Using the Dark Times Calendars

Purpose

My main reason for creating the Dark Times Calendars was to show, in advance, the best times for deep space astronomical observing. If I want to plan a family vacation that isn't going to include astronomy, I'd generally prefer to go at a time when I can't do deep sky observing anyway. If I were planning an astronomy trip however, I might want to know several months in advance when a good time to take such a trip might be.

Perhaps the biggest difference between a Dark Times Calendar and an ordinary calendar is that the 24 hour period we call a "day" is separated at noon instead of at midnight. Each *night* of the calendar, therefore, is shown on a single row. If we don't separate the "days" this way, some things can be particularly confusing. For instance, you hear that there will be a big meteor shower on the 18th of November. Should you get up early on the 18th or stay up late on the 18th to see it? Being wrong could mean you'll miss the meteor shower altogether.

What the Calendar Shows

Basically, the events section of the calendar is meant to show when events (like that big meteor shower) will occur. Essentially, the left side of the calendar shows when the sky will be …umm…, dark. By dark, I don't mean it will just be night time. I mean that the Moon will not be in the sky and the time of the night is between evening astronomical twilight and morning astronomical twilight. These Dark Times are the best times to view or photograph faint deep space objects. The shaded areas of the calendar show these Dark Times at a glance.

The Details

The left-most column shows the day of the week. The second column shows the date for that particular day, err night! The third column shows when astronomical twilight ends for that date. (It is best to have your scope setup and ready to go by this time!) The fourth column gives the time of night during the PM hours that the Moon will either rise or set. The fifth column gives the time of night during the AM hours that the Moon will either rise or set. The sixth column gives the time that morning astronomical twilight will begin. The seventh column gives the new date, which changes after midnight. The eighth column gives the new day of the week, abbreviated to three letters.

If the Moon is rising, the time given will have an "R" in front of it. Likewise, if the Moon is setting, the number will have an "S" in front of it. The number gives the time for the event where the right-most two digits are the minutes and any digits left of the right two are the hours in twelve-hour format.

When there is a row that is completely shaded and no Moon rise or setting times are listed, the Moon will not be in the sky during the hours between evening twilight and morning twilight. These are the best times for long observing marathons! If the row is not shaded and there are no times listed, the Moon will be in the sky the entire night! These are the worst times for deep space observing. (Take your non-astronomy vacations during these times.)

Deep Space Objects

Culmination times are given in the "Events" section for many deep space objects. An object "culminates" when it crosses the meridian. The meridian is an imaginary line connecting the North Pole, the zenith, and the South Pole. An object is highest in the sky when it culminates and this is therefore typically the best time to view it.

It is important to note here that all deep space objects culminate every day of the year. Sometimes these culmination times occur during the daytime or at poor times for observation. For instance, June is a pretty bad month to observe the Orion Nebula because it culminates during daylight hours. Deep space objects can be observed at times and dates other than the dates they are listed on. For each day prior to the day the object is listed, it will culminate approximately 4 minutes later. For each day after the object is listed, it will culminate approximately 4 minutes earlier than the time listed. For each month prior to the date the object is listed, the culmination time will be approximately 2 hours later, and for each month after, approximately 2 hours earlier.

If you are considering observing an object listed on the current date, and it hasn't yet culminated, it will be located approximately 15 degrees east of the meridian for each hour prior to the given culmination time. (The 15 degrees applies to objects near the equator. For objects near the poles, the angular distance will be much smaller.) Likewise, if the current time is past the culmination time, the object will be 15 degrees west of the meridian for each hour.

The listing of a deep space object on a particular date was chosen because the culmination time came close to the middle of the available dark time for that night. The selection of the objects is somewhat arbitrary, but they are listed on dates and times that should be good times for observing them.

Deep space objects with "M" numbers come from the Messier list. Deep space objects with "NGC" numbers come from the Herschel 400 list. (The entire NGC list has over 7000 objects and the Herschel 400 is a subset of that list.) Some objects are on both the Messier list and the Herschel 400 list. Those objects are listed with their "M" number.

Comets

David H. Levy has been quoted as saying "Comets are like cats; they have tails, and they do precisely what they want." With that in mind, it is important to note that the only information about a comet that can be accurately predicted is where it will be. Even then, some comets disintegrate when they pass close to the Sun and any prediction for a time after that is obviously of no use. All brightness estimates are predictions and there is no way to know if these predictions will come true. The predictions here were obtained from orbital elements available on November 19, 2016.

Asteroids

Sometimes asteroids are listed as being within a certain distance from a deep space object. Asteroids are shown with the designated number of the asteroid in parenthesis followed by the name of the asteroid. Since asteroids move through space, the notation of the asteroid is only valid for the date shown. It is a chance alignment for that specific date.

Data Sources

Culmination times come from "Cartes du Ciel" astronomy simulation software. Moon rise and set times as well as astronomical twilight times come from the US Naval Observatory website. I have converted the times to twelve hour format and applied Daylight Savings Time when appropriate.

All times shown for the Moon and astronomical twilight are accurate for Wilmot, Ohio. I wouldn't expect an error of more than 10 minutes for any location within Ohio. The calendar can be used outside of Ohio with proper consideration for changes due to local time zones and location within those time zones.

Clear, and dark, skies!

Phil

Dark Times January 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Sunday	1	649	S 846		612	2	Mon	Mars 28' from Neptune at sunset.
Monday	2	649	S 948		613	3	Tue	Moon sets in conjunction with Mars & Neptune; Quandrantids meteor shower peaks.
Tuesday	3	650	S 1052		613	4	Wed	Comet 45P/Honda-Mrkos-Pajdusakova predicted magnitude: 7.1 (evening sky).
Wednesday	4	651	S 1158		613	5	Thu	NGC2903 (galaxy/Leo) culminates at 2:59 AM (contains NGC 2905; 41' to NGC 2916, 2 asteroids w/in 30')
Thursday	5	652		S 104	613	6	Fri	NGC2974 (galaxy/Sextans) culminates at 3:06 AM
Friday	6	653		S 213	613	7	Sat	WCAC public night; NGC3432 (galaxy/Leo Minor) culminates at 4:12 AM
Saturday	7	654		S 323	613	8	Sun	Mercury, in Sagittarius, rises 6:20 AM; culminates 11:08 AM; sets 4:00 PM
Sunday	8	654		S 432	613	9	Mon	Venus, in Aquarius, rises 10:15 AM; culminates 3:44 PM; sets 9:12 PM
Monday	9	655		S 540	613	10	Tue	Mars, in Aquarius, rises 10:35 AM; culminates 4:19 PM; sets 10:01 PM
Tuesday	10	656			613	11	Wed	Jupiter, in Virgo, rises 12:52 AM; culminates 6:29 AM; sets 12:10 PM
Wednesday	11	657			612	12	Thu	**Full Moon**; Venus at greatest eastern elongation; Venus 22' from Neptune.
Thursday	12	658			612	13	Fri	Saturn, in Ophiuchus, R 5:41 AM; C 10:22 AM; S 3:07 PM
Friday	13	659	R 704		612	14	Sat	Uranus, in Pisces, rises 11:38 AM; culminates 6:09 PM; sets 12:37 AM
Saturday	14	700	R 810		612	15	Sun	Neptune, in Aquarius, rises 10:00 AM; culminates 3:36 PM; sets 9:09 PM
Sunday	15	701	R 914		611	16	Mon	Pluto, in Sagittarius, rises 7:12 AM; culminates 11:57 AM; sets 4:44 PM
Monday	16	702	R 1016		611	17	Tue	NGC1501 (planetary nebula/Camelopardalis) culminates 8:51 PM.
Tuesday	17	703	R 1116		611	18	Wed	NGC1545 (open cluster/Perseus) culminates at 9:01 PM
Wednesday	18	704		R 14	610	19	Thu	Mercury at Greatest Western Elongation
Thursday	19	705		R 111	610	20	Fri	NGC2024 (bright nebula/Orion) culminates at 10:10 PM (Flame Nebula)
Friday	20	706		R 207	610	21	Sat	NGC2186 (open cluster/Orion) culminates at 10:37 PM
Saturday	21	707		R 303	609	22	Sun	M41 (open cluster/Canis Major) culminates at 11:06 PM
Sunday	22	708		R 357	609	23	Mon	NGC2355 (open cluster/Gemini) culminates at 11:34 PM
Monday	23	709		R 450	608	24	Tue	M93 (open cluster/Puppis) culminates at 12:01 AM
Tuesday	24	710		R 542	607	25	Wed	Moon rises 1° from M25.
Wednesday	25	711			607	26	Thu	NGC2613 (galaxy/Pyxis) culminates at 12:38 AM
Thursday	26	712			606	27	Fri	M44 (open cluster/Cancer) culminates at 12:41 AM (Praesepe, Beehive Cluster)
Friday	27	713			605	28	Sat	WCAC meeting; **New Moon**
Saturday	28	714			605	29	Sun	M67 (open cluster/Cancer) culminates at 12:44 AM
Sunday	29	715	S 740		604	30	Mon	NGC2742 (galaxy/Ursa Major) culminates at 12:56 AM (AKA NGC 2816, 40' to NGC 2768)
Monday	30	716	S 845		603	31	Tue	NGC2950 (galaxy/Ursa Major) culminates at 1:27 AM
Tuesday	31	717	S 950		602	1	Wed	NGC3147 (galaxy/Draco) culminates at 1:57 AM

Dark Times February 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Wednesday	1	718	S 1057		602	2	Thu	NGC3432 (galaxy/Leo Minor) culminates at 2:29 AM
Thursday	2	720		S 4	601	3	Fri	NGC3726 (galaxy/Ursa Major) culminates at 3:06 AM
Friday	3	721		S 112	600	4	Sat	WCAC public night; NGC4111 (galaxy/Canes Venatici) C. at 3:36 AM (4 other galaxies w/in 13')
Saturday	4	722		S 220	559	5	Sun	Comet 45P/Honda-Mrkos-Pajdusakova predicted magnitude: 7.8 (morning sky).
Sunday	5	723		S 326	558	6	Mon	Mercury 43' from M75 at Sunrise.
Monday	6	724		S 429	557	7	Tue	Mercury, in Sagittarius, R 6:41 AM; C 11:26 AM; S 4:09 PM; Mercury at Superior Conjunction
Tuesday	7	725		S 527	556	8	Wed	Venus, in Pisces, rises 9:03 AM; culminates 3:21 PM; sets 9:38 PM
Wednesday	8	726			555	9	Thu	Mars, in Pisces, rises 9:27 AM; culminates 3:42 PM; sets 9:56 PM
Thursday	9	727			554	10	Fri	Jupiter, in Virgo, rises 10:56 PM; culminates 4:32 AM; sets 10:07 AM
Friday	10	728			553	11	Sat	**Full Moon**; Penumbral Lunar Eclipse
Saturday	11	729			552	12	Sun	Saturn, in Ophiuchus, rises 3:55 AM; culminates 8:36 AM; sets 1:21 PM
Sunday	12	730	R 758		551	13	Mon	Uranus, in Pisces, rises 9:42 AM; culminates 4:14 PM; sets 10:43 PM
Monday	13	731	R 900		550	14	Tue	Neptune, in Aquarius, rises 8:05 AM; culminates 1:42 PM; sets 7:16 PM
Tuesday	14	733	R 1000		548	15	Wed	Pluto, in Sagittarius, rises 5:18 AM; culminates 10:03 AM; sets 2:51 PM
Wednesday	15	734	R 1058		547	16	Thu	Comet C/2015 V2 (Johnson) predicted magnitude: 9.8 (rises 8:32 PM).
Thursday	16	735	R 1156		546	17	Fri	NGC2343 (open cluster/Monoceros) culminates at 9:46 PM (O.C. CR465 & CR466 w/in 17')
Friday	17	736		R 52	545	18	Sat	M46 (open cluster/Puppis) culminates at 10:16 PM (PN NGC2438 superimposed, PN PK 231+4.1 28' N)
Saturday	18	737		R 147	543	19	Sun	M48 (open cluster/Hydra) culminates at 10:44 PM
Sunday	19	738		R 240	542	20	Mon	Moon 26' from M9 at beginning of morning twilight.
Monday	20	739		R 332	541	21	Tue	Comet 2P/Encke predicted magnitude: 7.6 (evening sky).
Tuesday	21	740		R 421	539	22	Wed	NGC2964 (galaxy/Leo) culminates at 12:01 AM (NGC2968 & 2970 w/in 11', (1022) Olypiada 33' away)
Wednesday	22	741		R 507	538	23	Thu	NGC3166 (galaxy/Sextans) culminates at 12:28 AM (NGC 3169, 3165, 3156 w/in 25').
Thursday	23	742			537	24	Fri	Pluto rises at 4:44 AM 4.6' from comet 73P/Schwassmann-Wachmann (est. to be mag. 12.3)
Friday	24	744			535	25	Sat	WCAC meeting; Comet 2P/Encke predicted magnitude: 6.5 (evening sky).
Saturday	25	745			534	26	Sun	**New Moon**; Mars < 0.6° from Uranus; Annular solar eclipse visible from S. America & Africa
Sunday	26	746			532	27	Mon	Mars and Uranus 34' apart at end of evening twilight.
Monday	27	747			531	28	Tue	Comet C/2015 V2 (Johnson) predicted magnitude: 9.5 (rises 7:49 PM).
Tuesday	28	748	S 846		529	1	Wed	NGC3608 (galaxy/Leo) culminates at 1:08 AM (NGC3607, 3605, 3599 w/in 23', NGC3626 w/in 46')

Dark Times March 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Wednesday	1	749	S 955		528	2	Thu	Neptune in Conjunction with Sun
Thursday	2	750	S 1104		526	3	Fri	Comet 41P/Tuttle-Giacobini-Kresak predicted magnitude: 9.7 (all night).
Friday	3	751		S 12	525	4	Sat	WCAC public night; NGC5005 (galaxy/Canes Venatici) C. at 2:49 AM (NGC4893A, 5002, 5033 w/in 42')
Saturday	4	752		S 119	523	5	Sun	Moon occults Aldebaran.
Sunday	5	754		S 222	522	6	Mon	Comet C/2015 V2 (Johnson) predicted magnitude: 9.3 (rises 7:12 PM).
Monday	6	755		S 321	520	7	Tue	NGC5746 (galaxy/Virgo) culminates at 4:11 AM (17' to NGC 5740, 26' to NGC 5738)
Tuesday	7	756		S 413	518	8	Wed	Mercury, in Aquarius, rises 7:01 AM; culminates 12:42 PM; sets 6:25 PM
Wednesday	8	757		S 459	517	9	Thu	Venus, in Pisces, rises 7:06 AM; culminates 1:55 PM; sets 8:39 PM; Mercury 2° from 2P/Enke at sunset
Thursday	9	758			515	10	Fri	Mars, in Aries, rises 8:21 AM; culminates 3:07 PM; sets 9:50 PM
Friday	10	759			513	11	Sat	Jupiter, in Virgo, rises 8:54 PM; culminates 2:32 AM; sets 8:10 AM
Saturday	11	800			612	12	Sun	**Daylight Savings Time begins; Full Moon**
Sunday	12	902			610	13	Mon	Saturn, in Sagittarius, rises 3:09 AM; culminates 7:50 AM; sets 12:34 PM
Monday	13	903			608	14	Tue	Uranus, in Pisces, rises 8:50 AM; culminates 3:25 PM; sets 9:56 PM
Tuesday	14	904	R 945		607	15	Wed	Neptune, in Aquarius, rises 7:13 AM; culminates 12:52 PM; sets 6:27 PM
Wednesday	15	905	R 1044		605	16	Thu	Pluto, in Sagittarius, rises 4:26 AM; culminates 9:11 AM; sets 2:00 PM
Thursday	16	906	R 1141		603	17	Fri	Comet C/2015 V2 (Johnson) predicted magnitude: 9.0 (all night).
Friday	17	907		R 36	601	18	Sat	NGC2775 (galaxy/) culminates at 10:54 PM (NGC2777, 2773 w/in 12')
Saturday	18	908		R 131	600	19	Sun	NGC2976 (galaxy/Ursa Major) culminates at 11:31 PM
Sunday	19	910		R 223	558	20	Mon	Spring Equinox
Monday	20	911		R 313	556	21	Tue	NGC3344 (galaxy/Leo Minor) culminates at 12:16 AM (57' to NGC3323)
Tuesday	21	912		R 400	554	22	Wed	Comet 41P/Tuttle-Giacobini-Kresak predicted magnitude: 7.6 (circumpolar).
Wednesday	22	913		R 443	553	23	Thu	NGC3729 (galaxy/Ursa Major) culminates at 12:57 AM (NGC 3718 11' away)
Thursday	23	914		R 524	551	24	Fri	Comet C/2015 V2 (Johnson) predicted magnitude: 8.7 (all night).
Friday	24	916			549	25	Sat	Venus in Conjunction with Sun
Saturday	25	917			547	26	Sun	NGC4293 (galaxy/Coma Berenices) culminates at 1:33 AM
Sunday	26	918			545	27	Mon	NGC4361 (planetary nebula/Corvus) culminates at 1:33 AM
Monday	27	919			543	28	Tue	**New Moon**
Tuesday	28	921			542	29	Wed	M88 (galaxy/Coma Berenices) culminates at 1:32 AM (6 other galaxies w/in 1º)
Wednesday	29	922	S 949		540	30	Thu	NGC4699 (galaxy/Virgo) culminates at 1:45 AM (NGC4703, 4739, 4674 w/in 43', 26' to (2477)Biryukov)
Thursday	30	923	S 1100		538	31	Fri	M51 (galaxy/Canes Venatici) culminates at 2:22 AM (NGC 5169, 5198, 5173 w/in 40')
Friday	31	924		S 100	536	1	Sat	WCAC meeting; Mercury at greatest eastern elongation.

Dark Times April 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Saturday	1	926		S 116	534	2	Sun	Comet C/2015 V2 (Johnson) predicted magnitude: 8.4 (all night).
Sunday	2	927		S 217	532	3	Mon	NGC5907 (galaxy/Draco) culminates at 3:55 AM (NGC5866B, 5905, 5908 w/in 56')
Monday	3	928		S 311	530	4	Tue	NGC5982 (galaxy/Draco) culminates at 4:14 AM (NGC5976, 5976A, 5981, 5985, 5989 w/in 33')
Tuesday	4	930		S 359	528	5	Wed	M80 (globular cluster/Scorpius) culminates at 4:49 AM
Wednesday	5	931		S 441	527	6	Thu	Comet 41P/Tuttle-Giacobini-Kresak predicted magnitude: 6.7 (circumpolar).
Thursday	6	932		S 518	525	7	Fri	Mercury, in Aries, rises 7:27 AM; culminates 2:29 PM; sets 9:29 PM
Friday	7	934			523	8	Sat	WCAC public night; Venus, in Pisces, rises 5:43 AM; culminates 12:05 PM; sets 6:24 PM
Saturday	8	935			521	9	Sun	Mars, in Aries, rises 8:20 AM; culminates 3:32 PM; sets 10:42 PM
Sunday	9	936			519	10	Mon	Jupiter, in Virgo, rises 7:38 PM; culminates 1:21 AM; sets 7:03 AM
Monday	10	938			517	11	Tue	**Full Moon**
Tuesday	11	939			515	12	Wed	Saturn, in Sagittarius, rises 1:13 AM; culminates 5:54 AM; sets 10:35 AM
Wednesday	12	940			513	13	Thu	Uranus, in Pisces, rises 6:56 AM; culminates 1:33 AM; sets 8:06 PM
Thursday	13	942	R 1028		511	14	Fri	Neptune, in Aquarius, rises 5:18 AM; culminates 10:54 AM; sets 4:34 PM; Uranus in conjunction with Sun.
Friday	14	943	R 1123		509	15	Sat	Pluto, in Sagittarius, rises 2:30 AM; culminates 7:15 AM; sets 12:03 PM
Saturday	15	945		R 16	508	16	Sun	Comet C/2015 V2 (Johnson) predicted magnitude: 8.0 (all night).
Sunday	16	946		R 107	506	17	Mon	Moon 1° from M24
Monday	17	948		R 154	504	18	Tue	NGC4147 (globular cluster/Coma Berenices) C. at 11:52 PM (NGC4110, 4155, UGC7170 w/in 43')
Tuesday	18	949		R 238	502	19	Wed	M90 (galaxy/Virgo) culminates at 12:14 AM (IC3583, NGC4584, 4531 w/in 37')
Wednesday	19	950		R 319	500	20	Thu	Mercury in conjunction with Sun
Thursday	20	952		R 357	458	21	Fri	NGC5054 (galaxy/Virgo) culminates at 12:47 AM (7 other NGC galaxies w/in 46' to the NW)
Friday	21	953		R 433	456	22	Sat	Lyrid meteor shower peaks.
Saturday	22	955			455	23	Sun	Comet 41P/Tuttle-Giacobini-Kresak predicted magnitude: 7.0 (circumpolar).
Sunday	23	956			453	24	Mon	Comet C/2015 V2 (Johnson) predicted magnitude: 7.7 (all night).
Monday	24	958			451	25	Tue	NGC5557 (galaxy/Bootes) culminates at 1:32 AM (NGC5545, 5544, 5529, 5572, 5527 w/in 48')
Tuesday	25	959			449	26	Wed	**New Moon**
Wednesday	26	1001			447	27	Thu	NGC5566 (galaxy/Virgo) C. at 1:26 AM (paired w/ NGC 5569, 5560; 43' to NGC 5574, 5576, 5577)
Thursday	27	1002			445	28	Fri	Mercury and Uranus < 6' apart.
Friday	28	1004	S 1102		444	29	Sat	WCAC meeting; M102 (galaxy/Draco) culminates at 2:03 AM (NGC 5866A, 5867, 5862, 5826 < 17' away)
Saturday	29	1005		S 8	442	30	Sun	Comet 41P/Tuttle-Giacobini-Kresak predicted magnitude: 7.4 (all night).
Sunday	30	1007		S 107	440	1	Mon	Comet C/2015 V2 (Johnson) predicted magnitude: 7.5 (all night).

Dark Times May 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Monday	1	1008		S 158	438	2	Tue	NGC6217 (galaxy/Ursa Minor) culminates at 3:16 AM
Tuesday	2	1010		S 242	437	3	Wed	M10 (globular cluster/Ophiuchus) culminates at 3:39 AM
Wednesday	3	1012		S 321	435	4	Thu	NGC6342 (globular cluster/Ophiuchus) culminates at 3:59 AM (B259 20' away, (4286) Rubstov w/in 24')
Thursday	4	1013		S 355	433	5	Fri	Eta-Aquarid Meteor Shower peaks
Friday	5	1015		S 426	431	6	Sat	WCAC public night;
Saturday	6	1016			430	7	Sun	Mercury, in Pisces, rises 5:33 AM; culminates 12:00 PM; sets 6:30 PM
Sunday	7	1018			428	8	Mon	Venus, in Pisces, rises 4:30 AM; culminates 10:41 AM; sets 4:52 PM
Monday	8	1019			426	9	Tue	Mars, in Taurus, rises 7:31 AM; culminates 3:01 PM; sets 10:29 PM
Tuesday	9	1021			425	10	Wed	Jupiter, in Virgo, rises 5:23 PM; culminates 11:10 PM; sets 4:57 AM
Wednesday	10	1022			423	11	Thu	**Full Moon**
Thursday	11	1024			422	12	Fri	Saturn, in Sagittarius, rises 11:10 PM; culminates 3:56 AM; sets 8:37 AM
Friday	12	1025			420	13	Sat	Uranus, in Pisces, rises 5:03 AM; culminates 11:38 AM; sets 6:17 PM
Saturday	13	1027	R 1103		418	14	Sun	Neptune, in Aquarius, rises 3:22 AM; culminates 8:59 AM; sets 2:40 PM
Sunday	14	1029	R 1151		417	15	Mon	Pluto, in Sagittarius, rises 12:31 AM; culminates 5:16 AM; sets 10:01 AM
Monday	15	1030		R 36	415	16	Tue	M3 (globular cluster/Canes Venatici) culminates at 11:33 PM (30' to NGC 5263)
Tuesday	16	1032		R 118	414	17	Wed	Mars sets within open clusters NGC1746 & NGC1758
Wednesday	17	1033		R 156	413	18	Thu	Mercury at greatest western elongation
Thursday	18	1035		R 232	411	19	Fri	NGC5694 (globular cluster/Hydra) culminates at 12:23 AM
Friday	19	1036		R 306	410	20	Sat	Comet 41P/Tuttle-Giacobini-Kresak predicted magnitude: 9.3 (rises 8:06 PM).
Saturday	20	1038		R 339	409	21	Sun	Calhoun Star Gaze May 19 - May 21
Sunday	21	1039			407	22	Mon	Comet C/2015 V2 (Johnson) predicted magnitude: 7.0 (all night).
Monday	22	1040			406	23	Tue	NGC6118 (galaxy/Serpens Caput) culminates at 1:45AM
Tuesday	23	1042			405	24	Wed	M4 (globular cluster/Scorpius) culminates at 1:43 AM
Wednesday	24	1043			404	25	Thu	NGC6144 (globular cluster/Scorpius) C. at 1:43 AM (58' to M4, (2004)Lexell & (1149)Volga w/in 27')
Thursday	25	1045			402	26	Fri	**New Moon**
Friday	26	1046			401	27	Sat	WCAC meeting; Comet C/2015 V2 (Johnson) predicted magnitude: 6.9 (all night).
Saturday	27	1047	S 1053		400	28	Sun	M107 (globular cluster/Ophiuchus) culminates at 1:36 AM ((4513)Louvre & (799)Gudula w/in 49')
Sunday	28	1049	S 1150		359	29	Mon	NGC6235 (globular cluster/Ophiuchus) C. at 1:53 AM ((3418)Izvekov & (3143)Genecampbell w/in 41')
Monday	29	1050		S 39	358	30	Tue	NGC6356 (globular cluster/Ophiuchus) culminates at 2:19 AM
Tuesday	30	1051		S 121	357	31	Wed	NGC6440 (globular cluster/Sagittarius) culminates at 2:41 AM (22' to PN NGC 6445)
Wednesday	31	1052		S 158	356	1	Thu	NGC6553 (globular cluster/Sagittarius) culminates at 2:57 AM ((959Ame & (3991)Basilevsky w/in 25')

Dark Times June 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Thursday	1	1053		S 230	356	2	Fri	NGC6638 (globular cluster/Sagittarius) culminates at 3:15 AM (49’ to (4942)Munroe).
Friday	2	1055		S 301	355	3	Sat	WCAC public night; Venus at greatest western elongation.
Saturday	3	1056		S 330	354	4	Sun	Comet C/2015 V2 (Johnson) predicted magnitude: 6.8 (all night).
Sunday	4	1057			353	5	Mon	Mercury, in Taurus, rises 5:04 AM; culminates 12:10 PM; sets 7:18 PM
Monday	5	1058			353	6	Tue	Venus, in Pisces, rises 3:47 AM; culminates 10:22 AM; sets 4:57 PM
Tuesday	6	1059			352	7	Wed	Mars, in Gemini, rises 6:55 AM; culminates 2:31 PM; sets 10:06 PM; Mars sets within M35.
Wednesday	7	1100			352	8	Thu	Jupiter, in Virgo, rises 3:23 PM; culminates 9:11 PM; sets 2:59 AM
Thursday	8	1100			351	9	Fri	**Full Moon**
Friday	9	1101			351	10	Sat	Saturn, Ophiuchus, rises 9:08 PM; culminates 1:49 AM; sets 6:31 AM
Saturday	10	1102			350	11	Sun	Uranus, in Pisces, rises 3:12 AM; culminates 9:49 AM; sets 4:29 PM
Sunday	11	1103			350	12	Mon	Neptune, in Aquarius, rises 1:29 AM; culminates 7:06 AM; sets 12:48 PM
Monday	12	1104	R 1119		350	13	Tue	Pluto, in Sagittarius, rises 10:36 PM; culminates 3:20 AM; sets 8:04 AM
Tuesday	13	1104	R 1158		349	14	Wed	NGC5897 (globular cluster/Libra) culminates at 11:15 PM
Wednesday	14	1105		R 34	349	15	Thu	Saturn at opposition.
Thursday	15	1105		R 108	349	16	Fri	M13 (globular cluster/Hercules) culminates at 12:30 AM (28’ to NGC6207, 52' to NGC6196)
Friday	16	1106		R 140	349	17	Sat	Comet C/2015 V2 (Johnson) predicted magnitude: 6.8 (all night).
Saturday	17	1106		R 212	349	18	Sun	M62 (globular cluster/Ophiuchus) culminates at 12:42 AM
Sunday	18	1107		R 246	349	19	Mon	M9 (globular cluster/Ophiuchus) culminates at 12:56 AM (27’ to (1577)Reiss, 46’ to (983)Gunila)
Monday	19	1107		R 322	349	20	Tue	M6 (open cluster/Scorpius) culminates at 1:14 AM (52' to NGC6416, 45' to Tr28)
Tuesday	20	1107			350	21	Wed	Summer Solstice; Mercury in conjunction with Sun
Wednesday	21	1107			350	22	Thu	M21 (open cluster/Sagittarius) C. at 1:29 AM (36’ to M20, (3311)Podobed & (1078)Mnetha w/in 29’)
Thursday	22	1107			350	23	Fri	Registration desk for Cheery Springs Star Party opens.
Friday	23	1107			351	24	Sat	**New Moon**; Comet C/2015 V2 (Johnson) predicted magnitude: 7.0 (sets 3:31 AM).
Saturday	24	1108			351	25	Sun	M16(nebula & open cluster/Serpens Caput) culminates at 1:36AM (35’ to Tr32)
Sunday	25	1107			351	26	Mon	M17(nebula & open cluster/Sagittarius) culminates at 1:30 AM (59’ to M18)
Monday	26	1107	S 1116		352	27	Tue	NGC6633 (open cluster/Ophiuchus) culminates at 1:33 AM
Tuesday	27	1107	S 1156		353	28	Wed	M 57(planetary nebula/Lyra) culminates at 1:55 AM
Wednesday	28	1107		S 31	353	29	Thu	Mercury < 1° from Mars at Sunset.
Thursday	29	1107		S 103	354	30	Fri	Moon occults Gamma Virginis (Porrima)
Friday	30	1106		S 133	355	1	Sat	WCAC meeting; Comet C/2015 V2 (Johnson) predicted magnitude: 7.1 (sets 2:37 AM).

Dark Times July 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Saturday	1	1106		S 203	355	2	Sun	NGC6885 (open cluster/Vulpecula) culminates at 2:57 AM (11' to NGC6882)
Sunday	2	1106		S 233	356	3	Mon	NGC6934 (globular cluster/Delphinus) culminates at 3:16 AM
Monday	3	1105		S 304	357	4	Tue	
Tuesday	4	1104		S 338	358	5	Wed	Mercury, in Gemini, rises 7:13 AM; culminates 2:35 PM; sets 10:03 PM
Wednesday	5	1104			359	6	Thu	Venus, in Taurus, rises 3:20 AM; culminates 10:28 AM; sets 5:36 PM
Thursday	6	1103			400	7	Fri	Mars, in Gemini, rises 6:30 AM; culminates 1:59 PM; sets 9:27 PM
Friday	7	1103			401	8	Sat	WCAC public night; Jupiter, in Virgo, rises 1:31 PM; culminates 7:17 PM; sets 1:04 AM
Saturday	8	1102			402	9	Sun	**Full Moon**
Sunday	9	1101			403	10	Mon	Saturn, Ophiuchus, R 7:01 PM; C 11:42 PM; S 4:24 AM; Mercury within the Beehive cluster.
Monday	10	1100			404	11	Tue	Uranus, in Pisces, rises 1:16 AM; culminates 7:54 AM; sets 2:36 PM; Pluto 30**"** from HD180332
Tuesday	11	1059			406	12	Wed	Neptune, in Aquarius, rises 11:30 PM; culminates 5:08 AM; sets 10:45 AM
Wednesday	12	1058	R 1111		407	13	Thu	Pluto, in Sagittarius, rises 8:35 PM; culminates 1:23 AM; sets 6:07 AM
Thursday	13	1057	R 1143		408	14	Fri	Comet C/2015 V2 (Johnson) predicted magnitude: 7.5 (sets 1:04 AM).
Friday	14	1056		R 15	409	15	Sat	NGC6426 (globular cluster/Ophiuchus) culminates at 11:40 PM
Saturday	15	1055		R 47	410	16	Sun	NGC6517 (globular cluster/Ophiuchus) culminates at 11:53 PM
Sunday	16	1054		R 121	412	17	Mon	NGC6624 (globular cluster/Sagittarius) culminates at 12:11 AM
Monday	17	1053		R 158	413	18	Tue	M70 (globular cluster/Sagittarius) culminates at 12:26 AM (44' to (860)Ursina)
Tuesday	18	1052		R 239	414	19	Wed	NGC6755 (open cluster/Aquila) culminates at 12:47 AM (30' to OC NGC 6756)
Wednesday	19	1050		R 327	416	20	Thu	NGC6802 (open cluster/Vulpecula) culminates at 1:05 AM (1º to CR 399 very large OC)
Thursday	20	1049			417	21	Fri	NGC6866 (open cluster/Cygnus) culminates at 1:34 AM
Friday	21	1048			419	22	Sat	Comet C/2015 V2 (Johnson) predicted magnitude: 7.8 (sets 12:14 AM).
Saturday	22	1046			420	23	Sun	**New Moon;** Almost Heaven Star Party 7/22-25.
Sunday	23	1045			422	24	Mon	NGC6905 (planetary nebula/Delphinus) culminates at 1:41 AM
Monday	24	1044			423	25	Tue	NGC6910 (open cluster/Cygnus) culminates at 1:38 AM
Tuesday	25	1042			424	26	Wed	M29 (open cluster/Cygnus) culminates at 1:35 AM
Wednesday	26	1041	S 1102		426	27	Thu	Mars in conjunction with Sun
Thursday	27	1039	S 1134		427	28	Fri	Delta-Aquarid Meteor Shower peaks.
Friday	28	1038		S 4	429	29	Sat	WCAC meeting; NGC7044 (open cluster/Cygnus) culminates at 2:12 AM
Saturday	29	1036		S 34	430	30	Sun	Mercury at greatest eastern elongation.
Sunday	30	1035		S 105	432	31	Mon	NGC7160 (open cluster/Cepheus) culminates at 2:44 AM
Monday	31	1033		S 138	433	1	Tue	NGC7243 (open cluster/Lacerta) culminates at 3:01 AM

Dark Times August 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Tuesday	1	1031		S 215	435	2	Wed	NGC7380 (open cluster with nebula/Cepheus) culminates at 3:30 AM (40' to King 18)
Wednesday	2	1030		S 254	436	3	Thu	Mercury, in Leo, rises 8:47 AM; culminates 3:14 PM; sets 9:40 PM
Thursday	3	1028		S 339	438	4	Fri	Venus, in Gemini, rises 3:28 AM; culminates 10:53 AM; sets 6:17 PM
Friday	4	1026		S 427	439	5	Sat	WCAC public night; Mars, in Cancer, rises 6:11 AM; culminates 1:23 PM; sets 8:34 PM
Saturday	5	1025			441	6	Sun	Jupiter, in Virgo, rises 11:50 AM; culminates 5:35 PM; sets 11:17 PM
Sunday	6	1023			442	7	Mon	**Full Moon**
Monday	7	1021			444	8	Tue	Saturn, Ophiuchus, rises 5:01 PM; culminates 9:43 AM; sets 2:24 AM
Tuesday	8	1019			445	9	Wed	Uranus, in Pisces, rises 11:23 PM; culminates 6:01 AM; sets 12:43 PM
Wednesday	9	1018			447	10	Thu	Neptune, in Aquarius, rises 9:35 PM; culminates 3:11 AM; sets 8:48 AM
Thursday	10	1016	R 1019		448	11	Fri	Pluto, in Sagittarius, rises 6:39 PM; culminates 11:22 PM; sets 4:05 AM
Friday	11	1014	R 1051		450	12	Sat	
Saturday	12	1012	R 1123		451	13	Sun	Perseid meteor shower peaks
Sunday	13	1010	R 1159		453	14	Mon	NGC6756 (open cluster/Aquila) culminates at 11:05 PM (29' to NGC6755)
Monday	14	1009		R 37	454	15	Tue	M55 (globular cluster/Sagittarius) culminates at 11:33 PM
Tuesday	15	1007		R 121	456	16	Wed	Moon rises ~ 1/2° from Aldebaran
Wednesday	16	1005		R 211	457	17	Thu	NGC6939 (open cluster/Cepheus) culminates at 12:15 AM
Thursday	17	1003		R 308	458	18	Fri	NGC7000 (nebula/Cygnus) culminates at 12:42 AM (North American Nebula)
Friday	18	1001		R 411	500	19	Sat	NGC7086 (open cluster/Cygnus) culminates at 1:06 AM
Saturday	19	959			501	20	Sun	NGC7209 (open cluster/Lacerta) culminates at 1:37 AM (48' to UGC11909)
Sunday	20	957			503	21	Mon	NGC7217 (galaxy/Pegasus) culminates at 1:36 AM
Monday	21	956			504	22	Tue	**New Moon; TOTAL SOLAR ECLIPSE**
Tuesday	22	954			505	23	Wed	NGC7296 (open cluster/Lacerta) culminates at 1:48 AM
Wednesday	23	952			507	24	Thu	NGC7331 (galaxy/Pegasus) C. at 1:54 AM (Large galaxy with smaller ones, 30' to Stephen's Quintet)
Thursday	24	950	S 1003		508	25	Fri	NGC7448 (galaxy/Pegasus) culminates at 2:13 AM (6 galaxies < 34' away)
Friday	25	948	S 1033		509	26	Sat	WCAC meeting; NGC7479 (galaxy/Pegasus) culminates at 2:14 AM
Saturday	26	946	S 1104		511	27	Sun	Mercury in conjunction with Sun
Sunday	27	944	S 1137		512	28	Mon	M52 (open cluster/Cassiopeia) culminates at 2:24 AM (20' to Czernik 43, 37' to NGC7635)
Monday	28	942		S 12	513	29	Tue	NGC7727 (galaxy/Aquarius) culminates at 2:37 AM (13' to NGC7724, 42' to NGC7723)
Tuesday	29	940		S 51	515	30	Wed	NGC40 (planetary nebula/Cepheus) culminates at 3:05 AM
Wednesday	30	938		S 133	516	31	Thu	Pluto 3' from 6.4 magnitude HD179201
Thursday	31	936		S 220	517	1	Fri	NGC381 (open cluster/Cassiopeia) culminates at 3:53 AM (NGC358, 366 & Stock 3 w/in 48')

Dark Times September 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Friday	1	934		S 311	519	2	Sat	WCAC public night; Mercury, in Leo, rises 6:05 AM; culminates 12:45 PM; sets 7:18 PM
Saturday	2	933		S 406	520	3	Sun	Venus, in Cancer, rises 4:17 AM; culminates 11:25 AM; sets 6:33 PM
Sunday	3	931		S 505	521	4	Mon	Mars, in Leo, rises 5:51 AM; culminates 12:40 PM; sets 7:29 PM
Monday	4	929			522	5	Tue	Jupiter, in Virgo, R 10:17 AM; C 3:56 PM; S 9:31 PM; Neptune at opposition; Mars 42' from Regulus.
Tuesday	5	927			524	6	Wed	**Full Moon**
Wednesday	6	925			525	7	Thu	Saturn, Ophiuchus, rises 3:03 PM; culminates 7:44 PM; sets 12:25 AM
Thursday	7	923			526	8	Fri	Uranus, in Pisces, rises 9:24 PM; culminates 3:57 AM; sets 10:34 AM
Friday	8	921	R 925		527	9	Sat	Neptune, in Aquarius, rises 7:35 PM; culminates 1:11 AM; sets 6:46 PM
Saturday	9	919	R 1000		529	10	Sun	Pluto, in Sagittarius, rises 4:40 PM; culminates 9:23 PM; sets 2:05 AM
Sunday	10	917	R 1038		530	11	Mon	NGC6834 (open cluster/Cygnus) culminates at 9:58 PM (37' to PN NGC6842)
Monday	11	915	R 1120		531	12	Tue	Mercury at greatest W. elongation; Moon moves thru Hyades and occults Aldebaran during daylight hours.
Tuesday	12	913		R 7	532	13	Wed	NGC6940 (open cluster/Vulpecula) culminates at 10:33 PM
Wednesday	13	912		R 101	533	14	Thu	NGC7062 (open cluster/Cygnus) culminates at 11:18 PM
Thursday	14	910		R 200	535	15	Fri	NGC7142 (open cluster/Cepheus) culminates at 11:38 PM (25' to NGC7129)
Friday	15	908		R 304	536	16	Sat	Mercury and Mars 17' apart at Sunrise.
Saturday	16	906		R 410	537	17	Sun	NGC7510 (open cluster/Cepheus) culminates at 12:53 AM
Sunday	17	904		R 517	538	18	Mon	NGC7686 (open cluster/Andromeda) culminates at 1:08 AM
Monday	18	902			539	19	Tue	Venus 56' from Regulus at Sunrise; 7.8 magnitude Neptune 1.5' from 8th magnitude star HD216777
Tuesday	19	900			540	20	Wed	**New Moon**
Wednesday	20	859			541	21	Thu	NGC7789 (open cluster/Cassiopeia) culminates at 1:23 AM
Thursday	21	857			543	22	Fri	NGC7790 (open cluster/Cassiopeia) culminates at 1:20 AM (between NGC 7788 & Berk 58)
Friday	22	855	S 902		544	23	Sat	Autumn Equinox; Black Forest Star Party 9/22-24; Hidden Hollow Star Party 9/21-24.
Saturday	23	853	S 935		545	24	Sun	NGC129 (open cluster/Cassiopeia) culminates at 1:44 AM (37' to Berk 2)
Sunday	24	851	S 1009		546	25	Mon	NGC253 (galaxy/Sculptor) culminates at 1:58 AM
Monday	25	850	S 1046		547	26	Tue	NGC404 (galaxy/Andromeda) C. at 2:16 AM ("The ghost of Mirach", 7' to mag. 2.07 Beta Andromedae)
Tuesday	26	848	S 1127		548	27	Wed	NGC615 (galaxy/Cetus) culminates at 2:38 AM (Forms line w/ 5 other galaxies 2º long)
Wednesday	27	846		S 11	549	28	Thu	NGC779 (galaxy/Cetus) culminates at 2"58 AM (44' to NGC790, 53' to NGC762, 55' to NGC788)
Thursday	28	844		S 101	550	29	Fri	NGC936 (galaxy/Cetus) culminates at 3:22 AM (<1° to NGC 941, 955, 926, 934)
Friday	29	843		S 154	551	30	Sat	WCAC meeting; NGC1245 (open cluster/Perseus) culminates at 4:05 AM
Saturday	30	841		S 251	552	1	Sun	NGC1407 (galaxy/Eridanus) culminates at 4:27 AM (7 other galaxies w/in 41')

Dark Times October 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Sunday	1	839		S 351	553	2	Mon	Mercury, in Virgo, rises 6:58 AM; culminates 12:58 PM; sets 7:02 PM
Monday	2	837		S 453	554	3	Tue	Venus, in Leo, rises 5:24 AM; culminates 11:50 AM; sets 6:15 PM
Tuesday	3	836			556	4	Wed	Mars, in Leo, rises 5:30 AM; culminates 11:52 AM; sets 6:16 PM
Wednesday	4	834			557	5	Thu	Jupiter, in Virgo, rises 8:50 AM; culminates 2:20 PM; sets 7:48 PM; Venus and Mars 15' apart at Sunrise.
Thursday	5	832			558	6	Fri	**Full Moon**
Friday	6	831			559	7	Sat	WCAC public night; Saturn, in Ophiuchus, rises 1:11 PM; culminates 5:52 PM; sets 10:32 PM
Saturday	7	829	R 836		600	8	Sun	Uranus, in Pisces, rises 7:23 PM; culminates 1:59 AM; sets 8:35 AM
Sunday	8	828	R 917		601	9	Mon	Neptune, in Aquarius, rises 5:36 PM; culminates 11:10 PM; sets 4:44 AM; Mercury in conjunction with Sun
Monday	9	826	R 1004		602	10	Tue	Pluto, in Sagittarius, rises 2:42 PM; culminates 7:24 PM; sets 12:07 AM
Tuesday	10	824	R 1056		603	11	Wed	NGC6946 (galaxy/Cepheus) culminates at 8:46 PM (40' to OC NGC6939)
Wednesday	11	823	R 1154		604	12	Thu	NGC7128 (open cluster/Cygnus) culminates at 9:51 PM (54' to NGC7127)
Thursday	12	821		R 56	605	13	Fri	NGC7606 (galaxy/Aquarius) culminates at 11:19 PM (54' to NGC7600, 4 asteroids < 1º away)
Friday	13	820		R 201	606	14	Sat	NGC7662 (planetary nebula/Andromeda) culminates at 11:22 PM
Saturday	14	818		R 307	607	15	Sun	Moon occults Regulus.
Sunday	15	817		R 412	608	16	Mon	Mercury 28' from O.C.NGC 6568 at Sunrise
Monday	16	815		R 516	609	17	Tue	NGC288 (globular cluster/Sculptor) culminates at 12:37 AM
Tuesday	17	814			610	18	Wed	NGC596 (galaxy/Cetus) culminates at 1:13 AM (Forms line w/ 5 other galaxies 2º long)
Wednesday	18	813			611	19	Thu	Uranus at opposition.
Thursday	19	811			612	20	Fri	**New Moon**
Friday	20	810			613	21	Sat	Orionid meteor shower peaks.
Saturday	21	808			614	22	Sun	NGC663 (open cluster/Cassiopeia) culminates at 1:10 AM (circled by 8 O.C.s)
Sunday	22	807	S 842		615	23	Mon	NGC869 (open cluster/Perseus) culminates at 1:39 AM (West Part of Double Cluster)
Monday	23	806	S 921		616	24	Tue	NGC1022 (galaxy/Cetus) culminates at 1:55 AM (53' to NGC991, 40' to NGC961)
Tuesday	24	805	S 1004		617	25	Wed	NGC1084 (galaxy/Eridanus) culminates at 1:58 AM (50' to Gal NGC 1110 & 1108)
Wednesday	25	803	S 1052		618	26	Thu	NGC1342 (open cluster/Perseus) culminates at 2:40 AM
Thursday	26	802	S 1143		619	27	Fri	Jupiter in Conjunction with Sun
Friday	27	801		S 37	620	28	Sat	WCAC meeting; Comet 96P/Machholz *may* be visible in morning twilight, predicted mag. 2.2 (R. 7:15 AM)
Saturday	28	800		S 135	621	29	Sun	NGC1788 (nebula/Orion) culminates at 4:03 AM (w/ LDN 1616)
Sunday	29	759		S 235	622	30	Mon	NGC1999 (nebula/Orion) culminates at 4:28 AM (38' to IC430)
Monday	30	757		S 338	624	31	Tue	Mercury, in Libra, rises 9:13 AM; culminates 2:03 PM; sets 6:56 PM
Tuesday	31	756		S 443	625	1	Wed	Venus, in Virgo, rises 6:30 AM; culminates 12:08 PM; sets 5:46 PM

Dark Times November 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Wednesday	1	755		S 551	626	2	Thu	Mars, in Virgo, rises 5:08 AM; culminates 11:05 AM; sets 5:04 PM
Thursday	2	754			627	3	Fri	Jupiter, in Virgo, rises 7:28 AM; culminates 12:50 PM; sets 6:10 PM
Friday	3	753			628	4	Sat	WCAC public night; **Full Moon**
Saturday	4	752			529	5	Sun	Saturn, Ophiuchus, R 10:24 AM; C 4:08 PM; S 8:48 PM; **Daylight Savings time ends 2 AM**
Sunday	5	651	R 655		530	6	Mon	Uranus, in Pisces, rises 4:26 PM; culminates 11:01 PM; sets 5:40 AM; Moon occults Aldebaran.
Monday	6	650	R 747		531	7	Tue	Neptune, in Aquarius, rises 2:40 PM; culminates 8:14 PM; sets 1:48 AM
Tuesday	7	649	R 845		532	8	Wed	Pluto, in Sagittarius, rises 11:46 AM; culminates 4:32 PM; sets 9:14 PM
Wednesday	8	649	R 947		533	9	Thu	NGC7723 (galaxy/Aquarius) culminates at 8:53 AM (45' to NGC 7727 & 7724)
Thursday	9	648	R 1053		534	10	Fri	NGC7727 (galaxy/Aquarius) culminates at 8:50 PM (13' to NGC7724, 42' to NGC7723)
Friday	10	647	R 1159		535	11	Sat	NGC136 (open cluster/ Cassiopeia) culminates at 9:40 PM (7 O.C. w/in 1º 18')
Saturday	11	646		R 104	536	12	Sun	NGC278 (galaxy/Cassiopeia) culminates at 9:54 PM
Sunday	12	645		R 208	537	13	Mon	Venus and Jupiter 19' apart at Sunrise
Monday	13	645		R 311	538	14	Tue	NGC772 (galaxy/Aries) culminates at 10:53 PM (3' to NGC 770, 1º 8' to (7)Iris, 44' to (2665)Schrukta)
Tuesday	14	644		R 412	539	15	Wed	NGC1023 (galaxy/Perseus) culminates at 11:30 PM (1023A superimposed, 46' to IC239)
Wednesday	15	643		R 512	540	16	Thu	M45 (open cluster with nebula/Taurus) culminates at 12:33 AM
Thursday	16	643			541	17	Fri	Leonid meteor shower peaks.
Friday	17	642			542	18	Sat	**New Moon**
Saturday	18	642			543	19	Sun	NGC1502 (open cluster/Camelopardalis) culminates at 12:41 AM
Sunday	19	641			544	20	Mon	NGC1513 (open cluster/Perseus) culminates at 12:39 AM
Monday	20	641	S 700		545	21	Tue	NGC1535 (planetary nebula/Eridanus) culminates at 12:40 AM
Tuesday	21	640	S 745		546	22	Wed	NGC1528 (open cluster/Perseus) culminates at 12:37 AM
Wednesday	22	640	S 835		547	23	Thu	NGC1664 (open cluster/Auriga) culminates at 1:09 AM
Thursday	23	639	S 928		548	24	Fri	Mercury at greatest eastern elongation
Friday	24	639	S 1024		549	25	Sat	WCAC meeting; NGC2129 (open cluster/Gemini) culminates at 2:11 AM
Saturday	25	639	S 1122		550	26	Sun	NGC2232 (open cluster/Monoceros) culminates at 2:34 AM
Sunday	26	638		S 22	550	27	Mon	NGC2324 (open cluster/Monoceros) culminates at 3:06 AM
Monday	27	638		S 124	551	28	Tue	NGC2420 (open cluster/Gemini) culminates at 3:36 AM
Tuesday	28	638		S 228	552	29	Wed	Mercury, in Sagittarius, rises 9:17 AM; culminates 1:45 PM; sets 612: PM
Wednesday	29	638		S 336	553	30	Thu	Venus, in Libra, rises 6:42 AM; culminates 11:36 AM; sets 4:29 PM
Thursday	30	637		S 446	554	1	Fri	Mars, in Virgo, rises 3:46 AM; culminates 9:19 AM; sets 2:53 PM

Dark Times December 2017

PM Day	PM Date	Twilight Ends	PM Moon	AM Moon	Twilight Begins	AM Date	AM Day	Events
Friday	1	637			555	2	Sat	WCAC public night; Jupiter, in Libra, rises 5:05 AM; culminates 10:17 AM; sets 3:33 PM
Saturday	2	637			556	3	Sun	**Full Moon**
Sunday	3	637			557	4	Mon	Saturn, in Sagittarius, rises 8:44 AM; culminates 1:27 PM; sets 6:06 PM
Monday	4	637			557	5	Tue	Uranus, in Pisces, rises 2:30 PM; culminates 9:03 PM; sets 3:37 AM
Tuesday	5	637	R 730		558	6	Wed	Neptune, in Aquarius, rises 12:46 PM; culminates 6:20 PM; sets 11:54 PM
Wednesday	6	637	R 838		559	7	Thu	Pluto, in Sagittarius, rises 9:55 AM; culminates 2:41 PM; sets 7:24 PM
Thursday	7	637	R 947		600	8	Fri	NGC246 (planetary nebula/Cetus) culminates at 8:07 PM (26' to Gal NGC 255)
Friday	8	637	R 1055		601	9	Sat	NGC584 (galaxy/Cetus) culminates at 8:47 PM (NW end of line of 6 galaxies 2º long, 11' to (4582)Hank)
Saturday	9	637		R 0	601	10	Sun	NGC752 (open cluster/Andromeda) culminates at 9:09 PM
Sunday	10	638		R 104	602	11	Mon	NGC1027 (open cluster/Cassiopeia) culminates at 9:54 PM
Monday	11	638		R 206	603	12	Tue	M77 (galaxy/Cetus) culminates at 9:46 PM (31' to NGC1055, 22' to NGC1072)
Tuesday	12	638		R 306	604	13	Wed	Mercury in conjunction with Sun.
Wednesday	13	638		R 405	604	14	Thu	Geminid meteor shower peaks.
Thursday	14	639		R 503	605	15	Fri	NGC1817 (open cluster/Taurus) culminates at 12:04 AM (26' to NGC1807, 3 asteroids ~ 1º W)
Friday	15	639		R 600	605	16	Sat	NGC1964 (galaxy/Lepus) culminates at 12:21 AM
Saturday	16	639			606	17	Sun	NGC2022 (planetary nebula/Orion) culminates at 12:26 AM (36' to NGC2039, 25' to (4598)Coradini))
Sunday	17	640			607	18	Mon	**New Moon**
Monday	18	640			607	19	Tue	M78 (nebula/Orion) culminates at 12:22 AM (paired with NGC2071 & NGC2064)
Tuesday	19	641			608	20	Wed	M37 (open cluster/Auriga) culminates at 12:24 AM
Wednesday	20	641	S 722		608	21	Thu	Winter Solstice
Thursday	21	642	S 816		609	22	Fri	Saturn in conjunction with Sun; Ursid meteor shower peaks.
Friday	22	642	S 913		609	23	Sat	NGC2371 (planetary nebula/Gemini) culminates at 1:45 AM
Saturday	23	643	S 1012		610	24	Sun	NGC2489 (open cluster/Puppis) culminates at 2:12 AM
Sunday	24	643	S 1112		610	25	Mon	NGC2627 (open cluster/Pyxis) culminates at 2:48 AM
Monday	25	644		S 13	610	26	Tue	NGC2768 (galaxy/Ursa Major) culminates at 3:19 AM (40' to NGC2742/2816, 51' to NGC2726)
Tuesday	26	644		S 117	611	27	Wed	NGC2985 (galaxy/Ursa Major) culminates at 3:54 AM (25' to NGC3027, 54' to NGC3065 & 66)
Wednesday	27	645		S 223	611	28	Thu	NGC3184 (galaxy/Ursa Major) culminates at 4:18AM (18' to NGC3179)
Thursday	28	646		S 332	611	29	Fri	Mercury, in Ophiuchus, rises 6:04 AM; culminates 10:53 AM; sets 3:44 PM
Friday	29	646		S 443	612	30	Sat	Venus, in Sagittarius, rises 7:45 AM; culminates 12:18 PM; sets 4:53 PM
Saturday	30	647		S 555	612	31	Sun	Mars, in Libra, rises 3:24 AM; culminates 8:33 AM; sets 1:44 PM; Moon occults Aldebaran.
Sunday	31	648			612	1	Mon	Jupiter, in Libra, rises 3:36 AM; culminates 8:41 AM; sets 1:51 PM