Celestial Observer

The Official Newsletter of the
Amateur Observers' Society of NY, Inc.
A 501(c)3 organization

DEC 2020

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Next Meeting: Sunday, Dec 6, 1:30pm
Online Digital

www.facebook.com/pages/Amateur-Observers-Society-of-New-York-AOSNY/368529386242

For Meeting Invitation Contact AOSSecretary@aosny.org

The President's Message-Sue Rose

Greetings all. I hope everyone had a safe and healthy Thanksgiving and wish everyone the same with the upcoming holidays. We live in difficult times that will hopefully end soon so we can get back together and do the social things that we do and truly give thanks.

We had 2 wonderful presentations in Nov. **Dr. Hai-Bo Yu,** a Theoretical Physicist from USC Riverside spoke about the loss of dark matter, https://www.syfy.com/syfywire/why-dark-matter-is-missing-from-these-galaxies**,** and **Brother Guy Consolmagno,** Director of the Vatican Observatory and President of the Vatican Observatory Foundation who spoke about things we thought were correct, but weren't. The more we progress, the more we learn and discover that what we thought we knew, we really didn't because it was based upon the knowledge of the time. Fascinating work by both men. Our own **Joe Rao** will enlighten us at the Dec 6 meeting about the upcoming Geminid Meteor Shower, the Solstice Conjunction of Saturn and Jupiter and other things to look forward to in the new year. **Jason C** continues to line up great presenters for our upcoming meetings as well. Thanks Jason. We are always looking for people who wish to share their research, observations, theories, techniques, etc. If you would like to be among this distinguished list, or know of someone who would, please contact Jason.

Our usual Holiday Party is unfortunately canceled due to health & safety concerns. Let's hope we can gather for our summer barbeque and return to our outreach programs next year.

In this midst of this crazy world, our intrepid Director of the Susan Rose Observatory on the grounds of Custer Institute in Southold, **Bill C**, with help from **Jason** and **Bill B**, has continued to bring the night sky objects into view for the public outside using digital means to project images captured by our C14 within the dome. Thank you all. Sagamore Hill is waiting for us to be able to bring the night sky views back to their visitors. Until we are sure that virus transmission won't occur via eyepiece use, we'll need to continue with digital equipment.

Some of the programs have been recorded. Contact Jason for information. We greatly appreciate all those who have graciously given us their time on a Sunday afternoon and for those who we will visit with in the upcoming months.

Wishing everyone a safe and healthy New Year.

Hoping to see everyone at our online meetings. The next one is Sunday, Dec 6, 1:30pm.

Remember, the only dumb question is the one you don't ask.

Friends are like stars. You don't always see them,
but you know they are always there!

Please, everyone, be safe and be careful. We will get together at some point. Till then,

The AOS expresses its deepest appreciation to Custer Institute for hosting our Suffolk Observatory and the Sierra Club, Long Island Group, for the 20" telescope, http://newyork.sierraclub.org/longisland/

Rest in Peace Arecibo The world's largest radio telescope succumbed to several storms and collapsed under its' own weight. Incredible discoveries and highlight its' venerable career.

Amazon Smile Donation to AOS

Thanks to everyone who make their purchases through Amazon Smile. It costs nothing extra for you and AOS gets a small donation from every purchase. If you have questions, please contact our **Treasurer.** We received over $50 this last quarter. Thank you.

Observers' Handbook from RASC- order this excellent publication through the Astronomical League. AOS members are members of the AL and get a discount. Your name is on file because you get the Reflector Magazine from them. Go to https://store.astroleague.org/index.php for the US edition. S&H is **NOT** included.

Observing-The nights are getting longer as the Sun sinks faster into the western horizon. Since temps are still reasonable, don't miss the opportunity to go out and do some observing. Try the **www.GlobeatNight.org** program to help map light pollution. Work on one of the Astronomical League or AOS observing programs. If you need suggestions, let Sue know or put a note on the hotline. I might suggest th**at** you purchase a StarGazing permit from the NYS Parks Dept. Offices are at the beaches or at the main office off the Southern State exit 37N. Be aware, the restrooms are not open during the cold months. The permit is good from Jan 1-Dec 31 each year and is for the vehicle, regardless of the number of occupants. Just be sure you have some star gazing equipment, like a star map.

Stargazing in the NYS Parks- It's a good idea to put a note on the hotline and let others know you're going so you might get some company, socially distanced of course. No eyepiece sharing. **ALWAYS** tell someone where you will be. You might also call the NYS Police at 631-669-2500 to let them know you'll be there. PLEASE, make sure it is in your cell phone in a speed dial. This may be your only place to observe for the foreseeable future. Restrooms are not open during the winter so be prepared.

Our observatory in Southold at the Custer Institute is open on clear Sat nights under the auspices of our **Director Bill C** who uses digital equipment to provide magnified views of heavenly bodies as seen through or C14 SCT. He can always use extra help.

GREAT NEWS-We have been advised that our facility at Jones Beach will once again become available some time in the new year. There is also a new Nature Center, 1 field further west where we may hold programs for the public. Things are looking up and we hope to have some space available to us again by special permit. We can't get into that area now due to the Holiday Light Show and virus testing facilities.

Geminid Meteor Shower

We are still awaiting confirmation, but it looks good that 4 parks, Sunken Meadow, Robert Moses, Jones Beach and Montauk will be open for the public to view the meteors on Oct 13-14. This is not an outreach program. We will not be doing anything for the public. It's just an opportunity for everyone to go to a reasonably dark area with a whole sky view. It's a Sunday night so that's also good. Check the hotline for confirmation.

US Solar Eclipses

In less than 3 years, there will be an annular solar eclipse over the south and midwest. In a little less than 4 years, the US will once again be treated to a total solar eclipse, this time stretching from Mexico, up though the center of the country into Canada, over Buffalo, etc. It's time to start making plans. Contact Sue to help.

Observing Projects for Month http://www.theskyscrapers.org/december

The Night Sky This Month –https://cosmicpursuits.com/night-sky-this-month/

Astronomy Magazine https://astronomy.com/observing/sky-this-week

Sky & Telescope Magazine https://skyandtelescope.org/ In-the-Sky.org

Globe at Night https://www.globeatnight.org/ **EarthSky** https://earthsky.org/

City of Stars on Facebook!-Linda P

Many of you may have heard of my *City of Stars* tours, mostly walking excursions sponsored by the AOS, to visit astronomy-related sites in Manhattan. These tours were inspired by an article written by Dr. Neil deGrasse Tyson in the January 2002 issue of *Natural History* magazine. **Tom L** and I have created a Facebook page, **City of Stars - New York City**, in which we have expanded Tyson's original list to 42 sites, mostly in Manhattan but also in surrounding areas, with brief descriptions, photos, maps, and links for further information. I hope you will visit **City of Stars - New York City**! www.Facebook.com/CityofStarsNYC. If you see any other potential sites on your travels around NYC and surrounding areas, please contact Linda. She'll be adding a website soon.

NASA's Space Place

This article is distributed by NASA Night Sky Network-The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Visitors to Both Jupiter and Saturn by David Prosper

Have you observed Jupiter and Saturn moving closer to each other over the past few months? On December 21, the two worlds will be at their closest, around 1/5 of a full Moon apart! While the two gas giants may *appear* close, in reality they are hundreds of millions of miles apart. Despite this vast distance, a select few missions have visited both worlds by using a gravity assist from giant Jupiter to slingshot them towards Saturn, saving time and fuel.

Pioneer 11 was the first mission to visit both worlds! Launched in 1973, the probe flew past Jupiter in late 1974, passing just 26,400 miles above its stormy clouds. In 1979, it became the first spacecraft to encounter Saturn. Pioneer 11 took the first up-close photos of Saturn and its satellites, and made many exciting discoveries, including the detections of its magnetic field and a faint "F" ring, before departing Saturn and eventually, the solar system.

The Voyager missions quickly followed up, taking a "Grand Tour" of the four largest and most distant planets in our solar system. Both probes were launched within two weeks of each other in 1977. Voyager 1 flew past Jupiter in March 1979, discovering Jupiter's faint ring and two new moons, along with active volcanoes on Io's surface! The probe then flew past Saturn in November 1980, discovering five new moons, a new "G" ring, mysterious ring "spokes," and "shepherd moons" shaping the rings. After a brief encounter with Titan revealed evidence of complex organic chemistry and liquid on the moon's frigid surface, Voyager 1 was flung out of the plane of the solar system. Following close behind, Voyager 2 took detailed photos of Jupiter's moons and cloud tops in July 1979. Flying past Saturn in August 1981, Voyager 2 measured the thickness of Saturn's rings and took detailed photos of many of its moons. This second explorer then captured images of Uranus and Neptune before leaving our solar system.

Cassini-Huygens was the last mission to visit both worlds. Launched in 1997, the mission flew past Jupiter in late 2000 and took incredibly detailed photos of its stormy atmosphere and faint rings. Cassini entered into Saturn's orbit on July 1, 2004. The Huygens probe separated from Cassini, landing on Titan to become the first probe in the outer solar system. Cassini discovered geysers on Enceladus, fine details in Saturn's rings, many more moons and "moonlets," the changing oceans of Titan, and seasonal changes on Saturn itself. After revolutionizing our understanding of the Saturnian system, Cassini's mission ended with a fiery plunge into its atmosphere on September 15, 2017.

What's next for the exploration of the outer worlds of our solar system? While Juno is currently in orbit around Jupiter, there are more missions in development to study the moons of Jupiter and Saturn. Discover more about future NASA missions to the outer worlds of our solar system at nasa.gov.

The difference in technology between generations of space probes can be stunning! The top two photos of Jupiter and Saturn were taken by Pioneer 11 in 1974 (Jupiter) and 1979 (Saturn); the bottom two were taken by Cassini in 2000 (Jupiter) and 2016 (Saturn). What kinds of photos await us from future generations of deep space explorers?

Crazy Facts About the Grumman Apollo Lunar Module

https://www.longisland.com/news/05-27-20/crazy-facts-about-the-grumman-apollo-lunar-module.html

By AOS Member Lon C Published: May 27 2020

Built on Long island by Long Islanders, the lander ferried the first men to the moon.

Photo: Public domain

During the Cold War, Russian launched the first artificial satellite called “Sputnik” and supercharged the space race. President John F. Kennedy promised we would put men on the moon by the end of the 1960s.

"I believe that this nation should commit itself to achieving the goal, before the decade is out, of landing a man on the moon and returning him safely to Earth," he said.

Spoiler alert: We did it.

The vehicle that carried us there was designed and built by Long Island-based Grumman Aerospace Corporation. Long Island is steeped in aerospace history and no accomplishment can rival the feat of rocketing humans to a heavenly body and back. (Read about five times Long Island made aviation history in our article here.)

Grumman was tasked with creating the vehicle that would take astronauts from the orbiting command module to the surface of the moon and back. It was known as the Lunar Module (affectionately called the “Lem.”)

See some historic pics of the Linar Lander here. https://www.longisland.com/news/05-27-20/history-pics-of-the-grumman-lunar-module.html

Below we present crazy and historical facts about the Grumman Lunar Module.

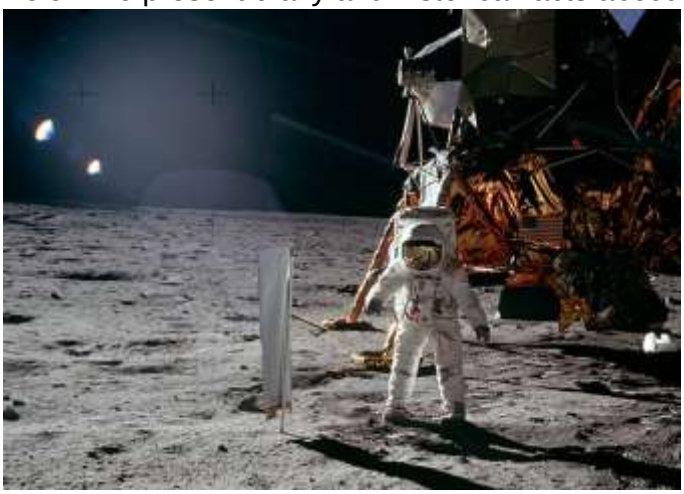

Photo: NASA.

History

- In 1962, NASA invited 11 companies to submit proposals for a lunar excursion module
- The proposal process was described by then vice president of Grumman Joseph G. Gavin Jr. as ”a game of Twenty Questions”
- Grumman Aircraft was awarded the contract on November 7, 1962
- All Lunar Modules were built on Long Island by Long Islanders
- The vehicle is now officially known as the Lunar Module
- It is affectionately known as the “Lem”
- According to a NASA history document, the lunar module was called "lunar excursion module (LEM)" until 1966
- It was renamed because the word "excursion" implied mobility on the moon and the vehicle did not have that capability
- The name was shortened to Lunar Module and abbreviated LM but was still referred to as “Lem”
- Later Apollo flights carried a lunar roving vehicle (LRV), aka "Rover" to provide greater mobility for the astronauts while on the surface of the moon
- Thomas J. Kelly is credited as the Grumman engineer who led the team that designed and built the LM
- Kelly was called the "father of the lunar module" by NASA
- Kelly is quoted as saying, “Remember, there are six descent stages today sitting on the moon... with a ‘Made in Bethpage, New York’ nameplate on them. And that’s something that thousands of Grummanites take great pride in."

- He wrote a book about it called “Moon Lander: How We Developed the Apollo Lunar Module”
- The LM carried two crewmen to the lunar surface (while one stayed in orbit in the Command and Service Module aka CSM)
- The LM was designed as a two-stage vehicle for space operations near and on the Moon
- The stages were ascent and descent
- Both stages were covered with gold, silver and black thermal shielding which gave the spacecraft a fragile appearance, according to the Cradle of Aviation Museum
- No aerodynamic design was needed for the LM as it was intended to perform its mission strictly in the vacuum of space, making it the first true spacecraft
- It was built of extremely light thin metal to conserve fuel while looking for a safe lunar landing spot during its mission
- Its function was to support two astronauts on the moon and returned them to the CSM in lunar orbit
- The LM was never flight tested because the lunar environment couldn’t be replicated, according to the Cradle of Aviation Museum
- Grumman built a Lunar Module Simulator to train astronauts for lunar landings
- The simulator operated at the Kennedy Space Center between 1968 and 1972 and was used by every Apollo astronaut to train for landing on the Moon prior to their mission
- The LM simulator had an early virtual reality function to help simulate landing on the moon
- Astronauts would sleep overnight inside it to prepare for three-day stays on the Moon
- Only one was built and it survived to this day
- The simulator is currently in the Cradle of Aviation Museum
- The LM was used during the Apollo missions taking the first humans to the moon and back
- NASA chose the name Apollo, because of the tradition of naming missions after Greek gods begun during the Mercury missions
- Apollo was the god of archery, prophecy, poetry, and music, and most significantly he was god of the sun. In his horse-drawn golden chariot, Apollo pulled the sun in its course across the sky each day
- In March 1969, the first crewed mission of the LM took place
- In May 1962 the LM entered lunar orbit for the first time
- The LM landed the first men on the moon during the Apollo 11 mission on July 20, 1969
- It carried two astronauts, Commander Neil A. Armstrong and LM pilot Edwin E. "Buzz" Aldrin, Jr., the first men to walk on the Moon.
- The LM is the only crewed vehicle to land anywhere other than Earth (that we know of)
- About 22 hours later, Aldrin and Armstrong returned to the CSM for the crew’s return to Earth
- Art on the Moon? It is rumored that artwork by Andy Warhol and other contemporary artists were etched onto a half-inch ceramic chip and covertly attached to the leg of a LM
- The artwork still sits on the moon surface with the Intrepid LM, making it the one and only human art museum in outer space

Photo: NASA.

LM Role in Coining Famous Phrases

- The phrase “The Eagle has landed” used by people when arriving successfully or completing a mission originated when the Apollo 11 Lunar Module landed on the moon
- Commander Armstrong set down on the lunar surface in the LM and announced, "Houston, Tranquility Base here - the Eagle has landed" (“Eagle” was the callsign of the LM for Apollo 11)
- Commander Armstrong stepped out of the LM onto the lunar surface at around 11pm on July 20 EST and uttered his famous words, "That's one small step for man, one giant leap for mankind"

Stats

- According to Apollo by the Numbers the lander was 31 feet wide by 23 feet high, weighing roughly between 32,000 and 36,000 lbs
- It had a top speed of 17,500 mph
- The LM computed and performed the lunar landing functions including abort, launch, and rendezvous and docking with Command and Service Module
- Grumman built 13 LMs
- Ten LMs were sent to space
- Six LMs landed humans on the moon

- Each Lunar Module had a distinct callsign for each Apollo mission

Photo: NASA.

LM Lifesaving Role in Apollo 13

- As depicted in the famous movie, after the real Apollo 13 mission was aborted two days after launch when an explosion damaged the Service Module crewmen used the LM (named Aquarius) as a lifeboat to help return them to Earth
- The LM - designed to support two astronauts for 45 hours - was used as a lifeboat to house the three astronauts (Commander James A. Lovell Jr., CSM pilot John L. Swigert Jr., and LM pilot Fred W. Haise Jr.) for 90 hours, as the CSM could not provide life support
- Apollo 13 continued on to the Moon, and the LM descent engine was used to accelerate the spacecraft around the Moon and back to Earth
- The LM was jettisoned shortly before reaching Earth, the astronauts returning to the Command Module for the reentry
- Aquarius burned up in the Earth's atmosphere with surviving pieces impacted in the ocean off the coast of New Zealand

Fate of the LMs

- The crash sites of most LMs are known - but no-one is quite sure where the ascent stages of Apollo 11's module Eagle or Apollo 16's module Orion ended up
- According to the Cradle of Aviation Museum, the 13th and final LM was never flown and is on permanent loan from the Smithsonian Institution to the Cradle of Aviation Museum on Charles Lindbergh Blvd in Garden City
- There are two other LMs on display in U.S. museums, one at the Smithsonian's National Air and Space Museum in Washington, DC. and another at the Kennedy Space Center Visitor Complex in Florida
- Two additional, partially built and unused LMs were scrapped by Grumman after the Apollo program was cancelled
- According to NASA here is what happened to each of the Lunar Modules along with their callsigns and lunar landing sites:

Mission	LM Callsign	Lunar Landing Site	Fate of Ascent Stage
Apollo 5	Unnamed	None	Burned up in Earth's atmosphere
Apollo 9	Spider	None	Burned up in Earth's atmosphere
Apollo 10	Snoopy	Sea of Tranquillity	In orbit around the sun
Apollo 11	Eagle	Sea of Tranquillity	Crash site unknown
Apollo 12	Intrepid	Ocean of Storms	Crash-landed on moon
Apollo 13	Aquarius	Planned: Fra Mauro	Used as a 'lifeboat'
Apollo 14	Antares	Fra Mauro	Crash-landed on moon
Apollo 15	Falcon	HadleyApennine	Crash landed on moon
Apollo 16	Orion	Plain of Descartes	Crash site unknown
Apollo 17	Challenger	Taurus-Littrow	Crash landed on moon