AD-A179 844 CORRELATION OF B-1 FLIGHT TEST SUBJECTIVE ASSESSMENTS 2/2
AND SOME RIDE QUALI (U) AERONAUTICAL SYSTEMS DIV
WRIGHT-PATTERSON AFB OH J W RUSTENBURG MAY 86
UNCLASSIFIED ASD-TR-85-5015 F/G 1/3 NL

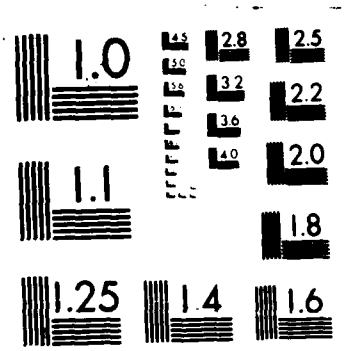
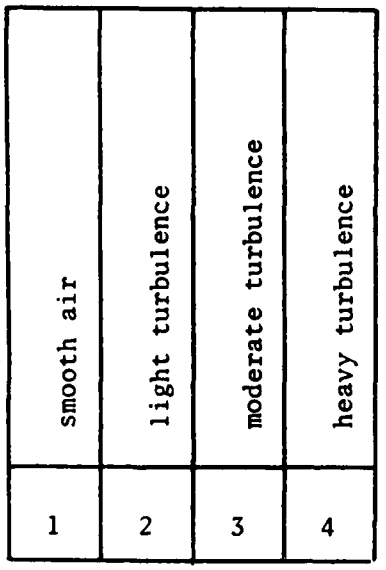


TABLE 10 SUBJECTIVE RATING SCALES

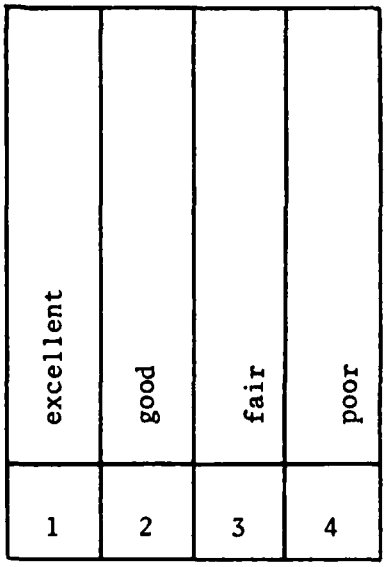
Increase of pilot effort with turbulence	Deterioration of task performance with turbulence	Rating
No significant increase	No significant deterioration	A
More effort required	No significant deterioration	B
	Minor	C
	Moderate	D
Best effort required	Moderate	E
	Major (but evaluation tasks can still be accomplished)	F
	Large (some tasks cannot be performed)	G
	Unable to perform tasks	H

Turbulence Effect Ratings

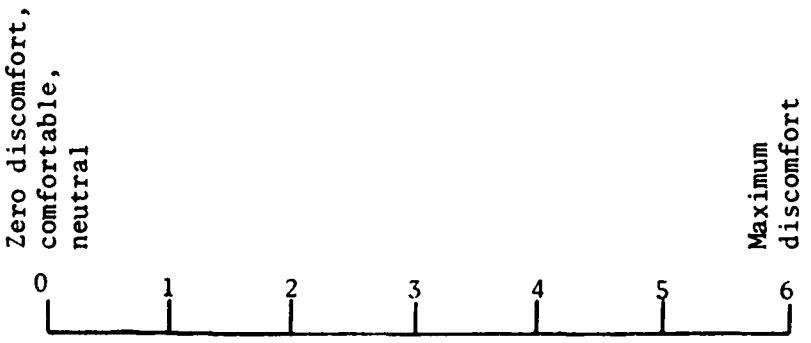
TABLE 10 (Con't) SUBJECTIVE RATING SCALES



Turbulence level scale



Comfort Rating #1



Comfort Rating #2

TABLE 11 FLIGHT TEST CONDITIONS

FLIGHT TEST CONDITIONS						TURBULENCE LEVELS		SUBJECTIVE DATA			
Condition Number	SMCS Mode	Mach Number	Ride Setting		Gross* Weight	σ_{wg}	σ_{vg}	Turb. Level Rating	Turb. Effect Rating	RQ#1 Rating	RQ#2 Rating
1	on	.85	hard	65°	med	2.15	3.13	2.0	2.5	-	1.8
2	on				"	2.3	2.3	2.0	2.5	-	1.9
3	on				"	3.3	3.09	2.0	3.0	2.0	2.2
4	off				"	3.0	2.7	2.0	3.6	3.0	3.5
5	on				light	2.47	2.45	2.0	1.8	2.0	.75
6	off				"	2.13	3.13	2.3	2.3	2.5	1.8
7	on				heavy	1.8	1.97	1.8	2.3	2.0	.88
8	off				"	2.23	2.79	2.0	3.7	2.5	2.4
9	on	↓	↓	↓	medium	2.18	2.12	2.0	4.0	-	2.0
10	on	.85	hard	65°	"	2.92	2.27	2.0	4.0	-	2.9
11	on	.65	medium	55°	light	1.58	2.06	1.6	2.3	2.0	1.3
12	off	.65	"	55°	"	1.39	2.94	1.8	3.0	2.6	2.5

* light gross weight = 260,000 lbs
medium " " = 260,000 - 310,000 lbs
heavy " " 310,000 - 360,000 lbs

TABLE 12 VERTICAL AND LATERAL RIDE QUALITY INDICES

Flight Test Condition	rms Accelerations		ISO-2631-ANSI-53.18-1979		ASD-TR-80-18		MIL-F-94900		Absorbed Power	
	σ_{n_z}	σ_{n_y}	a_{z_w}	a_{y_w}	σ_{e_z}	σ_{e_y}	D_{i_z}	D_{i_y}	P_z	P_y
1	.0542	.0369	.327	.223	.05	.0423	.072	.0235	.139	.108
2	.0463	.0271	.350	.165	.053	.0311	.0771	.0173	.159	.058
3	.0710	.0374	.521	.224	.081	.0433	.118	.0253	.359	.115
4	.1113	.0338	.883	.225	.115	.050	.152	.0332	1.170	.109
5	.0551	.0299	.432	.187	.063	.035	.0924	.0211	.213	.076
6	.0794	.0394	.69	.288	.083	.0585	.1091	.0391	.603	.157
7	.0356	.0230	.243	.131	.038	.0254	.0542	.0130	.071	.033
8	.083	.0352	.648	.227	.080	.0494	.1102	.0332	.596	.097
9	.0458	.0250	.332	.152	.0506	.0286	.0730	.0159	.142	.049
10	.0613	.0268	.429	.163	.068	.0306	.0978	.0170	.255	.057
11	.0337	.0245	.248	.149	.038	.0284	.0547	.0159	.077	.048
12	.0516	.0368	.409	.245	.053	.0541	.0701	.0359	.246	.157

TABLE 13 CORRELATION COEFFICIENTS FOR SINGLE AXIS VIBRATION

SUBJECTIVE RATING	Vertical Vibration Axis						Lateral Vibration Axis					
	Unweighted Accelerations		Weighted Accelerations				Unweighted Accelerations		Weighted Accelerations			
	ISO/ ANSI 1/3 Oct.	Broad Band	ASD TR 70-18	MIL-F-9490D	ISO/ ANSI	Absorbed Power	ISO/ ANSI 1/3 Oct.	Broad Band	ASD TR 70-18	MIL-F-9490D	ISO/ ANSI	Absorbed Power
Turbulence Level	.469	.552	.575	.582	.579	.435	.498	.527	.485	.462	.581	.444
Turbulence Effect	.366	.404	.377	.383	.323	.352	.069	-.014	.066	.093	-.024	.036
Comfort #1	.903	.774	.706	.622	.798	.851	.724	.534	.756	.791	.619	.601
Comfort #2	.674	.699	.645	.662	.643	.678	.453	.365	.460	.468	.369	.376

TABLE 14 COMBINED AXIS RIDE QUALITY INDICES

Flight Test Condition	ASD-TR-70-18	Absorbed Power	ISO
1	.0655	.0989	.452
2	.0615	.0943	.419
3	.0918	.1460	.608
4	.125	.4305	.938
5	.0721	.1176	.505
6	.1015	.3331	.799
7	.0457	.0563	.364
8	.094	.3022	.722
9	.0581	.0887	.394
10	.0743	.1126	.486
11	.0474	.0721	.524
12	.0757	.2307	.534

TABLE 15 CORRELATION COEFFICIENTS FOR COMBINED AXIS VIBRATION

Subjective Rating	ASD-TR-70-18	Absorbed Power	ISO
Turbulence Level	.584	.449	.595
Turbulence Effect	.327	.284	.280
Comfort #1	.775	.937	.811
Comfort #2	.683	.632	.632

TABLE A1 TURBULENCE FIELD PARAMETERS

Altitude (Ft)	Mission Segment	Direction	P_1	b_1 (Ft/Sec)	P_2	b_2 (Ft/Sec)	L (ft)
0 – 1,000	Low Level Contour	Vertical	1.00	2.7	10^{-3}	10.65	500
0 – 1,000	Low Level Contour	Lateral	1.00	3.1	10^{-3}	14.06	500
0 – 1,000	Climb, Cruise, Descent	Vert & Lat	1.00	2.51	.005	5.04	500
1,000 – 2,500	Climb, Cruise, Descent	Vert & Lat	.42	3.02	.0033	5.94	1750
2,500 – 5,000	Climb, Cruise, Descent	Vert & Lat	.30	3.42	.0020	8.17	2500
5,000 – 10,000	Climb, Cruise, Descent	Vert & Lat	.15	3.59	.00095	9.22	2500
10,000 – 20,000	Climb, Cruise, Descent	Vert & Lat	.062	3.27	.00028	10.52	2500
20,000 – 30,000	Climb, Cruise, Descent	Vert & Lat	.025	3.15	.00011	11.88	2500
30,000 – 40,000	Climb, Cruise, Descent	Vert & Lat	.011	2.93	.000095	9.84	2500
40,000 – 50,000	Climb, Cruise, Descent	Vert & Lat	.0046	3.28	.000115	8.81	2500
50,000 – 60,000	Climb, Cruise, Descent	Vert & Lat	.0020	3.82	.000078	7.04	2500
60,000 – 70,000	Climb, Cruise, Descent	Vert & Lat	.00088	2.93	.000057	4.33	2500
70,000 – 80,000	Climb, Cruise, Descent	Vert & Lat	.00038	2.80	.000044	1.80	2500
above 80,000	Climb, Cruise, Descent	Vert & Lat	.00025	2.50	0	0	2500

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