

MAGNITUDE

● -1
● 0
● 1
● 2
● 3
● 4

Standard Mural Projection

16
ACHERNAR

106

95
28
AL NAIR

33
PEACOCK

84

51
ATRIA

100

15
HADAR

76

74
ACRUX

54
DIPHDA

26
FOMALHAUT

58
DENEB ALGEDI

35
NUNIKI

109
ECLIPIC

36
KAUS AUSTRALS

30
ANTARES

78
MENKENT

53
MENKENT

77
ALPHERATZ

37
ALPHERATZ

59
SCHEAT

79
ENIF

60
ENIF

22
ALTAIR

104

43
RASALHAGUE

110

92

38
NAVI

86

27
DENEB

96

14
VEGA

102

42
ALPHECCA

20
ARCTURUS

105

29
ALKAID

65

46
PHECDA

44
MERAK

41
DENEBOLA

87

29
REGULUS

55
ALPHARD

103

48
ZUBENESCHAMALI

98

19
SPICA

47
GIENAH

103
JUPITER

41
DENEBOLA

87

29
REGULUS

55
ALPHARD

56
AL SUHAIL

68

50
AVIOR

107

72

11
SIRIUS

21
PROCTON

31
CASTOR

107

21
BETELGEUSE

11
SIRIUS

21
PROCTON

31
CASTOR

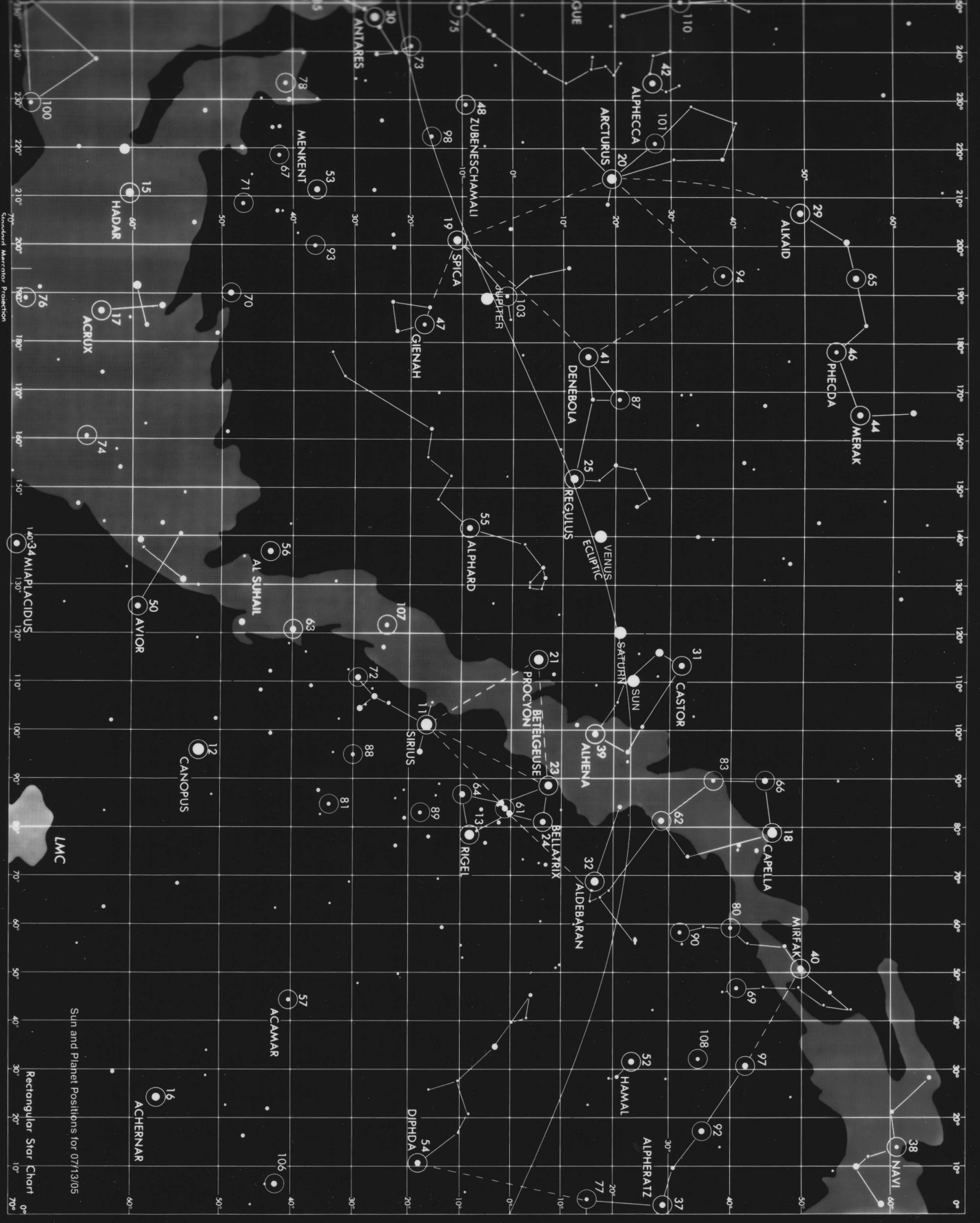
SUN

SATURN

VENUS

ECLIPIC

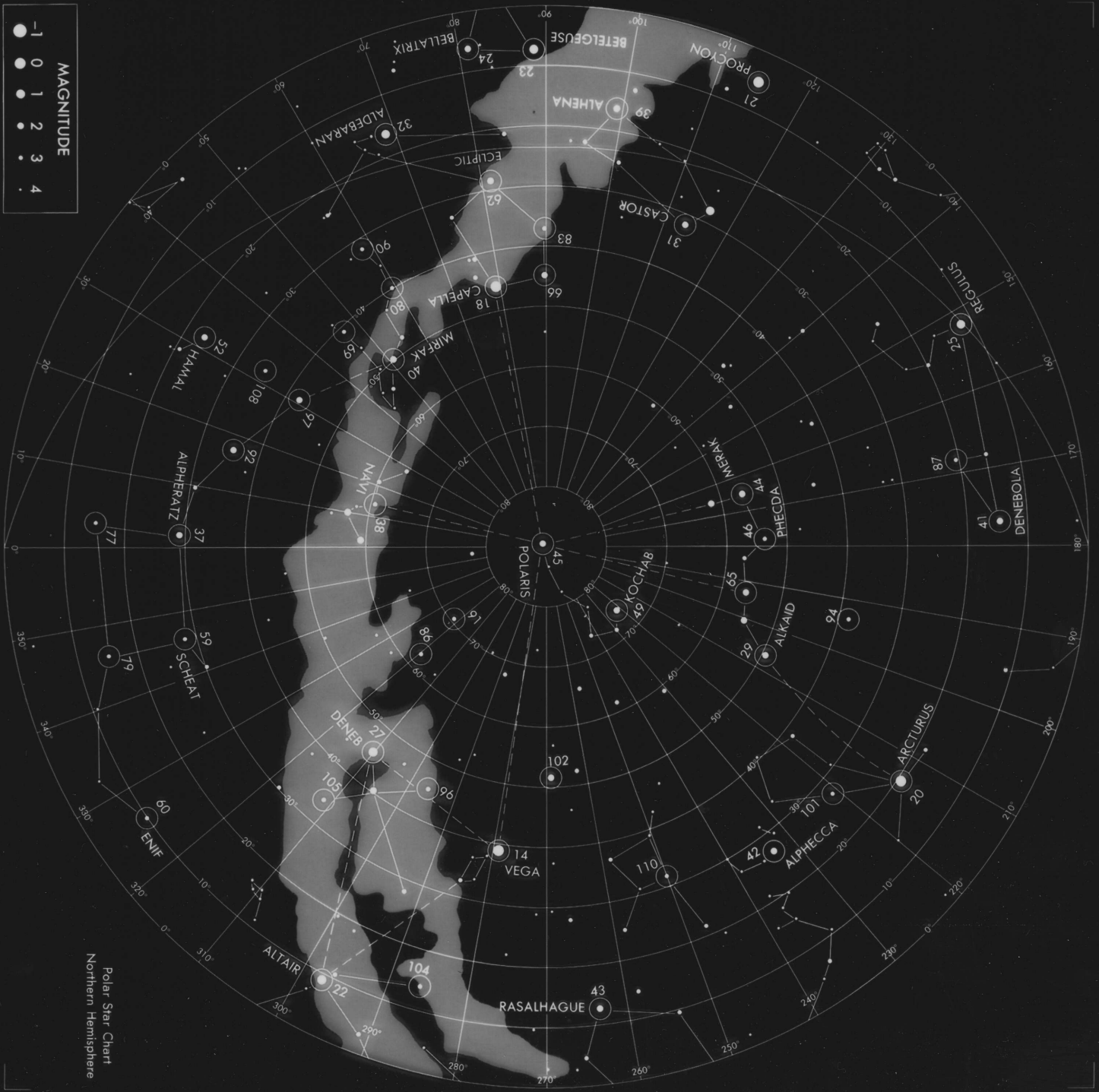
MARS



General Mercator Projection

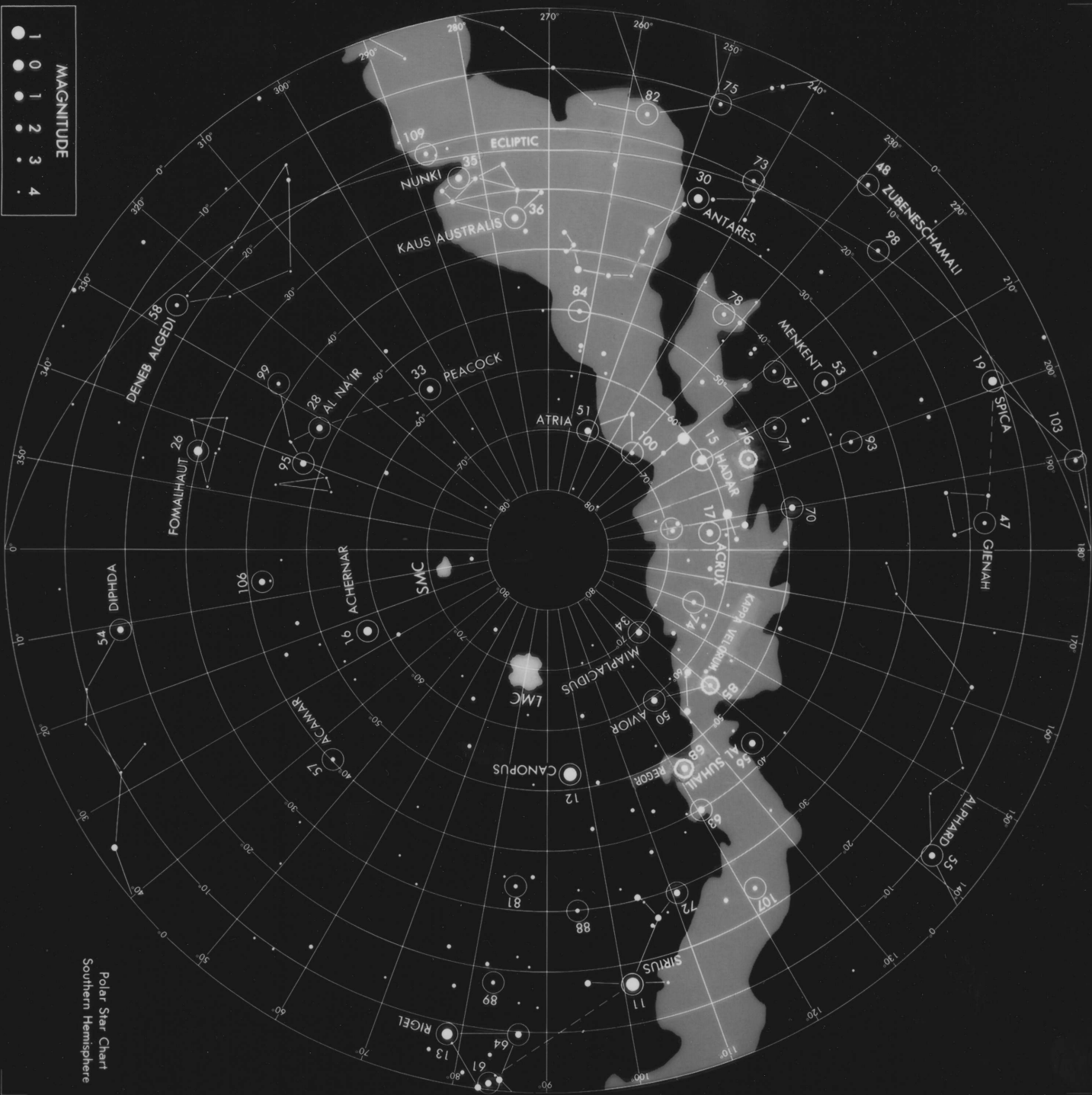
Rectangular Star Chart
Sun and Planet Positions for 07/13/05

LMC



Azimuthal Equal-Distant Projection

DMAAC 9TH EDITION FEBRUARY 1988



NAV STAR REFERENCE TABLE

- ① Nav Star Mean-of-1950 RA/DEC coordinates and magnitude data are provided for use with the onboard star charts. The names of the stars 60-110 have been omitted from the star charts for clarity.
- ② The current RA and DEC of the Orbiter's +X axis can be determined from the IMU M50 angles on SPEC 21. The Z angle is equal to the RA and the -Y angle is equal to the DEC. (Ref SPEC 21 description in the DPS Dictionary).
- ③ Mean-of-1950 Pitch, yaw angles are included to support two axis manual maneuvers for COAS IMU alignments. By placing either the CDRs or aft ADI in the inertial reference frame and using either the +X or -Z sense respectively, a manual maneuver can be flown to the given inertial pitch, yaw angles to center the star in either the +X or -Z COAS. These data emulate the technique of using the old Starball RELMAT.

Please note that no formal procedures exist to support this maneuver technique for COAS star acquisition.

NAV
STARS

NAV STAR REFERENCE TABLE ①

Star ID	Name	*** MEAN OF 1950 ***				
		RA ②	Dec	Pitch ③	Yaw	MAG
11	SIRIUS	101	-17	122	70	-1
12	CANOPUS	96	-53	94	37	-1
13	RIGEL	78	-8	35	75	0
14	VEGA	279	39	281	310	0
15	HADAR	210	-60	116	346	1
16	ACHERNAR	24	-57	60	13	0
17	ACRUX	186	-63	117	357	1
18	CAPELLA	78	46	281	43	0
19	SPICA	201	-11	168	340	1
20	ARCTURUS	213	19	203	329	0
21	PROCYON	114	5	193	65	0
22	ALTAIR	297	9	341	298	1
23	BETELGEUSE	88	7	284	82	0
24	BELLATRIX	81	6	326	79	2
25	REGULUS	151	12	194	28	1
26	FOMALHAUT	344	-30	31	346	1
27	DENEB	310	45	303	327	1
28	AL NA'IR	331	-47	51	341	2
29	ALKAID	206	50	233	343	2
30	ANTARES	247	-26	129	305	1
31	CASTOR	113	32	238	51	2
32	ALDEBARAN	68	16	322	63	1
33	PEACOCK	305	-57	69	334	2
34	MIAPLACIDUS	138	-70	106	14	2
35	NUNKI	283	-26	66	299	2
36	KAUS AUSTRALIS	275	-34	82	305	2
37	ALPHERATZ	1	29	331	1	2
38	NAVI	13	60	299	7	2
39	ALHENA	99	16	243	71	2
40	MIRFAK	50	50	299	30	2
41	DENEBOLA	177	15	195	3	2
42	ALPHECCA	233	27	220	314	2
43	RASALHAGUE	263	13	242	284	2
44	MERAK	165	57	238	8	2
45	POLARIS	27	89	271	0	2
46	PHECDA	178	54	234	1	2
47	GIENAH	183	-17	163	357	3
48	ZUBENESCHEMALI	229	-9	166	312	3
49	KOCHAB	223	74	258	349	2
50	AVIOR	125	-59	109	25	2
51	ATRIA	251	-69	97	340	2
52	HAMAL	31	23	333	28	2
53	MENKENT	211	-36	140	335	2
54	DIPHDA	10	-18	19	10	2
55	ALPHARD	141	-8	169	38	2
56	AL SUHAIL	137	-43	128	30	2
57	ACAMAR	44	-41	50	32	3
58	DENEB ALGEDI	326	-16	19	328	3
59	SCHEAT	345	28	331	347	2
60	ENIF	325	10	348	326	2

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NAV STAR REFERENCE TABLE ①

Star ID	Name	*** MEAN OF 1950 ***				
		RA ②	Dec	Pitch ③	Yaw	MAG
61	ALNILAM	83	-1	11	83	2
62	EL NATH	81	29	286	60	2
63	NAOS	120	-40	121	41	2
64	SAIPH	86	-10	70	80	2
65	ALIOTH	193	56	237	353	2
66	MENKALINAN	89	45	271	45	2
67	ETA CENTAURI	218	-42	131	333	2
68	KAPPA SCORPII	265	-39	96	309	2
69	ALGOL	46	41	309	33	2
70	MUHLIFAIN	190	-49	131	354	2
71	ZETA CENTAURI	208	-47	129	341	3
72	ALUDRA	111	-29	122	55	2
73	ACRAB	241	-20	144	305	3
74	THETA CARINAE	160	-64	115	8	3
75	ZETA OPHIUCHI	249	-10	153	294	3
76	ALPHA MUSCAE	189	-69	111	357	3
77	ALGENIB	3	15	345	3	3
78	GAMMA LUPI	233	-41	125	323	3
79	MARKAB	346	15	345	346	2
80	EPSILON PERSEI	59	40	302	41	3
81	PHACT	84	-34	82	56	3
82	SABIK	257	-16	129	290	2
83	THETA AURIGAE	89	37	271	53	3
84	ALPHA ARAE	262	-50	97	320	3
85	MU SCORPII	252	-38	111	311	3
86	ALDERAMIN	319	62	292	342	2
87	ZOZCA	168	21	201	11	3
88	ZETA CAN. MAJ.	95	-30	98	60	3
89	ARNEB	83	-18	68	71	3
90	ZETA PERSEI	58	32	311	46	3
91	ALPHIRK	322	70	286	348	3
92	MIRACH	17	35	323	14	2
93	ICEN	199	-36	142	344	3
94	COR CAROLI	193	39	219	350	3
95	BETA GRUIS	340	-47	49	346	2
96	DELTA CYGNI	296	45	294	320	3
97	ALMACH	30	42	314	22	2
98	ZUBENELGENUBI	222	-16	159	320	3
99	GAMMA GRUIS	328	-38	42	335	3
100	GAMMA TRI. AUS.	229	-68	105	344	3
101	IZAR	221	27	214	325	3
102	ELTAMIN	269	51	269	322	2
103	ARICH	190	-1	179	350	3
104	ZETA AQUILAE	286	14	318	291	3
105	EPSILON CYGNI	311	34	314	321	2
106	ANKAA	6	-43	43	4	2
107	RHO PUPPIS	121	-24	139	51	3
108	BETA TRIANGULI	32	35	321	26	3
109	PI SAGITTARII	287	-21	53	297	3
110	ZETA HERCULIS	250	32	241	307	3

6-4

REF/ALL/GEN A

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•END•

NAV STARS

**NAV
STARS**

6-1

REF/ALL/GEN E

NAV STAR REFERENCE TABLE

- ① Nav Star Mean of 1950 RA/DEC coordinates and magnitude data are provided for use with the onboard star charts. The names of the stars 61–110 have been omitted from the star charts for clarity.
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		RA	Dec	Pitch	Yaw	MAG
11	SIRIUS	101	-17	122	70	-1
12	CANOPUS	96	-53	94	37	-1
13	RIGEL	78	-8	35	75	0
14	VEGA	279	39	281	310	0
15	HADAR	210	-60	116	346	1
16	ACHERNAR	24	-57	60	13	0
17	ACRUX	186	-63	117	357	1
18	CAPELLA	78	46	281	43	0
19	SPICA	201	-11	168	340	1
20	ARCTURUS	213	19	203	329	0
21	PROCYON	114	5	193	65	0
22	ALTAIR	297	9	341	298	1
23	BETELGEUSE	88	7	284	82	0
24	BELLATRIX	81	6	326	79	2
25	REGULUS	151	12	194	28	1
26	FOMALHAUT	344	-30	31	346	1
27	DENEK	310	45	303	327	1
28	AL NA'IR	331	-47	51	341	2
29	ALKAID	206	50	233	343	2
30	ANTARES	247	-26	129	305	1
31	CASTOR	113	32	238	51	2
32	ALDEBARAN	68	16	322	63	1
33	PEACOCK	305	-57	69	334	2
34	MIAPLACIDUS	138	-70	106	14	2
35	NUNKI	283	-26	66	299	2
36	KAUS AUSTRALIS	275	-34	82	305	2
37	ALPHERATZ	1	29	331	1	2
38	NAVI	13	60	299	7	2
39	ALHENA	99	16	243	71	2
40	MIRFAK	50	50	299	30	2
41	DENEKOLA	177	15	195	3	2
42	ALPHECCA	233	27	220	314	2
43	RASALHAGUE	263	13	242	284	2
44	MERAK	165	57	238	8	2
45	POLARIS	27	89	271	0	2
46	PHECDA	178	54	234	1	2
47	GIENAH	183	-17	163	357	3
48	ZUBENESCHEMALI	229	-9	166	312	3
49	KOCHAB	223	74	258	349	2
50	AVIOR	125	-59	109	25	2
51	ATRIA	251	-69	97	340	2
52	HAMAL	31	23	333	28	2
53	MENKENT	211	-36	140	335	2
54	DIPHDA	10	-18	19	10	2
55	ALPHARD	141	-8	169	38	2
56	AL SUHAIL	137	-43	128	30	2
57	ACAMAR	44	-41	50	32	3
58	DENEK ALGEDI	326	-16	19	328	3
59	SCHEAT	345	28	331	347	2
60	ENIF	325	10	348	326	2

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62	EL NATH	81	29	286	60	2
63	NAOS	120	-40	121	41	2
64	SAIPH	86	-10	70	80	2
65	ALIOTH	193	56	237	353	2
66	MENKALINAN	89	45	271	45	2
67	ETA CENTAURI	218	-42	131	333	2
68	REGOR	122	-47	116	35	2
69	ALGOL	46	41	309	33	2
70	MUHLIFAIN	190	-49	131	354	2
71	ZETA CENTAURI	208	-47	129	341	3
72	ALUDRA	111	-29	122	55	2
73	ACRAB	241	-20	144	305	3
74	THETA CARINAE	160	-64	115	8	3
75	ZETA OPHIUCHI	249	-10	153	294	3
76	EPSILON CENTAURI	204	-53	124	346	2
77	ALGENIB	3	15	345	3	3
78	GAMMA LUPI	233	-41	125	323	3
79	MARKAB	346	15	345	346	2
80	EPSILON PERSEI	59	40	302	41	3
81	PHACT	84	-34	82	56	3
82	SABIK	257	-16	129	290	2
83	THETA AURIGAE	89	37	271	53	3
84	ALPHA ARAE	262	-50	97	320	3
85	KAPPA VELORUM	140	-55	118	22	2
86	ALDERAMIN	319	62	292	342	2
87	ZOZCA	168	21	201	11	3
88	ZETA CAN. MAJ.	95	-30	98	60	3
89	ARNEB	83	-18	68	71	3
90	ZETA PERSEI	58	32	311	46	3
91	ALPHIRK	322	70	286	348	3
92	MIRACH	17	35	323	14	2
93	ICEN	199	-36	142	344	3
94	COR CAROLI	193	39	219	350	3
95	BETA GRUIS	340	-47	49	346	2
96	DELTA CYGNI	296	45	294	320	3
97	ALMACH	30	42	314	22	2
98	ZUBENELGENUBI	222	-16	159	320	3
99	GAMMA GRUIS	328	-38	42	335	3
100	GAMMA TRI. AUS.	229	-68	105	344	3
101	IZAR	221	27	214	325	3
102	ELTAMIN	269	51	269	322	2
103	ARICH	190	-1	179	350	3
104	ZETA AQUILAE	286	14	318	291	3
105	EPSILON CYGNI	311	34	314	321	2
106	ANKAA	6	-43	43	4	2
107	RHO PUPPIS	121	-24	139	51	3
108	BETA TRIANGULI	32	35	321	26	3
109	PI SAGITTARII	287	-21	53	297	3
110	ZETA HERCULIS	250	32	241	307	3

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14	VEGA	279	39	281	310	0
15	HADAR	210	-60	116	346	1
16	ACHERNAR	24	-57	60	13	0
17	ACRUX	186	-63	117	357	1
18	CAPELLA	78	46	281	43	0
19	SPICA	201	-11	168	340	1
20	ARCTURUS	213	19	203	329	0
21	PROCYON	114	5	193	65	0
22	ALTAIR	297	9	341	298	1
23	BETELGEUSE	88	7	284	82	0
24	BELLATRIX	81	6	326	79	2
25	REGULUS	151	12	194	28	1
26	FOMALHAUT	344	-30	31	346	1
27	DENEB	310	45	303	327	1
28	AL NA'IR	331	-47	51	341	2
29	ALKAID	206	50	233	343	2
30	ANTARES	247	-26	129	305	1
31	CASTOR	113	32	238	51	2
32	ALDEBARAN	68	16	322	63	1
33	PEACOCK	305	-57	69	334	2
34	MIAPLACIDUS	138	-70	106	14	2
35	NUNKI	283	-26	66	299	2
36	KAUS AUSTRALIS	275	-34	82	305	2
37	ALPHERATZ	1	29	331	1	2
38	NAVI	13	60	299	7	2
39	ALHENA	99	16	243	71	2
40	MIRFAK	50	50	299	30	2
41	DENEBOLA	177	15	195	3	2
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46	PHECDA	178	54	234	1	2
47	GIENAH	183	-17	163	357	3
48	ZUBENESCHEMALI	229	-9	166	312	3
49	KOCHAB	223	74	258	349	2
50	AVIOR	125	-59	109	25	2
51	ATRIA	251	-69	97	340	2
52	HAMAL	31	23	333	28	2
53	MENKENT	211	-36	140	335	2
54	DIPHDA	10	-18	19	10	2
55	ALPHARD	141	-8	169	38	2
56	AL SUHAIL	137	-43	128	30	2
57	ACAMAR	44	-41	50	32	3
58	DENEB ALGEDI	326	-16	19	328	3
59	SCHEAT	345	28	331	347	2
60	ENIF	325	10	348	326	2

NAV STAR REFERENCE TABLE (Cont)

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63	NAOS	120	-40	121	41	2
64	SAIPH	86	-10	70	80	2
65	ALIOTH	193	56	237	353	2
66	MENKALINAN	89	45	271	45	2
67	ETA CENTAURI	218	-42	131	333	2
68	REGOR	122	-47	116	35	2
69	ALGOL	46	41	309	33	2
70	MUHLIFAIN	190	-49	131	354	2
71	ZETA CENTAURI	208	-47	129	341	3
72	ALUDRA	111	-29	122	55	2
73	ACRAB	241	-20	144	305	3
74	THETA CARINAE	160	-64	115	8	3
75	ZETA OPHIUCHI	249	-10	153	294	3
76	EPSILON CENTAURI	204	-53	124	346	2
77	ALGENIB	3	15	345	3	3
78	GAMMA LUPI	233	-41	125	323	3
79	MARKAB	346	15	345	346	2
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88	ZETA CAN. MAJ.	95	-30	98	60	3
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94	COR CAROLI	193	39	219	350	3
95	BETA GRUIS	340	-47	49	346	2
96	DELTA CYGNI	296	45	294	320	3
97	ALMACH	30	42	314	22	2
98	ZUBENELGENUBI	222	-16	159	320	3
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101	IZAR	221	27	214	325	3
102	ELTAMIN	269	51	269	322	2
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104	ZETA AQUILAE	286	14	318	291	3
105	EPSILON CYGNI	311	34	314	321	2
106	ANKAA	6	-43	43	4	2
107	RHO PUPPIS	121	-24	139	51	3
108	BETA TRIANGULI	32	35	321	26	3
109	PI SAGITTARII	287	-21	53	297	3
110	ZETA HERCULIS	250	32	241	307	3