



Astronomy  
APD  
Picture of the Day  
2014  
Calendar





### **Peculiar Galaxies of Arp 273**

Credit: NASA, ESA, and the Hubble Heritage Team (STScI / AURA)

The spiky stars in the foreground of this sharp cosmic portrait are well within our own Milky Way Galaxy. The two eye-catching galaxies lie far beyond the Milky Way, at a distance of over 300 million light-years. Their distorted appearance is due to gravitational tides as the pair engage in close encounters. Cataloged as Arp 273 (also as UGC 1810), the galaxies do look peculiar, but interacting galaxies are now understood to be common in the universe. In fact, the nearby large spiral Andromeda Galaxy is known to be some 2 million light-years away and approaching the Milky Way. Arp 273 may offer an analog of their far future encounter. Repeated galaxy encounters on a cosmic timescale can ultimately result in a merger into a single galaxy of stars. From our perspective, the bright cores of the Arp 273 galaxies are separated by only a little over 100,000 light-years. The release of this stunning vista celebrates the 21st anniversary of the Hubble Space Telescope in orbit. [ap110421.html](http://ap110421.html)



# December

# 2013

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 	2 	3 	4 	5 	6 	7 
8 	9 	10 	11 	12 	13 	14 
15 	16 	17 	18 	19 	20 	21 
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## Endeavour Looking Up

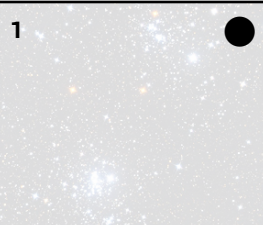
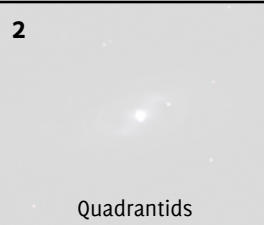
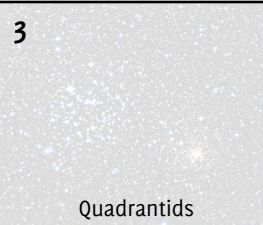
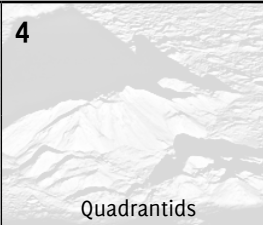
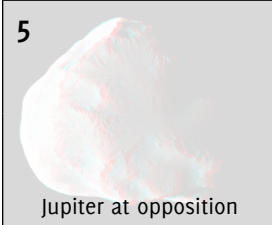


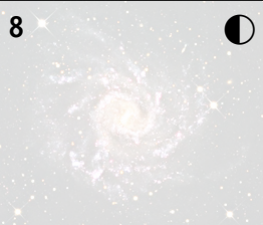

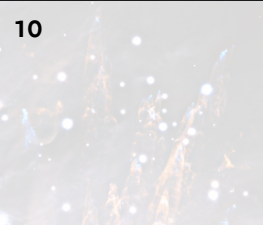

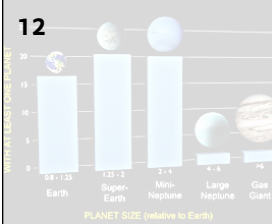












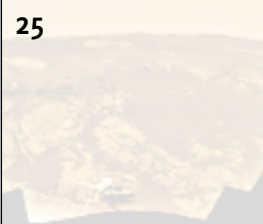
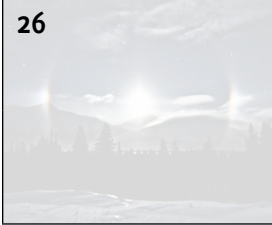
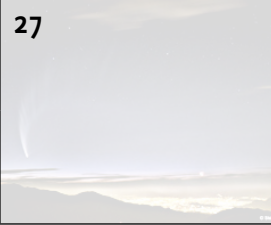


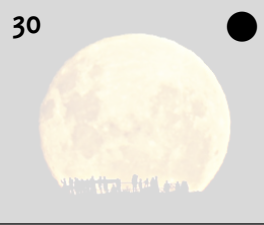
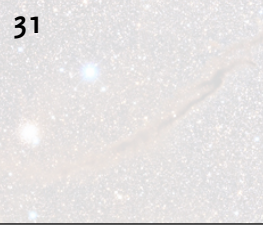
Credit & Copyright: Ben Cooper (Spaceflight Now, Launch Photography)

Explanation: First flown in 1992, Endeavour, the youngest space shuttle orbiter, is being prepared for its 25th and final trip to low Earth orbit. Seen here from an exciting perspective 400 feet above the floor of Kennedy Space Center's Vehicle Assembly Building, Endeavour (OV-105) is mated to an external tank and solid rocket boosters just prior to roll out to launch pad 39A on March 11. The completed space shuttle stands over 18 stories tall. Intended for an April 19 near sunset launch on STS-134, Endeavour will head for the International Space Station and deliver the AMS cosmic ray experiment. The final flight of Endeavour will be the penultimate planned space shuttle flight. [ap110402.html](http://ap110402.html)



# January

2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
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5 	6 	7 	8 	9 	10 	11 
12 	13 	14 	15 	16 	17 	18 
19 	20 	21 	22 	23 	24 	25 
26 	27 	28 	29 	30 	31 	





### NGC 1999: South of Orion

Credit & Copyright: Robert Gendler

Explanation: South of the large star-forming region known as the Orion Nebula, lies bright blue reflection nebula NGC 1999. The nebula is marked with a dark inverted T-shape at the lower left in a broad cosmic vista that spans over 10 light-years. The dark shape is a dense gas and dust cloud, or Bok globule, seen in silhouette against the bright nebula, and likely a site of future star formation. At the edge of the Orion molecular cloud complex some 1,500 light-years distant, NGC 1999's illumination is provided by the embedded variable star V380 Orionis. The region abounds with energetic young stars producing jets and outflows that create luminous shock waves, including HH (Herbig-Haro) 1 and 2 just below and left of NGC 1999, and the apparent cascade of reddish arcs and bow shocks beginning at the upper right. The stellar jets and outflows push through the surrounding material at speeds of hundreds of kilometers per second. [apo60130.html](http://apo60130.html)



# February

2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1 
2 	3 	4 	5 	6 	7 	8 
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16 	17 	18 	19 	20 	21 	22 
23 	24 	25 	26 	27 	28 	





### Twisting with NGC 3718

Image Credit & Copyright: Martin Pugh (Heaven's Mirror Observatory)

Explanation: A careful look at this colorful cosmic snapshot reveals a surprising number of galaxies both near and far toward the constellation Ursa Major. The most striking is NGC 3718, the warped spiral galaxy near picture center. NGC 3718's spiral arms look twisted and extended, mottled with young blue star clusters. Drawn out dust lanes obscure its yellowish central regions. A mere 150 thousand light-years to the right is another large spiral galaxy, NGC 3729. The two are likely interacting gravitationally, accounting for the peculiar appearance of NGC 3718. While this galaxy pair lies about 52 million light-years away, the remarkable Hickson Group 56 can also be seen clustered above NGC 3718, near the top of the frame. Hickson Group 56 consists of five interacting galaxies and lies over 400 million light-years away. This picture was chosen as the overall winner in the 2013 David Malin Astrophotography Competition. [ap130803.html](http://ap130803.html)

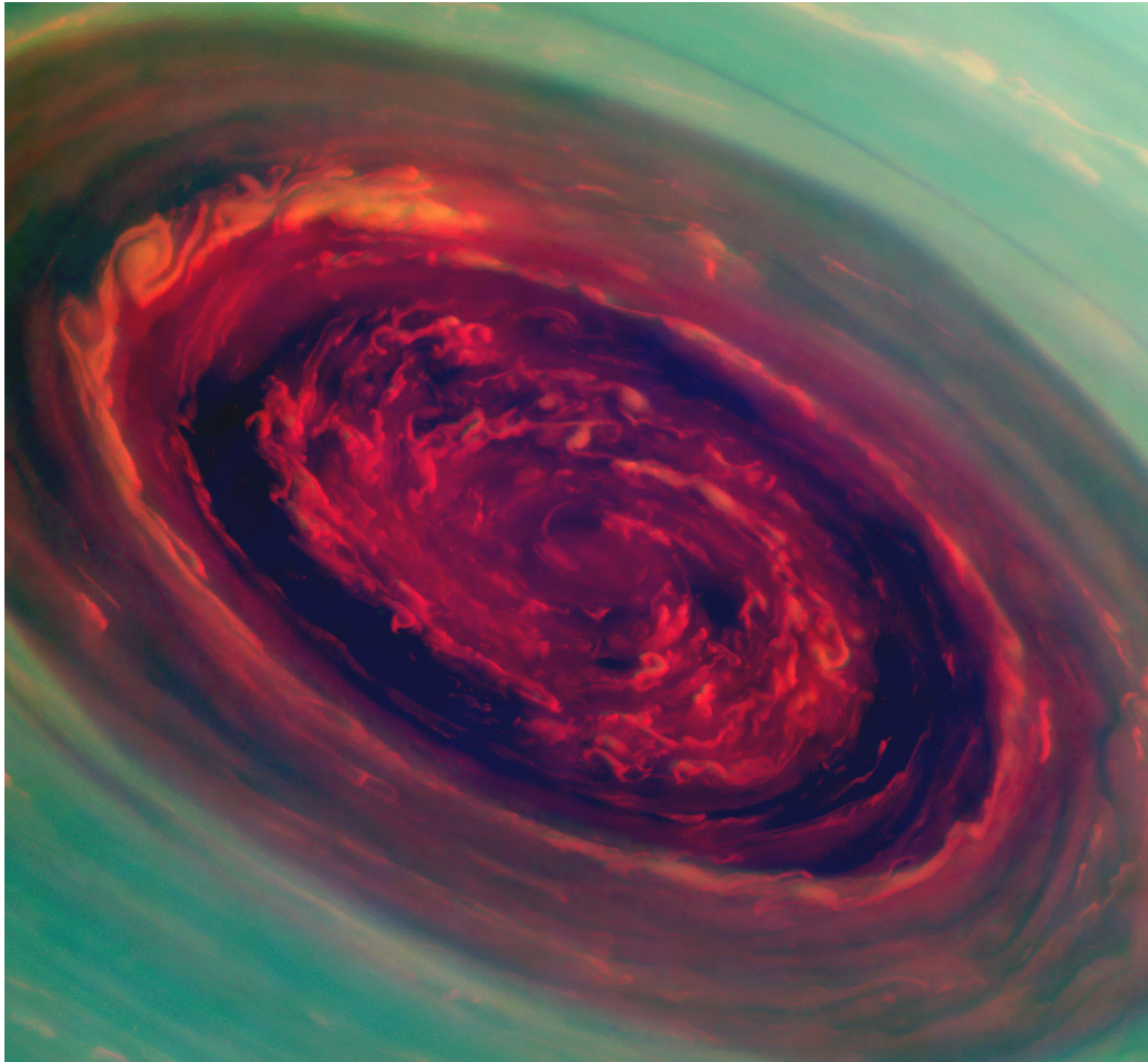


# March

# 2014

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16 	17 	18 	19 	20  Equinox 16:57 UTC	21 	22 
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30 	31 					





### Saturn Hurricane

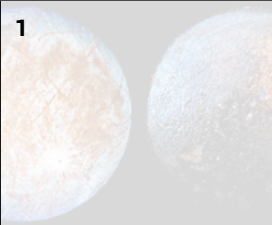
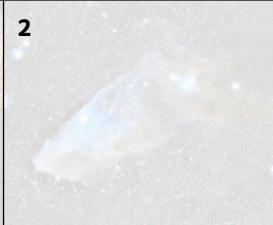
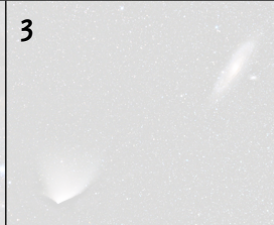


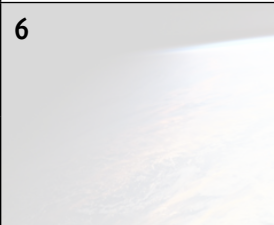

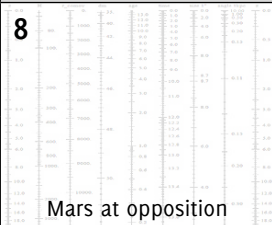
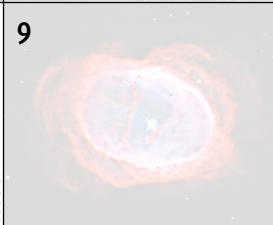

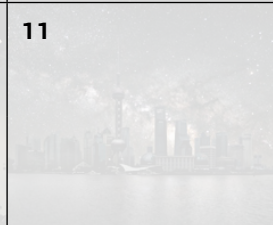

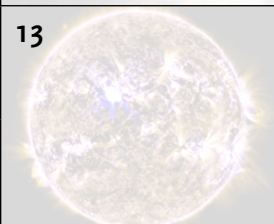
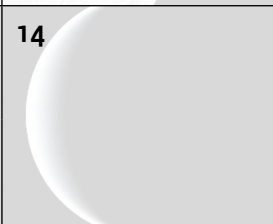
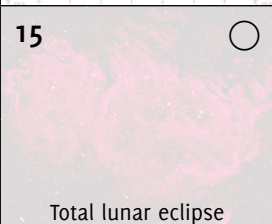

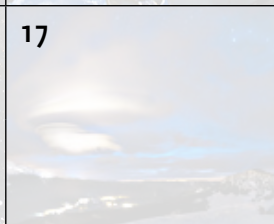
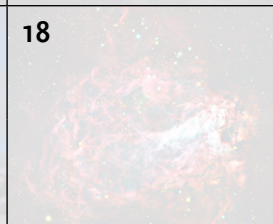
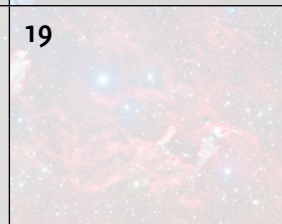
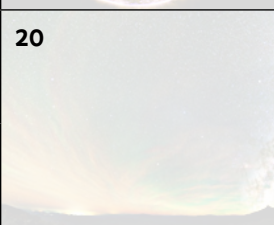
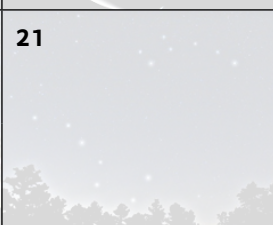
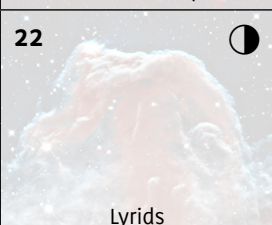
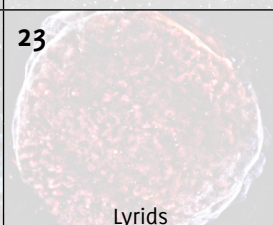
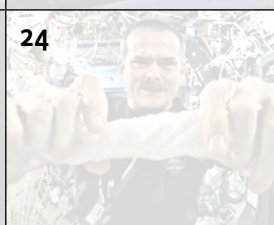
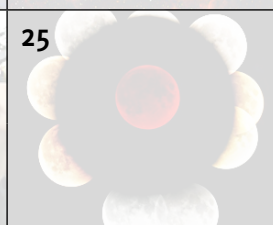
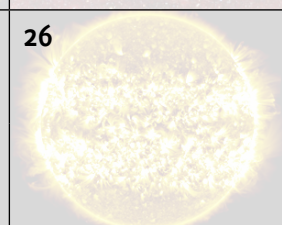
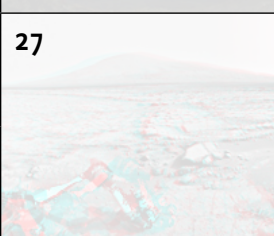
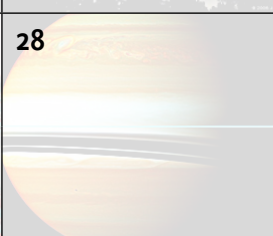


Image Credit: Cassini Imaging Team, SSI, JPL, ESA, NASA

Explanation: Acquiring its first sunlit views of far northern Saturn late last year, the Cassini spacecraft's narrow-angle camera recorded this stunning image of the vortex at the ringed planet's north pole. The false color, near-infrared image results in red hues for low clouds and green for high ones, causing the north-polar hurricane to take on the appearance of a rose. Enormous by terrestrial hurricane standards, this storm's eye is about 2,000 kilometers wide, with clouds at the outer edge traveling at over 500 kilometers per hour. The north pole Saturn hurricane swirls inside the large, six-sided weather pattern known as the hexagon. Of course, in 2006 Cassini also imaged the hurricane at Saturn's south pole. [ap130502.html](http://ap130502.html)



# April

# 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		<b>1</b> 	<b>2</b> 	<b>3</b> 	<b>4</b> 	<b>5</b> 
<b>6</b> 	<b>7</b> 	<b>8</b>  Mars at opposition	<b>9</b> 	<b>10</b> 	<b>11</b> 	<b>12</b> 
<b>13</b> 	<b>14</b> 	<b>15</b>  Total lunar eclipse	<b>16</b> 	<b>17</b> 	<b>18</b> 	<b>19</b> 
<b>20</b> 	<b>21</b> 	<b>22</b>  Lyrids	<b>23</b>  Lyrids	<b>24</b> 	<b>25</b> 	<b>26</b> 
<b>27</b> 	<b>28</b> 	<b>29</b>  Annular solar eclipse	<b>30</b> 			





## The Magnificent Tail of Comet McNaught

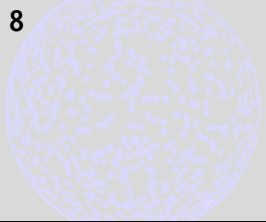

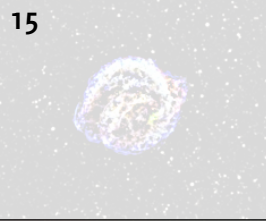

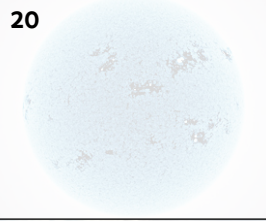
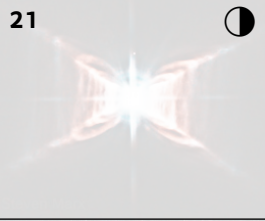
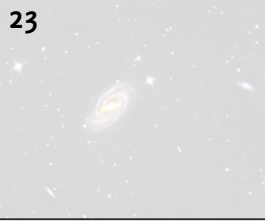
Credit & Copyright: Robert H. McNaught

Explanation: Comet McNaught, the Great Comet of 2007, was the brightest comet of the last 40 years. Its spectacular tail spread across the sky and was breathtaking to behold from dark locations for many Southern Hemisphere observers. The head of the comet remained quite bright and was easily visible to even city observers without any optical aide. Part of the spectacular tail was visible just above the horizon after sunset for many northern observers as well. Comet C/2006 P1 (McNaught), which reached an estimated peak brightness of magnitude -6 (minus six), was caught by the comet's discoverer in the above image soon after sunset in 2007 January from Siding Spring Observatory in Australia. The robotic Ulysses spacecraft fortuitously flew through Comet McNaught's tail and found, unexpectedly, that the speed of the solar wind dropped significantly. [ap091206.html](http://ap091206.html)

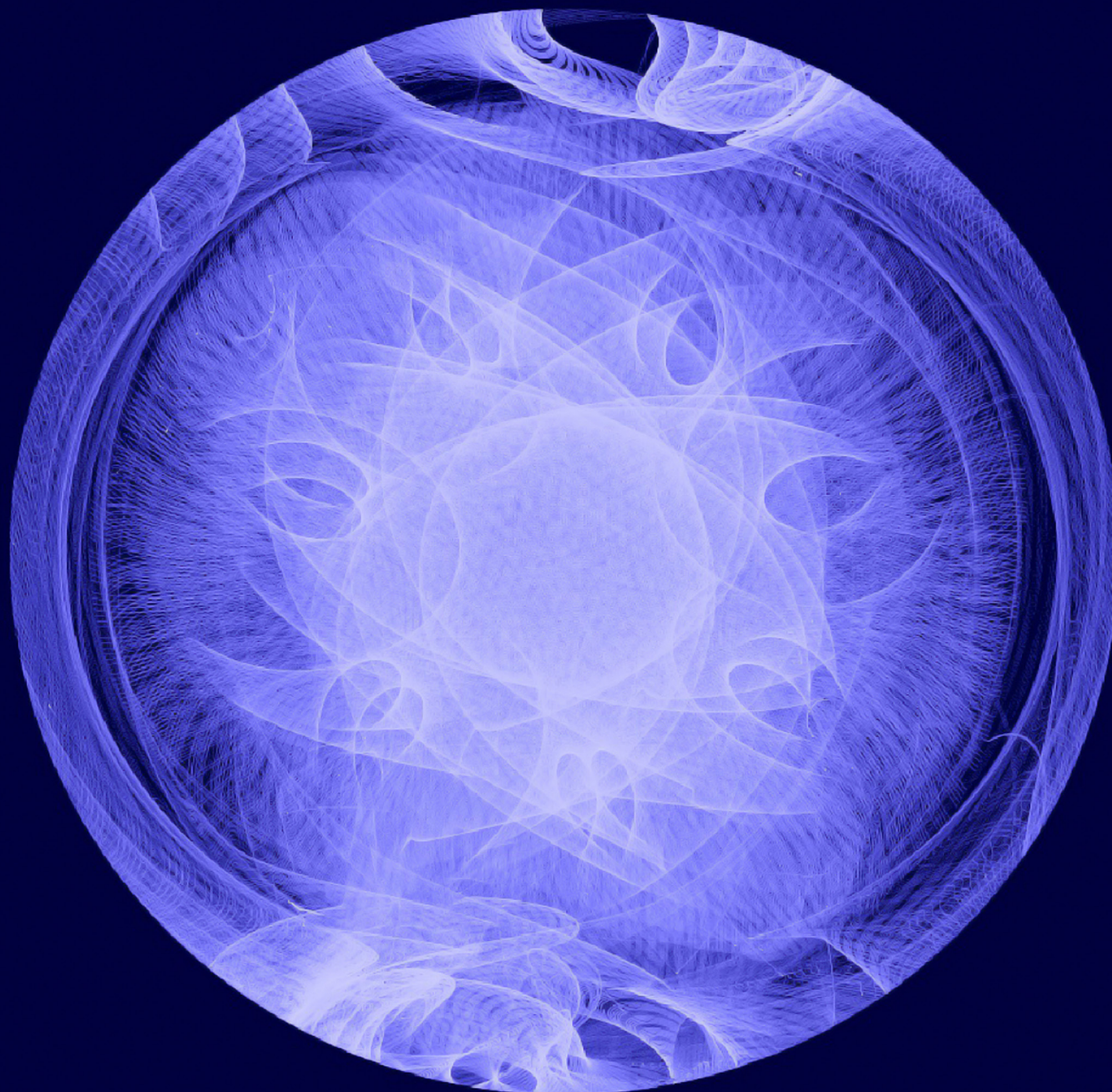


# May

# 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 	2 	3 
4 	5  Eta Aquariids	6  Eta Aquariids	7 	8 	9 	10  Saturn at opposition
11 	12 	13 	14 	15 	16 	17 
18 	19 	20 	21 	22 	23 	24 
25 	26 	27 	28 	29 	30 	31 





### Fermi Epicycles: The Vela Pulsar's Path

Credit: NASA, DOE, International Fermi LAT Collaboration

Explanation: Exploring the cosmos at extreme energies, the Fermi Gamma-ray Space Telescope orbits planet Earth every 95 minutes. By design, it rocks to the north and then to the south on alternate orbits in order to survey the sky with its Large Area Telescope (LAT). The spacecraft also rolls so that solar panels are kept pointed at the Sun for power, and the axis of its orbit precesses like a top, making a complete rotation once every 54 days. As a result of these multiple cycles the paths of gamma-ray sources trace out complex patterns from the spacecraft's perspective, like this mesmerising plot of the path of the Vela Pulsar. Centered on the LAT instrument's field of view, the plot spans 180 degrees and follows Vela's position from August 2008 through August 2010. The concentration near the center shows that Vela was in the sensitive region of the LAT field during much of that period. Born in the death explosion of a massive star within our Milky Way galaxy, the Vela Pulsar is a neutron star spinning 11 times a second, seen as the brightest persistent source in the gamma-ray sky. [ap120504.html](#)



# June

# 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
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8 	9 	10 	11 	12 	13 	14 
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22 	23 	24 	25 	26 	27 	28 
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### **IRAS 05437+2502: An Enigmatic Star Cloud from Hubble**

Credit:

ESA, Hubble, R. Sahai (JPL), NASA

Explanation: What's lighting up nebula IRAS 05437+2502? No one is sure. Particularly enigmatic is the bright upside-down V that defines the upper edge of this floating mountain of interstellar dust, visible near the image center. In general, this ghost-like nebula involves a small star forming region filled with dark dust that was first noted in images taken by the IRAS satellite in infrared light in 1983. Shown above is a spectacular, recently released image from the Hubble Space Telescope that, although showing many new details, has not uncovered a clear cause of the bright sharp arc. One hypothesis holds that the glowing arc was created by a massive star that somehow attained a high velocity and has now left the nebula. Small, faint IRAS 05437+2502 spans only 1/18th of a full moon toward the constellation of the Bull (Taurus). [ap100809.html](http://ap100809.html)



July

2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
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13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		





## Raining Perseids

Credit & Copyright: Fred Bruenjes

Explanation: Tonight is a good night to see meteors. Comet dust will rain down on planet Earth, streaking through dark skies in the annual Perseid meteor shower. While enjoying the anticipated space weather, astronomer Fred Bruenjes recorded a series of many 30 second long exposures spanning about six hours on the night of 2004 August 11/12 using a wide angle lens. Combining those frames which captured meteor flashes, he produced this dramatic view of the Perseids of summer. Although the comet dust particles are traveling parallel to each other, the resulting shower meteors clearly seem to radiate from a single point on the sky in the eponymous constellation Perseus. The radiant effect is due to perspective, as the parallel tracks appear to converge at a distance. Bruenjes notes that there are 51 Perseid meteors in the composite image, including one seen nearly head-on. This year, the Perseids Meteor Shower is expected to peak after midnight tonight, in the moonless early morning hours of August 12. [ap070812.html](http://ap070812.html)



# August

2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	5	6	7	8	9
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24	25	26	27	28	29	30
31						





## Spiral Galaxy M66






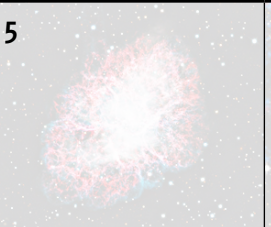



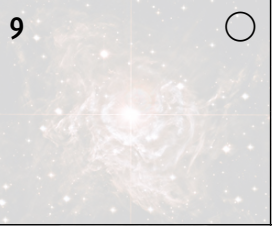


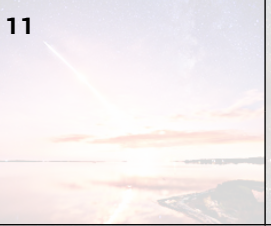
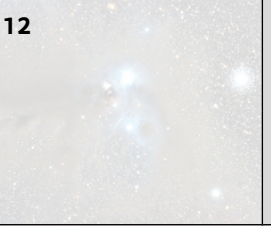

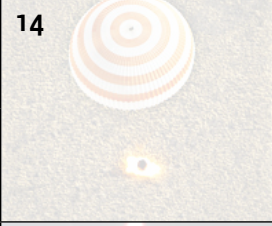

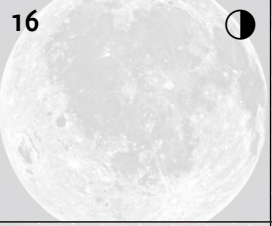














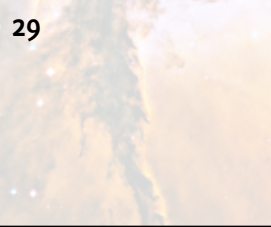
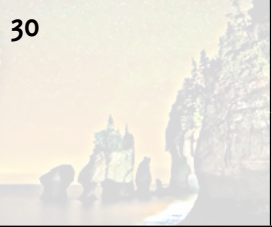
Credit & Copyright: Russell Croman

Explanation: Big beautiful spiral galaxy M66 lies a mere 35 million light-years away. About 100 thousand light-years across, the gorgeous island universe is well known to astronomers as a member of the Leo Triplet of galaxies. In M66, pronounced dust lanes and young, blue star clusters sweep along spiral arms dotted with the tell-tale glow of pink star forming regions. This colorful and deep view also reveals faint extensions beyond the brighter galactic disk. Of course, the bright, spiky stars lie in the foreground, within our own Milky Way Galaxy, but many, small, distant background galaxies can be seen in the cosmic snapshot. Gravitational interactions with its neighboring galaxies have likely influenced the shape of spiral galaxy M66. [ap101113.html](http://ap101113.html)



# September

2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 	2  	3 	4 	5 	6 
7 	8 	9  	10 	11 	12 	13 
14 	15 	16  	17 	18 	19 	20 
21 	22 	23  <p>Equinox 02:29 UTC</p>	24  	25 	26 	27 
28 	29 	30 				





### Iridescent Clouds Over Aiguille de la Tsa


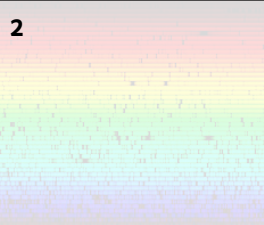

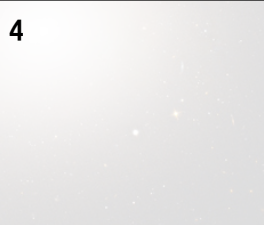


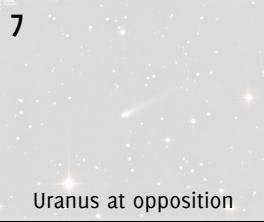
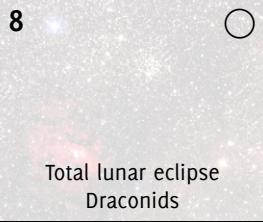


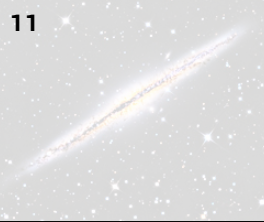





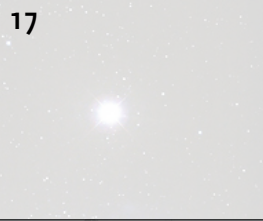



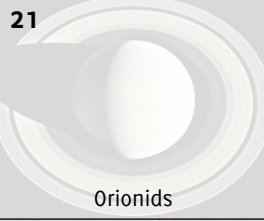


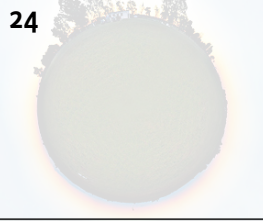





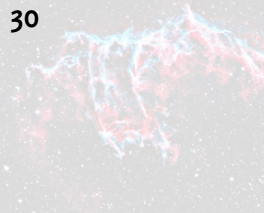
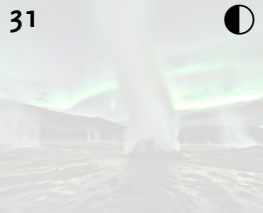
Credit & Copyright: Ute Esser (U. Heidelberg)

Explanation: Before the sun rose over the mountains, iridescent colors danced across the sky. The unexpected light show was caused by a batch of iridescent clouds, and captured on film in early September in Arolla, Wallis, Switzerland. The peak in the foreground of the above image is Aiguille de la Tsa. Iridescent clouds contain patches of water droplets of nearly identical size that can therefore diffract sunlight in a nearly uniform manner. Different colors will be deflected by different amounts and so come to the observer from slightly different directions. Iridescent clouds are best seen outside the glare of the direct Sun although they can occasionally be seen to encircle the Sun. [ap031014.html](#)



# October

# 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1  ☾	2 	3 	4 
5 	6 	7  Uranus at opposition	8  Total lunar eclipse Draconids	9  Draconids	10  Southern Taurids	11 
12 	13 	14 	15  ☾	16 	17 	18 
19 	20 	21  Orionids	22  Orionids	23  ● Partial solar eclipse	24 	25 
26 	27 	28 	29 	30 	31  ☾	





## Hubble Floats Free








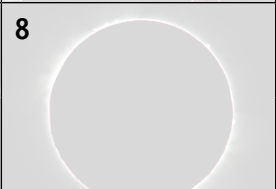
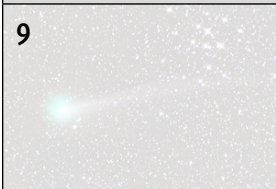


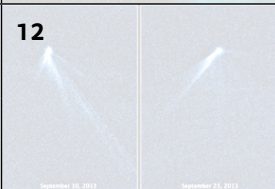
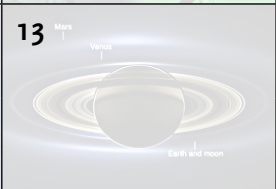
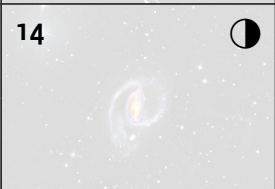
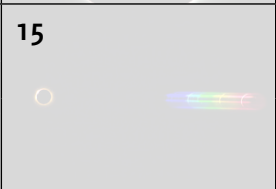
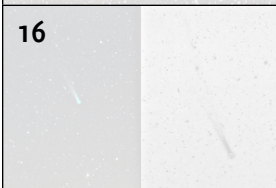
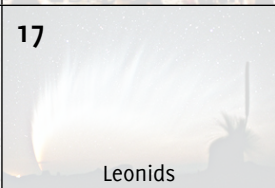
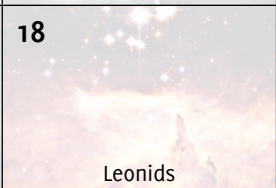

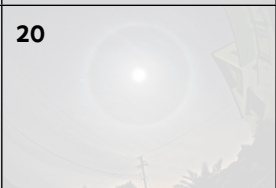
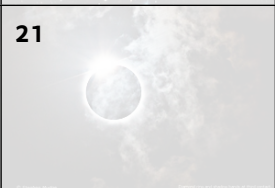

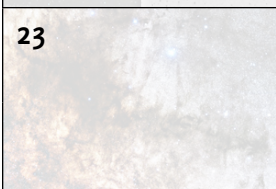






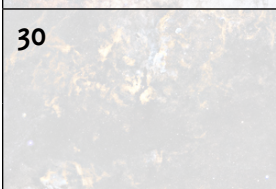
Credit: STS-125 Crew, NASA

Explanation: Why put observatories in space? Most telescopes are on the ground. On the ground, you can deploy a heavier telescope and fix it more easily. The trouble is that Earth-bound telescopes must look through the Earth's atmosphere. First, the Earth's atmosphere blocks out a broad range of the electromagnetic spectrum, allowing a narrow band of visible light to reach the surface. Telescopes which explore the Universe using light beyond the visible spectrum, such as those onboard the Chandra X-ray Observatory, and the Fermi Gamma Ray Space Telescope need to be carried above the absorbing atmosphere. Second, the Earth's atmosphere blurs the light it lets through. The blurring is caused by varying density and continual motion of air. By orbiting above the Earth's atmosphere, the Hubble Space Telescope, pictured above last week after being captured, refurbished, and released, can get clearer images. In fact, even though HST has a mirror 15 times smaller than large Earth-bound telescopes, it can still resolve finer details. A future large telescope for space, the James Webb Space Telescope is currently planned for launch in 2014. [ap090525.html](#)



# November

# 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1 
2 	3 	4 	5  Northern Taurids	6  Northern Taurids	7 	8 
9 	10 	11 	12 	13  Earth and moon	14 	15 
16 	17  Leonids	18  Leonids	19 	20 	21 	22 
23 	24 	25 	26 	27 	28 	29 
30 						





### A Quadruple Lunar Halo Over Spain



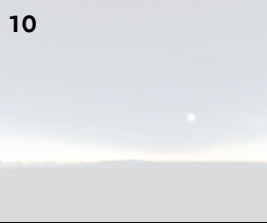






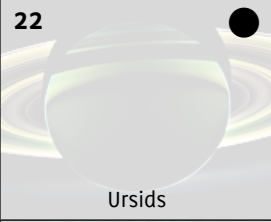
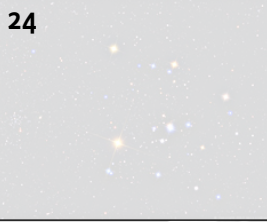




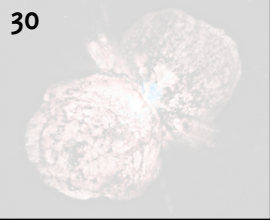

Image Credit & Copyright: Dani Caxete

Explanation: Sometimes falling ice crystals make the atmosphere into a giant lens causing arcs and halos to appear around the Sun or Moon. This past Saturday night was just such a time near Madrid, Spain, where a winter sky displayed not only a bright Moon but as many as four rare lunar halos. The brightest object, near the top of the above image, is the Moon. Light from the Moon refracts through tumbling hexagonal ice crystals into a 22 degree halo seen surrounding the Moon. Elongating the 22 degree arc horizontally is a circumscribed halo caused by column ice crystals. More rare, some moonlight refracts through more distant tumbling ice crystals to form a (third) rainbow-like arc 46 degrees from the Moon and appearing here just above a picturesque winter landscape. Furthermore, part of a whole 46 degree circular halo is also visible, so that an extremely rare—especially for the Moon—quadruple halo was actually imaged. The snow-capped trees in the foreground line the road Puerto de Navacerrada in the Sierra de Guadarrama mountain range near Madrid. Far in the background is a famous winter skyscape that includes Sirius, the belt of Orion, and Betelgeuse all visible between the inner and outer arcs. Halos and arcs typically last for minutes to hours, so if you do see one there should be time to invite family, friends or neighbors to share your unusual lensed vista of the sky. [ap121203.html](http://ap121203.html)



# December

2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 	2 	3 	4 	5 	6 
7 	8 	9 	10 	11 	12 	13  Geminids
14  Geminids	15 	16 	17 	18 	19 	20 
21  Solstice 23:03 UTC	22  Ursids	23  Ursids	24 	25 	26 	27 
28  Geminids	29 	30 	31 			



# 2015

## January

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

## February

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

## March

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

## April

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

## May

S	M	T	W	T	F	S
31					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	31

## June

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

## July

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

## August

S	M	T	W	T	F	S
30	31					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

## September

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

## October

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

## November

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

## December

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		



# 2016

## January

S	M	T	W	T	F	S
31					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

## February

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29					

## March

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

## April

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

## May

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

## June

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

## July

S	M	T	W	T	F	S
31					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

## August

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

## September

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

## October

S	M	T	W	T	F	S
30	31					1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

## November

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

## December

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31



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<http://apod.nasa.gov/>

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