National Aeronautics and
Space Administration

NASA SCIENCE 2018

COMMEMORATIVE CALENDAR

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EXPLORER 1

INSIGHT

PARKER

ICESAT-2

WEBB

A Message from the

NASA SCIENCE
Associate Administrator

As humans, it's in our DNA to explore—to yearn to understand our origin and our place in the universe.

For the last sixty years, NASA Science has been at the forefront of exploration of the solar system and beyond. NASA has led the exploration of the Sun, Earth, the Moon, the planets, the Asteroid and Kuiper Belts, the stars, and the deep universe.

We have discovered surprising ocean worlds in our own neighborhood that beckon us to further explore. We have peered into the vastness of space to discover more than 3,000 exoplanets. The James Webb Space Telescope will observe even further back in time to the first light of the universe.

NASA Science research not only serves to satisfy our curiosity and unlock the secrets of the universe but also saves and improves lives on Earth every day. As we appreciate the power and wonder of nature, we also inspire future generations of scientists and engineers.

I like to think of each image in this calendar as nature's art. Each is a moment in space and time that represents the efforts of individuals committed to the scientific pursuit of knowledge and advancement of humankind.

It is my privilege to lead such a noble effort.

Thomas H. Zurbuchen

Associate Administrator
NASA Science Mission Directorate

Cover/Spread Illustration: NASA/Jenny Mottar

JANUARY 2018

New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 New Year's Day	2	3	4	5	6
7 01/07/1610 Galileo discovered four satellites of Jupiter (Io, Europa, Ganymede, and Callisto), disproving dogma that Earth is the center of all motion.	8	9	10	11	12	13
14	15 Birthday of Martin Luther King, Jr. (observed date)	16	17	18	19	20
21	01/22/1968 Launch of Apollo 5, a successful non-crewed test of the Lunar Module in Earth orbit. 22	23	24	25	26	27
28	29	30	01/31/1958 Launch of Explorer 1, the first successful U.S. satellite. 31			

New Full-Hemisphere Views of Earth at Night

This composite image of the Americas at night shows large concentrations of human activity and urban infrastructure. It was produced by researchers at NASA's Goddard Space Flight Center using night lights data from the Visible Infrared Imaging Radiometer Suite (VIIRS) on the Suomi National Polar-orbiting Partnership satellite, a NASA-National Oceanic and Atmospheric Administration (NOAA) mission. The researchers wrote a code to pick the clearest night views over many months, combining them to provide moonlight-free and -corrected images. The clouds and sunglint, added for aesthetic effect, are derived from Moderate Resolution Imaging Spectroradiometer (MODIS) land surface and cloud cover products. The researchers analyze night lights data and develop software algorithms that make night lights imagery clearer, more accurate and readily available.

Image and text credit: NASA's Earth Observatory/Joshua Stevens, NASA GSFC/Miguel Román

Born April 11, 1928, Barbara Paulson was a "computer" at NASA's Jet Propulsion Laboratory (JPL) who calculated the trajectory and orbit of the Explorer 1 satellite with just a mechanical pencil and some graph paper, confirming the first successful launch of a U.S. satellite in 1958. She retired in 1993 after a 45-year career at JPL, working on explorations of the Moon and Mars, and the journeys of the Voyager 1 and 2 spacecraft. Photo courtesy of Barbara Paulson.

December 2017

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
24/31	25	26	27	28	29	30

February 2018

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			

FEBRUARY 2018

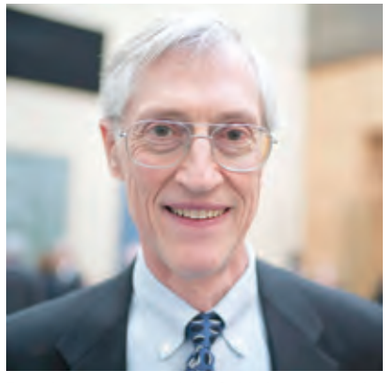
New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4	5	6	7	8	9	10
11 02/11/2015 Launch of NOAA's Deep Space Climate Observatory (DSCOVR) from Cape Canaveral's Launch Complex 40 in Florida.	12	13	14	15	16	17
18	19 Washington's Birthday (observed date)	20	21	22 02/22/2017 Astronomers announce the discovery of the first known system of seven Earth-size exoplanets found in the habitable zone of ultra-cool dwarf star TRAPPIST-1.	23	24
25	26	27	28			

Spiral Galaxy Pair NGC 4302 and NGC 4298

When the Hubble Space Telescope launched aboard the Space Shuttle Discovery on April 24, 1990, astronomers could only dream what they might see. Now, 27 years and more than a million observations later, the telescope delivers yet another magnificent view of the universe—this time, a striking pair of spiral galaxies much like our own Milky Way. These galaxies, which are approximately 55 million light-years away, give astronomers an idea of what our own galaxy would look like to an outside observer. The edge-on galaxy is called NGC 4302, and the tilted galaxy is NGC 4298. Although the pinwheel galaxies look quite different because they are angled at different positions on the sky, they are actually very similar in terms of their structure and contents.

Image and text credit: NASA, ESA, and M. Mutchler (STScI)



Born August 7, 1946, John C. Mather, who works at NASA's Goddard Space Flight Center, is an American astrophysicist, cosmologist and Nobel Prize in Physics laureate for his work on the Cosmic Background Explorer Satellite (COBE). Photo credit: Christopher Mich

January 2018

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	1	2	3	4	5	6
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21	22	23	24	25	26	27
28	29	30	31			

March 2018

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18	19	20	21	22	23	24
25	26	27	28	29	30	31

MARCH 2018

New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	03/03/1915 The National Advisory Committee for Aeronautics (NACA) was formed to "supervise and direct the scientific study of the problems of flight." 3
4	5	03/06/2015 NASA's Dawn spacecraft makes a historical orbital insertion around the dwarf planet Ceres, the largest object in the asteroid belt. 6	7	8	9	10
11 Daylight Savings Time Begins	12	03/13/1781 William Herschel discovered the planet Uranus. 13	03/14/1879 Albert Einstein was born. 14	15	16	17
18	19	20	21	22	23	24
03/25/1961 Launch of Explorer 10, a mission that successfully monitored the solar wind and its interaction with the Earth's magnetic field. 25	26	27	28	29	30	31

Curiosity Approaches Vera Rubin Ridge

June 5, 2017- Sol 1717: NASA's Curiosity Mars rover snapped this self-portrait mosaic view during its trek to the Vera Rubin Ridge at the base of Mount Sharp inside Gale Crater—backdropped by the distant crater rim. The ridge appears as a thin band separating the redder rocks in the foreground and the crater rim in the distance. This colorized mosaic was composed using raw images from the Navigation Camera onboard Curiosity. NASA's Curiosity Mars rover, which landed near Mount Sharp, is examining clues on that mountain about long-ago lakes on Mars. This image shows a look ahead towards the regions Curiosity will be exploring, including four distinct geologic layers.

Image and text credit: NASA/JPL/Ken Kremer/Marco Di Lorenzo

Claudia Joan Alexander (1959 - 2015) was an American research scientist specializing in geophysics and planetary science. She earned her Ph.D. in plasma physics from the University of Michigan and was named *Woman of the Year* by the Association for Women Geoscientists. Alexander was a prolific scientist and worked on various topics, including: the evolution and interior physics of comets, Jupiter and its moons, magnetospheres, plate tectonics, space plasma, the discontinuities and expansion of solar wind, and the planet Venus. Photo credit: NASA

February 2018

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			

April 2018

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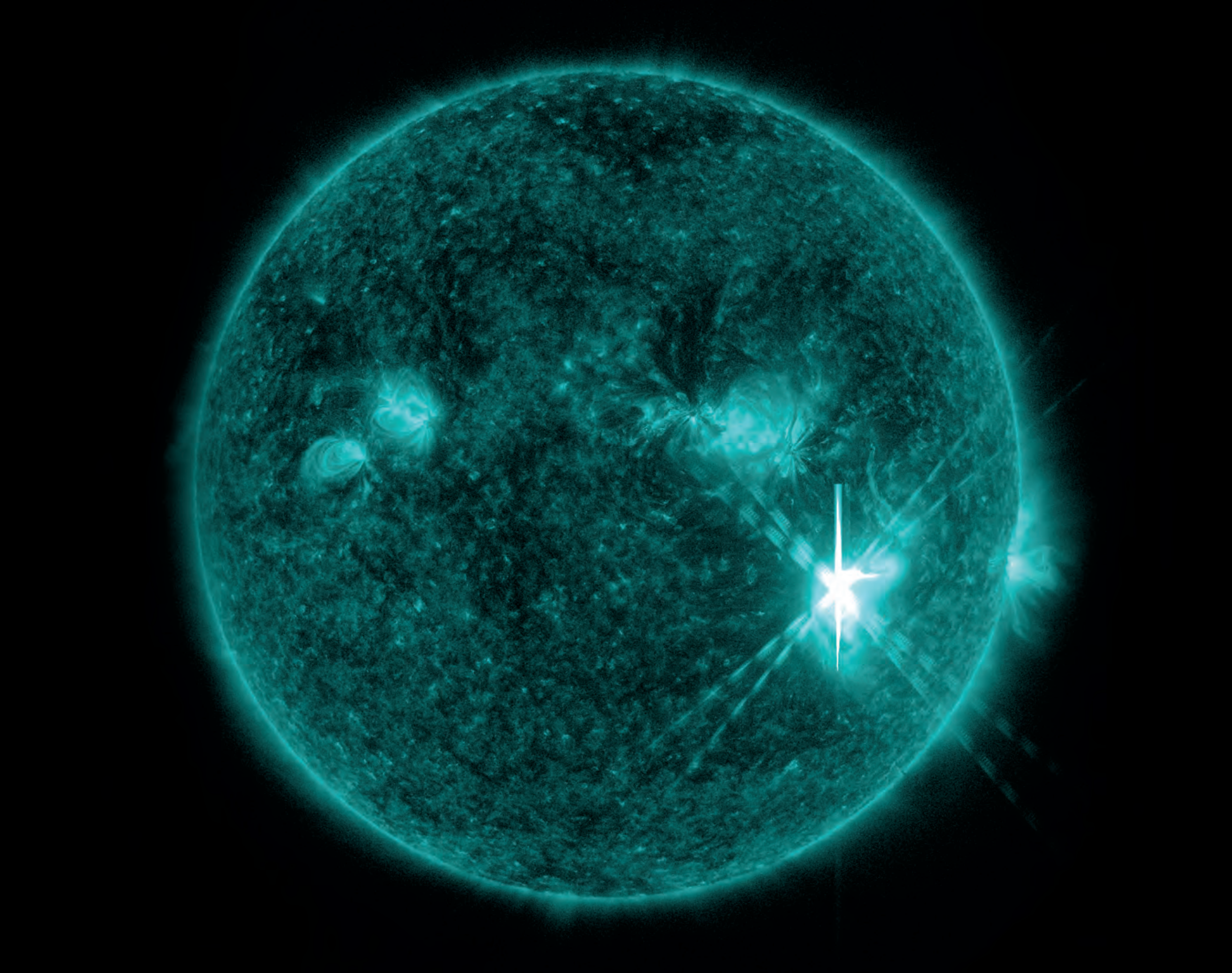
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					



APRIL 2018

New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3 04/03/1966 Luna 10 became the first spacecraft to orbit the Moon.	4 04/04/1997 Launch of STS-83 Space Shuttle Columbia, on the first Microgravity Science Laboratory mission.	5 04/05/1973 Launch of Pioneer 11, the second spacecraft to reach Jupiter and the first to fly by Saturn.	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28 04/28/2006 Launch of the USA/French CALIPSO and CloudSat satellites, together on a Delta II booster.
29	30					

Solar Fireworks

A giant solar flare erupted from the Sun on September 6, 2017, as seen in this image captured by NASA's Solar Dynamics Observatory, which watches the Sun constantly. Solar flares are powerful bursts of radiation. Harmful radiation from a flare cannot pass through Earth's atmosphere to physically affect humans on the ground. However—when intense enough—they can disturb the atmosphere in the layer where GPS and communications signals travel.

The flare in this image was an X9.3 flare. X-class denotes the most intense flares, while the number provides more information about its strength. When it erupted, the X9.3 flare was the largest flare observed since 2005 and the largest of its solar cycle, the approximately 11-year-cycle during which the Sun's activity waxes and wanes.

The image shows light in the 131 Angstrom wavelength, which is particularly good for highlighting the hot solar material present in flares, and which is typically colorized in teal.

Image and text credit: NASA/GSFC/SDO

Galileo Galilei (1564 - 1642) was an Italian scientist who pioneered the study of the solar system using telescopes. Among his other accomplishments as a scientist and an astronomer, Galileo discovered sunspots, dark spots on the Sun that appear and disappear over time.

March 2018

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May 2018

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27	28	29	30	31		

MAY 2018

New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4 05/04/2002 Launch of the Aqua satellite, designed to study details of the Earth's water cycle. The spacecraft was formerly known as 'EOS PM-1.'	5
6	7	8	9	10	11 05/11/1996 Asteroid 12820 Robinwilliams is discovered by Spacewatch at Kitt Peak National Observatory. The asteroid is named in honor of actor and comedian Robin Williams.	12
13 Mother's Day	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28 Memorial Day	29	30	31 05/31/1975 The European Space Agency (ESA) was created.		

NASA Says Goodbye to a Pathfinder Earth Satellite After 17 Years

The Mt. Kilimanjaro snowcap is seen in this January 2017 image taken by the Pathfinder Earth Observing-1 (EO-1) satellite just months before the mission ended. Originally designed to last one year, EO-1 spent 17 years in orbit providing a variety of Earth data, including observations of forest cover, crops, coastal waters and aerosols. One of EO-1's most important achievements was to validate the Advanced Land Imager (ALI), which influenced the development of later Earth-observing technologies—including the Operational Land Imager (OLI) on Landsat 8, a NASA-U.S. Geological Survey (USGS) mission launched in February 2013.

Image and text credit: NASA's Earth Observatory

Astronaut and climate scientist Piers Sellers (1955 - 2016), a veteran of three missions to the International Space Station, was deputy director of NASA's Goddard Space Flight Center Sciences and Exploration Directorate and director of its Earth Sciences Division. He was the first project scientist on the ongoing Terra mission and his work on biosphere-climate interactions has been cited thousands of times. He led major field campaigns combining ground, airborne and satellite measurements at an unprecedented scale. Photo credit: NASA

April 2018

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29	30					

June 2018

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2018 YEAR AT A GLANCE

January

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February

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March

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April

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May

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June

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NASA SCIENCE | OPERATING & FUTURE MISSIONS

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WEBB
KEPLER
XMM-NEWTON*
ISS-CREAM
HUBBLE
IXPE
CHANDRA
FERMI
ISS-NICER
EUCLID*
NEW HORIZONS
SWIFT
TESS
NUSTAR
NEOWISE
VOYAGER 1
VOYAGER 2
SPITZER
WFIRST
PARKER SOLAR PROBE
THEMIS
WIND
MMS
SOFIA
TWINS
VAN ALLEN PROBES
HINODE*
GOLD
ICON
GEOTAIL
TIMED
ACE
DSCOVR*
AIM
BEPICOLOMBO*
SOHO*
RHESSI
SET-1
SDO
SOLAR ORBITER*
STEREO
IRIS
IBEX
JUICE*
PSYCHE
JUNO
OSIRIS-REX
EUROPA CLIPPER
LUCY

DAWN
MARS ODYSSEY
MARS EXPRESS*
EXOMARS 2016*
OPPORTUNITY
CURIOSITY
EXOMARS 2020*
INSIGHT
MARS 2020
MAVEN
MRO
ISS (3)
NISAR
ICESAT-2
ISS (3)
SORCE
CALIPSO
MAIA
OCO-2
LANDSAT 9
OSTM/JASON 2
CLOUDSAT
TROPICS
AQUA
LANDSAT 7, 8
SUOMI NPP
GRACE-FO
GPM
SMAP
SENTINEL-6A/B*
GRACE
QUIKSCAT
JPSS-2*
TERRA
SWOT
CYGNSS
GEOCARB
AURA
TEMPO
LRO
ASTROPHYSICS
PLANETARY SCIENCE
HELIOPHYSICS
EARTH SCIENCE
FUTURE MISSIONS IN BOLD
* PARTNER-LED
SEPTEMBER 2017
Illustration: NASA/Jenny Mottar

July

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29	30	31				

August

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26	27	28	29	30	31	

September

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23/30	24	25	26	27	28	29

October

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21	22	23	24	25	26	27
28	29	30	31			

November

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18	19	20	21	22	23	24
25	26	27	28	29	30	

December

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16	17	18	19	20	21	22
23/30	24/31	25	26	27	28	29

JUNE 2018

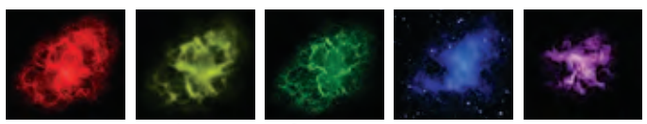
New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	06/02/1966 Surveyor 1 made the first U.S. soft landing on the Moon. 2
3	4	5	6	7	8	9
10	06/11/2008 Launch of the Fermi spacecraft (Gamma-ray Large Area Space Telescope) on a mission to provide data on very high-energy astronomical events/objects. 11	12	13	14 Flag Day	15	16
17 Father's Day	18	19	20	21	22	23
24	06/25/1908 Astronomer George Ellery Hale discovers magnetic fields on the Sun. 25	26	27	28	29	30

Crab Nebula in Multiple Wavelengths

The Crab Nebula, the result of a supernova explosion seen by Chinese and other astronomers in the year 1054, is 6,500 light-years from Earth. At its center is a super-dense type of neutron star called a pulsar, which rotates once every 33 milliseconds, shooting out rotating lighthouse-like beams of radiation spanning nearly the entire electromagnetic spectrum from radio waves to gamma rays. This image of the Crab Nebula was assembled by combining data from five telescopes: The Very Large Array (radio) in red; Spitzer Space Telescope (infrared) in yellow; Hubble Space Telescope (visible) in green; XMM-Newton (ultraviolet) in blue; and Chandra X-ray Observatory (X-ray) in purple. The nebula's intricate shape is caused by a complex interplay of the pulsar, a fast-moving wind of particles coming from the pulsar, and material originally ejected by the supernova explosion and by the star itself before the explosion.

Image and text credit: NASA, ESA, G. Dubner (IAFE, CONICET-University of Buenos Aires) et al.; A. Loll et al.; T. Temim et al.; F. Seward et al.; VLA/NRAO/AUI/NSF; Chandra/CXC; Spitzer/JPL-Caltech; XMM-Newton/ESA; and Hubble/STScI



Radio · Infrared · Optical · Ultraviolet · X-ray

Born May 16, 1925, Nancy Grace Roman is an American astronomer who was one of the first female executives at NASA. She is known to many as the "Mother of Hubble" for her role in planning the Hubble Space Telescope. Photo credit: NASA

May 2018

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
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27	28	29	30	31		

July 2018

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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				

JULY 2018

New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4 Independence Day	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	07/20/1969 Apollo 11 landed safely on the Moon. 07/20/1976 Viking 1 landed safely on Mars. 20	21
22	07/23/1972 Launch of the Earth Resources Technology Satellite, later known as Landsat 1. 23	24	25	26	27	28
07/29/1958 President Eisenhower signed the “National Aeronautics and Space Act of 1958,” thereby establishing NASA. 29	30	31				

Jupiter’s Clouds of Many Colors

NASA’s Juno spacecraft was racing away from Jupiter following its seventh close pass of the planet when JunoCam snapped this image on May 19, 2017, from about 29,100 miles (46,900 kilometers) above the cloud tops. The spacecraft was over 65.9 degrees south latitude, with a lovely view of the south polar region of the planet.

This image was processed to enhance color differences, showing the amazing variety in Jupiter’s stormy atmosphere, from the swirling cyclones at the planet’s poles to its great white ovals, storms and stripes of gas.

The result is a world of vibrant color, clarity and contrast. Four of the white oval storms known as the “String of Pearls” appear on the right side of the image. Interestingly, one orange-colored storm can be seen at the belt-zone boundary, while other storms are more of a cream color.

Image and text credit: NASA/JPL-Caltech/SwRI/MSSS/Gerald Eichstädt /Seán Doran

Carolyn Jean Spellmann Shoemaker (*center*) (born June 24, 1929) is an American astronomer and Eugene Merle Shoemaker (*right*) (1928 - 1997), also known as Gene Shoemaker, was an American geologist and one of the founders of the field of planetary science. The couple co-discovered the Comet Shoemaker–Levy 9 in 1993 with David H. Levy (*left*) (born May 22, 1948). Levy is a Canadian astronomer, science writer and discoverer of comets and minor planets. Carolyn once held the record for most comets discovered by an individual. Comet Shoemaker–Levy 9 hit Jupiter in July 1994; the impact was televised around the world. Photo credit: USGS

June 2018

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

August 2018

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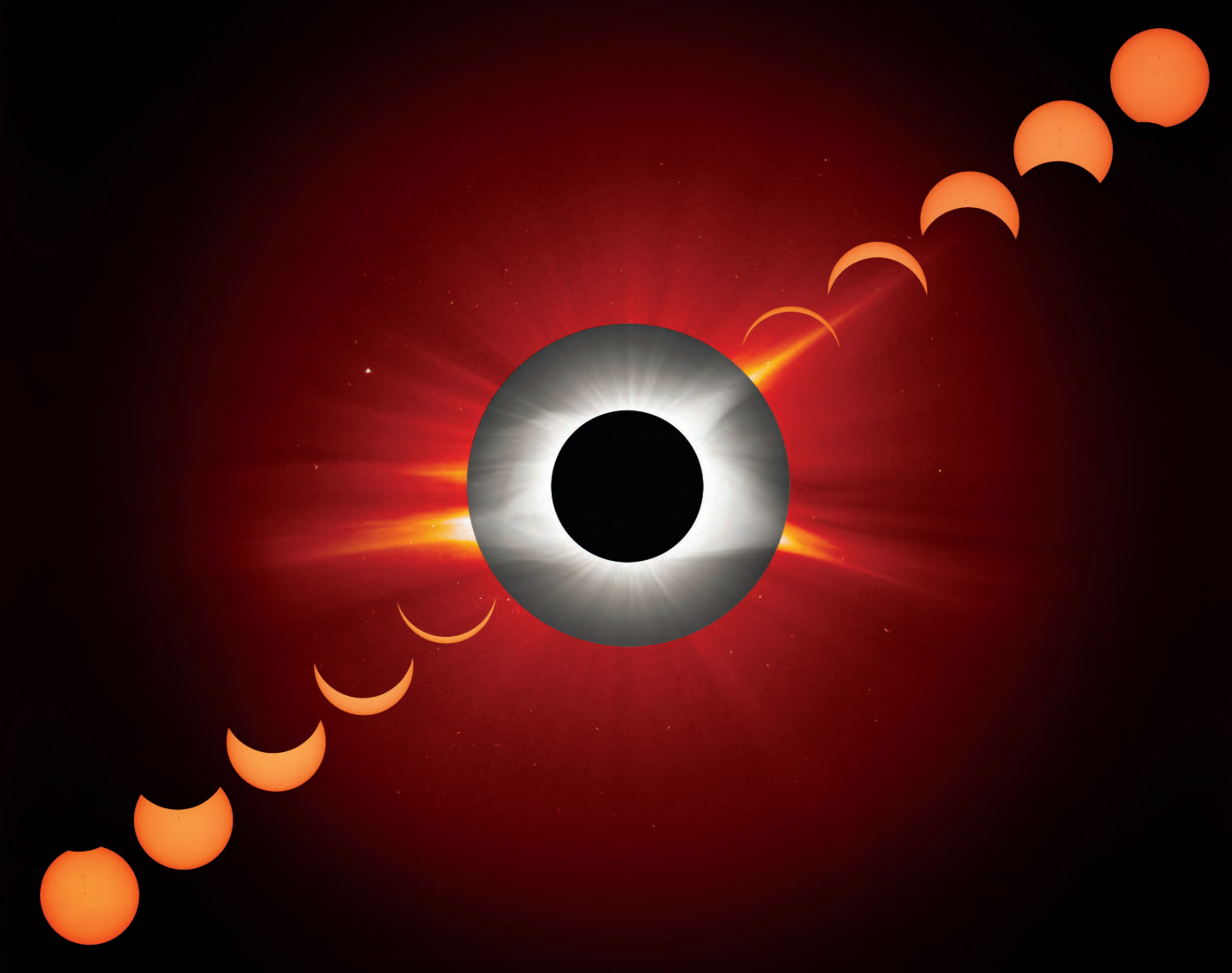
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	



AUGUST 2018

New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4
5	08/06/1996 Evidence of microbial paleo-life in Martian meteorite ALH84001 was announced. 6	7	8	9	10	08/11/1877 Asaph Hall, at the U.S. Naval Observatory, first observed the Martian moon, Deimos. 11
12	13	14	15	16	17	18
19	20	21	22	08/23/1966 The first image of Earth from the vicinity of the Moon is captured by Lunar Orbiter 1. 23	24	25
26	27	28	29	30	31	

Multiple Views of a Total Eclipse

The center ground-based image of the total solar eclipse from August 21, 2017, clearly shows the structure of the Sun's atmosphere, the corona. While we have instruments to enable us to see much of the dim corona by obscuring the bright light of the Sun, the only time one can see the very lowest part of the Sun's atmosphere is during a total solar eclipse.

The structure of the corona—defined by giant magnetic fields sweeping out from the Sun's surface—can clearly be seen extending into the outer image from ESA/NASA's Solar and Heliospheric Observatory, which watches the Sun from space. The more scientists understand about the lower corona, the more they can understand what causes the constant outward stream of material called the solar wind, as well as occasional giant eruptions called coronal mass ejections.

Additional ground-based images of the partial eclipse are superimposed across the image.

Image and text credit: ESA/NASA/SOHO
Ground-based eclipse images: Jay Pasachoff, Ron Dantowitz, Christian Lockwood and the Williams College Eclipse Expedition/NSF/National Geographic

Walter Maunder (1851 - 1928) was a British astronomer who studied dark spots on the Sun known as sunspots, which wax and wane in response to the Sun's approximately 11-year cycle. Maunder's research showed a dearth of sunspots from 1645 to 1715, a period of time now known as the Maunder minimum. Photo credit: UC Santa Cruz University Library

July 2018

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 2018

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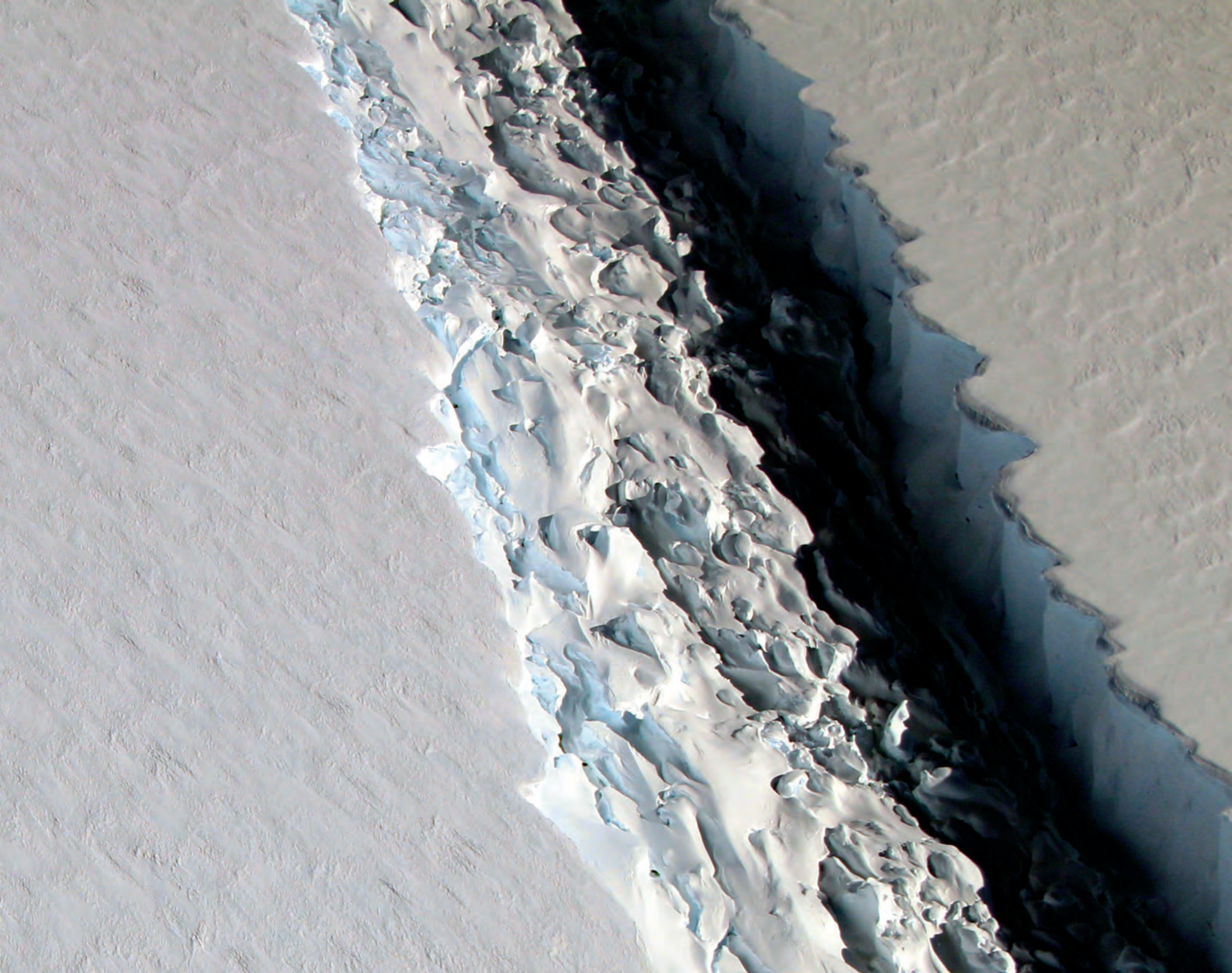
16	17	18	19	20	21	22
23/30	24	25	26	27	28	29



SEPTEMBER 2018

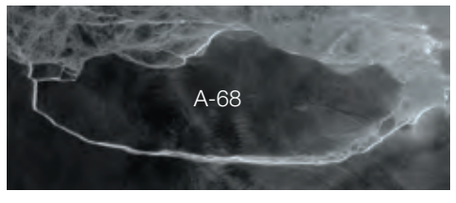
New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	09/03/1976 The Viking 2 lander safely touched down on the Martian surface. 3 Labor Day	4	5	6	7	8
09/09/1975 Launch of the Viking 2 Mars spacecraft, a combination of orbiter and lander components. 9	10	11	12	13	14	15
16	17 Constitution Day	18	19	20	09/21/2014 The robotic Mars Atmosphere and Volatile EvolutioN (MAVEN) spacecraft enters elliptical orbit around Mars following a ten-month interplanetary voyage. 21	22
23 30	24	25	26	27	28	29

Rift in Antarctica's Larsen C Ice Shelf

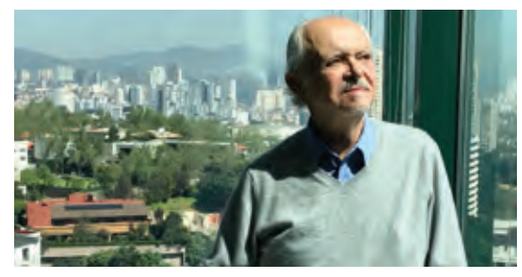
In November 2016, scientists on NASA's IceBridge mission photographed this massive rift in the Antarctic Peninsula's Larsen C ice shelf, a floating platform of glacial ice abutting the grounded ice behind it. The image shows the jagged edges of the fractured ice shelf as well as the partly-shadowed mix of ice blocks, sea ice and snow that floats on the ocean below and filled the growing rift. IceBridge scientists on board NASA's DC-8 research aircraft measured the Larsen C fracture at about 90 miles (~145 kilometers) long, more than 300 feet (~91 meters) wide and about 900 feet (~274 meters) deep at about 68 degrees south latitude. In July 2017, the crack broke through the ice shelf front and a 2,240-square-mile (~5,800-square-kilometer) iceberg, roughly the size of Delaware, began to float freely in the Weddell Sea (see inset image below). The release of this large iceberg reduced the area of the Larsen C ice shelf by more than 10 percent.

Image and text credits: NASA/John Sonntag, NASA GSFC/UMBC JCET/Christopher Shuman



While Antarctica was shrouded in darkness during the Southern Hemisphere winter, the Thermal Infrared Sensor (TIRS) on Landsat 8, a NASA-U.S. Geological Survey (USGS) mission, captured this view of the iceberg (named A-68) as it floated in the Weddell Sea on July 30, 2017. The strong temperature contrast between the relatively warm, bright ocean water and the colder, darker ice shelf and icebergs is clearest along thin breaks in the surrounding sea ice called leads.

Image and text credit: NASA GSFC/UMBC JCET/Christopher Shuman



Born March 19, 1943 in Mexico City, Mario J. Molina was awarded the 1995 Nobel Prize in Chemistry along with Paul J. Crutzen and F. Sherwood Rowland for work on the role of "atmospheric chemistry, particularly concerning the formation and decomposition of ozone." Molina, who earlier worked at NASA's Jet Propulsion Laboratory and is a Distinguished Professor of Chemistry and Biochemistry at the University of California, San Diego, played a key role in the discovery of the threat of chlorofluorocarbons in the atmosphere. Among his many honors, Molina received the Presidential Medal of Freedom in 2013. Molina currently serves as president of the Mario Molina Center for Strategic Studies on Energy and the Environment in Mexico City. Photo courtesy of Mario J. Molina.

August 2018

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			1	2	3	4
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26	27	28	29	30	31	

October 2018

S	M	T	W	T	F	S
	1	2	3	4	5	6
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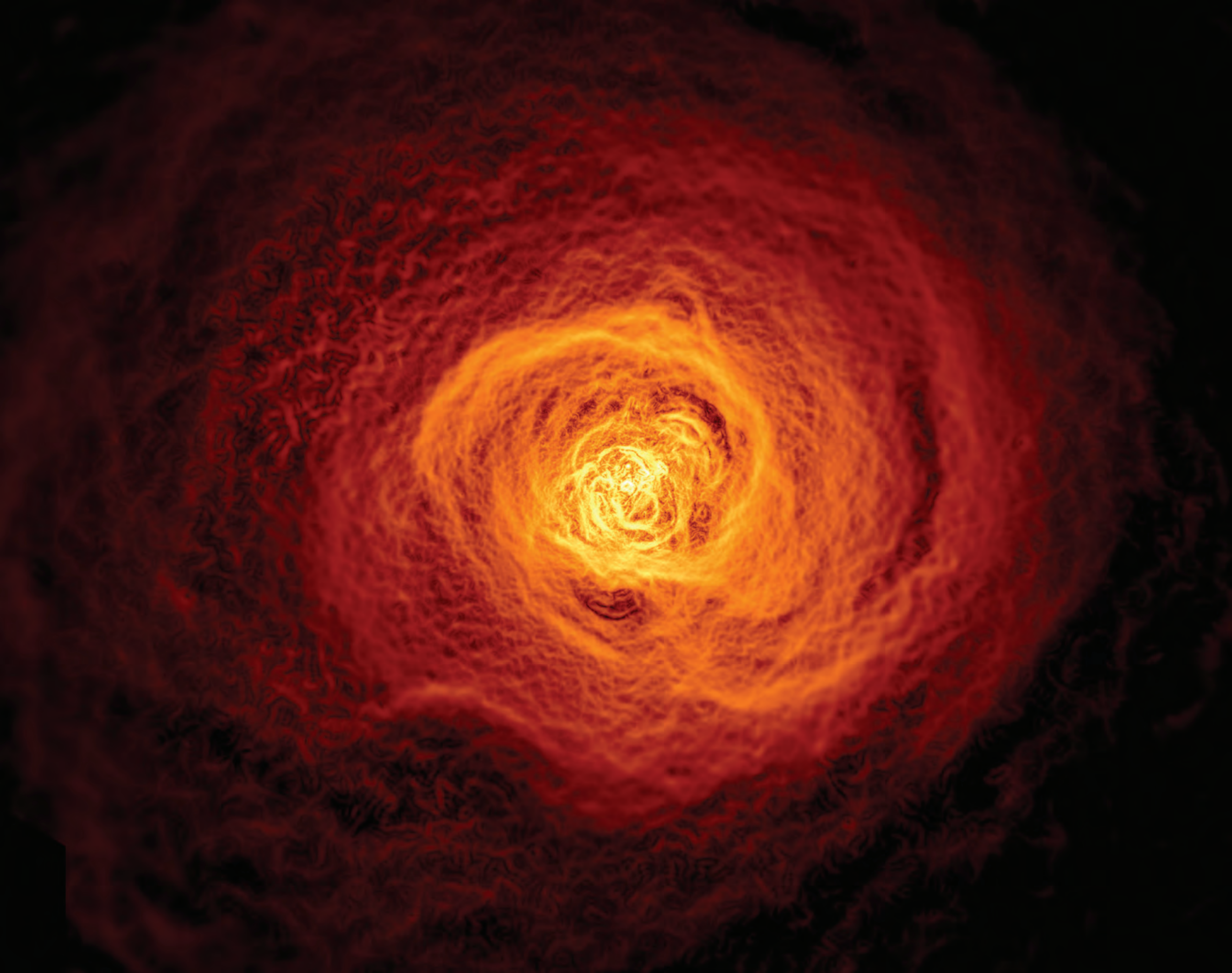
28	29	30	31			



OCTOBER 2018

New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 10/01/1958 The National Aeronautics and Space Administration (NASA) was founded.	2	3 10/03/2006 Astrophysicists John C. Mather of NASA's Goddard Space Flight Center and George F. Smoot of the University of California Berkeley share the 2006 Nobel Prize for Physics.	4	5	6
7	8 Columbus Day	9 10/09/1604 First appearance of Supernova 1604 (SN 1604), recorded by observers in northern Italy, China, and Korea. Better known as Kepler's Supernova, it was named after Johannes Kepler.	10	11	12	13
14	15	16	17 10/17/1978 Half of the Nobel Prize in Physics was awarded to Arno Allan Penzias and Robert Woodrow Wilson for their discovery of cosmic microwave background (CMB) radiation.	18	19 10/19/1967 Mariner 5 flew by Venus successfully. 10/19/2008 Launch of the Interstellar Boundary EXplorer spacecraft (IBEX).	20
21	22	23	24	25	26	27
28	29	30 10/30/1964 First flight of NASA's Lunar Landing Research Vehicle (LLRV).	31 Halloween			

Giant Wave Rolling through the Perseus Galaxy

Combining data from NASA's Chandra X-ray Observatory with radio observations and computer simulations, scientists have found a vast wave of hot gas in the Perseus galaxy cluster. Spanning some 200,000 light-years, the wave is about twice the size of the Milky Way galaxy. Researchers think the wave formed billions of years ago after a small galaxy cluster grazed Perseus and caused its vast supply of gas to slosh around in an enormous volume of space.

Image and text credit: NASA/CXC/GSFC/S.A.Walker, et al.

Born January 26, 1939, William J. Borucki is an American space scientist who worked at NASA's Ames Research Center. He conceived and led NASA's Kepler mission, which revolutionized the field of extrasolar planets. Photo credit: NASA

September 2018

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
23/30	24	25	26	27	28	29

November 2018

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				1	2	3
4	5	6	7	8	9	10
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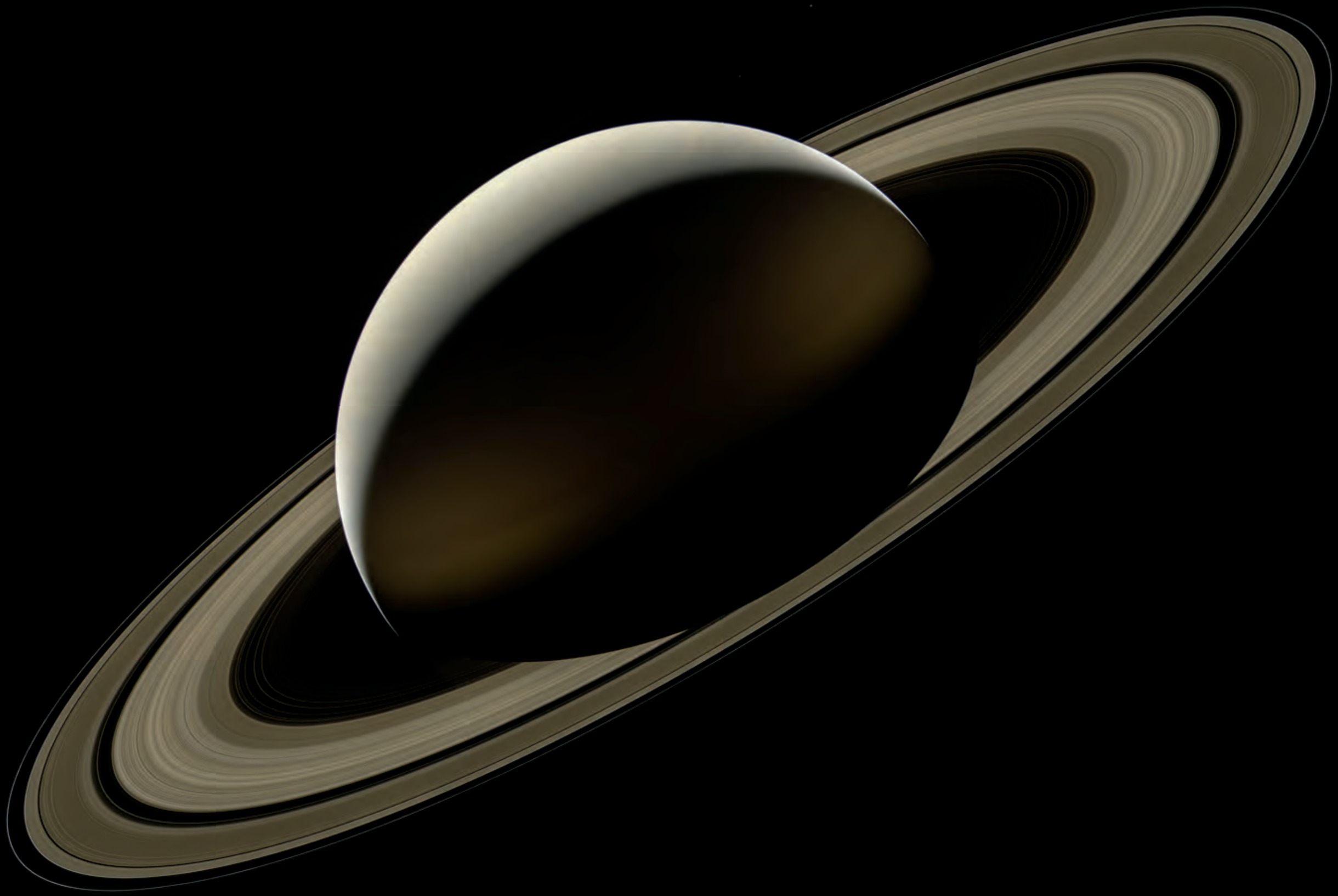

NOVEMBER 2018

New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3
4 Daylight Savings Time Ends	5	6 Election Day	7	8	9	10
11	12 Veterans Day (observed date)	13	14	15	16 11/16/1965 Launch of Venera 3, the first spacecraft to hit another planet; unfortunately in this case after communications had been lost.	17
18	19	20 11/20/2004 Launch of the SWIFT satellite, on a mission to detect and observe an astronomical phenomenon called gamma ray bursts (GRBs) and their aftermath.	21	22 Thanksgiving Day	23	24
25	26 11/26/2011 Launch of the Mars Science Laboratory, the Curiosity rover.	27	28 11/ 28/1967 The first pulsar was discovered by Cambridge graduate student S. Jocelyn Bell. Pulsars were later proved to be the by-products of stellar explosions.	29	30	

Cassini's Saturn Farewell Portrait

NASA's Cassini spacecraft captured this dazzling farewell portrait of Saturn two days before its mission-ending plunge into the planet. Saturn itself casts a shadow on the rings. The planet's night side is dimly lit by sunlight reflected from the rings. The view was obtained on September 13, 2017, at a distance of about 684,000 miles (1.1 million kilometers) from Saturn. The rings span a distance almost as large as the distance between the Earth and the Moon.

Image and text credit: NASA/JPL-Caltech/Space Science Institute

Carl Edward Sagan (1934 - 1996) was an American astronomer, cosmologist, astrophysicist, astrobiologist, author, science popularizer, and science communicator. Sagan assembled the first physical messages sent into space: the Pioneer plaque and the Voyager Golden Record, universal messages that could potentially be understood by any extraterrestrial intelligence that might find them. Sagan argued the now accepted hypothesis that the high surface temperatures of Venus can be attributed to and calculated using the greenhouse effect. Photo credit: NASA/Cosmos Studies

October 2018

S	M	T	W	T	F	S
	1	2	3	4	5	6
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21	22	23	24	25	26	27
28	29	30	31			

December 2018

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						1
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9	10	11	12	13	14	15
16	17	18	19	20	21	22
23/30	24/31	25	26	27	28	29

DECEMBER 2018

New Moon · First Quarter · Full Moon · Last Quarter

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4 12/04/1978 Pioneer Venus 1 entered orbit around Venus, the first spacecraft to accomplish that feat.	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23 30	24 31	25 12/25/1642 Isaac Newton, arguably one of the world's greatest scientists, was born. Christmas Day	26	27	28	29

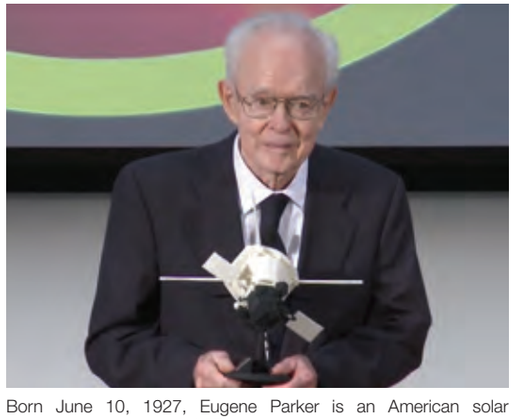
Dance of Lights as Seen from the International Space Station

Bright swaths of red, known as airglow, can be seen above Earth's horizon in this image from the International Space Station. Airglow forms in a layer of charged particles in the upper atmosphere, the ionosphere, which—while close to home—has been historically hard to observe. NASA's new Ionospheric Connection, or ICON, explorer observes variations in such airglow to track changes in the ionosphere.

The bright lights in the lower left of the image are flashes of lightning from a storm in the lower atmosphere. The ionosphere can be affected both by terrestrial weather from below and space weather coming in from above. ICON, and another new ionospheric mission, the Global-scale Observations of the Limb and Disk, or GOLD, focus on understanding how the ionosphere responds to both kinds of weather.

The more we understand about the ionosphere—which is home to astronauts, satellites, and radio signals used to guide airplanes and ships—the more we can provide situational awareness to protect human interests in space.

Image and text credit: NASA/ISS



Born June 10, 1927, Eugene Parker is an American solar astrophysicist who, in 1957, first predicted the existence of the solar wind, a steady stream of particles flowing out from the Sun. NASA named its upcoming mission to touch the Sun, the Parker Solar Probe, after Dr. Parker—the first time that a spacecraft has been named for a living individual. Photo credit: NASA

November 2018

S	M	T	W	T	F	S
				1	2	3
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18	19	20	21	22	23	24
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January 2019

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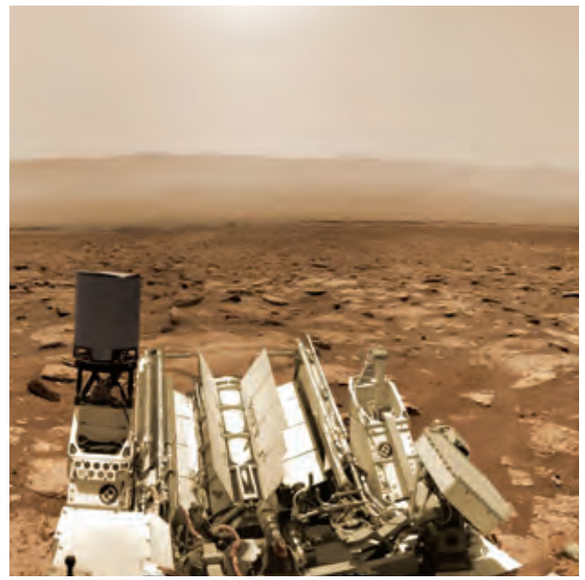
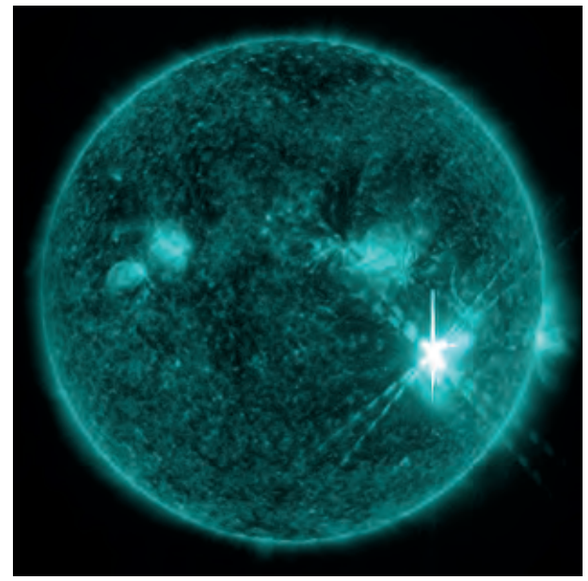
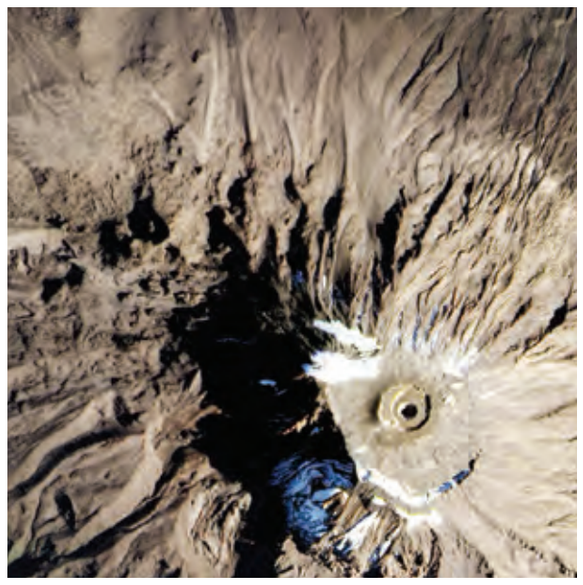

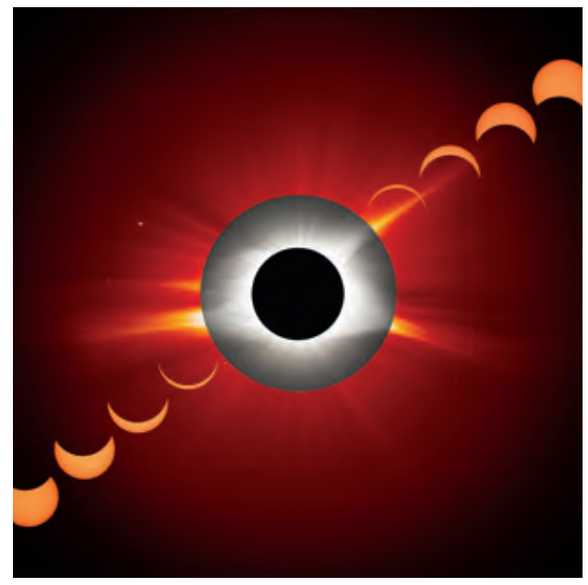
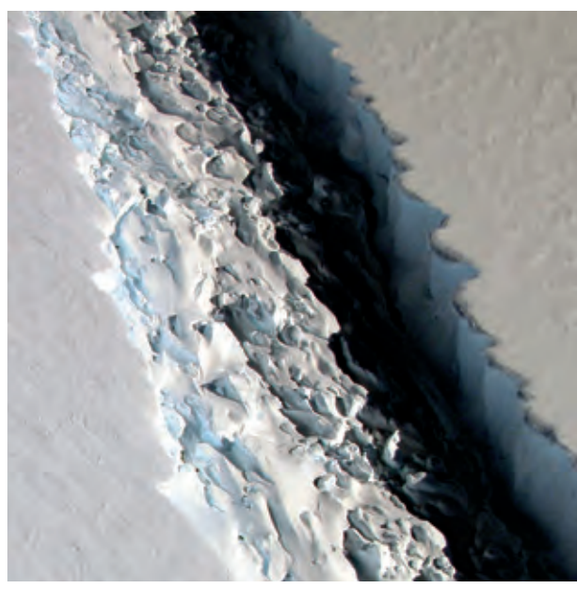
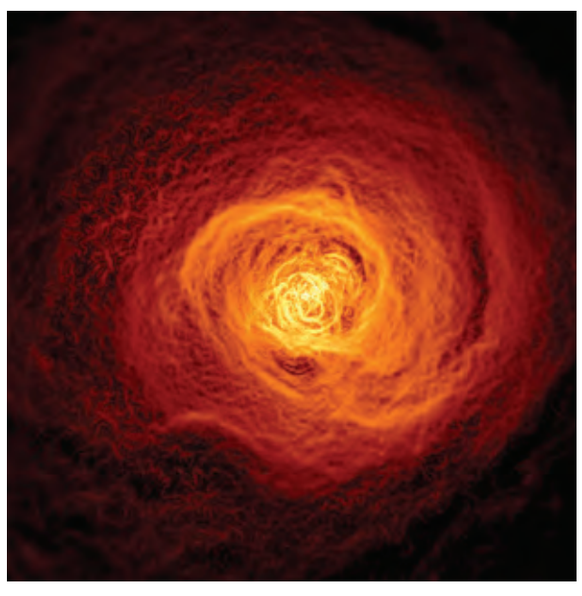

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