

ANNEXURE 1**EXAMINATION NOTES AND DEVIATION CARD**

1. **All** relevant working must be shown.
2. **All** work done on the chart must be done lightly, using a 2B pencil.
3. Corrections applicable to courses and bearings must be calculated correct to the nearest $\frac{1}{2}^\circ$ and plotted to a similar accuracy.

DEVIATION CARD

Mag. Head	Dev.	Comp. Head	Mag. Head	Dev.	Comp. Head
000	4° E	356	180	3° E	177
010	5° E	005	190	4° E	186
020	4° E	016	200	5° E	195
030	3° E	027	210	4° E	206
040	2° E	038	220	3° E	217
050	1° E	049	230	2° E	228
060	1° W	061	240	1° E	239
070	2° W	072	250	0°	250
080	3° W	083	260	1° W	261
090	4° W	094	270	2° W	272
100	5° W	105	280	3° W	283
110	4° W	114	290	4° W	294
120	3° W	123	300	5° W	305
130	2° W	132	310	4° W	314
140	1° W	141	320	3° W	323
150	0°	150	330	2° W	332
160	1° E	159	340	1° W	341
170	2° E	168	350	2° E	348

ANNEXURE 2

PREDICTED HOURLY HEIGHTS IN METRES/ VOOSPELDE HOOGTE ELKE UUR IN METER
WALVIS BAY/ WALVISBAAI
NOVEMBER 2001

		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
TD	1	0.86	1.19	1.47	1.61	1.57	1.39	1.11	0.78	0.50	0.37	0.41	0.59	0.86	1.17	1.46	1.62	1.60	1.43	1.14	0.78	0.44	0.25	0.26	0.42
FV	2	0.69	1.02	1.34	1.56	1.61	1.50	1.27	0.96	0.63	0.41	0.36	0.48	0.70	0.99	1.30	1.54	1.62	1.53	1.30	0.98	0.62	0.34	0.24	0.32
S	3	0.54	0.83	1.16	1.44	1.59	1.57	1.41	1.14	0.81	0.52	0.37	0.41	0.57	0.81	1.11	1.38	1.55	1.56	1.42	1.17	0.84	0.51	0.30	0.29
S	4	0.43	0.67	0.96	1.26	1.49	1.58	1.49	1.30	1.02	0.70	0.47	0.40	0.49	0.67	0.91	1.18	1.40	1.50	1.47	1.31	1.06	0.74	0.47	0.35
M	5	0.40	0.56	0.78	1.05	1.31	1.46	1.48	1.40	1.20	0.92	0.64	0.48	0.48	0.58	0.75	0.96	1.19	1.36	1.42	1.37	1.23	0.99	0.70	0.50
TD	6	0.44	0.51	0.66	0.86	1.09	1.29	1.40	1.41	1.32	1.14	0.88	0.66	0.55	0.57	0.85	0.78	0.97	1.15	1.28	1.33	1.31	1.18	0.97	0.73
W	7	0.59	0.56	0.61	0.71	0.88	1.08	1.24	1.33	1.35	1.29	1.12	0.90	0.72	0.64	0.64	0.67	0.77	0.92	1.08	1.20	1.27	1.28	1.19	1.01
TD	8	0.81	0.70	0.65	0.65	0.71	0.85	1.02	1.17	1.28	1.33	1.30	1.16	0.96	0.81	0.71	0.65	0.64	0.70	0.84	0.99	1.14	1.28	1.32	1.25
FV	9	1.09	0.92	0.78	0.69	0.63	0.67	0.80	0.96	1.12	1.27	1.37	1.36	1.23	1.05	0.88	0.72	0.60	0.55	0.61	0.75	0.93	1.12	1.30	1.39
S	10	1.34	1.19	1.00	0.82	0.66	0.57	0.60	0.74	0.92	1.12	1.32	1.46	1.46	1.32	1.12	0.89	0.67	0.49	0.43	0.52	0.68	0.91	1.16	1.40
S	11	1.50	1.44	1.27	1.04	0.79	0.58	0.48	0.54	0.70	0.92	1.17	1.42	1.58	1.56	1.39	1.14	0.84	0.55	0.36	0.93	0.44	0.65	0.94	1.26
M	12	1.51	1.81	1.52	1.30	1.02	0.71	0.47	0.40	0.50	0.69	0.96	1.27	1.55	1.68	1.62	1.41	1.10	0.73	0.41	0.23	0.25	0.41	0.68	1.02
TD	13	1.36	1.63	1.68	1.55	1.29	0.94	0.60	0.37	0.35	0.48	0.72	1.04	1.39	1.66	1.75	1.64	1.37	1.00	0.60	0.28	0.16	0.23	0.44	0.75
W	14	1.14	1.50	1.71	1.71	1.53	1.21	0.82	0.48	0.30	0.33	0.51	0.79	1.14	1.49	1.73	1.76	1.59	1.28	0.87	0.46	0.19	0.14	0.26	0.52
TD	15	0.87	1.27	1.59	1.74	1.69	1.46	1.10	0.70	0.39	0.28	0.36	0.57	0.88	1.24	1.56	1.73	1.70	1.50	1.16	0.74	0.37	0.17	0.19	0.35
FV	16	0.64	1.00	1.38	1.64	1.72	1.61	1.35	0.97	0.59	0.34	0.30	0.42	0.66	0.97	1.31	1.58	1.67	1.60	1.37	1.02	0.62	0.33	0.22	0.29
S	17	0.49	0.78	1.13	1.44	1.63	1.65	1.50	1.22	0.84	0.51	0.34	0.36	0.51	0.75	1.06	1.35	1.53	1.57	1.47	1.23	0.89	0.56	0.35	0.32
S	18	0.43	0.63	0.91	1.22	1.46	1.57	1.54	1.38	1.08	0.74	0.49	0.40	0.46	0.61	0.84	1.11	1.33	1.45	1.45	1.33	1.10	0.80	0.55	0.43
M	19	0.45	0.57	0.77	1.02	1.26	1.43	1.49	1.43	1.25	0.98	0.70	0.52	0.49	0.56	0.71	0.91	1.12	1.28	1.35	1.33	1.22	1.01	0.76	0.59
TD	20	0.54	0.58	0.70	0.87	1.08	1.26	1.37	1.40	1.33	1.16	0.91	0.70	0.59	0.59	0.65	0.78	0.94	1.10	1.21	1.26	1.24	1.13	0.96	0.78
W	21	0.67	0.65	0.69	0.78	0.93	1.09	1.23	1.30	1.32	1.28	1.10	0.90	0.75	0.68	0.67	0.71	0.81	0.94	1.06	1.15	1.19	1.18	1.10	0.98
TD	22	0.83	0.75	0.79	0.75	0.82	0.94	1.07	1.18	1.25	1.28	1.22	1.09	0.93	0.81	0.74	0.70	0.72	0.80	0.91	1.02	1.11	1.17	1.18	1.11
FV	23	1.00	0.90	0.82	0.77	0.76	0.81	0.92	1.04	1.15	1.24	1.28	1.23	1.12	0.98	0.86	0.75	0.69	0.69	0.77	0.88	1.00	1.11	1.20	1.21
S	24	1.16	1.06	0.95	0.84	0.75	0.73	0.78	0.88	1.02	1.15	1.26	1.31	1.27	1.15	1.01	0.86	0.71	0.63	0.64	0.73	0.96	1.01	1.16	1.26
S	25	1.28	1.21	1.10	0.96	0.81	0.70	0.68	0.75	0.88	1.03	1.20	1.33	1.37	1.31	1.17	0.99	0.79	0.82	0.55	0.59	0.71	0.88	1.07	1.25
M	26	1.35	1.35	1.25	1.10	0.92	0.74	0.83	0.63	0.73	0.89	1.09	1.28	1.41	1.43	1.33	1.15	0.91	0.68	0.51	0.47	0.55	0.72	0.94	1.17
TD	27	1.36	1.44	1.39	1.28	1.06	0.83	0.64	0.56	0.61	0.75	0.95	1.19	1.39	1.49	1.46	1.30	1.06	0.78	0.54	0.40	0.42	0.58	0.78	1.05
W	28	1.30	1.47	1.50	1.40	1.21	0.96	0.70	0.53	0.51	0.81	0.79	1.04	1.31	1.50	1.55	1.45	1.23	0.94	0.63	0.40	0.33	0.41	0.61	0.88
TD	29	1.19	1.44	1.56	1.53	1.37	1.12	0.82	0.57	0.45	0.48	0.64	0.88	1.16	1.43	1.58	1.56	1.40	1.12	0.78	0.48	0.30	0.30	0.45	0.70
FV	30	1.02	1.33	1.55	1.61	1.51	1.29	0.99	0.67	0.46	0.40	0.50	0.70	0.98	1.29	1.52	1.61	1.53	1.31	0.99	0.63	0.36	0.25	0.32	0.52

ANNEXURE 3

ALTITUDE CORRECTION TABLES 10°-90°—SUN, STARS, PLANETS

OCT.—MAR. SUN			APR.—SEPT.			STARS AND PLANETS				DIP			
App. Alt.	Lower Limb	Upper Limb	App. Alt.	Lower Limb	Upper Limb	App. Alt.	Corr ⁿ	App. Alt.	Additional Corr ⁿ	Ht. of Eye	Corr ⁿ	Ht. of Eye	Ht. of Eye
										m		ft.	m
9 34	+10.8	-21.5	9 39	+10.6	-21.2	9 56	-5.3		1987	2.4	-2.8	8.0	1.0 - 1.8
9 45	+10.9	-21.4	9 51	+10.7	-21.1	10 08	-5.2		VENUS	2.6	-2.9	8.6	1.5 - 2.2
9 56	+11.0	-21.3	10 03	+10.8	-21.0	10 20	-5.1		Jan. 1-Jan. 4	2.8	-3.0	9.2	2.0 - 2.5
10 08	+11.1	-21.2	10 15	+10.9	-20.9	10 33	-5.0		0	3.0	-3.1	9.8	2.5 - 2.8
10 21	+11.2	-21.1	10 27	+11.0	-20.8	10 46	-4.9		34 + 0.3	3.2	-3.2	10.5	3.0 - 3.0
10 34	+11.3	-21.0	10 40	+11.1	-20.7	11 00	-4.8		60 + 0.2	3.4	-3.3	11.2	See table
10 47	+11.4	-20.9	10 54	+11.2	-20.6	11 14	-4.7		80 + 0.1	3.6	-3.4	11.9	←
11 01	+11.5	-20.8	11 08	+11.3	-20.5	11 29	-4.6		Jan. 5-Feb. 25	3.8	-3.5	12.6	m
11 15	+11.6	-20.7	11 23	+11.4	-20.4	11 45	-4.5		0	4.0	-3.6	13.3	20 - 7.9
11 30	+11.7	-20.6	11 38	+11.5	-20.3	12 01	-4.4		41 + 0.2	4.3	-3.7	14.1	22 - 8.3
11 46	+11.8	-20.5	11 54	+11.6	-20.2	12 18	-4.3		76 + 0.1	4.5	-3.8	14.9	24 - 8.6
12 02	+11.9	-20.4	12 10	+11.7	-20.1	12 35	-4.2		Feb. 26-Dec. 31	4.7	-3.9	15.7	26 - 9.0
12 19	+12.0	-20.3	12 28	+11.8	-20.0	12 54	-4.1		0	5.0	-4.0	16.5	28 - 9.3
12 37	+12.1	-20.2	12 46	+11.9	-19.9	13 13	-4.0		0	5.2	-4.1	17.4	
12 55	+12.2	-20.1	13 05	+12.0	-19.8	13 33	-3.9		60 + 0.1	5.5	-4.2	18.3	30 - 9.6
13 14	+12.3	-20.0	13 24	+12.1	-19.7	13 54	-3.8			5.8	-4.3	19.1	32 - 10.0
13 35	+12.4	-19.9	13 45	+12.2	-19.6	14 16	-3.7		MARS	6.1	-4.4	20.1	34 - 10.3
13 56	+12.5	-19.8	14 07	+12.3	-19.5	14 40	-3.6		Jan. 1-Dec. 31	6.3	-4.5	21.0	36 - 10.6
14 18	+12.6	-19.7	14 30	+12.4	-19.4	15 04	-3.5		0	6.6	-4.6	22.0	38 - 10.8
14 42	+12.7	-19.6	14 54	+12.5	-19.3	15 30	-3.4		60 + 0.1	6.9	-4.7	22.9	
15 06	+12.8	-19.5	15 19	+12.6	-19.2	15 57	-3.3			7.2	-4.8	23.9	40 - 11.1
15 32	+12.9	-19.4	15 46	+12.7	-19.1	16 26	-3.2			7.5	-4.9	24.9	42 - 11.4
15 59	+13.0	-19.3	16 14	+12.8	-19.0	16 56	-3.1			7.9	-5.0	26.0	44 - 11.7
16 28	+13.1	-19.2	16 44	+12.9	-18.9	17 28	-3.0			8.2	-5.1	27.1	46 - 11.9
16 59	+13.2	-19.1	17 15	+13.0	-18.8	18 02	-2.9			8.5	-5.2	28.1	48 - 12.2
17 32	+13.3	-19.0	17 48	+13.1	-18.7	18 38	-2.8			8.8	-5.3	29.2	ft.
18 06	+13.4	-18.9	18 24	+13.2	-18.6	19 17	-2.7			9.2	-5.4	30.4	2 - 1.4
18 42	+13.5	-18.8	19 01	+13.3	-18.5	19 58	-2.6			9.5	-5.5	31.5	4 - 1.9
19 21	+13.6	-18.7	19 42	+13.4	-18.4	20 42	-2.5			9.9	-5.6	32.7	6 - 2.4
20 03	+13.7	-18.6	20 25	+13.5	-18.3	21 28	-2.4			10.3	-5.7	33.9	8 - 2.7
20 48	+13.8	-18.5	21 11	+13.6	-18.2	22 19	-2.3			10.6	-5.8	35.1	10 - 3.1
21 35	+13.9	-18.4	22 00	+13.7	-18.1	23 13	-2.2			11.0	-5.9	36.3	See table
22 26	+14.0	-18.3	22 54	+13.8	-18.0	24 11	-2.1			11.4	-6.0	37.6	←
23 22	+14.1	-18.2	23 51	+13.9	-17.9	25 14	-2.0			11.8	-6.1	38.9	ft.
24 21	+14.2	-18.1	24 53	+14.0	-17.8	26 22	-1.9			12.2	-6.2	40.1	70 - 8.1
25 26	+14.3	-18.0	26 00	+14.1	-17.7	27 36	-1.8			12.6	-6.3	41.5	75 - 8.4
26 36	+14.4	-17.9	27 13	+14.2	-17.6	28 56	-1.7			13.0	-6.4	42.8	80 - 8.7
27 52	+14.5	-17.8	28 33	+14.3	-17.5	30 24	-1.6			13.4	-6.5	44.2	85 - 8.9
29 15	+14.6	-17.7	30 00	+14.4	-17.4	32 00	-1.5			13.8	-6.6	45.5	90 - 9.2
30 46	+14.7	-17.6	31 35	+14.5	-17.3	33 45	-1.4			14.2	-6.7	46.9	95 - 9.5
32 26	+14.8	-17.5	33 20	+14.6	-17.2	35 40	-1.3			14.7	-6.8	48.4	
34 17	+14.9	-17.4	35 17	+14.7	-17.1	37 48	-1.2			15.1	-6.9	49.8	
36 20	+15.0	-17.3	37 26	+14.8	-17.0	40 08	-1.1			15.5	-7.0	51.3	100 - 9.7
38 36	+15.1	-17.2	39 50	+14.9	-16.9	42 44	-1.0			16.0	-7.1	52.8	105 - 9.9
41 08	+15.2	-17.1	42 31	+15.0	-16.8	45 36	-0.9			16.5	-7.2	54.3	110 - 10.2
43 59	+15.3	-17.0	45 31	+15.1	-16.7	48 47	-0.8			16.9	-7.3	55.8	115 - 10.4
47 10	+15.4	-16.9	48 55	+15.2	-16.6	52 18	-0.7			17.4	-7.4	57.4	120 - 10.6
50 46	+15.5	-16.8	52 44	+15.3	-16.5	56 11	-0.6			17.9	-7.5	58.9	125 - 10.8
54 49	+15.6	-16.7	57 02	+15.4	-16.4	60 28	-0.5			18.4	-7.6	60.5	
59 23	+15.7	-16.6	61 51	+15.5	-16.3	65 08	-0.4			18.8	-7.7	62.1	130 - 11.1
64 30	+15.8	-16.5	67 17	+15.6	-16.2	70 11	-0.3			19.3	-7.8	63.8	135 - 11.3
70 12	+15.9	-16.4	73 16	+15.7	-16.1	75 34	-0.2			19.8	-7.9	65.4	140 - 11.5
76 26	+16.0	-16.3	79 43	+15.8	-16.0	81 13	-0.1			20.4	-8.0	67.1	145 - 11.7
83 05	+16.1	-16.2	86 32	+15.9	-15.9	87 03	0.0			20.9	-8.1	68.8	150 - 11.9
90 00			90 00			90 00				21.4		70.5	155 - 12.1

App. Alt. = Apparent altitude = Sextant altitude corrected for index error and dip.

ANNEXURE 4

CONVERSION OF ARC TO TIME

0°-59°		60°-119°		120°-179°		180°-239°		240°-299°		300°-359°		0°-00	0°-25	0°-50	0°-75
a	h m	b	h m	c	h m	d	h m	e	h m	f	h m	g	m s	m s	m s
0	0 00	60	4 00	120	8 00	180	12 00	240	16 00	300	20 00	0	0 00	0 01	0 02
1	0 04	61	4 04	121	8 04	181	12 04	241	16 04	301	20 04	1	0 04	0 05	0 06
2	0 08	62	4 08	122	8 08	182	12 08	242	16 08	302	20 08	2	0 08	0 09	0 10
3	0 12	63	4 12	123	8 12	183	12 12	243	16 12	303	20 12	3	0 12	0 13	0 14
4	0 16	64	4 16	124	8 16	184	12 16	244	16 16	304	20 16	4	0 16	0 17	0 18
5	0 20	65	4 20	125	8 20	185	12 20	245	16 20	305	20 20	5	0 20	0 21	0 22
6	0 24	66	4 24	126	8 24	186	12 24	246	16 24	306	20 24	6	0 24	0 25	0 26
7	0 28	67	4 28	127	8 28	187	12 28	247	16 28	307	20 28	7	0 28	0 29	0 30
8	0 32	68	4 32	128	8 32	188	12 32	248	16 32	308	20 32	8	0 32	0 33	0 34
9	0 36	69	4 36	129	8 36	189	12 36	249	16 36	309	20 36	9	0 36	0 37	0 38
10	0 40	70	4 40	130	8 40	190	12 40	250	16 40	310	20 40	10	0 40	0 41	0 42
11	0 44	71	4 44	131	8 44	191	12 44	251	16 44	311	20 44	11	0 44	0 45	0 46
12	0 48	72	4 48	132	8 48	192	12 48	252	16 48	312	20 48	12	0 48	0 49	0 50
13	0 52	73	4 52	133	8 52	193	12 52	253	16 52	313	20 52	13	0 52	0 53	0 54
14	0 56	74	4 56	134	8 56	194	12 56	254	16 56	314	20 56	14	0 56	0 57	0 58
15	1 00	75	5 00	135	9 00	195	13 00	255	17 00	315	21 00	15	1 00	1 01	1 02
16	1 04	76	5 04	136	9 04	196	13 04	256	17 04	316	21 04	16	1 04	1 05	1 06
17	1 08	77	5 08	137	9 08	197	13 08	257	17 08	317	21 08	17	1 08	1 09	1 10
18	1 12	78	5 12	138	9 12	198	13 12	258	17 12	318	21 12	18	1 12	1 13	1 14
19	1 16	79	5 16	139	9 16	199	13 16	259	17 16	319	21 16	19	1 16	1 17	1 18
20	1 20	80	5 20	140	9 20	200	13 20	260	17 20	320	21 20	20	1 20	1 21	1 22
21	1 24	81	5 24	141	9 24	201	13 24	261	17 24	321	21 24	21	1 24	1 25	1 26
22	1 28	82	5 28	142	9 28	202	13 28	262	17 28	322	21 28	22	1 28	1 29	1 30
23	1 32	83	5 32	143	9 32	203	13 32	263	17 32	323	21 32	23	1 32	1 33	1 34
24	1 36	84	5 36	144	9 36	204	13 36	264	17 36	324	21 36	24	1 36	1 37	1 38
25	1 40	85	5 40	145	9 40	205	13 40	265	17 40	325	21 40	25	1 40	1 41	1 42
26	1 44	86	5 44	146	9 44	206	13 44	266	17 44	326	21 44	26	1 44	1 45	1 46
27	1 48	87	5 48	147	9 48	207	13 48	267	17 48	327	21 48	27	1 48	1 49	1 50
28	1 52	88	5 52	148	9 52	208	13 52	268	17 52	328	21 52	28	1 52	1 53	1 54
29	1 56	89	5 56	149	9 56	209	13 56	269	17 56	329	21 56	29	1 56	1 57	1 58
30	2 00	90	6 00	150	10 00	210	14 00	270	18 00	330	22 00	30	2 00	2 01	2 02
31	2 04	91	6 04	151	10 04	211	14 04	271	18 04	331	22 04	31	2 04	2 05	2 06
32	2 08	92	6 08	152	10 08	212	14 08	272	18 08	332	22 08	32	2 08	2 09	2 10
33	2 12	93	6 12	153	10 12	213	14 12	273	18 12	333	22 12	33	2 12	2 13	2 14
34	2 16	94	6 16	154	10 16	214	14 16	274	18 16	334	22 16	34	2 16	2 17	2 18
35	2 20	95	6 20	155	10 20	215	14 20	275	18 20	335	22 20	35	2 20	2 21	2 22
36	2 24	96	6 24	156	10 24	216	14 24	276	18 24	336	22 24	36	2 24	2 25	2 26
37	2 28	97	6 28	157	10 28	217	14 28	277	18 28	337	22 28	37	2 28	2 29	2 30
38	2 32	98	6 32	158	10 32	218	14 32	278	18 32	338	22 32	38	2 32	2 33	2 34
39	2 36	99	6 36	159	10 36	219	14 36	279	18 36	339	22 36	39	2 36	2 37	2 38
40	2 40	100	6 40	160	10 40	220	14 40	280	18 40	340	22 40	40	2 40	2 41	2 42
41	2 44	101	6 44	161	10 44	221	14 44	281	18 44	341	22 44	41	2 44	2 45	2 46
42	2 48	102	6 48	162	10 48	222	14 48	282	18 48	342	22 48	42	2 48	2 49	2 50
43	2 52	103	6 52	163	10 52	223	14 52	283	18 52	343	22 52	43	2 52	2 53	2 54
44	2 56	104	6 56	164	10 56	224	14 56	284	18 56	344	22 56	44	2 56	2 57	2 58
45	3 00	105	7 00	165	11 00	225	15 00	285	19 00	345	23 00	45	3 00	3 01	3 02
46	3 04	106	7 04	166	11 04	226	15 04	286	19 04	346	23 04	46	3 04	3 05	3 06
47	3 08	107	7 08	167	11 08	227	15 08	287	19 08	347	23 08	47	3 08	3 09	3 10
48	3 12	108	7 12	168	11 12	228	15 12	288	19 12	348	23 12	48	3 12	3 13	3 14
49	3 16	109	7 16	169	11 16	229	15 16	289	19 16	349	23 16	49	3 16	3 17	3 18
50	3 20	110	7 20	170	11 20	230	15 20	290	19 20	350	23 20	50	3 20	3 21	3 22
51	3 24	111	7 24	171	11 24	231	15 24	291	19 24	351	23 24	51	3 24	3 25	3 26
52	3 28	112	7 28	172	11 28	232	15 28	292	19 28	352	23 28	52	3 28	3 29	3 30
53	3 32	113	7 32	173	11 32	233	15 32	293	19 32	353	23 32	53	3 32	3 33	3 34
54	3 36	114	7 36	174	11 36	234	15 36	294	19 36	354	23 36	54	3 36	3 37	3 38
55	3 40	115	7 40	175	11 40	235	15 40	295	19 40	355	23 40	55	3 40	3 41	3 42
56	3 44	116	7 44	176	11 44	236	15 44	296	19 44	356	23 44	56	3 44	3 45	3 46
57	3 48	117	7 48	177	11 48	237	15 48	297	19 48	357	23 48	57	3 48	3 49	3 50
58	3 52	118	7 52	178	11 52	238	15 52	298	19 52	358	23 52	58	3 52	3 53	3 54
59	3 56	119	7 56	179	11 56	239	15 56	299	19 56	359	23 56	59	3 56	3 57	3 58

The above table is for converting expressions in arc to their equivalent in time ; its main use in this Almanac is for the conversion of longitude for application to L.M.T. (*added if west, subtracted if east*) to give G.M.T. or vice

ANNEXURE 5

Nautical Almanac

1987 FEBRUARY 12, 13, 14 (THURS., FRI., SAT.)

39

G.M.T. (UT)		SUN		MOON				Lat.	Twilight		Sunrise	Moonrise								
		G.H.A.	Dec.	G.H.A.	<i>v</i>	Dec.	<i>d</i>		H.P.	Naut.		Civil	12	13	14	15				
<i>d</i>	<i>h</i>	°	'	°	'	°	'	°	'	h	m	h	m	h	m	h	m	h	m	
T H U R S D A Y	12 00	176	26.0	S13	56.5	16	15.1	11.7	N24	26.8	7.8	54.4	N 72	06 25	07 46	09 09	□	□	15 57	18 16
	01	191	26.0		55.7	30	45.8	11.7	24	19.0	8.0	54.4	N 70	06 22	07 35	08 46	□	13 48	16 22	18 26
	02	206	26.0		54.8	45	16.5	11.7	24	11.0	8.0	54.4	68	06 20	07 26	08 29	□	14 33	16 41	18 34
	03	221	26.0	..	54.0	59	47.2	11.8	24	03.0	8.2	54.4	66	06 18	07 18	08 15	12 44	15 02	16 55	18 41
	04	236	26.0		53.2	74	18.0	11.9	23	54.8	8.3	54.4	64	06 15	07 12	08 03	13 30	15 24	17 08	18 47
	05	251	26.0		52.4	88	48.9	11.9	23	46.5	8.4	54.4	62	06 14	07 06	07 54	13 59	15 41	17 18	18 51
	06	266	26.0	S13	51.5	103	19.8	11.9	N23	38.1	8.4	54.4	60	06 12	07 01	07 45	14 22	15 55	17 26	18 55
	07	281	26.0		50.7	117	50.7	12.0	23	29.7	8.7	54.4	N 58	06 10	06 56	07 38	14 40	16 08	17 34	18 59
	08	296	26.0		49.9	132	21.7	12.1	23	21.0	8.7	54.5	56	06 08	06 52	07 31	14 55	16 18	17 41	19 02
	09	311	26.0	..	49.1	146	52.8	12.1	23	12.3	8.8	54.5	54	06 07	06 48	07 25	15 08	16 27	17 47	19 05
	10	326	26.0		48.2	161	23.9	12.2	23	03.5	8.9	54.5	52	06 05	06 45	07 20	15 19	16 36	17 52	19 08
	11	341	26.0		47.4	175	55.1	12.2	22	54.6	9.1	54.5	50	06 04	06 42	07 15	15 29	16 43	17 57	19 10
	12	356	26.0	S13	46.6	190	26.3	12.3	N22	45.5	9.1	54.5	45	06 00	06 35	07 05	15 50	16 59	18 07	19 15
	13	11	26.0		45.7	204	57.6	12.3	22	36.4	9.3	54.5	N 40	05 57	06 28	06 56	16 07	17 11	18 16	19 20
	14	26	26.0		44.9	219	28.9	12.4	22	27.1	9.3	54.5	35	05 53	06 23	06 49	16 21	17 22	18 23	19 23
	15	41	26.1	..	44.1	234	00.3	12.4	22	17.8	9.5	54.5	30	05 49	06 18	06 42	16 33	17 32	18 29	19 27
	16	56	26.1		43.3	248	31.7	12.5	22	08.3	9.5	54.6	20	05 42	06 08	06 31	16 54	17 48	18 40	19 32
	17	71	26.1		42.4	263	03.2	12.5	21	58.8	9.7	54.6	N 10	05 34	05 59	06 20	17 12	18 02	18 50	19 37
	18	86	26.1	S13	41.6	277	34.7	12.6	N21	49.1	9.8	54.6	0	05 25	05 50	06 11	17 29	18 15	18 59	19 42
	19	101	26.1		40.8	292	06.3	12.7	21	39.3	9.8	54.6	S 10	05 14	05 39	06 01	17 46	18 28	19 08	19 46
	20	116	26.1		39.9	306	38.0	12.7	21	29.5	10.0	54.6	20	05 01	05 28	05 50	18 04	18 42	19 17	19 51
	21	131	26.1	..	39.1	321	09.7	12.8	21	19.5	10.0	54.6	30	04 43	05 13	05 38	18 24	18 58	19 28	19 57
	22	146	26.1		38.3	335	41.5	12.8	21	09.5	10.2	54.6	35	04 32	05 04	05 31	18 36	19 07	19 34	20 00
23	161	26.1		37.4	350	13.3	12.8	20	59.3	10.3	54.7	40	04 19	04 54	05 23	18 50	19 17	19 41	20 03	
												45	04 03	04 42	05 14	19 06	19 30	19 50	20 07	
F R I D A Y	13 00	176	26.1	S13	36.6	4	45.1	13.0	N20	49.0	10.3	54.7	S 50	03 41	04 26	05 02	19 26	19 44	19 59	20 12
	01	191	26.1		35.8	19	17.1	12.9	20	38.7	10.5	54.7	52	03 30	04 19	04 57	19 35	19 51	20 04	20 15
	02	206	26.2		34.9	33	49.0	13.1	20	28.2	10.5	54.7	54	03 18	04 10	04 51	19 45	19 59	20 09	20 17
	03	221	26.2	..	34.1	48	21.1	13.1	20	17.7	10.6	54.7	56	03 03	04 01	04 44	19 57	20 07	20 14	20 20
	04	236	26.2		33.3	62	53.2	13.1	20	07.1	10.8	54.7	58	02 46	03 50	04 36	20 11	20 17	20 20	20 23
	05	251	26.2		32.4	77	25.3	13.2	19	56.3	10.8	54.7	S 60	02 23	03 37	04 28	20 27	20 27	20 27	20 26
	06	266	26.2	S13	31.6	91	57.5	13.2	N19	45.5	10.9	54.8								
	07	281	26.2		30.7	106	29.7	13.3	19	34.6	11.0	54.8	Lat.	Sunset	Twilight		Moonset			
	08	296	26.2		29.9	121	02.0	13.3	19	23.6	11.1	54.8			Civil	Naut.	12	13	14	15
	09	311	26.2	..	29.1	135	34.3	13.4	19	12.5	11.2	54.8								
	10	326	26.2		28.2	150	06.7	13.5	19	01.3	11.2	54.8								
	11	341	26.3		27.4	164	39.2	13.5	18	50.1	11.4	54.8	N 72	15 21	16 44	18 05	h m	h m	h m	h m
	12	356	26.3	S13	26.6	179	11.7	13.5	N18	38.7	11.4	54.8	N 70	15 44	16 55	18 08	□	10 38	09 37	09 03
	13	11	26.3		25.7	193	44.2	13.6	18	27.3	11.6	54.9	68	16 01	17 04	18 10	□	09 52	09 17	08 53
	14	26	26.3		24.9	208	16.8	13.6	18	15.7	11.6	54.9	66	16 15	17 12	18 12	10 03	09 22	09 00	08 44
	15	41	26.3	..	24.0	222	49.4	13.7	18	04.1	11.7	54.9	64	16 26	17 18	18 14	09 16	08 59	08 47	08 37
	16	56	26.3		23.2	237	22.1	13.8	17	52.4	11.7	54.9	62	16 36	17 24	18 16	08 46	08 40	08 35	08 30
	17	71	26.4		22.4	251	54.9	13.8	17	40.7	11.9	54.9	60	16 44	17 29	18 18	08 23	08 25	08 25	08 25
	18	86	26.4	S13	21.5	266	27.7	13.8	N17	28.8	11.9	54.9	N 58	16 52	17 33	18 20	08 04	08 12	08 17	08 20
	19	101	26.4		20.7	281	00.5	13.9	17	16.9	12.1	55.0	56	16 58	17 37	18 21	07 49	08 01	08 09	08 15
	20	116	26.4		19.8	295	33.4	13.9	17	04.8	12.1	55.0	54	17 04	17 41	18 23	07 35	07 51	08 02	08 11
	21	131	26.4	..	19.0	310	06.3	14.0	16	52.7	12.1	55.0	52	17 09	17 44	18 24	07 23	07 42	07 56	08 05
	22	146	26.4		18.1	324	39.3	14.0	16	40.6	12.3	55.0	50	17 14	17 48	18 26	07 13	07 34	07 51	08 08
23	161	26.4		17.3	339	12.3	14.1	16	28.3	12.3	55.0	45	17 24	17 55	18 29	06 51	07 17	07 39	07 57	
S A T U R D A Y	14 00	176	26.5	S13	16.5	353	45.4	14.1	N16	16.0	12.4	55.0	N 40	17 33	18 01	18 33	06 33	07 03	07 29	07 51
	01	191	26.5		15.6	8	18.5	14.1	16	03.6	12.5	55.0	35	17 40	18 06	18 36	06 18	06 51	07 20	07 46
	02	206	26.5		14.8	22	51.6	14.2	15	51.1	12.5	55.1	30	17 47	18 11	18 39	06 05	06 40	07 12	07 42
	03	221	26.5	..	13.9	37	24.8	14.3	15	38.6	12.6	55.1	20	17 58	18 21	18 47	05 42	06 22	06 59	07 33
	04	236	26.5		13.1	51	58.1	14.3	15	26.0	12.7	55.1	N 10	18 08	18 30	18 55	05 23	06 06	06 47	07 26
	05	251	26.6		12.2	66	31.4	14.3	15	13.3	12.8	55.1	0	18 18	18 39	19 04	05 04	05 51	06 36	07 20
	06	266	26.6	S13	11.4	81	04.7	14.3	N15	00.5	12.8	55.1	S 10	18 27	18 49	19 14	04 46	05 36	06 25	07 13
	07	281	26.6		10.6	95	38.0	14.4	14	47.7	12.9	55.1	20	18 38	19 01	19 27	04 26	05 20	06 13	07 05
	08	296	26.6		09.7	110	11.4	14.5	14	34.8	13.0	55.2	30	18 50	19 15	19 44	04 03	05 02	06 00	06 57
	09	311	26.6	..	08.9	124	44.9	14.5	14	21.8	13.0	55.2	35	18 57	19 23	19 55	03 50	04 51	05 52	06 52
	10	326	26.7		08.0	139	18.4	14.5	14	08.8	13.1	55.2	40	19 05	19 34	20 08	03 34	04 38	05 42	06 46
	11	341	26.7		07.2	153	51.9	14.6	13	55.7	13.2	55.2	45							

ANNEXURE 6

Increments and Corrections

32^m

INCREMENTS AND CORRECTIONS

33^m

32 ^m	SUN PLANETS	ARIES	MOON	T ^r or d	Corr ⁿ	T ^r or d	Corr ⁿ	T ^r or d	Corr ⁿ	33 ^m	SUN PLANETS	ARIES	MOON	T ^r or d	Corr ⁿ	T ^r or d	Corr ⁿ	T ^r or d	Corr ⁿ
s	o	°	°	°	°	°	°	°	°	s	o	°	°	°	°	°	°	°	°
00	8 00-0	8 01-3	7 38-1	0-0	0-0	6-0	3-3	12-0	6-5	00	8 15-0	8 16-4	7 52-5	0-0	0-0	6-0	3-4	12-0	6-7
01	8 00-3	8 01-6	7 38-4	0-1	0-1	6-1	3-3	12-1	6-6	01	8 15-3	8 16-6	7 52-7	0-1	0-1	6-1	3-4	12-1	6-8
02	8 00-5	8 01-8	7 38-6	0-2	0-1	6-2	3-4	12-2	6-6	02	8 15-5	8 16-9	7 52-9	0-2	0-1	6-2	3-5	12-2	6-8
03	8 00-8	8 02-1	7 38-8	0-3	0-2	6-3	3-4	12-3	6-7	03	8 15-8	8 17-1	7 53-2	0-3	0-2	6-3	3-5	12-3	6-9
04	8 01-0	8 02-3	7 39-1	0-4	0-2	6-4	3-5	12-4	6-7	04	8 16-0	8 17-4	7 53-4	0-4	0-2	6-4	3-6	12-4	6-9
05	8 01-3	8 02-6	7 39-3	0-5	0-3	6-5	3-5	12-5	6-8	05	8 16-3	8 17-6	7 53-6	0-5	0-3	6-5	3-6	12-5	7-0
06	8 01-5	8 02-8	7 39-6	0-6	0-3	6-6	3-6	12-6	6-8	06	8 16-5	8 17-9	7 53-9	0-6	0-3	6-6	3-7	12-6	7-0
07	8 01-8	8 03-1	7 39-8	0-7	0-4	6-7	3-6	12-7	6-9	07	8 16-8	8 18-1	7 54-1	0-7	0-4	6-7	3-7	12-7	7-1
08	8 02-0	8 03-3	7 40-0	0-8	0-4	6-8	3-7	12-8	6-9	08	8 17-0	8 18-4	7 54-4	0-8	0-4	6-8	3-8	12-8	7-1
09	8 02-3	8 03-6	7 40-3	0-9	0-5	6-9	3-7	12-9	7-0	09	8 17-3	8 18-6	7 54-6	0-9	0-5	6-9	3-9	12-9	7-2
10	8 02-5	8 03-8	7 40-5	1-0	0-5	7-0	3-8	13-0	7-0	10	8 17-5	8 18-9	7 54-8	1-0	0-6	7-0	3-9	13-0	7-3
11	8 02-8	8 04-1	7 40-8	1-1	0-6	7-1	3-8	13-1	7-1	11	8 17-8	8 19-1	7 55-1	1-1	0-6	7-1	4-0	13-1	7-3
12	8 03-0	8 04-3	7 41-0	1-2	0-7	7-2	3-9	13-2	7-2	12	8 18-0	8 19-4	7 55-3	1-2	0-7	7-2	4-0	13-2	7-4
13	8 03-3	8 04-6	7 41-2	1-3	0-7	7-3	4-0	13-3	7-2	13	8 18-3	8 19-6	7 55-6	1-3	0-7	7-3	4-1	13-3	7-4
14	8 03-5	8 04-8	7 41-5	1-4	0-8	7-4	4-0	13-4	7-3	14	8 18-5	8 19-9	7 55-8	1-4	0-8	7-4	4-1	13-4	7-5
15	8 03-8	8 05-1	7 41-7	1-5	0-8	7-5	4-1	13-5	7-3	15	8 18-8	8 20-1	7 56-0	1-5	0-8	7-5	4-2	13-5	7-5
16	8 04-0	8 05-3	7 42-0	1-6	0-9	7-6	4-1	13-6	7-4	16	8 19-0	8 20-4	7 56-3	1-6	0-9	7-6	4-2	13-6	7-6
17	8 04-3	8 05-6	7 42-2	1-7	0-9	7-7	4-2	13-7	7-4	17	8 19-3	8 20-6	7 56-5	1-7	0-9	7-7	4-3	13-7	7-6
18	8 04-5	8 05-8	7 42-4	1-8	1-0	7-8	4-2	13-8	7-5	18	8 19-5	8 20-9	7 56-7	1-8	1-0	7-8	4-4	13-8	7-7
19	8 04-8	8 06-1	7 42-7	1-9	1-0	7-9	4-3	13-9	7-5	19	8 19-8	8 21-1	7 57-0	1-9	1-1	7-9	4-4	13-9	7-8
20	8 05-0	8 06-3	7 42-9	2-0	1-1	8-0	4-3	14-0	7-6	20	8 20-0	8 21-4	7 57-2	2-0	1-1	8-0	4-5	14-0	7-8
21	8 05-3	8 06-6	7 43-1	2-1	1-1	8-1	4-4	14-1	7-6	21	8 20-3	8 21-6	7 57-5	2-1	1-2	8-1	4-5	14-1	7-9
22	8 05-5	8 06-8	7 43-4	2-2	1-2	8-2	4-4	14-2	7-7	22	8 20-5	8 21-9	7 57-7	2-2	1-2	8-2	4-6	14-2	7-9
23	8 05-8	8 07-1	7 43-6	2-3	1-2	8-3	4-5	14-3	7-7	23	8 20-8	8 22-1	7 57-9	2-3	1-3	8-3	4-6	14-3	8-0
24	8 06-0	8 07-3	7 43-9	2-4	1-3	8-4	4-6	14-4	7-8	24	8 21-0	8 22-4	7 58-2	2-4	1-3	8-4	4-7	14-4	8-0
25	8 06-3	8 07-6	7 44-1	2-5	1-4	8-5	4-6	14-5	7-9	25	8 21-3	8 22-6	7 58-4	2-5	1-4	8-5	4-7	14-5	8-1
26	8 06-5	8 07-8	7 44-3	2-6	1-4	8-6	4-7	14-6	7-9	26	8 21-5	8 22-9	7 58-7	2-6	1-5	8-6	4-8	14-6	8-2
27	8 06-8	8 08-1	7 44-6	2-7	1-5	8-7	4-7	14-7	8-0	27	8 21-8	8 23-1	7 58-9	2-7	1-5	8-7	4-9	14-7	8-2
28	8 07-0	8 08-3	7 44-8	2-8	1-5	8-8	4-8	14-8	8-0	28	8 22-0	8 23-4	7 59-1	2-8	1-6	8-8	4-9	14-8	8-3
29	8 07-3	8 08-6	7 45-1	2-9	1-6	8-9	4-8	14-9	8-1	29	8 22-3	8 23-6	7 59-4	2-9	1-6	8-9	5-0	14-9	8-3
30	8 07-5	8 08-8	7 45-3	3-0	1-6	9-0	4-9	15-0	8-1	30	8 22-5	8 23-9	7 59-6	3-0	1-7	9-0	5-0	15-0	8-4
31	8 07-8	8 09-1	7 45-5	3-1	1-7	9-1	4-9	15-1	8-2	31	8 22-8	8 24-1	7 59-8	3-1	1-7	9-1	5-1	15-1	8-4
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