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RESEARCH MEMORANDUM

EVALUATION OF GUST AND DRAFT VELOCITIES FROM FLIGHTS OF

P-61C AIRPLANES WITHIN THUNDERSTORMS

AUGUST 14, 1946 TO AUGUST 15, 1946

AT ORLANDO, FLORIDA

By

H. B. Tolefson

Langley Memorial Aeronautical Laboratory
Langley Field, Va.

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RESEARCH MEMORANDUM

EVALUATION OF GUST AND DRAFT VELOCITIES FROM FLIGHTS OF P-61C AIRPLANES WITHIN THUNDERSTORMS AUGUST 14, 1946 TO AUGUST 15, 1946 AT ORLANDO, FLORIDA

By H. B. Tolefson

Tables I and II of the present paper summarize the gust and draft velocity data for thunderstorm-flights 21 and 22 of August 14, 1946 and August 15, 1946, respectively. These data were evaluated from records of NACA airspeed-altitude and acceleration recorders installed in P-61C airplanes and are of the type presented in reference 1 for previous flights.

Table III summarizes the readings of a milliammeter which was used in conjunction with other equipment to indicate ambient-air temperature during thunderstorm surveys. These data were read from photo-observer records and include all cases in which variations of the instrument indications were noted for the present flights.

Langley Memorial Aeronautical Laboratory
National Advisory Committee for Aeronautics
Langley Field, Va.

Harold B. Tolefson
Harold B. Tolefson
Aeronautical Engineer

Approved: Richard V. Rhode
Richard V. Rhode
Chief of Aircraft Loads Division

CJB

REFERENCE

1. Tolefson, H. B.: Evaluation of Gust and Draft Velocities from Flights of P-61C Airplanes within Thunderstorms August 7, 1946 to August 13, 1946 at Orlando, Florida. NACA RM No. L6K16, 1946.

TABLE I.- SUMMARY OF GUST MEASUREMENTS FROM FLIGHTS

OF P-61C AIRPLANES WITHIN THUNDERSTORMS

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 347 Traverse 1		Time (EST) - (a) Length of traverse 395.4 sec, 145,690 ft Initial heading (deg) 80						
0 - 3	26,000	----	-----	----	-----	----	----	0
3 - 6		----	-----	----	-----	----	----	0
6 - 9		4.5	-7.6	15.1	-----	180	----	5
9 - 12		5.1	-6.7	----	-7.6	----	181	5
12 - 15		----	-----	----	-----	----	----	0
15 - 18	25,500	----	-----	----	-----	----	----	0
18 - 21		10.2	-7.3	14.6	-24.2	134	135	3
21 - 24		8.0	-7.3	15.6	-----	103	----	4
24 - 27		5.4	-12.7	----	-----	----	----	6
27 - 30		14.6	-12.7	----	-19.6	----	203	4
30 - 33		11.1	-12.1	----	-----	----	----	6
33 - 36		6.4	-7.3	----	-----	----	----	13
36 - 39		12.4	-6.1	----	-----	----	----	7
39 - 42		13.4	-8.0	----	-----	----	----	8
42 - 45	26,000	13.7	-16.9	----	-----	----	----	6
45 - 48		12.4	-11.5	----	-----	----	----	7
48 - 51		17.5	-27.1	----	-----	----	----	5
51 - 54		3.5	-7.6	----	-4.9	----	65	3
54 - 57	25,500	29.3	-18.2	11.8	-----	96	----	5
57 - 60		17.8	-12.1	----	-----	----	----	4
60 - 63		11.1	-5.7	----	-----	----	----	4
63 - 66	26,000	16.6	-18.2	----	-----	----	----	6
66 - 69		4.8	-12.7	----	-----	----	----	5
69 - 72		13.1	-9.9	----	-19.5	----	301	4
72 - 75		16.6	-13.4	----	-26.9	----	142	4
75 - 78		3.2	-4.1	----	-----	----	----	3
78 - 81	25,500	6.1	-6.4	----	-----	----	----	2
81 - 84		12.7	-----	----	-----	----	----	3
84 - 87		3.2	-9.2	----	-----	----	----	3
87 - 90	25,000	5.4	-----	----	-9.2	----	41	3
90 - 93		5.7	-----	8.7	-----	81	----	2
93 - 96		5.4	-6.1	6.8	-4.7	80	80	5
96 - 99	25,500	2.2	-2.2	5.9	-----	352	----	2

[a]Clock not in field of view of camera.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 347 Traverse 1	Time (EST) - (a) Length of traverse 395.4 sec, 145,690 ft Initial heading (deg) 80							
99 - 102	25,500	7.3	-----	6.5	-----	116	----	1
102 - 105		----	-7.0	----	-----	----	----	3
105 - 108		2.5	-6.1	----	-----	----	----	2
108 - 111	25,000	8.3	-8.3	----	-----	----	----	3
111 - 114		3.2	-----	----	-----	----	----	1
114 - 117		3.5	-4.8	----	-11.0	----	103	2
117 - 120		4.5	-2.5	----	-10.6	----	206	3
120 - 123		2.5	-3.8	----	-----	----	----	6
123 - 126		----	-----	----	-----	----	----	0
126 - 129		----	-----	----	-----	----	----	0
129 - 132		----	-----	----	-----	----	----	1
132 - 135		----	-----	----	-----	----	----	0
135 - 138		----	-----	----	-----	----	----	1
138 - 141		----	-----	----	-----	----	----	0
141 - 144		----	-----	----	-----	----	----	1
144 - 147		----	-----	----	-----	----	----	0
Airplane 347 Traverse 2	Time (EST) - (a) Length of traverse 283 sec, 106,070 ft Initial heading (deg) 270							
0 - 3	26,000	----	-----	----	-----	----	----	0
3 - 6		----	-2.2	----	-11.2	----	351	1
6 - 9	25,500	6.0	-4.4	9.3	-----	17	----	2
9 - 12		3.8	-2.5	7.5	-----	175	----	5
12 - 15		5.4	-2.8	23.9	-----	365	----	4
15 - 18		11.4	-1.9	----	-----	----	----	3
18 - 21	26,000	4.7	-7.6	----	-----	----	----	2
21 - 24		6.3	-4.1	----	-----	----	----	3
24 - 27		3.8	-3.8	11.7	-----	115	----	9
27 - 30		10.1	-7.6	----	-4.1	----	37	6
30 - 33		5.1	-4.1	----	-6.4	----	37	6
33 - 36		6.3	-6.0	----	-----	----	----	6
36 - 39	25,500	5.1	-7.3	----	-----	----	----	6

[a]Clock not in field of view of camera.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS -- Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 347 Traverse 2	Time (EST) - (a) Length of traverse 283 sec, 106,070 ft Initial heading (deg) 270							
39 - 42	25,500	4.7	-7.0	----	-----	----	----	7
42 - 45		5.1	-3.5	----	-----	----	----	5
45 - 48	25,000	4.4	-2.2	----	-----	----	----	3
48 - 51		2.8	-2.2	----	-10.7	----	440	3
51 - 54		4.4	-1.9	----	-----	----	----	6
54 - 57		4.4	-6.0	8.8	-----	120	----	5
57 - 60		6.0	-4.4	----	-7.6	----	155	3
60 - 63		----	-2.2	----	-----	----	----	2
63 - 66		4.7	-4.1	----	-----	----	----	2
66 - 69		7.9	-6.6	----	-----	----	----	5
69 - 72		4.7	-4.7	----	-----	----	----	3
72 - 75		6.0	-1.9	----	-----	----	----	4
75 - 78		8.2	-8.5	----	-----	----	----	8
78 - 81		5.1	-8.9	----	-----	----	----	5
81 - 84		2.5	-----	----	-----	----	----	1
84 - 87		13.9	-4.1	----	-----	----	----	3
87 - 90		8.2	-12.3	----	-----	----	----	8
90 - 93		11.4	-13.3	----	-----	----	----	5
93 - 96	24,500	6.6	-4.7	----	-----	----	----	4
96 - 99		----	-----	----	-----	----	----	0
99 - 102		----	-----	----	-----	----	----	0
102 - 105		----	-----	----	-----	----	----	0
105 - 108		----	-----	----	-----	----	----	0
Airplane 347 Traverse 3	Time (EST) - (a) Length of traverse 286 sec, 100,261 ft Initial heading (deg) 50							
0 - 3	25,000	9.8	-7.6	----	-----	----	----	5
3 - 6		9.8	-2.2	----	-----	----	----	5
6 - 9		7.9	-5.4	----	-----	----	----	4
9 - 12	25,500	4.7	-9.4	----	-----	----	----	5
12 - 15		7.2	-7.6	----	-----	----	----	2
15 - 18		7.6	-5.0	9.7	-----	98	----	7
18 - 21		5.0	-9.8	----	-----	----	----	4

[a]Clock not in field of view of camera.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 347 Traverse 3	Time (EST) - (a) Length of traverse 286 sec, 100,261 ft Initial heading (deg) 50							
21 - 24	25,500	6.9	-----	8.4	-----	107	----	2
24 - 27	26,000	14.8	-8.8	----	-----	----	----	6
27 - 30		4.4	-12.3	----	-----	----	----	7
30 - 33		7.6	-5.7	----	-----	----	----	4
33 - 36		----	-12.7	5.8	-----	99	----	2
36 - 39		11.6	-----	18.2	-----	180	----	1
39 - 42		2.5	-----	----	-----	----	----	1
42 - 45		5.0	-----	10.0	-----	188	----	1
45 - 48		----	-----	----	-----	----	----	0
48 - 51		3.5	-2.5	----	-----	----	----	3
51 - 54		----	-----	----	-----	----	----	0
54 - 57		----	-----	----	-----	----	----	0
57 - 60		----	-----	----	-----	----	----	0
60 - 63		----	-5.0	----	-10.6	----	405	1
63 - 66		6.9	-2.2	12.6	-----	176	----	4
66 - 69		10.4	-5.0	13.2	-----	217	----	3
69 - 72		8.2	-----	----	-----	----	----	3
72 - 75		----	-6.6	----	-----	----	----	1
75 - 78		5.0	-----	----	-----	----	----	1
78 - 81		4.1	-----	----	-----	----	----	2
81 - 84		----	-----	----	-----	----	----	0
84 - 87		4.4	-----	6.2	-----	210	----	1
87 - 90		----	-5.7	----	-----	----	----	2
90 - 93		----	-2.5	9.4	-6.5	213	35	3
93 - 96		----	-4.7	----	-----	----	----	1
96 - 99		----	-6.3	----	-----	----	----	1
99 - 102		----	-----	----	-----	----	----	0
Airplane 347 Traverse 4	Time (EST) - (a) Length of traverse 232.3 sec, 81,936 ft Initial heading (deg) 290							
0 - 3	25,500	2.5	-4.1	----	-----	----	----	2
3 - 6		4.1	-4.1	----	-5.4	----	72	3
6 - 9		5.0	-----	----	-----	----	----	1

[a]Clock not in field of view of camera.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 347 Traverse 4	Time (EST) - (a) Length of traverse 232.3 sec, 81,936 ft Initial heading (deg) 290							
9 - 12	25,500	6.0	-5.0	----	-----	----	----	2
12 - 15	25,000	8.2	-2.5	----	-5.4	----	71	3
15 - 18		7.8	-11.3	----	-10.3	----	36	4
18 - 21		5.0	-4.4	----	-----	----	----	3
21 - 24		4.7	-----	----	-----	----	----	1
24 - 27		----	-3.1	----	-----	----	----	1
27 - 30		----	-----	----	-----	----	----	0
30 - 33	24,500	12.6	-3.1	----	-4.3	----	231	3
33 - 36	25,000	7.5	-1.6	----	-----	----	----	5
36 - 39		----	-5.3	----	-----	----	----	1
39 - 42		5.0	-----	----	-----	----	----	1
42 - 45		2.8	-6.0	----	-----	----	----	4
45 - 48		----	-----	----	-----	----	----	0
48 - 51		3.8	-2.8	----	-5.5	----	164	2
51 - 54		2.8	-----	----	-----	----	----	1
54 - 57		2.8	-4.4	----	-----	----	----	3
57 - 60		5.0	-----	----	-11.1	----	411	1
60 - 63		----	-----	----	-----	----	----	0
63 - 66		----	-----	----	-----	----	----	0
66 - 69		4.1	-----	----	-----	----	----	1
69 - 72		----	-2.5	----	-----	----	----	1
72 - 75		----	-----	----	-----	----	----	0
75 - 78		----	-----	----	-----	----	----	0
78 - 81		----	-----	----	-----	----	----	0
81 - 84		----	-----	----	-----	----	----	0
Airplane 345 Traverse [c]1	Time (EST) - (b) Length of traverse 354.7 sec, 126,041 ft Initial heading (deg) - (b)							
0 - 3	20,500	----	-3.5	----	-----	----	----	1
3 - 6		4.5	-4.5	----	-----	----	----	2
6 - 9		10.8	-9.6	----	-----	----	----	7
9 - 12		13.7	-10.5	9.0	-----	128	----	9
12 - 15		8.6	-8.6	----	-----	----	----	9

[a]Clock not in field of view of camera.
[b]No records obtained.
[c]No records obtained for other traverses of this airplane.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 345 Traverse [c]1	Time (EST) - (b) Length of traverse 354.7 sec, 126,041 ft Initial heading (deg) - (b)							
15 - 18	20,000	12.1	-5.4	----	-16.3	----	177	9
18 - 21		16.9	-8.3	----	-----	----	----	5
21 - 24		10.2	-10.5	----	-----	----	----	5
24 - 27	20,500	9.9	-10.5	----	-----	----	----	8
27 - 30		7.3	-5.7	----	-10.6	----	146	5
30 - 33		11.5	-14.5	----	-----	----	----	4
33 - 36		9.6	-6.4	----	-----	----	----	5
36 - 39		12.4	-8.0	----	-----	----	----	3
39 - 42		14.0	-9.6	----	-----	----	----	2
42 - 45	21,000	----	-6.7	----	-----	----	----	1
45 - 48		----	-----	----	-----	----	----	0
48 - 51	20,500	6.4	-8.0	----	-----	----	----	7
51 - 54		2.5	-7.7	----	-----	----	----	3
54 - 57	20,000	7.3	-----	----	-----	----	----	2
57 - 60		6.1	-2.9	----	-----	----	----	2
60 - 63		6.4	-7.7	----	-----	----	----	4
63 - 66		10.8	-7.7	----	-15.5	----	356	2
66 - 69		8.9	-2.9	15.4	-----	337	----	4
69 - 72		8.9	-2.9	16.9	-----	304	----	5
72 - 75	20,500	5.4	-9.9	----	-----	----	----	4
75 - 78		8.0	-9.2	21.9	-----	208	----	6
78 - 81	21,000	5.7	-5.7	----	-6.5	----	70	6
81 - 84		8.9	-6.4	----	-----	----	----	4
84 - 87		15.3	-13.1	----	-----	----	----	7
87 - 90		7.3	-16.6	----	-----	----	----	5
90 - 93		2.6	-8.6	----	-----	----	----	4
93 - 96	20,500	9.6	-4.5	10.6	-----	212	----	5
96 - 99		7.0	-5.1	----	-----	----	----	6
99 - 102		11.8	-8.9	----	-----	----	----	6
102 - 105		7.7	-5.7	----	-----	----	----	4
105 - 108		5.1	-8.6	----	-----	----	----	7
108 - 111		4.5	-----	12.4	-----	427	----	1
111 - 114		14.7	-9.6	5.7	-----	377	----	5

[b]No records obtained.
[c]No records obtained for other traverses of this airplane.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 345 Traverse [c]1	Time (EST) - (b) Length of traverse 354.7 sec, 126,041 ft Initial heading (deg) - (b)							
114 - 117	21,000	13.7	-20.1	----	-----	----	----	6
117 - 120		3.8	-3.2	----	-----	----	----	2
120 - 123		3.8	-----	----	-----	----	----	2
123 - 126		5.7	-----	----	-----	----	----	2
126 - 129		----	-----	----	-----	----	----	0
Airplane 344 Traverse 1	Time (EST) 145812 - 150341 Length of traverse 341 sec, 96,747 ft Initial heading (deg) 40							
0 - 3	15,500	2.9	-5.4	----	-5.1	----	27	4
3 - 6		15.0	-16.3	----	-----	----	----	10
6 - 9	16,000	16.0	-8.3	----	-24.4	----	171	9
9 - 12		3.8	-17.9	----	-----	----	----	5
12 - 15		----	-----	----	-----	----	----	0
15 - 18		----	-----	----	-----	----	----	0
18 - 21		----	-----	----	-----	----	----	0
21 - 24		13.7	-3.2	----	-----	----	----	9
24 - 27		----	-16.6	----	-----	----	----	2
27 - 30		20.7	-----	----	-----	----	----	2
30 - 33	16,500	4.5	-10.2	----	-----	----	----	4
33 - 36		6.4	-11.8	----	-----	----	----	6
36 - 39	16,000	4.8	-11.8	9.0	-----	54	----	5
39 - 42		----	-----	----	-----	----	----	0
42 - 45		----	-----	----	-----	----	----	0
45 - 48		----	-----	----	-----	----	----	0
48 - 51		----	-----	----	-----	----	----	0
51 - 54		----	-----	----	-----	----	----	0
54 - 57		----	-----	----	-----	----	----	0
57 - 60		----	-2.9	----	-7.5	----	85	3
60 - 63		8.6	-10.5	----	-7.4	----	58	6
63 - 66		11.2	-15.6	----	-----	----	----	9
66 - 69		9.9	-16.6	----	-----	----	----	9
69 - 72		16.6	-8.6	----	-10.0	----	33	7
72 - 75	16,500	10.8	-13.1	----	-----	----	----	4

[b]No records obtained.
[c]No records obtained for other traverses of this airplane.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 344 Traverse 1	Time (EST) 145812 - 150341 Length of traverse 341 sec, 96,747 ft Initial heading (deg) 40							
75 - 78	16,500	12.4	-10.5	----	-----	----	----	6
78 - 81		----	-----	----	-----	----	----	0
81 - 84	17,000	8.6	-2.9	----	-----	----	----	1
84 - 87		----	-----	----	-----	----	----	0
87 - 90		----	-----	----	-----	----	----	0
90 - 93	17,500	8.6	-9.6	----	-----	----	----	2
93 - 96		----	-----	----	-----	----	----	0
96 - 99		----	-----	4.4	-----	56	----	0
Airplane 344 Traverse 2	Time (EST) 151700 - 152230 Length of traverse 378.5 sec, 111,044 ft Initial heading (deg) 30							
0 - 3	15,500	28.3	-9.2	----	-----	----	----	10
3 - 6		13.0	-35.3	----	-----	----	----	5
6 - 9		30.9	-25.1	----	-----	----	----	6
9 - 12		5.7	-15.9	----	-----	----	----	6
12 - 15	16,000	3.2	-8.3	----	-----	----	----	3
15 - 18		6.4	-4.8	----	-----	----	----	3
18 - 21		----	-5.1	----	-----	----	----	1
21 - 24		2.2	-3.8	----	-----	----	----	4
24 - 27	15,500	7.3	-7.3	----	-----	----	----	7
27 - 30		14.3	-8.9	----	-----	----	----	6
30 - 33	16,000	11.8	-12.4	----	-----	----	----	7
33 - 36		6.7	-10.5	----	-----	----	----	5
36 - 39		12.4	-10.2	----	-----	----	----	5
39 - 42		4.1	-11.1	----	-----	----	----	4
42 - 45		----	-16.2	----	-----	----	----	3
45 - 48		10.8	-8.6	----	-----	----	----	6
48 - 51		8.9	-4.1	----	-----	----	----	3
51 - 54	16,500	4.8	-4.5	----	-----	----	----	2
54 - 57		----	-----	----	-----	----	----	0
57 - 60		3.8	-15.3	----	-----	----	----	2
60 - 63		11.8	-7.3	----	-----	----	----	6
63 - 66		12.7	-10.8	----	-----	----	----	9

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 344 Traverse 2	Time (EST) 151700 - 152230 Length of traverse 378.5 sec, 111,044 ft Initial heading (deg) 30							
66 - 69	16,000	8.0	-----	----	-----	----	----	1
69 - 72		----	-----	----	-----	----	----	0
72 - 75		4.5	-6.4	----	-----	----	----	2
75 - 78		7.3	-2.5	----	-----	----	----	6
78 - 81		5.4	-4.1	----	-----	----	----	6
81 - 84		3.8	-----	----	-----	----	----	1
84 - 87		17.2	-38.2	----	-----	----	----	10
87 - 90		----	-4.8	----	-----	----	----	1
90 - 93		10.5	-11.1	----	-----	----	----	7
93 - 96		4.1	-11.8	----	-----	----	----	2
96 - 99		9.2	-9.2	----	-----	----	----	11
99 - 102		9.9	-12.7	----	-----	----	----	5
102 - 105		----	-----	----	-----	----	----	0
105 - 108		2.2	-----	----	-----	----	----	1
108 - 111		----	-----	----	-----	----	----	0
111 - 114		----	-----	----	-----	----	----	0
Airplane 344 Traverse 3	Time (EST) 152918 - 153313 Length of traverse 384 sec, 111,900 ft Initial heading (deg) 50							
0 - 3	15,000	14.7	-11.0	----	-----	----	----	5
3 - 6		18.2	-24.5	----	-----	----	----	7
6 - 9		12.9	-23.2	----	-----	----	----	7
9 - 12	16,000	7.8	-4.7	----	-----	----	----	2
12 - 15		----	-----	----	-----	----	----	0
15 - 18		9.7	-9.1	----	-----	----	----	6
18 - 21		8.8	-12.2	----	-----	----	----	8
21 - 24		11.9	-7.2	----	-----	----	----	10
24 - 27		10.7	-13.8	----	-----	----	----	10
27 - 30		10.0	-11.0	----	-----	----	----	10
30 - 33		3.5	-15.7	----	-----	----	----	3
33 - 36		14.1	-8.2	----	-----	----	----	7
36 - 39		17.6	-7.8	----	-----	----	----	5
39 - 42		----	-2.5	----	-----	----	----	1

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 344 Traverse 3	Time (EST) 152918 - 153313 Length of traverse 384 sec, 111,900 ft Initial heading (deg) 50							
42 - 45	16,000	----	-----	----	-----	----	----	0
45 - 48		----	-----	----	-----	----	----	0
48 - 51		----	-----	----	-----	----	----	0
51 - 54		----	-----	----	-----	----	----	0
54 - 57		----	-----	----	-----	----	----	0
57 - 60		----	-----	----	-----	----	----	0
60 - 63		----	-----	----	-----	----	----	0
63 - 66		2.8	-3.8	----	-----	----	----	1
66 - 69		----	-3.8	----	-----	----	----	2
69 - 72		----	-4.1	----	-----	----	----	1
72 - 75		2.8	-4.4	----	-----	----	----	2
75 - 78		3.5	-----	----	-----	----	----	3
78 - 81		----	-6.6	----	-----	----	----	3
81 - 84		3.5	-----	----	-----	----	----	2
84 - 87		----	-----	----	-----	----	----	0
87 - 90		----	-2.8	----	-----	----	----	1
90 - 93		5.3	-7.5	----	-----	----	----	2
93 - 96		3.5	-3.8	----	-----	----	----	2
96 - 99		2.2	-6.0	4.3	-----	58	----	2
99 - 102		5.3	-3.8	----	-----	----	----	2
102 - 105		2.8	-6.0	4.0	-----	86	----	2
105 - 108		----	-----	----	-----	----	----	0
108 - 111		----	-----	----	-----	----	----	0
111 - 114		----	-----	----	-----	----	----	0
Airplane 344 Traverse 4	Time (EST) 154208 - 154630 Length of traverse 129.5 sec, 75,984 ft Initial heading (deg) 290							
0 - 3	15,500	----	-----	----	-----	----	----	0
3 - 6		----	-4.4	----	-----	----	----	1
6 - 9		----	-----	----	-----	----	----	0
9 - 12		----	-----	----	-----	----	----	0
12 - 15		----	-----	----	-----	----	----	0
15 - 18		----	-2.5	----	-----	----	----	1

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 344 Traverse 4	Time (EST) 154208 - 154630 Length of traverse 129.5 sec, 75,984 ft Initial heading (deg) 290							
18 - 21	15,500	----	-6.8	----	-----	----	----	1
21 - 24		----	-----	----	-----	----	----	0
24 - 27		2.5	-----	----	-----	----	----	1
27 - 30		----	-----	----	-----	----	----	0
[d]30 - 33		----	-----	----	-----	----	----	0
Airplane 351 Traverse 1	Time (EST) 145635 - 150219 Length of traverse 359.5 sec, 105,379 ft Initial heading (deg) 40							
(e)								
Airplane 351 Traverse 2	Time (EST) 151333 - 151835 Length of traverse 313.4 sec, 93,539 ft Initial heading (deg) 270							
(e)								
Airplane 351 Traverse 3	Time (EST) 152547 - 153057 Length of traverse 327.4 sec, 93,237 ft Initial heading (deg) 80							
(e)								
Airplane 351 Traverse 4	Time (EST) 154113 - 154457 Length of traverse 240.4 sec, 66,836 ft Initial heading (deg) 290							
(e)								
Airplane 331 Traverse 1	Time (EST) 145346 - 15000 Length of traverse 458.5 sec, 110,930 ft Initial heading (deg) 30							
0 - 3	6,000	6.1	-5.8	9.8	-----	87	----	4
3 - 6		8.0	-8.0	----	-12.7	----	70	7

[d]Records for complete traverse not obtained.
[e]Failure in operation of accelerometer prevented computations for gust velocities.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 331 Traverse 1	Time (EST) 145346 - 15000 Length of traverse 458.5 sec, 110,930 ft Initial heading (deg) 30							
6 - 9	6,000	5.8	-3.8	----	-8.0	----	23	5
9 - 12		7.0	-12.8	----	-13.4	----	116	9
12 - 15		----	-3.8	----	-----	----	----	2
15 - 18		5.8	-7.4	----	-----	----	----	7
18 - 21		17.3	-6.7	28.6	-----	180	----	4
21 - 24		5.4	-8.6	----	-6.0	----	92	3
24 - 27		8.0	-6.1	10.5	-----	25	----	5
27 - 30	6,500	1.9	-8.6	9.4	-12.1	25	160	5
30 - 33		11.2	-9.3	22.6	-----	155	----	8
33 - 36	6,000	15.3	-3.5	21.4	-6.7	48	47	8
36 - 39		8.0	-8.6	----	-----	----	----	7
39 - 42		3.5	-4.5	9.6	-----	100	----	3
42 - 45		8.0	-7.7	20.1	-----	225	----	7
45 - 48		9.9	-3.5	----	-----	----	----	3
48 - 51		----	-----	----	-----	----	----	0
51 - 54		10.9	-11.5	13.1	-----	73	----	6
54 - 57		13.1	-12.8	----	-----	----	----	6
57 - 60	5,500	----	-----	----	-----	----	----	0
60 - 63	6,000	14.7	-12.8	----	-----	----	----	4
63 - 66		5.8	-6.4	4.6	-6.7	96	46	6
66 - 69		5.4	-5.4	8.4	-----	118	----	6
69 - 72		5.4	-3.8	----	-----	----	----	3
72 - 75		8.0	-5.4	12.5	-9.5	175	125	4
75 - 78		6.1	-5.4	----	-8.9	----	73	3
78 - 81		6.1	-16.9	13.0	-----	168	----	8
81 - 84		9.9	-4.5	22.6	-----	175	----	5
84 - 87		12.2	-22.4	15.3	-----	73	----	10
87 - 90		16.0	-10.6	15.9	-----	69	----	8
90 - 93		9.6	-8.0	16.5	-----	128	----	6
93 - 96		6.4	-3.5	----	-----	----	----	7
96 - 99		9.9	-7.7	----	-7.4	----	75	6
99 - 102		8.6	-7.4	13.6	-----	103	----	7
102 - 105		5.4	-7.0	----	-----	----	----	4
105 - 108	5,500	10.9	-6.7	----	-----	----	----	7
108 - 111	6,000	5.4	-8.0	12.2	-----	71	----	5

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 331 Traverse 2	Time (EST) 151010 - 151145 Length of traverse 111.7 sec, 27,823 ft Initial heading (deg) 270							
0 - 3	6,000	----	-3.5	----	-7.2	----	25	1
3 - 6		5.7	-9.2	----	-----	----	----	6
6 - 9		5.4	-6.0	----	-----	----	----	4
9 - 12		7.9	-7.6	----	-9.5	----	100	9
12 - 15		5.1	-7.0	----	-----	----	----	3
15 - 18		14.3	-7.3	----	-----	----	----	9
18 - 21		5.1	-11.4	11.3	-9.2	24	24	8
21 - 24	5,500	7.6	-9.5	----	-----	----	----	6
24 - 27		----	-----	----	-----	----	----	0
27 - 30		----	-----	----	-----	----	----	0
Airplane 331 Traverse 3	Time (EST) 151245 - 151708 Length of traverse 345.9 sec, 78,957 ft Initial heading (deg) 290							
0 - 3	6,000	----	-----	----	-----	----	----	0
3 - 6		----	-----	----	-----	----	----	0
6 - 9		----	-----	----	-----	----	----	0
9 - 12		----	-3.8	----	-----	----	----	1
12 - 15		----	-----	----	-----	----	----	0
15 - 18		----	-5.7	----	-----	----	----	1
18 - 21		----	-3.8	----	-----	----	----	1
21 - 24		----	-----	----	-----	----	----	0
24 - 27		5.1	-5.1	----	-17.9	----	23	5
27 - 30	5,500	5.4	-8.5	----	-8.0	----	23	5
30 - 33		5.7	-7.3	----	-6.8	----	118	6
33 - 36		5.4	-8.2	9.4	-12.8	69	47	6
36 - 39		6.0	-9.2	----	-----	----	----	6
39 - 42	5,000	10.1	-10.1	9.5	-----	44	----	5
42 - 45		10.1	-5.7	20.8	-----	137	----	6
45 - 48		19.0	-13.9	----	-----	----	----	8
48 - 51		9.8	-11.1	8.6	-----	88	----	6
51 - 54		14.6	-3.5	----	-----	----	----	7
54 - 57		6.0	-8.9	----	-----	----	----	4
57 - 60		6.0	-8.9	10.5	-----	44	----	8

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 331 Traverse 3	Time (EST) 151245 - 151708 Length of traverse 345.9 sec, 78,957 ft Initial heading (deg) 290							
60 - 63	5,000	10.4	-5.7	9.2	-----	47	----	9
63 - 66	5,500	10.8	-9.5	24.5	-----	113	----	8
66 - 69		5.1	-8.2	----	-----	----	----	6
69 - 72		8.2	-7.3	----	-----	----	----	10
72 - 75		7.9	-4.4	18.8	-----	49	----	4
75 - 78	6,000	11.4	-8.5	21.5	-----	133	----	9
78 - 81		7.6	-8.5	----	-----	----	----	4
Airplane 331 Traverse 4	Time (EST) 152445 - 152930 Length of traverse 278.2 sec, 62,452 ft Initial heading (deg) 60							
0 - 3	6,000	6.9	-9.8	16.6	-----	135	----	5
3 - 6		5.0	-4.1	----	-----	----	----	4
6 - 9		9.4	-10.4	----	-13.8	----	49	10
9 - 12		7.2	-7.9	16.2	-----	25	----	10
12 - 15	5,500	12.9	-12.0	22.1	-----	125	----	9
15 - 18		11.0	-21.1	----	-37.3	----	44	10
18 - 21	5,000	14.8	-22.0	----	-----	----	----	8
21 - 24		24.5	-11.6	----	-----	----	----	10
24 - 27		8.2	-15.1	----	-----	----	----	9
27 - 30		7.9	-10.7	13.0	-----	24	----	10
30 - 33		5.3	-10.1	----	-----	----	----	4
33 - 36	4,500	6.6	-8.2	----	-----	----	----	2
36 - 39		10.7	-3.8	----	-----	----	----	3
39 - 42		----	-12.9	----	-----	----	----	3
42 - 45		----	-----	----	-----	----	----	0
45 - 48		----	-4.1	----	-----	----	----	1
48 - 51		----	-4.1	----	-----	----	----	2
51 - 54		----	-----	----	-----	----	----	0
54 - 57		----	-4.1	----	-----	----	----	2
57 - 60		----	-3.8	----	-----	----	----	1
60 - 63		----	-3.8	----	-----	----	----	1

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 14, 1946 - Flight 21								
Airplane 331 Traverse 5	Time (EST) 154030 - 154510 Length of traverse 288.7 sec, 65,759 ft Initial heading (deg) 290							
0 - 3	5,500	6.9	-3.4	----	-----	----	----	3
3 - 6		----	-5.3	----	-----	----	----	1
6 - 9		----	-----	----	-----	----	----	0
9 - 12		----	-----	----	-----	----	----	0
12 - 15		----	-4.4	----	-----	----	----	1
15 - 18		----	-3.7	----	-----	----	----	1
18 - 21		----	-----	----	-----	----	----	0
21 - 24		----	-----	----	-----	----	----	0
24 - 27		----	-6.5	----	-----	----	----	1
27 - 30		----	-3.7	----	-----	----	----	1
30 - 33		----	-3.7	----	-----	----	----	1
33 - 36		5.6	-----	----	-----	----	----	1
36 - 39		5.9	-7.5	----	-11.8	----	71	3
39 - 42		5.3	-8.4	----	-----	----	----	5
42 - 45		9.7	-7.5	----	-----	----	----	3
45 - 48		----	-7.5	----	-----	----	----	4
48 - 51		----	-5.9	----	-12.2	----	44	1
51 - 54		----	-8.7	----	-----	----	----	4
54 - 57		9.0	-5.6	----	-----	----	----	4
57 - 60		----	-10.0	----	-----	----	----	1
60 - 63		10.9	-12.8	----	-----	----	----	7
63 - 66	5,000	7.2	-5.0	11.2	-----	189	----	4
August 15, 1946 - Flight 22								
Airplane 345 Traverse 1	Time (EST) - (b) Length of traverse 341.1 sec, 106,539 ft Initial heading (deg) - (b)							
0 - 3	25,500	----	-5.1	----	-7.6	----	285	1
3 - 6	26,000	----	-5.4	----	-----	----	----	1
6 - 9		3.2	-3.8	----	-----	----	----	2
9 - 12		----	-----	----	-----	----	----	0
12 - 15		3.2	-3.8	----	-----	----	----	2
15 - 18		3.2	-3.2	----	-----	----	----	2

[b]No records obtained.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 15, 1946 - Flight 22								
Airplane 345 Traverse 1		Time (EST) - (b) Length of traverse 341.1 sec, 106,539 ft Initial heading (deg) - (b)						
18 - 21	26,000	6.7	-6.3	----	-----	----	----	5
21 - 24		10.5	-14.0	----	-----	----	----	6
24 - 27		12.7	-9.2	----	-32.3	----	123	6
27 - 30		5.1	-11.1	----	-----	----	----	4
30 - 33		13.0	-6.3	18.5	-----	148	----	5
33 - 36	25,500	5.4	-3.5	----	-7.7	----	72	2
36 - 39	26,000	6.0	-4.1	----	-----	----	----	4
39 - 42		8.9	-9.5	----	-----	----	----	5
42 - 45		11.1	-11.4	----	-----	----	----	9
45 - 48	26,500	19.0	-17.1	----	-----	----	----	9
48 - 51		15.9	-9.8	----	-----	----	----	12
51 - 54	27,000	9.2	-11.7	----	-----	----	----	7
54 - 57		15.2	-13.3	----	-----	----	----	5
57 - 60	27,500	11.7	-12.7	----	-----	----	----	6
60 - 63		10.5	-18.1	----	-----	----	----	6
63 - 66	27,000	16.5	-6.7	----	-----	----	----	4
66 - 69		11.4	-4.1	16.6	-----	35	----	4
69 - 72		----	-4.1	----	-----	----	----	2
72 - 75		7.3	-2.9	----	-----	----	----	3
75 - 78		3.5	-3.2	----	-13.6	----	404	5
78 - 81		4.4	-5.1	9.2	-----	335	----	3
81 - 84		3.8	-2.5	----	-----	----	----	3
84 - 87		4.1	-3.8	----	-----	----	----	3
87 - 90		----	-3.2	----	-----	----	----	1
90 - 93		3.5	-----	5.9	-----	219	----	1
93 - 96		----	-2.9	----	-----	----	----	1
96 - 99		3.5	-3.5	----	-----	----	----	2
99 - 102		4.1	-6.0	----	-----	----	----	2
102 - 105	27,500	----	-----	----	-----	----	----	0
105 - 108		----	-----	----	-----	----	----	0

[b] No records obtained.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 15, 1946 - Flight 22								
Airplane 344 Traverse 1	Time (EST) 131004 - 131500 Length of traverse 306.4 sec, 109,745 ft Initial heading (deg) 300							
0 - 3	20,500	----	-----	----	-----	----	----	0
3 - 6		----	-----	----	-----	----	----	0
6 - 9		----	-----	----	-----	----	----	0
9 - 12		----	-3.5	----	-9.3	----	332	1
12 - 15		5.4	-----	10.6	-----	491	----	1
15 - 18		----	-----	----	-----	----	----	0
18 - 21		5.4	-6.0	----	-----	----	----	4
21 - 24		4.8	-4.4	----	-4.2	----	103	5
24 - 27		7.3	-3.5	6.6	-----	105	----	4
27 - 30		8.2	-5.7	----	-----	----	----	10
30 - 33		10.5	-5.7	----	-----	----	----	4
33 - 36		7.6	-8.2	----	-----	----	----	6
36 - 39	21,000	3.5	-7.3	----	-----	----	----	8
39 - 42		4.4	-6.7	----	-----	----	----	6
42 - 45		4.1	-13.0	----	-----	----	----	6
45 - 48		10.1	-9.5	----	-----	----	----	3
48 - 51	20,500	2.9	-----	----	-----	----	----	2
51 - 54		----	-3.8	----	-----	----	----	3
54 - 57		4.1	-----	----	-----	----	----	2
57 - 60		7.3	-----	----	-----	----	----	2
60 - 63	20,000	6.7	-4.8	----	-5.0	----	70	3
63 - 66	20,500	4.1	-7.3	13.3	-----	379	----	4
66 - 69		2.9	-----	----	-----	----	----	1
69 - 72		3.5	-7.9	6.5	-----	144	----	3
72 - 75		8.6	-2.2	----	-----	----	----	4
75 - 78		7.0	-8.2	----	-----	----	----	3
78 - 81		9.5	-3.2	----	-----	----	----	3
81 - 84		2.2	-6.3	----	-----	----	----	3
84 - 87	21,000	1.9	-6.0	----	-----	----	----	5
87 - 90	20,500	----	-----	----	-----	----	----	0
90 - 93		3.5	-7.9	4.1	-----	145	----	3
93 - 96		----	-3.2	----	-----	----	----	1
96 - 99		----	-----	----	-----	----	----	0
99 - 102		3.5	-----	3.6	-----	104	----	1

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 15, 1946 - Flight 22								
Airplane 344 Traverse 1	Time (EST) 131004 - 131500 Length of traverse 306.4 sec, 109,745 ft Initial heading (deg) 300							
102 - 105	20,500	----	-----	----	-----	----	----	0
105 - 108		----	-----	----	-----	----	----	0
108 - 111		----	-----	----	-----	----	----	0
Airplane 344 Traverse 2	Time (EST) 131945 - 132432 Length of traverse 309.5 sec, 103,045 ft Initial heading (deg) 160							
0 - 3	20,500	4.1	-----	----	-----	----	----	1
3 - 6		----	-4.1	----	-----	----	----	1
6 - 9		----	-----	----	-----	----	----	0
9 - 12		----	-----	----	-----	----	----	0
12 - 15	20,000	----	-3.8	----	-----	----	----	1
15 - 18		2.5	-----	----	-----	----	----	1
18 - 21		2.5	-----	4.6	-----	225	----	1
21 - 24		----	-----	----	-----	----	----	0
24 - 27	20,500	----	-----	----	-----	----	----	0
27 - 30		----	-----	----	-----	----	----	0
30 - 33	20,000	7.2	-3.1	----	-----	----	----	2
33 - 36		12.6	-----	----	-----	----	----	1
36 - 39		5.0	-6.6	----	-19.3	----	443	3
39 - 42	20,500	6.9	-10.1	19.0	-----	260	----	4
42 - 45		7.5	-10.4	----	-----	----	----	2
45 - 48		8.2	-10.7	----	-----	----	----	3
48 - 51		8.8	-6.9	----	-----	----	----	2
51 - 54	21,000	5.3	-14.2	----	-----	----	----	5
54 - 57	20,500	9.8	-9.8	----	-----	----	----	5
57 - 60		6.9	-3.5	----	-----	----	----	2
60 - 63		5.0	-6.3	----	-----	----	----	2
63 - 66		9.4	-11.3	----	-----	----	----	5
66 - 69	21,000	4.7	-9.5	7.6	-----	135	----	5
69 - 72	20,500	6.9	-6.0	8.7	-----	135	----	3
72 - 75		10.1	-3.8	13.3	-----	175	----	3
75 - 78		8.5	-----	----	-----	----	----	3
78 - 81		8.5	-8.2	----	-----	----	----	3

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 15, 1946 - Flight 22								
Airplane 344 Traverse 2	Time (EST) 131945 - 132432 Length of traverse 309.5 sec, 103,045 ft Initial heading (deg) 160							
81 - 84	20,500	----	-2.2	----	-----	----	----	2
84 - 87	21,000	4.7	-6.6	12.4	-----	247	----	4
87 - 90	20,500	7.2	-8.8	----	-----	----	----	2
90 - 93		3.8	-3.1	----	-----	----	----	3
93 - 96		4.1	-3.5	----	-----	----	----	2
96 - 99		5.3	-7.2	----	-----	----	----	3
99 - 102		----	-----	----	-----	----	----	0
102 - 105		----	-2.8	----	-7.8	----	110	1
Airplane 344 Traverse 3	Time (EST) 133412 - 133807 Length of traverse 259.4 sec, 86,582 ft Initial heading (deg) 330							
0 - 3	21,000	4.7	-9.4	----	-----	----	----	2
3 - 6		12.5	-2.5	----	-----	----	----	3
6 - 9	20,500	10.0	-----	----	-----	----	----	1
9 - 12	21,000	7.5	-6.6	----	-----	----	----	3
12 - 15		----	-8.4	----	-----	----	----	1
15 - 18	20,500	10.0	-3.4	----	-----	----	----	3
18 - 21		2.2	-8.7	8.8	-----	33	----	2
21 - 24		7.5	-6.2	----	-----	----	----	4
24 - 27		9.1	-5.3	----	-----	----	----	5
27 - 30		7.8	-5.3	----	-----	----	----	5
30 - 33		7.8	-15.6	----	-----	----	----	2
33 - 36		2.5	-----	----	-----	----	----	1
36 - 39	21,000	----	-----	----	-----	----	----	0
39 - 42		2.2	-7.2	----	-----	----	----	4
42 - 45		4.4	-4.1	----	-----	----	----	2
45 - 48	20,500	4.1	-4.1	----	-----	----	----	2
48 - 51		4.7	-5.3	----	-----	----	----	3
51 - 54		----	-4.4	----	-----	----	----	1
54 - 57		10.0	-----	----	-----	----	----	1
57 - 60		6.9	-----	----	-----	----	----	1
60 - 63	21,000	----	-3.4	----	-----	----	----	1
63 - 66		3.7	-----	----	-----	----	----	1
66 - 69		----	-----	----	-----	----	----	0

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 15, 1946 - Flight 22								
Airplane 344 Traverse 3	Time (EST) 133412 - 133807 Length of traverse 259.4 sec, 86,582 ft Initial heading (deg) 330							
69 - 72	20,500	3.1	-----	----	-----	----	----	1
72 - 75		4.7	-----	8.8	-----	234	----	1
75 - 78		10.0	-----	----	-----	----	----	2
78 - 81		----	-7.2	----	-----	----	----	1
81 - 84		----	-4.1	----	-----	----	----	1
84 - 87		7.2	-----	----	-----	----	----	1
Airplane 344 Traverse 4	Time (EST) 134134 - 134515 Length of traverse 239.5 sec, 76,278 ft Initial heading (deg) - (f)							
0 - 3	20,500	2.8	-----	----	-----	----	----	1
3 - 6	21,000	----	-4.4	----	-----	----	----	1
6 - 9		----	-----	----	-----	----	----	0
9 - 12	20,500	----	-4.4	----	-----	----	----	1
12 - 15		----	-----	----	-----	----	----	0
15 - 18		1.9	-----	3.0	-----	136	----	1
18 - 21		----	-----	----	-----	----	----	0
21 - 24		3.1	-----	----	-----	----	----	1
24 - 27		5.9	-----	----	-----	----	----	1
27 - 30		3.4	-6.5	----	-----	----	----	5
30 - 33		7.8	-9.0	----	-----	----	----	4
33 - 36		8.4	-15.2	----	-----	----	----	2
36 - 39		8.1	-8.7	9.8	-----	156	----	5
39 - 42		7.5	-5.0	----	-----	----	----	5
42 - 45		----	-6.2	----	-----	----	----	2
45 - 48		5.0	-2.5	----	-----	----	----	2
48 - 51		7.1	-3.4	----	-----	----	----	4
51 - 54		2.8	-----	----	-----	----	----	1
54 - 57		2.8	-2.8	----	-8.9	----	32	3
57 - 60		----	-6.8	----	-----	----	----	1
60 - 63		4.0	-5.9	----	-----	----	----	3
63 - 66		5.3	-----	----	-----	----	----	1
66 - 69	21,000	----	-5.9	----	-----	----	----	1

[f]Not readable.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 15, 1946 - Flight 22								
Airplane 344 Traverse 4		Time (EST) 134134 - 134515 Length of traverse 239.5 sec, 76,278 ft Initial heading (deg) - (f)						
69 - 72	21,000	2.2	-----	----	-----	----	----	1
72 - 75	20,500	5.0	-2.5	12.6	-----	195	----	4
75 - 78		4.0	-----	----	-----	----	----	1
Airplane 351[b]								
Airplane 331 Traverse [c]1		Time (EST) 130244 - 130735 Length of traverse 306.2 sec, 87,568 ft Initial heading (deg) 270						
0 - 3	11,000	----	-4.2	----	-----	----	----	1
3 - 6	11,500	4.2	-4.2	----	-----	----	----	2
6 - 9		4.2	-----	----	-----	----	----	1
9 - 12		----	-4.2	----	-----	----	----	1
12 - 15		----	-6.1	----	-----	----	----	1
15 - 18		8.9	-6.7	----	-----	----	----	4
18 - 21		7.7	-6.4	----	-----	----	----	6
21 - 24		6.4	-9.3	----	-10.1	----	53	4
24 - 27		10.2	-5.7	26.5	-----	57	----	6
27 - 30		4.5	-8.3	----	-----	----	----	5
30 - 33		1.9	-7.3	12.8	-----	139	----	4
33 - 36		8.6	-8.3	7.0	-----	141	----	5
36 - 39		4.2	-10.2	9.5	-----	118	----	5
39 - 42		15.0	-9.9	----	-----	----	----	10
42 - 45	12,000	9.3	-9.9	----	-----	----	----	7
45 - 48	11,500	6.1	-8.0	8.2	-----	61	----	8
48 - 51		8.6	-7.7	12.4	-----	84	----	7
51 - 54		4.5	-4.8	12.8	-28.1	169	177	7
54 - 57		7.3	-12.1	----	-----	----	----	6
57 - 60		4.2	-16.0	7.2	-----	87	----	5
60 - 63		4.5	-----	9.8	-----	61	----	4
63 - 66	12,000	13.1	-4.2	----	-----	----	----	5
66 - 69	12,500	15.7	-24.3	15.8	-----	61	----	5
69 - 72	13,000	4.5	-8.9	9.6	-7.1	56	193	7
72 - 75		8.9	-11.2	----	-----	----	----	8

[b]No records obtained.
[c]No records obtained for other traverses of this airplane.
[f]Not readable.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 15, 1946 - Flight 22								
Airplane 331 Traverse [c]1	Time (EST) 130244 - 130735; Length of traverse 306.2 sec, 87,568 ft; Initial heading (deg) 270							
75 - 78	13,500	10.5	-12.8	10.2	-14.8	27	114	10
78 - 81		----	-8.0	----	-----	----	----	4
81 - 84		----	-7.0	----	-----	----	----	2
84 - 87		6.1	-4.2	----	-----	----	----	2
87 - 90		----	-----	----	-----	----	----	0
Airplane 347 Traverse 1	Time (EST) - (b); Length of traverse 352 sec, 92,527 ft; Initial heading (deg) - (b)							
0 - 3	6,000	5.8	-7.4	7.9	-3.3	73	72	5
3 - 6		7.1	-7.7	----	-21.0	----	73	7
6 - 9	5,500	3.5	-----	----	-----	----	----	2
9 - 12		5.5	-4.5	----	-----	----	----	2
12 - 15		4.8	-4.8	4.5	-12.5	127	182	6
15 - 18		----	-----	----	-----	----	----	0
18 - 21		----	-----	----	-----	----	----	0
21 - 24		4.5	-2.2	----	-----	----	----	2
24 - 27		----	-----	----	-----	----	----	0
27 - 30		----	-----	----	-----	----	----	0
30 - 33		2.6	-----	4.4	-----	54	----	1
33 - 36		6.1	-----	5.1	-----	81	----	4
36 - 39		5.8	-5.1	----	-----	----	----	4
39 - 42		5.5	-4.8	----	-----	----	----	4
42 - 45	5,000	20.9	-9.9	----	-8.2	----	79	5
45 - 48		11.9	-7.1	8.8	-13.4	50	75	4
48 - 51		----	-----	----	-4.5	----	72	1
51 - 54		----	-----	----	-----	----	----	0
54 - 57		----	-3.5	----	-----	----	----	2
57 - 60		7.4	-5.5	----	-----	----	----	8
60 - 63		7.7	-7.4	----	-----	----	----	4
63 - 66	5,500	6.4	-5.8	8.2	-4.5	53	53	8
66 - 69		----	-9.3	----	-10.4	----	55	2
69 - 72		6.7	-13.5	----	-21.0	----	115	6
72 - 75		2.6	-4.5	----	-----	----	----	3
75 - 78		9.3	-5.5	11.9	-11.3	136	58	6

[b]No records obtained.
[c]No records obtained for other traverses of this airplane.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 15, 1946 - Flight 22								
Airplane 347 Traverse 1		Time (EST) - (b) Length of traverse 352 sec, 92,527 ft Initial heading (deg) - (b)						
78 - 81	5,500	4.2	-4.8	----	-10.4	----	174	4
81 - 84		5.1	-5.8	----	-9.8	----	59	4
84 - 87		5.8	-9.9	----	-5.4	----	60	5
87 - 90		14.1	-10.6	7.0	-----	113	----	5
90 - 93		5.1	-4.2	----	-----	----	----	3
Airplane 347 Traverse 2		Time (EST) - (b) Length of traverse 263.6 sec, 67,128 ft Initial heading (deg) - (b)						
0 - 3	5,500	4.1	-2.9	4.5	-----	47	----	3
3 - 6		4.1	-5.1	----	-----	----	----	5
6 - 9		4.5	-----	----	-----	----	----	2
9 - 12		----	-6.4	4.7	-----	75	----	3
12 - 15		4.1	-7.3	----	-----	----	----	4
15 - 18		7.0	-3.8	7.8	-----	49	----	4
18 - 21		10.5	-5.1	6.2	-----	77	----	9
21 - 24		9.9	-6.1	----	-----	----	----	12
24 - 27		17.9	-19.1	10.6	-----	50	----	9
27 - 30		5.7	-2.9	8.4	-8.3	48	73	5
30 - 33		3.5	-----	----	-----	----	----	1
33 - 36		----	-----	----	-----	----	----	0
36 - 39	5,000	3.8	-----	----	-----	----	----	1
39 - 42		4.1	-----	----	-----	----	----	1
42 - 45		----	-----	----	-----	----	----	1
45 - 48		----	-----	----	-----	----	----	1
48 - 51		----	-----	----	-----	----	----	2
51 - 54		----	-----	----	-----	----	----	0
54 - 57		----	-----	----	-----	----	----	0
57 - 60		----	-----	----	-----	----	----	0
60 - 63		----	-----	----	-----	----	----	1
63 - 66	5,500	----	-----	----	-----	----	----	1
66 - 69		----	-----	----	-----	----	----	0

[b]No records obtained.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Continued

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 15, 1946 - Flight 22								
Airplane 347 Traverse 3	Time (EST) - (b) Length of traverse 488.3 sec, 130,212 ft Initial heading (deg) - (b)							
0 - 3	5,500	----	-----	----	-----	----	----	0
3 - 6		3.1	-----	----	-----	----	----	1
6 - 9		----	-4.1	----	-----	----	----	2
9 - 12		23.3	-10.7	9.8	-----	53	----	7
12 - 15		16.4	-6.6	----	-8.9	----	116	8
15 - 18		4.4	-5.7	----	-----	----	----	8
18 - 21		7.9	-6.0	----	-12.3	----	182	6
21 - 24		7.5	-4.4	5.1	-----	26	----	6
24 - 27		----	-----	----	-----	----	----	0
27 - 30		5.7	-----	4.9	-----	49	----	2
30 - 33		----	-2.2	----	-----	----	----	2
33 - 36		----	-----	----	-----	----	----	0
36 - 39	6,000	----	-2.5	----	-----	----	----	1
39 - 42		----	-----	----	-----	----	----	0
42 - 45		----	-----	----	-----	----	----	0
45 - 48		----	-----	----	-----	----	----	0
48 - 51		----	-----	----	-----	----	----	0
51 - 54		----	-----	----	-----	----	----	0
54 - 57		----	-----	----	-----	----	----	0
57 - 60		2.5	-----	----	-4.0	----	82	2
60 - 63		----	-----	----	-----	----	----	0
63 - 66		2.5	-----	----	-----	----	----	1
66 - 69	5,500	----	-1.9	----	-3.2	----	56	1
69 - 72		2.5	-----	2.7	-4.3	56	56	2
72 - 75		----	-----	----	-----	----	----	0
75 - 78		----	-----	----	-----	----	----	0
78 - 81	5,000	2.5	-2.8	----	-3.2	----	56	4
81 - 84		4.4	-4.7	----	-----	----	----	3
84 - 87		3.8	-3.8	----	-----	----	----	2
87 - 90		----	-3.5	----	-3.2	----	27	9
90 - 93	5,500	6.3	-3.1	9.8	-6.5	156	52	7
93 - 96		----	-----	----	-----	----	----	0
96 - 99		3.5	-5.0	5.6	-----	80	----	2
99 - 102		5.0	-3.1	----	-----	----	----	6
102 - 105		2.5	-3.5	----	-----	----	----	3

[b]No records obtained.

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TABLE I.- SUMMARY OF GUST MEASUREMENTS - Concluded

Space interval ft × 10^3	Pressure altitude (ft)	Maximum effective gust velocity $U_{e_{max}}$ (fps)		Maximum true gust velocity $U_{t_{max}}$ (fps)		Gust gradient distance (ft)		No. of gusts
August 15, 1946 - Flight 22								
Airplane 347 Traverse 3	Time (EST) - (b) Length of traverse 488.3 sec, 130,212 ft Initial heading (deg) - (b)							
105 - 108	5,500	3.5	-4.1	4.3	-9.1	52	53	4
108 - 111		2.8	-2.5	4.5	-7.0	76	53	6
111 - 114		6.9	-4.4	5.3	-----	52	----	3
114 - 117		3.8	-6.0	----	-8.6	----	54	4
117 - 120	5,000	11.3	-5.0	11.5	-----	135	----	8
120 - 123		9.4	-3.5	----	-----	----	----	8
123 - 126		4.1	-7.5	----	-----	----	----	8
126 - 129		5.0	-4.1	----	-3.8	----	27	5
129 - 132		----	-----	----	-----	----	----	0
Airplane 347 Traverse 4	Time (EST) - (b) Length of traverse 130.8 sec, 33,813 ft Initial heading (deg) - (b)							
0 - 3	6,000	2.8	-5.9	6.6	-8.2	23	139	2
3 - 6		----	-----	----	-----	----	----	0
6 - 9		----	-2.8	----	-----	----	----	1
9 - 12		----	-----	----	-----	----	----	0
12 - 15		3.7	-2.8	----	-----	----	----	4
15 - 18		4.1	-4.1	----	-4.1	----	80	4
18 - 21	5,500	3.7	-8.7	9.1	-----	53	----	5
21 - 24		4.7	-4.7	5.0	-----	28	----	4
24 - 27		2.2	-4.7	----	-----	----	----	6
27 - 30		8.7	-4.1	----	-----	----	----	8
30 - 33		----	-----	----	-----	----	----	0
33 - 36		----	-----	----	-----	----	----	0

[b]No records obtained.

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TABLE II.- SUMMARY OF DRAFT VELOCITY MEASUREMENTS FROM FLIGHTS OF P-61C AIRPLANES WITHIN THUNDERSTORMS

Date	Flight no.	Airplane no.	Assigned altitude (ft)	Traverse no.	Draft location from cloud entry (ft)		Draft extent (ft)	Average draft velocity (fps)
					Start	End		
8-14-46	21	347	26,000	1	28,324	50,327	22,003	17.0
					50,712	56,868	6,156	-43.7
					56,868	66,170	9,302	39.1
					70,478	91,021	20,543	-22.7
				2	14,916	19,652	4,736	24.6
					36,311	48,297	11,986	-22.9
				3	6,059	32,548	26,489	23.0
					60,525	75,211	14,686	-10.6
				4	31,452	37,781	6,329	39.5
		345	21,000	1	8,415	17,895	9,480	-18 6
					22,071	32,000	9,929	35.1
					63,311	87,651	24,340	22.4
					87,651	103,600	15,949	-13.1
		344	16,000	1	4,797	9,281	4,484	35.4
				2	30,594	44,206	13,612	18.5
				[a]3				
				[a]4				
		351	11,000	1	28,878	37,050	8,172	15.8
					45,589	52,095	6,506	-13.6
					78,073	81,238	3,165	28.3
				2	5,893	12,077	6,184	17.9
					13,044	20,322	7,278	-12.1
					25,337	42,902	17,565	19.9
					42,902	59,714	16,812	-11.9
					59,777	72,356	12,579	19.5
				3	21,859	27,158	5,299	13.0
				[a]4				

[a]No draft velocities indicated by records.

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TABLE II.- SUMMARY OF DRAFT VELOCITY MEASUREMENTS - Concluded

Date	Flight no.	Airplane no.	Assigned altitude (ft)	Traverse no.	Draft location from cloud entry (ft)		Draft extent (ft)	Average draft velocity (fps)
					Start	End		
8-14-46	21	331	6,000	1	20,101	29,763	9,662	16.4
					35,695	40,124	4,429	18.0
					40,740	47,397	6,657	-12.3
				[a]2				
				3	38,235	52,380	14,145	-12.6
					52,380	67,364	14,984	15.0
				[a]4				
				[a]5				
8-15-46	22	345	26,000	1	11,655	22,662	11,007	9.1
					27,058	34,764	7,706	-11.8
					34,764	61,289	26,525	23.0
		344	21,000	1	32,590	46,352	13,762	22.5
				2	48,252	51,853	3,601	42.3
					59,931	66,781	6,850	26.4
					66,781	77,973	11,192	-15.7
				3	7,746	11,586	3,840	29.2
				[a]4				
		351	16,000	1	50,455	70,244	19,789	34.3
				2	37,337	56,947	19,610	30.3
		331	11,000	[b]1	16,976	30,833	13,857	8.1
					57,905	82,433	24,528	23.8
		347	6,000	1	63,405	69,431	6,026	20.3
				2	20,611	26,534	5,923	23.2
				[a]3				
				[a]4				

[a]No draft velocities indicated by records.
[b]No records obtained for other traverses of this airplane.

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TABLE III.- SUMMARY OF INDICATIONS OF AMBIENT

AIR TEMPERATURE WITHIN THUNDERSTORMS

Date	Flight no.	Airplane no.	Traverse no.	Time (EST)	Distance from cloud entry (ft)	Milliammeter reading
8-14-46	21	331	1	145346	0	180
				145400	2,900	180
				145415	6,300	190
				145430	9,900	200
				145445	13,200	210
				145500	16,700	200
				145515	20,000	210
				145530	23,500	200
				145600	30,500	200
				145615	34,200	210
				145745	56,600	210
				145800	60,700	200
				145900	74,800	200
				145915	78,700	220
				145930	82,300	220
				145945	85,900	230
				150000	89,600	220
8-15-46	22	331	1	130244	0	300
				130300	4,500	300
				130315	8,800	310
				130330	13,100	320
				130345	17,200	320
				130400	21,400	330
				130415	25,500	340
				130500	38,200	340
				130515	42,800	350
				130530	47,100	350
				130545	51,500	360
				130600	55,800	360
				130615	60,300	350
				130630	64,600	350
				130645	69,200	330
				130700	73,400	320
				130715	77,700	330
				130730	81,900	360

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