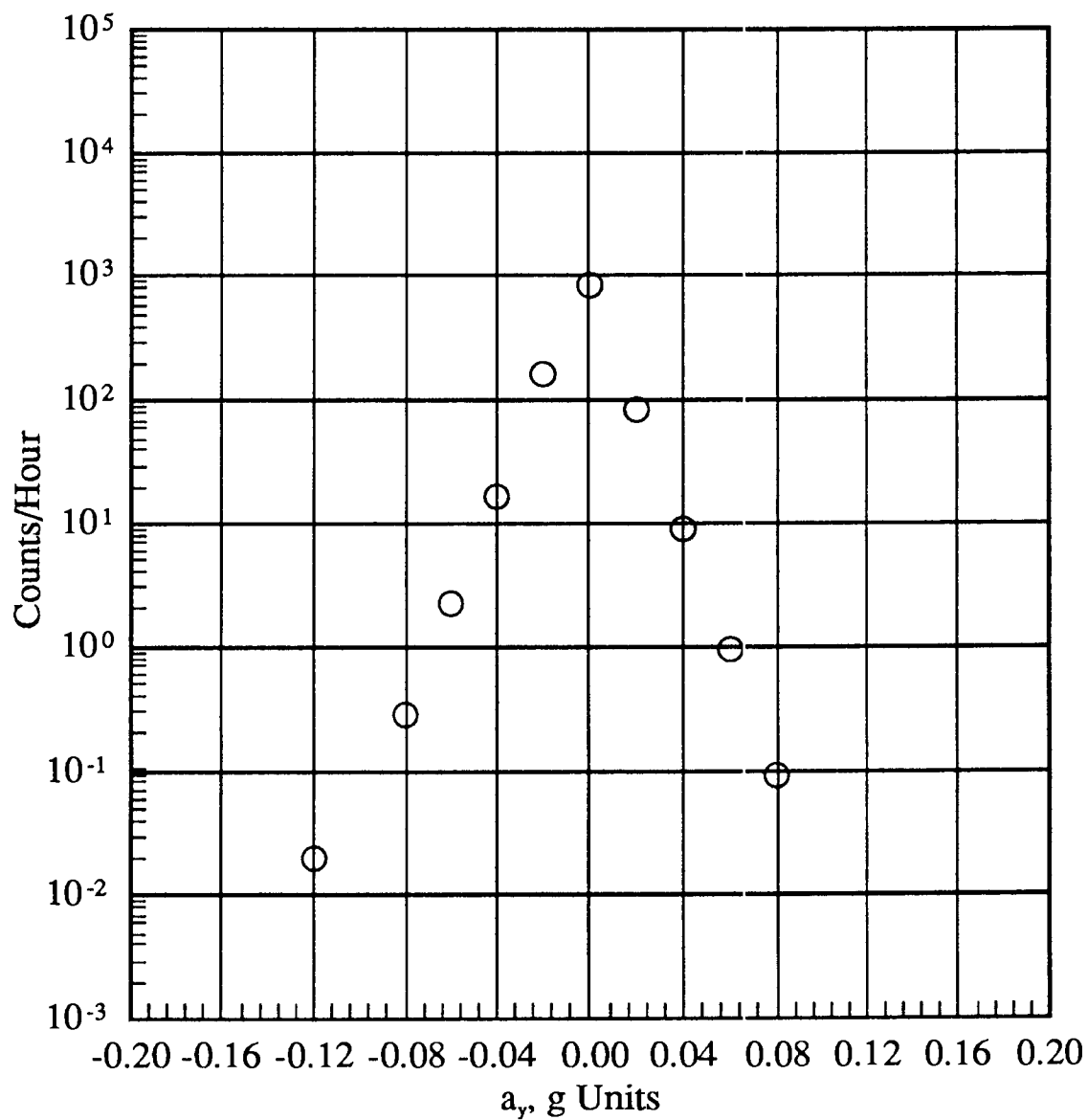
Total Flights	442
Total Hours	57.68
Total Miles	10718



(b) -500 to 4500 feet altitude

Figure 14.- Continued.

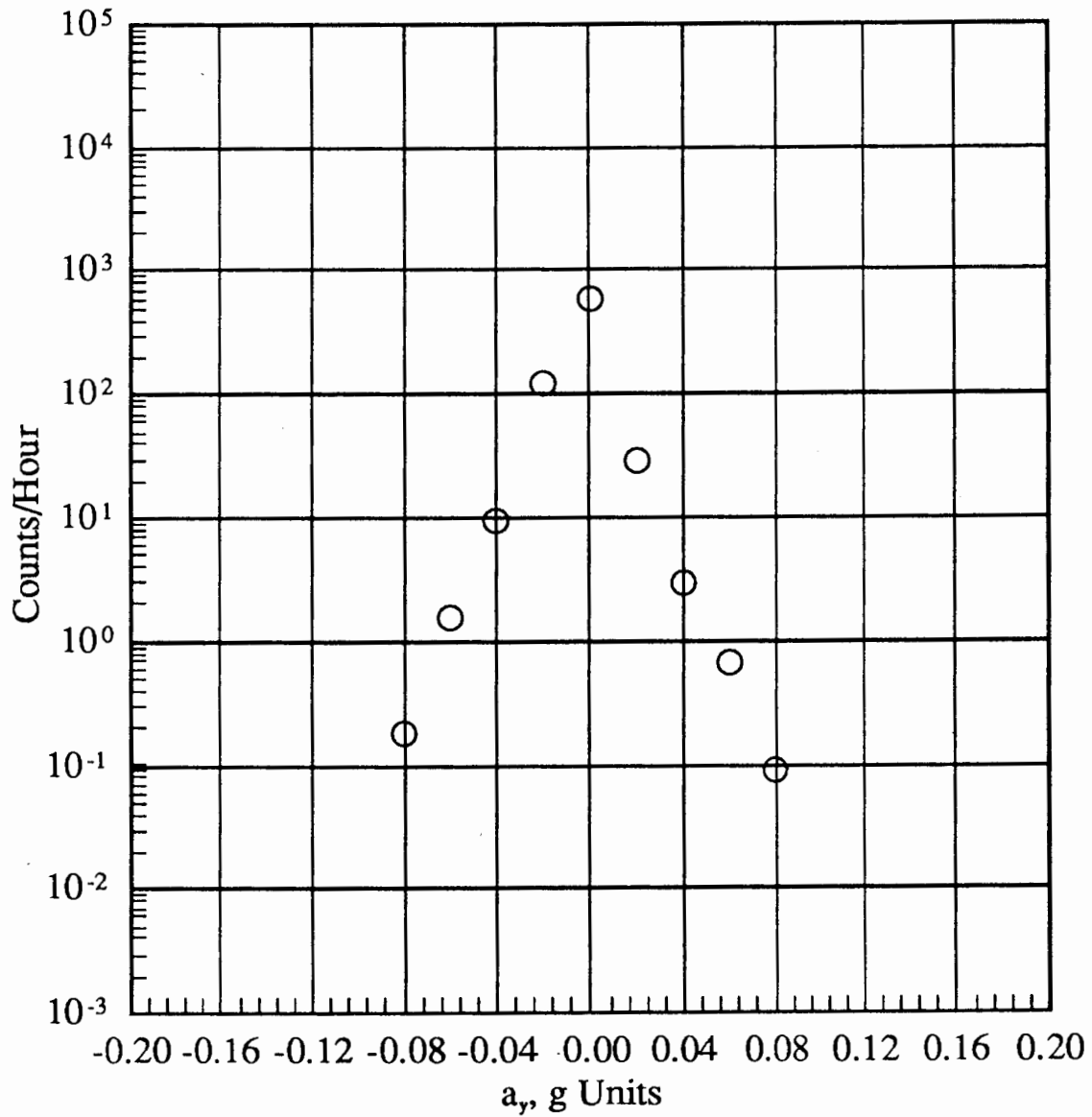
Total Flights 442
Total Hours 57.61
Total Miles 14656



(c) 4500 to 9500 feet altitude

Figure 14.- Continued.

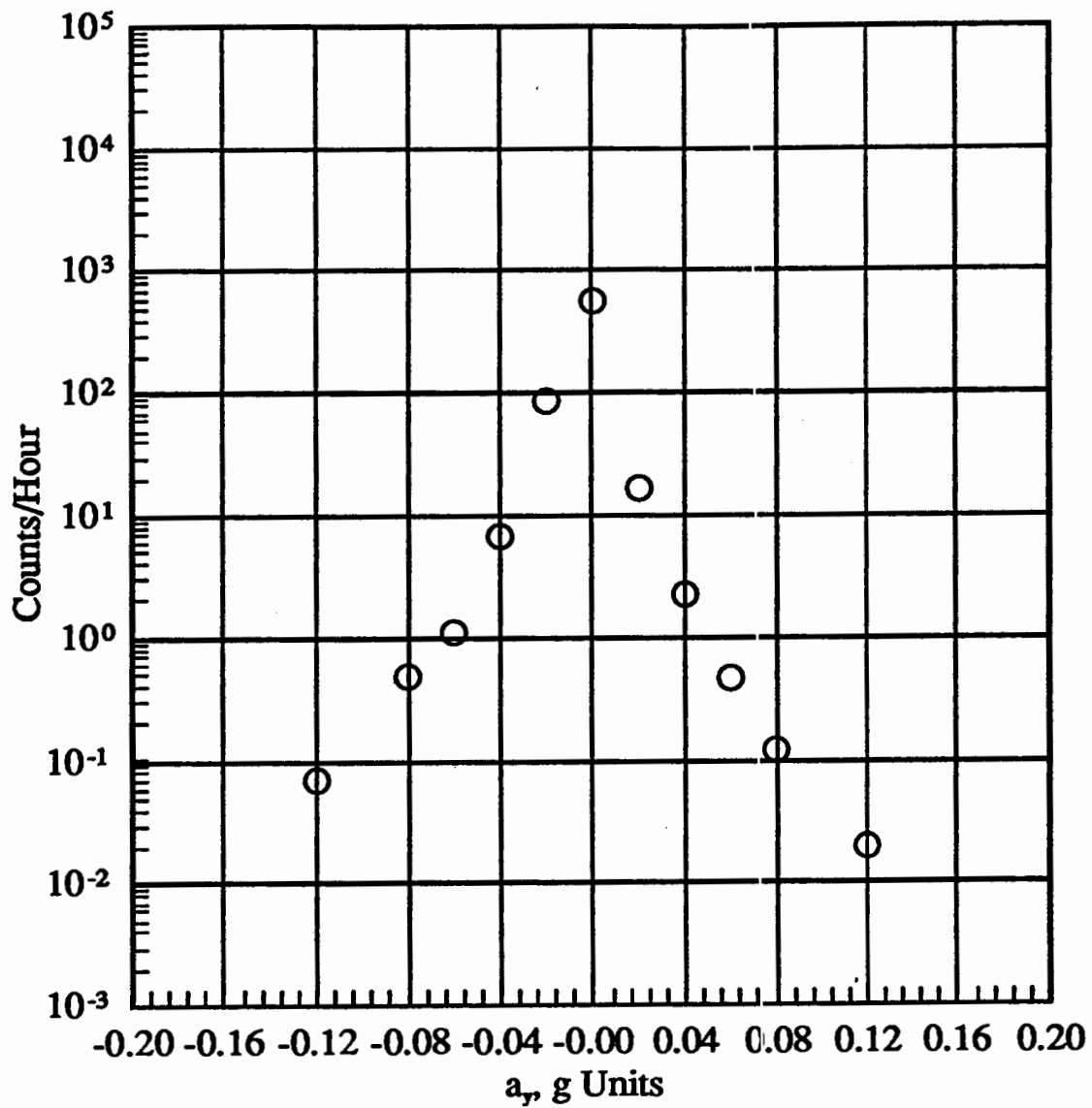
Total Flights	442
Total Hours	54.88
Total Miles	18760



(d) 9500 to 14500 feet altitude

Figure 14.- Continued.

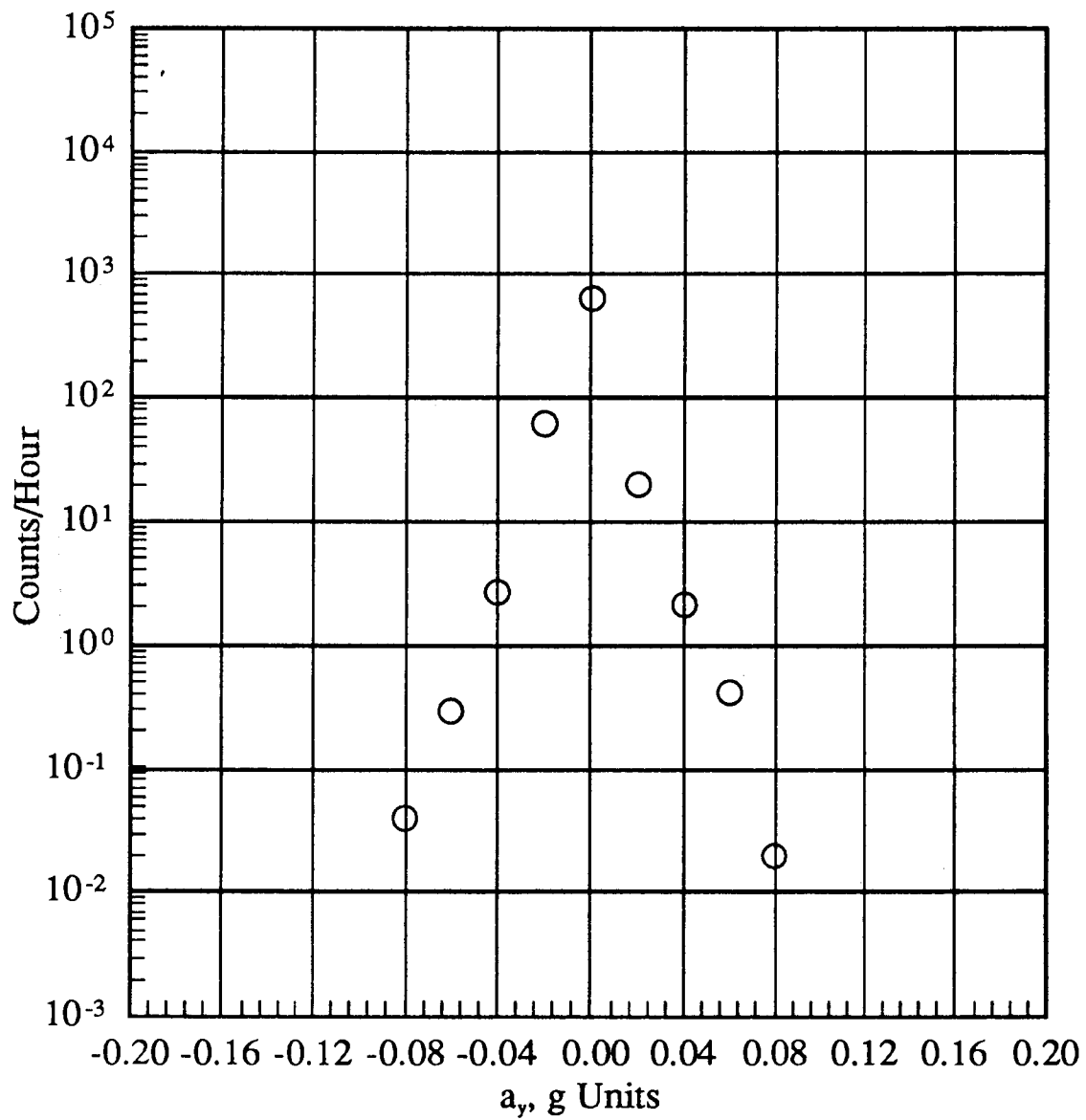
Total Flights	442
Total Hours	43.48
Total Miles	17398



(e) 14500 to 19500 feet altitude:

Figure 14.- Continued.

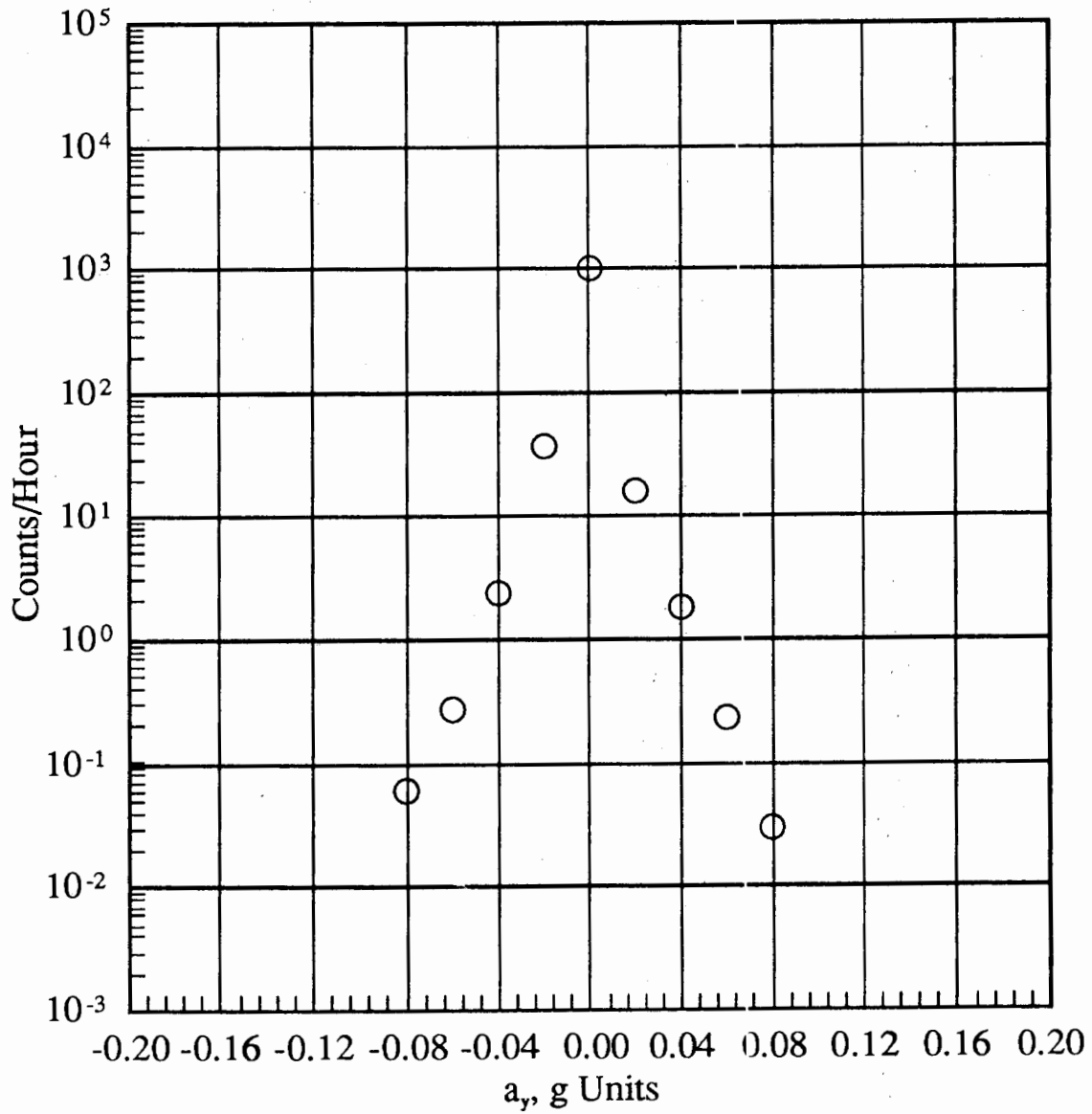
Total Flights	442
Total Hours	48.52
Total Miles	21055



(f) 19500 to 24500 feet altitude

Figure 14.- Continued.

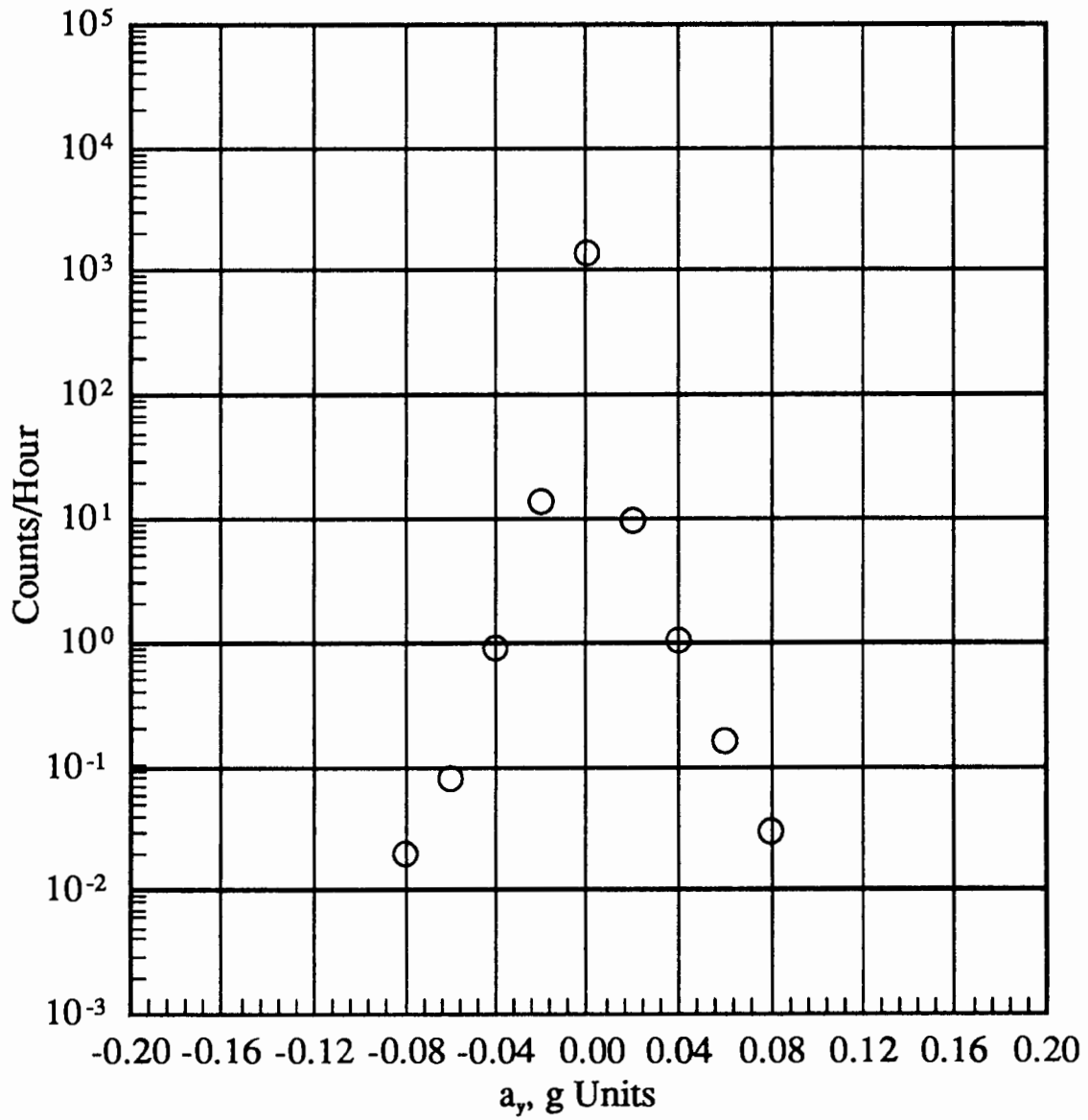
Total Flights	442
Total Hours	79.06
Total Miles	36267



(g) 24500 to 29500 feet altitude

Figure 14.- Continued.

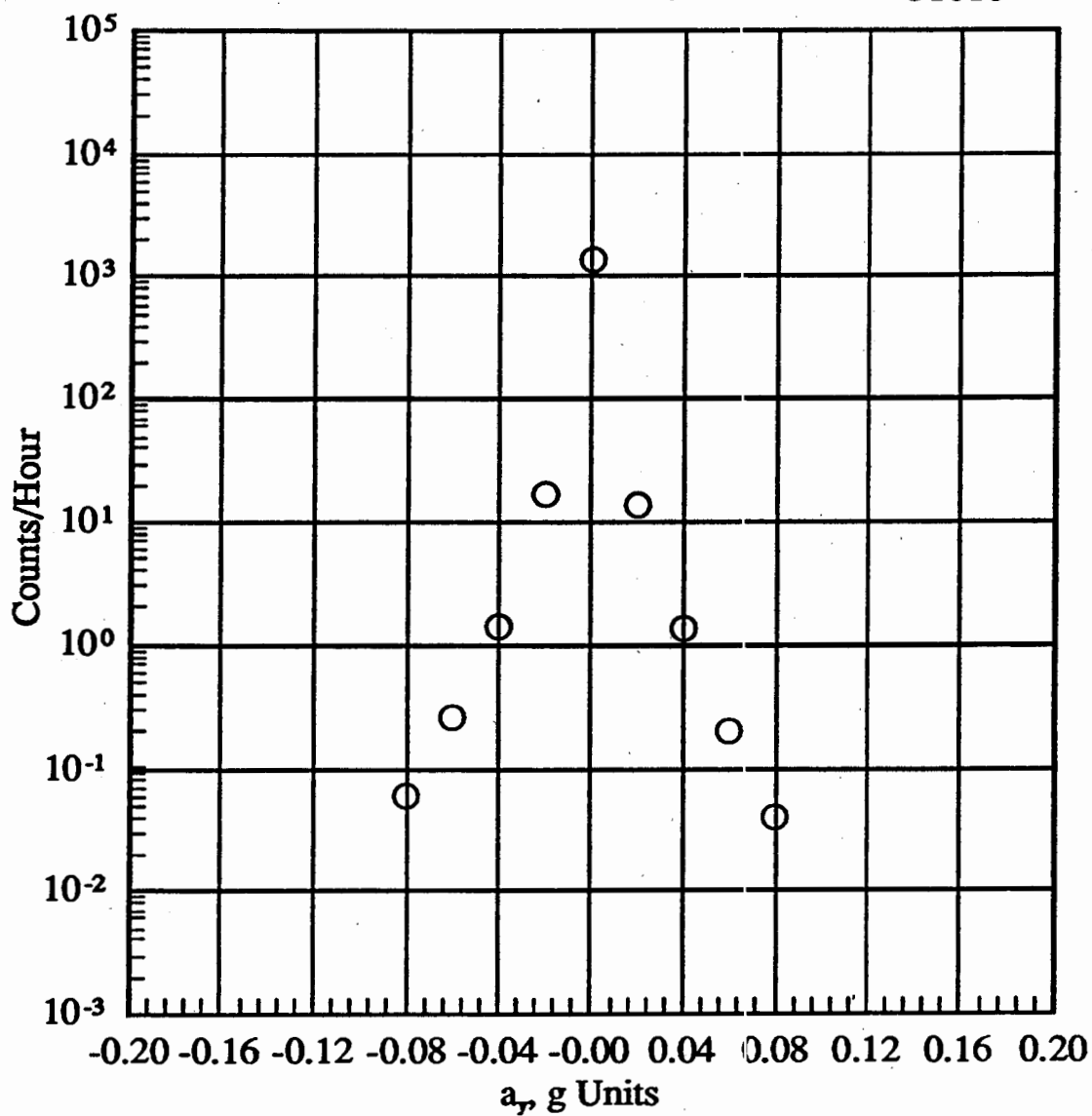
Total Flights 442
Total Hours 273.84
Total Miles 133304



(h) 29500 to 34500 feet altitude

Figure 14.- Continued.

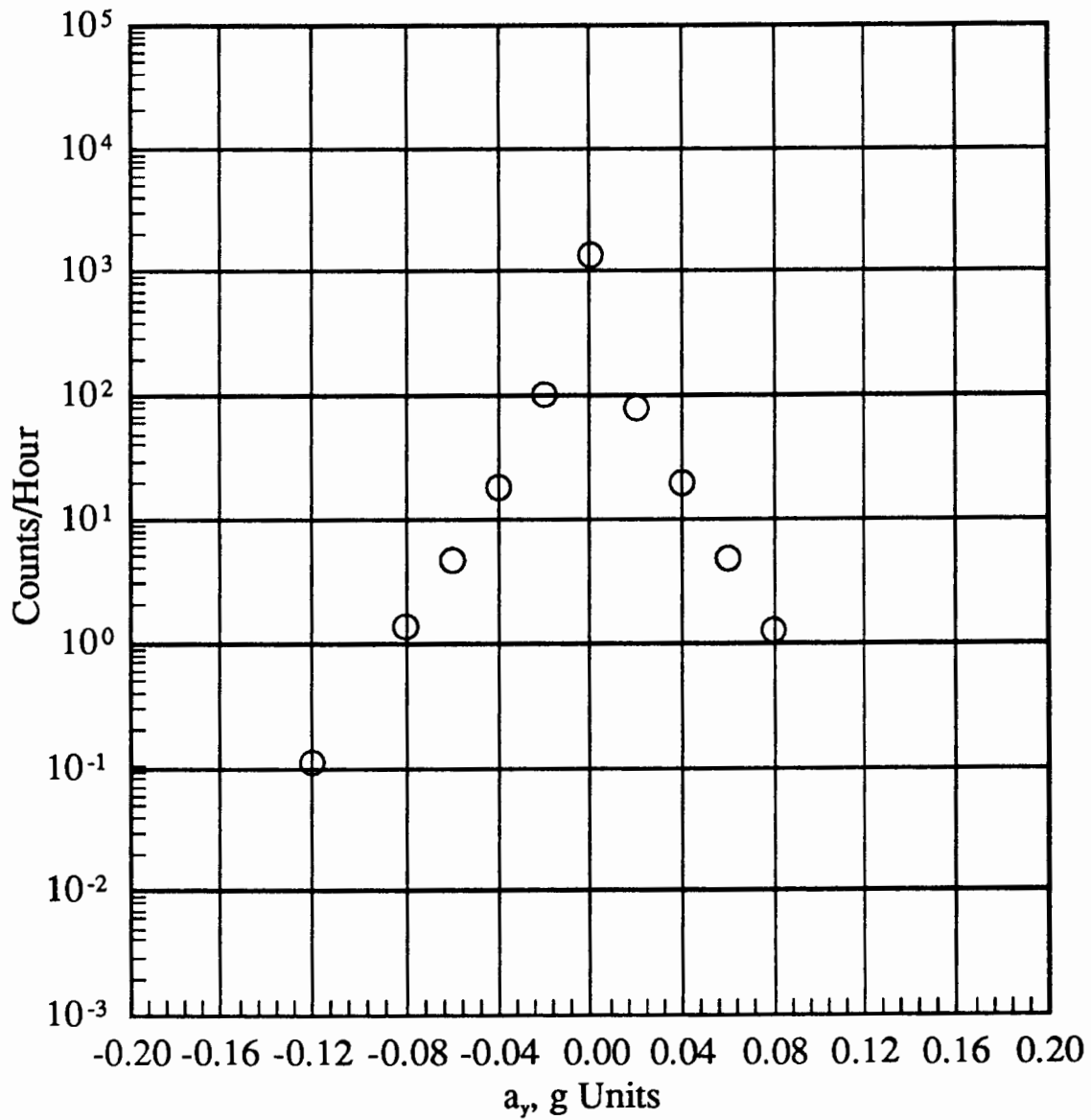
Total Flights 442
 Total Hours 1065.45
 Total Miles 516184



(i) 34500 to 39500 feet altitude

Figure 14.- Continued.

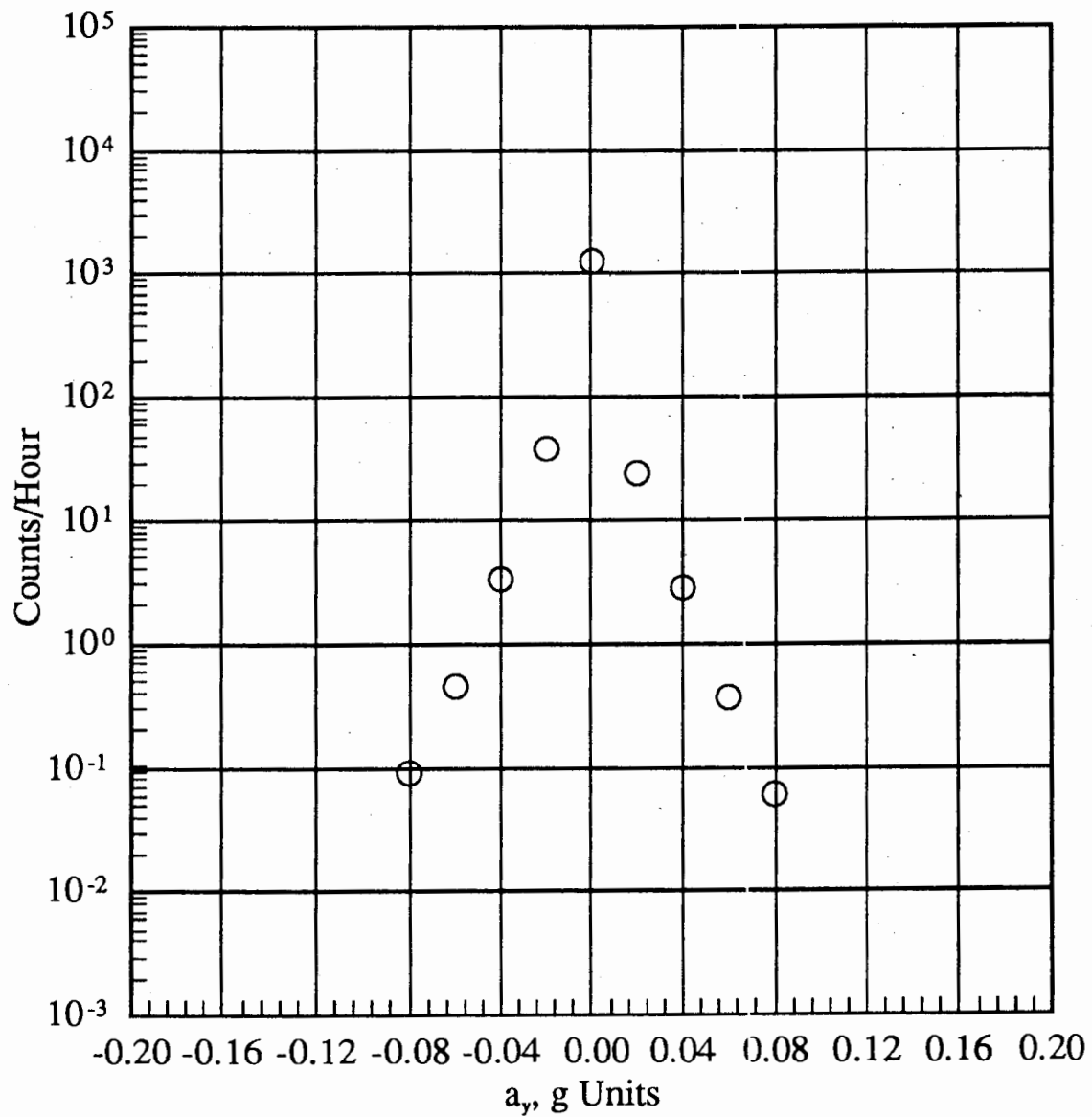
Total Flights	442
Total Hours	8.81
Total Miles	4282



(j) 39500 to 44500 feet altitude

Figure 14.- Continued.

Total Flights	442
Total Hours	1688.83
Total Miles	772613



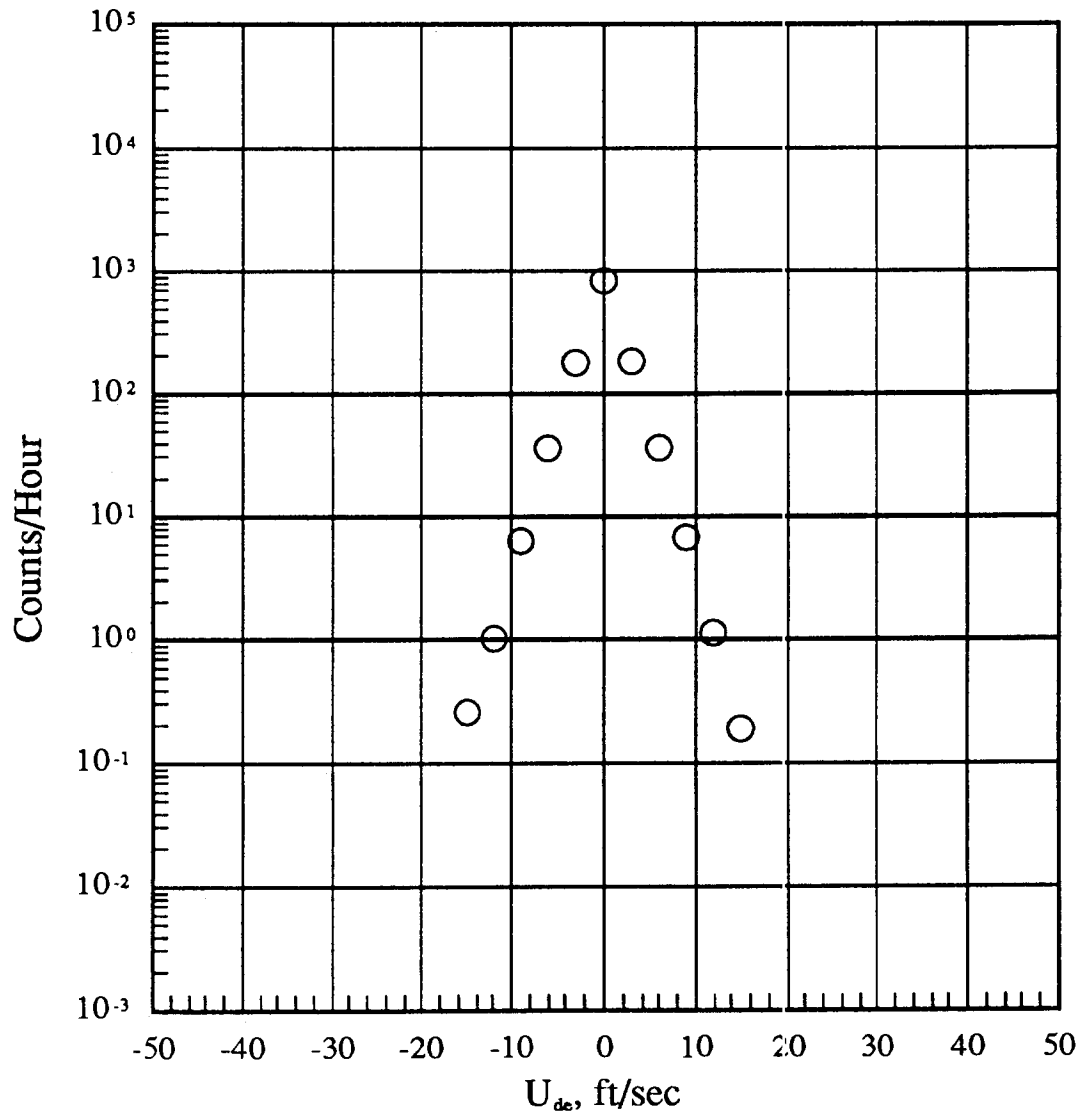
(k) -500 to 44500 feet altitude

Figure 14.- Concluded.

PRESSURE ALTITUDE BANDS										
U_{de} DERIVED GUST VELOCITY LEVEL FT/SEC	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
100	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0
15	0.19	0.07	0	0	0	0	0	0	0	0.01
12	1.13	0.45	0.04	0.05	0	0.01	0	0.01	0.23	0.06
9	6.74	1.87	0.29	0.14	0	0.03	0.01	0.03	1.02	0.34
6	36.10	8.14	1.64	0.58	0.14	0.16	0.16	0.20	4.77	1.77
3	181.56	53.60	12.74	6.74	3.98	2.53	1.96	2.61	24.98	10.94
0	832.76	849.54	873.74	962.55	1025.26	1085.15	1143.63	1121.41	1088.03	1089.10
-3	177.06	53.23	12.79	6.72	4.45	2.35	2.08	2.64	25.78	10.82
-6	35.54	8.83	1.44	0.74	0.23	0.13	0.19	0.23	4.66	1.79
-9	6.33	1.75	0.35	0.09	0	0.01	0.01	0.03	0.45	0.31
-12	1.02	0.54	0.02	0	0	0	0	0.01	0	0.06
-15	0.26	0.17	0	0	0	0	0	0	0	0.02
-20	0	0.02	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0
-80	0	0	0	0	0	0	0	0	0	0
-90	0	0	0	0	0	0	0	0	0	0
-100	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	57.68	57.61	54.89	43.48	48.52	79.06	273.34	1065.45	8.81	1688.83
FLIGHT MILES @ ALT	10712.91	14655.73	18759.60	17393.17	21054.53	36267.12	133304.10	516183.63	4282.14	772612.93
TOTAL FLIGHTS										442
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										1688.83
TOTAL FLIGHT MILES FLAPS UP AND DOWN										772612.93

(a) U_{de} Level crossing counts per hour within pressure altitude bandsFigure 15.- U_{de} exceedances.

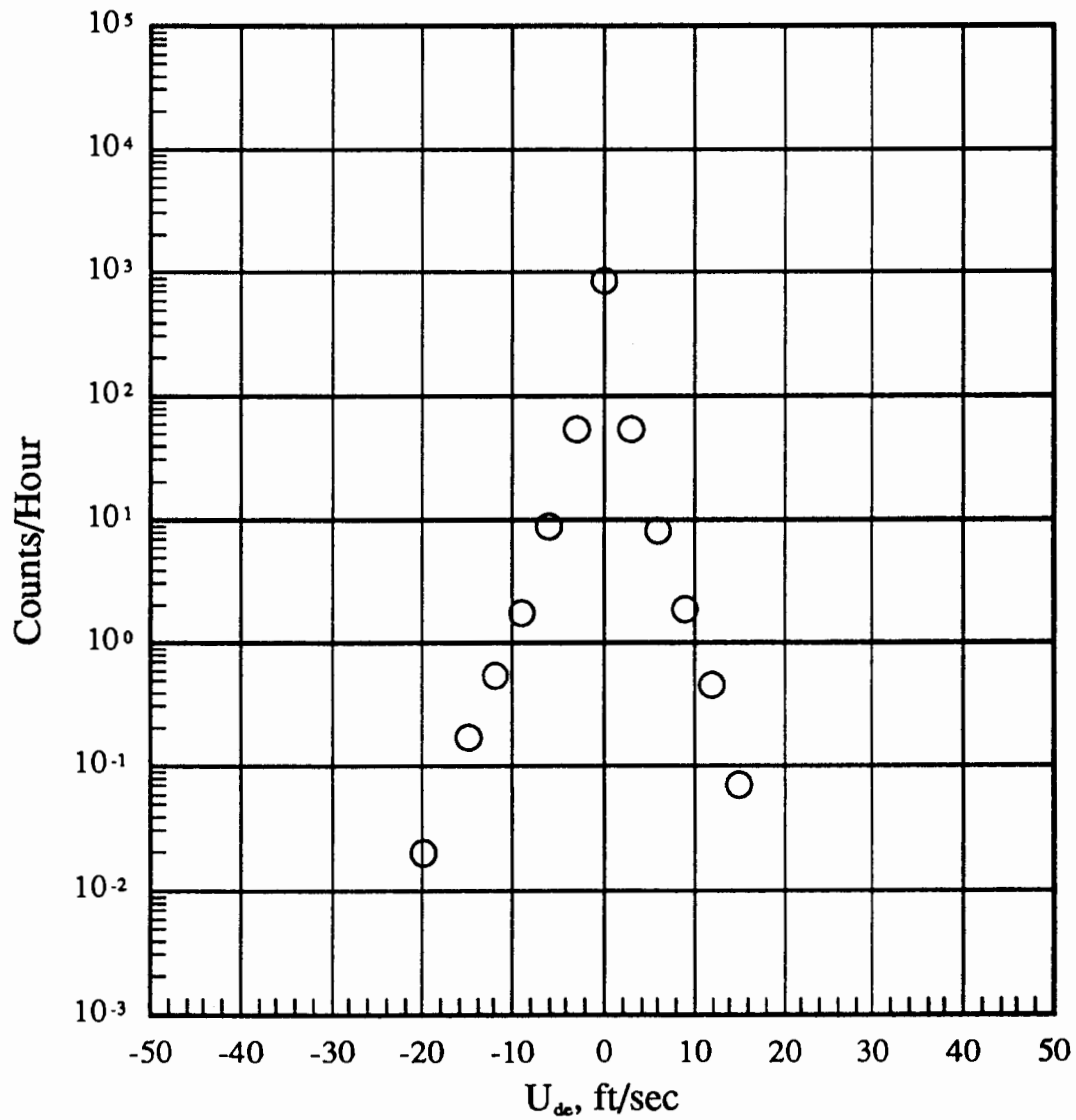
Total Flights	442
Total Hours	57.68
Total Miles	10718



(b) -500 to 4500 feet altitude

Figure 15.- Continued.

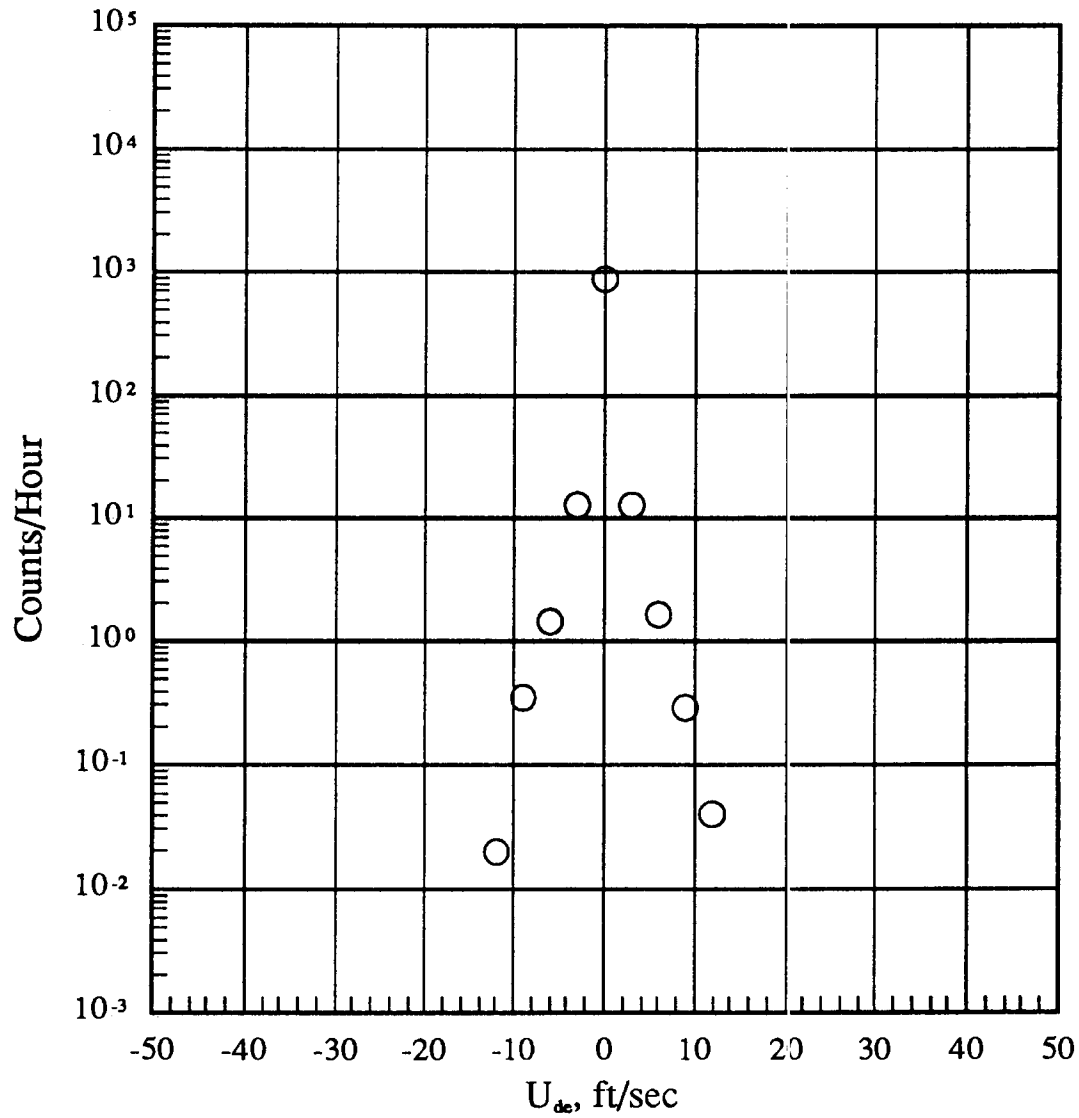
Total Flights	442
Total Hours	57.61
Total Miles	14656



(c) 4500 to 9500 feet altitude

Figure 15.- Continued.

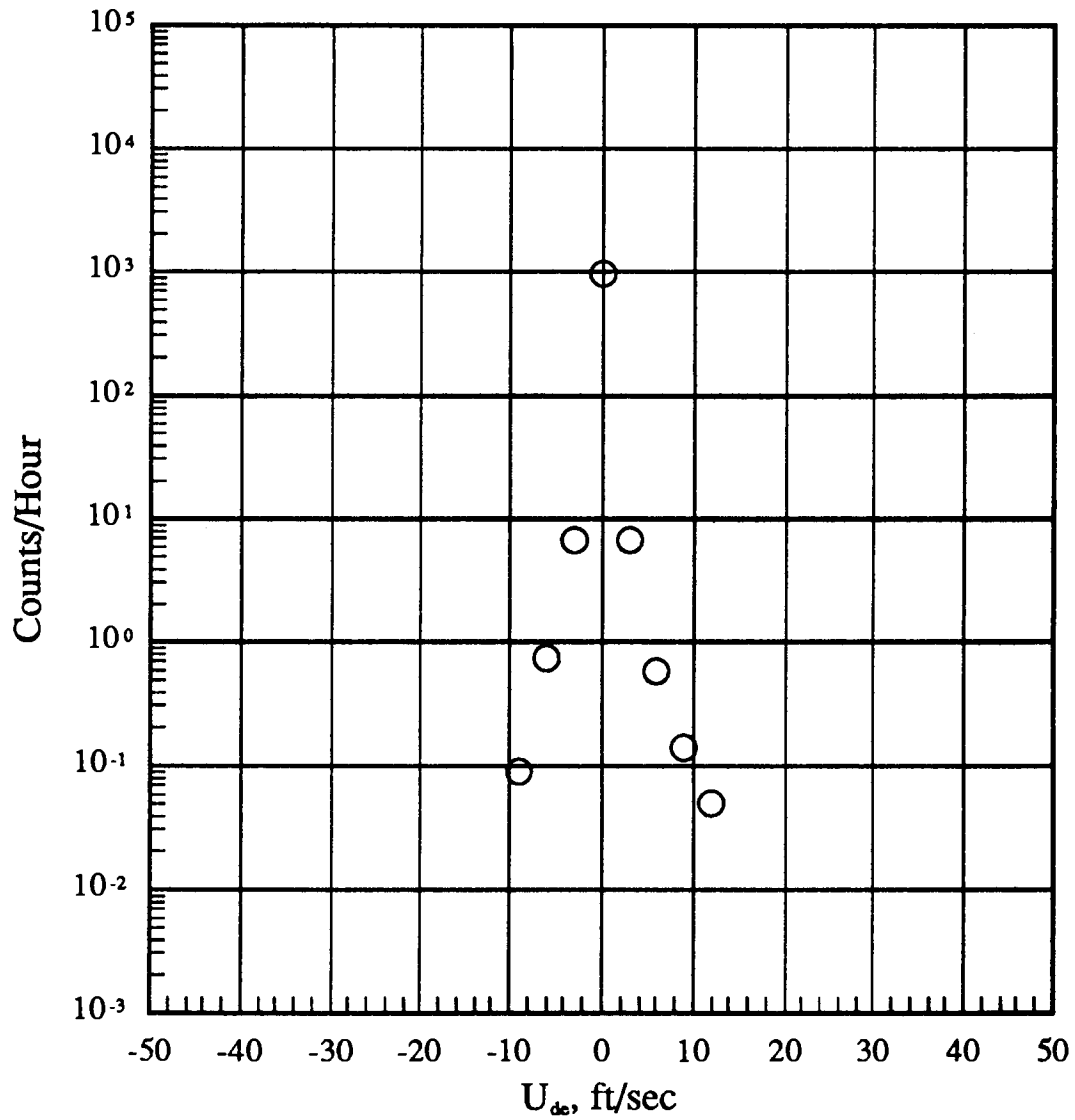
Total Flights	442
Total Hours	54.88
Total Miles	18760



(d) 9500 to 14500 feet altitude

Figure 15.- Continued.

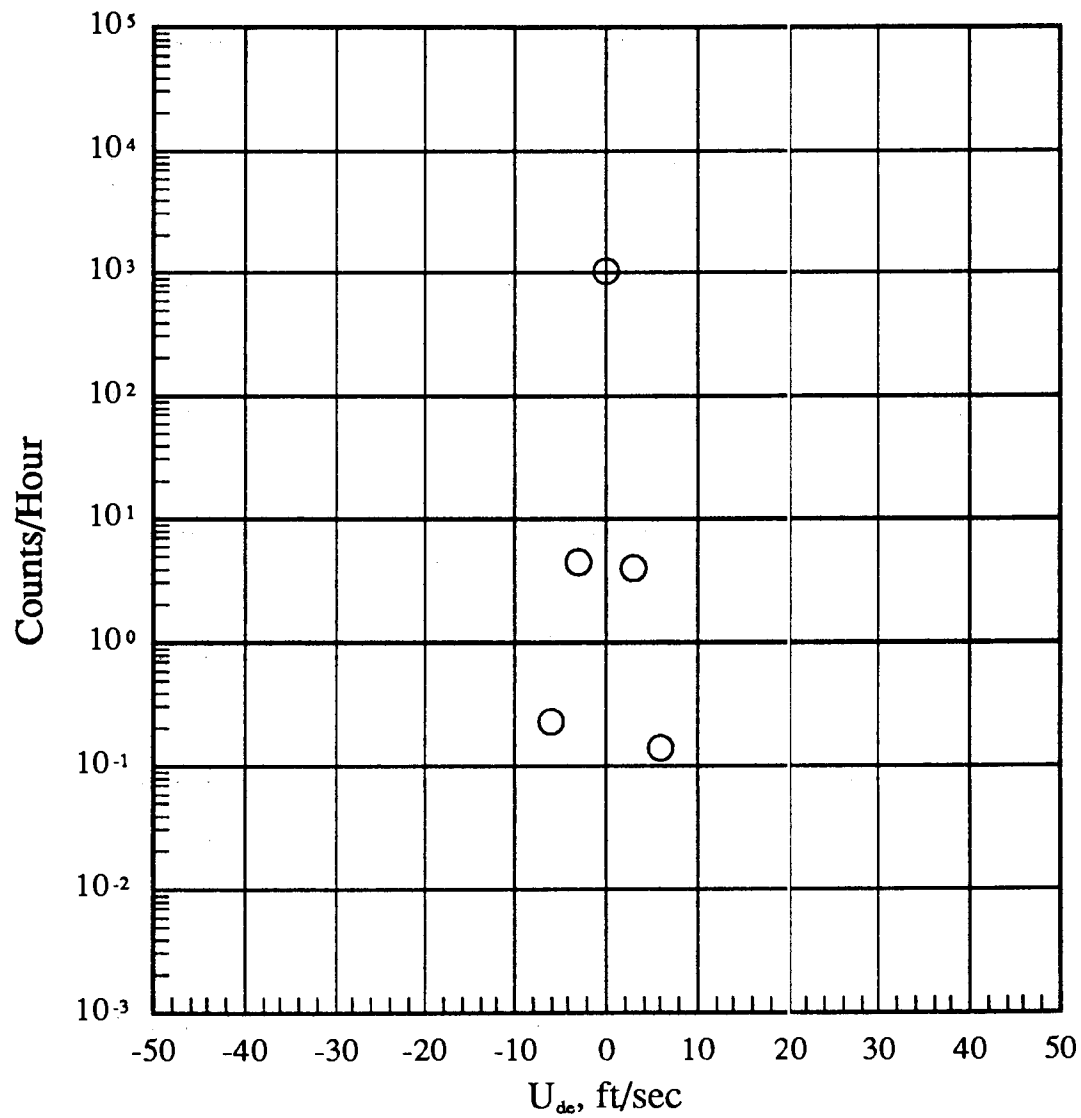
Total Flights 442
Total Hours 43.43
Total Miles 17398



(e) 14500 to 19500 feet altitude

Figure 15.- Continued.

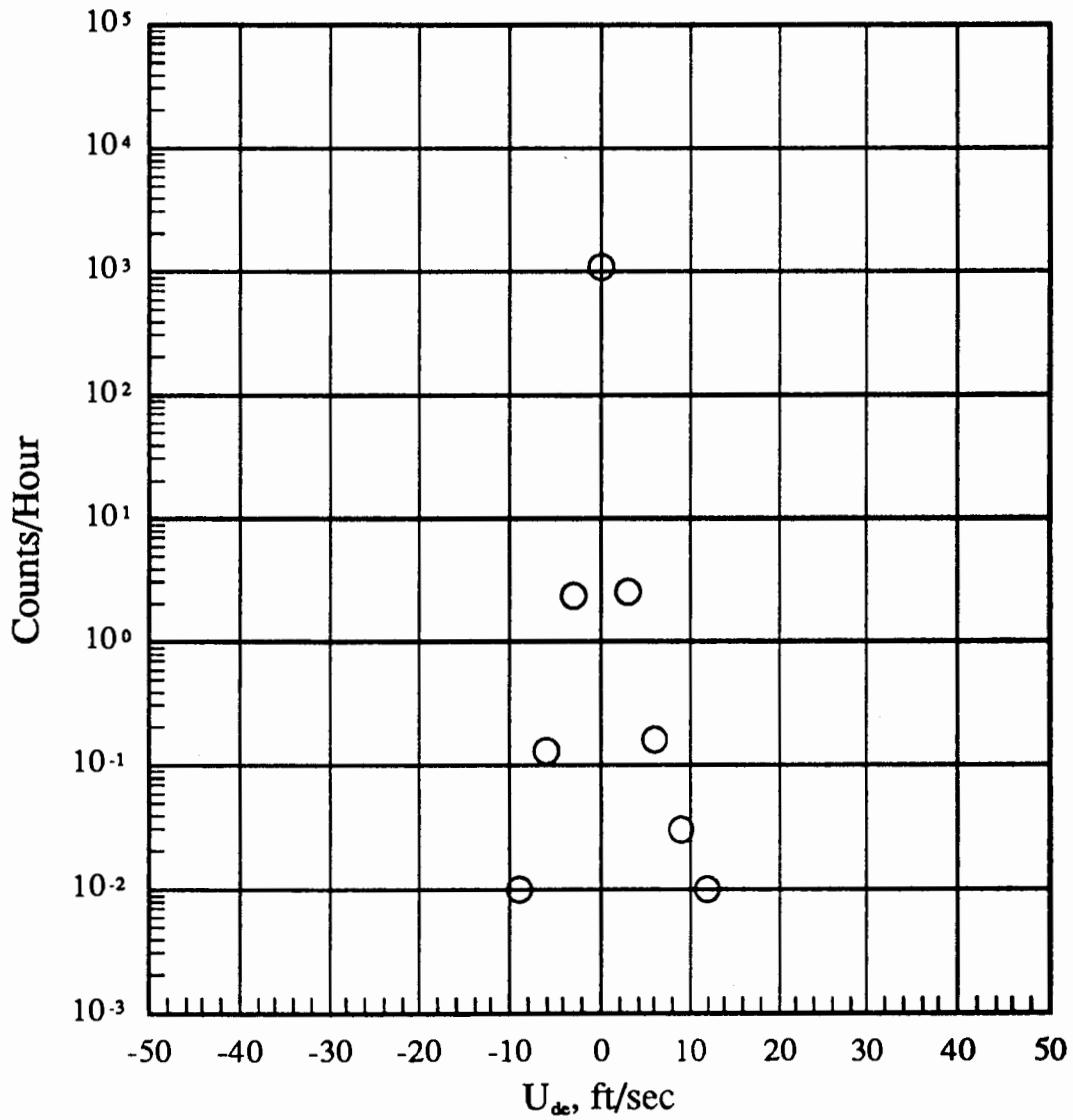
Total Flights	442
Total Hours	48.52
Total Miles	21055



(f) 19500 to 24500 feet altitude

Figure 15.- Continued.

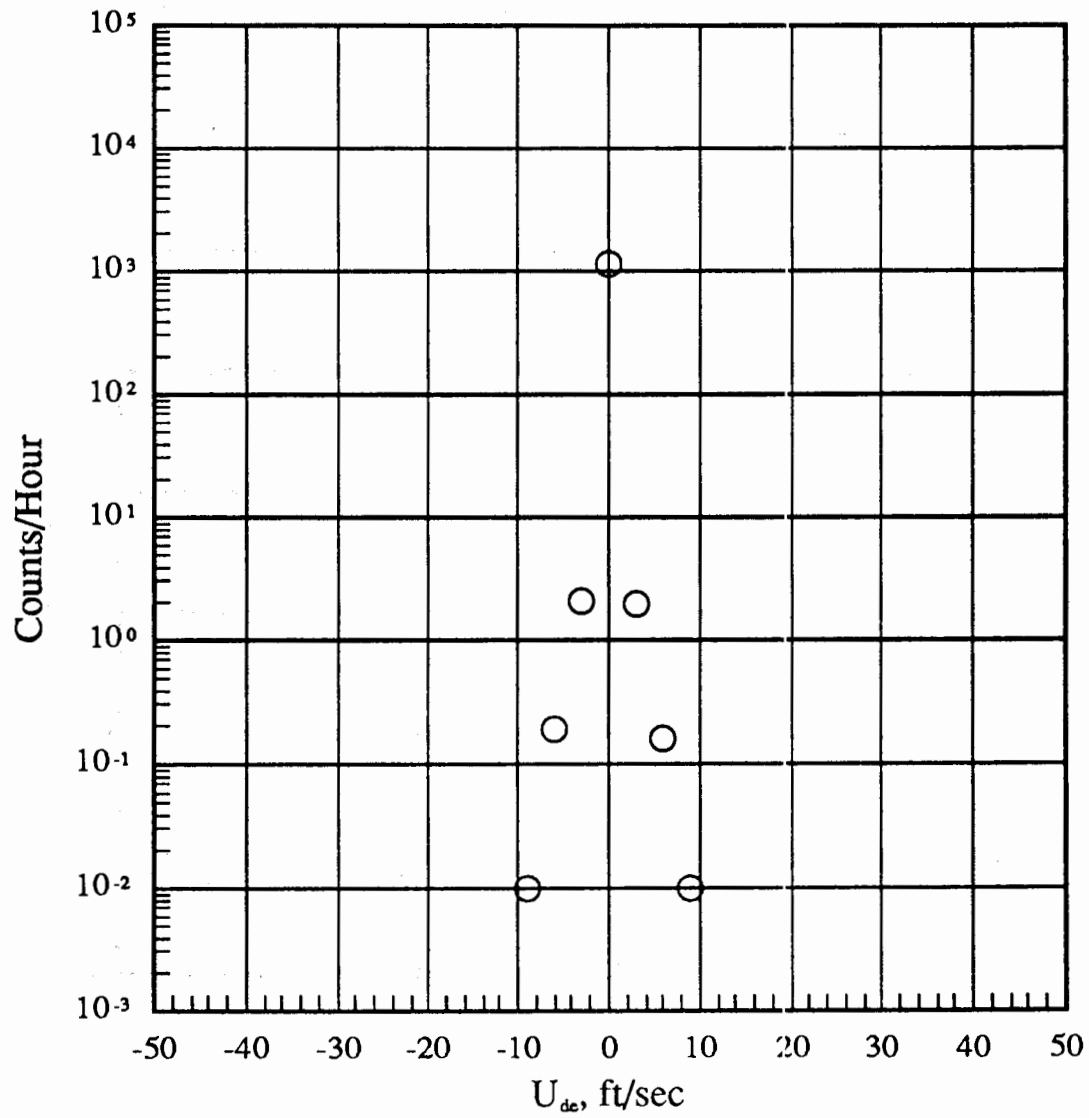
Total Flights 442
Total Hours 79.06
Total Miles 36267



(g) 24500 to 29500 feet altitude

Figure 15.- Continued.

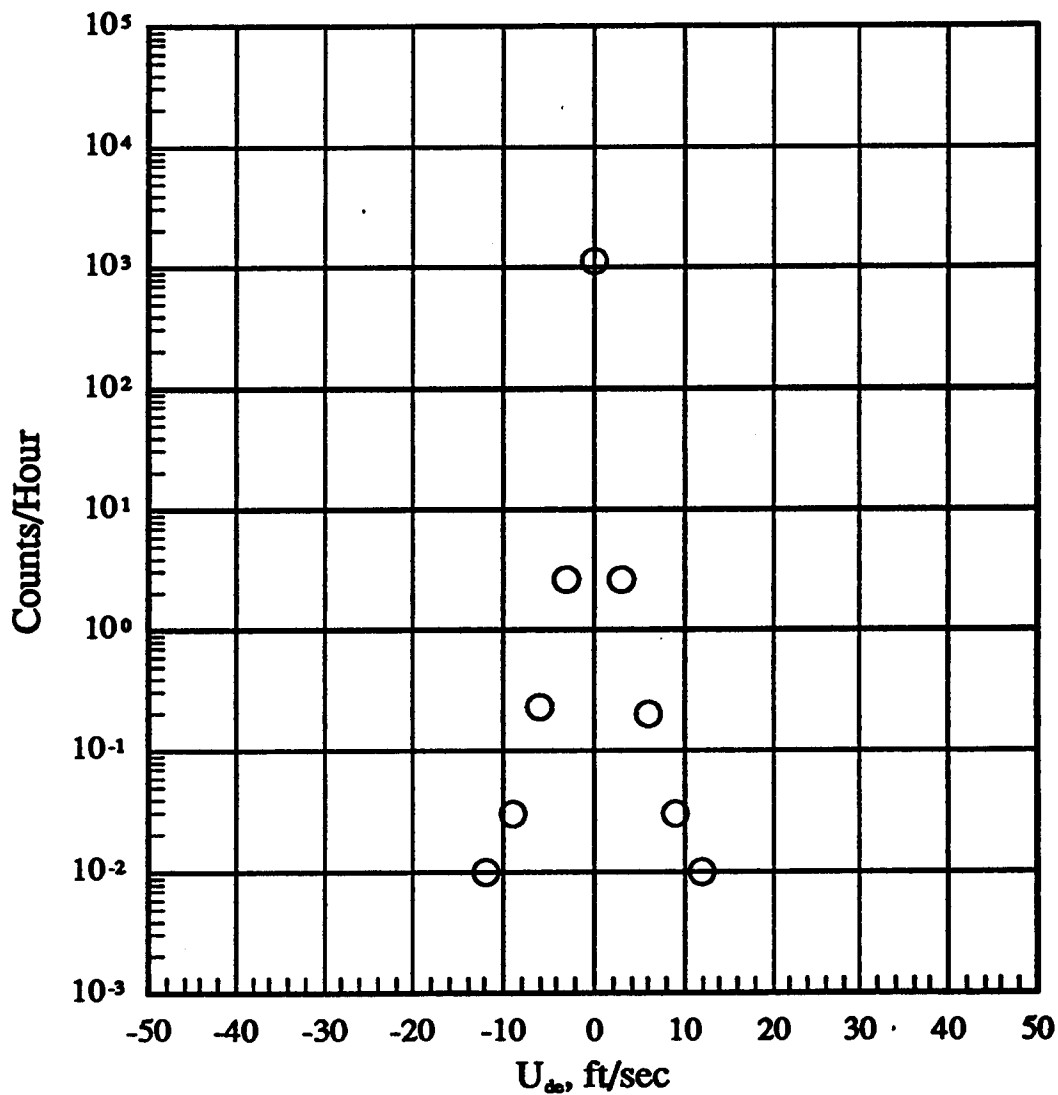
Total Flights 442
Total Hours 273.34
Total Miles 133304



(h) 29500 to 34500 feet altitude

Figure 15.- Continued.

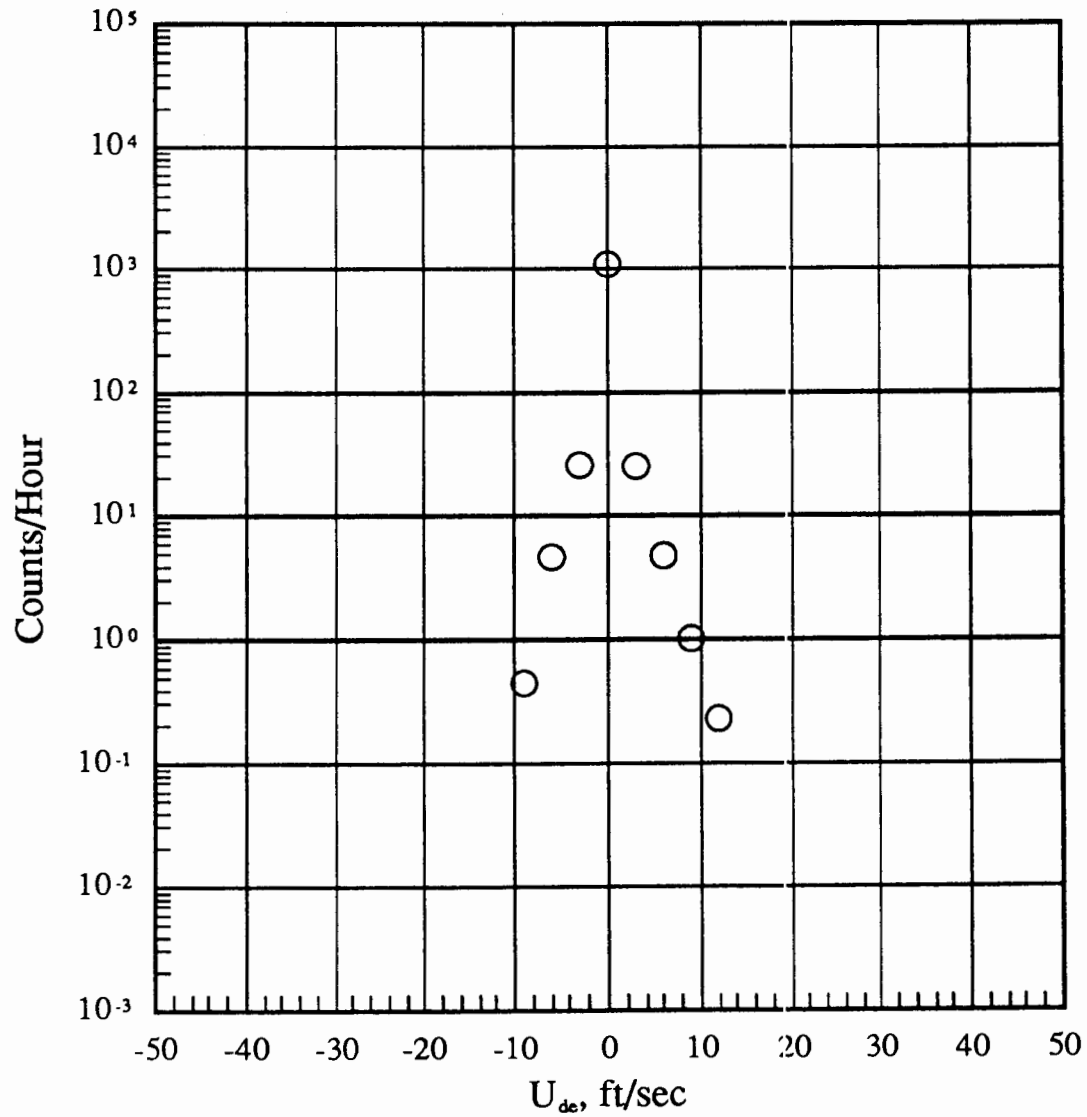
Total Flights	442
Total Hours	1065.45
Total Miles	516184



(i) 34500 to 39500 feet altitude

Figure 15.- Continued.

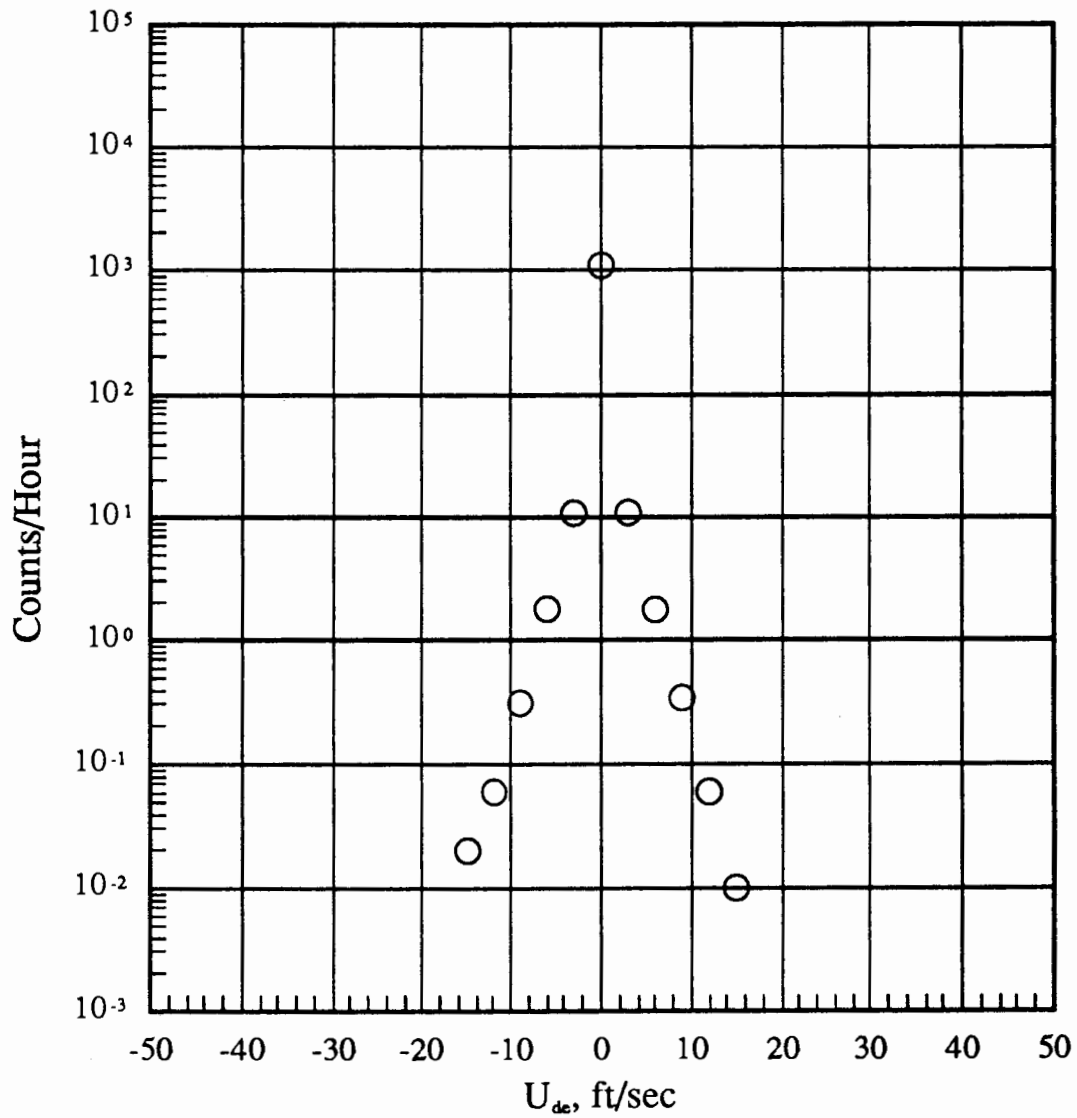
Total Flights	442
Total Hours	8.81
Total Miles	4282



(j) 39500 to 44500 feet altitude

Figure 15.- Continued.

Total Flights 442
Total Hours 1688.83
Total Miles 772613



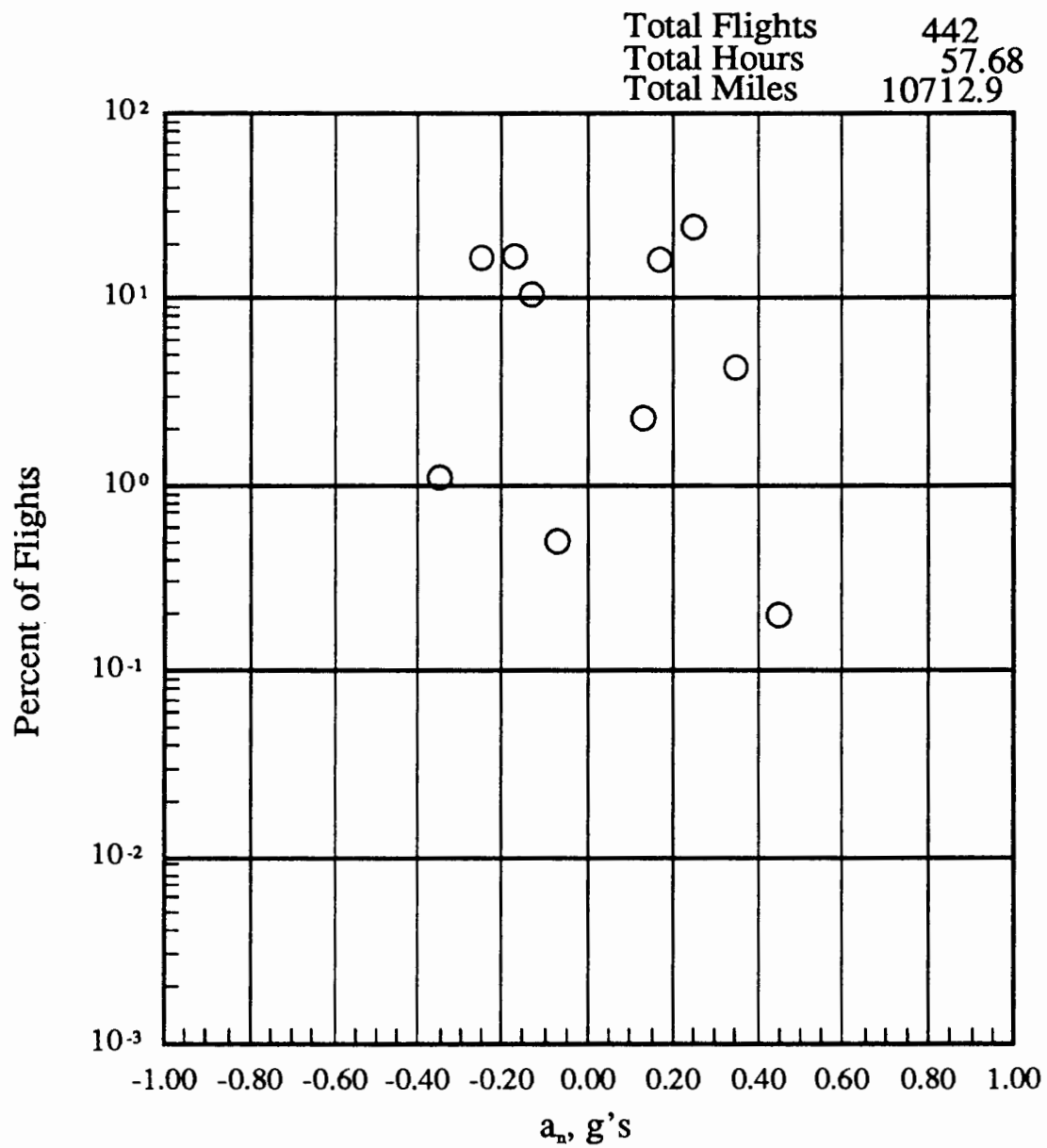
(k) -500 to 44500 feet altitude

Figure 15.- Concluded

PRESSURE ALTITUDE BANDS											
MAXIMUM a_n LEVEL FOR EACH FLIGHT g's FROM TO		-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
1.60	1.80	0	0	0	0	0	0	0	0	0	0
1.40	1.60	0	0	0	0	0	0	0	0	0	0
1.20	1.40	0	0	0	0	0	0	0	0	0	0
1.00	1.20	0	0	0	0	0	0	0	0	0	0
.80	1.00	0	0	0	0	0	0	0	0	0	0
.70	0.80	0	0	0	0	0	0	0	0	0	0
.60	0.70	0	0	0	0	0	0	0	0	0	0
.50	0.60	0	0.2	0	0	0	0.2	0.5	0	0.9	0.9
.40	0.50	0.2	0.2	0.5	0.2	0.2	0	0.7	0.2	2.3	2.3
.30	0.40	4.3	4.1	0.7	0.2	0	0.2	1.6	0.2	11.5	11.5
.20	0.30	24.4	12.0	3.6	0.9	0.9	1.1	3.6	0	48.4	48.4
.15	0.20	16.3	6.3	1.8	1.4	0	1.1	0.9	2.0	30.1	30.1
.10	0.15	2.3	1.6	1.6	0	0	0.2	0.5	0.7	6.8	6.8
.05	0.10	0	0	0	0	0	0	0	0	0	0
-.05	-0.10	0.5	0.2	0	0.2	0	0	0.2	0	1.1	1.1
-.10	-0.15	10.6	1.6	0.9	0	0.2	0.5	0.7	0.2	17.4	17.4
-.15	-0.20	17.0	6.3	2.9	1.1	0.9	0.9	2.7	0.2	35.1	35.1
-.20	-0.30	16.7	9.0	1.6	1.1	0.5	0.5	1.6	0	39.1	39.1
-.30	-0.40	1.1	2.5	0.5	0	0	0	0.2	1.1	5.4	5.4
-.40	-0.50	0	0	0	0	0	0	0.2	0.7	1.1	1.1
-.50	-0.60	0	0.2	0	0	0	0	0	0.2	0.5	0.5
-.60	-0.70	0	0	0	0	0	0	0	0	0	0
-.70	-0.80	0	0	0	0	0	0	0	0	0	0
-.80	-1.00	0	0	0	0	0	0	0	0	0.2	0.2
-1.00	-1.20	0	0	0	0	0	0	0	0	0	0
-1.20	-1.40	0	0	0	0	0	0	0	0	0	0
-1.40	-1.60	0	0	0	0	0	0	0	0	0	0
-1.60	-1.80	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT		57.68	57.61	54.89	43.48	48.52	79.06	273.34	1065.45	8.81	1688.83
FLIGHT MILES @ ALT		10712.91	14655.73	18759.60	17393.17	21054.53	36267.13	133304.11	516183.66	4282.14	772612.98
TOTAL FLIGHTS										442	

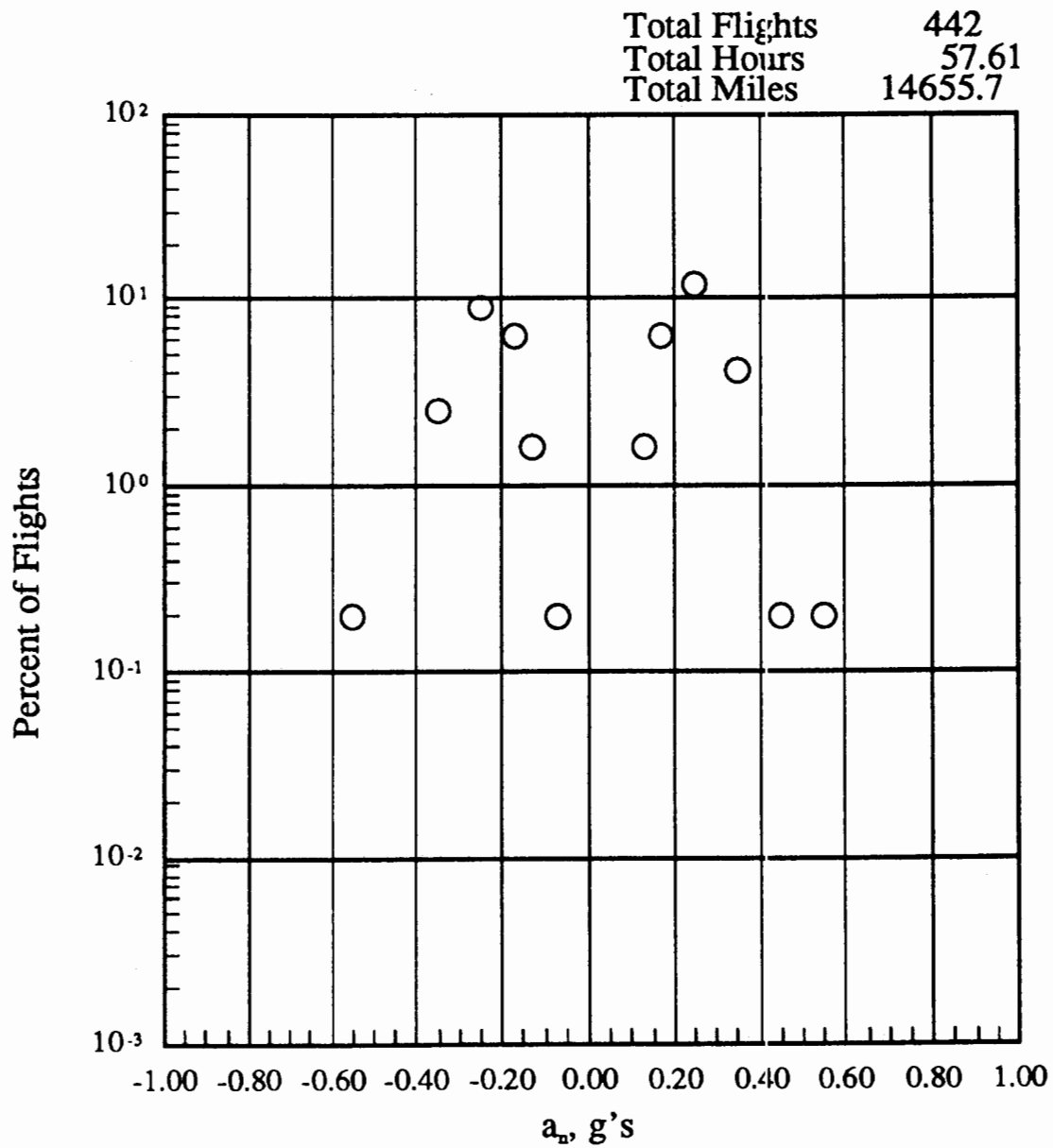
(a) Percent of flights where peak positive and negative a_n per flight occurs within pressure altitude bands, any flap

Figure 16.- Peak positive and negative a_n vs altitude.



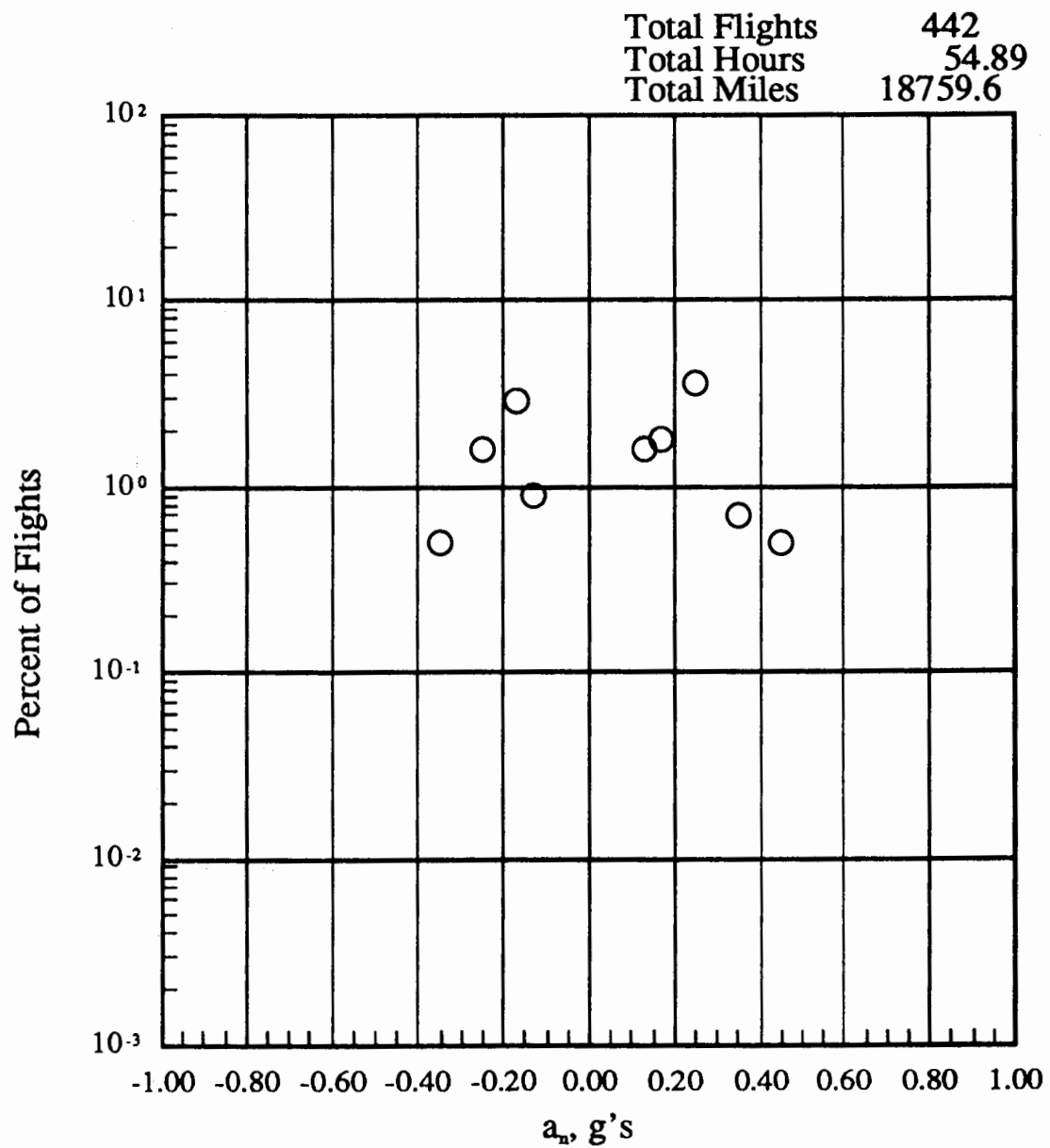
(b) -500 to 4500 feet altitude

Figure 16.- Continued.



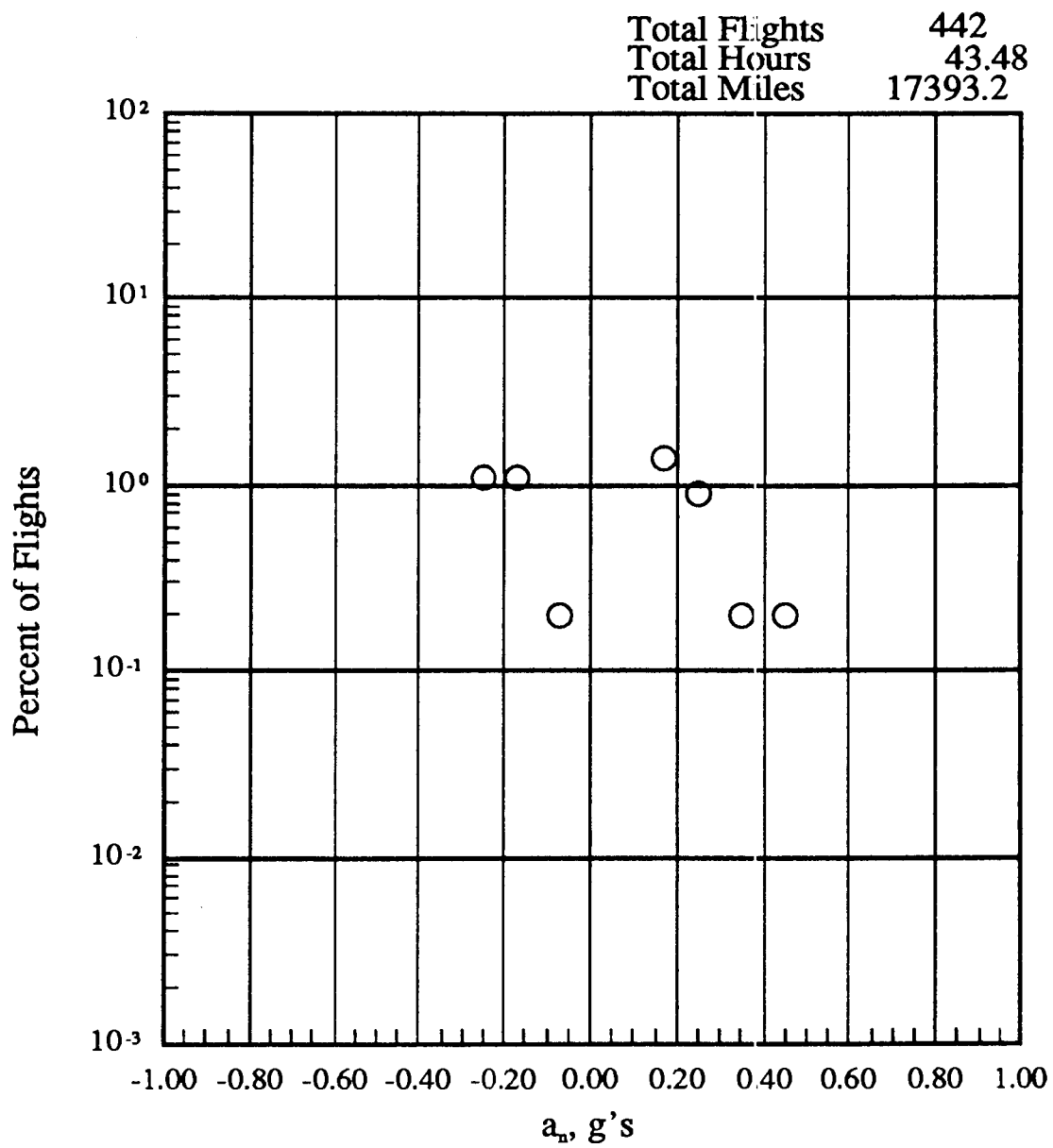
(c) 4500 to 9500 feet altitude

Figure 16.- Continued.



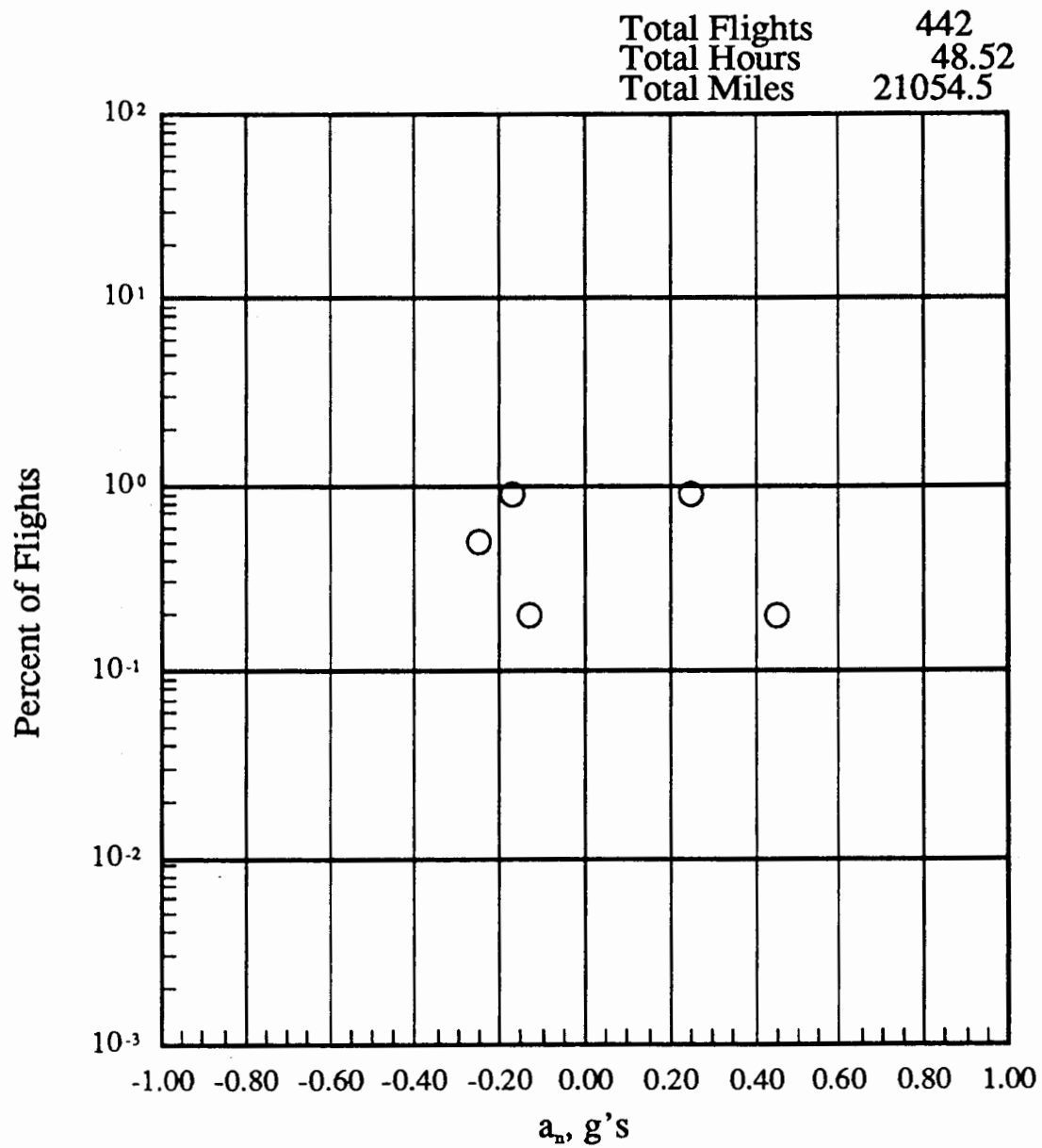
(d) 9500 to 14500 feet altitude

Figure 16.- Continued.



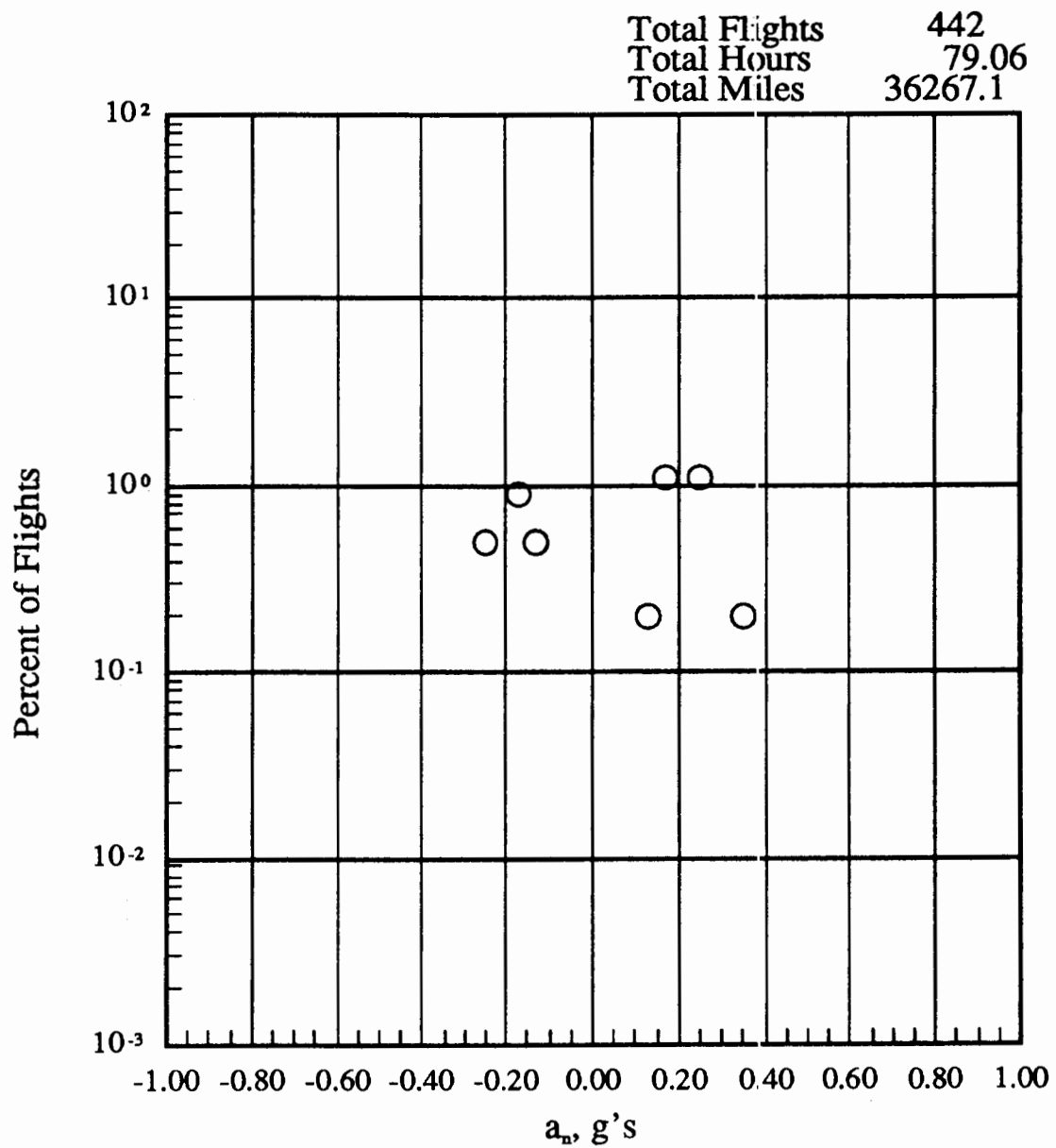
(e) 14500 to 19500 feet altitude

Figure 16.- Continued.



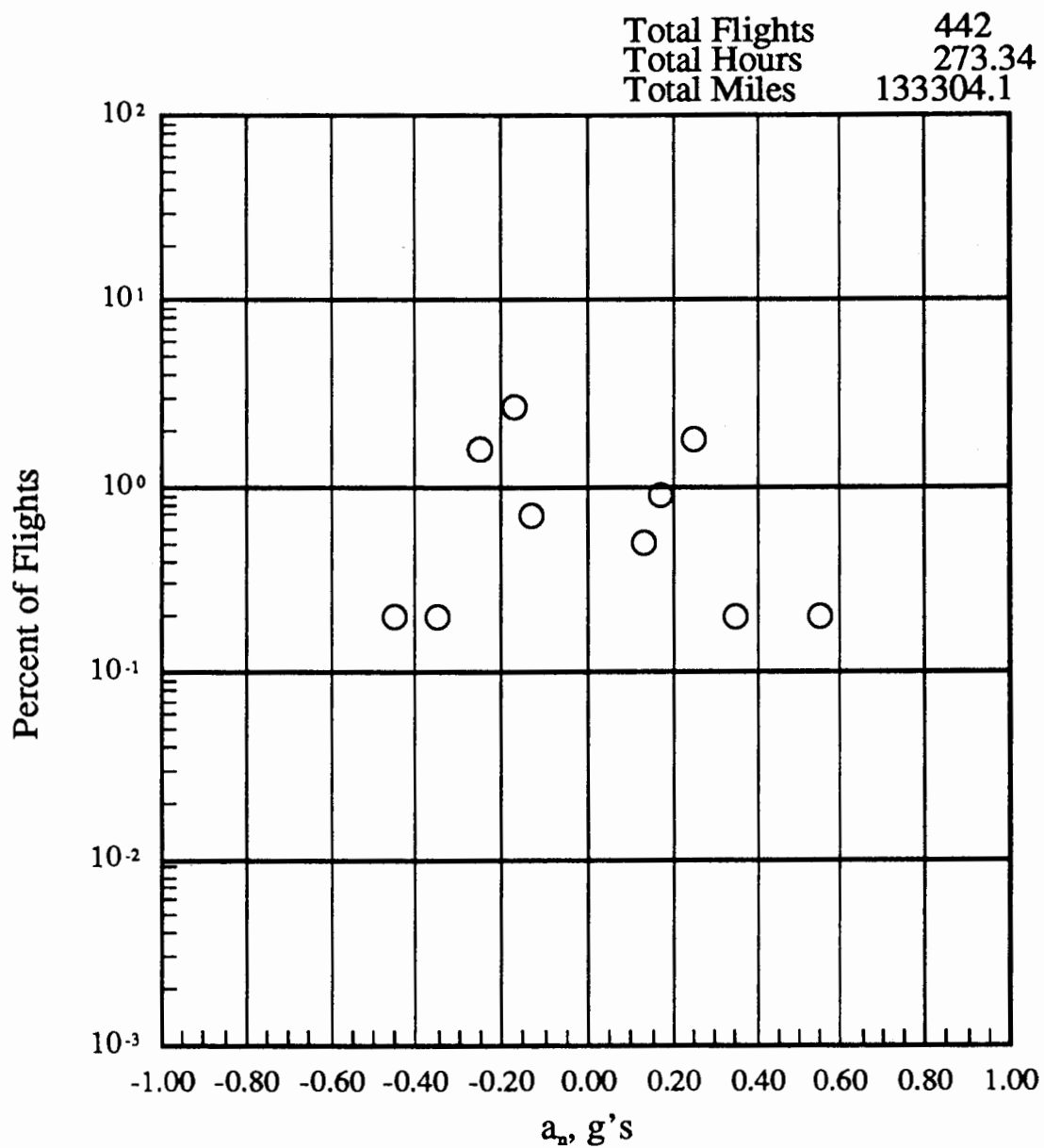
(f) 19500 to 24500 feet altitude

Figure 16.- Continued.



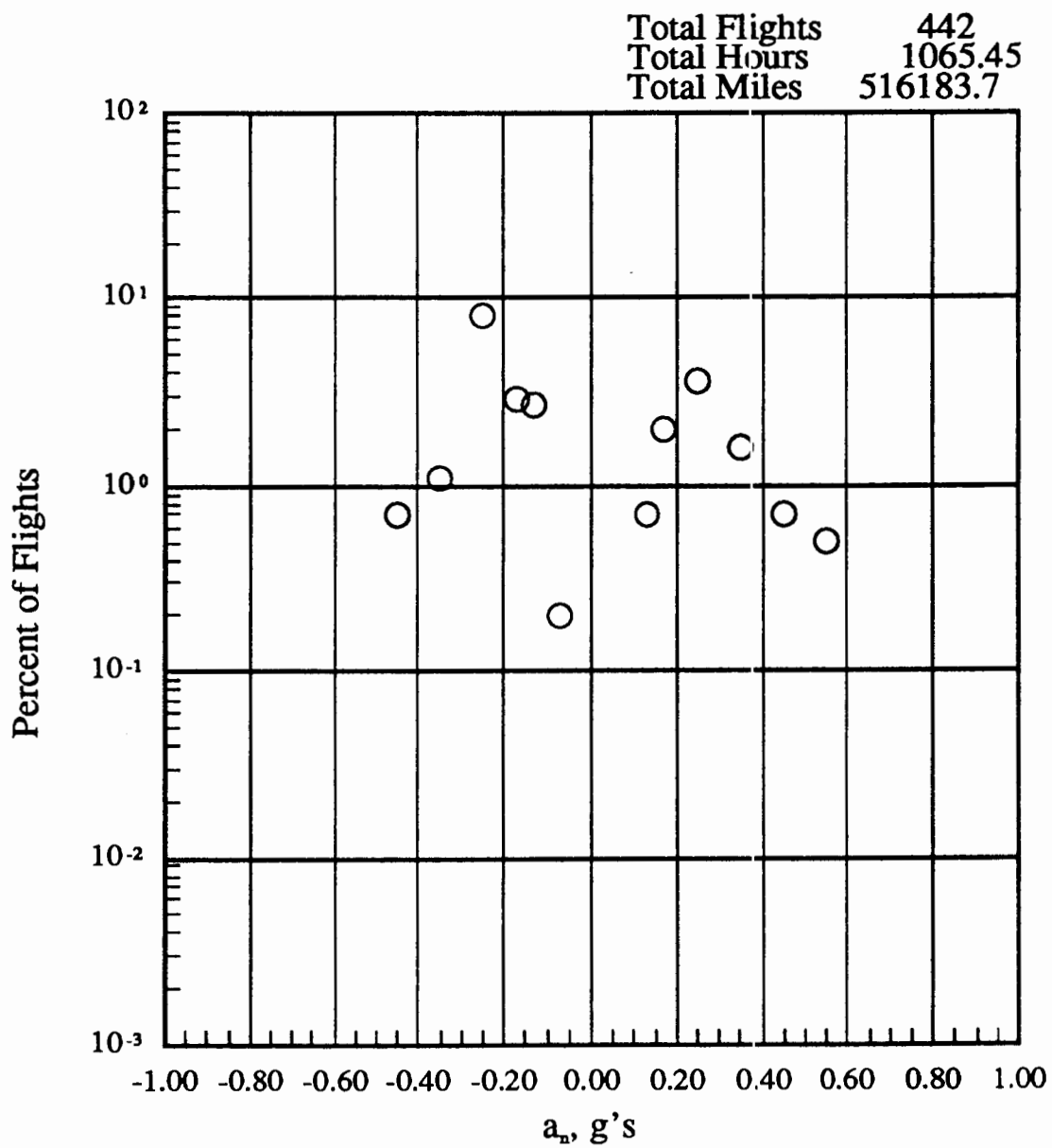
(g) 24500 to 29500 feet altitude

Figure 16.- Continued.



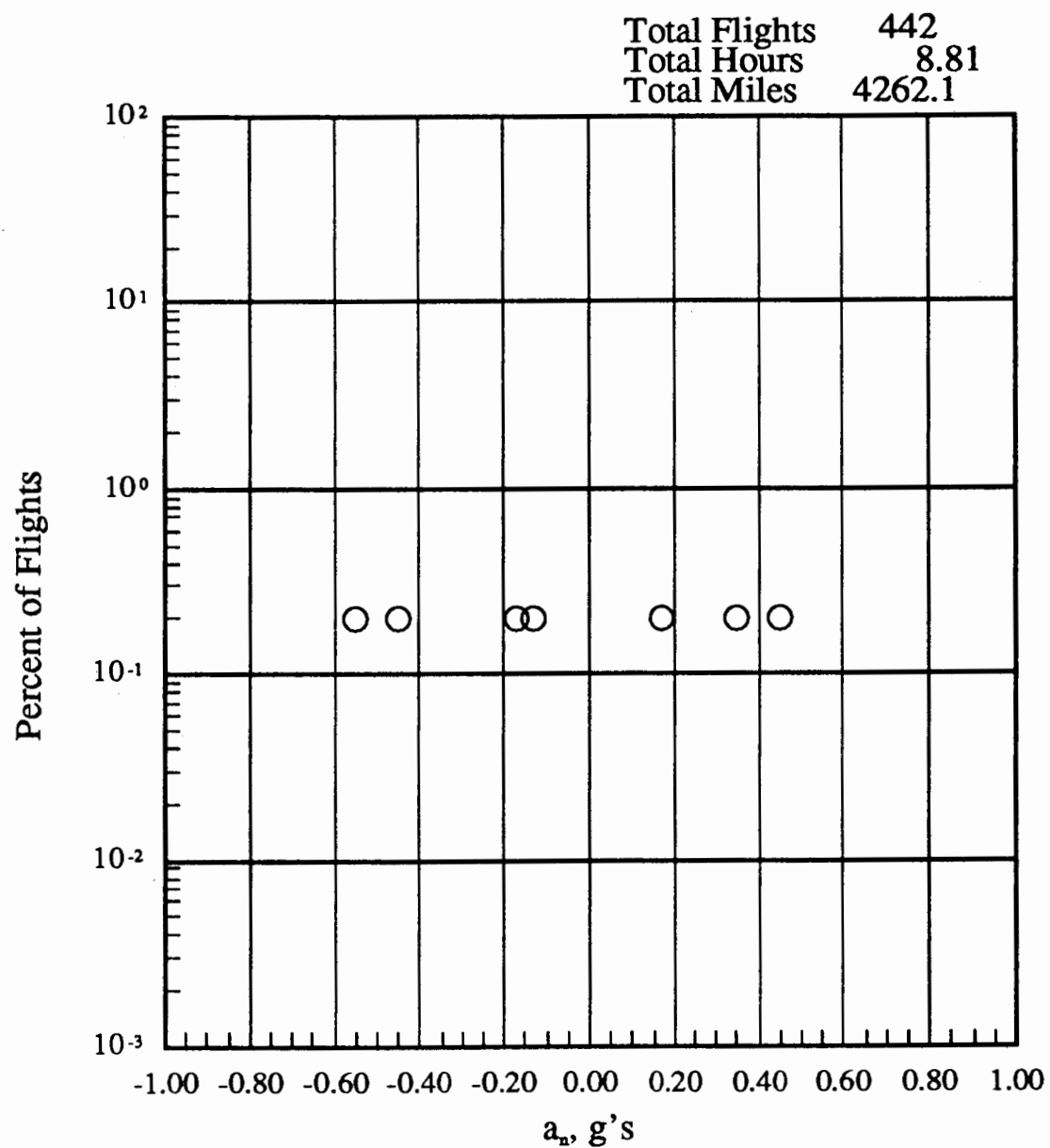
(h) 29500 to 34500 feet altitude

Figure 16.- Continued.



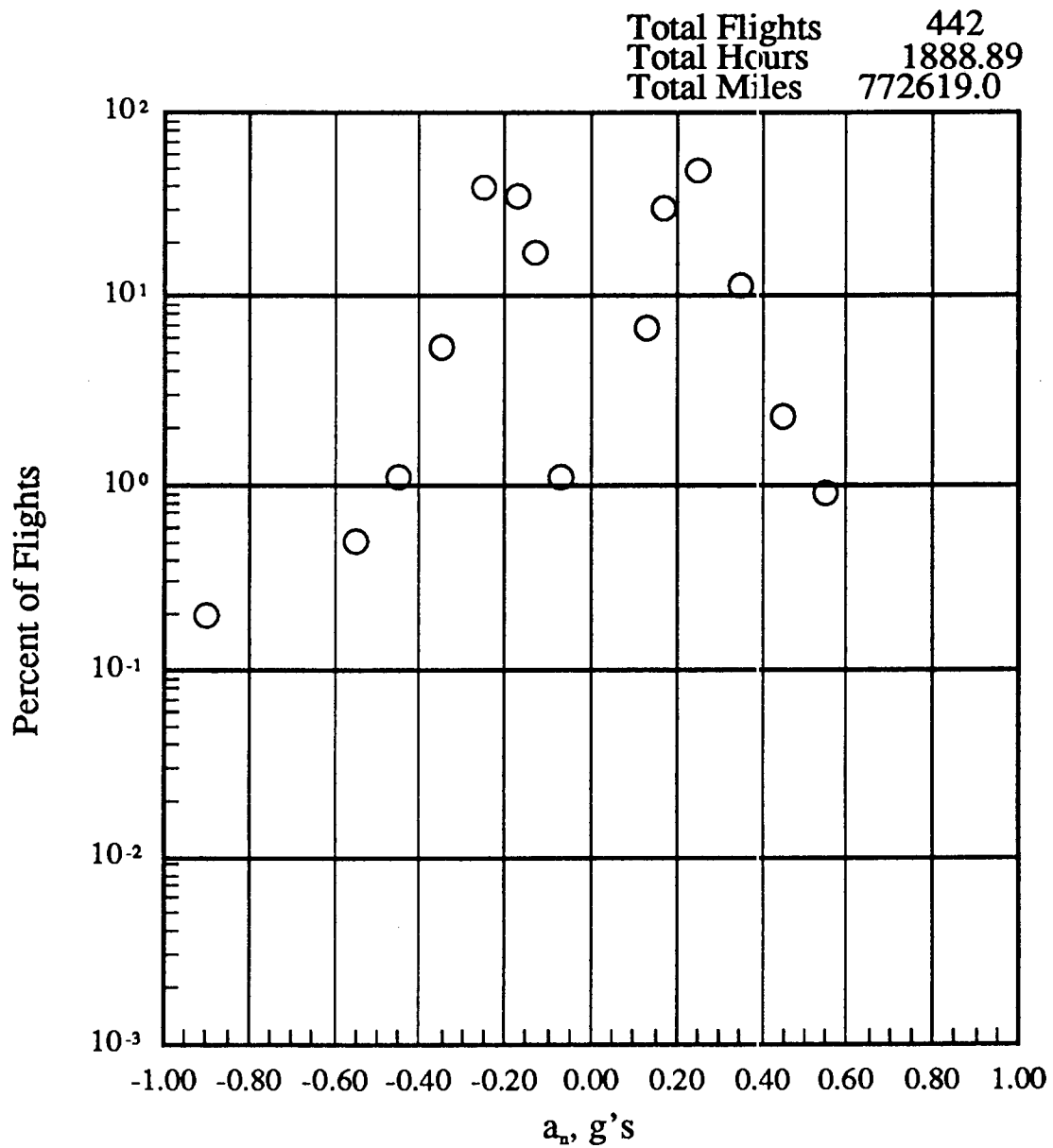
(i) 34500 to 39500 feet altitude

Figure 16.- Continued.



(j) 39500 to 44500 feet altitude

Figure 16.- Continued.



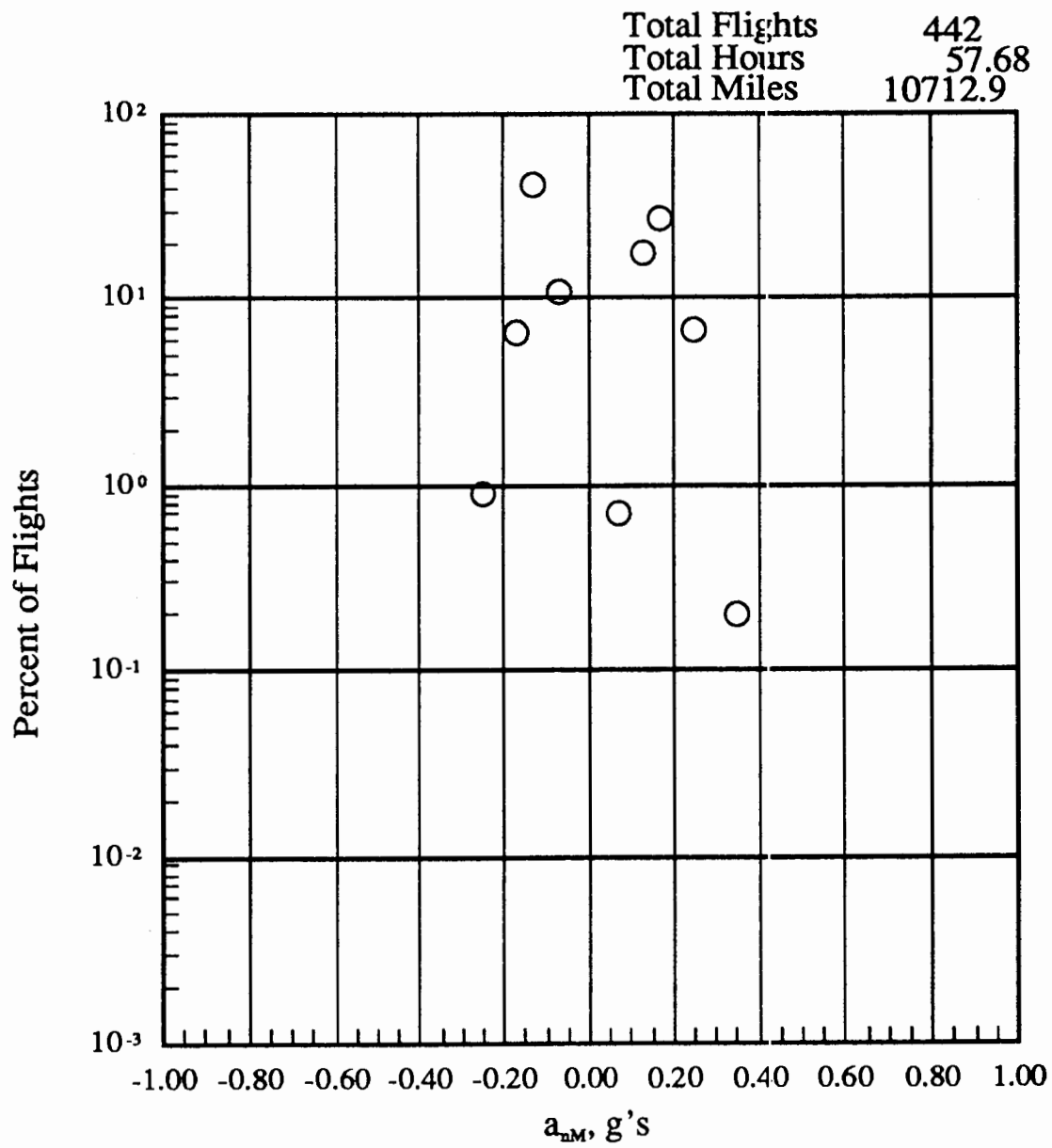
(k) -500 to 44500 feet altitude

Figure 16.- Concluded.

PRESSURE ALTITUDE BANDS											
MAXIMUM a_{NM} LEVEL FOR EACH FLIGHT g's FROM TO		-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
1.60 1.80		0	0	0	0	0	0	0	0	0	0
1.40 1.60		0	0	0	0	0	0	0	0	0	0
1.20 1.40		0	0	0	0	0	0	0	0	0	0
1.00 1.20		0	0	0	0	0	0	0	0	0	0
.80 1.00		0	0	0	0	0	0	0	0	0	0
.70 0.80		0	0	0	0	0	0	0	0	0	0
.60 0.70		0	0	0	0	0	0	0	0	0	0
.50 0.60		0	0	0	0	0	0	0	0	0	0
.40 0.50		0	0	0	0	0	0	0	0	0	0
.30 0.40		0.2	0.5	0	0	0.2	0	0	0.2	0	1.1
.20 0.30		6.8	4.5	1.6	0.2	0	0.2	0.2	0	0.2	13.8
.15 0.20		27.1	12.9	1.1	0.9	0.2	0.5	0.2	1.6	0	44.6
.10 0.15		17.6	9.7	4.8	0.9	0.5	0	0.9	1.6	0.2	36.2
.05 0.10		0.7	1.1	0.7	0	0	0.2	0.9	0.7	0	4.3
-.05 -0.10		10.9	4.1	2.3	0	0.5	0	0.5	2.0	0	20.1
-.10 -0.15		41.4	11.1	2.5	1.4	0.9	1.4	2.3	5.0	0.7	66.5
-.15 -0.20		6.6	2.7	0	0.2	0.2	0	0	1.8	0	11.5
-.20 -0.30		0.9	0.2	0	0	0	0	0	0.5	0.2	1.8
-.30 -0.40		0	0	0	0	0	0	0	0	0	0
-.40 -0.50		0	0	0	0	0	0	0	0	0	0
-.50 -0.60		0	0	0	0	0	0	0	0	0	0
-.60 -0.70		0	0	0	0	0	0	0	0	0	0
-.70 -0.80		0	0	0	0	0	0	0	0	0	0
-.80 -1.00		0	0	0	0	0	0	0	0	0	0
-1.00 -1.20		0	0	0	0	0	0	0	0	0	0
-1.20 -1.40		0	0	0	0	0	0	0	0	0	0
-1.40 -1.60		0	0	0	0	0	0	0	0	0	0
-1.60 -1.80		0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT		57.68	57.61	54.89	43.48	48.52	79.06	273.34	1065.45	8.81	1688.83
FLIGHT MILES @ ALT		10712.91	14655.73	18759.60	17393.17	21054.53	36267.13	133304.11	516183.66	4282.14	772612.98
TOTAL FLIGHTS											442

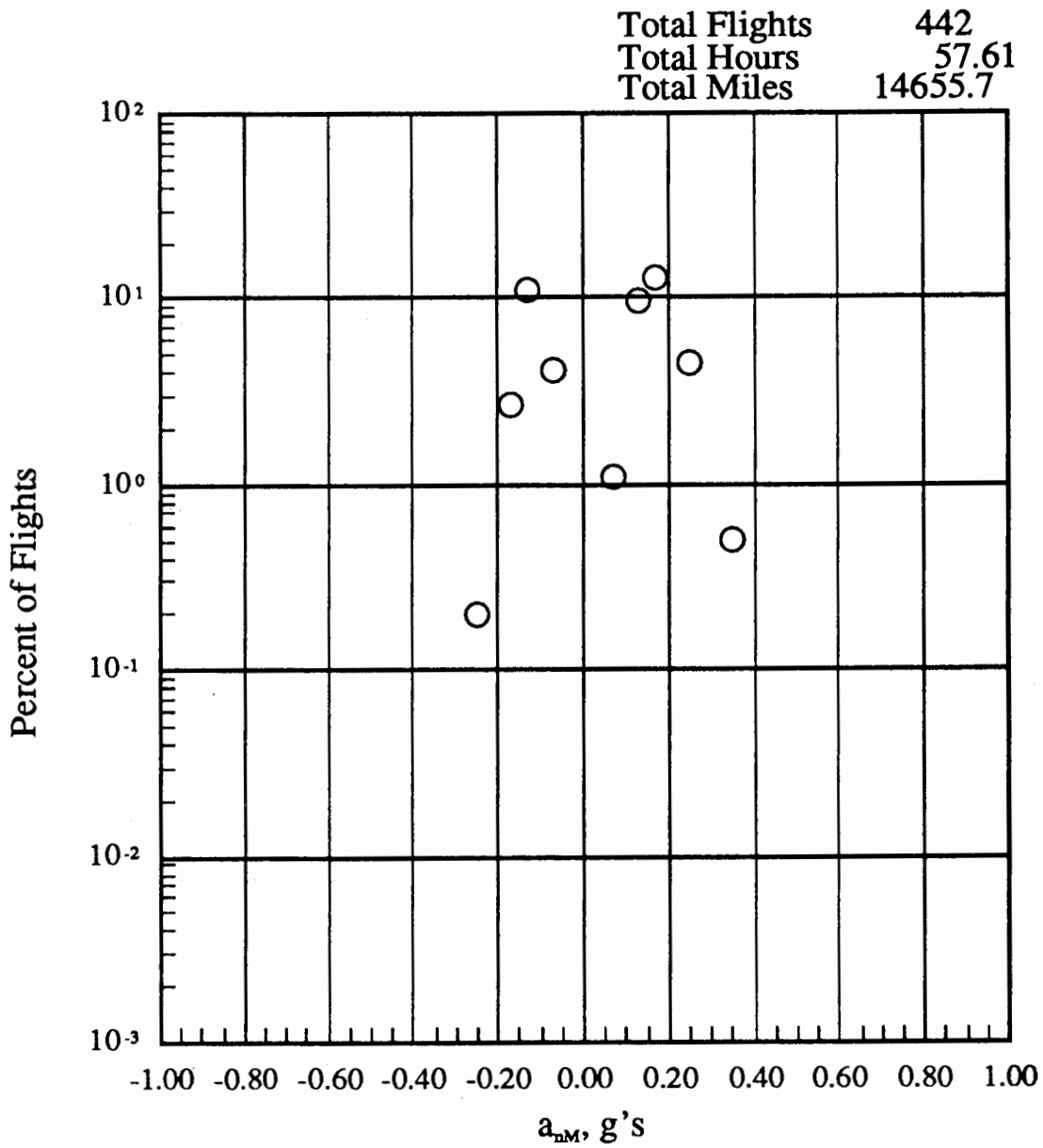
(a) Percent of flights where peak positive and negative a_{NM} per flight
occurs within pressure altitude bands, any flap

Figure 17.- Peak positive and negative a_{NM} vs altitude.



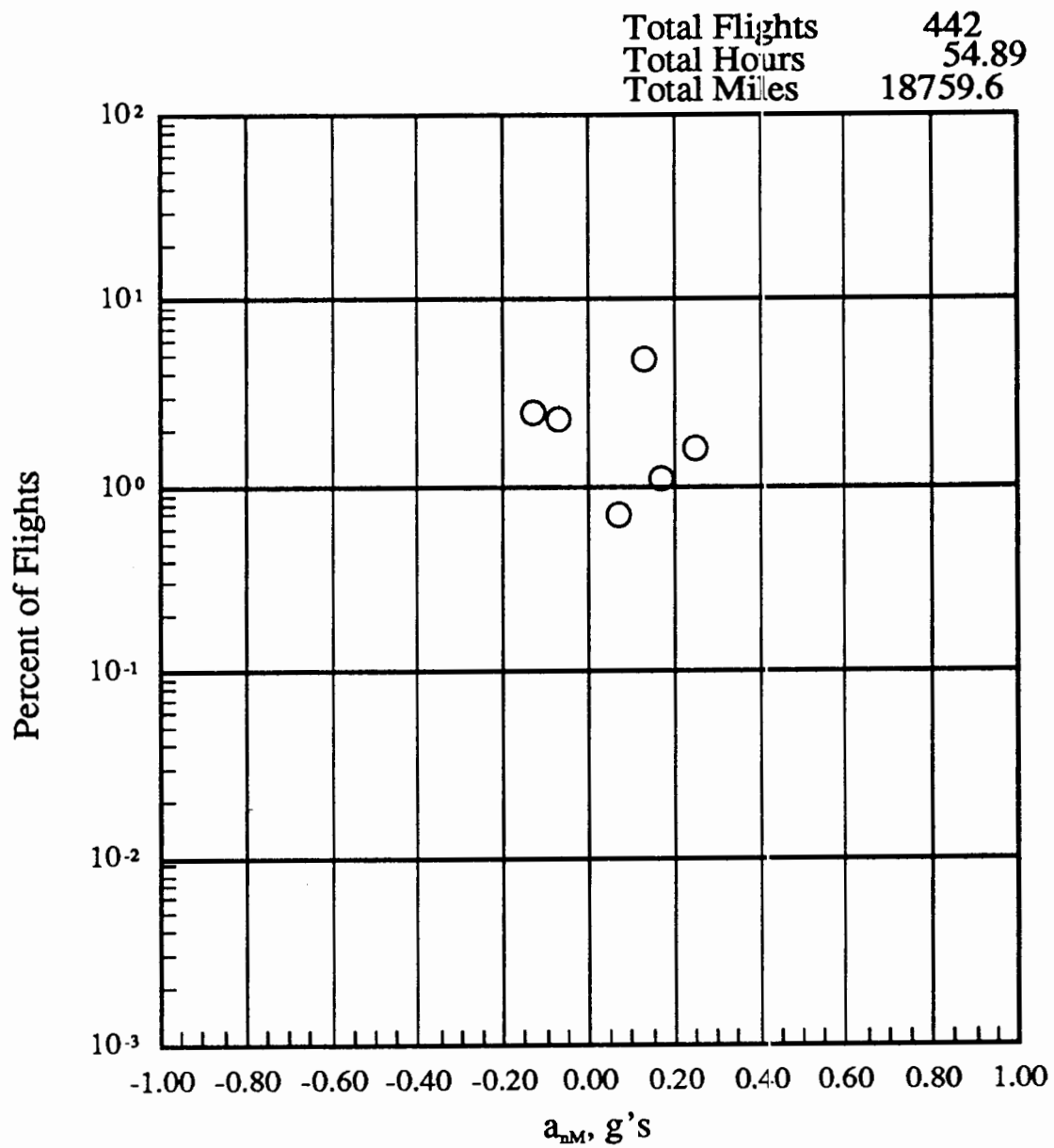
(b) -500 to 4500 feet altitude

Figure 17.- Continued.



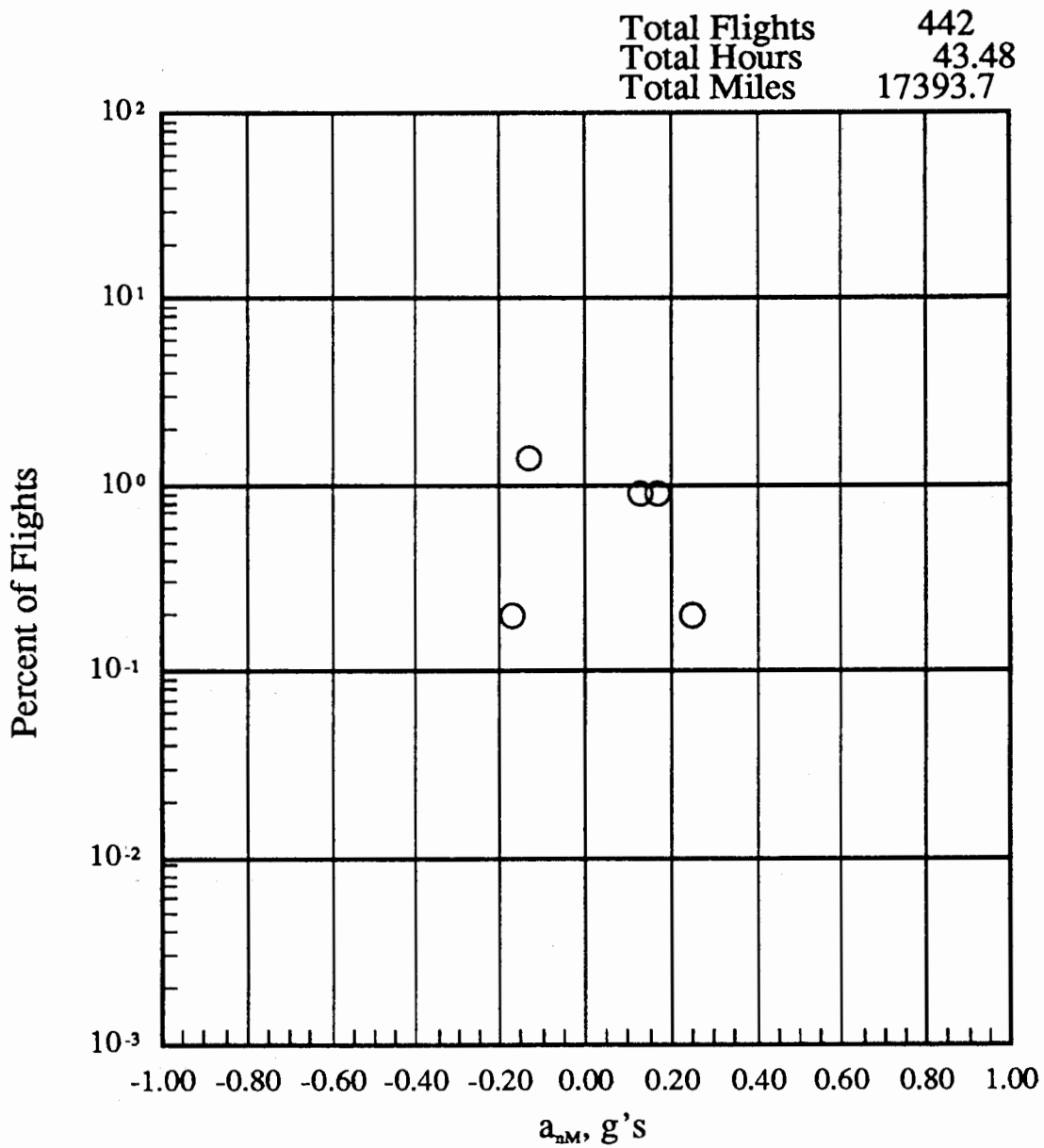
(c) 4500 to 9500 feet altitude

Figure 17.- Continued.



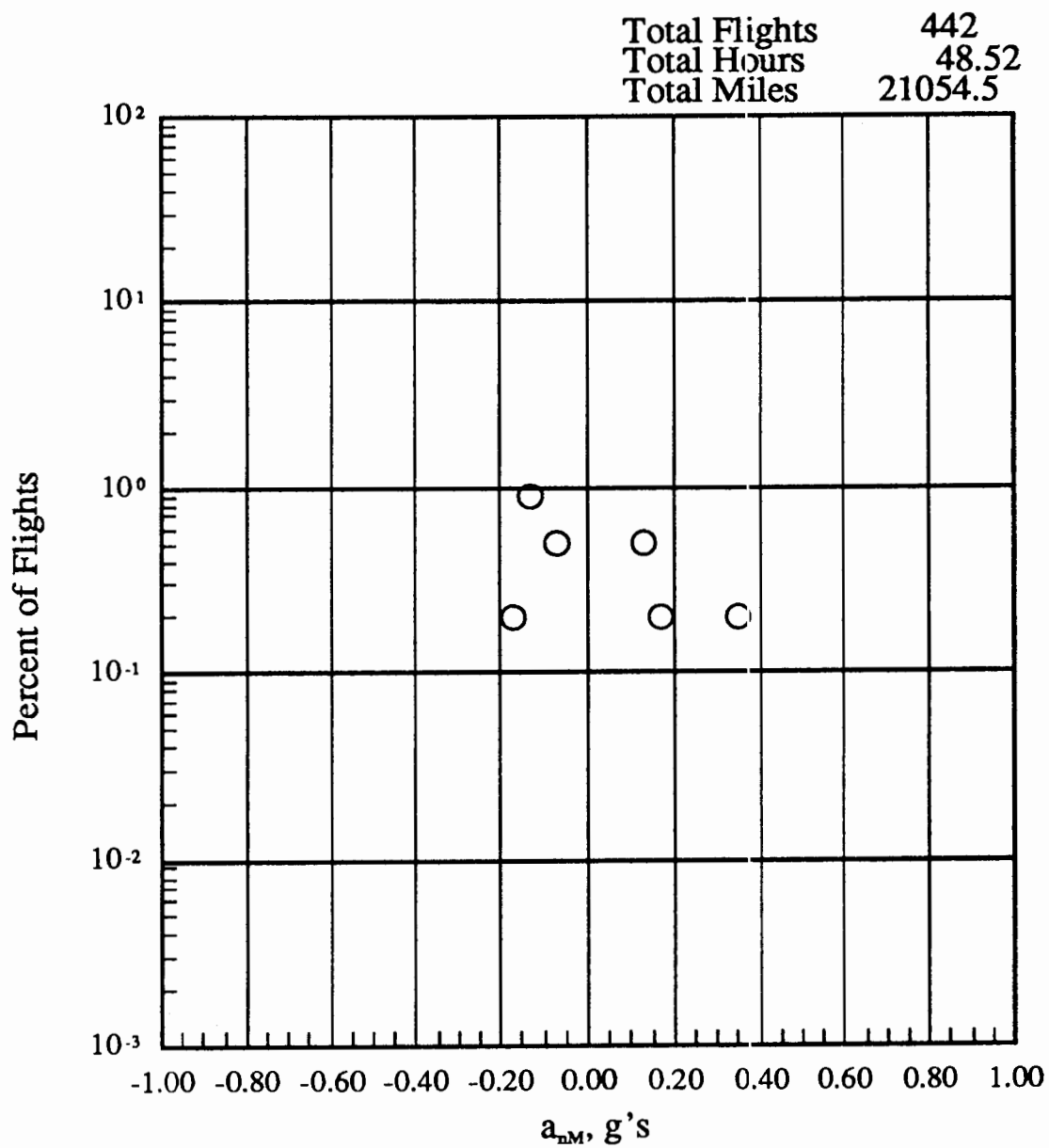
(d) 9500 to 14500 feet altitude

Figure 17.- Continued.



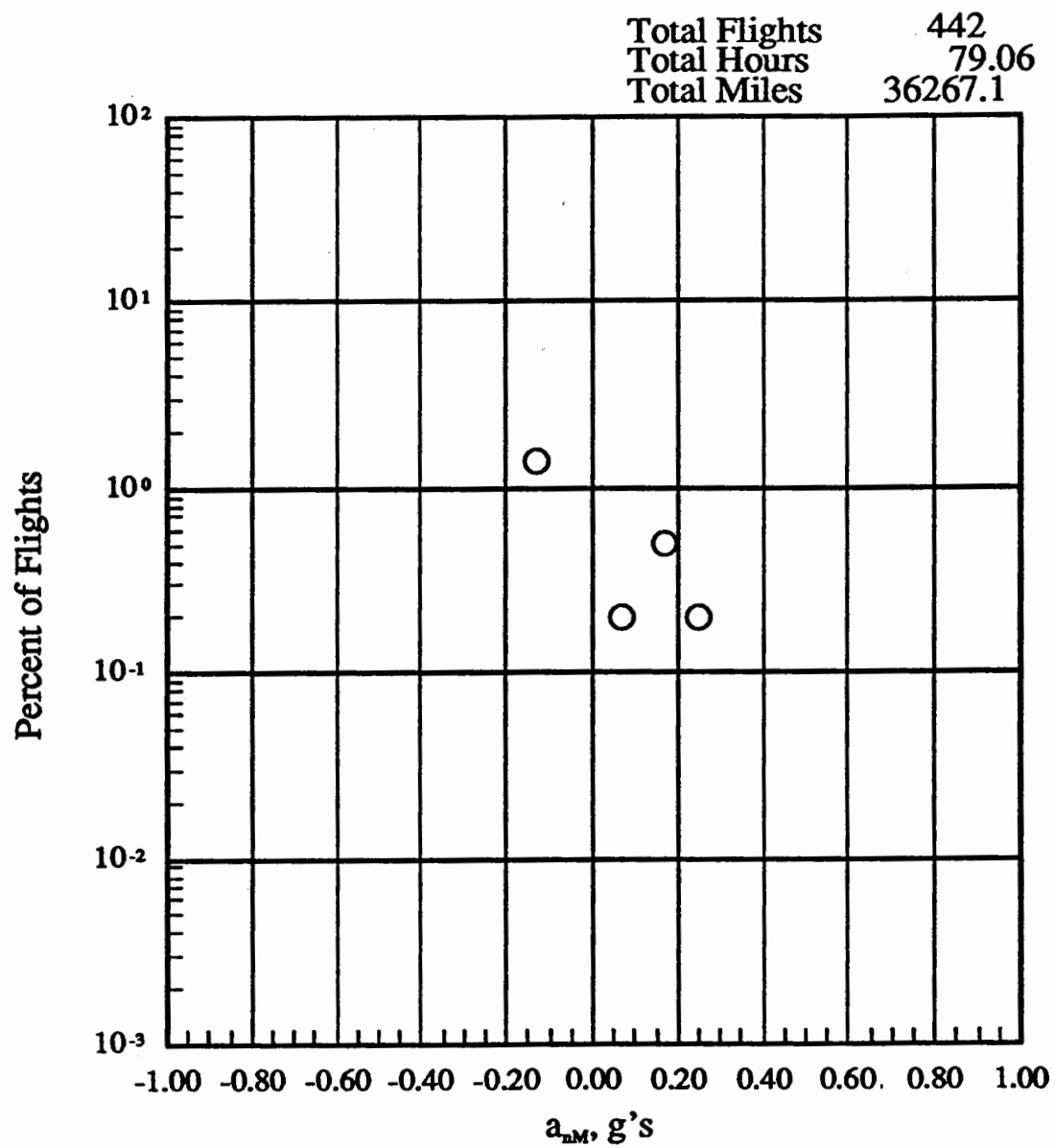
(e) 14500 to 19500 feet altitude

Figure 17.- Continued.



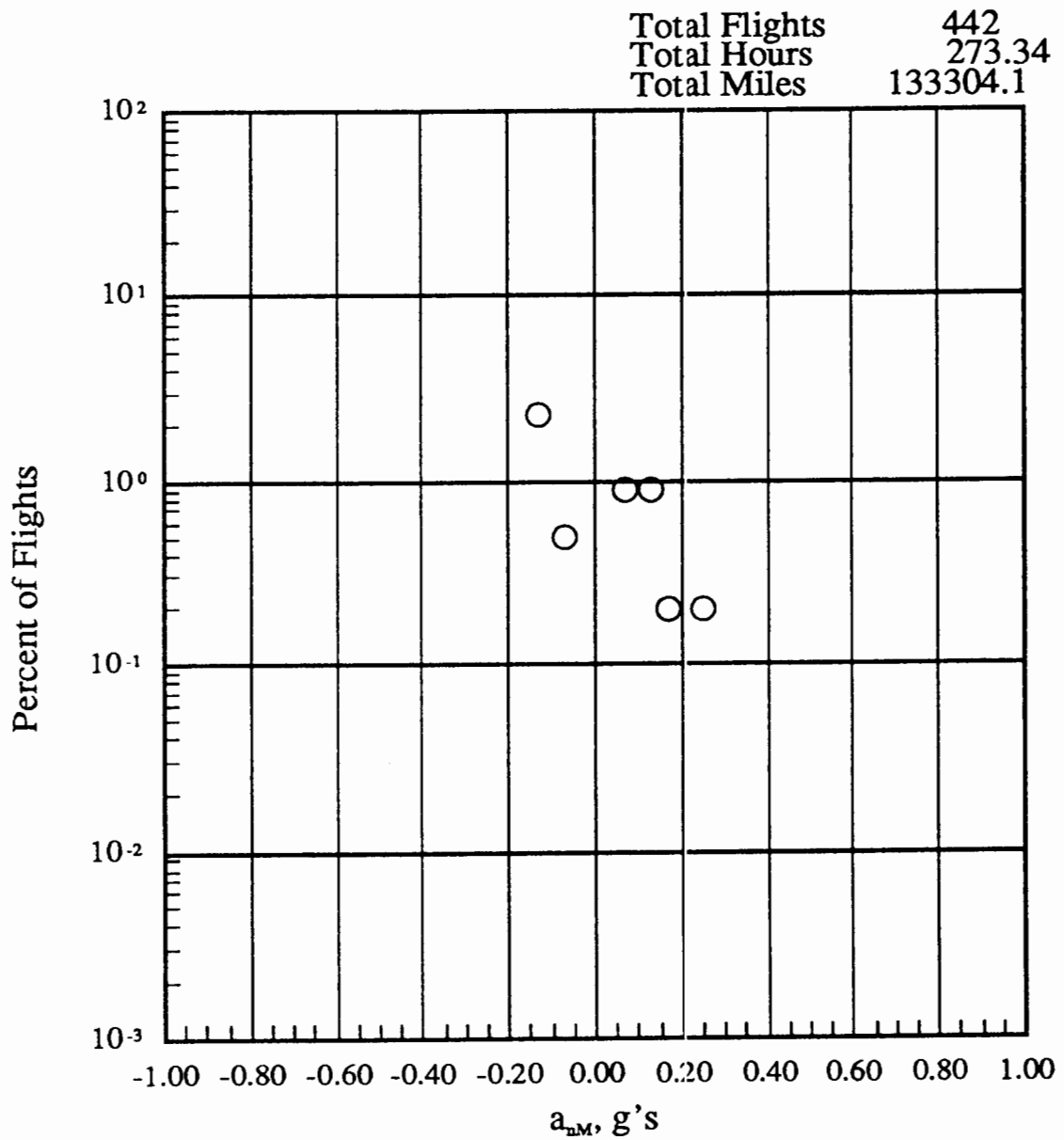
(f) 19500 to 24500 feet altitude

Figure 17.- Continued.



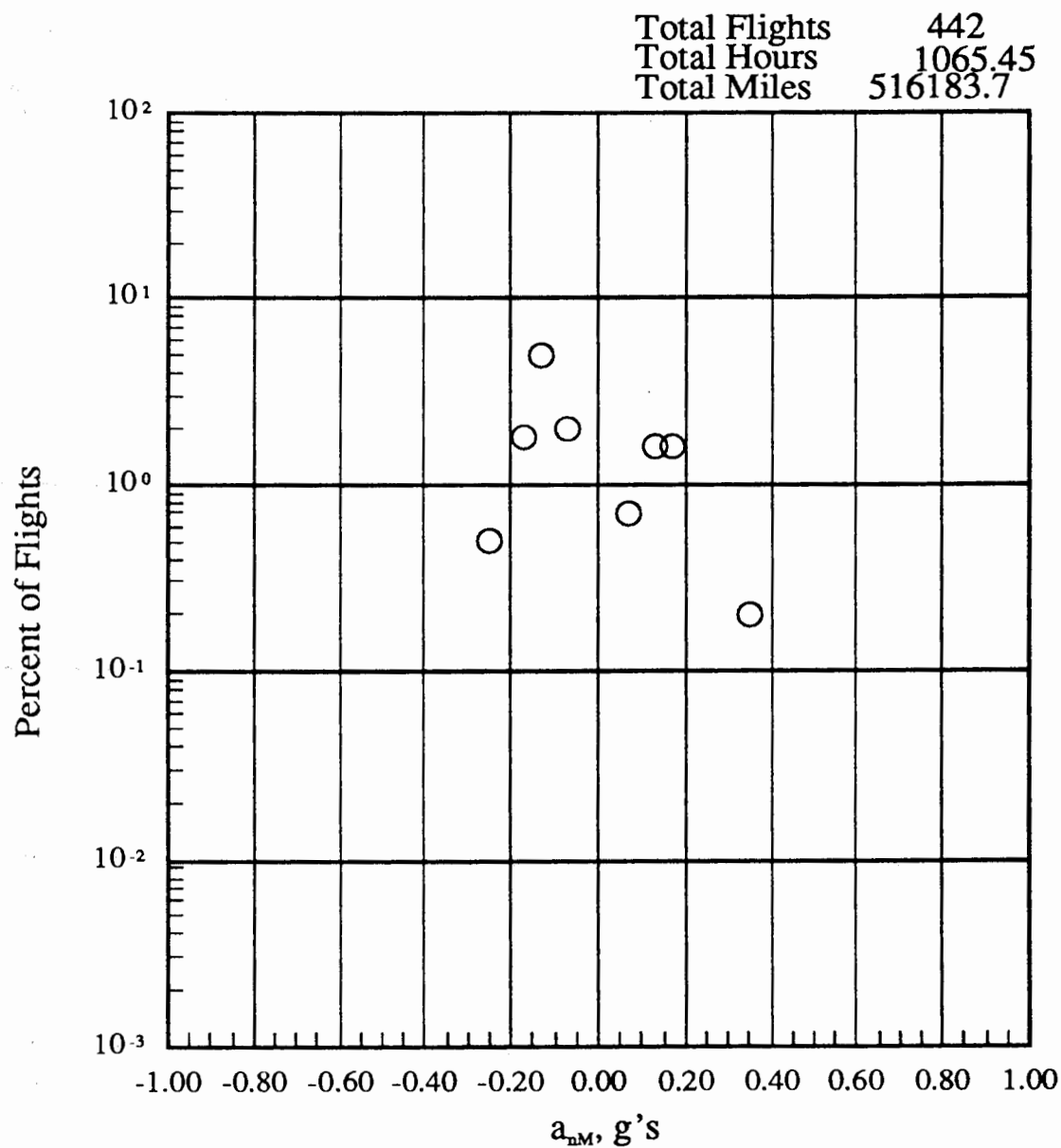
(g) 24500 to 29500 feet altitude

Figure 17.- Continued.



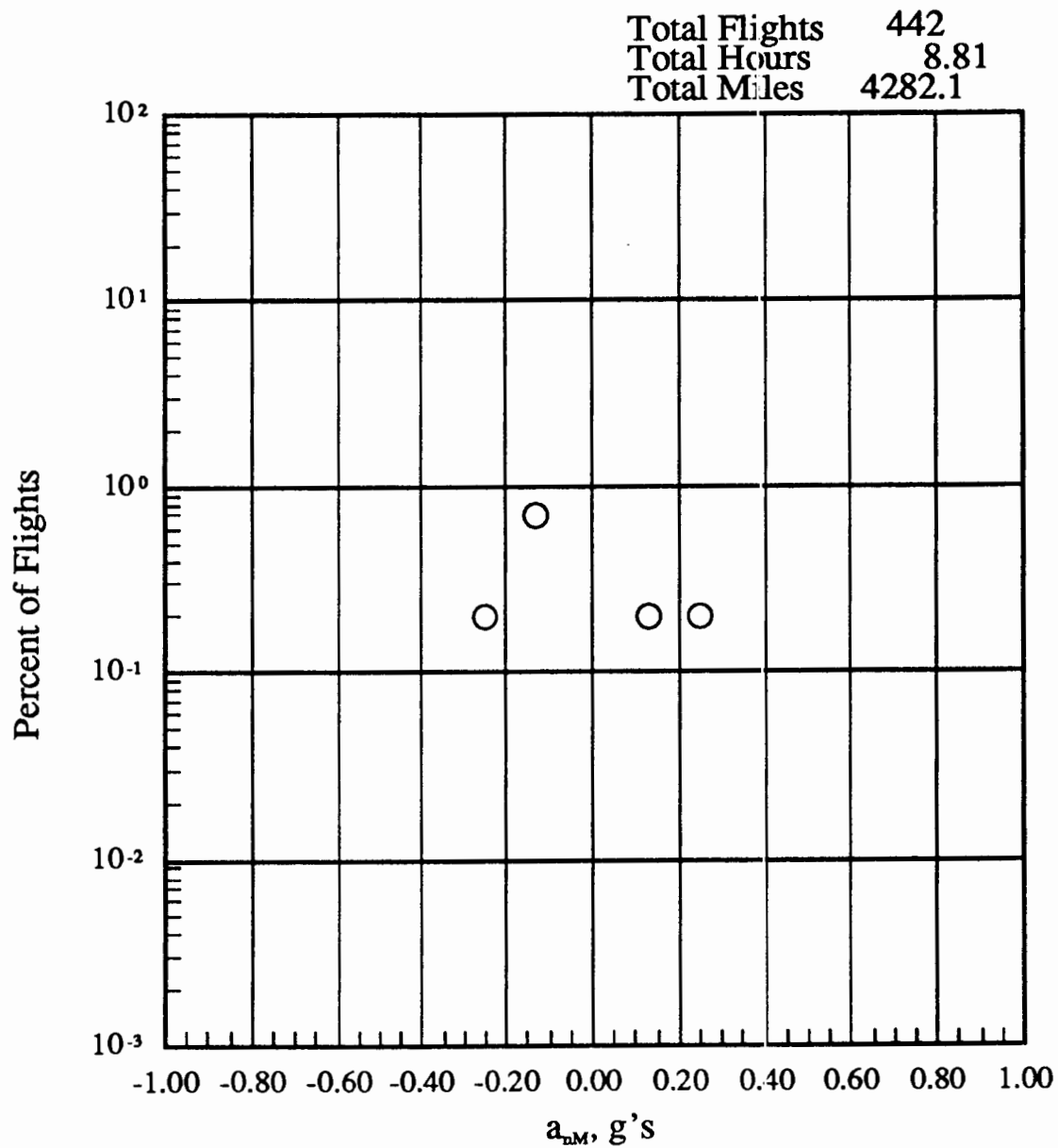
(h) 29500 to 34500 feet altitude

Figure 17.- Continued.



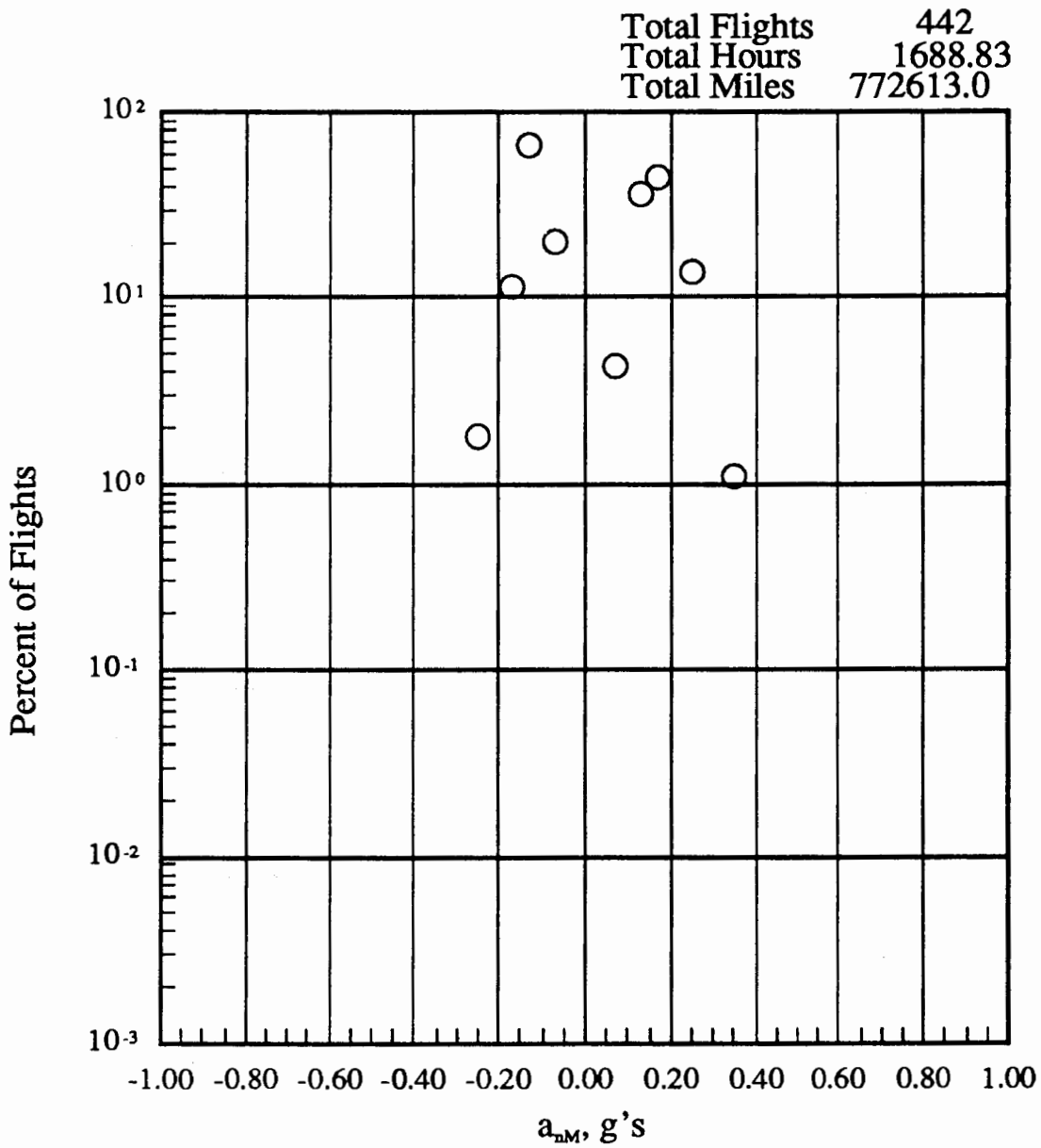
(i) 34500 to 39500 feet altitude

Figure 17.- Continued.



(j) 39500 to 44500 feet altitude

Figure 17.- Continued.



(k) -500 to 44500 feet altitude

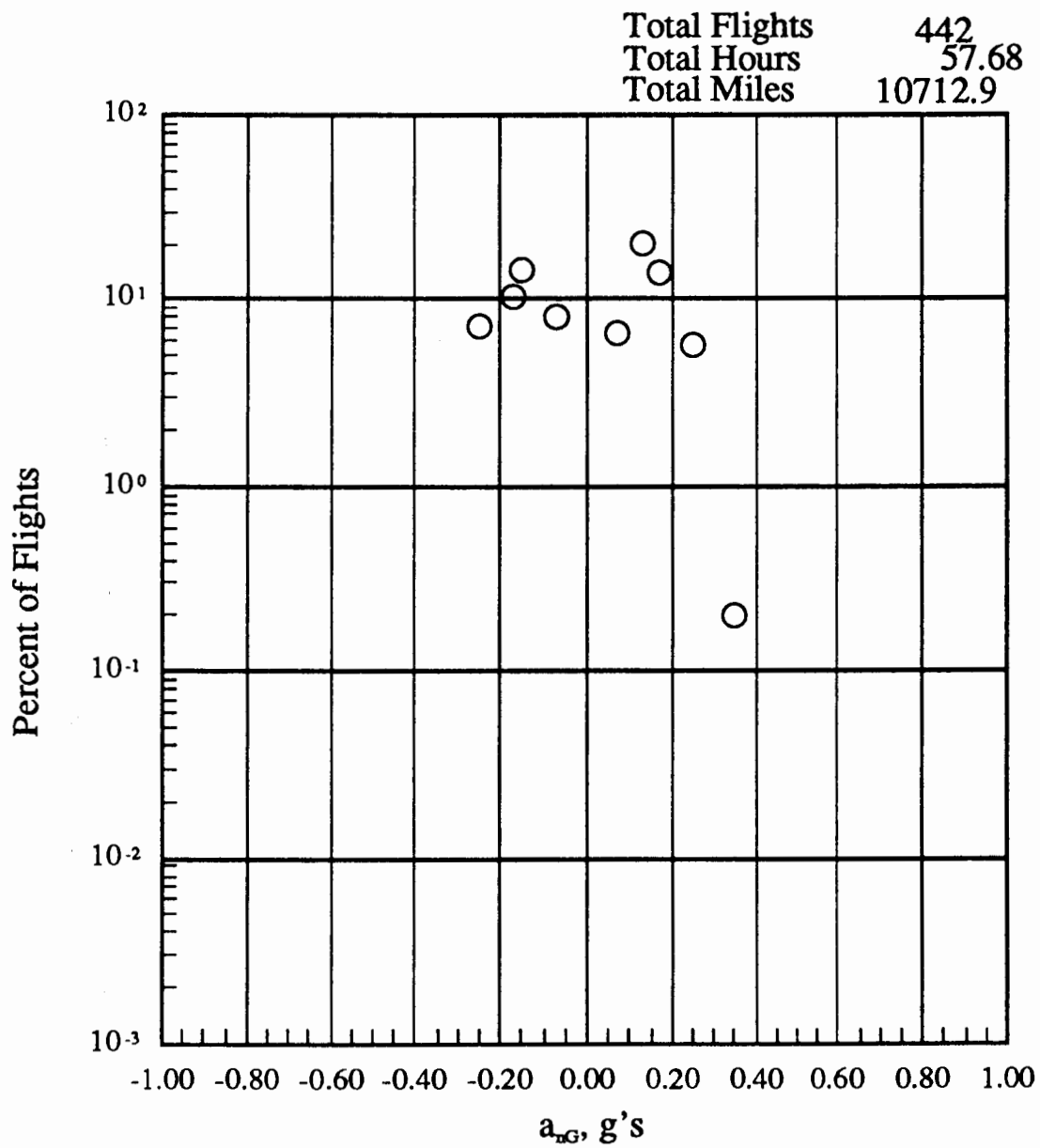
Figure 17.- Concluded.

PRESSURE ALTITUDE BANDS

MAXIMUM a_{nG} LEVEL FOR EACH FLIGHT g's FROM TO		-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
1.60	1.80	0	0	0	0	0	0	0	0	0	0
1.40	1.60	0	0	0	0	0	0	0	0	0	0
1.20	1.40	0	0	0	0	0	0	0	0	0	0
1.00	1.20	0	0	0	0	0	0	0	0	0	0
.80	1.00	0	0	0	0	0	0	0	0	0	0
.70	0.80	0	0	0	0	0	0	0	0	0	0
.60	0.70	0	0	0	0	0	0	0	0	0	0
.50	0.60	0	0	0	0	0	0	0	0.2	0	0.2
.40	0.50	0	0	0	0	0	0	0	0	0	0
.30	0.40	0.2	0.7	0.2	0	0	0	0.2	0.9	0.5	2.7
.20	0.30	5.7	4.3	1.8	0.7	0.2	0.5	0.5	2.7	0	16.3
.15	0.20	14.0	4.1	1.1	1.4	1.1	0.7	1.6	3.4	0	27.4
.10	0.15	20.1	5.7	3.4	0.9	0.5	0.9	1.1	4.1	0.5	37.1
.05	0.10	6.6	2.5	1.6	1.4	0	0.9	0.2	2.9	0	16.1
-.05	-0.10	8.1	2.0	1.1	0.2	0.2	0.9	0.9	2.9	0	16.5
-.10	-0.15	14.5	6.1	3.2	3.6	0.5	0.7	1.4	6.3	0.2	36.4
-.15	-0.20	10.4	4.5	1.6	0.7	0.9	0.2	1.6	4.3	0	24.2
-.20	-0.30	7.2	7.0	1.8	0.7	0	0	0.7	3.6	0.5	21.5
-.30	-0.40	0	0.5	0	0	0	0	0	0.5	0	0.9
-.40	-0.50	0	0	0	0	0	0	0	0	0	0
-.50	-0.60	0	0	0	0	0	0	0	0	0	0
-.60	-0.70	0	0	0	0	0	0	0	0.2	0	0.2
-.70	-0.80	0	0	0	0	0	0	0	0	0	0
-.80	-1.00	0	0	0	0	0	0	0	0	0	0
-1.00	-1.20	0	0	0	0	0	0	0	0	0	0
-1.20	-1.40	0	0	0	0	0	0	0	0	0	0
-1.40	-1.60	0	0	0	0	0	0	0	0	0	0
-1.60	-1.80	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT		57.68	57.61	54.89	43.48	48.52	79.06	273.34	1065.45	8.81	1688.83
FLIGHT MILES @ ALT		10712.91	14655.73	18759.60	17393.17	21054.53	36267.13	133304.11	516183.66	4282.14	772612.98
TOTAL FLIGHTS											442

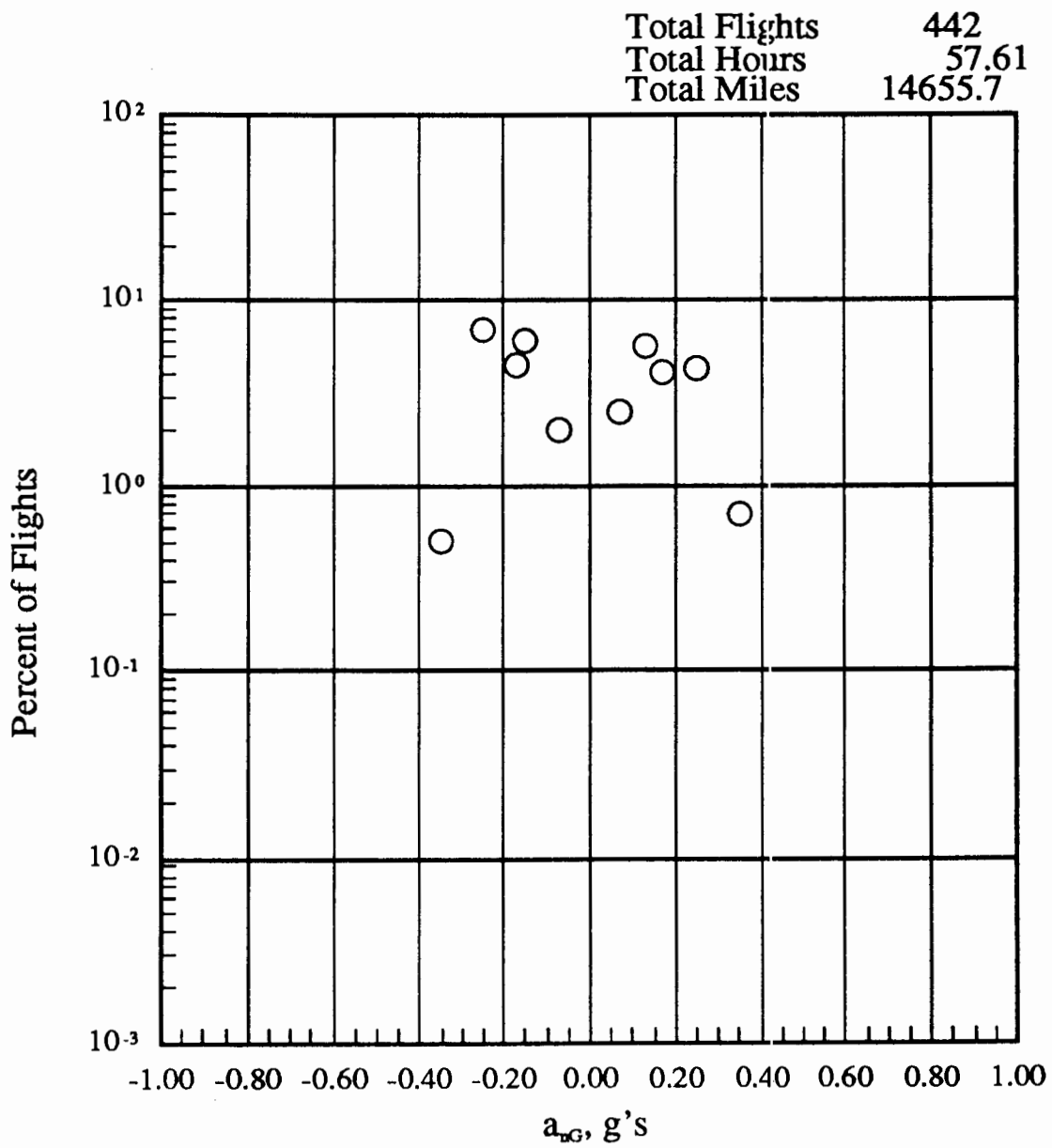
(a) Percent of flights where peak positive and negative a_{nG} per flight
occurs within pressure altitude bands, any flap

Figure 18.- Peak positive and negative a_{nG} vs altitude.



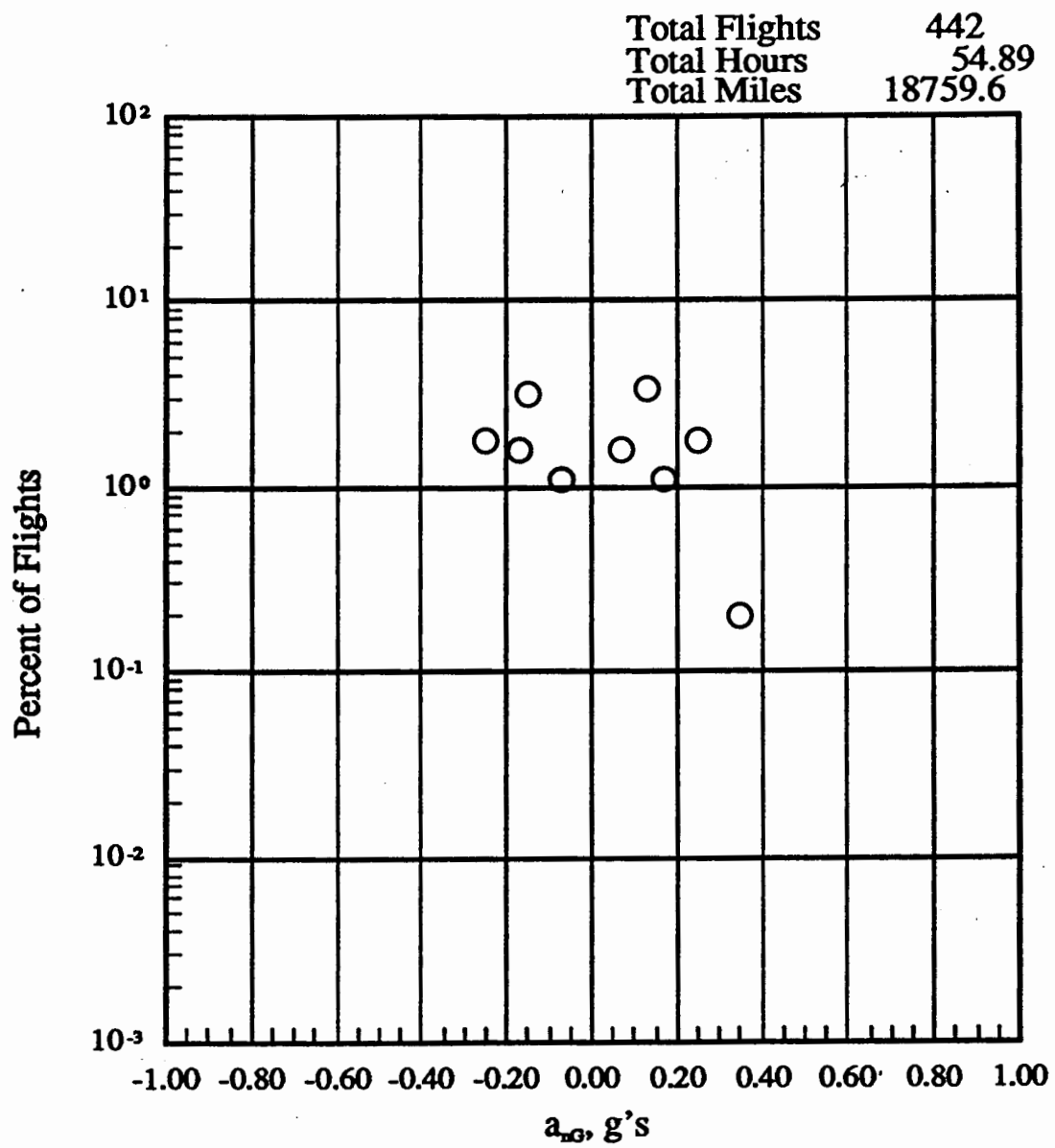
(b) -500 to 4500 feet altitude

Figure 18.- Continued.



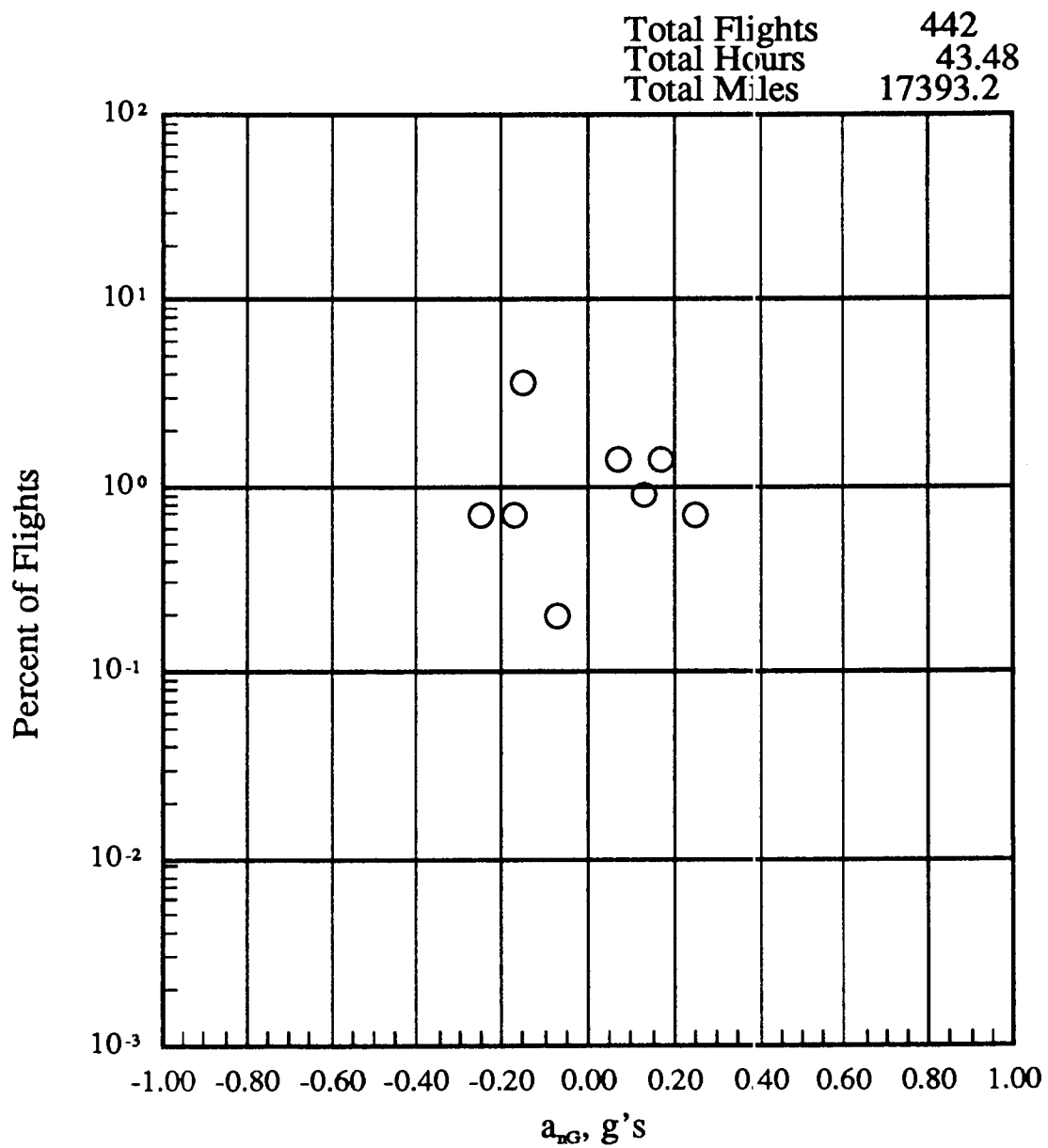
(c) 4500 to 9500 feet altitude

Figure 18.- Continued.



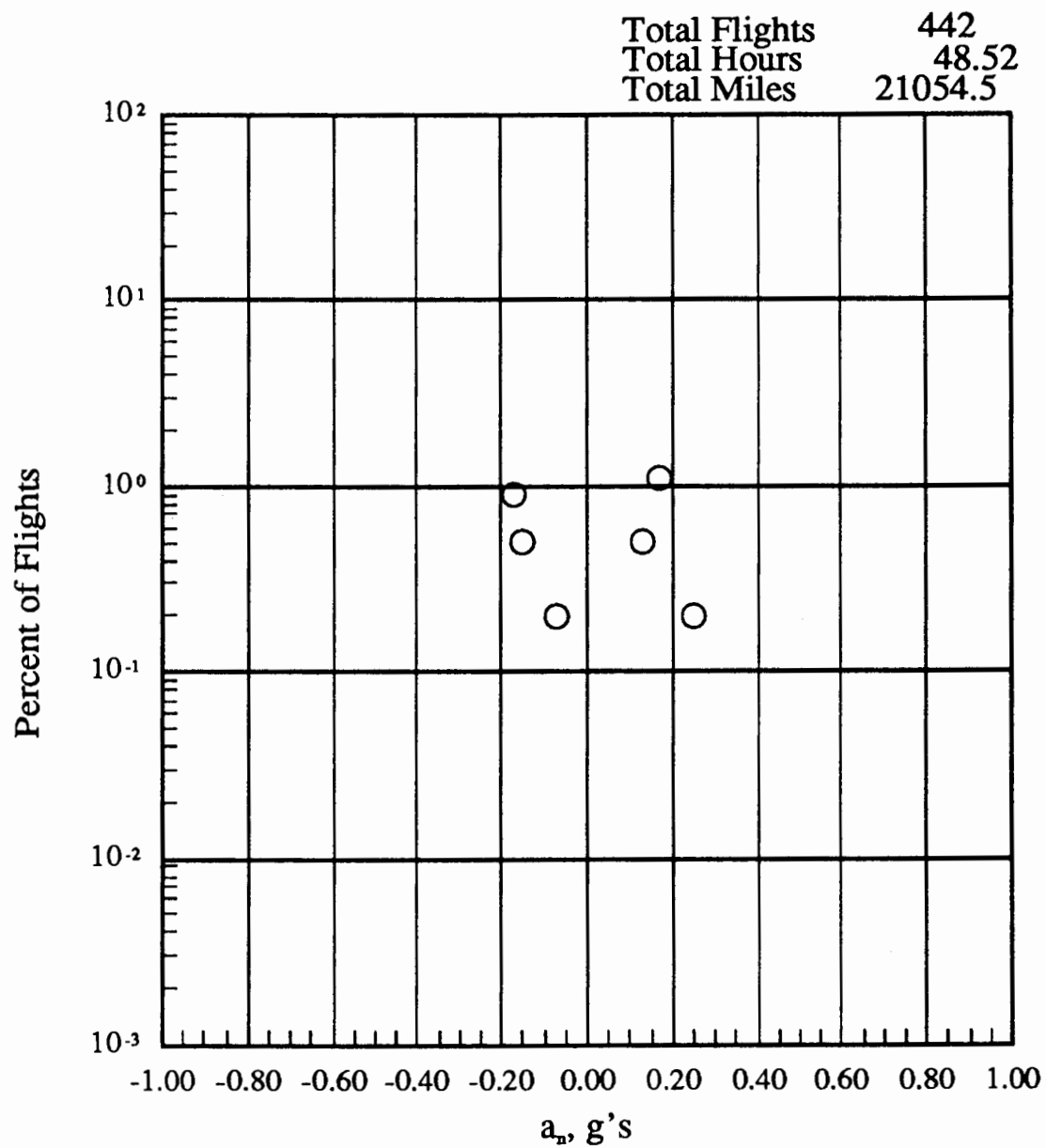
(d) 9500 to 14500 feet altitude

Figure 18.- Continued.



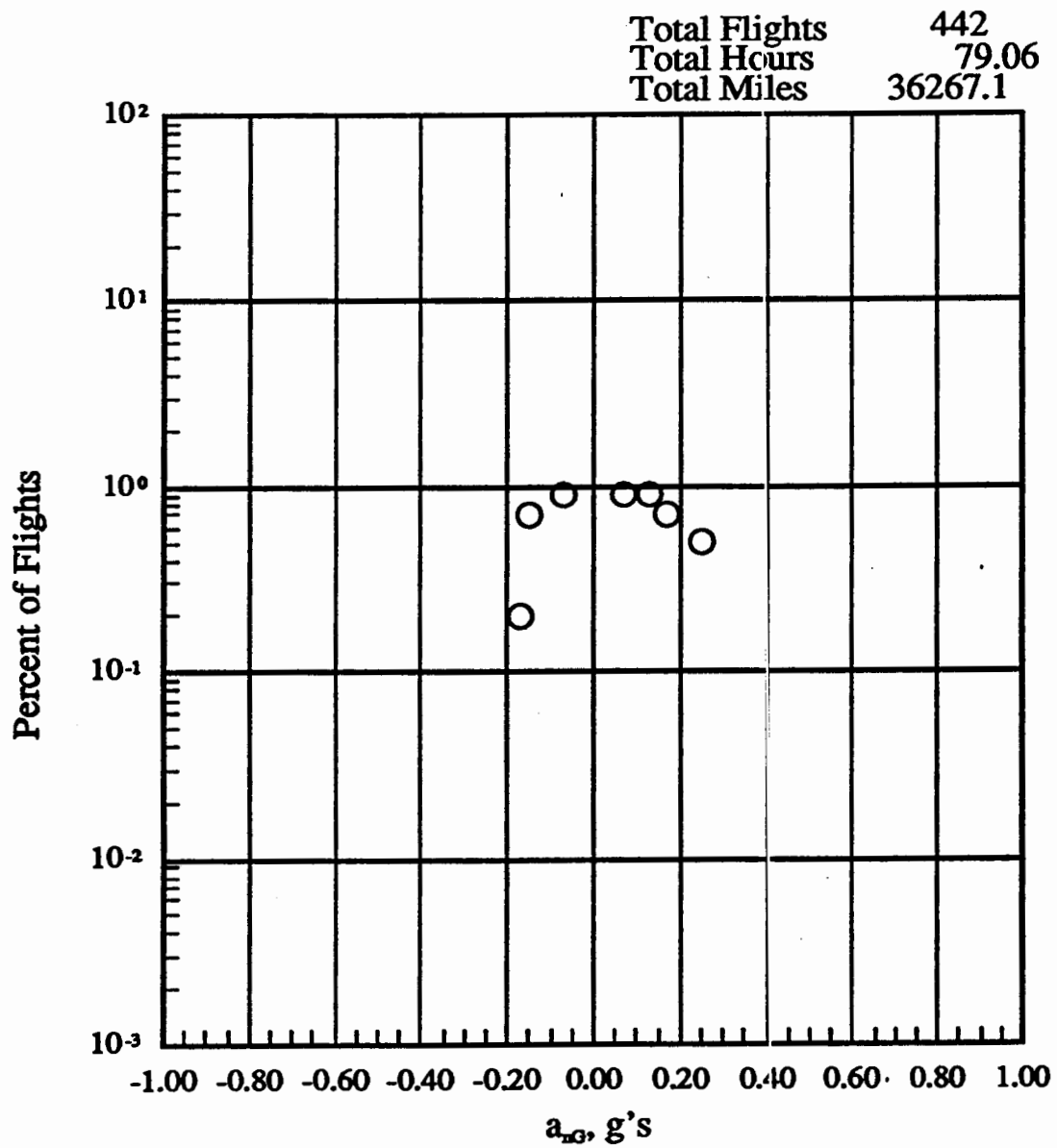
(e) 14500 to 19500 feet altitude

Figure 18.- Continued.



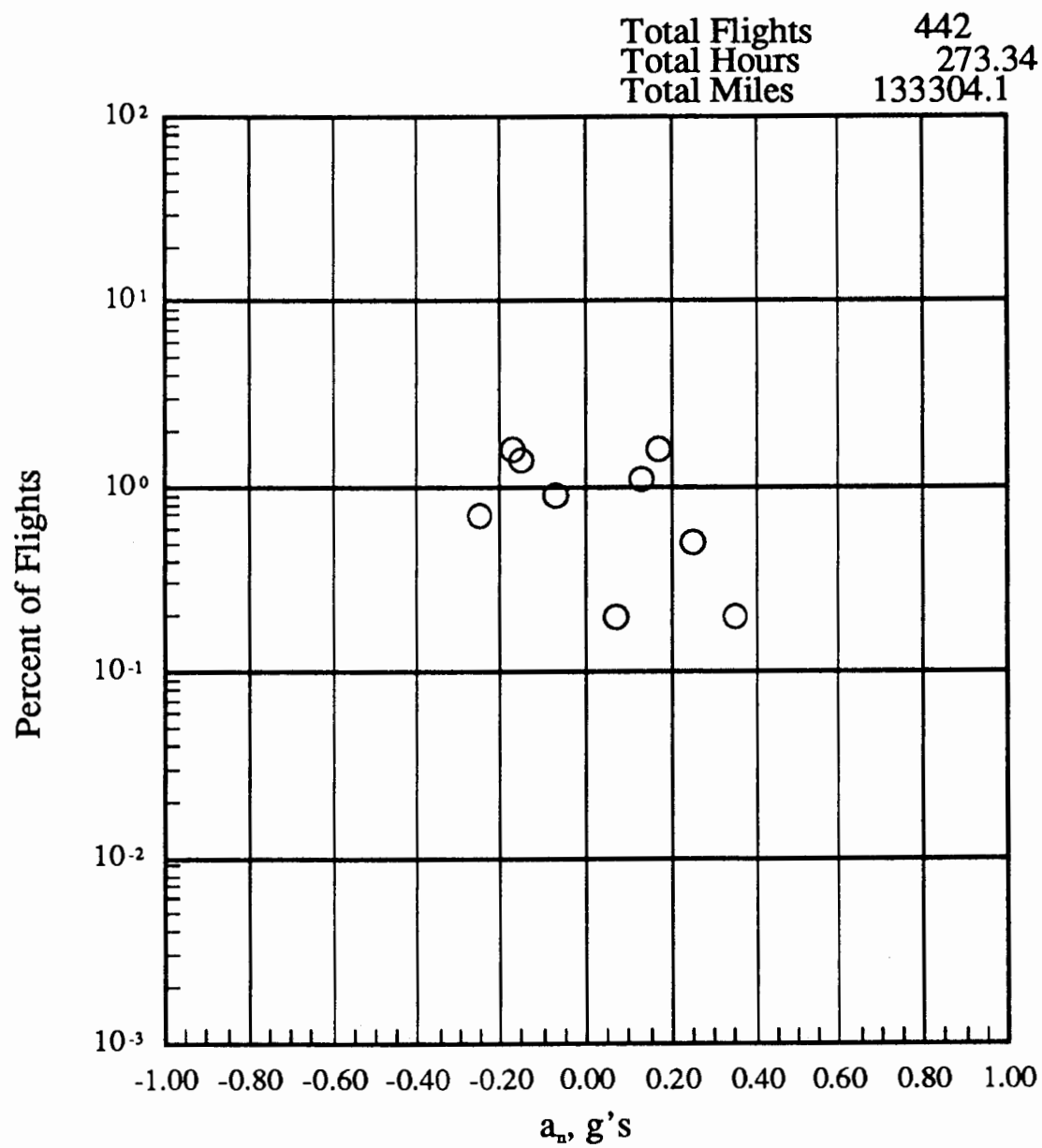
(f) 19500 to 24500 feet altitude

Figure 18.- Continued.



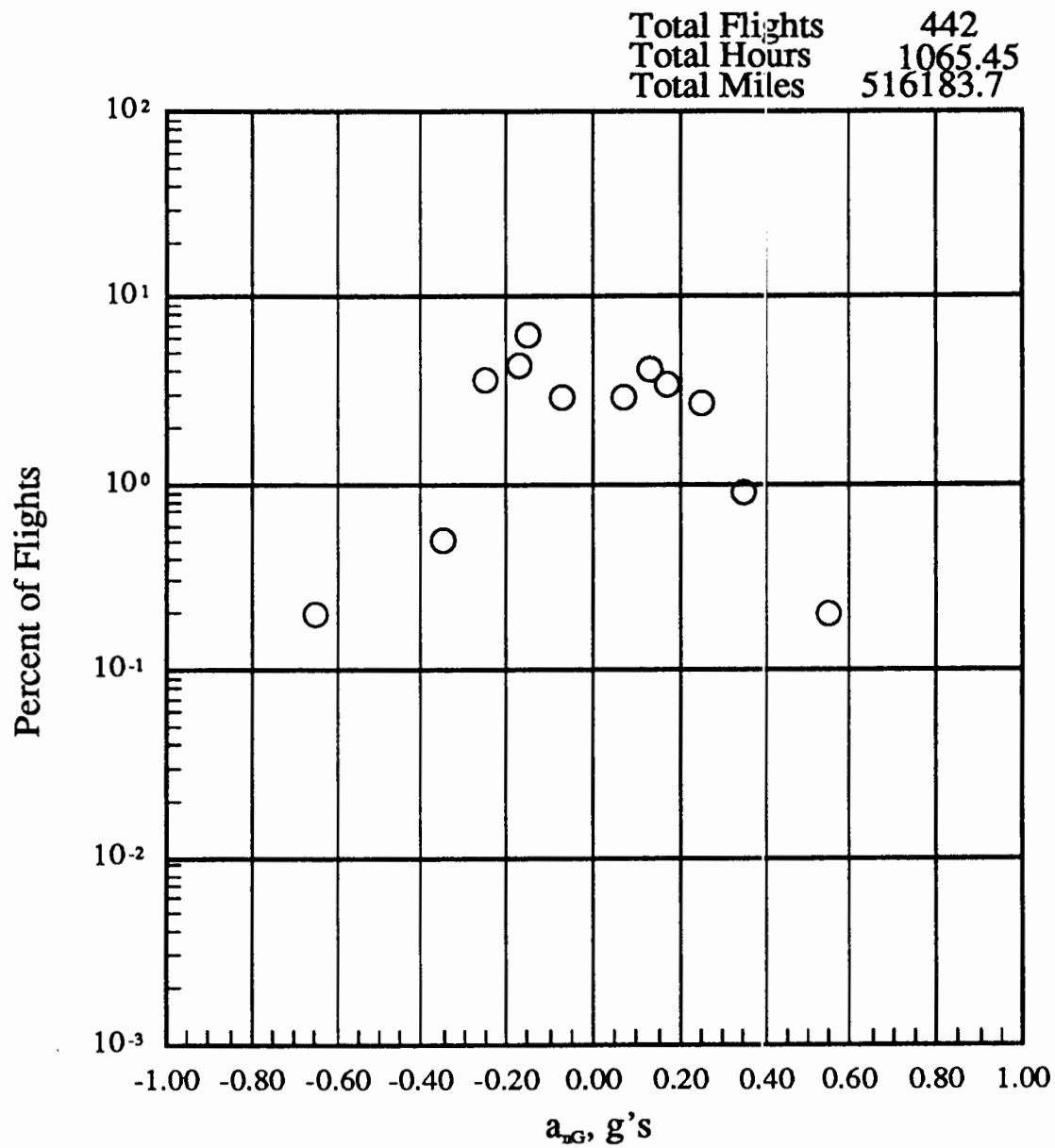
(g) 24500 to 29500 feet altitude

Figure 18.- Continued.



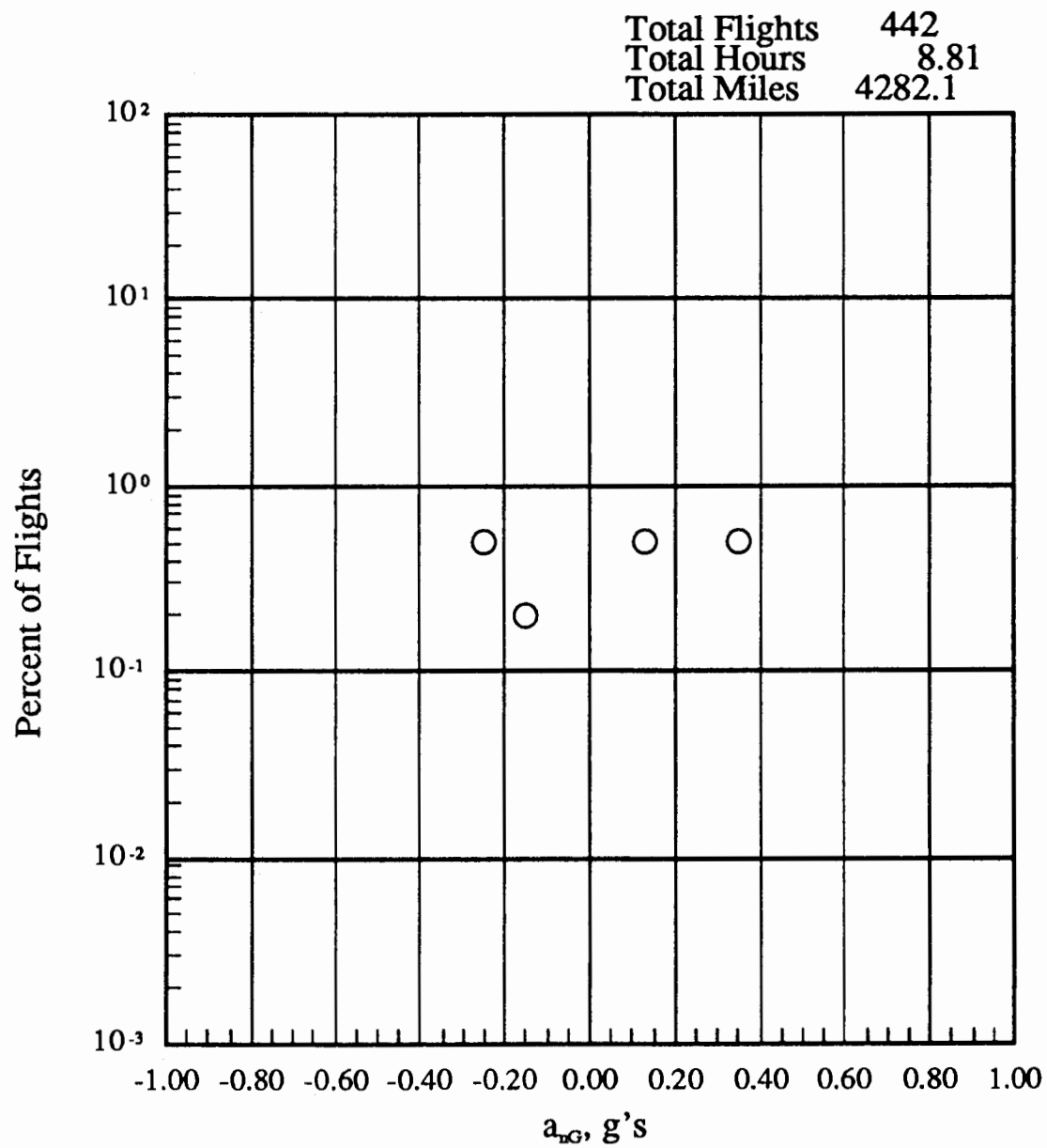
(h) 29500 to 34500 feet altitude

Figure 18.- Continued.



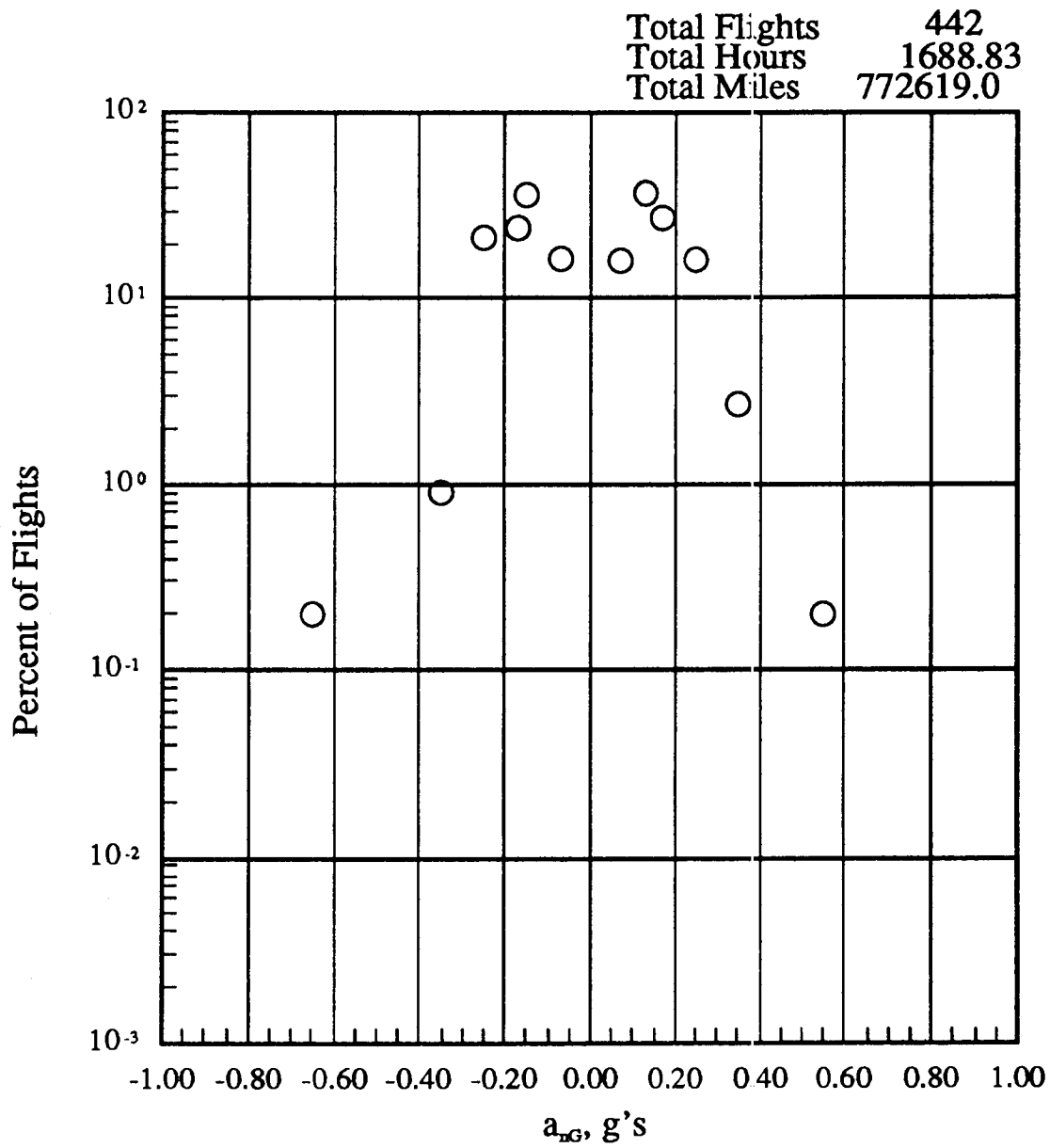
(i) 34500 to 39500 feet altitude

Figure 18.- Continued.



(j) 39500 to 44500 feet altitude

Figure 18.- Continued.



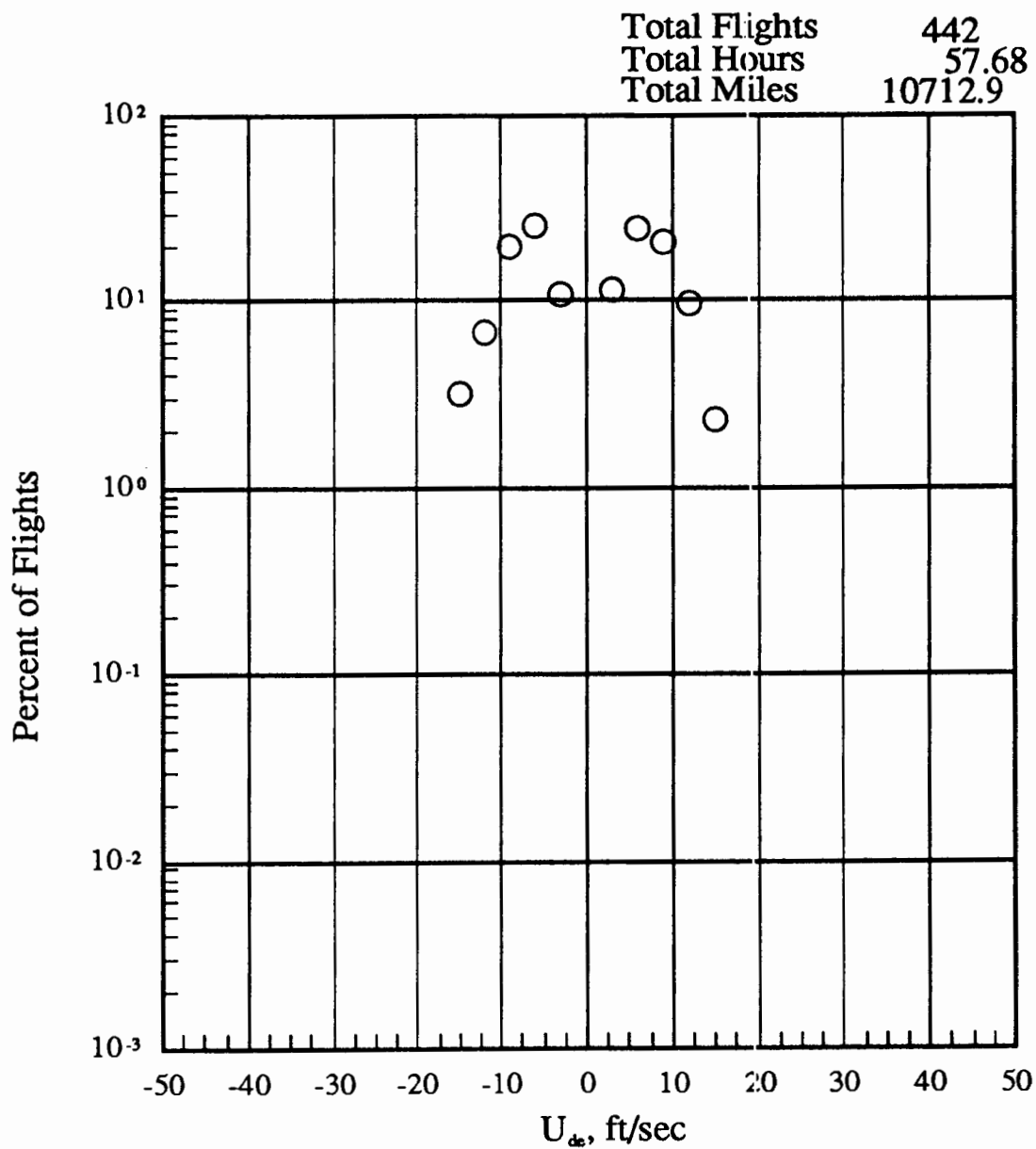
(k) -500 to 44500 feet altitude

Figure 18.- Concluded.

	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
MAXIMUM U_{de} LEVEL FOR EACH FLIGHT FT/SEC										
100	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0.2	0	0.2
15	2.3	0.9	0	0	0	0	0.2	0.5	0	3.8
12	9.7	2.3	0.5	0.2	0	0.2	0	0.5	0.5	13.8
9	20.8	4.5	0.7	0.5	0	0	0.2	2.0	0	28.7
6	24.7	3.4	1.8	0.5	0.5	0	1.1	2.0	0	33.9
3	11.5	2.0	1.4	0.2	0.2	0.5	0.2	2.5	0.2	18.8
-3	10.9	1.8	2.0	0.5	0.2	0	0.2	1.4	0.2	17.2
-6	25.6	4.5	0.9	0.5	0.5	0	1.6	3.2	0	36.7
-9	19.7	5.0	1.1	0.2	0	0	0.5	2.3	0.5	29.2
-12	6.8	3.6	0.2	0	0	0	0	0.2	0	10.9
-15	3.2	1.4	0	0	0	0	0	0.2	0	4.8
-20	0	0.2	0	0	0	0	0	0.2	0	0.5
-30	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0
-80	0	0	0	0	0	0	0	0	0	0
-90	0	0	0	0	0	0	0	0	0	0
-100	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	57.68	57.61	54.89	43.48	48.52	79.06	273.34	1065.45	8.81	1688.83
FLIGHT MILES @ ALT	10712.91	14655.73	18759.60	17393.17	21054.53	36267.13	133304.11	516183.66	4282.14	772612.98
TOTAL FLIGHTS										442

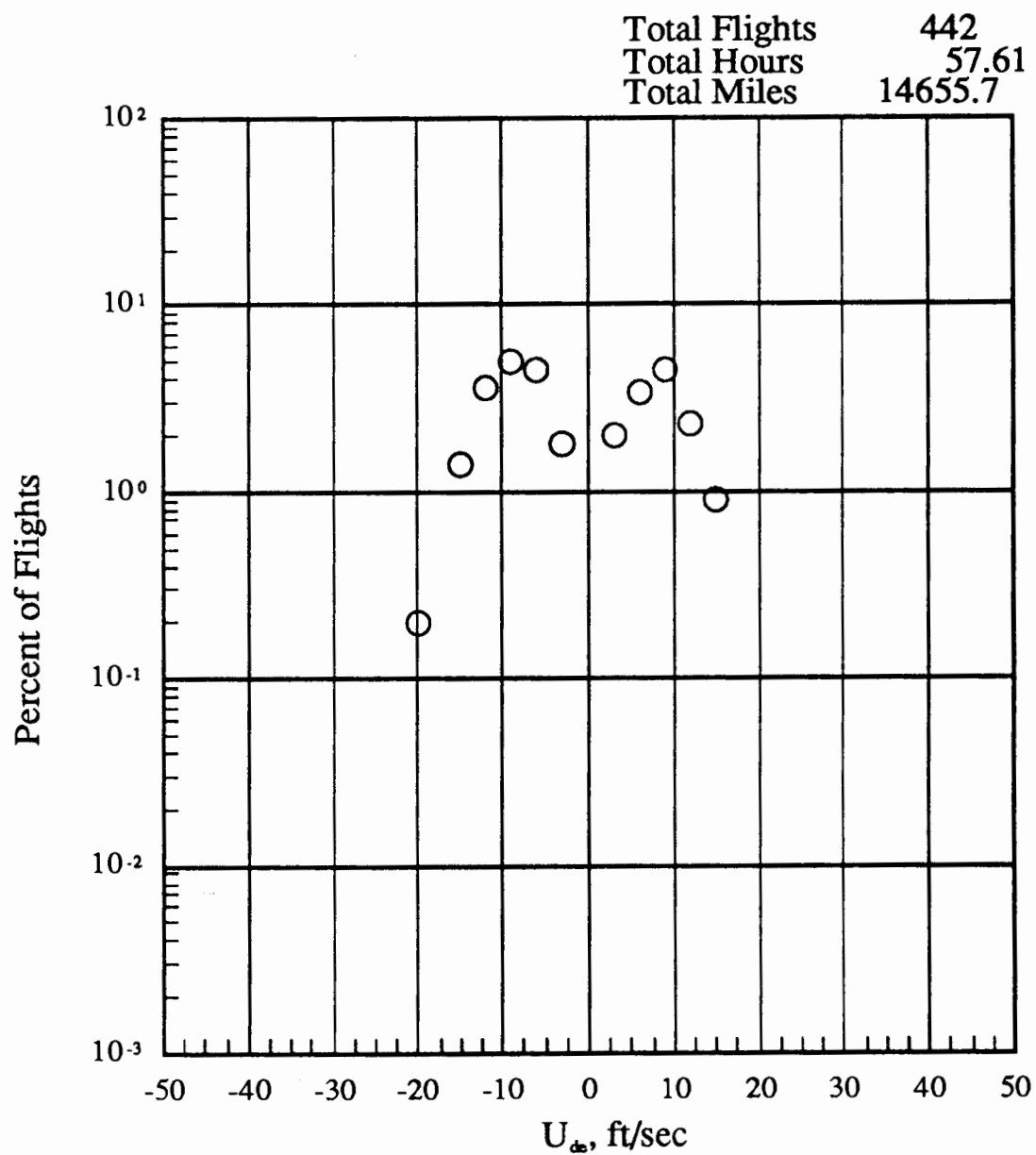
(a) Percent of flights where peak positive and negative U_{de} per flight occurs within pressure altitude bands, any flap

Figure 19.- Peak positive and negative U_{de} vs altitude.



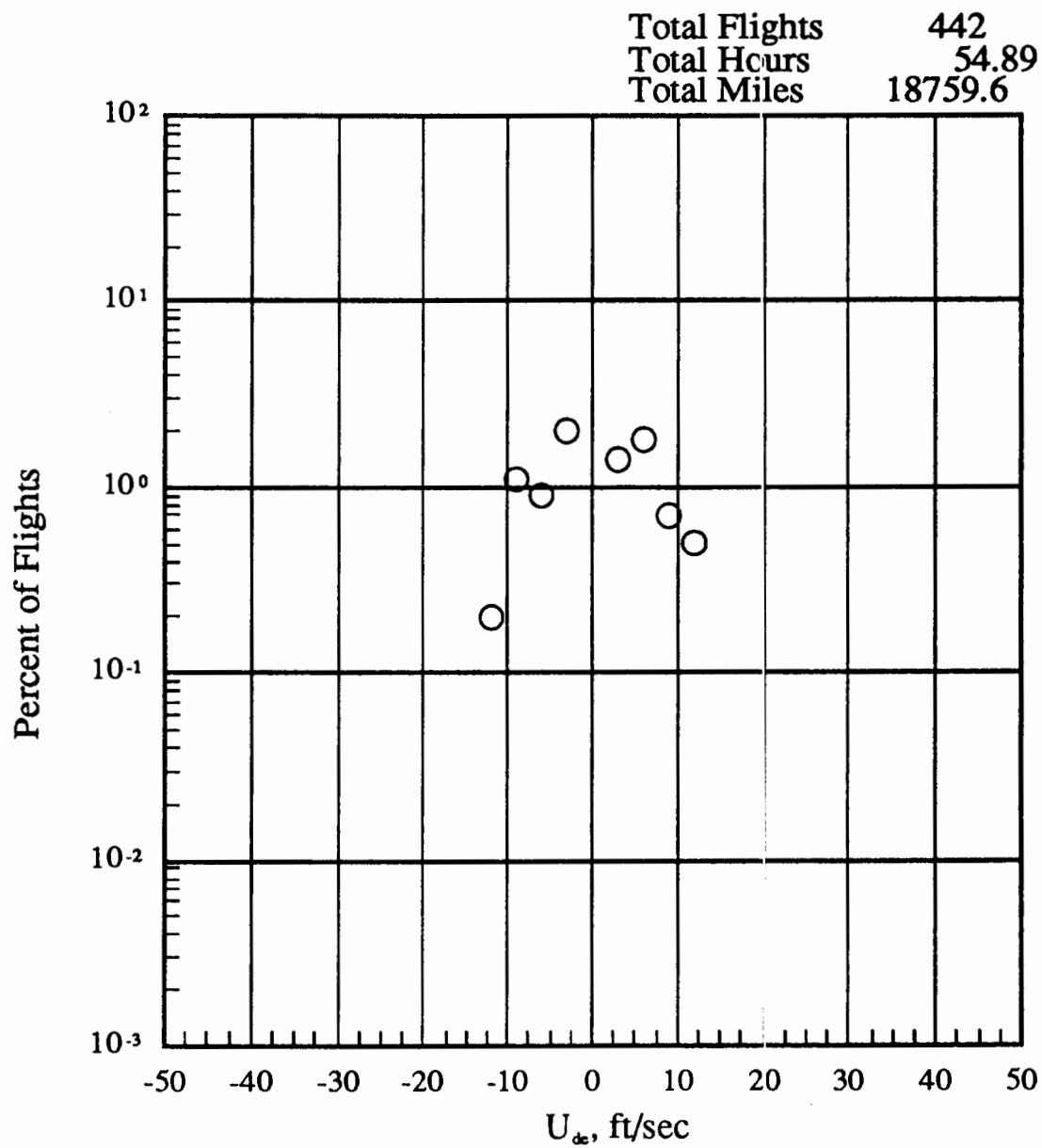
(b) -500 to 4500 feet altitude

Figure 19.- Continued.



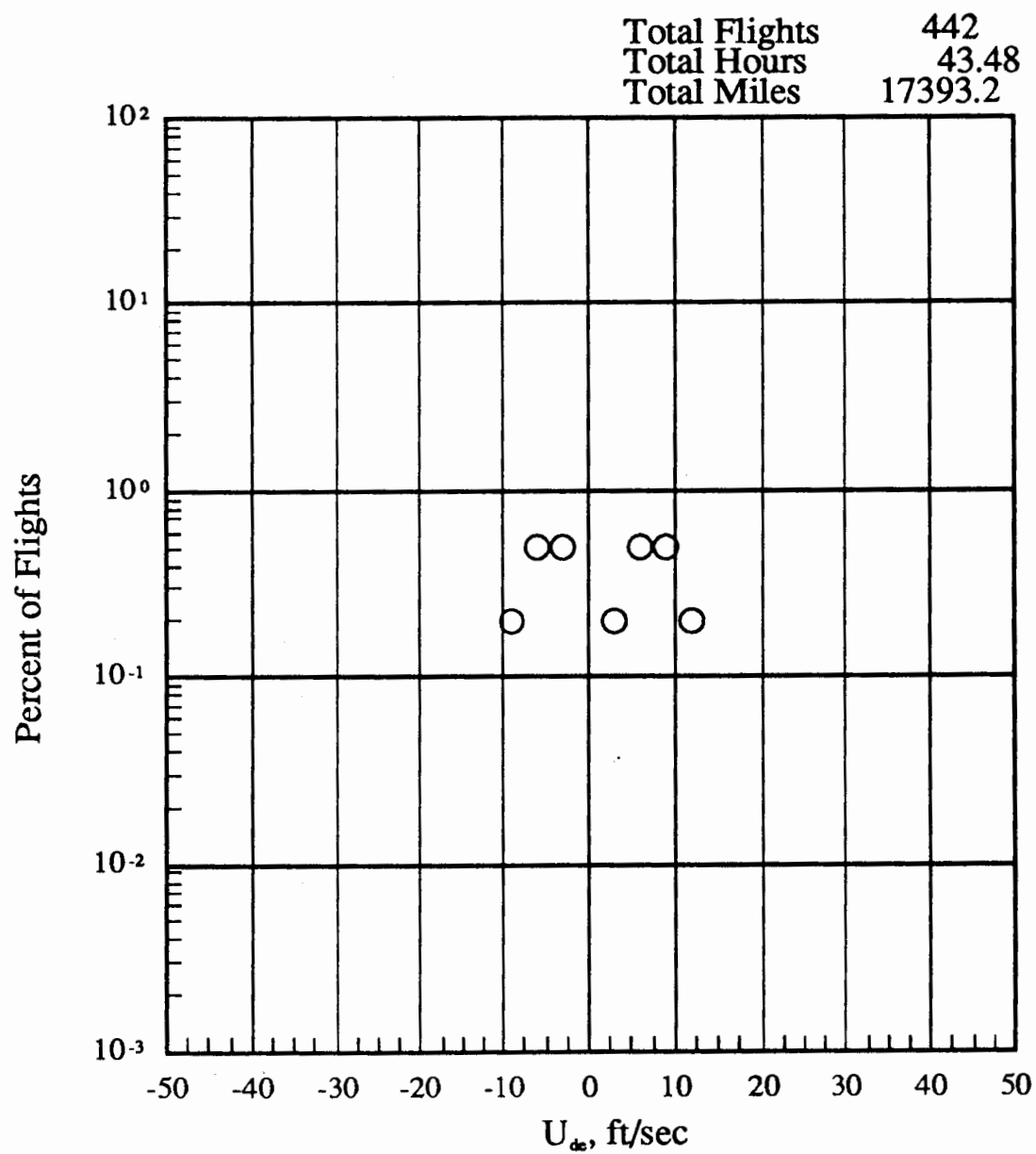
(c) 4500 to 9500 feet altitude

Figure 19.- Continued.



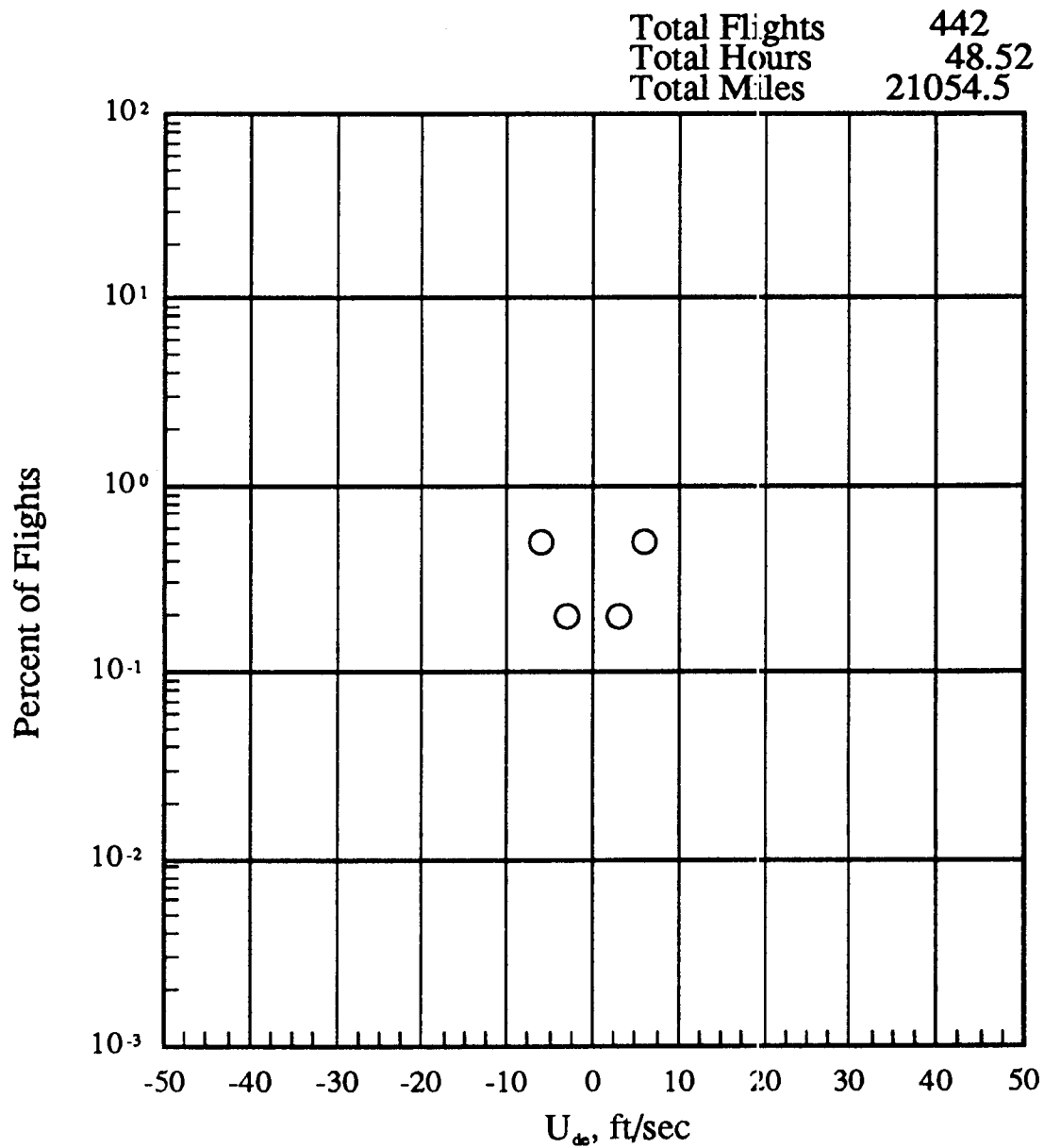
(d) 9500 to 14500 feet altitude

Figure 19.- Continued.



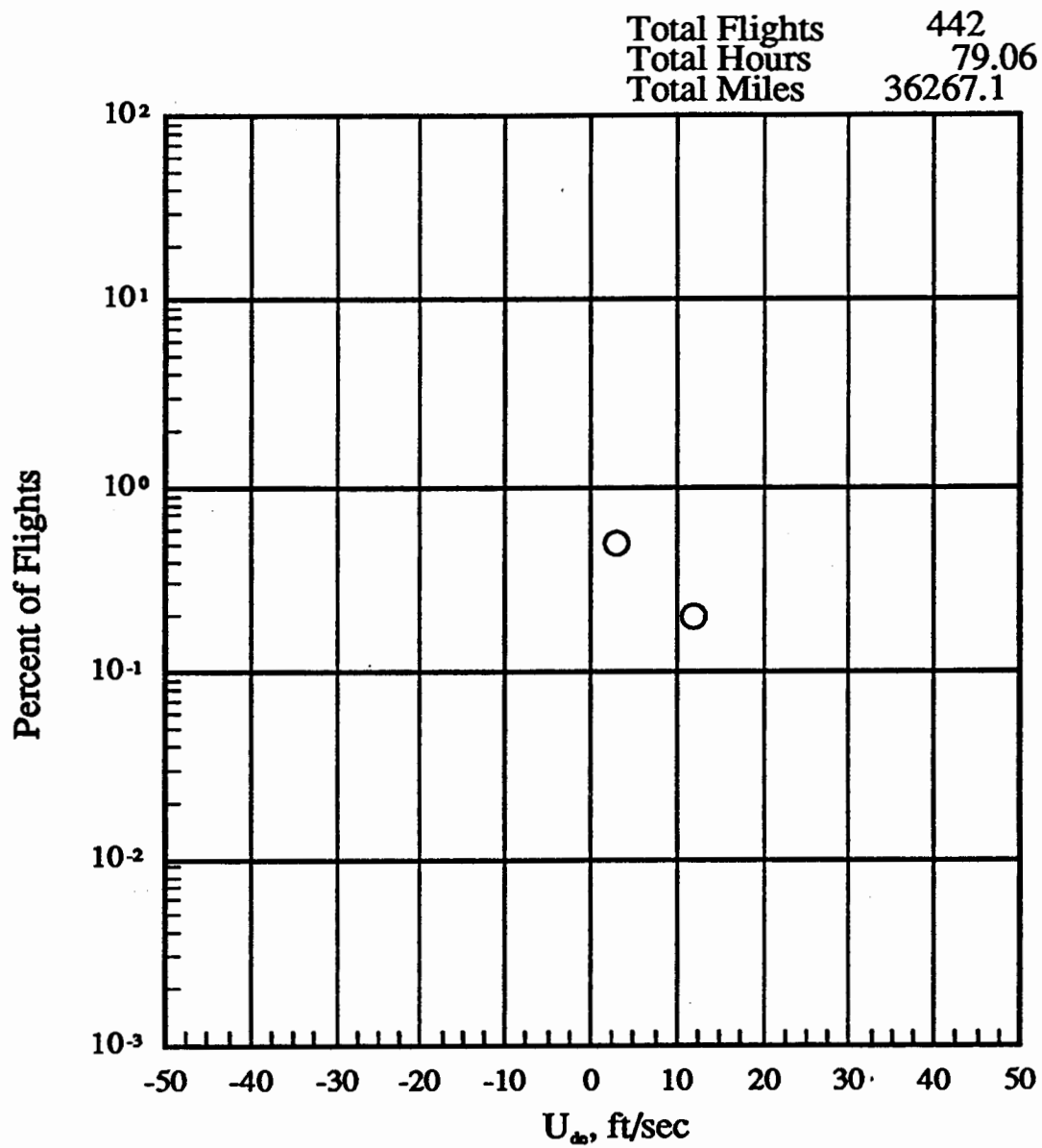
(e) 14500 to 19500 feet altitude

Figure 19.- Continued.



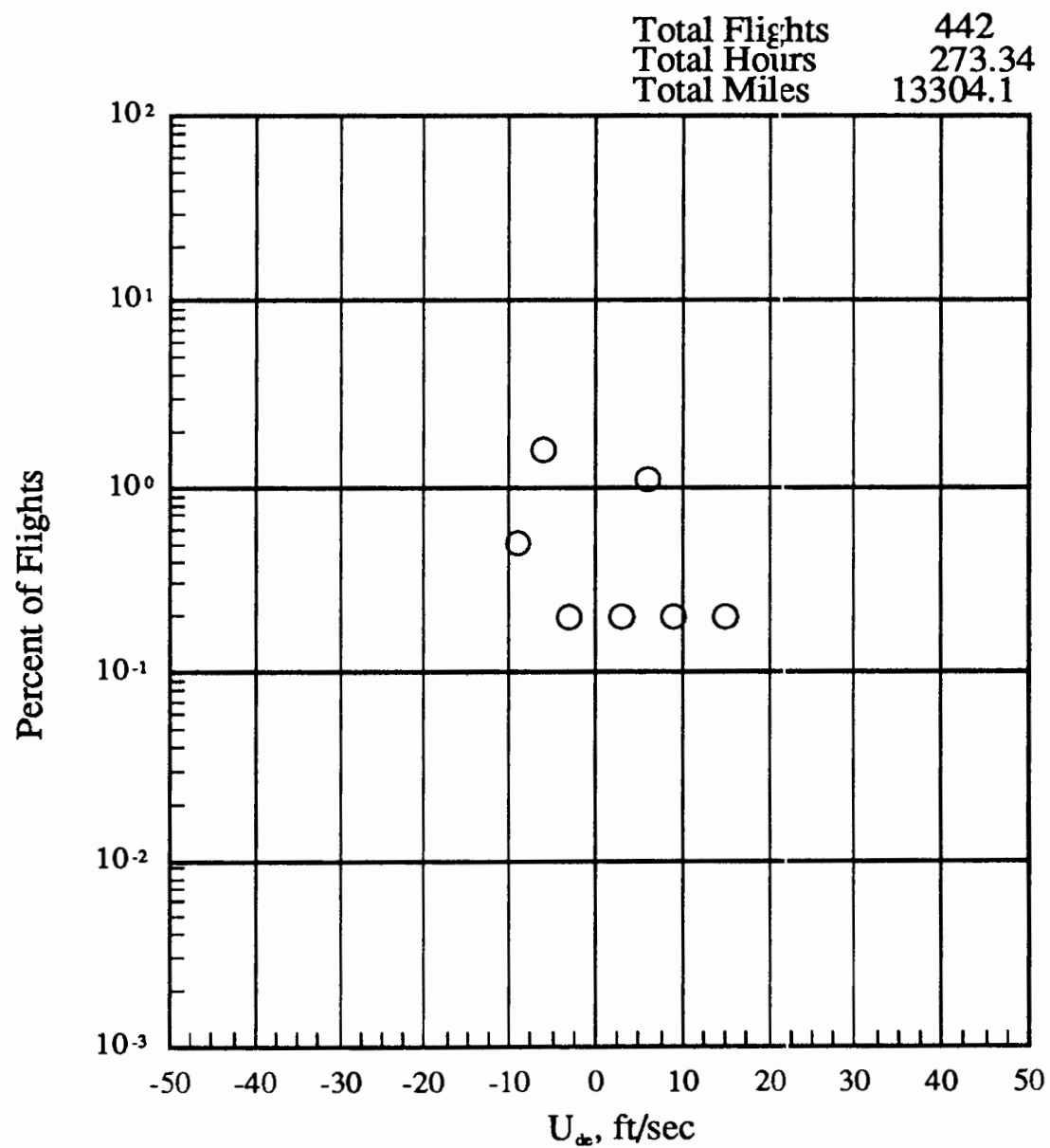
(f) 19500 to 24500 feet altitude

Figure 19.- Continued.



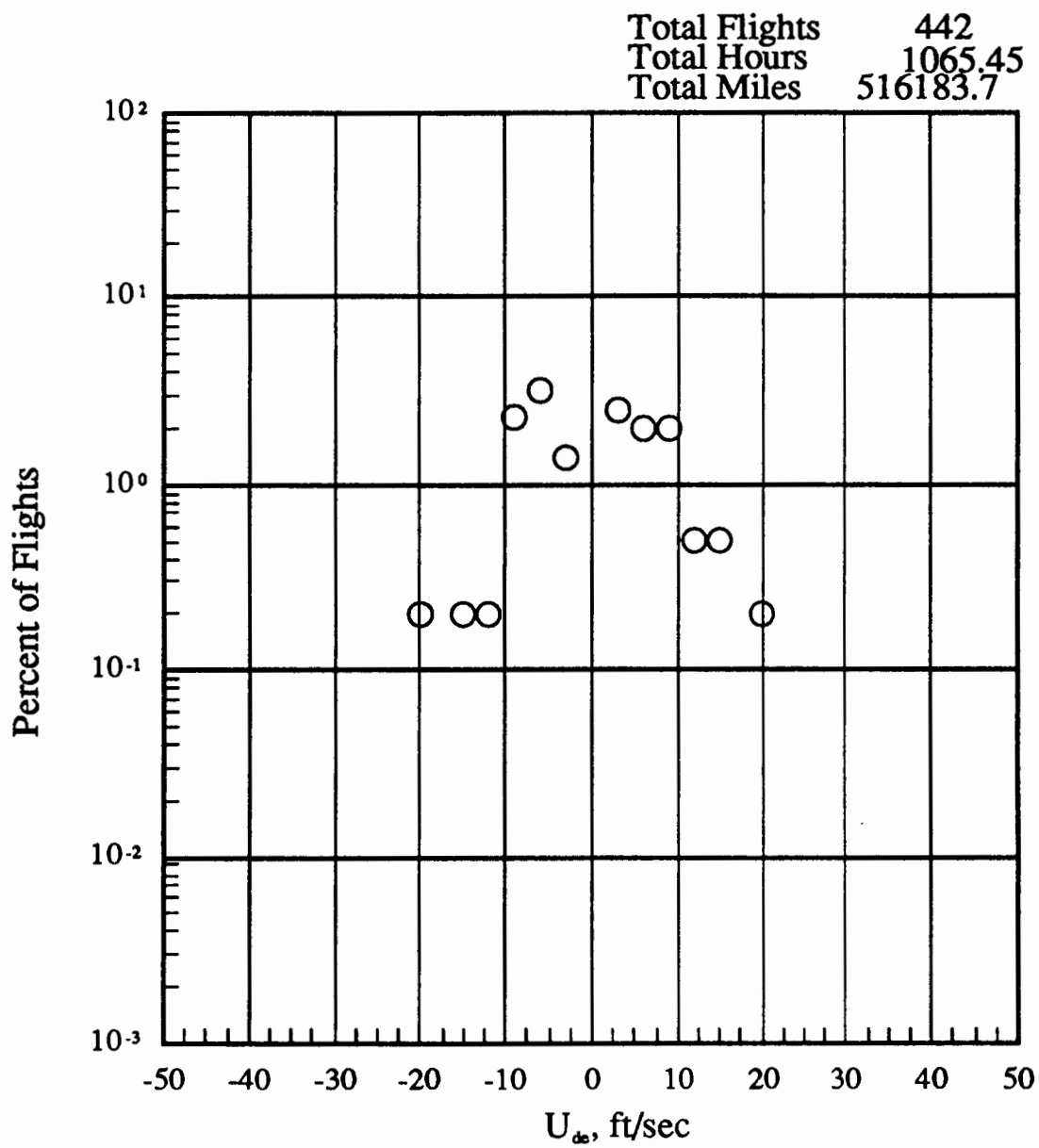
(g) 24500 to 29500 feet altitude

Figure 19.- Continued.



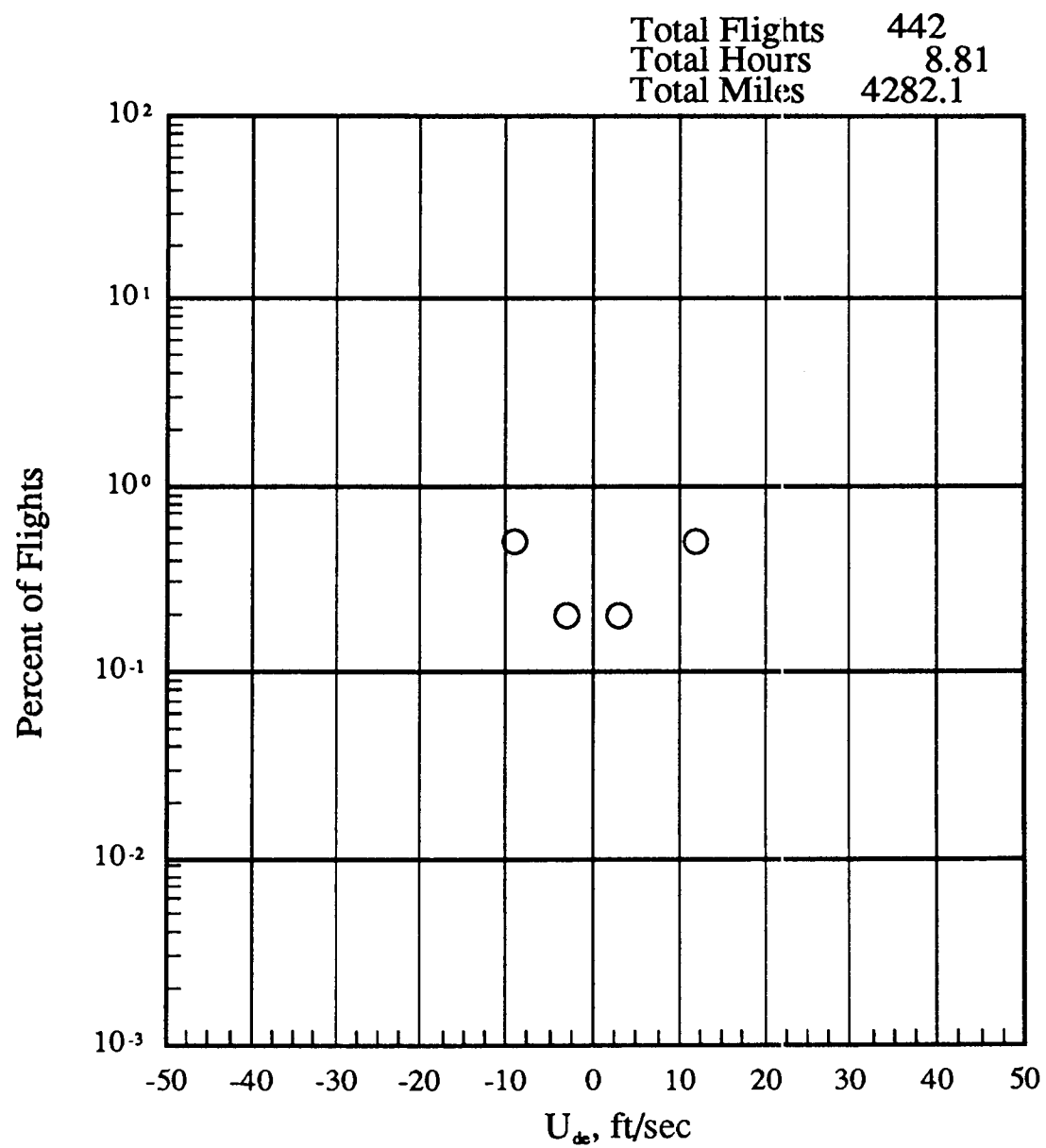
(h) 29500 to 34500 feet altitude

Figure 19.- Continued.



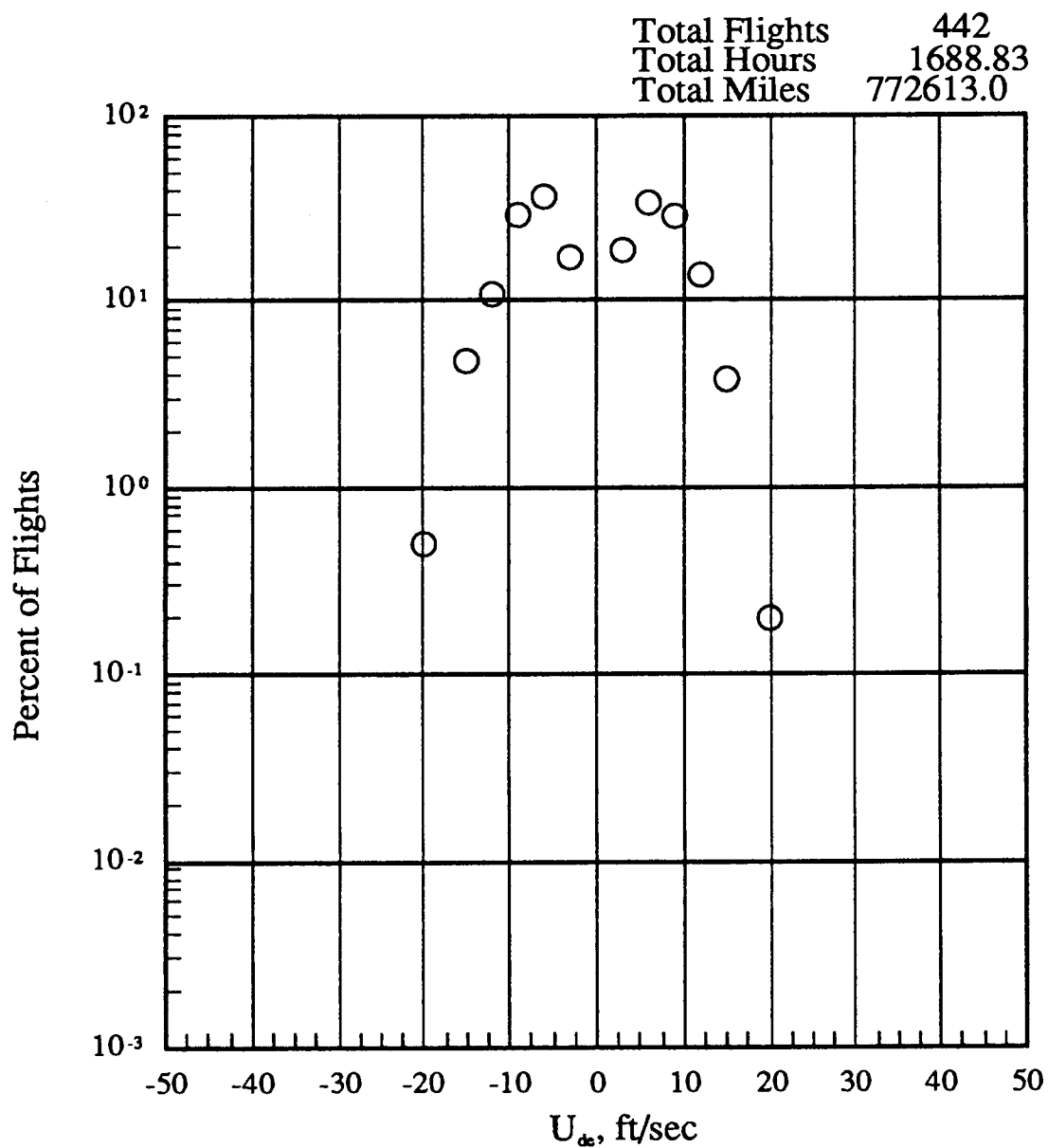
(i) 34500 to 39500 feet altitude

Figure 19.- Continued.



(j) 39500 to 44500 feet altitude

Figure 19.- Continued.



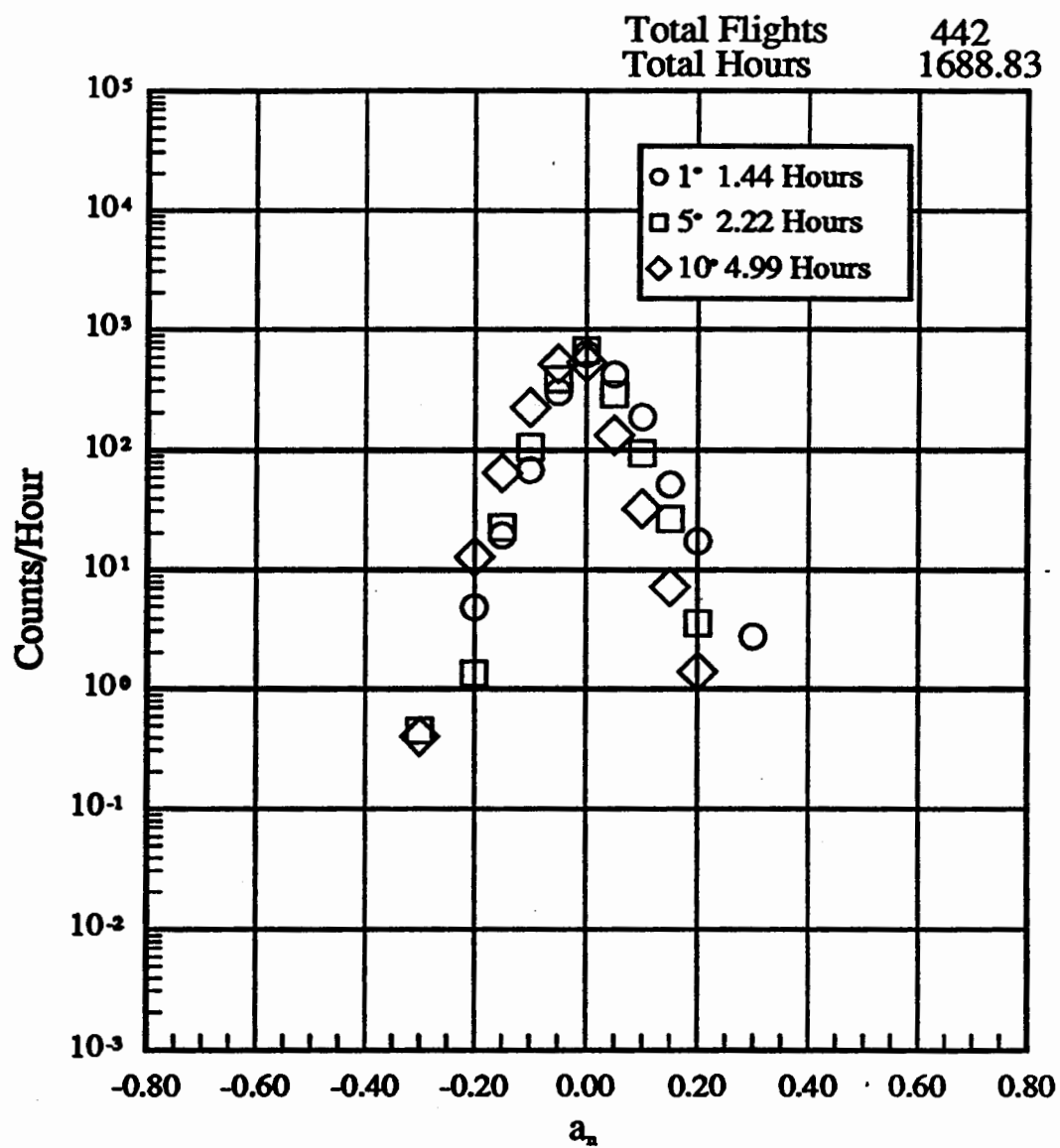
(k) -500 to 44500 feet altitude

Figure 19.- Concluded.

FLAP DETENT, DEGREES						
a_n LEVEL	1	5	10	20	25	30
g's						
1.60	0	0	0	0	0	0
1.40	0	0	0	0	0	0
1.20	0	0	0	0	0	0
1.00	0	0	0	0	0	0
.80	0	0	0	0	0	0
.70	0	0	0	0	0	0
.60	0	0	0	0	0	0
.50	0	0	0	0	0	0
.40	0	0	0	0	0	0
.30	2.778	0	0	0	0	0
.20	17.363	3.601	1.402	0	0	0
.15	51.394	26.557	7.210	0	0	0
.10	186.129	93.626	32.245	0	0	0
.05	422.263	289.882	132.384	0	0	0
0	622.977	670.689	531.939	0	0	0
-.05	300.029	384.408	514.515	0	0	0
-.10	68.062	106.230	223.711	0	0	0
-.15	19.446	22.506	64.490	0	0	0
-.20	4.862	1.350	12.818	0	0	0
-.30	0	0.450	0.401	0	0	0
-.40	0	0	0	0	0	0
-.50	0	0	0	0	0	0
-.60	0	0	0	0	0	0
-.70	0	0	0	0	0	0
-.80	0	0	0	0	0	0
-1.00	0	0	0	0	0	0
-1.20	0	0	0	0	0	0
-1.40	0	0	0	0	0	0
-1.60	0	0	0	0	0	0
FLIGHT HOURS IN DETENT	1.440	2.222	4.993	0	0	0
TOTAL HOURS						8.65
TOTAL FLIGHTS						442
TOTAL FLIGHT HOURS FLAPS UP AND DOWN						1688.83
TOTAL FLIGHT MILES FLAPS UP AND DOWN						772612.93

(a) Take off

Figure 20.- a_n exceedances with flaps deflected.



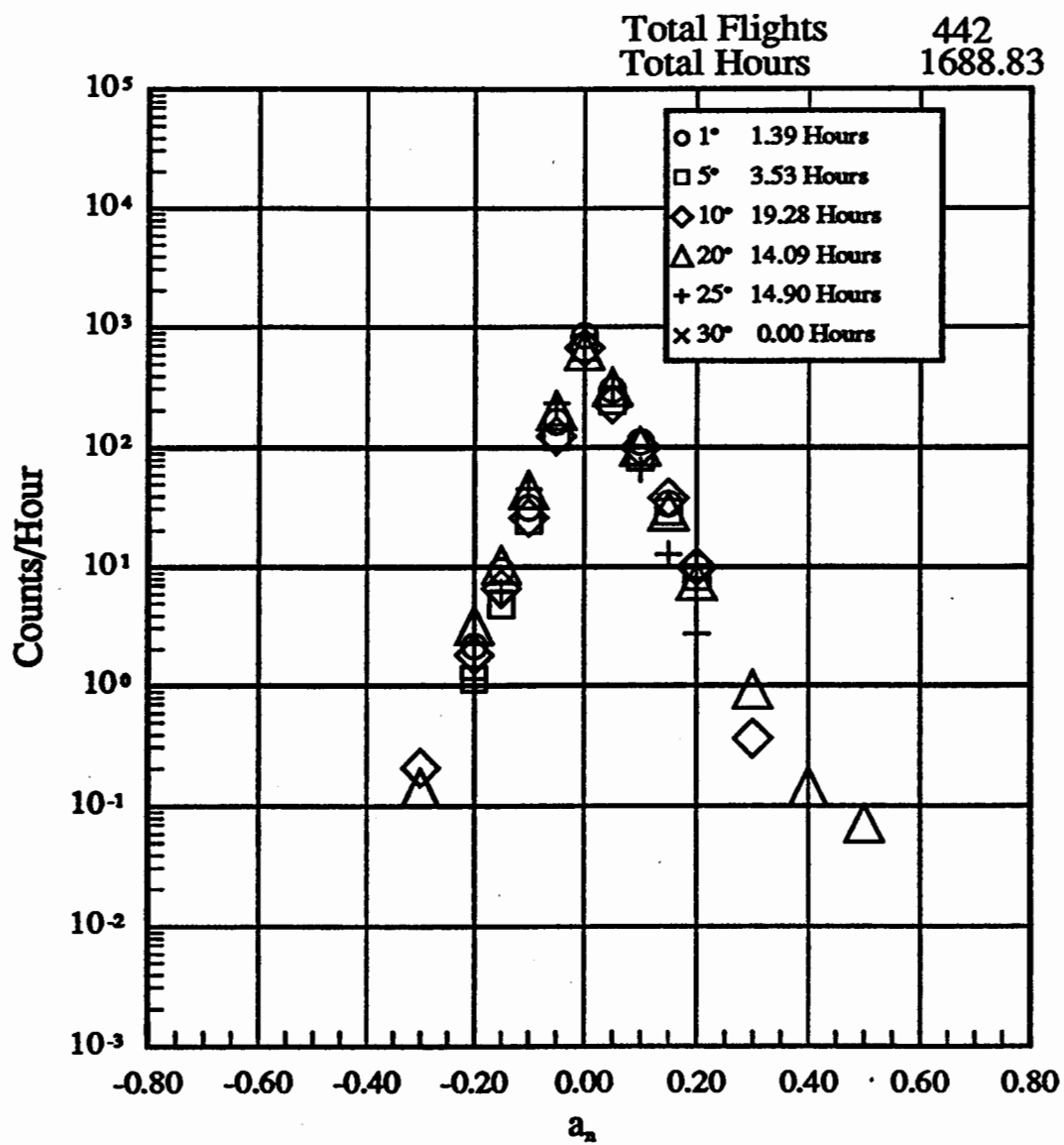
(b) Take off

Figure 20.- Continued.

FLAP DETENT, DEGREES						
a_n LEVEL	1	5	10	20	25	30
g's						
1.60	0	0	0	0	0	0
1.40	0	0	0	0	0	0
1.20	0	0	0	0	0	0
1.00	0	0	0	0	0	0
.80	0	0	0	0	0	0
.70	0	0	0	0	0	0
.60	0	0	0	0	0	0
.50	0	0	0	0.071	0	0
.40	0	0	0	0.142	0	0
.30	0	0	0.363	0.923	0	0
.20	10.040	8.226	9.906	7.596	2.752	0
.15	33.705	28.934	37.655	29.177	12.822	0
.10	110.438	80.845	99.272	101.159	65.316	0
.05	297.610	240.832	227.796	313.843	315.101	0
0	842.629	667.749	666.220	627.828	859.110	0
-.05	164.223	121.125	124.271	201.822	231.593	0
-.10	31.554	24.395	25.933	43.871	44.842	0
-.15	9.323	4.822	6.587	10.295	6.243	0
-.20	2.151	1.135	1.815	3.195	1.141	0
-.30	0	0	0.207	0.142	0	0
-.40	0	0	0	0	0	0
-.50	0	0	0	0	0	0
-.60	0	0	0	0	0	0
-.70	0	0	0	0	0	0
-.80	0	0	0	0	0	0
-1.00	0	0	0	0	0	0
-1.20	0	0	0	0	0	0
-1.40	0	0	0	0	0	0
-1.60	0	0	0	0	0	0
FLIGHT HOURS IN DETENT	1.394	3.525	19.280	14.087	14.897	0
TOTAL HOURS						53.18
TOTAL FLIGHTS						442
TOTAL FLIGHT HOURS FLAPS UP AND DOWN						1688.83
TOTAL FLIGHT MILES FLAPS UP AND DOWN						772612.93

(c) Landing

Figure 20.- Continued.



(d) Landing.

Figure 20.- Concluded.

MAXIMUM a_n LEVEL FOR EACH FLIGHT		EAS, KTS																			
g's FROM	TO	120 130	130 140	140 150	150 160	160 170	170 180	180 190	190 200	200 210	210 220	220 230	230 240	240 250	250 260	260 270	270 280	280 290	290 300	300 310	310 320
1.60	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.40	1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.20	1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.00	1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.80	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.70	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.60	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.50	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.40	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.30	0.40	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
.20	0.30	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	
.15	0.20	0	0	0	0	0	0	1	2	3	2	1	0	0	0	0	0	0	0	0	
.10	0.15	0	0	0	0	0	0	2	5	8	5	2	0	0	0	0	0	0	0	0	
.05	0.10	0	0	0	0	0	0	1	9	10	12	3	0	0	0	0	0	0	0	0	
-.05	-0.10	0	0	0	0	0	0	1	9	14	9	2	0	0	0	0	0	0	0	0	
-.10	-0.15	0	0	0	0	0	0	0	2	4	3	1	0	0	0	0	0	0	0	0	
-.15	-0.20	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	
-.20	-0.30	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	
-.30	-0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.40	-0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.50	-0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.60	-0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.70	-0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.80	-1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.00	-1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.20	-1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.40	-1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.60	-1.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL PEAKS @ EAS		0	0	0	1	0	2	24	120	196	135	30	2	0	0	0	0	0	0	0	
FLIGHT HOURS @ EAS		0	0	0	0	0	0	0.1	0.4	0.5	0.4	0.1	0	0	0	0	0	0	0	0	
FLIGHT MILES @ EAS		0	0	0	0	0	1	11	74	112	89	24	1	0	0	0	0	0	0	0	
TOTAL FLIGHTS INCLUDED																				439	
TOTAL FLIGHTS OBSERVED																				462	
TOTAL FLIGHT HOURS, ANY FLAP																				1688.83	
TOTAL FLIGHT MILES, ANY FLAP																				772612.96	

(a) Take off; flaps 1 degree detent

Figure 21.- Peak positive and negative a_n per flight vs EAS bands; percent of flights.

MAXIMUM a_n		KAS, KTS																					
LEVEL FOR EACH FLIGHT																							
g's FROM	TO	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	
		130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320		
1.60	1.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
1.40	1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
1.20	1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
1.00	1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
.80	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
.70	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
.60	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
.50	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
.40	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
.30	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
.20	0.30	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0		
.15	0.20	0	0	0	0	0	0	2	3	2	1	0	0	0	0	0	0	0	0	0	0		
.10	0.15	0	0	0	0	0	1	4	5	4	1	0	0	0	0	0	0	0	0	0	0		
.05	0.10	0	0	0	0	0	3	11	12	7	4	0	0	0	0	0	0	0	0	0	0		
-.05	-0.10	0	0	0	0	2	10	12	12	5	2	0	0	0	0	0	0	0	0	0	0		
-.10	-0.15	0	0	0	0	1	4	8	4	3	2	0	0	0	0	0	0	0	0	0	0		
-.15	-0.20	0	0	0	0	0	2	3	2	1	0	0	0	0	0	0	0	0	0	0	0		
-.20	-0.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-.30	-0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-.40	-0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-.50	-0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-.60	-0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-.70	-0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-.80	-1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-1.00	-1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-1.20	-1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-1.40	-1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
-1.60	-1.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
TOTAL PEAKS @ KAS		0	0	0	1	18	96	180	170	96	44	2	0	0	0	0	0	0	0	0	0		
FLIGHT HOURS @ KAS		0	0	0	0	0.1	0.3	0.6	0.6	0.5	0.2	0	0	0	0	0	0	0	0	0	0		
FLIGHT MILES @ KAS		0	0	0	0	11	54	113	126	104	44	3	0	0	0	0	0	0	0	0	0		
TOTAL FLIGHTS INCLUDED																						441	
TOTAL FLIGHTS ANALYZED																						442	
TOTAL FLIGHT HOURS, ANY FLAP																						1688.83	
TOTAL FLIGHT MILES, ANY FLAP																						772612.93	

(b) Take off; flaps 5 degree detent

Figure 21.- Continued.

MAXIMUM a_z

LEVEL FOR EACH

FLIGHT

g's FROM TO

1.40 1.40

1.40 1.40

1.20 1.20

1.00 1.00

.80 1.00

.70 0.80

.60 0.70

.50 0.60

.40 0.50

.30 0.40

.20 0.30

.15 0.20

.10 0.15

.05 0.10

-.05 -0.10

-.10 -0.15

-.15 -0.20

-.20 -0.30

-.30 -0.40

-.40 -0.50

-.50 -0.60

-.60 -0.70

-.70 -0.80

-.80 -1.00

-1.00 -1.20

-1.20 -1.40

-1.40 -1.60

-1.60 -1.80

FLIGHT HOURS

200 210

210 220

220 230

230 240

240 250

250 260

260 270

270 280

280 290

290 300

300 310

310 320

320 330

330 340

340 350

350 360

360 370

370 380

380 390

390 400

400 410

410 420

420 430

430 440

440 450

450 460

460 470

470 480

480 490

490 500

500 510

510 520

520 530

530 540

540 550

550 560

560 570

570 580

580 590

590 600

600 610

610 620

620 630

630 640

640 650

650 660

660 670

670 680

680 690

690 700

700 710

710 720

720 730

730 740

740 750

750 760

760 770

770 780

780 790

790 800

800 810

810 820

820 830

830 840

840 850

850 860

860 870

870 880

FLIGHT HOURS

200 210

210 220

220 230

230 240

240 250

250 260

260 270

270 280

280 290

290 300

300 310

310 320

320 330

330 340

340 350

350 360

360 370

370 380

380 390

390 400

400 410

410 420

420 430

430 440

440 450

450 460

460 470

470 480

480 490

490 500

500 510

510 520

520 530

530 540

540 550

550 560

560 570

570 580

580 590

590 600

600 610

610 620

620 630

630 640

640 650

650 660

660 670

670 680

680 690

690 700

700 710

710 720

720 730

730 740

740 750

750 760

760 770

770 780

780 790

790 800

800 810

810 820

820 830

830 840

840 850

850 860

860 870

870 880

FLIGHT HOURS

200 210

210 220

220 230

230 240

240 250

250 260

260 270

270 280

280 290

290 300

300 310

310 320

320 330

330 340

340 350

350 360

360 370

370 380

380 390

390 400

400 410

410 420

420 430

430 440

440 450

450 460

460 470

470 480

480 490

490 500

500 510

510 520

520 530

530 540

540 550

550 560

560 570

570 580

580 590

590 600

600 610

610 620

620 630

630 640

640 650

650 660

660 670

670 680

680 690

690 700

700 710

710 720

720 730

730 740

740 750

750 760

760 770

770 780

780 790

790 800

800 810

810 820

820 830

830 840

840 850

850 860

860 870

870 880

FLIGHT HOURS

200 210

MAXIMUM a_n		EAS, KTS																			
LEVEL FOR EACH FLIGHT																					
g's FROM	TO	120 130	130 140	140 150	150 160	160 170	170 180	180 190	190 200	200 210	210 220	220 230	230 240	240 250	250 260	260 270	270 280	280 290	290 300	300 310	310 320
1.60	1.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.40	1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.20	1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.00	1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.80	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.70	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.60	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.50	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.40	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.30	0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.20	0.30	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	
.15	0.20	0	0	0	0	0	0	1	2	3	1	1	0	0	0	0	0	0	0	0	
.10	0.15	0	0	0	0	0	0	2	4	5	3	2	0	0	0	0	0	0	0	0	
.05	0.10	0	0	0	0	0	2	6	12	14	11	4	0	0	0	0	0	0	0	0	
-.05	-0.10	0	0	0	0	0	1	3	7	9	3	2	0	0	0	0	0	0	0	0	
-.10	-0.15	0	0	0	0	0	1	1	2	3	1	0	0	0	0	0	0	0	0	0	
-.15	-0.20	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	
-.20	-0.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.30	-0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.40	-0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.50	-0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.60	-0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.70	-0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.80	-1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.00	-1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.20	-1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.40	-1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.60	-1.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL PEAKS @ EAS		0	0	0	0	2	22	66	119	144	83	37	4	0	0	0	0	0	0	0	
FLIGHT HOURS @ EAS		0	0	0	0	0.1	0.2	0.6	0.8	1.0	0.6	0.2	0	0	0	0	0	0	0	0	
FLIGHT MILES @ EAS		0	0	0	0	11	41	123	163	229	135	54	8	0	0	0	0	0	0	0	
TOTAL FLIGHTS INCLUDED																				421.50	
TOTAL FLIGHTS ANALYZED																				442	
TOTAL FLIGHT HOURS, ANY FLAP																				1688.83	
TOTAL FLIGHT MILES, ANY FLAP																				772612.98	

(e) Landing; flaps 5 degree detent

Figure 21.- Continued.

MAXIMUM g _n		KAS, KTS																			
LEVEL FOR EACH FLIGHT																					
g's FROM	TO	120 130	130 140	140 150	150 160	160 170	170 180	180 190	190 200	200 210	210 220	220 230	230 240	240 250	250 260	260 270	270 280	280 290	290 300	300 310	310 320
1.60	1.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.40	1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.20	1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.00	1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.80	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.70	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.60	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.50	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.40	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
.30	0.40	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
.20	0.30	0	0	0	0	2	4	5	6	2	1	0	0	0	0	0	0	0	0	0	0
.15	0.20	0	0	0	0	4	7	7	4	3	1	0	0	0	0	0	0	0	0	0	0
.10	0.15	0	0	0	0	2	7	8	5	5	1	0	0	0	0	0	0	0	0	0	0
.05	0.10	0	0	0	0	1	2	7	6	4	2	0	0	0	0	0	0	0	0	0	0
-.05	-0.10	0	0	0	0	6	14	11	7	4	3	0	0	0	0	0	0	0	0	0	0
-.10	-0.15	0	0	0	0	2	6	3	3	3	1	0	0	0	0	0	0	0	0	0	0
-.15	-0.20	0	0	0	1	1	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0
-.20	-0.30	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
-.30	-0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.40	-0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.50	-0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.60	-0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.70	-0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-.80	-1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1.00	-1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1.20	-1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1.40	-1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-1.60	-1.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PERMS @ KAS		0	0	0	7	80	194	195	143	93	46	3	2	0	0	0	0	0	0	0	0
HOURS @ KAS		0	0	0	0.2	2.1	6.0	5.0	3.0	2.1	0.7	0.1	0	0	0	0	0	0	0	0	0
MILES @ KAS		0	0	0	29	379	1114	985	638	474	150	28	9	0	0	0	0	0	0	0	0
TOTAL FLIGHTS INCLUDED																					434
TOTAL FLIGHTS ANALYZED																					442
TOTAL FLIGHT HOURS, ANY FLAP																					1688.83
TOTAL FLIGHT MILES, ANY FLAP																					772612.93

(f) Landing; flaps 15 degree detent

Figure 21.- Continued.

MAXIMUM q_z LEVEL FOR EACH FLIGHT		EAS, KTS																			
q's FROM	TO	120 130	130 140	140 150	150 160	160 170	170 180	180 190	190 200	200 210	210 220	220 230	230 240	240 250	250 260	260 270	270 280	280 290	290 300	300 310	310 320
1.60	1.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.40	1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.20	1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1.00	1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.80	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.70	0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.60	0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.50	0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.40	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
.30	0.40	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
.20	0.30	0	0	1	2	3	4	1	1	0	0	0	0	0	0	0	0	0	0	0	
.15	0.20	0	0	1	2	7	6	4	0	1	0	0	0	0	0	0	0	0	0	0	
.10	0.15	0	0	1	5	8	10	7	2	1	0	0	0	0	0	0	0	0	0	0	
.05	0.10	0	0	2	5	5	8	4	0	1	0	0	0	0	0	0	0	0	0	0	
-.05	-0.10	0	0	3	10	12	11	2	1	1	0	0	0	0	0	0	0	0	0	0	
-.10	-0.15	0	0	4	6	9	8	2	0	0	0	0	0	0	0	0	0	0	0	0	
-.15	-0.20	0	0	1	2	5	3	1	0	0	0	0	0	0	0	0	0	0	0	0	
-.20	-0.30	0	0	1	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.30	-0.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.40	-0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.50	-0.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.60	-0.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.70	-0.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-.80	-1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.00	-1.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.20	-1.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.40	-1.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-1.60	-1.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL PEAKS @ EAS		0	3	58	148	224	237	101	26	23	2	0	2	0	0	0	0	0	0	0	
FLIGHT HOURS @ EAS		0	0.1	1.2	3.5	4.2	3.0	1.3	0.5	0.2	0	0	0.1	0	0	0	0	0	0	0	
FLIGHT MILES @ EAS		0	21	188	570	718	540	259	96	33	5	1	18	0	0	0	0	0	0	0	
TOTAL FLIGHTS INCLUDED																				441	
TOTAL FLIGHTS ANALYZED																				442	
TOTAL FLIGHT HOURS, ANY FLAP																				1688.83	
TOTAL FLIGHT MILES, ANY FLAP																				772612.93	

(g) Landing; flaps 20 degree detent

Figure 21.- Continued.

PRESSURE ALTITUDE BANDS										
a_n	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
LEVEL										
g's										
1.60	0	0	0	0	0	0	0	0	0	0
1.40	0	0	0	0	0	0	0	0	0	0
1.20	0	0	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0	0	0
.80	0	0	0	0	0	0	0	0	0	0
.70	0	0	0	0	0	0	0	0	0	0
.60	0	0	0	0	0	0	0	0	0	0
.50	0	0	0	0	0	0	0	0	0	0
.40	0.20	0.96	0	0	0	0.93	0	0	0	0.17
.30	1.76	1.91	0	0	0	0.93	0.79	0.29	0	1.03
.20	36.54	11.47	3.24	1.47	0	2.80	0.79	0.14	0	17.08
.15	106.10	20.07	8.91	1.47	2.81	7.48	5.51	0.58	0	49.16
.10	244.45	52.56	31.59	4.41	8.43	10.28	19.69	3.60	0	114.96
.05	461.34	177.75	126.34	52.88	51.99	34.58	90.55	33.71	0	238.15
0	777.20	556.20	744.30	934.15	781.26	1016.82	885.83	1034.29	0	864.17
-.05	410.83	124.24	108.53	86.66	61.83	46.73	62.99	17.14	0	207.88
-.10	151.63	27.71	16.20	7.34	5.62	8.41	8.66	3.03	0	71.19
-.15	54.81	11.47	10.53	1.47	0	7.48	2.36	1.01	0	26.09
-.20	19.34	0	3.24	0	0	5.61	2.36	0.43	0	9.23
-.30	1.56	0	0	0	0	0	0	0.14	0	0.73
-.40	0.10	0	0	0	0	0	0	0	0	0.04
-.50	0	0	0	0	0	0	0	0	0	0
-.60	0	0	0	0	0	0	0	0	0	0
-.70	0	0	0	0	0	0	0	0	0	0
-.80	0	0	0	0	0	0	0	0	0	0
-1.00	0	0	0	0	0	0	0	0	0	0
-1.20	0	0	0	0	0	0	0	0	0	0
-1.40	0	0	0	0	0	0	0	0	0	0
-1.60	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	10.24	1.05	1.23	0.68	0.71	1.07	1.27	6.94	0	23.19
FLIGHT MILES @ ALT	1814.48	278.29	435.09	273.62	305.17	508.15	620.66	3369.31	0	7604.77
TOTAL FLIGHTS										73
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										23.19
TOTAL FLIGHT MILES FLAPS UP AND DOWN										7604.77

(a) a_n Level crossing counts per hour within pressure altitude bands

Figure 22.- Normal acceleration exceedances: Non-revenue flights.

PRESSURE ALTITUDE BANDS										
a_{NM} LEVEL g's	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
1.60	0	0	0	0	0	0	0	0	0	0
1.40	0	0	0	0	0	0	0	0	0	0
1.20	0	0	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0	0	0
.80	0	0	0	0	0	0	0	0	0	0
.70	0	0	0	0	0	0	0	0	0	0
.60	0	0	0	0	0	0	0	0	0	0
.50	0	0	0	0	0	0	0	0	0	0
.40	0	0	0	0	0	0	0	0	0	0
.30	0	0.96	0	0	0	0.93	0	0.14	0	0.13
.20	2.34	2.87	0	1.47	0	0.93	0.79	0.14	0	1.34
.15	12.11	4.78	0.81	1.47	0	1.87	1.57	0.14	0	5.86
.10	36.54	10.51	5.67	2.94	0	2.80	2.36	0.43	0	17.38
.05	71.13	37.27	30.78	13.22	5.62	9.35	15.75	4.18	0	37.82
0	170.29	122.33	123.91	138.07	119.44	151.40	169.29	143.76	0	154.28
-.05	55.98	23.89	19.44	13.22	7.03	12.15	7.87	2.74	0	29.24
-.10	11.33	5.73	3.24	2.94	1.41	3.74	0	0.43	0	5.86
-.15	2.74	0.96	0	1.47	0	1.87	0	0.29	0	1.47
-.20	0.98	0	0	0	0	0.93	0	0.14	0	0.52
-.30	0	0	0	0	0	0	0	0	0	0
-.40	0	0	0	0	0	0	0	0	0	0
-.50	0	0	0	0	0	0	0	0	0	0
-.60	0	0	0	0	0	0	0	0	0	0
-.70	0	0	0	0	0	0	0	0	0	0
-.80	0	0	0	0	0	0	0	0	0	0
-1.00	0	0	0	0	0	0	0	0	0	0
-1.20	0	0	0	0	0	0	0	0	0	0
-1.40	0	0	0	0	0	0	0	0	0	0
-1.60	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	10.24	1.05	1.23	0.68	0.71	1.07	1.27	6.94	0	23.19
FLIGHT MILES @ ALT	1814.48	278.29	435.09	273.62	305.17	508.15	620.66	3369.31	0	7604.77
TOTAL FLIGHTS										73
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										23.19
TOTAL FLIGHT MILES FLAPS UP AND DOWN										7604.77

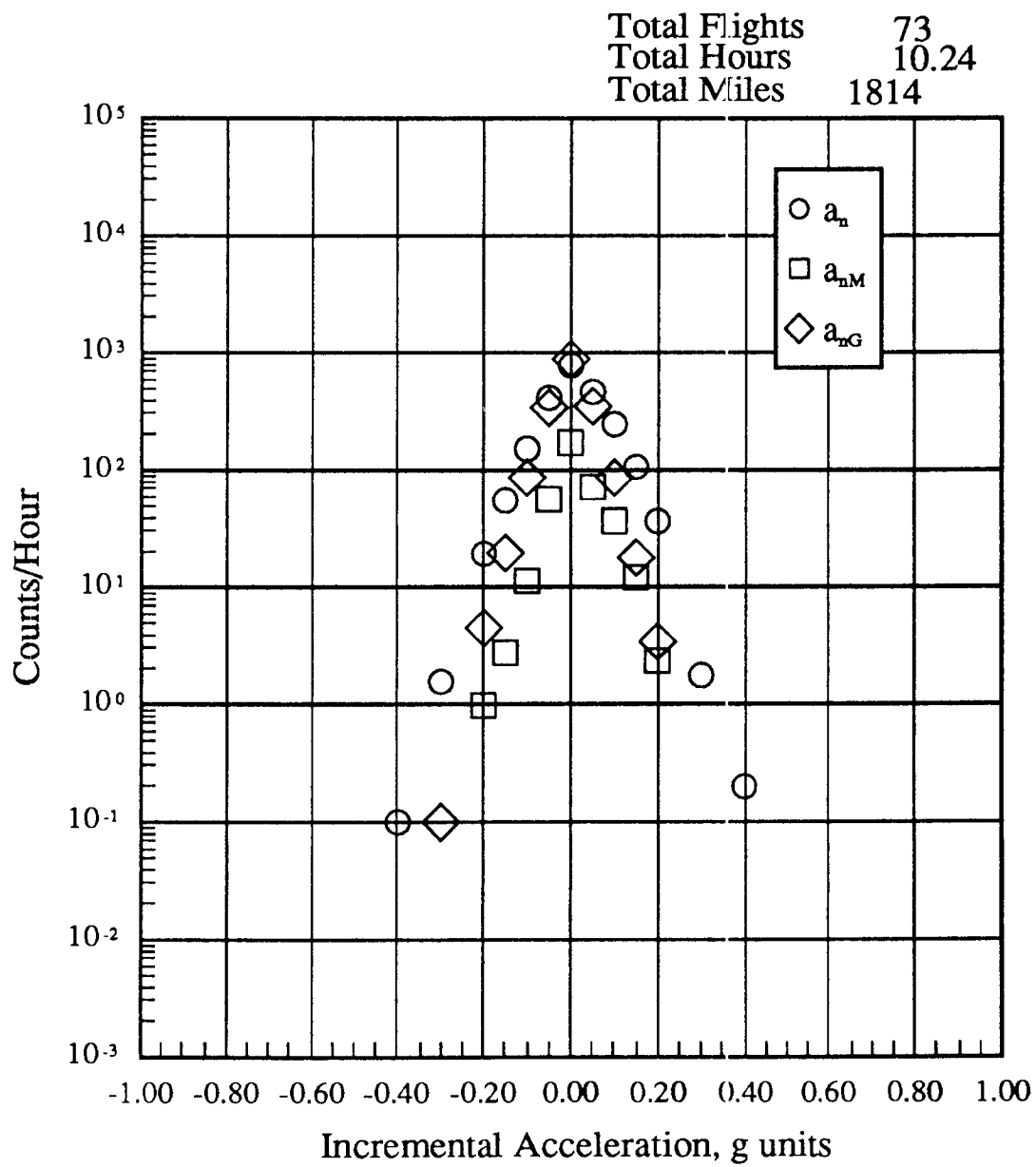
(b) a_{NM} Level crossing counts per hour within pressure altitude bands

Figure 22.- Continued.

PRESSURE ALTITUDE BANDS										
a _{nG} LEVEL g's	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
1.60	0	0	0	0	0	0	0	0	0	0
1.40	0	0	0	0	0	0	0	0	0	0
1.20	0	0	0	0	0	0	0	0	0	0
1.00	0	0	0	0	0	0	0	0	0	0
.80	0	0	0	0	0	0	0	0	0	0
.70	0	0	0	0	0	0	0	0	0	0
.60	0	0	0	0	0	0	0	0	0	0
.50	0	0	0	0	0	0	0	0	0	0
.40	0	0	0	0	0	0	0	0	0	0
.30	0	0	0	0	0	0	0	0	0	0
.20	3.42	0	0	0	0	0	0	0	0	0
.15	17.88	0	2.43	0	0	0.93	0	0	0	1.68
.10	85.98	2.87	3.24	0	0	2.80	0	0.14	0	8.37
.05	348.59	11.47	8.10	0	4.22	3.74	3.15	0.72	0	39.58
0	880.96	69.76	26.73	19.09	9.84	21.50	24.41	7.78	0	163.94
-.05	338.24	820.92	888.46	987.03	1001.87	1074.77	981.89	1122.45	0	972.23
-.10	85.88	64.03	29.16	13.22	15.46	17.76	23.62	5.76	0	158.42
-.15	19.64	9.56	8.10	0	0	7.48	3.94	0.58	0	39.50
-.20	4.49	0.96	6.48	0	0	3.74	0.79	0.14	0	9.31
-.30	0.10	0.96	3.24	0	0	1.87	0	0	0	2.29
-.40	0	0	0	0	0	0	0	0	0	0.04
-.50	0	0	0	0	0	0	0	0	0	0
-.60	0	0	0	0	0	0	0	0	0	0
-.70	0	0	0	0	0	0	0	0	0	0
-.80	0	0	0	0	0	0	0	0	0	0
-1.00	0	0	0	0	0	0	0	0	0	0
-1.20	0	0	0	0	0	0	0	0	0	0
-1.40	0	0	0	0	0	0	0	0	0	0
-1.60	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	10.24	1.05	1.23	0.68	0.71	1.07	1.27	6.94	0	23.19
FLIGHT MILES @ ALT	1814.48	278.29	435.09	273.62	305.17	508.15	620.66	3369.31	0	7604.77
TOTAL FLIGHTS										73
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										23.19
TOTAL FLIGHT MILES FLAPS UP AND DOWN										7604.77

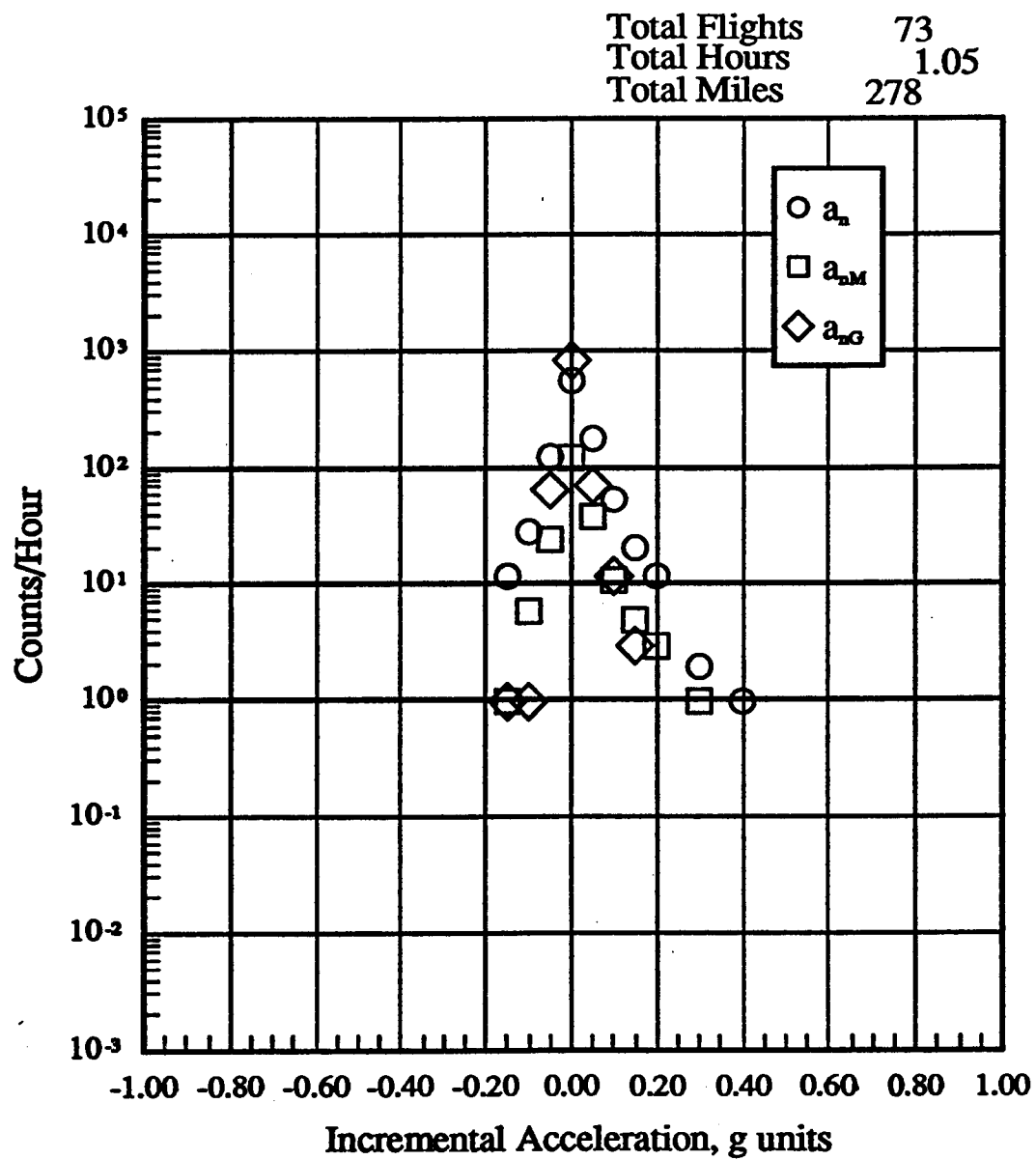
(c) a_{nG} Level crossing counts per hour within pressure altitude bands

Figure 22.- Continued.



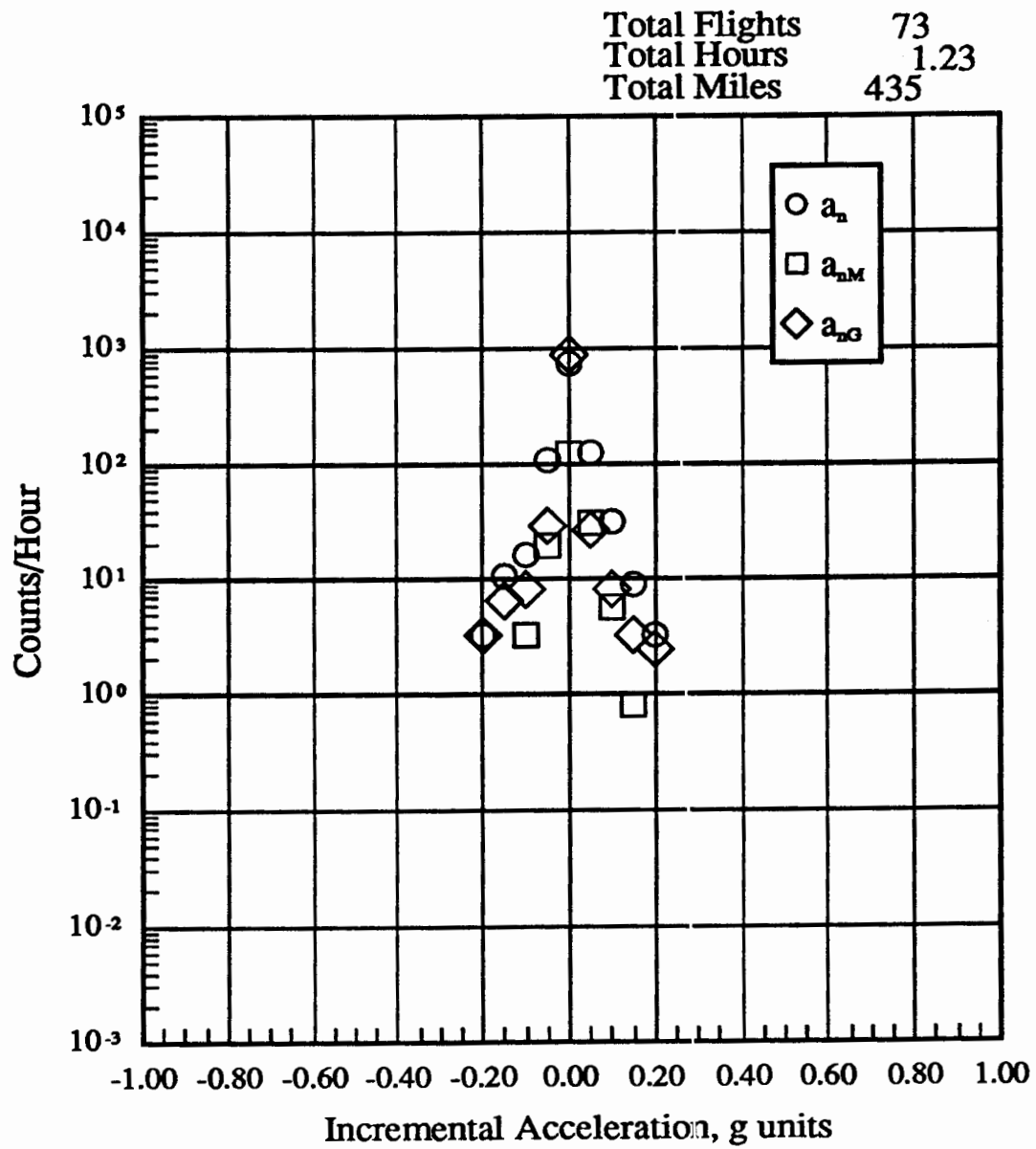
(d) a_n , a_{nM} , a_{nG} , -500 to 4500 feet altitude

Figure 22.- Continued.



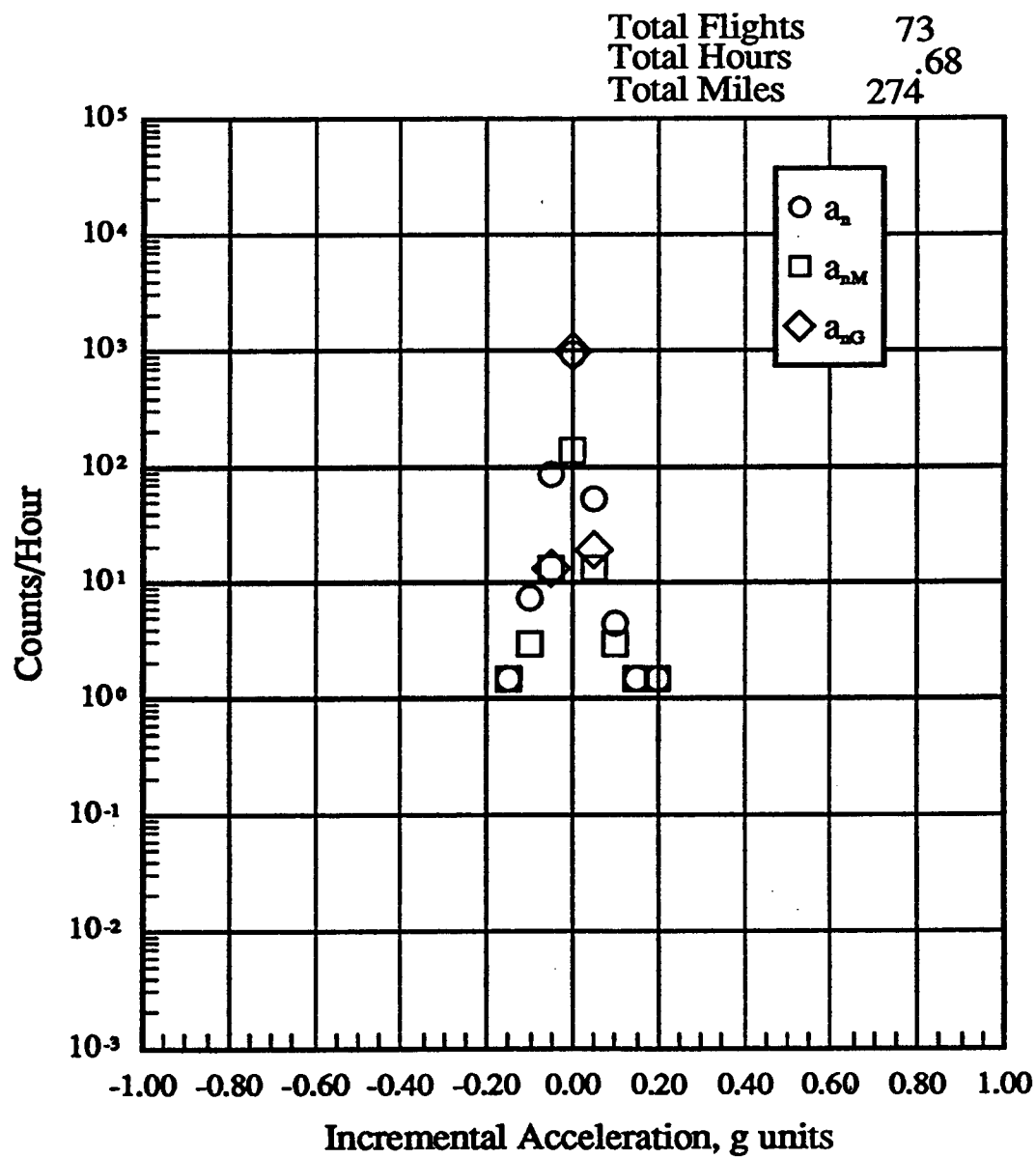
(e) a_n , a_{nM} , a_{nG} , 4500 to 9500 feet altitude

Figure 22.- Continued.



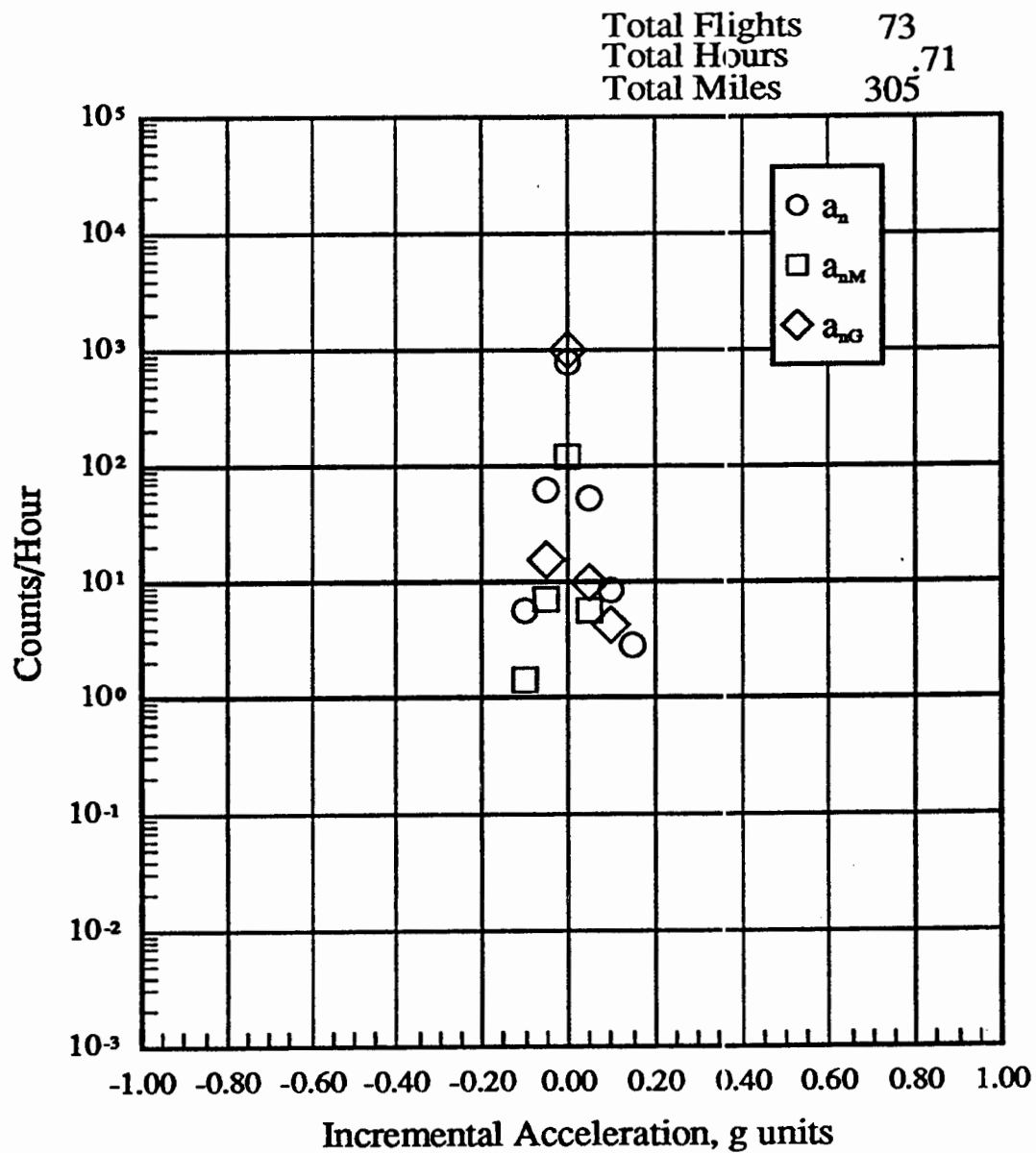
(f) a_n , a_{nM} , a_{nG} , 9500 to 14500 feet altitude

Figure 22.- Continued.



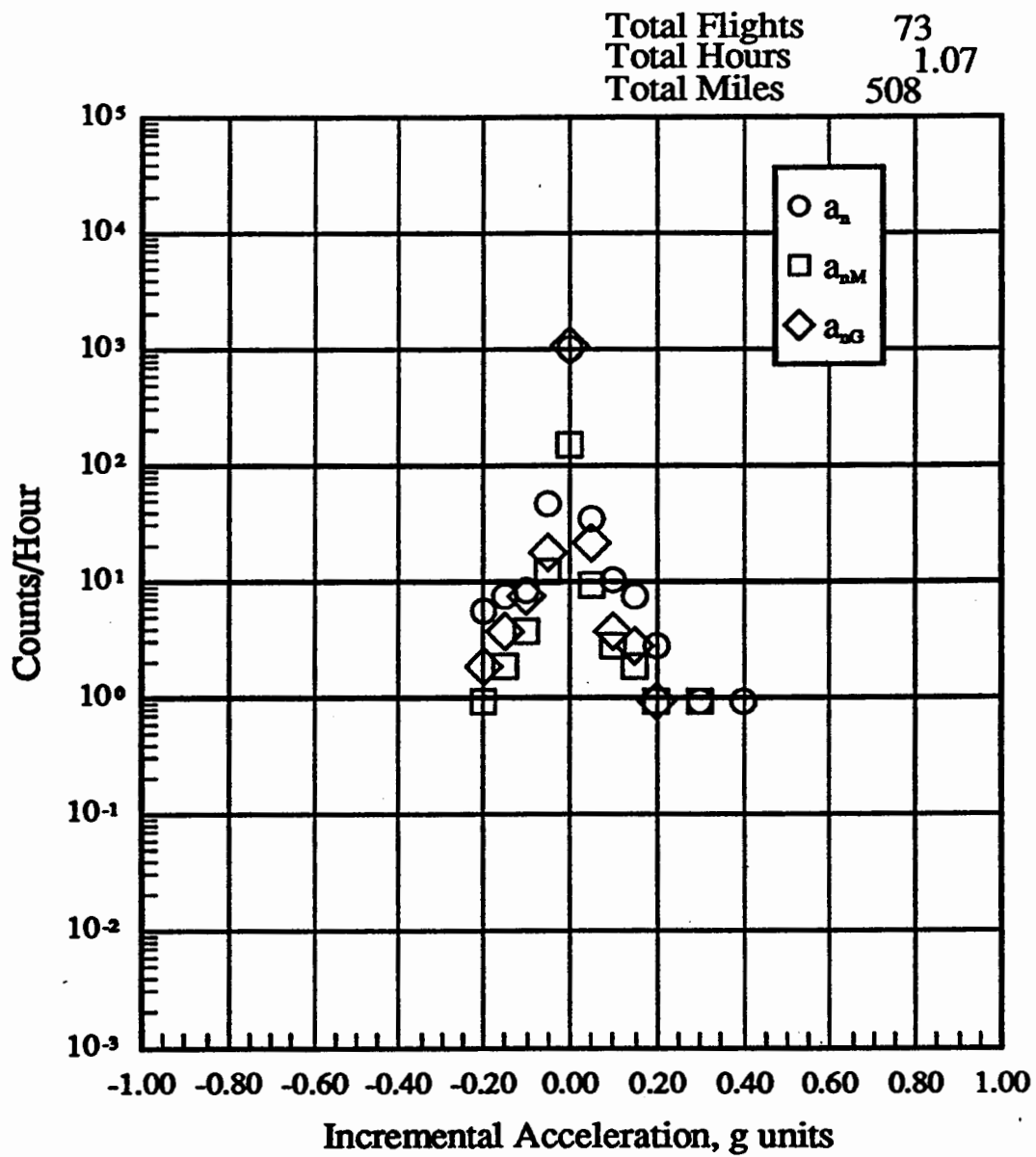
(g) a_n , a_{nM} , a_{nG} , 14500 to 19500 feet altitude

Figure 22.- Continued.



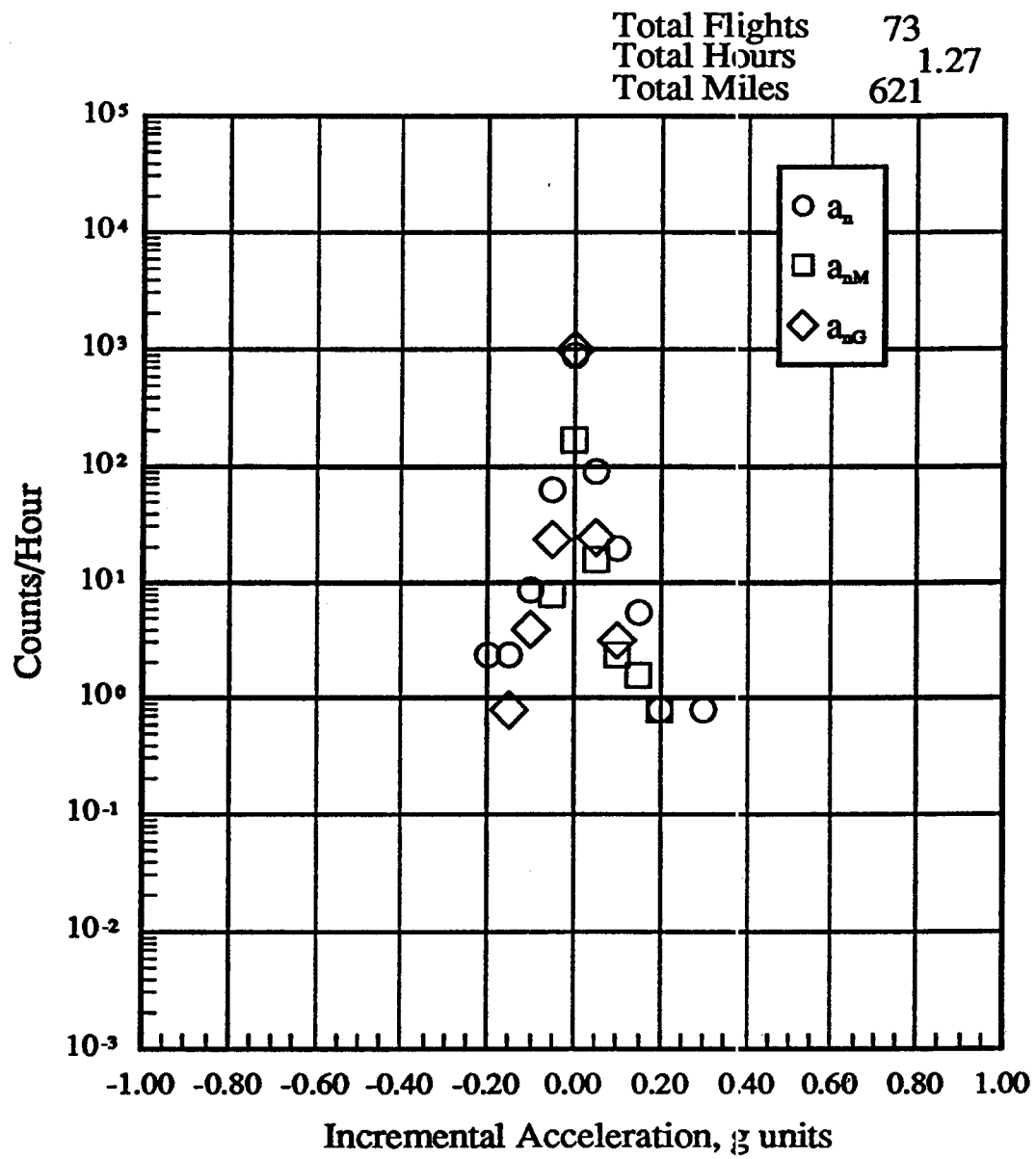
(h) a_n , a_{nm} , a_{mg} , 19500 to 24500 feet altitude

Figure 22.- Continued.



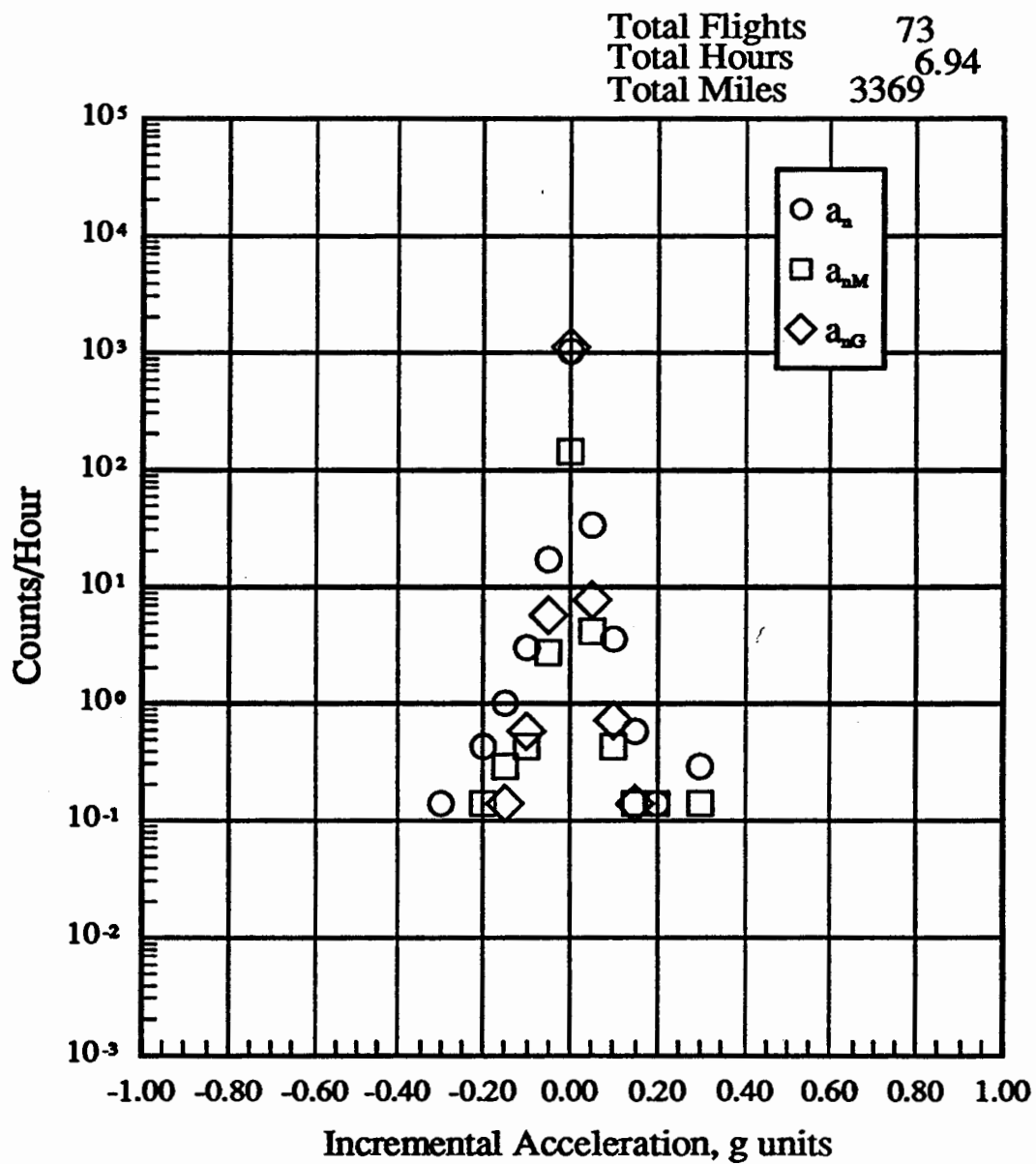
(i) a_n , a_{nM} , a_{nG} , 24500 to 29500 feet altitude

Figure 22.- Continued.



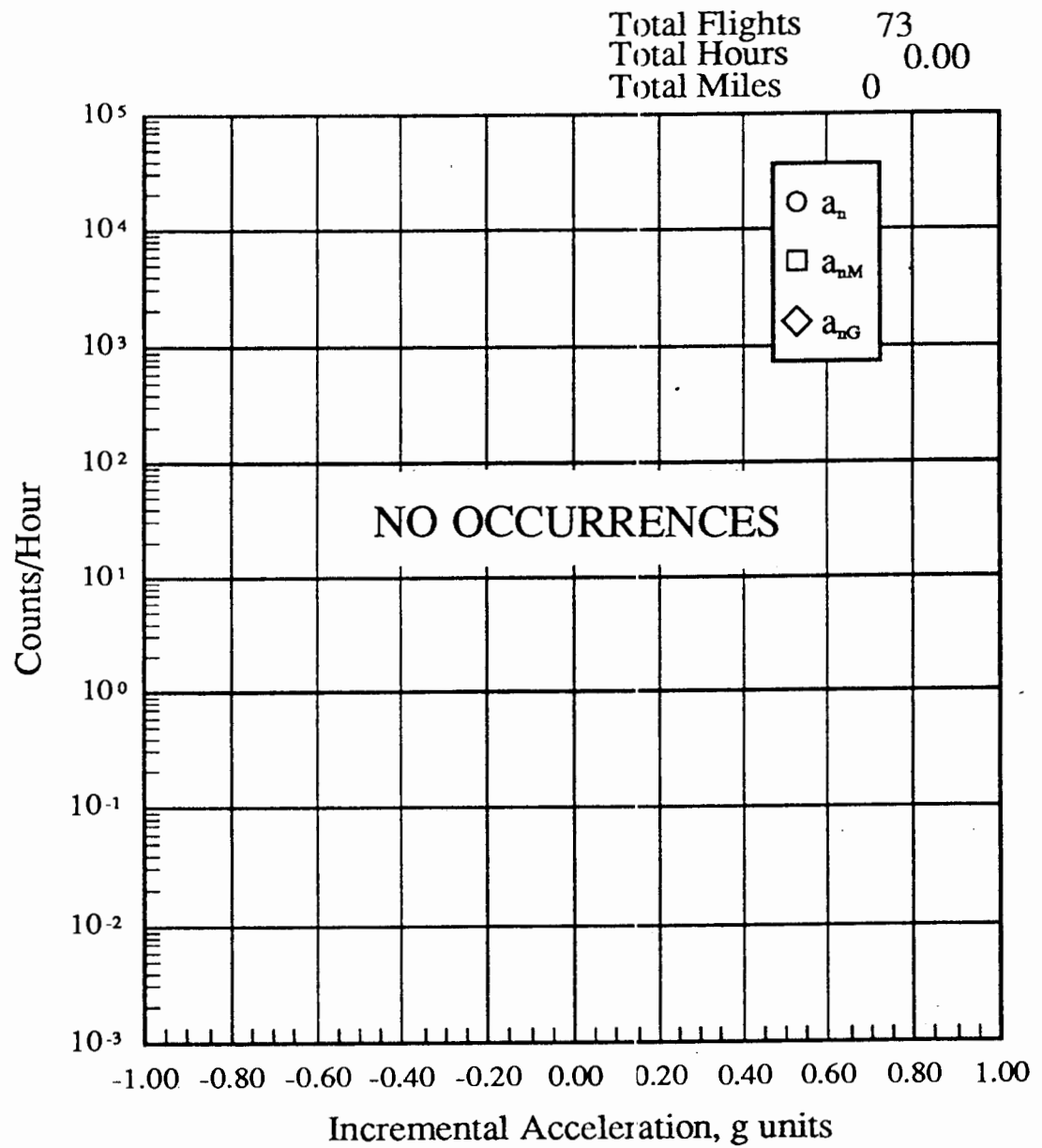
(j) a_n , a_{nM} , a_{nG} , 29500 to 34500 feet altitude

Figure 22.- Continued.



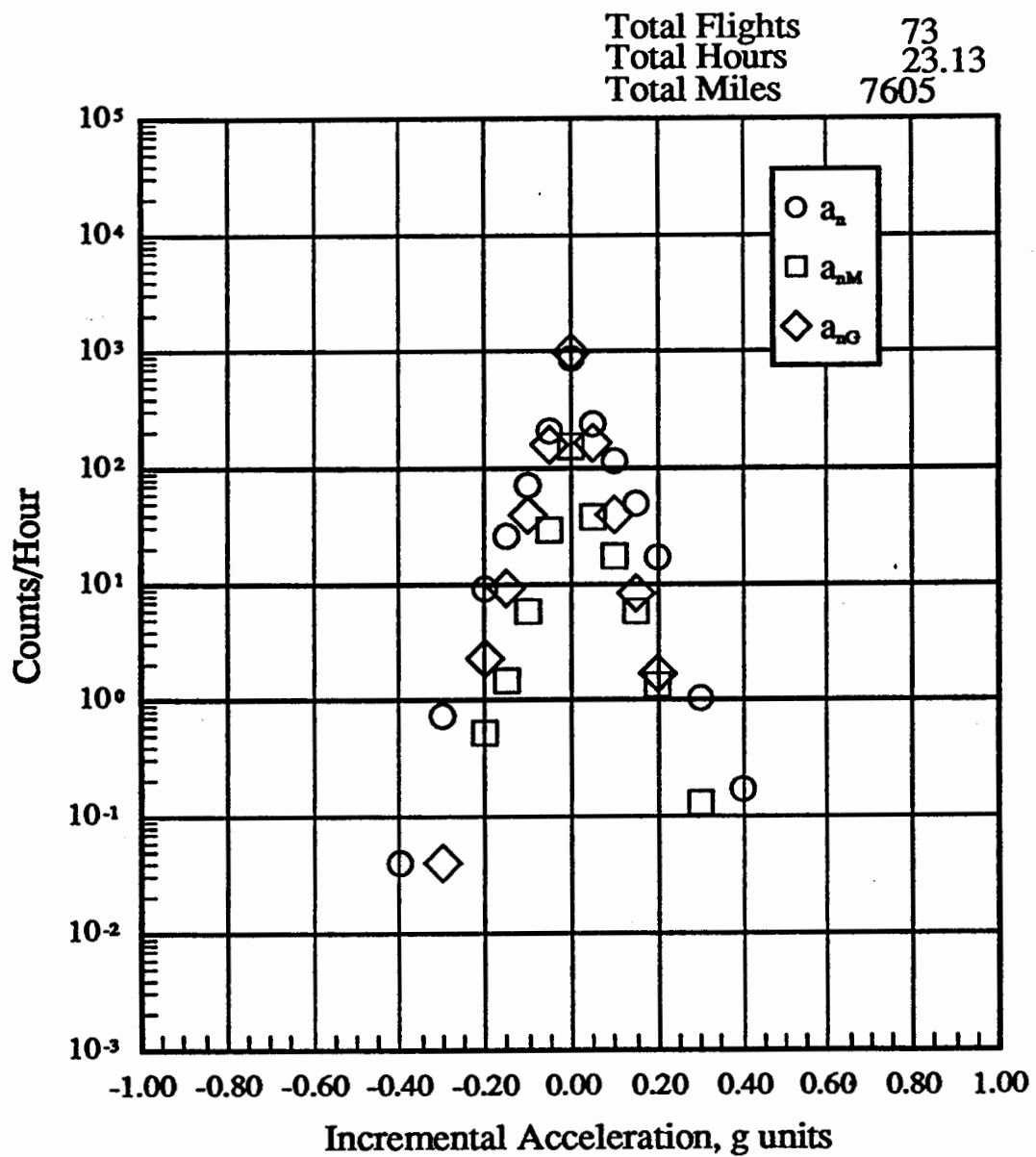
(k) a_n , a_{nM} , a_{nG} , 34500 to 39500 feet altitude

Figure 22.- Continued.



(1) a_n , a_{nM} , a_{nG} , 39500 to 44500 feet altitude

Figure 22.- Continued.



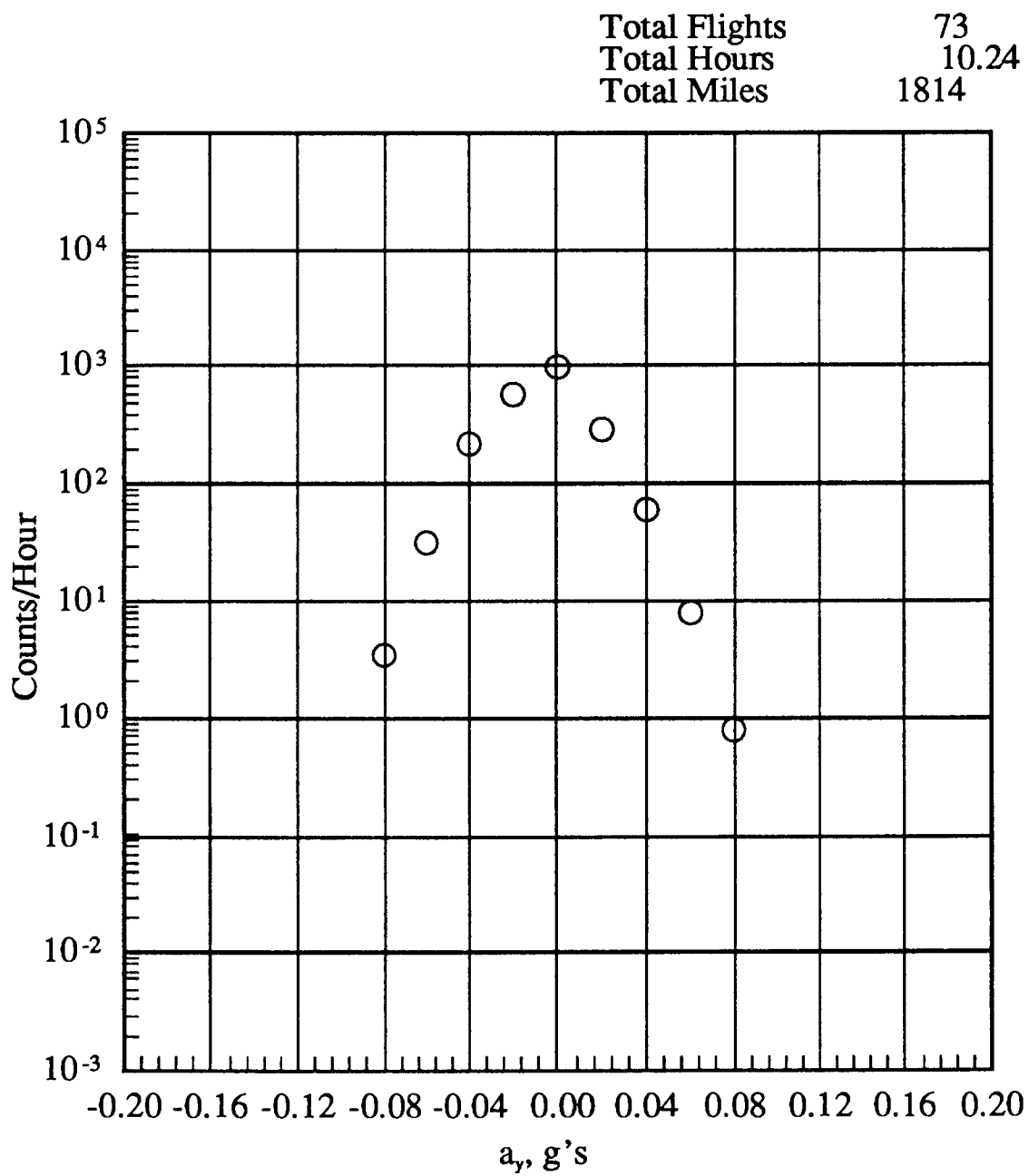
(m) a_n , a_{nM} , a_{nG} , -500 to 44500 feet altitude

Figure 22.- Continued.

PRESSURE ALTITUDE BANDS										
a_y LEVEL g's	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
.48	0	0	0	0	0	0	0	0	0	0
.44	0	0	0	0	0	0	0	0	0	0
.40	0	0	0	0	0	0	0	0	0	0
.36	0	0	0	0	0	0	0	0	0	0
.32	0	0	0	0	0	0	0	0	0	0
.28	0	0	0	0	0	0	0	0	0	0
.24	0	0	0	0	0	0	0	0	0	0
.20	0	0	0	0	0	0	0	0	0	0
.16	0	0	0	0	0	0	0	0	0	0
.12	0	0	0	0	0	0	0	0	0	0.34
.08	0.78	0	0	0	0	0	0	0	0	3.75
.06	7.91	5.73	0	0	0	0.93	0.79	0	0	28.42
.04	60.77	26.76	4.86	0	1.41	5.61	25.98	8.36	0	141.82
.02	294.37	100.35	45.35	13.22	12.65	1054.21	906.30	1293.87	0	1032.34
0	994.59	731.09	660.07	574.30	743.33	21.50	40.16	13.83	0	276.75
-.02	582.88	97.48	69.65	99.88	36.53	0.93	3.15	0.43	0	99.48
-.04	222.07	17.20	1.62	7.34	1.41	0	0	0	0	13.88
-.06	31.46	0	0	0	0	0	0	0	0	1.51
-.08	3.42	0	0	0	0	0	0	0	0	0
-.12	0	0	0	0	0	0	0	0	0	0
-.16	0	0	0	0	0	0	0	0	0	0
-.20	0	0	0	0	0	0	0	0	0	0
-.24	0	0	0	0	0	0	0	0	0	0
-.28	0	0	0	0	0	0	0	0	0	0
-.32	0	0	0	0	0	0	0	0	0	0
-.36	0	0	0	0	0	0	0	0	0	0
-.40	0	0	0	0	0	0	0	0	0	0
-.44	0	0	0	0	0	0	0	0	0	0
-.48	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	10.24	1.05	1.23	0.68	0.71	1.07	1.27	6.94	0	23.19
FLIGHT HOURS @ ALT	1814.48	278.29	435.09	273.62	305.17	508.15	620.66	3369.31	0	7604.77
TOTAL FLIGHTS										73
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										23.19
TOTAL FLIGHT MILES FLAPS UP AND DOWN										7604.77

(a) a_y Level crossing counts per hour within pressure altitude bands

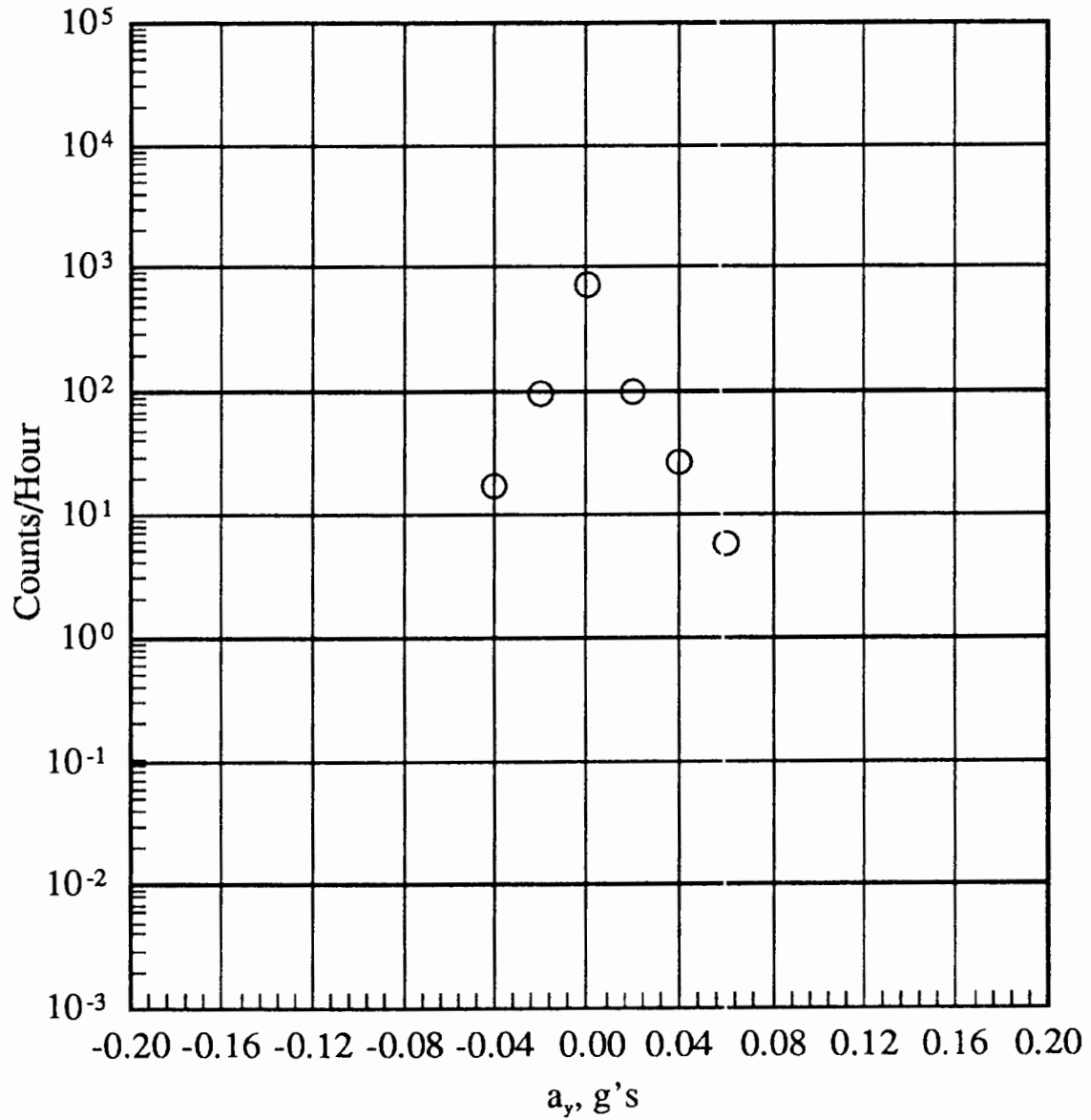
Figure 23.- Lateral acceleration exceedances: Non-revenue flights.



(b) -500 to 4500 feet altitude

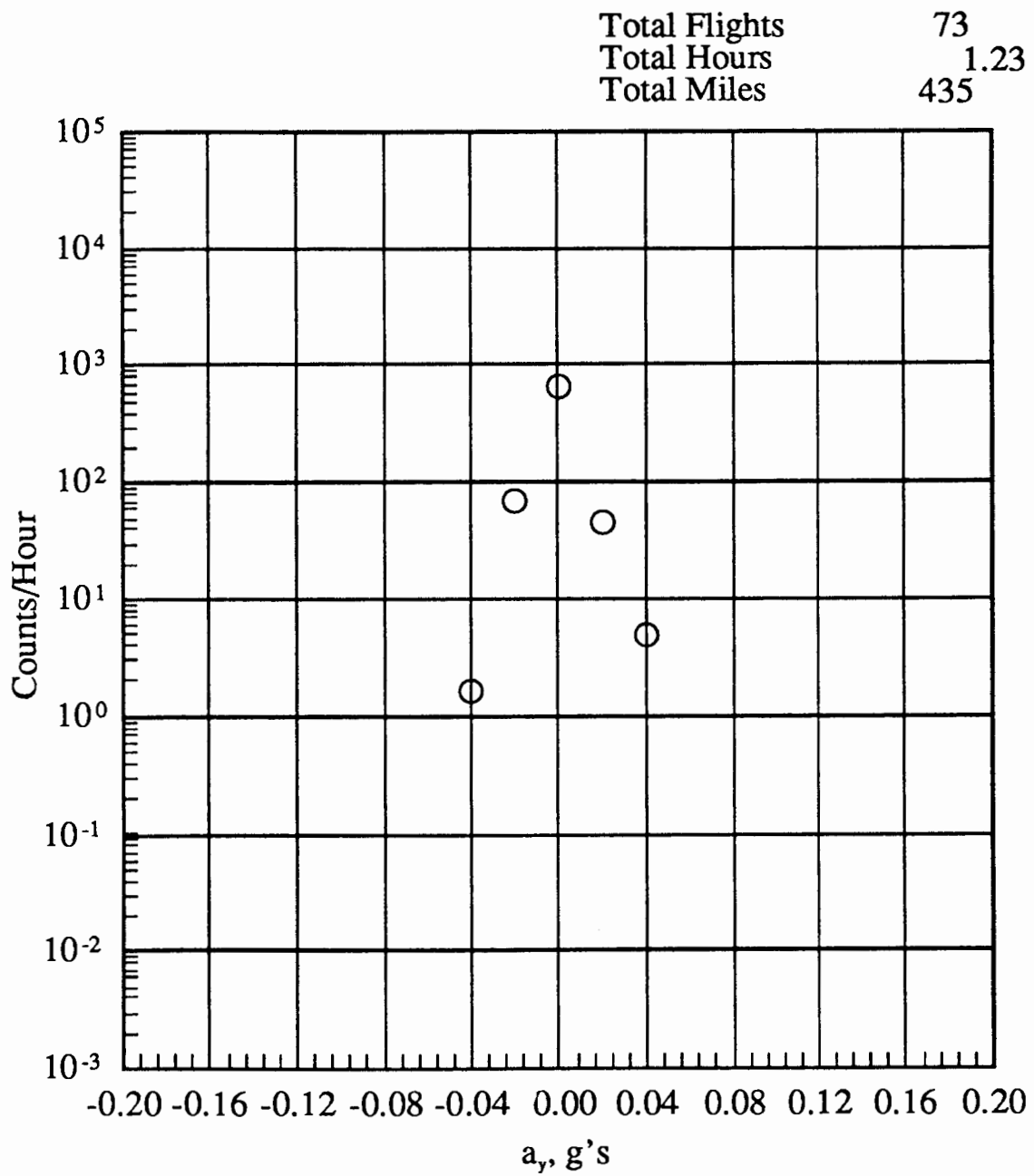
Figure 23.- Continued.

Total Flights	73
Total Hours	1.05
Total Miles	278



(c) 4500 to 9500 feet altitude

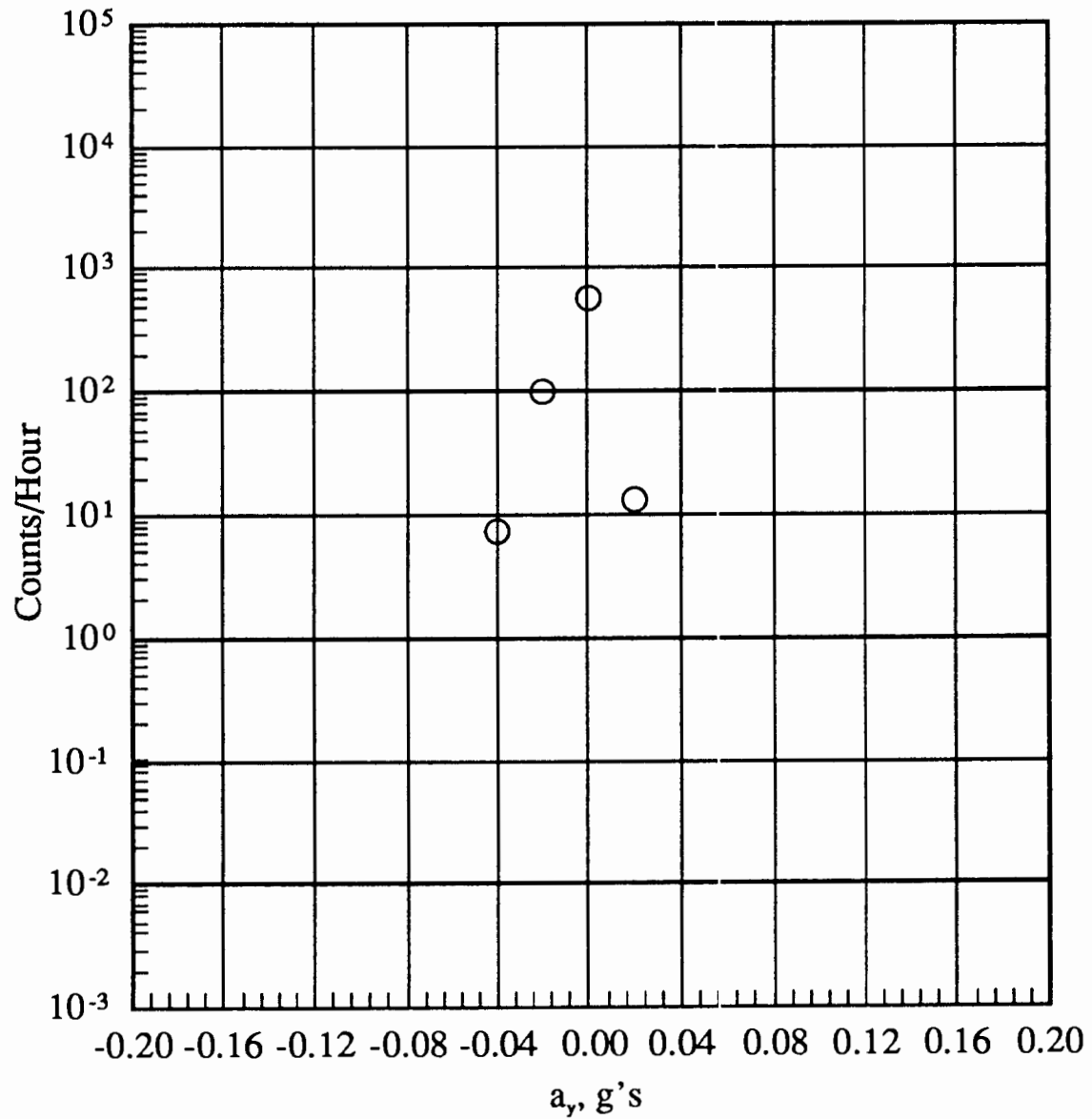
Figure 23.- Continued.



(d) 9500 to 14500 altitude

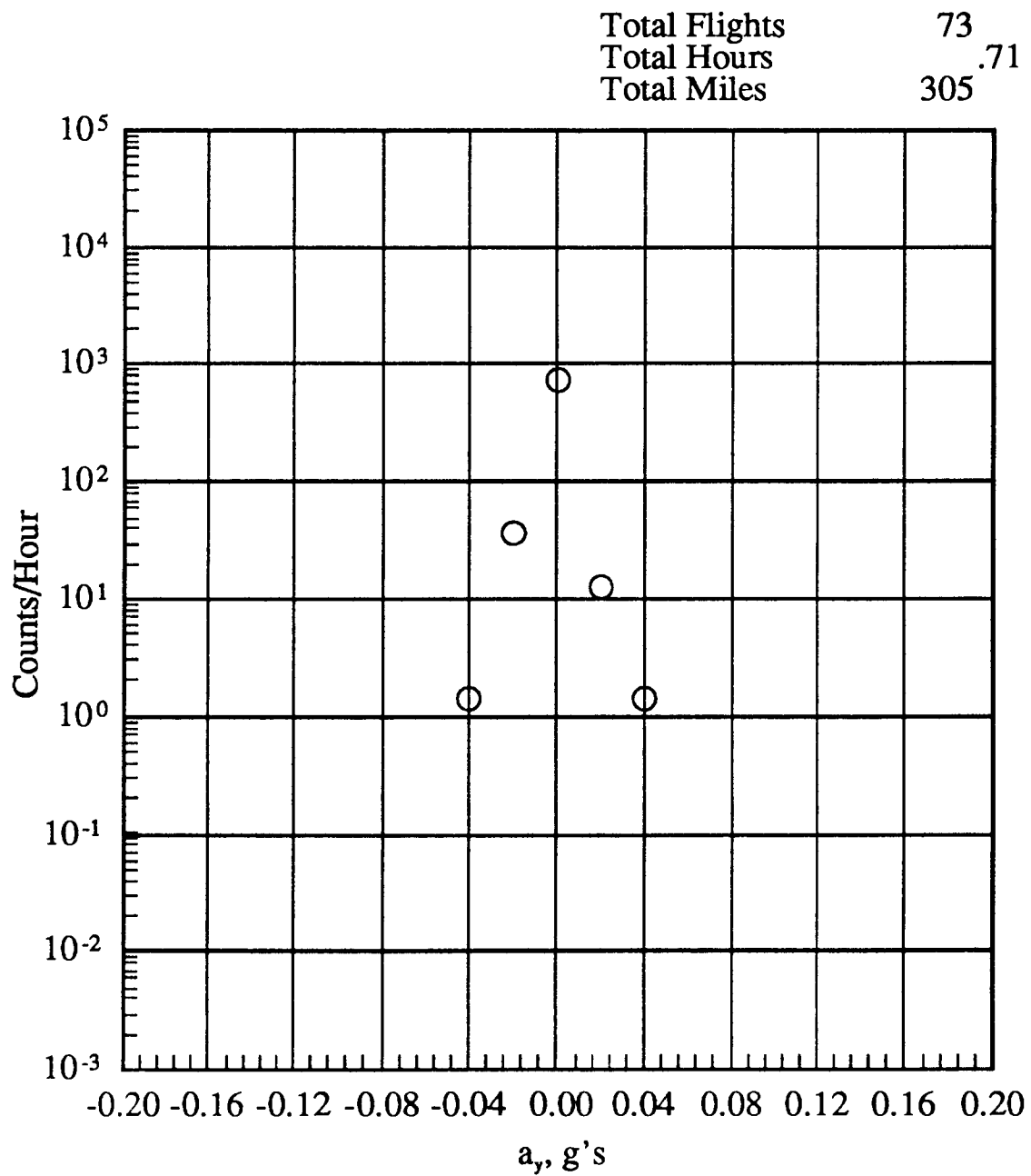
Figure 23.- Continued.

Total Flights	73
Total Hours	.68
Total Miles	274



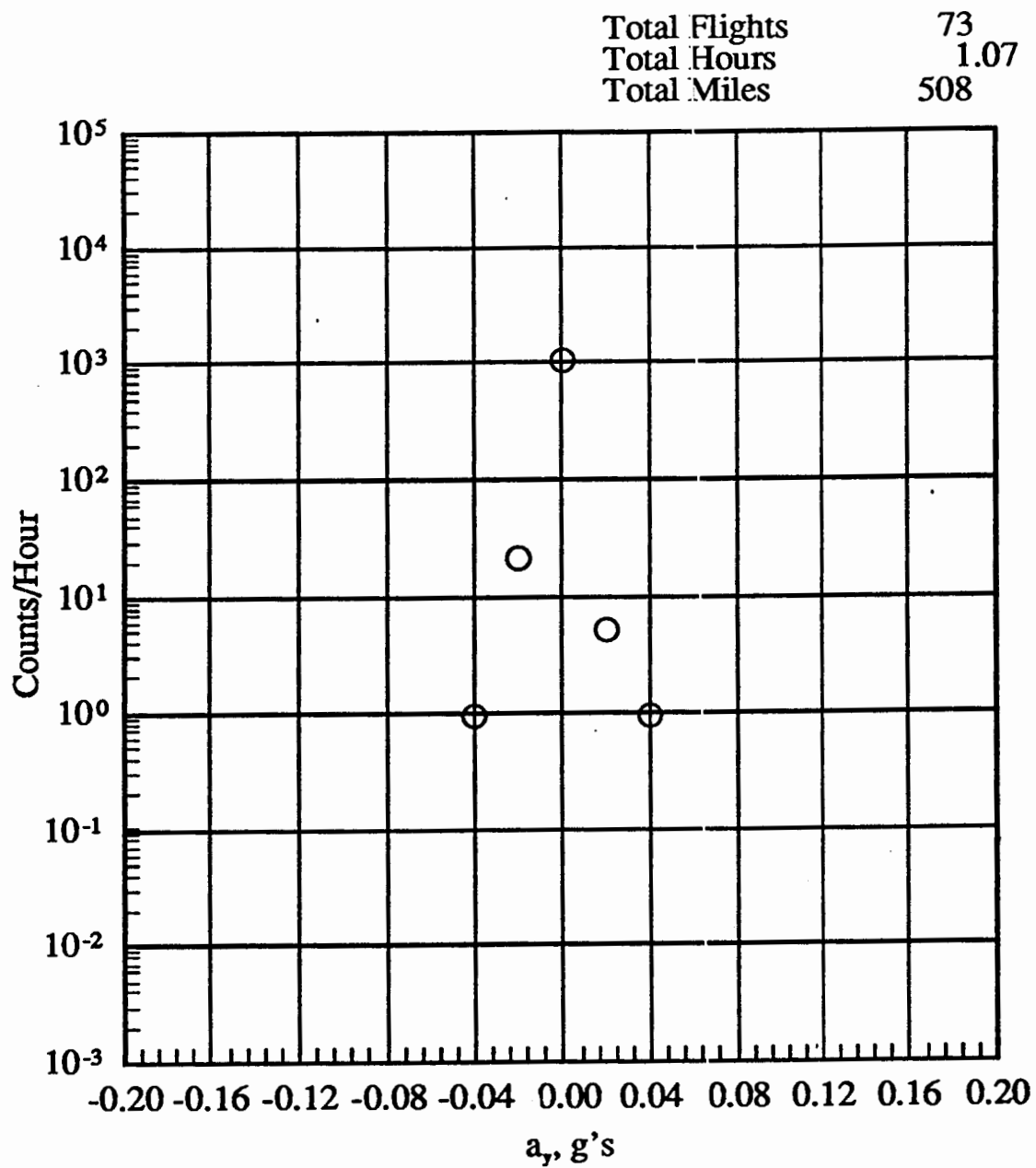
(e) 14500 to 19500 feet altitude

Figure 23.- Continued.



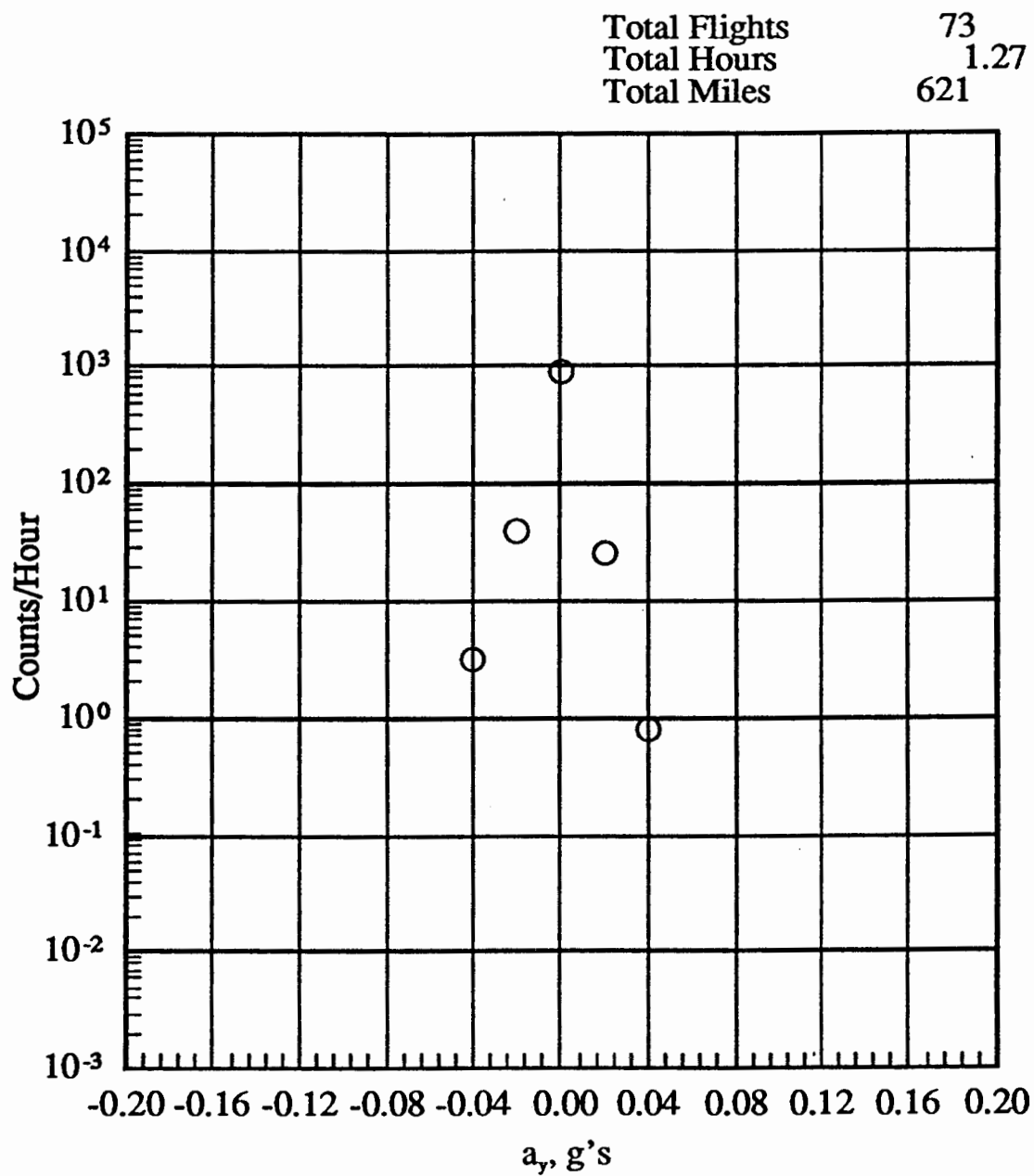
(f) 19500 to 24500 feet altitude

Figure 23.- Continued.



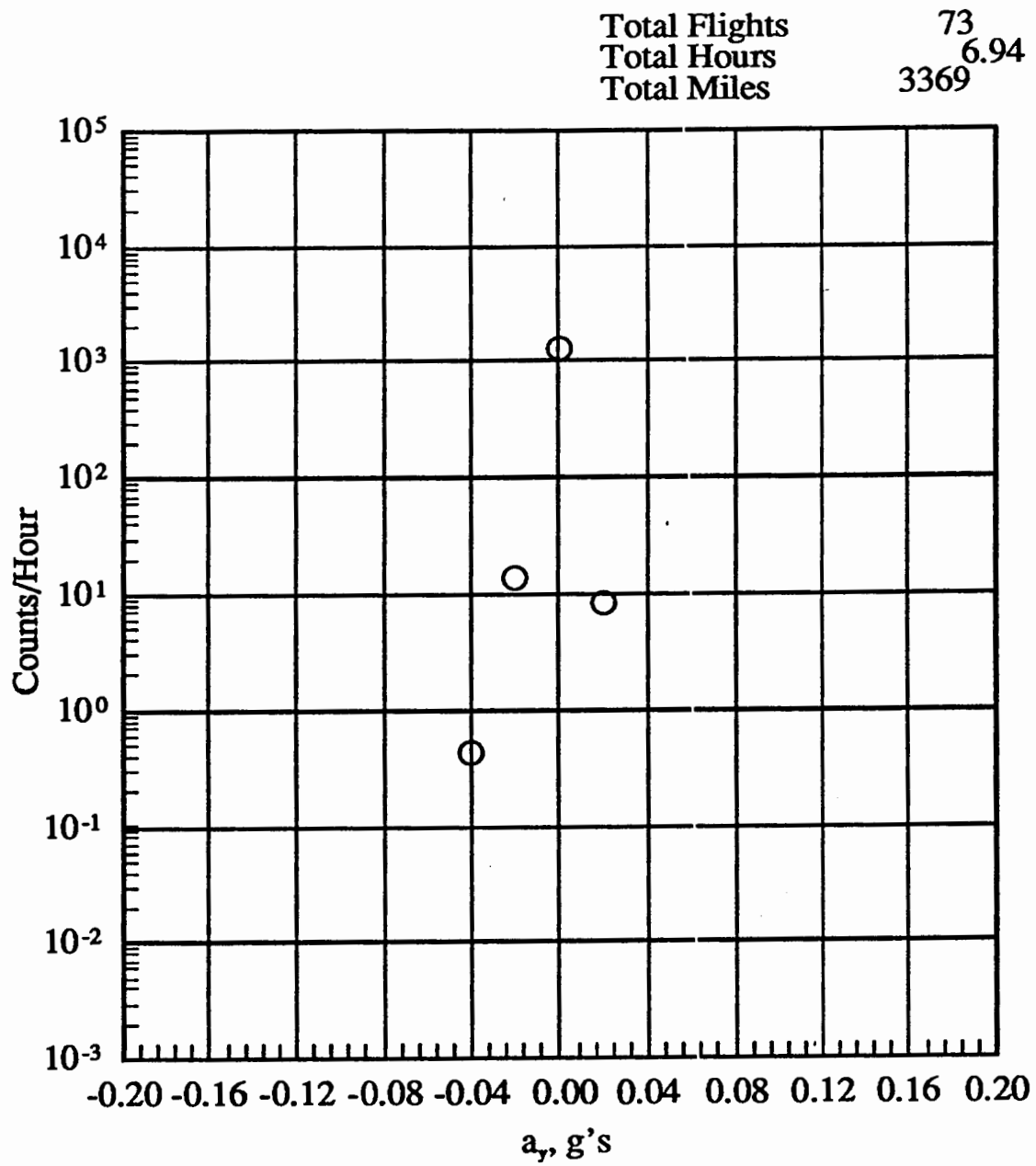
(g) 24500 to 29500 feet altitude

Figure 23.- Continued.



(h) 29500 to 34500 feet altitude

Figure 23.- Continued.

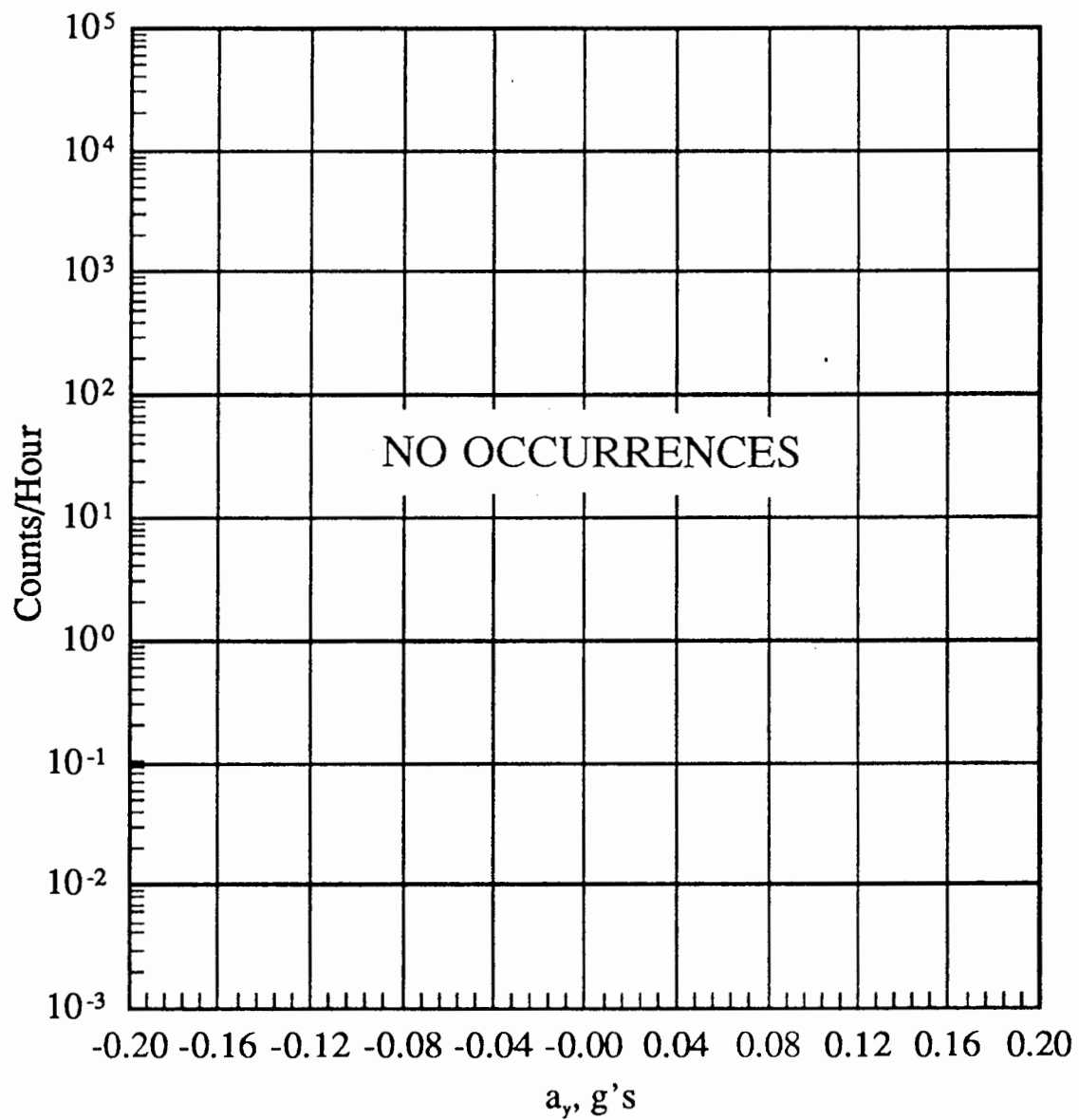


(i) 34500 to 39500 feet altitude

Figure 23.- Continued.

Total Flights
Total Hours
Total Miles

73
0.00
0

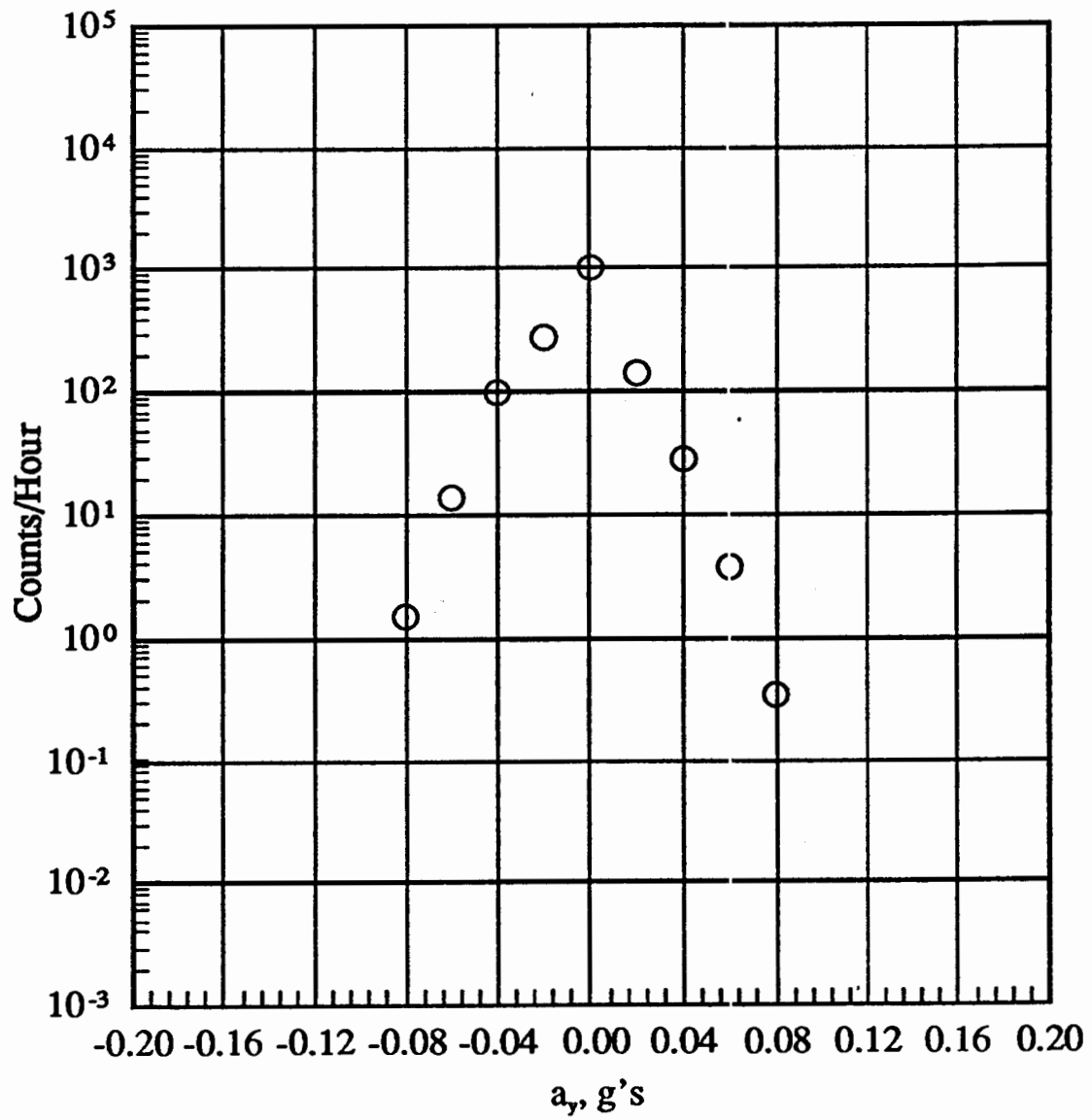


(j) 39500 to 44500 feet altitude

Figure 23.- Continued.

Total Flights
Total Hours
Total Miles

73
23.13
7605



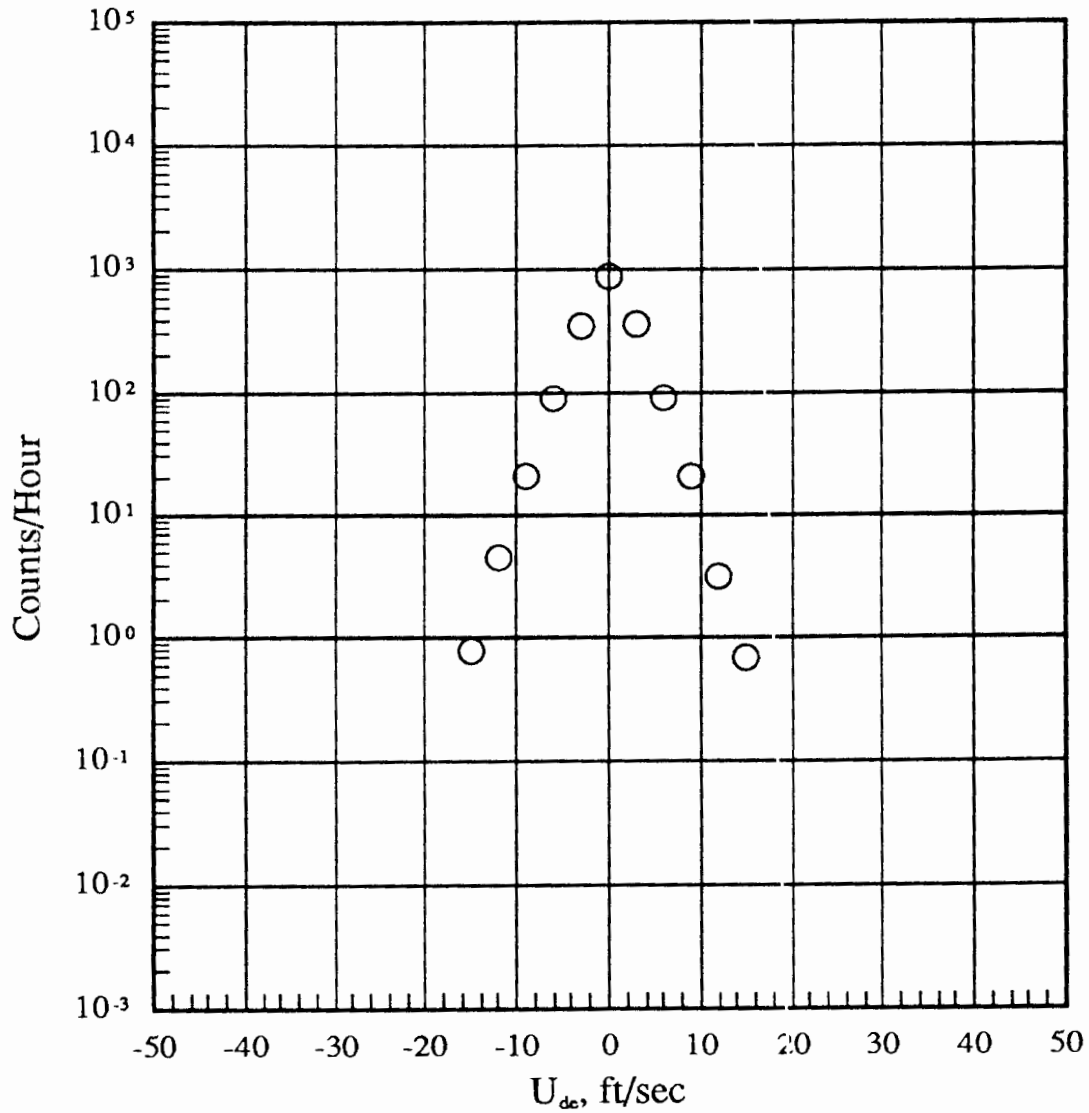
(k) -500 to 44500 feet altitude

Figure 23.- Concluded.

PRESSURE ALTITUDE BANDS										
U_{de} FT/SEC	-500 TO 4500 FT	4500 TO 9500 FT	9500 TO 14500 FT	14500 TO 19500 FT	19500 TO 24500 FT	24500 TO 29500 FT	29500 TO 34500 FT	34500 TO 39500 FT	39500 TO 44500 FT	-500 TO 44500 FT
100	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0
15	0.68	0	0	0	0	0	0	0	0	0.30
12	3.13	0	0	0	0	0	0	0	0	1.38
9	20.81	0	2.43	0	0	0	0	0	0	9.31
6	90.96	4.78	3.24	0	0	1.87	0	0.14	0	40.66
3	364.81	38.23	12.96	0	4.22	8.41	4.72	2.45	0	164.93
0	880.96	820.92	888.46	987.03	1001.87	1074.77	981.89	1122.45	0	972.23
-3	352.60	31.54	9.72	1.47	0	9.35	6.30	1.30	0	158.77
-6	90.18	0.96	5.67	0	0	2.80	0.79	0.14	0	40.36
-9	20.91	0	0.81	0	0	0.93	0	0	0	9.31
-12	4.49	0	0	0	0	0	0	0	0	1.98
-15	0.78	0	0	0	0	0	0	0	0	0.34
-20	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0
-50	0	0	0	0	0	0	0	0	0	0
-60	0	0	0	0	0	0	0	0	0	0
-70	0	0	0	0	0	0	0	0	0	0
-80	0	0	0	0	0	0	0	0	0	0
-90	0	0	0	0	0	0	0	0	0	0
-100	0	0	0	0	0	0	0	0	0	0
FLIGHT HOURS @ ALT	10.24	1.05	1.23	0.68	0.71	1.07	1.27	6.94	0	23.19
FLIGHT MILES @ ALT	1814.48	278.29	435.09	273.62	305.17	508.15	620.66	3369.31	0	7604.77
TOTAL FLIGHTS										73
TOTAL FLIGHT HOURS FLAPS UP AND DOWN										23.19
TOTAL FLIGHT MILES FLAPS UP AND DOWN										7604.77

(a) U_{de} Level crossing counts per hour within pressure altitude bandsFigure 24.- U_{de} exceedances: Non-revenue flights.

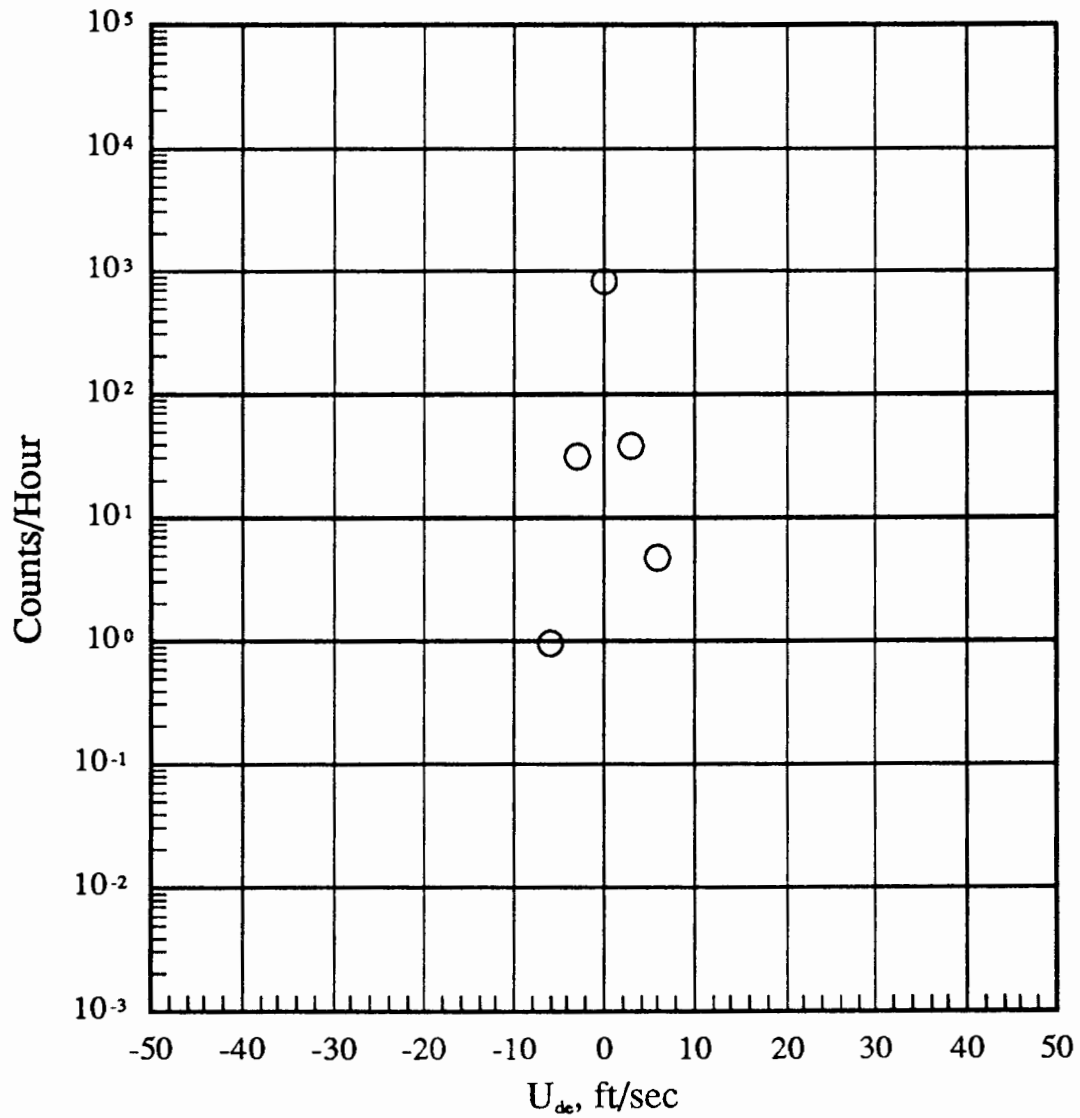
Total Flights	73
Total Hours	10.24
Total Miles	1814



(b) -500 to 4500 feet altitude

Figure 24.- Continued.

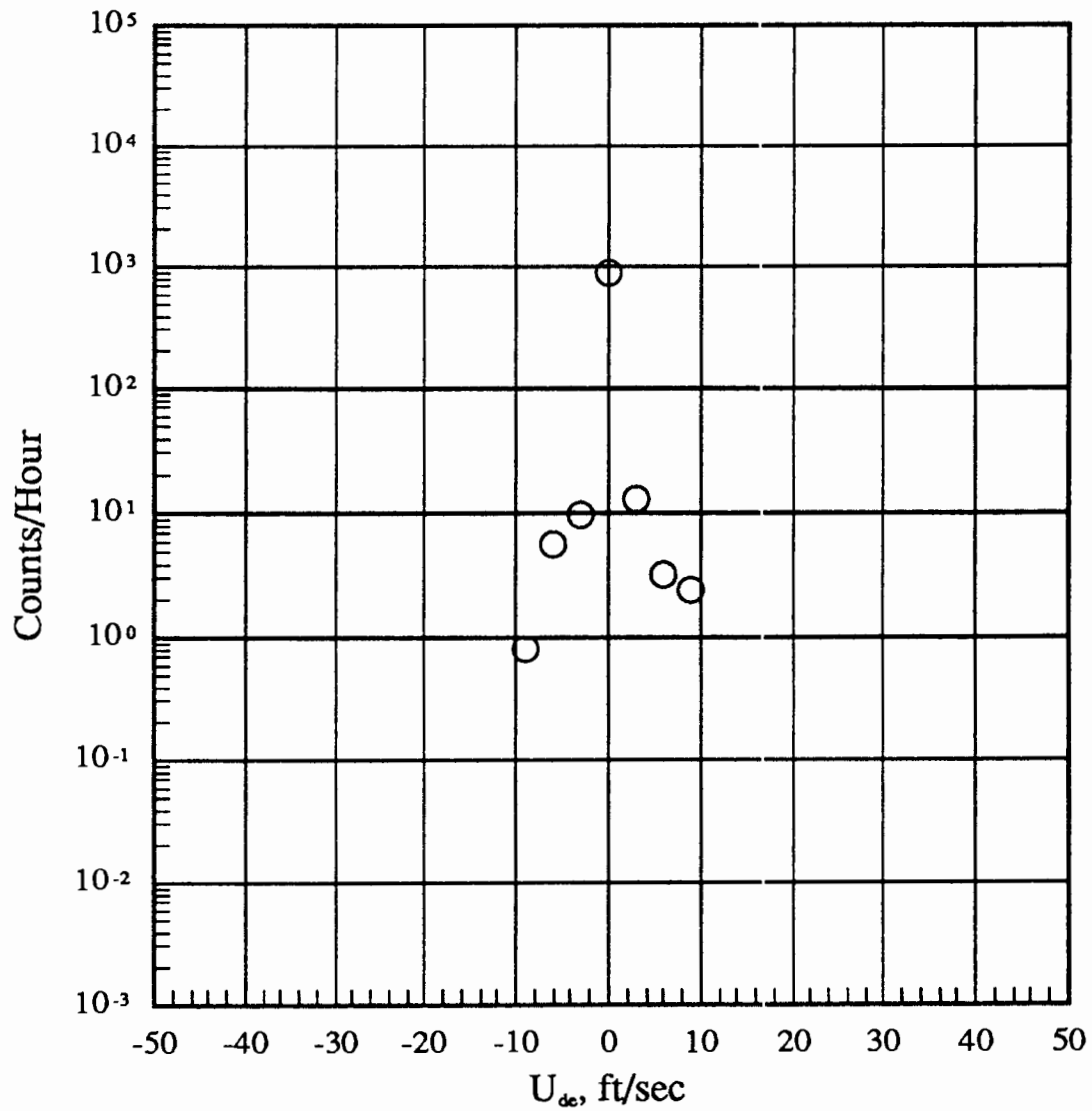
Total Flights	73
Total Hours	1.05
Total Miles	278



(c) 4500 to 9500 feet altitude

Figure 24.- Continued.

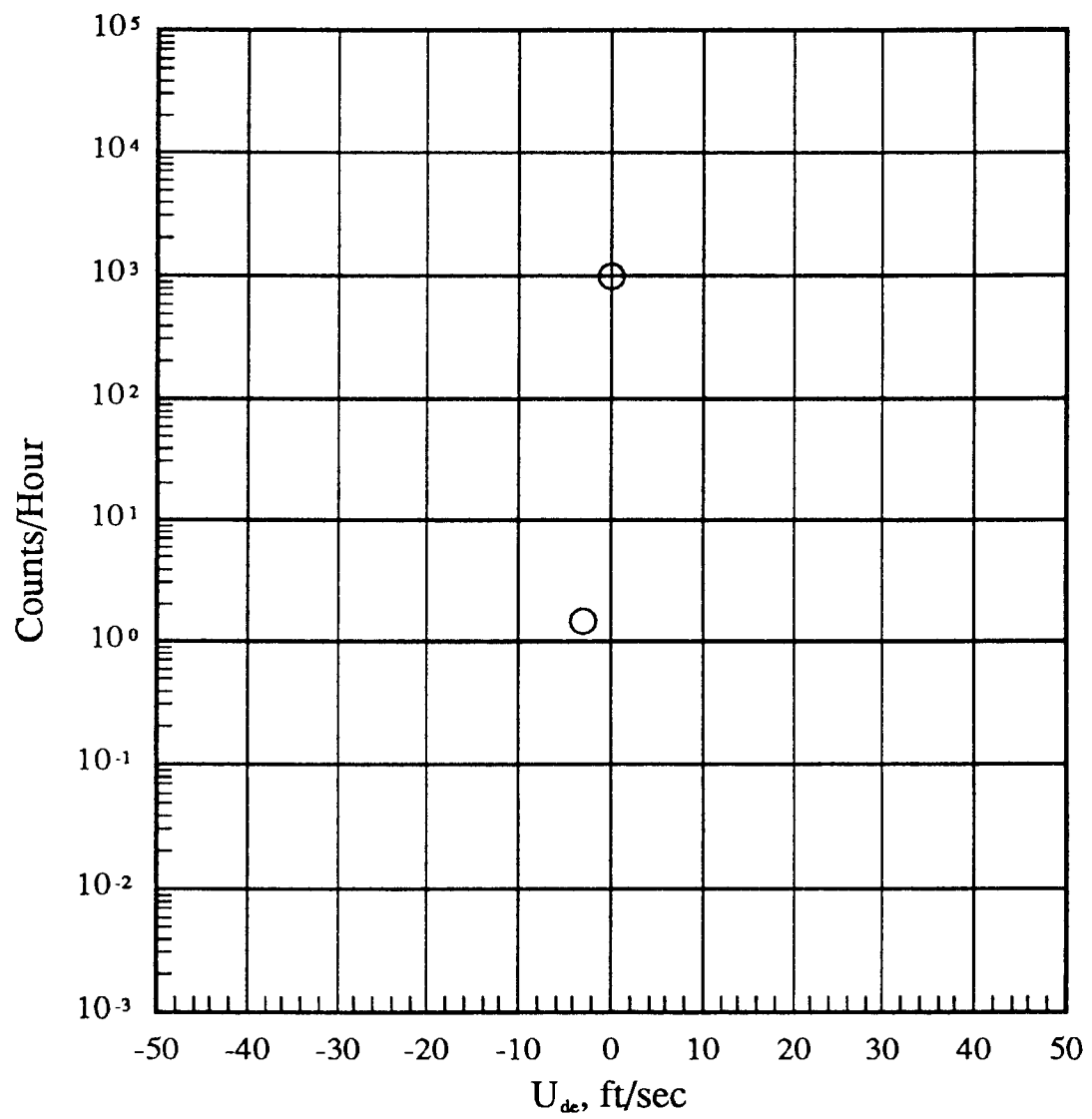
Total Flights	73
Total Hours	1.23
Total Miles	435



(d) 9500 to 14500 feet altitude

Figure 24.- Continued.

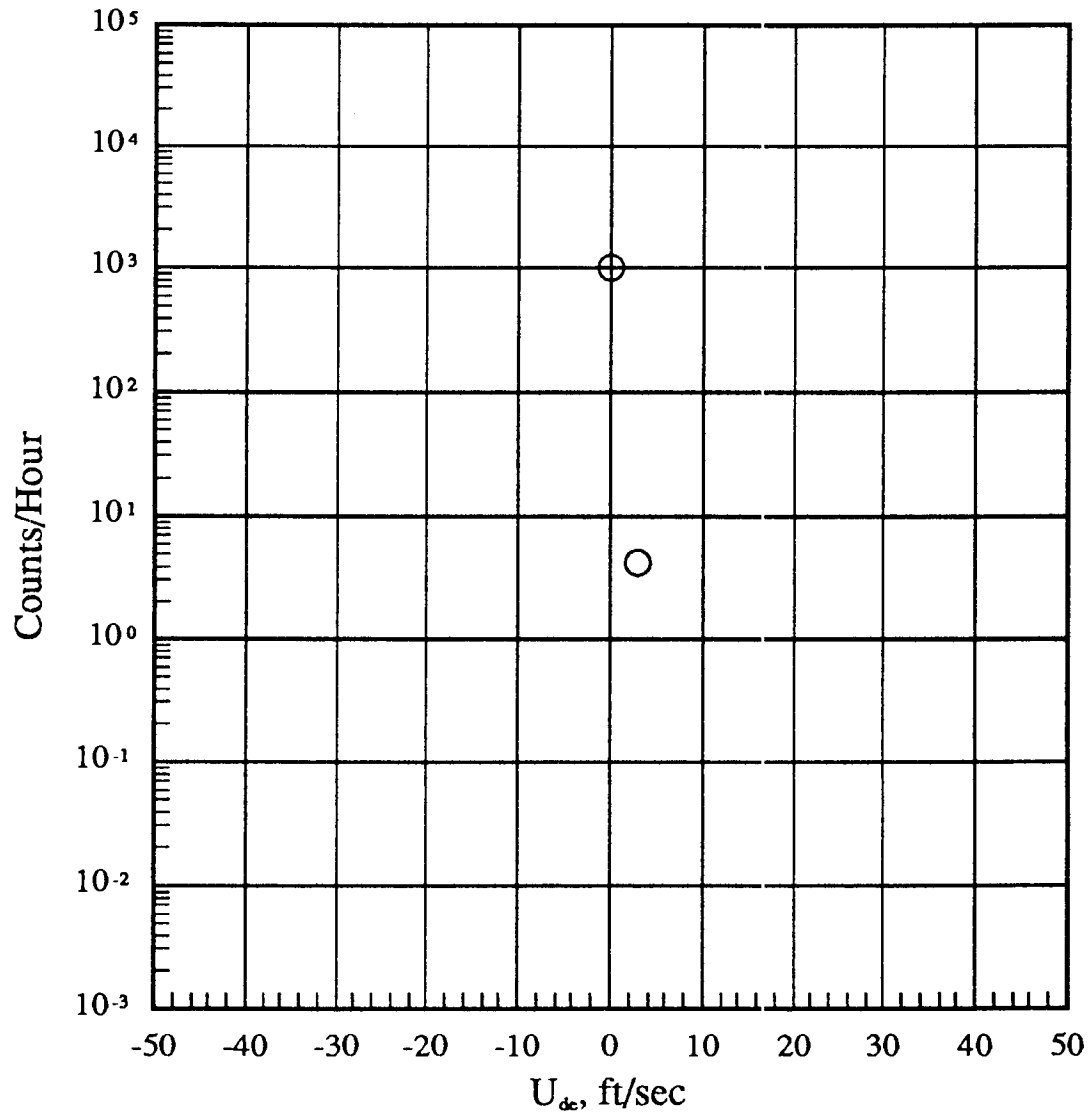
Total Flights	73
Total Hours	.68
Total Miles	274



(e) 14500 to 19500 feet altitude

Figure 24.- Continued.

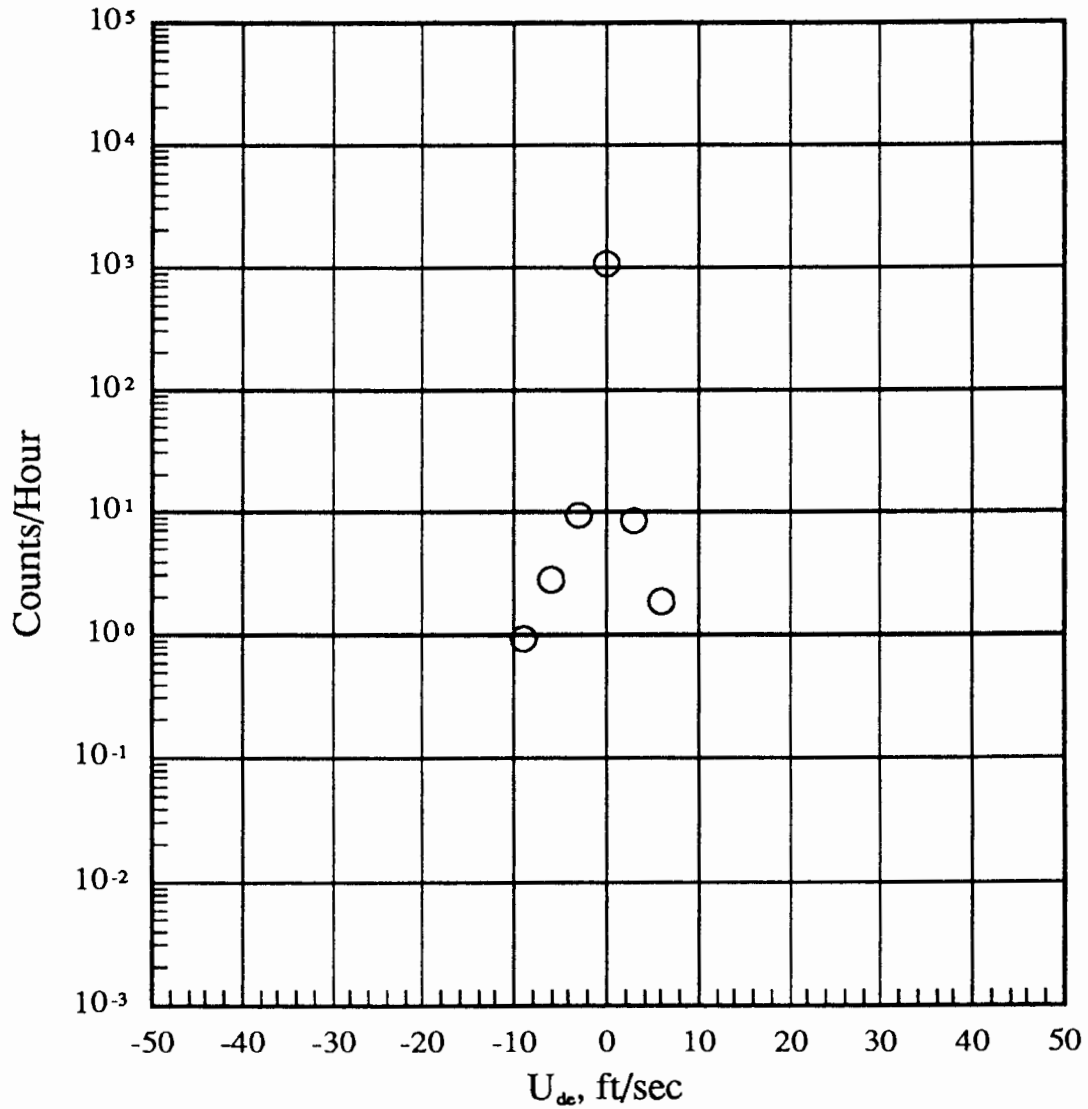
Total Flights	73
Total Hours	.71
Total Miles	305



(f) 19500 to 24500 feet altitude

Figure 24.- Continued.

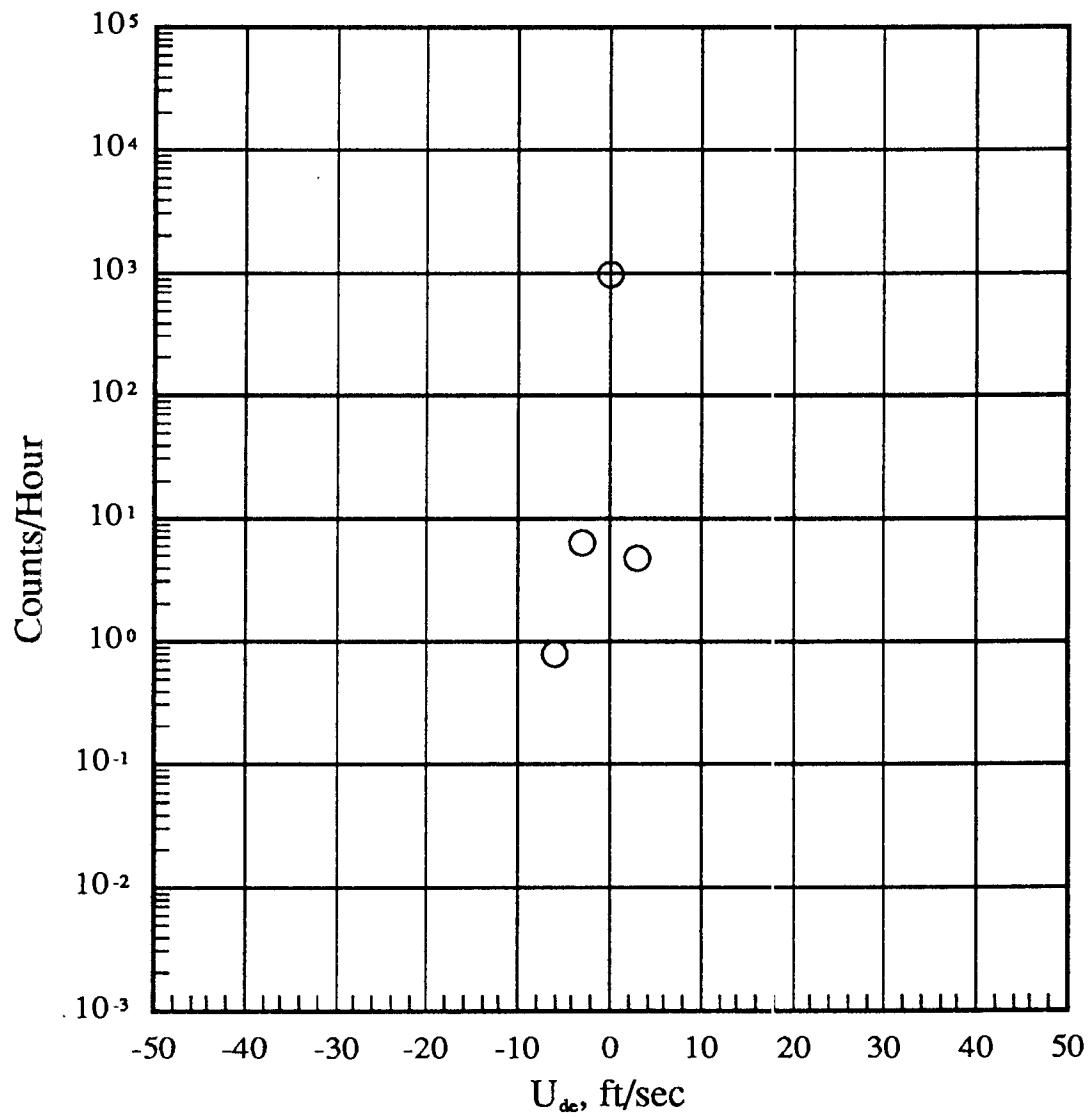
Total Flights 73
Total Hours 1.07
Total Miles 508



(g) 24500 to 29500 feet altitude

Figure 24.- Continued.

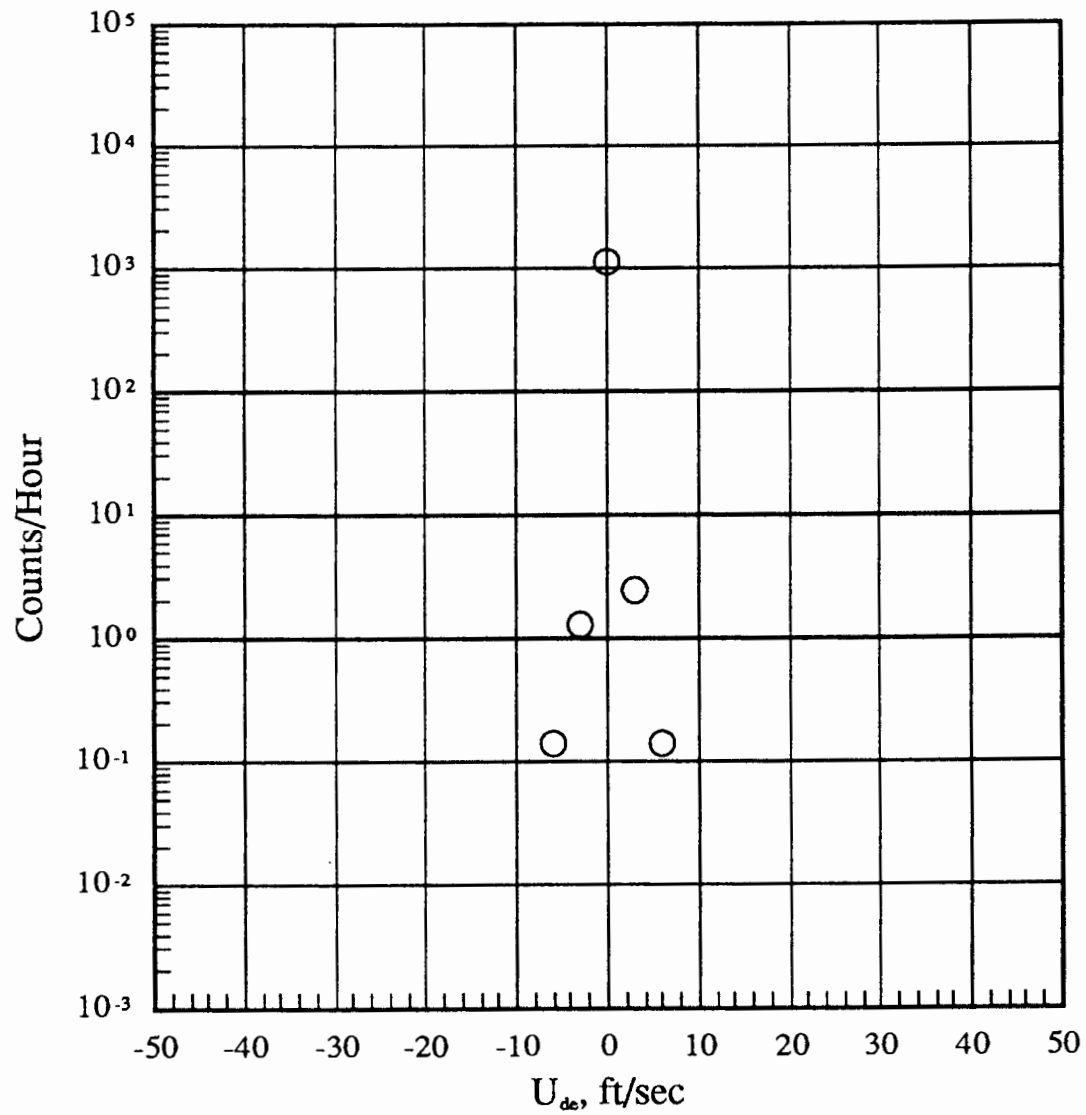
Total Flights	73
Total Hours	1.27
Total Miles	621



(h) 29500 to 34500 feet altitude

Figure 24.- Continued.

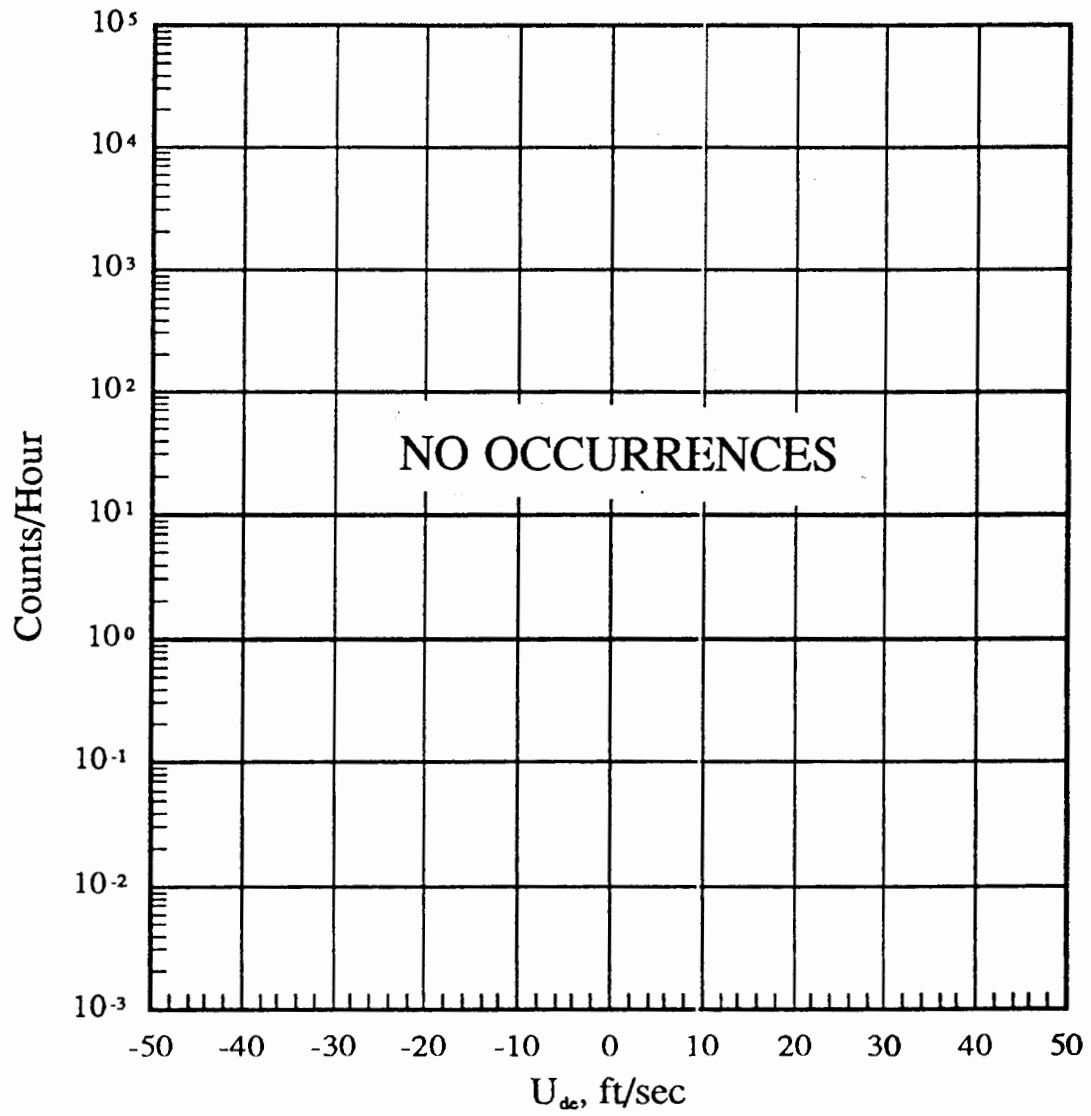
Total Flights 73
Total Hours 6.94
Total Miles 3369



(i) 34500 to 39500 feet altitude

Figure 24.- Continued.

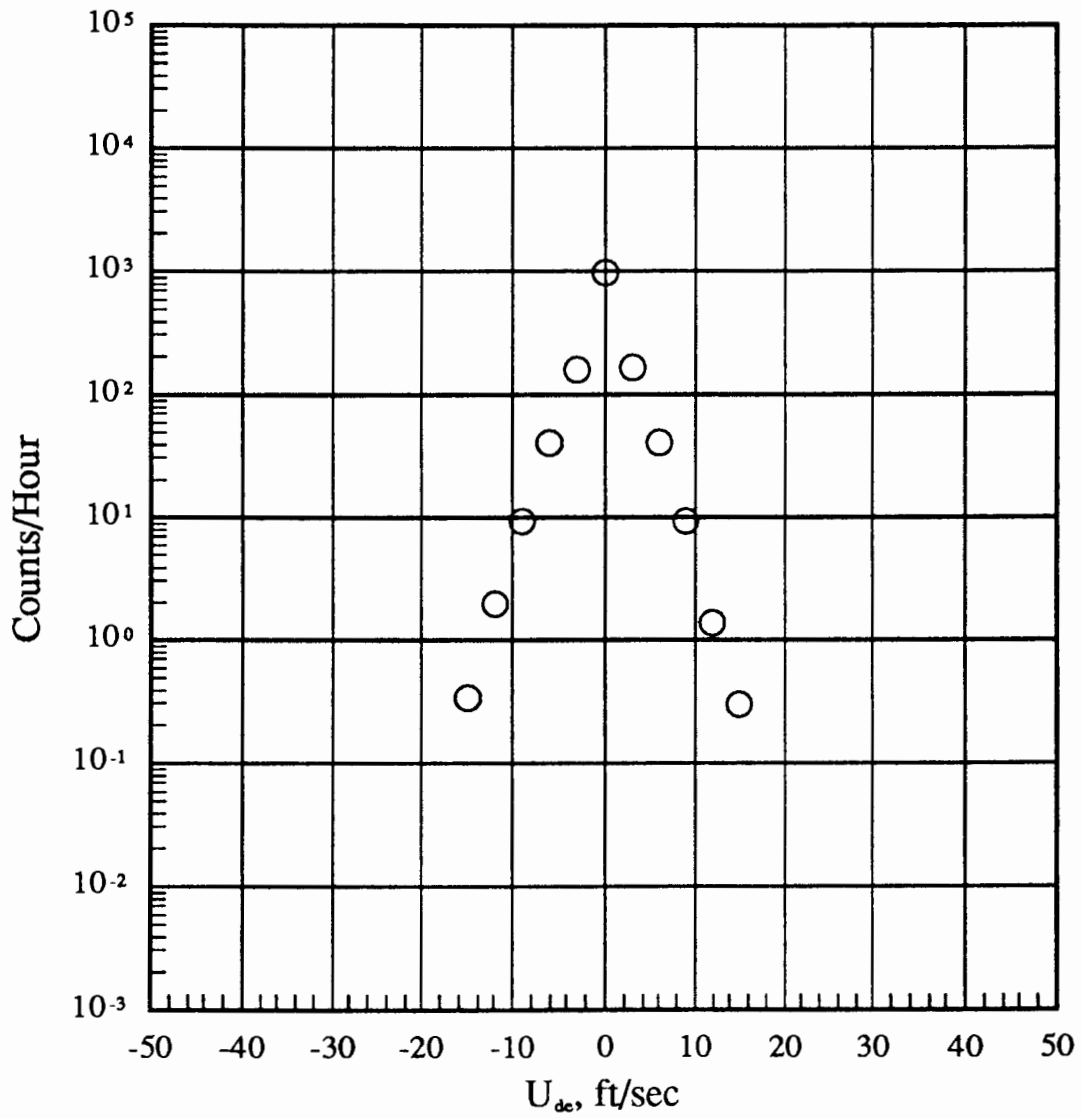
Total Flights 73
Total Hours 0.00
Total Miles 0



(j) 39500 to 44500 feet altitude

Figure 24.- Continued.

Total Flights	73
Total Hours	23.13
Total Miles	7605



(k) -500 to 44500 feet altitude

Figure 24.- Concluded.

DATA FROM 247 HOURS & 70 FLIGHTS

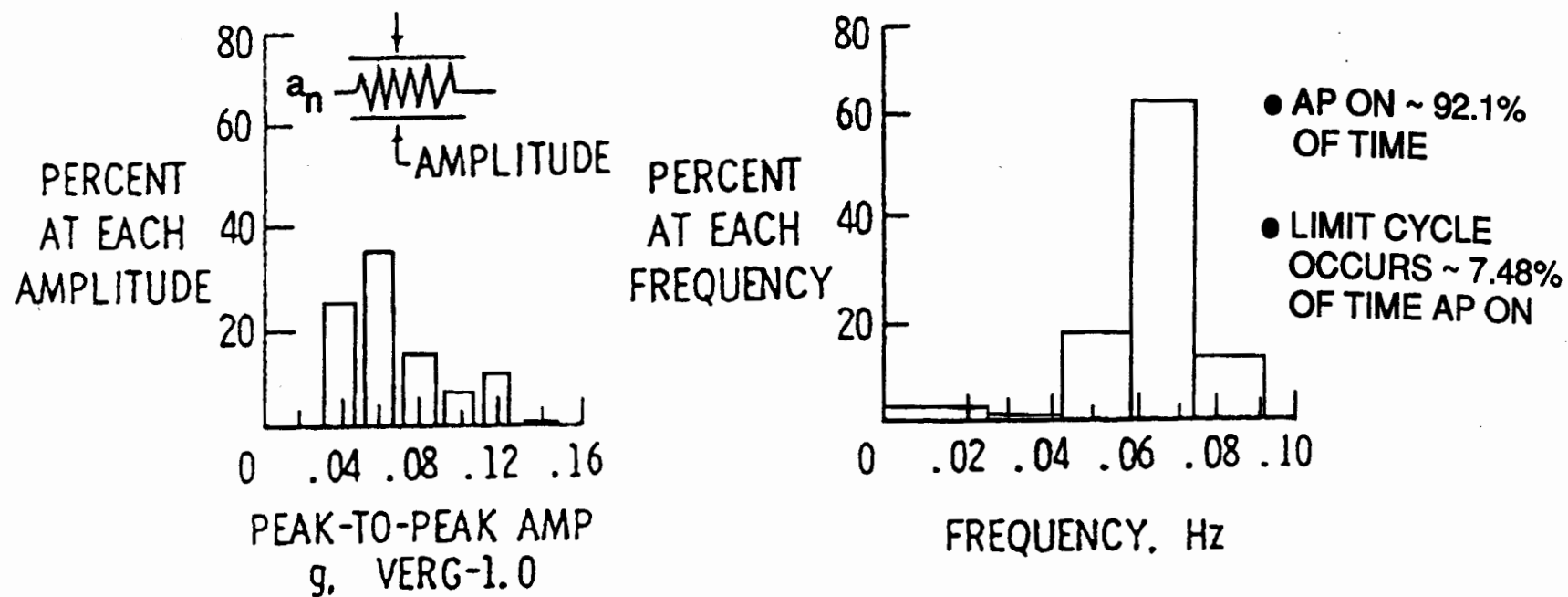


Figure 25.- Autopilot "limit cycle" experience.

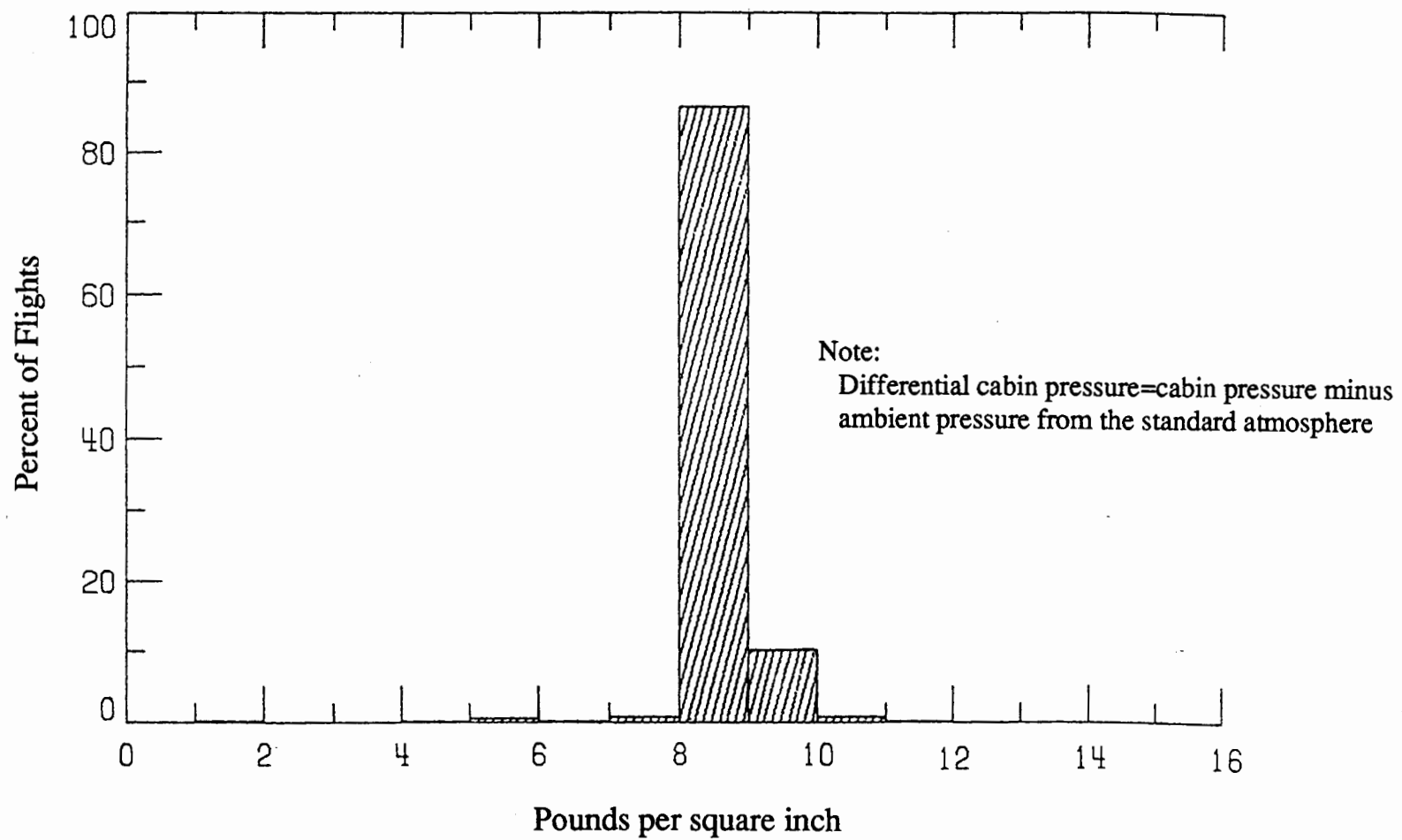


Figure 26.- Maximum differential cabin pressure per flight; Percent of flights.



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