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Nautical Almanac (Selected Stars)

2022

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Star Maps
The Nautical Almanac 2022 (Selected Stars)
Polaris Tables 2022

Revision V0.6 - Nov 2018

Warning and Terms of Usage:

The following pages have been generated by a computer program. Complex computer programs usually have bugs and may produce wrong data. The data in this Nautical Almanac is believed to be accurate but no warranty is given for its correctness.

Use this Nautical Almanac only for training and exercising!

Compiled by Erik De Man (mail2erik@siranah.de) on Thu Oct 28 11:53:37 2021

Introduction

This Nautical Almanac contains the Ephemerides of the "First Point of Aries" and sixty selected stars. It is designed for determination of Position (geographical Latitude and Longitude) from astronomical observations (Altitude of Celestial Objects).

The data compiled in this Nautical Almanac is based on calculations done with the software package "NOVAS" from the U.S. Naval Observatory (<http://aa.usno.navy.mil/AA/software>). The fundamental star data was originally obtained from the "Bright Star Catalogue" (5th revised edition of 1991). However, this data has recently been updated from other star catalogues. The complete star data as used in this Almanac is shown on the next page.

Values for "deltaT"

For the astrodynamical calculations, the following values for "delta T" (the difference between terrestrial time realized by atomic clocks and UT defined by the irregular rotation of the Earth) have been used:

Jan : 69.3 s	Apr : 69.3 s	Jul : 69.3 s	Oct : 69.2 s
Feb : 69.3 s	May : 69.3 s	Aug : 69.2 s	Nov : 69.2 s
Mar : 69.3 s	Jun : 69.3 s	Sep : 69.2 s	Dec : 69.2 s

Interpolation of the integral-hour GHA values

This Nautical Almanac uses a slightly different approach for the interpolation of the integral-hour values of Greenwich Hour Angle, compared to the techniques used in most commercially available Almanacs.

For more information please refer to the following web site: "<http://www.siranah.de/>"

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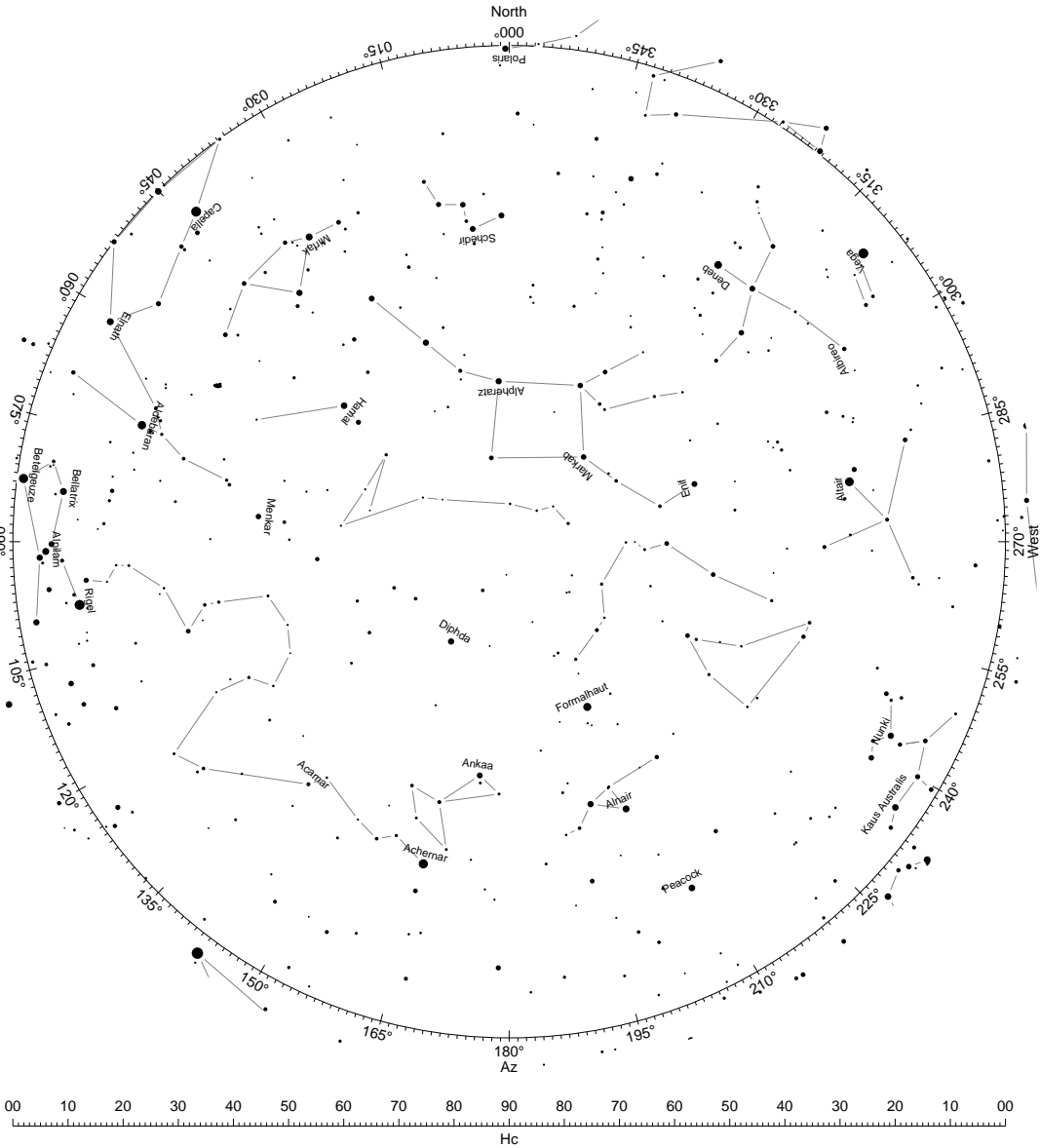
The following table shows the fundamental star data as used in this Almanac. The data refers to Equinox J2000 / Epoch J2000.0.

Star Name	RA			Dec ° ' "	mu_RA ["/yr]	mu_Dec ["/yr]	prllx ["]	rad.vel. [km/s]
	h	m	s					
Alpheratz	00	08	23.3	N 29 05.4	0.135680	-0.162950	0.034	-11
Ankaa	00	26	17.0	S 42 18.4	0.233050	-0.356300	0.039	75
Schedir	00	40	30.4	N 56 32.2	0.050360	-0.032170	0.014	-4
Diphda	00	43	35.4	S 17 59.2	0.232550	0.031990	0.034	13
Achernar	01	37	42.8	S 57 14.2	0.088020	-0.038240	0.023	16
Hamal	02	07	10.4	N 23 27.7	0.190730	-0.145770	0.049	-14
Polaris	02	31	49.1	N 89 15.8	0.044480	-0.011850	0.008	-17
Acamar	02	58	15.7	S 40 18.3	-0.044600	-0.019000	0.028	12
Menkar	03	02	16.8	N 04 05.4	-0.010410	-0.076850	0.013	-26
Mirfak	03	24	19.4	N 49 51.7	0.024110	-0.026010	0.005	-2
Aldebaran	04	35	55.2	N 16 30.6	0.063000	-0.190000	0.050	54
Capella	05	16	41.4	N 45 59.9	0.075520	-0.427110	0.077	29
Rigel	05	14	32.3	S 08 12.1	0.001870	-0.000560	0.004	21
Bellatrix	05	25	07.9	N 06 21.0	-0.008750	-0.013280	0.013	18
Elnath	05	26	17.5	N 28 36.5	0.023280	-0.174220	0.025	9
Alnilam	05	36	12.8	S 01 12.1	0.001490	-0.001060	0.002	26
Betelgeuze	05	55	10.3	N 07 24.4	0.024950	0.009560	0.005	22
Canopus	06	23	57.1	S 52 41.7	0.019990	0.023670	0.010	21
Sirius	06	45	08.9	S 16 43.0	-0.546050	-1.223140	0.379	-8
Adhara	06	58	37.6	S 28 58.3	0.002600	0.002290	0.008	27
Castor	07	34	36.0	N 31 53.3	-0.206330	-0.148180	0.066	5
Procyon	07	39	18.1	N 05 13.5	-0.716570	-1.034580	0.286	-3
Pollux	07	45	19.4	N 28 01.6	-0.625690	-0.045950	0.097	3
Avior	08	22	30.8	S 59 30.6	-0.025340	0.022720	0.005	2
Suhail	09	07	59.8	S 43 25.9	-0.023210	0.014280	0.006	18
Miaplacidus	09	13	12.0	S 69 43.0	-0.157660	0.108910	0.029	-5
Alphard	09	27	35.2	S 08 39.5	-0.014500	0.033250	0.018	-4
Regulus	10	08	22.3	N 11 58.0	0.249000	0.002000	0.042	6
Dubhe	11	03	43.7	N 61 45.0	-0.136460	-0.035250	0.026	-9
Denebola	11	49	03.6	N 14 34.3	-0.499020	-0.113780	0.090	0
Gienah	12	15	48.4	S 17 32.5	-0.161000	0.023000	0.020	-4
Acrux	12	26	35.9	S 63 05.9	-0.035370	-0.014730	0.010	-11
Gacrux	12	31	09.9	S 57 06.8	0.027940	-0.264330	0.037	21
Alioth	12	54	01.6	N 55 57.6	0.112000	-0.009000	0.040	-9
Spica	13	25	11.6	S 11 09.7	-0.042500	-0.031730	0.012	1
Alkaid	13	47	32.4	N 49 18.8	-0.122000	-0.015600	0.032	-11
Hadar	14	03	49.4	S 60 22.4	-0.033960	-0.025060	0.009	6
Menkent	14	06	41.3	S 36 22.1	-0.519290	-0.517870	0.053	1
Arcturus	14	15	39.7	N 19 10.9	-1.093450	-1.999400	0.089	5
Rigel Kentaurus	14	39	36.5	S 60 50.0	-3.678190	0.481840	0.747	-22
Zubenelgenubi	14	50	52.8	S 16 02.5	-0.106000	-0.067000	0.058	-10
Kocab	14	50	42.3	N 74 09.3	-0.032290	0.011910	0.026	17
Alphecca	15	34	41.3	N 26 42.9	0.120380	-0.089440	0.044	2
Antares	16	29	24.0	S 26 25.9	-0.010160	-0.023210	0.005	-3
Atria	16	48	39.9	S 69 01.7	0.017850	-0.032920	0.008	-3
Sabik	17	10	22.7	S 15 43.5	0.041160	0.097650	0.039	-2
Shaula	17	33	36.5	S 37 06.2	-0.008900	-0.029950	0.005	-3
Rasalhague	17	34	56.1	N 12 33.6	0.110080	-0.222610	0.070	13
Etamin	17	56	36.4	N 51 29.3	-0.008480	-0.022790	0.021	-28
Kaus Australis	18	24	10.3	S 34 23.1	-0.039420	-0.124200	0.023	-15
Vega	18	36	56.3	N 38 47.0	0.201030	0.287470	0.129	-14
Nunki	18	55	15.9	S 26 17.8	0.015140	-0.053430	0.014	-11
Albireo	19	30	43.3	N 27 57.6	0.005000	0.006000	0.009	-24
Altair	19	50	47.0	N 08 52.1	0.536870	0.385570	0.194	-26
Peacock	20	25	38.9	S 56 44.1	0.007710	-0.086150	0.018	2
Deneb	20	41	25.9	N 45 16.8	0.001990	0.001950	0.002	-5
Enif	21	44	11.2	N 09 52.5	0.030020	-0.001380	0.005	3
Alnair	22	08	14.0	S 46 57.7	0.128000	-0.148000	0.032	11
Formalhaut	22	57	39.0	S 29 37.3	0.329220	-0.164220	0.131	7
Markab	23	04	45.6	N 15 12.3	0.060400	-0.041300	0.024	-4

The following table lists the traditional star names as used in this Almanac with the corresponding scientific names (Bayer designation) as used in astronomical star constellation maps.

Star Name	Bayer designation	Apparent Magnitude
Alpheratz	Alpha Andromedae	2.06
Ankaa	Alpha Phoenicis	2.39
Schedir	Alpha Cassiopeiae	2.23
Diphda	Beta Ceti	2.04
Achernar	Alpha Eridani	0.46
Hamal	Alpha Arietis	2.00
Polaris	Alpha Ursae Minoris	2.02
Acamar	Theta Eridani	3.24
Menkar	Alpha Ceti	2.53
Mirfak	Alpha Persei	1.79
Aldebaran	Alpha Tauri	0.85
Capella	Alpha Aurigae	0.08
Rigel	Beta Orionis	0.12
Bellatrix	Gamma Orionis	1.64
Elnath	Beta Tauri	1.65
Alnilam	Epsilon Orionis	1.70
Betelgeuze	Alpha Orionis	0.50
Canopus	Alpha Carinae	-0.72
Sirius	Alpha Canis Majoris	-1.46
Adhara	Epsilon Canis Majoris	1.50
Castor	Alpha Geminorum	2.88
Procyon	Alpha Canis Minoris	0.38
Pollux	Beta Geminorum	1.14
Avior	Epsilon Carinae	1.86
Suhail	Lambda Velorum	2.21
Miaplacidus	Beta Carinae	1.68
Alphard	Alpha Hydrae	1.98
Regulus	Alpha Leonis	1.35
Dubhe	Alpha Ursae Majoris	1.79
Denebola	Beta Leonis	2.14
Gienah	Gamma Corvi	2.59
Acrux	Alpha Crucis	1.33
Gacrux	Gamma Crucis	1.63
Alioth	Epsilon Ursae Majoris	1.77
Spica	Alpha Virginis	0.98
Alkaid	Eta Ursae Majoris	1.86
Hadar	Beta Centauri	0.61
Menkent	Theta Centauri	2.06
Arcturus	Alpha Bootis	-0.04
Rigel Kentaurus	Alpha Centauri	-0.01
Zubenelgenubi	Alpha-2 Librae	2.75
Kocab	Beta Ursae Minoris	2.08
Alphecca	Alpha Coronae Borealis	2.23
Antares	Alpha Scorpii	0.96
Atria	Alpha Trianguli Australis	1.92
Sabik	Eta Ophiuchi	2.43
Shaula	Lambda Scorpii	1.63
Rasalhague	Alpha Ophiuchi	2.08
Etamin	Gamma Draconis	2.23
Kaus Australis	Epsilon Sagittarii	1.85
Vega	Alpha Lyrae	0.03
Nunki	Sigma Sagittarii	2.02
Albireo	Beta Cygni	3.08
Altair	Alpha Aquilae	0.77
Peacock	Alpha Pavonis	1.94
Deneb	Alpha Cygni	1.25
Enif	Epsilon Pegasi	2.39
Alnair	Alpha Gruis	1.74
Formalhaut	Alpha Piscis Austrini	1.16
Markab	Alpha Pegasi	2.49

Horizontal-Coordinate-System Map of bright Stars - Part I



Position of the Stars on the local hemisphere

The following pages show different maps of the brightest stars on the night sky (down to magnitude 4.5) as well as some of the standard constellations. On each of the maps, the stars used in this Almanac are labeled with their traditional names.

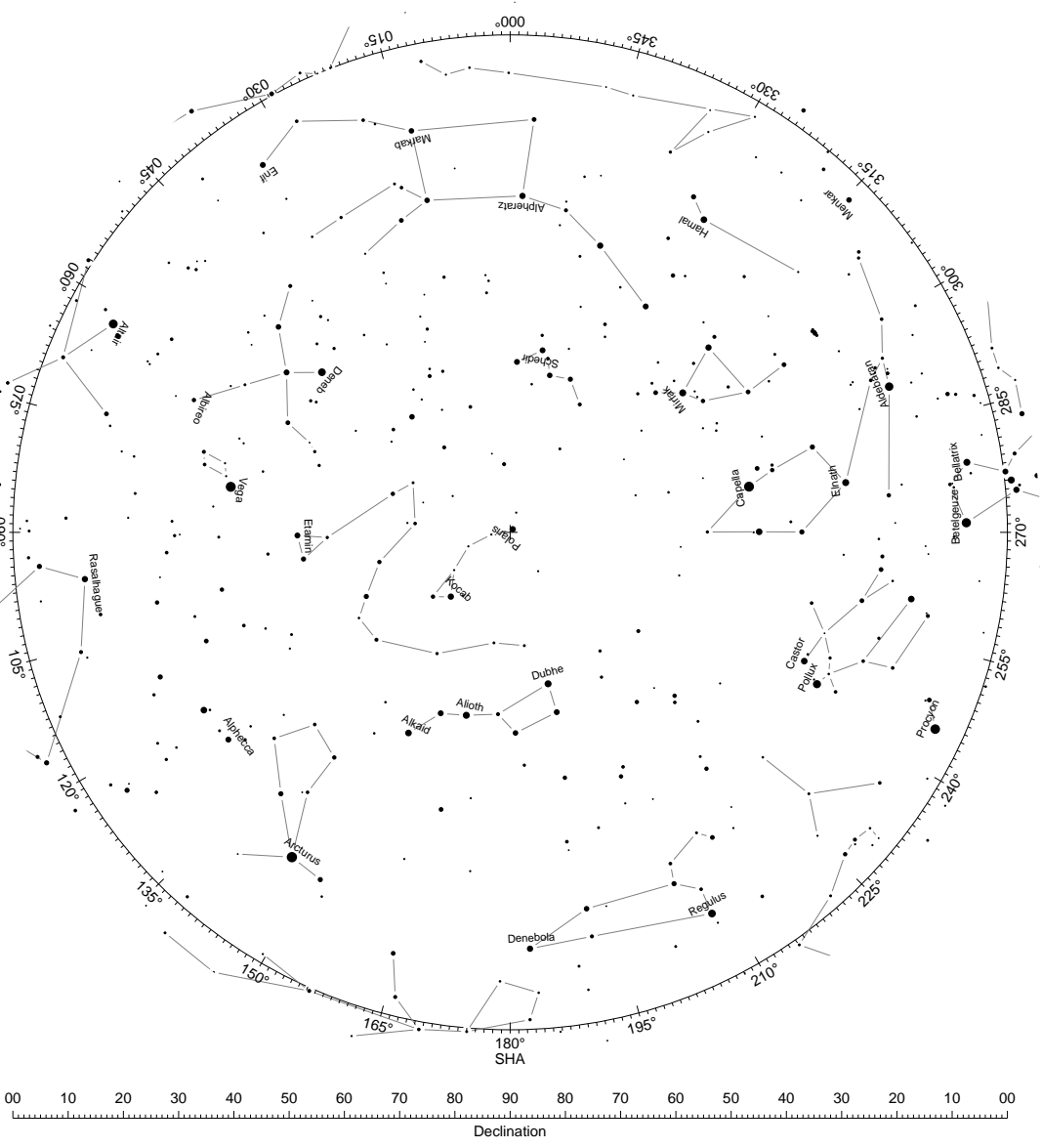
The first two maps are stereographic maps of the stars of the northern- and southern hemisphere, respectively. These maps are centered on the celestial poles and may be used for observations at locations in high northern- or southern latitudes.

The following eight maps show the star constellations on the local hemisphere for locations on the Equator. These maps can be used for observations at locations in lower latitudes.

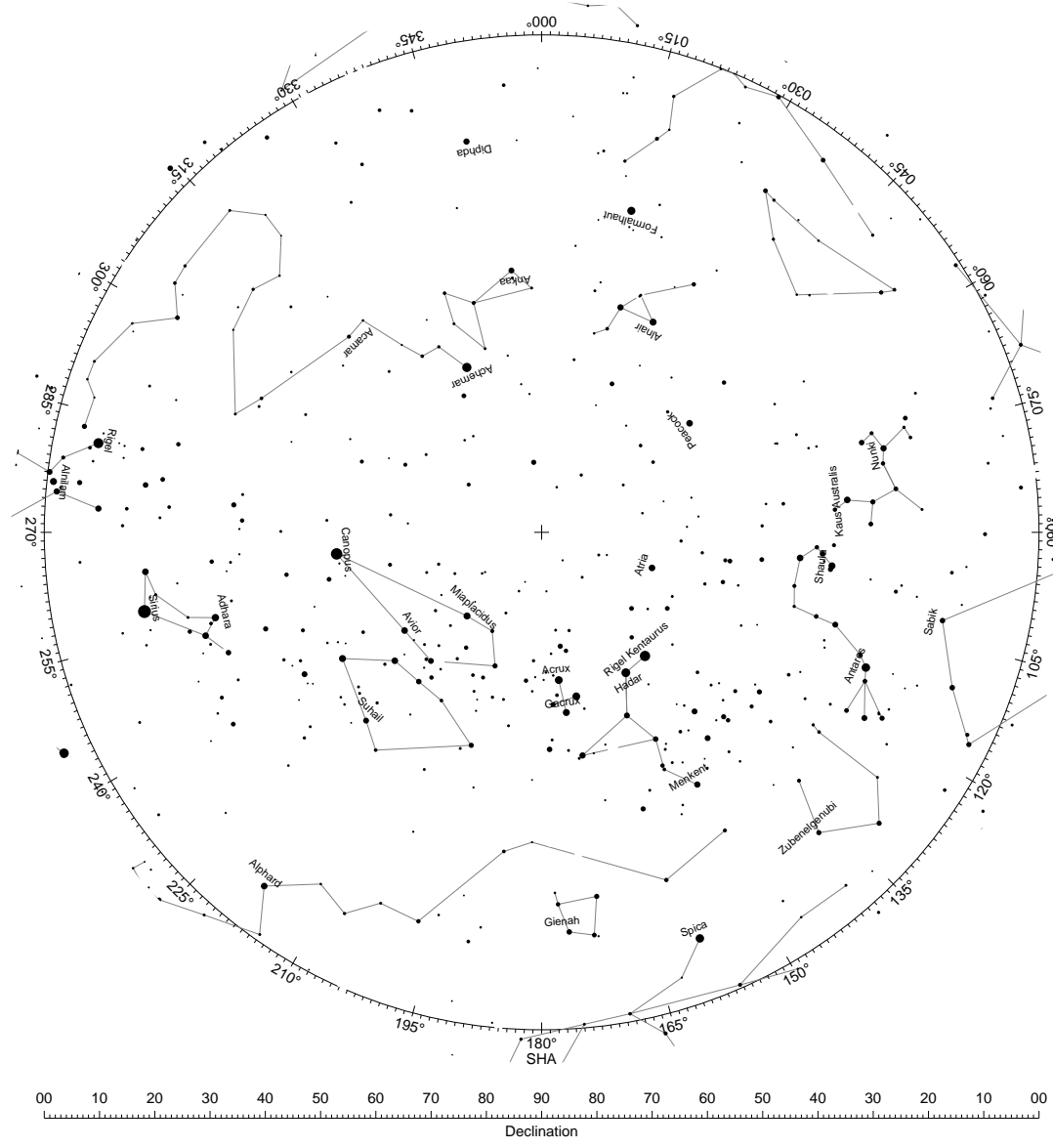
The Horizontal-Coordinate-System map shows the brightest stars (up to magnitude 4.5) of the local hemisphere for a location on the Equator. The stars are plotted with their Altitude (Hc) and Azimuth (Az) coordinates. The Azimuth scale is plotted on the circle of 0°-Altitude (local horizon). The Azimuth is the approximate compass direction in which the star is visible.

Each of these maps is valid for a location on the equator at a specific time of the day.

Map of bright Stars of the Northern Celestial Sphere



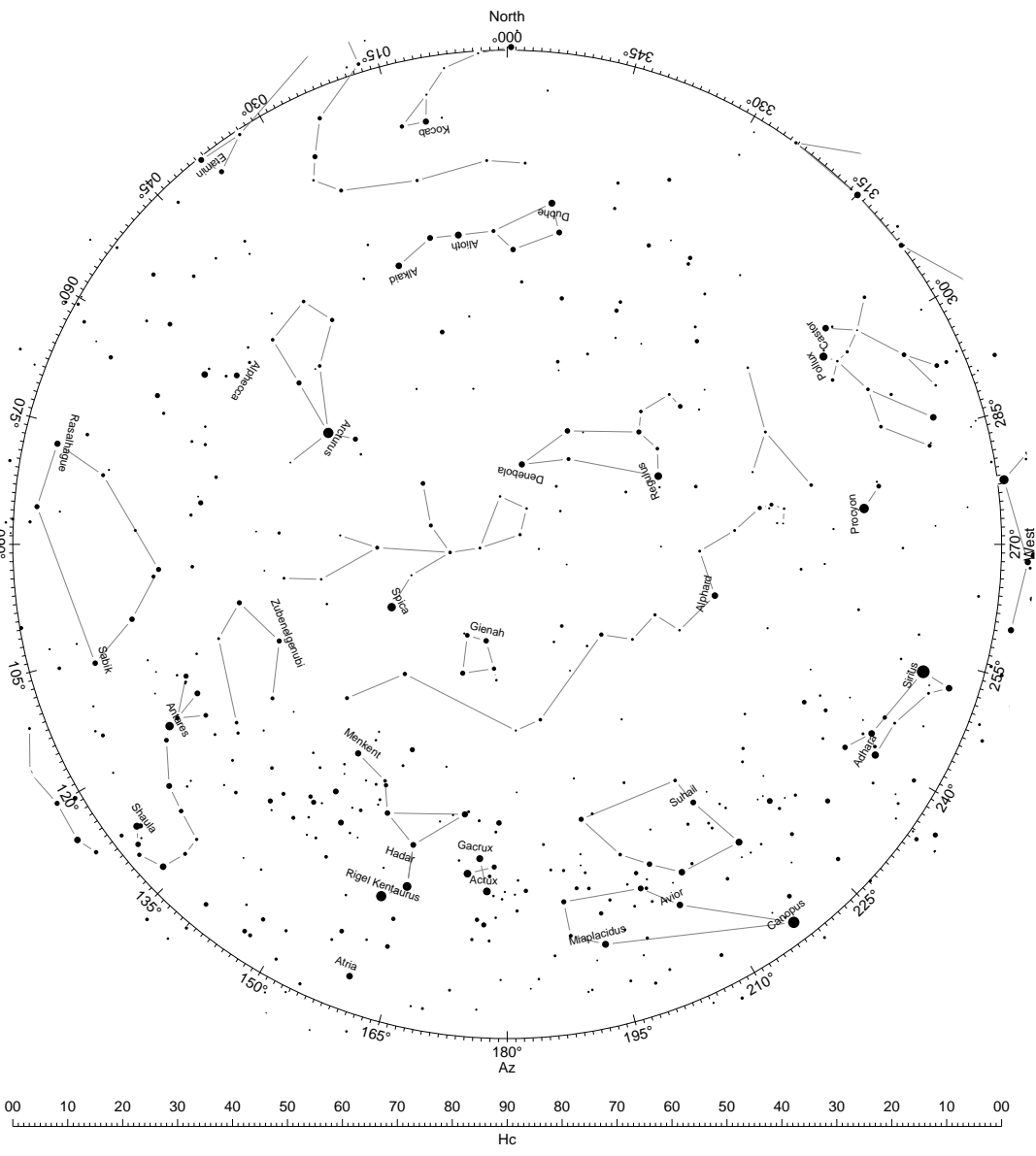
Map of bright Stars of the Southern Celestial Sphere



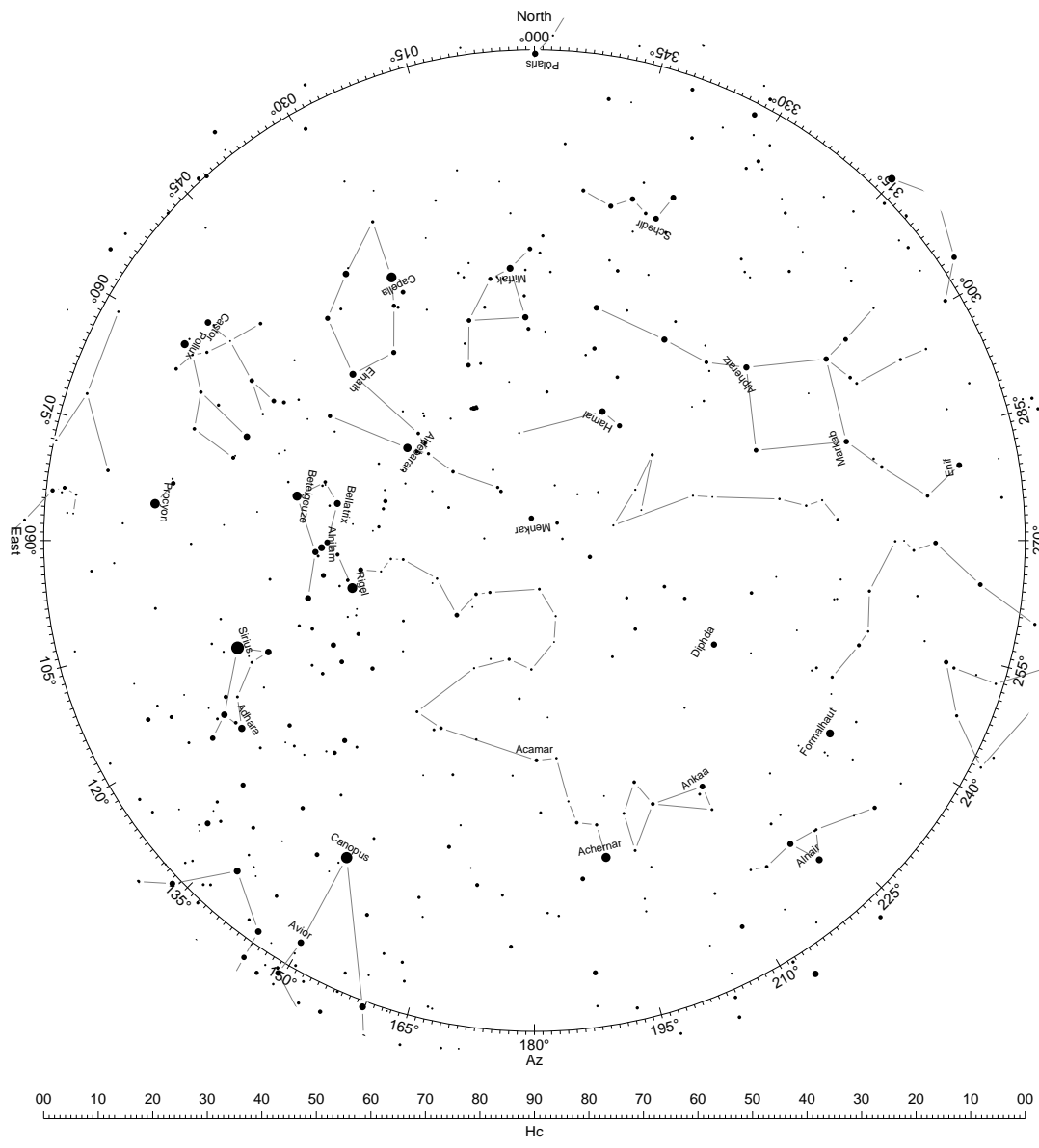
The map is centered on the celestial north pole and shows the brightest stars (up to magnitude 4.5) of the northern celestial hemisphere. The circle of constant declination is shown at 00° (Celestial Equator). The Sidereal Hour Angle of a specific star can be directly read from the SHA scale plotted on the Celestial Equator, while, the Declination can be determined by transferring the distance from the star to the center of the map onto the separate Declination scale. The Sidereal Hour Angle is zero for the "First-Point-of-Aries" and increases westward.

The map is centered on the celestial south pole and shows the brightest stars (up to magnitude 4.5) of the southern celestial hemisphere. The circle of constant declination is shown at 00° (Celestial Equator). The Sidereal Hour Angle of a specific star can be directly read from the SHA scale plotted on the Celestial Equator, while, the Declination can be determined by transferring the distance from the star to the center of the map onto the separate Declination scale. The Sidereal Hour Angle is zero for the "First-Point-of-Aries" and increases westward.

Horizontal-Coordinate-System Map of bright Stars - Part V



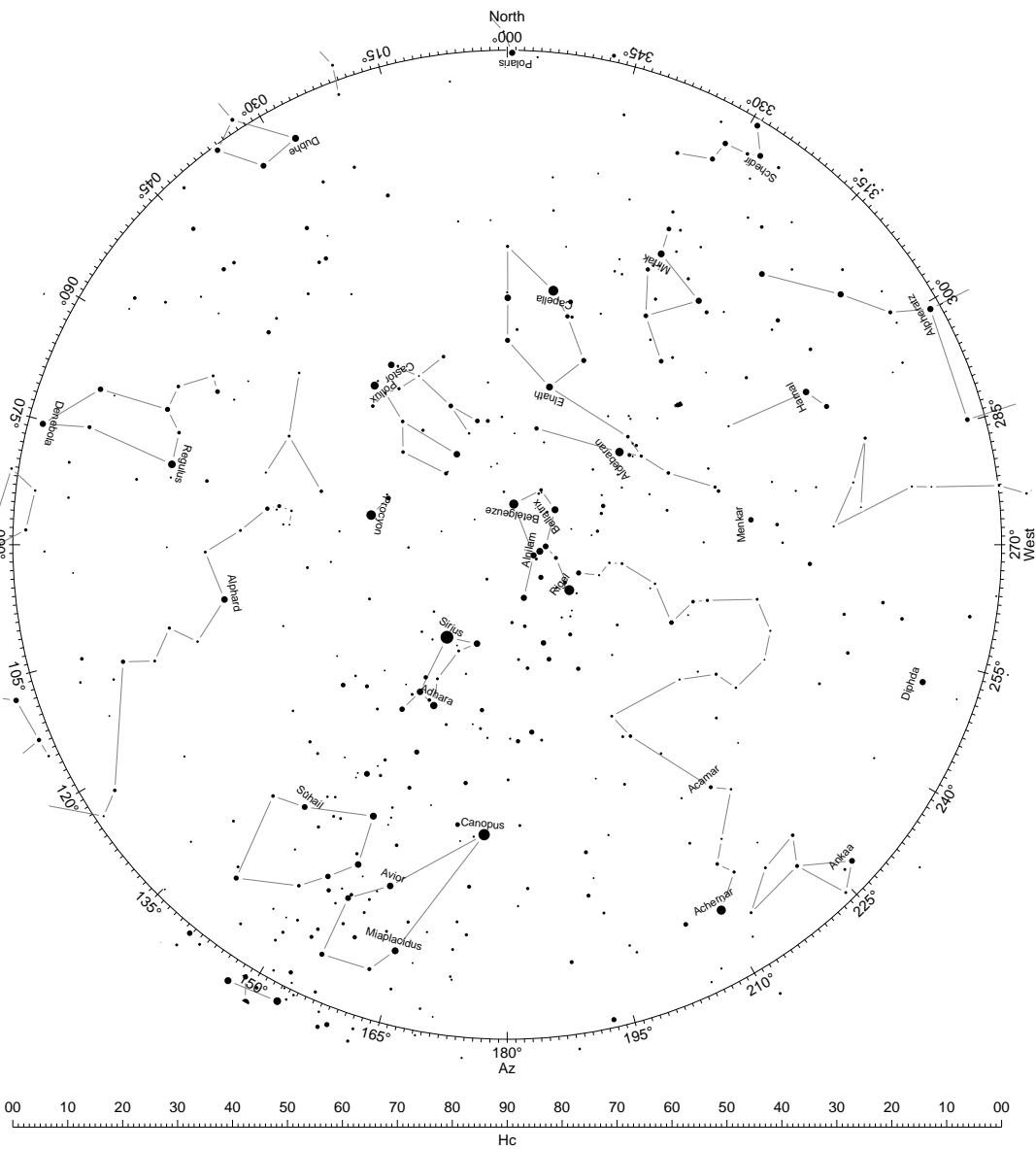
Horizontal-Coordinate-System Map of bright Stars - Part II



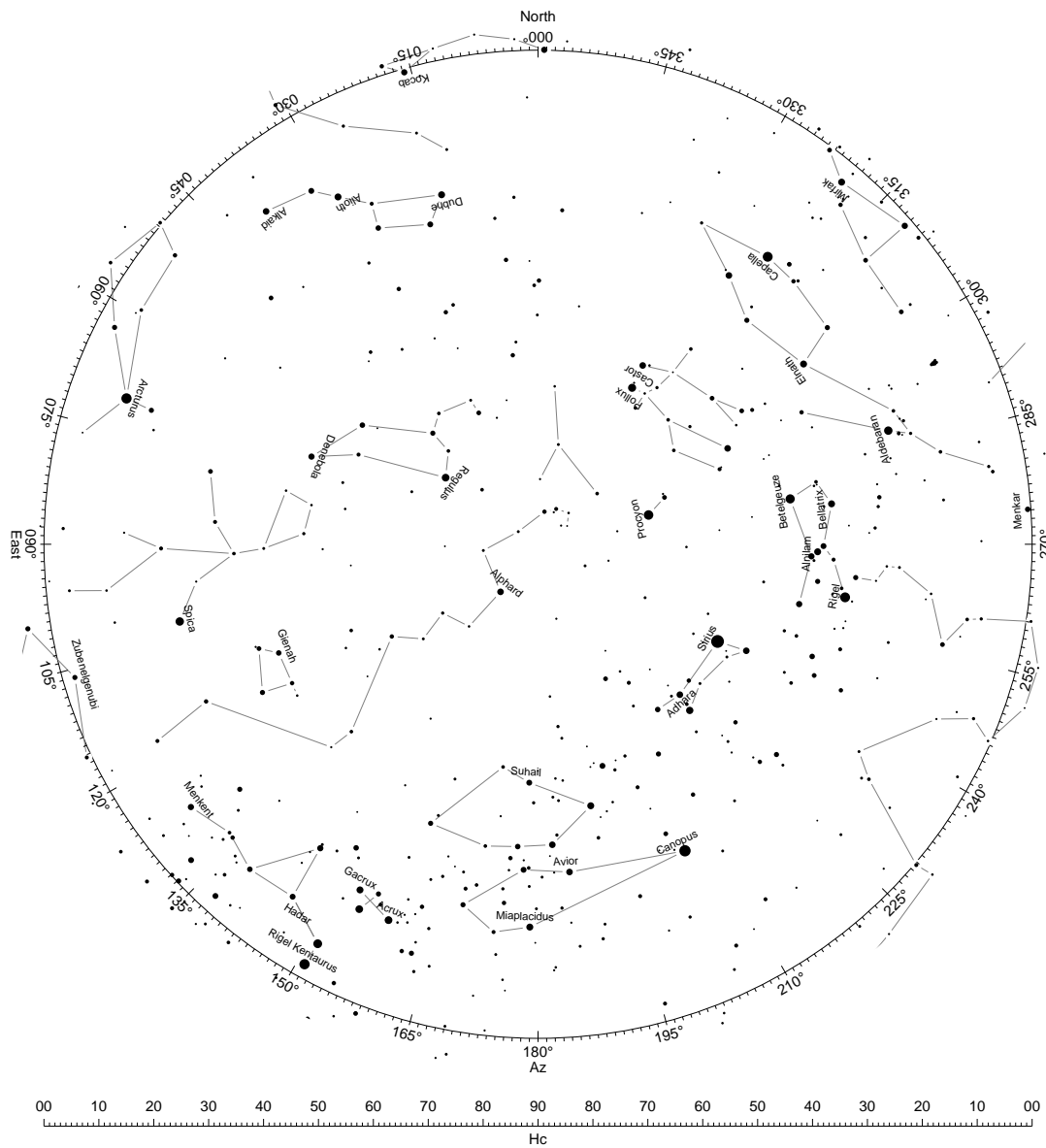
The Horizontal-Coordinate-System map shows the brightest stars (up to magnitude 4.5) of the local hemisphere for a location on the Equator. The stars are plotted with their Altitude (Hc) and Azimuth (Az) coordinates. The Azimuth scale is plotted on the circle of 0°-Altitude (local horizon). The Azimuth is the approximate compass direction in which the star is visible.
 Each of these maps is valid for a location on the equator at a specific time of the day.

The Horizontal-Coordinate-System map shows the brightest stars (up to magnitude 4.5) of the local hemisphere for a location on the Equator. The stars are plotted with their Altitude (Hc) and Azimuth (Az) coordinates. The Azimuth scale is plotted on the circle of 0°-Altitude (local horizon). The Azimuth is the approximate compass direction in which the star is visible.
 Each of these maps is valid for a location on the equator at a specific time of the day.

Horizontal-Coordinate-System Map of bright Stars - Part III



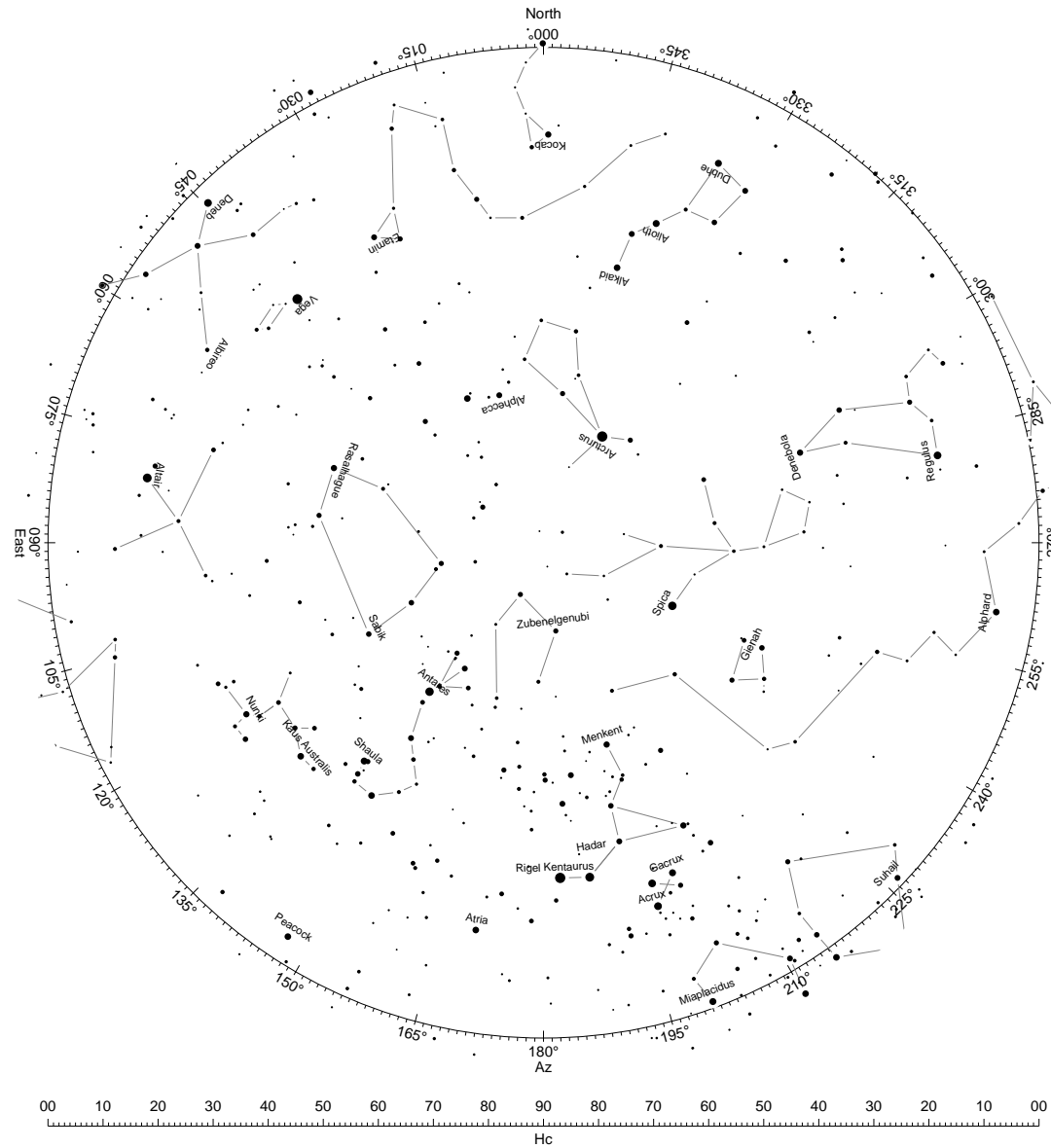
Horizontal-Coordinate-System Map of bright Stars - Part IV



The Horizontal-Coordinate-System map shows the brightest stars (up to magnitude 4.5) of the local hemisphere for a location on the Equator. The stars are plotted with their Altitude (Hc) and Azimuth (Az) coordinates. The Azimuth scale is plotted on the circle of 0°-Altitude (local horizon). The Azimuth is the approximate compass direction in which the star is visible. Each of these maps is valid for a location on the equator at a specific time of the day.

The Horizontal-Coordinate-System map shows the brightest stars (up to magnitude 4.5) of the local hemisphere for a location on the Equator. The stars are plotted with their Altitude (Hc) and Azimuth (Az) coordinates. The Azimuth scale is plotted on the circle of 0°-Altitude (local horizon). The Azimuth is the approximate compass direction in which the star is visible. Each of these maps is valid for a location on the equator at a specific time of the day.

Horizontal-Coordinate-System Map of bright Stars - Part VI

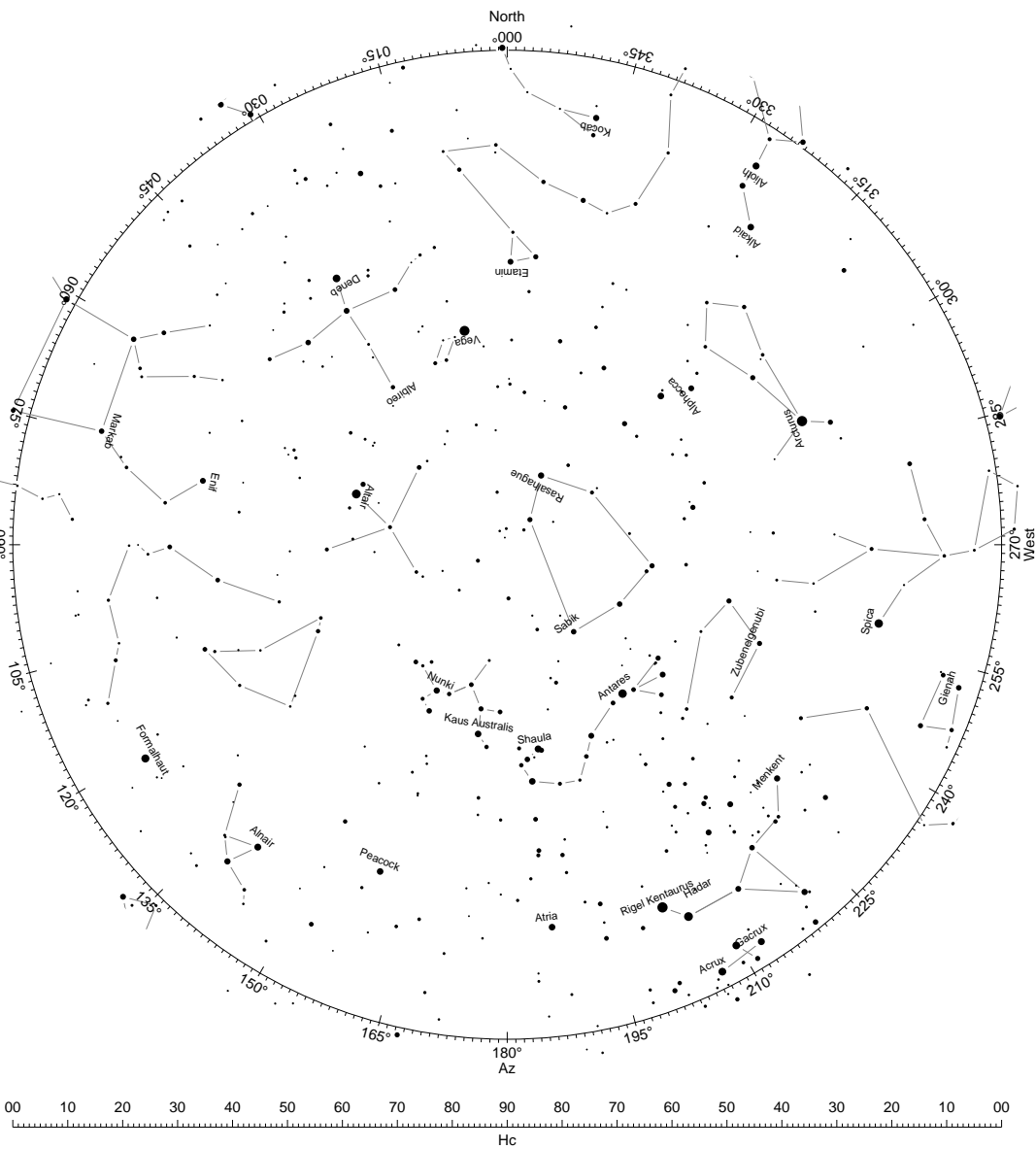


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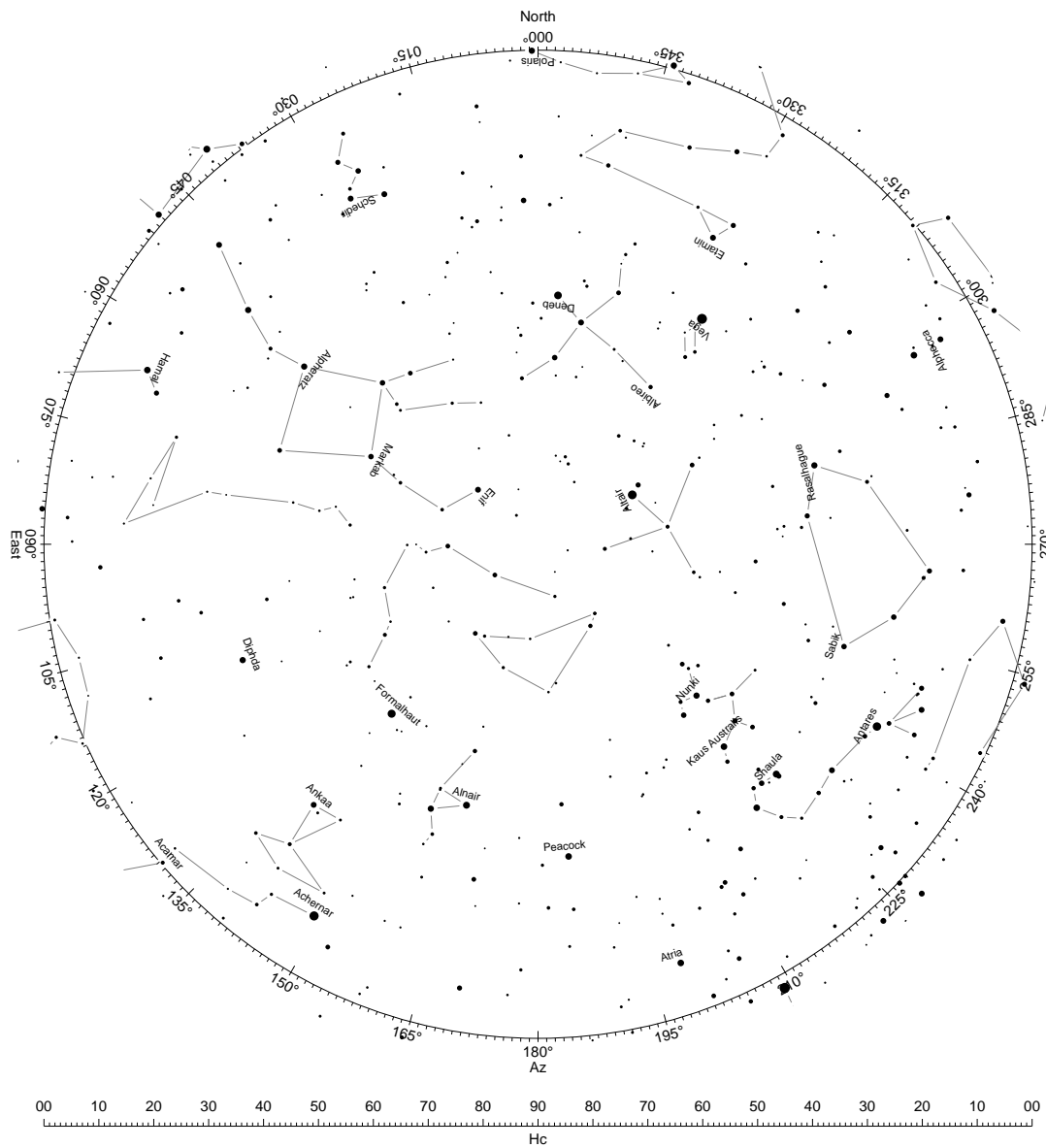
The Horizontal-Coordinate-System map shows the brightest stars (up to magnitude 4.5) of the local hemisphere for a location on the Equator. The stars are plotted with their Altitude (Hc) and Azimuth (Az) coordinates. The Azimuth scale is plotted on the circle of 0°-Altitude (local horizon). The Azimuth is the approximate compass direction in which the star is visible.

Each of these maps is valid for a location on the equator at a specific time of the day.

Horizontal-Coordinate-System Map of bright Stars - Part VII



Horizontal-Coordinate-System Map of bright Stars - Part VIII



The Horizontal-Coordinate-System map shows the brightest stars (up to magnitude 4.5) of the local hemisphere for a location on the Equator. The stars are plotted with their Altitude (Hc) and Azimuth (Az) coordinates. The Azimuth scale is plotted on the circle of 0°-Altitude (local horizon). The Azimuth is the approximate compass direction in which the star is visible.
 Each of these maps is valid for a location on the equator at a specific time of the day.

The Horizontal-Coordinate-System map shows the brightest stars (up to magnitude 4.5) of the local hemisphere for a location on the Equator. The stars are plotted with their Altitude (Hc) and Azimuth (Az) coordinates. The Azimuth scale is plotted on the circle of 0°-Altitude (local horizon). The Azimuth is the approximate compass direction in which the star is visible.
 Each of these maps is valid for a location on the equator at a specific time of the day.

2022 - First Point of Aries / Selected Stars

UT	day 11 of 365 January 11			day 12 of 365 January 12			day 13 of 365 January 13			day 14 of 365 January 14			day 15 of 365 January 15			UT
	GHA	ddGHA		GHA	ddGHA		GHA	ddGHA		GHA	ddGHA		GHA	ddGHA		
00	110	29.0	+02.4	111	28.1	+02.5	112	27.3	+02.4	113	26.4	+02.5	114	25.5	+02.5	00
01	125	31.4	+02.5	126	30.6	+02.4	127	29.7	+02.5	128	28.9	+02.4	129	28.0	+02.5	01
02	140	33.9	+02.5	141	33.0	+02.5	142	32.2	+02.5	143	31.3	+02.5	144	30.5	+02.4	02
03	155	36.4	+02.4	156	35.5	+02.5	157	34.7	+02.4	158	33.8	+02.5	159	32.9	+02.5	03
04	170	38.8	+02.5	171	38.0	+02.4	172	37.1	+02.5	173	36.3	+02.4	174	35.4	+02.5	04
05	185	41.3	+02.5	186	40.4	+02.5	187	39.6	+02.4	188	38.7	+02.5	189	37.9	+02.4	05
06	200	43.8	+02.4	201	42.9	+02.5	202	42.0	+02.5	203	41.2	+02.4	204	40.3	+02.5	06
07	215	46.2	+02.5	216	45.4	+02.4	217	44.5	+02.5	218	43.6	+02.5	219	42.8	+02.5	07
08	230	48.7	+02.5	231	47.8	+02.5	232	47.0	+02.4	233	46.1	+02.5	234	45.3	+02.4	08
09	245	51.2	+02.4	246	50.3	+02.5	247	49.4	+02.5	248	48.6	+02.4	249	47.7	+02.5	09
10	260	53.6	+02.5	261	52.8	+02.4	262	51.9	+02.5	263	51.0	+02.5	264	50.2	+02.4	10
11	275	56.1	+02.5	276	55.2	+02.5	277	54.4	+02.4	278	53.5	+02.5	279	52.6	+02.5	11
12	290	58.6	+02.4	291	57.7	+02.5	292	56.8	+02.5	293	56.0	+02.4	294	55.1	+02.5	12
13	306	01.0	+02.5	307	00.2	+02.4	307	59.3	+02.5	308	58.4	+02.5	309	57.6	+02.4	13
14	321	03.5	+02.4	322	02.6	+02.5	323	01.8	+02.4	324	00.9	+02.5	325	00.0	+02.5	14
15	336	05.9	+02.5	337	05.1	+02.4	338	04.2	+02.5	339	03.4	+02.4	340	02.5	+02.5	15
16	351	08.4	+02.5	352	07.5	+02.5	353	06.7	+02.4	354	05.8	+02.5	355	05.0	+02.4	16
17	6	10.9	+02.4	7	10.0	+02.5	8	09.1	+02.5	9	08.3	+02.5	10	07.4	+02.5	17
18	21	13.3	+02.5	22	12.5	+02.4	23	11.6	+02.5	24	10.8	+02.4	25	09.9	+02.5	18
19	36	15.8	+02.5	37	14.9	+02.5	38	14.1	+02.4	39	13.2	+02.5	40	12.4	+02.4	19
20	51	18.3	+02.4	52	17.4	+02.5	53	16.5	+02.5	54	15.7	+02.4	55	14.8	+02.5	20
21	66	20.7	+02.5	67	19.9	+02.4	68	19.0	+02.5	69	18.1	+02.5	70	17.3	+02.5	21
22	81	23.2	+02.5	82	22.3	+02.5	83	21.5	+02.4	84	20.6	+02.5	85	19.8	+02.4	22
23	96	25.7	+02.4	97	24.8	+02.5	98	23.9	+02.5	99	23.1	+02.4	100	22.2	+02.5	23

Nautical Almanac for selected Stars

The following pages contain the celestial coordinates of the "First Point of Aries" and a set of selected stars. Each page compiles the almanac data for five successive days of the year. For this time span, the recorded star data consisting of Siderial Hour Angle (SHA) and Declination (Dec) is valid. The time used in this Almanac is Universal Time (UT).

The GHA of a specific star is obtained from the GHA of the "First Point of Aries" and the star's SHA by the following relationship: $GHA_{star} = GHA_{Aries} + SHA_{star}$

NOTICE:

This Nautical Almanac uses a slightly different approach for the interpolation of the integral-hour values of Greenwich Hour Angle and Declination, compared to the techniques used in most commercially available Almanacs.

For more information please refer to the following web site: "<http://www.siranah.de/>"

Abbreviations used in the Almanac tables:

UT	Universal Time	
GHA	Greenwich Hour Angle	° [degrees]
ddGHA	the increment of the GHA value for the next hour of time, additional to the "linear" increment of 15°/h	' [minutes of arc]
SHA	Siderial Hour Angle	° [degrees]
Dec	Declination	° [degrees]

	SHA	Dec		SHA	Dec
	° ,	° ,		° ,	° ,
Alpheratz	357 37.5	N 29 12.8	Gienah	175 46.0	S 17 39.7
Ankaa	353 09.8	S 42 11.4	Acrux	173 02.6	S 63 12.9
Schedir	349 33.9	N 56 39.7	Gacrux	171 54.2	S 57 13.8
Diphda	348 49.9	S 17 52.2	Alioth	166 15.2	N 55 50.2
Achernar	335 22.1	S 57 07.9	Spica	158 24.9	S 11 16.5
Hamal	327 53.9	N 23 34.0	Alkaid	152 54.0	N 49 12.0
Polaris	314 58.1	N 89 21.7	Hadar	148 39.6	S 60 28.4
Acamar	315 13.4	S 40 13.3	Menkent	148 00.3	S 36 28.2
Menkar	314 08.6	N 04 10.5	Arcturus	145 49.9	N 19 04.7
Mirfak	308 31.5	N 49 56.5	Rigel Kentaurus	139 41.3	S 60 55.4
Aldebaran	290 42.2	N 16 33.2	Zubenelgenubi	136 58.8	S 16 07.8
Capella	280 25.1	N 46 01.4	Kocab	137 20.3	N 74 03.6
Rigel	281 05.9	S 08 10.7	Alphecca	126 06.1	N 26 38.4
Bellatrix	278 25.2	N 06 22.1	Antares	112 19.2	S 26 28.7
Elnath	278 04.6	N 28 37.6	Atria	107 16.0	S 69 03.8
Alnilam	275 39.9	S 01 11.4	Sabik	102 05.9	S 15 45.1
Betelgeuze	270 54.4	N 07 24.6	Shaula	96 14.1	S 37 07.1
Canopus	263 52.9	S 52 42.5	Rasalhague	96 01.2	N 12 32.7
Sirius	258 27.9	S 16 44.4	Etamin	90 43.8	N 51 29.0
Adhara	255 07.4	S 29 00.2	Kaus Australis	83 36.2	S 34 22.4
Castor	245 59.7	N 31 50.4	Vega	80 35.4	N 38 48.1
Procyon	244 52.8	N 05 10.4	Nunki	75 51.2	S 26 16.1
Pollux	243 19.6	N 27 58.3	Albireo	67 06.4	N 28 00.3
Avior	234 15.0	S 59 34.7	Altair	62 02.9	N 08 55.4
Suhail	222 47.7	S 43 31.1	Peacock	53 10.2	S 56 39.9
Miaplacidus	221 37.7	S 69 48.3	Deneb	49 27.9	N 45 21.5
Alphard	217 49.9	S 08 45.2	Enif	33 41.5	N 09 58.5
Regulus	207 36.7	N 11 51.5	Alnair	27 36.4	S 46 51.5
Dubhe	193 43.6	N 61 37.7	Formalhaut	15 17.6	S 29 30.5
Denebola	182 27.2	N 14 26.9	Markab	13 32.5	N 15 19.4

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2022 - First Point of Aries / Selected Stars

2022 - First Point of Aries / Selected Stars

Table with 7 columns: UT, day 81 of 365 (March 22), day 82 of 365 (March 23), day 83 of 365 (March 24), day 84 of 365 (March 25), day 85 of 365 (March 26), UT. Each day column contains GHA and ddGHA values for stars 00 through 23.

Table with 7 columns: UT, day 86 of 365 (March 27), day 87 of 365 (March 28), day 88 of 365 (March 29), day 89 of 365 (March 30), day 90 of 365 (March 31), UT. Each day column contains GHA and ddGHA values for stars 00 through 23.

Table with 4 columns: Star Name, SHA, Dec, Star Name, SHA, Dec. Lists stars such as Alpheratz, Ankaa, Schedir, Diphda, Achernar, Hamal, Polaris, etc., with their corresponding SHA and Dec values.

Table with 4 columns: Star Name, SHA, Dec, Star Name, SHA, Dec. Lists stars such as Alpheratz, Ankaa, Schedir, Diphda, Achernar, Hamal, Polaris, etc., with their corresponding SHA and Dec values.

2022 - First Point of Aries / Selected Stars

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Table with 7 columns: UT, day 191 of 365, day 192 of 365, day 193 of 365, day 194 of 365, day 195 of 365, UT. Rows are numbered 00 to 23.

Table with 7 columns: UT, day 176 of 365, day 177 of 365, day 178 of 365, day 179 of 365, day 180 of 365, UT. Rows are numbered 00 to 23.

Table with 4 columns: Star Name, SHA, Dec, Star Name, SHA, Dec. Lists stars like Alpheratz, Ankaa, Schedir, etc.

Table with 4 columns: Star Name, SHA, Dec, Star Name, SHA, Dec. Lists stars like Alpheratz, Ankaa, Schedir, etc.

2022 - First Point of Aries / Selected Stars

2022 - First Point of Aries / Selected Stars

Table with columns: UT, day 221 of 365 (August 9), day 222 of 365 (August 10), day 223 of 365 (August 11), day 224 of 365 (August 12), day 225 of 365 (August 13), UT. Contains star position data for 23 days.

Table with columns: UT, day 226 of 365 (August 14), day 227 of 365 (August 15), day 228 of 365 (August 16), day 229 of 365 (August 17), day 230 of 365 (August 18), UT. Contains star position data for 15 days.

Table with columns: Star Name, SHA, Dec. Lists 50 stars including Alpheratz, Ankaa, Schedir, Diphda, Achernar, Hamal, Polaris, etc.

Table with columns: Star Name, SHA, Dec. Lists 50 stars including Alpheratz, Ankaa, Schedir, Diphda, Achernar, Hamal, Polaris, etc.

2022 - First Point of Aries / Selected Stars

2022 - First Point of Aries / Selected Stars

Table with columns for UT, day of year (251-255), month (September 8-12), GHA, ddGHA, and UT. Rows list stars from 00 to 23 with their coordinates.

Table with columns for UT, day of year (236-240), month (August 24-28), GHA, ddGHA, and UT. Rows list stars from 00 to 23 with their coordinates.

Table with columns for star name, SHA, and Dec. Rows list stars from Alpheratz to Denebola with their SHA and Dec coordinates.

Table with columns for star name, SHA, and Dec. Rows list stars from Alpheratz to Denebola with their SHA and Dec coordinates.

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2022 - First Point of Aries / Selected Stars

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Table with columns for UT, GHA, ddGHA, and dates from October 18 to October 22. It lists star coordinates and time differences for days 291-365.

Table with columns for UT, GHA, ddGHA, and dates from October 3 to October 7. It lists star coordinates and time differences for days 276-365.

Table with columns for Star Name, SHA, Dec, SHA, Dec. It lists names like Alpheratz, Ankaa, Schedir, etc., and their coordinates.

Table with columns for Star Name, SHA, Dec, SHA, Dec. It lists names like Alpheratz, Ankaa, Schedir, etc., and their coordinates.

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2022 - First Point of Aries / Selected Stars

2022 - First Point of Aries / Selected Stars

Table with 7 columns: UT, day 281 of 365 (October 8), day 282 of 365 (October 9), day 283 of 365 (October 10), day 284 of 365 (October 11), day 285 of 365 (October 12), and UT. Rows list stars with GHA and ddGHA values.

Table with 7 columns: UT, day 286 of 365 (October 13), day 287 of 365 (October 14), day 288 of 365 (October 15), day 289 of 365 (October 16), day 290 of 365 (October 17), and UT. Rows list stars with GHA and ddGHA values.

Table with 4 columns: Star Name, SHA, Dec, and Star Name. Lists stars like Alpheratz, Ankaa, Schedir, Diphda, Achernar, Hamal, Polaris, etc.

Table with 4 columns: Star Name, SHA, Dec, and Star Name. Lists stars like Alpheratz, Ankaa, Schedir, Diphda, Achernar, Hamal, Polaris, etc.

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2022 - First Point of Aries / Selected Stars

Table with 7 columns: day (321-325), GHA, ddGHA, UT. Rows for dates November 17 to 23.

Table with 2 columns: Star Name, SHA, Dec. Lists stars like Alpheratz, Ankaa, Schedir, etc.

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2022 - First Point of Aries / Selected Stars

Table with 7 columns: day (326-330), GHA, ddGHA, UT. Rows for dates November 22 to 28.

Table with 2 columns: Star Name, SHA, Dec. Lists stars like Alpheratz, Ankaa, Schedir, etc.

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2022 - First Point of Aries / Selected Stars

	day 356 of 365 December 22		day 357 of 365 December 23		day 358 of 365 December 24		day 359 of 365 December 25		day 360 of 365 December 26		
UT	GHA	ddGHA	GHA	ddGHA	GHA	ddGHA	GHA	ddGHA	GHA	ddGHA	UT
00	90	31.9 +02.5	91	31.1 +02.4	92	30.2 +02.5	93	29.3 +02.5	94	28.5 +02.5	00
01	105	34.4 +02.4	106	33.5 +02.5	107	32.7 +02.4	108	31.8 +02.5	109	31.0 +02.4	01
02	120	36.8 +02.5	121	36.0 +02.5	122	35.1 +02.5	123	34.3 +02.4	124	33.4 +02.5	02
03	135	39.3 +02.5	136	38.5 +02.4	137	37.6 +02.5	138	36.7 +02.5	139	35.9 +02.4	03
04	150	41.8 +02.4	151	40.9 +02.5	152	40.1 +02.4	153	39.2 +02.5	154	38.3 +02.5	04
05	165	44.2 +02.5	166	43.4 +02.4	167	42.5 +02.5	168	41.7 +02.4	169	40.8 +02.5	05
06	180	46.7 +02.5	181	45.8 +02.5	182	45.0 +02.5	183	44.1 +02.5	184	43.3 +02.4	06
07	195	49.2 +02.4	196	48.3 +02.5	197	47.5 +02.4	198	46.6 +02.5	199	45.7 +02.5	07
08	210	51.6 +02.5	211	50.8 +02.4	212	49.9 +02.5	213	49.1 +02.4	214	48.2 +02.5	08
09	225	54.1 +02.5	226	53.2 +02.5	227	52.4 +02.4	228	51.5 +02.5	229	50.7 +02.4	09
10	240	56.6 +02.4	241	55.7 +02.5	242	54.8 +02.5	243	54.0 +02.5	244	53.1 +02.5	10
11	255	59.0 +02.5	256	58.2 +02.4	257	57.3 +02.5	258	56.5 +02.4	259	55.6 +02.5	11
12	271	01.5 +02.5	272	00.6 +02.5	272	59.8 +02.4	273	58.9 +02.5	274	58.1 +02.4	12
13	286	04.0 +02.4	287	03.1 +02.5	288	02.2 +02.5	289	01.4 +02.4	290	00.5 +02.5	13
14	301	06.4 +02.5	302	05.6 +02.4	303	04.7 +02.5	304	03.8 +02.5	305	03.0 +02.4	14
15	316	08.9 +02.4	317	08.0 +02.5	318	07.2 +02.4	319	06.3 +02.5	320	05.4 +02.5	15
16	331	11.3 +02.5	332	10.5 +02.5	333	09.6 +02.5	334	08.8 +02.4	335	07.9 +02.5	16
17	346	13.8 +02.5	347	13.0 +02.4	348	12.1 +02.5	349	11.2 +02.5	350	10.4 +02.4	17
18	1	16.3 +02.4	2	15.4 +02.5	3	14.6 +02.4	4	13.7 +02.5	5	12.8 +02.5	18
19	16	18.7 +02.5	17	17.9 +02.4	18	17.0 +02.5	19	16.2 +02.4	20	15.3 +02.5	19
20	31	21.2 +02.5	32	20.3 +02.5	33	19.5 +02.5	34	18.6 +02.5	35	17.8 +02.4	20
21	46	23.7 +02.4	47	22.8 +02.5	48	22.0 +02.4	49	21.1 +02.5	50	20.2 +02.5	21
22	61	26.1 +02.5	62	25.3 +02.4	63	24.4 +02.5	64	23.6 +02.4	65	22.7 +02.5	22
23	76	28.6 +02.5	77	27.7 +02.5	78	26.9 +02.4	79	26.0 +02.5	80	25.2 +02.4	23

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	SHA	Dec		SHA	Dec
	° ,	° ,		° ,	° ,
Alpheratz	357 36.6	N 29 13.2	Gienah	175 45.3	S 17 40.0
Ankaa	353 08.9	S 42 11.0	Acruz	173 02.1	S 63 13.2
Schedir	349 32.9	N 56 40.0	Gacrux	171 53.7	S 57 14.1
Diphda	348 49.0	S 17 51.8	Alioth	166 14.7	N 55 49.9
Achernar	335 21.3	S 57 07.5	Spica	158 24.2	S 11 16.7
Hamal	327 53.0	N 23 34.4	Alkaid	152 53.6	N 49 11.7
Polaris	314 29.7	N 89 21.9	Hadar	148 38.8	S 60 28.7
Acamar	315 12.7	S 40 13.0	Menkent	147 59.6	S 36 28.5
Menkar	314 07.7	N 04 10.8	Arcturus	145 49.3	N 19 04.5
Mirfak	308 30.3	N 49 56.7	Rigel Kentaurus	139 40.4	S 60 55.7
Aldebaran	290 41.3	N 16 33.4	Zubenelgenubi	136 58.1	S 16 08.1
Capella	280 24.0	N 46 01.4	Kocab	137 20.6	N 74 03.4
Rigel	281 05.2	S 08 10.5	Alphecca	126 05.6	N 26 38.2
Bellatrix	278 24.4	N 06 22.2	Antares	112 18.4	S 26 28.9
Elnath	278 03.6	N 28 37.7	Atria	107 14.6	S 69 04.0
Alnilam	275 39.1	S 01 11.2	Sabik	102 05.1	S 15 45.2
Betelgeuze	270 53.6	N 07 24.7	Shaula	96 13.1	S 37 07.2
Canopus	263 52.6	S 52 42.4	Rasalhague	96 00.5	N 12 32.7
Sirius	258 27.2	S 16 44.4	Etamin	90 43.5	N 51 29.1
Adhara	255 06.8	S 29 00.1	Kaus Australis	83 35.2	S 34 22.4
Castor	245 58.8	N 31 50.3	Vega	80 34.9	N 38 48.2
Procyon	244 52.1	N 05 10.4	Nunki	75 50.3	S 26 16.1
Pollux	243 18.7	N 27 58.2	Albireo	67 05.8	N 28 00.5
Avior	234 14.9	S 59 34.8	Altair	62 02.1	N 08 55.6
Suhail	222 47.2	S 43 31.3	Peacock	53 08.9	S 56 39.8
Miaplacidus	221 37.8	S 69 48.4	Deneb	49 27.3	N 45 21.8
Alphard	217 49.2	S 08 45.4	Enif	33 40.7	N 09 58.8
Regulus	207 36.0	N 11 51.3	Alnair	27 35.4	S 46 51.2
Dubhe	193 42.8	N 61 37.4	Formalhaut	15 16.6	S 29 30.2
Denebola	182 26.5	N 14 26.6	Markab	13 31.7	N 15 19.8

2022 - First Point of Aries / Selected Stars

UT	day 361 of 365 <i>December 27</i>		day 362 of 365 <i>December 28</i>		day 363 of 365 <i>December 29</i>		day 364 of 365 <i>December 30</i>		day 365 of 365 <i>December 31</i>		UT
	GHA	ddGHA	GHA	ddGHA	GHA	ddGHA	GHA	ddGHA	GHA	ddGHA	
00	95	27.6 +02.5	96	26.8 +02.4	97	25.9 +02.5	98	25.0 +02.5	99	24.2 +02.4	00
01	110	30.1 +02.5	111	29.2 +02.5	112	28.4 +02.4	113	27.5 +02.5	114	26.6 +02.5	01
02	125	32.6 +02.4	126	31.7 +02.5	127	30.8 +02.5	128	30.0 +02.4	129	29.1 +02.5	02
03	140	35.0 +02.5	141	34.2 +02.4	142	33.3 +02.5	143	32.4 +02.5	144	31.6 +02.4	03
04	155	37.5 +02.4	156	36.6 +02.5	157	35.8 +02.4	158	34.9 +02.5	159	34.0 +02.5	04
05	170	39.9 +02.5	171	39.1 +02.5	172	38.2 +02.5	173	37.4 +02.4	174	36.5 +02.5	05
06	185	42.4 +02.5	186	41.6 +02.4	187	40.7 +02.5	188	39.8 +02.5	189	39.0 +02.4	06
07	200	44.9 +02.4	201	44.0 +02.5	202	43.2 +02.4	203	42.3 +02.5	204	41.4 +02.5	07
08	215	47.3 +02.5	216	46.5 +02.4	217	45.6 +02.5	218	44.8 +02.4	219	43.9 +02.5	08
09	230	49.8 +02.5	231	48.9 +02.5	232	48.1 +02.4	233	47.2 +02.5	234	46.4 +02.4	09
10	245	52.3 +02.4	246	51.4 +02.5	247	50.5 +02.5	248	49.7 +02.4	249	48.8 +02.5	10
11	260	54.7 +02.5	261	53.9 +02.4	262	53.0 +02.5	263	52.1 +02.5	264	51.3 +02.4	11
12	275	57.2 +02.5	276	56.3 +02.5	277	55.5 +02.4	278	54.6 +02.5	279	53.7 +02.5	12
13	290	59.7 +02.4	291	58.8 +02.5	292	57.9 +02.5	293	57.1 +02.4	294	56.2 +02.5	13
14	306	02.1 +02.5	307	01.3 +02.4	308	00.4 +02.5	309	59.5 +02.5	310	58.7 +02.4	14
15	321	04.6 +02.5	322	03.7 +02.5	323	02.9 +02.4	324	02.0 +02.5	325	01.1 +02.5	15
16	336	07.1 +02.4	337	06.2 +02.5	338	05.3 +02.5	339	04.5 +02.4	340	03.6 +02.5	16
17	351	09.5 +02.5	352	08.7 +02.4	353	07.8 +02.5	354	06.9 +02.5	355	06.1 +02.4	17
18	6	12.0 +02.4	7	11.1 +02.5	8	10.3 +02.4	9	09.4 +02.5	10	08.5 +02.5	18
19	21	14.4 +02.5	22	13.6 +02.4	23	12.7 +02.5	24	11.9 +02.4	25	11.0 +02.5	19
20	36	16.9 +02.5	37	16.0 +02.5	38	15.2 +02.4	39	14.3 +02.5	40	13.5 +02.4	20
21	51	19.4 +02.4	52	18.5 +02.5	53	17.6 +02.5	54	16.8 +02.5	55	15.9 +02.5	21
22	66	21.8 +02.5	67	21.0 +02.4	68	20.1 +02.5	69	19.3 +02.4	70	18.4 +02.5	22
23	81	24.3 +02.5	82	23.4 +02.5	83	22.6 +02.4	84	21.7 +02.5	85	20.9 +02.4	23

	SHA	Dec		SHA	Dec
	° ,	° ,		° ,	° ,
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Betelgeuze	270 53.6	N 07 24.7	Shaula	96 13.1	S 37 07.2
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Sirius	258 27.2	S 16 44.4	Etamin	90 43.5	N 51 29.1
Adhara	255 06.8	S 29 00.1	Kaus Australis	83 35.1	S 34 22.4
Castor	245 58.8	N 31 50.3	Vega	80 34.9	N 38 48.2
Procyon	244 52.0	N 05 10.3	Nunki	75 50.2	S 26 16.1
Pollux	243 18.7	N 27 58.2	Albireo	67 05.8	N 28 00.5
Avior	234 14.8	S 59 34.8	Altair	62 02.1	N 08 55.6
Suhail	222 47.2	S 43 31.3	Peacock	53 08.9	S 56 39.8
Miaplacidus	221 37.7	S 69 48.4	Deneb	49 27.3	N 45 21.8
Alphard	217 49.2	S 08 45.4	Enif	33 40.7	N 09 58.8
Regulus	207 35.9	N 11 51.3	Alnair	27 35.4	S 46 51.2
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Polaris (Pole Star) Tables, 2022
For determining Latitude from Sextant Altitude and for Azimuth

LHA ARIES	000° - 009°	010° - 019°	020° - 029°	030° - 039°	040° - 049°	050° - 059°	060° - 069°	070° - 079°	080° - 089°	090° - 099°	100° - 109°	110° - 119°
	a0	a0	a0	a0	a0	a0	a0	a0	a0	a0	a0	a0
0	0 31.7	0 27.4	0 24.1	0 21.8	0 20.6	0 20.6	0 21.8	0 24.1	0 27.5	0 31.8	0 36.9	0 42.7
1	0 31.3	0 27.1	0 23.8	0 21.6	0 20.6	0 20.7	0 22.0	0 24.4	0 27.9	0 32.3	0 37.5	0 43.4
2	0 30.8	0 26.7	0 23.5	0 21.5	0 20.5	0 20.8	0 22.2	0 24.7	0 28.3	0 32.8	0 38.0	0 44.0
3	0 30.4	0 26.3	0 23.3	0 21.3	0 20.5	0 20.9	0 22.4	0 25.0	0 28.7	0 33.3	0 38.6	0 44.6
4	0 29.9	0 26.0	0 23.0	0 21.2	0 20.5	0 21.0	0 22.6	0 25.3	0 29.1	0 33.8	0 39.2	0 45.2
5	0 29.5	0 25.6	0 22.8	0 21.1	0 20.5	0 21.1	0 22.8	0 25.7	0 29.5	0 34.3	0 39.8	0 45.9
6	0 29.1	0 25.3	0 22.6	0 21.0	0 20.5	0 21.2	0 23.1	0 26.0	0 30.0	0 34.8	0 40.4	0 46.5
7	0 28.6	0 25.0	0 22.4	0 20.9	0 20.5	0 21.3	0 23.3	0 26.4	0 30.4	0 35.3	0 40.9	0 47.1
8	0 28.2	0 24.7	0 22.2	0 20.8	0 20.5	0 21.5	0 23.6	0 26.7	0 30.9	0 35.8	0 41.5	0 47.8
9	0 27.8	0 24.4	0 22.0	0 20.7	0 20.6	0 21.6	0 23.8	0 27.1	0 31.3	0 36.4	0 42.1	0 48.4
Lat.	a1	a1	a1	a1	a1	a1	a1	a1	a1	a1	a1	a1
10	0.3	0.3	0.3	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8
20	0.3	0.3	0.3	0.4	0.5	0.5	0.6	0.6	0.7	0.8	0.8	0.9
30	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.9	0.9
40	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.8	0.9	1.0
45	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.9	0.9	1.0
50	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.0	1.0
55	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.0	1.1
60	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.0	1.1
62	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.8	1.0	1.1	1.2
64	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.9	1.0	1.1	1.2
66	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.7	0.9	1.0	1.1	1.2
68	0.5	0.4	0.4	0.4	0.5	0.5	0.6	0.8	0.9	1.0	1.2	1.3
70	0.5	0.4	0.4	0.4	0.5	0.5	0.6	0.8	0.9	1.1	1.2	1.3
Month	a2	a2	a2	a2	a2	a2	a2	a2	a2	a2	a2	a2
Jan	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.3	0.3
Feb	0.6	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.5
Mar	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6
Apr	0.4	0.5	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.7
May	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
Jun	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7
Jul	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6
Aug	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5
Sep	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
Oct	0.5	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Nov	0.7	0.6	0.6	0.5	0.5	0.4	0.3	0.3	0.2	0.2	0.1	0.1
Dec	0.8	0.8	0.8	0.7	0.6	0.6	0.5	0.4	0.3	0.2	0.2	0.1
Lat.	Zo	Zo	Zo	Zo	Zo	Zo	Zo	Zo	Zo	Zo	Zo	Zo
10	0.4	0.3	0.2	0.1	360.0	359.9	359.8	359.7	359.6	359.5	359.4	359.4
20	0.4	0.3	0.2	0.1	360.0	359.9	359.8	359.7	359.6	359.5	359.4	359.4
30	0.5	0.4	0.3	0.1	360.0	359.9	359.7	359.6	359.5	359.4	359.4	359.3
40	0.5	0.4	0.3	0.1	360.0	359.9	359.7	359.6	359.5	359.4	359.3	359.2
45	0.6	0.5	0.3	0.2	360.0	359.8	359.7	359.5	359.4	359.3	359.2	359.1
50	0.6	0.5	0.3	0.2	360.0	359.8	359.7	359.5	359.4	359.2	359.1	359.1
55	0.7	0.6	0.4	0.2	360.0	359.8	359.6	359.4	359.3	359.1	359.0	358.9
60	0.8	0.7	0.4	0.2	360.0	359.8	359.6	359.3	359.2	359.0	358.9	358.8
62	0.9	0.7	0.5	0.2	360.0	359.8	359.5	359.3	359.1	358.9	358.8	358.7
64	1.0	0.7	0.5	0.3	360.0	359.7	359.5	359.3	359.0	358.9	358.7	358.6
66	1.0	0.8	0.6	0.3	360.0	359.7	359.4	359.2	359.0	358.8	358.6	358.5
68	1.1	0.9	0.6	0.3	360.0	359.7	359.4	359.1	358.9	358.7	358.5	358.4
70	1.2	1.0	0.7	0.3	360.0	359.7	359.3	359.0	358.8	358.5	358.3	358.2

Latitude = Apparent Altitude (corrected for refraction and dip) - 1° + a0 + a1 + a2

To determine Latitude, the table is entered with LHA Aries, which is obtained by addition of the observer's Longitude and the GHA Aries from the daily pages of this Almanac. The value of LHA Aries determines which column of the Polaris Tables to be used. Each column refers to a range of 10° of LHA. The value a0 is taken with mental interpolation (taking into account the fractional part of LHA Aries), from the upper table with the units of LHA Aries in degrees as argument. The values of a1 and a2 are taken, without interpolation, from the second and third table with arguments Latitude and Month respectively. The correction terms a0, a1 and a2 are always positive. The final table gives the Azimuth of Polaris.

