The Shoreline Observer

2011

Serving Holland And The Lakeshore Since 1989

Celestial Highlights:
April / May

April 11 First quarter

April 17 Full moon

Apr 21-22, Lyrid meteors

May 3 New moon

May 10 First quarter

May 17 Full moon

May 24 Last quarter

June 1 New moon

Upcoming SAAA Events…

Astronomy Day May 7th

Club Meeting: Friday, March 13 @ 7:00 PM

Macatawa Bay School Planetarium

Topic: Bylaws Voting

Refreshments:

Board Meeting: Wednesday May 4th 2011

@ 6:00 PM at Herrick District Library

Inside this Newsletter

Quick Update

The grant for our projector has been submitted and we will hear back in July sometime.

Astronomy Day May 7th Lumir park watch your e-mail for updates

I ordered some new business cards. I had the back side printed with some of soft-ware we talk about.

Fun Facts

Do you know about the weirdest among all telescopes?

It was the telescope in to which physicist Raymond Davis Jr used 100,000 gallons of dry-cleaning fluid in order to discover the neutrino particles which is invisible but they come from the sun.

March Board minutes

SAAA EXECUTIVE BOARD MINUTES – REVISED 4/2/2011

Present: Russ Hills, Pete Burke, Frank Roldan, Larry Logsdon

Meeting Called to Order: 6:05 PM
Meeting Closed: 7:15 PM

Old Business

Pete Burke will issue check to Robin Hudson for payment of SAAA hats. A club member will be asked to manage hat sales.
Frank Roland continues working on the grant for acquiring a club projector.
Insurance indemnification is in place and SAAA is covered at all Ottawa County Parks.
Pete Burke will email the excel membership list to SAAA membership.
Frank Roland will make new member SAAA badges from the membership list supplied by Pete Burke.
Ideas for monthly meetings covered. Suggestions included Constellation Of The Month, Legends & Lore. SAAA membership will be asked for input.

Outreach Events

Messier Marathon is a "go" for April 1.
Blue Star Elementary requested SAAA to make a presentation April 15 during the afternoon and/or evening. SAAA has agreed, more details to follow.
Radical Science Saturday at Black River for April 16 is under consideration.
Muskegon Astronomy request has been responded to by President Russ Hills. There has not been any further response from the school.
Grand Haven High School has requested an astronomy class session possibly in late April. More details will follow.
KAS Astronomy Day – invitation by KAS, SAAA Executive Board voted not to participate. SAAA will plan to hold their Astronomy Day on May 7th.

New Business

Treasurer's Report: $420.08
SAAA (President Russ Hills) will contact Hemlock Park concerning the club holding an Astronomy Day at the park May 7th.
New club business cards were approved and Russ Hills will place the order.
Purchase of a club banner was approved by the Executive board. Cost will be $36 and the banner will be 2 ft. X 3 ft. Russ Hills will proceed with the purchase.
Frank Roland will begin working on the club 1023 form. It was suggested other members of the club work with Frank in accomplishing this task.
Board has voted to hold SAAA meetings throughout the summer. Plans will be to hold the meetings at the Herrick Library (Main Branch). SAAA membership will be asked for input regarding attendance.
Magazine discounts were discussed. Sky & Telescope provides an automatic discount for SAAA members upon subscribing or renewing subscriptions. Astronomy magazine will be contacted by Pete Burke to determine necessary actions for SAAA members to acquire a discount.
Classes for presentation at Hemlock Park were discussed. Suggestions include;
Night Sky With Binos
Seasonal Constellations
Solar System tour
Intro to Amateur Astronomy
Telescopes 101
The membership will be asked for input during the Aril, 2011 meeting.
The Executive board created the position of Observing Awards Program Coordinator. This position will deal only with the Astronomical League Award Program. Larry Logsdon will assume this role.
The Astronomical League ALCor assignment still contains the wrong information. Pete Burke will contact that organization with the proper information.
Frank Roland will act as the Program Chairman as best he can. Membership will be approached during the April, 2011 regarding assisting Frank.
Respectively submitted,
Acting SAAA Secretary, Larry Logsdon

Are you a Martian?

By David L. Chandler

Are we all Martians? According to many planetary scientists, it's conceivable that all life on Earth is descended from organisms that originated on Mars and were carried here aboard meteorites. If that's the case, an instrument being developed by researchers at MIT and Harvard could provide the clinching evidence.

In order to detect signs of past or present life on Mars — if it is in fact true that we're related — then a promising strategy would be to search for DNA or RNA, and specifically for particular sequences of these molecules that are nearly universal in all forms of terrestrial life. That's the strategy being pursued by MIT research scientist Christopher Carr and postdoctoral associate Clarissa Lui, working with Maria Zuber, head of MIT's Department of Earth, Atmospheric and Planetary Sciences (EAPS), and Gary Ruvkun, a molecular biologist at the Massachusetts General Hospital and Harvard University, who came up with the instrument concept and put together the initial team. Lui presented a summary of their proposed instrument, called the Search for Extra-Terrestrial Genomes (SETG), at the IEEE Aerospace Conference this month in Big Sky, Mont.

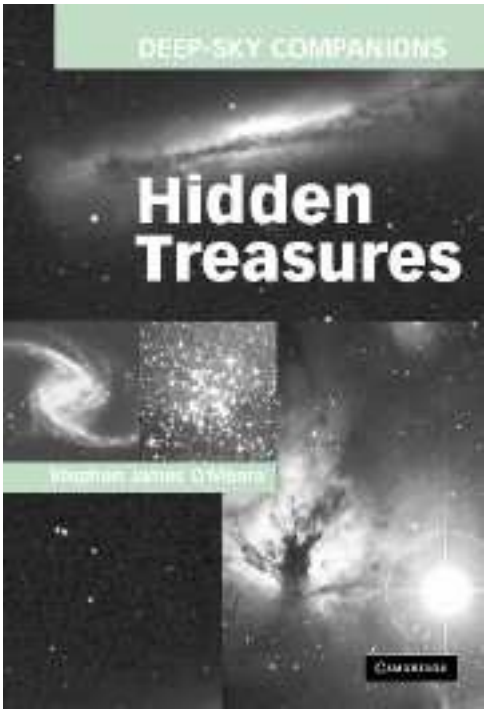
The idea is based on several facts that have now been well established. First, in the early days of the solar system, the climates on Mars and the Earth were much more similar than they are now, so life that took hold on one planet could presumably have survived on the other. Second, an estimated one billion tons of rock have traveled from Mars to Earth, blasted loose by asteroid impacts and then traveling through interplanetary space before striking Earth's surface. Third, microbes have been shown to be capable of surviving the initial shock of such an impact, and there is some evidence they could also survive the thousands of years of transit through space before arriving at another planet.

So the various steps needed for life to have started on one planet and spread to another are all plausible. Additionally, orbital dynamics show that it's about 100 times easier for rocks to travel from Mars to Earth than the other way. So if life got started there first, microbes could have been carried here and we might all be its descendants.

Book Review

Deep-Sky Companions: Hidden Treasures

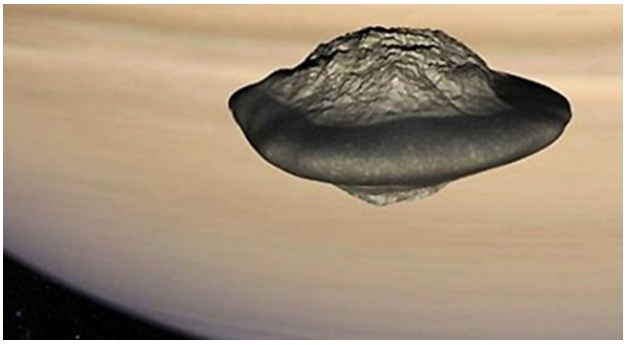
Stephen O'Meara's new and exciting observing guide spotlights an original selection of 109 deep-sky objects that will appeal to sky-watchers worldwide. His 'hidden treasures' include a wonderful assortment of galaxies, open clusters, planetary nebulae and more, all of which have been carefully chosen based on their popularity and ease of observing. None of these objects are included in either the Messier or the Caldwell catalogs, and all are visible in a 4-inch telescope under dark skies. Stunning photographs and beautiful drawings accompany detailed visual descriptions of the objects, which include their rich histories and astrophysical significance. The author's original finder charts are designed to help observers get to their targets fast and efficiently.



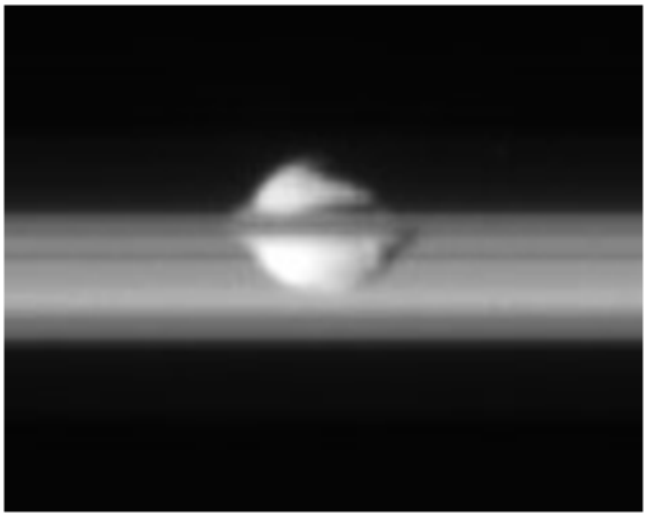
• This guide is fully consistent with O'Meara's previous books in this series, Deep-Sky Companions: The Messier Objects and Deep-Sky Companions: The Caldwell Objects. This allows observers to compare the physical properties and visual descriptions of objects covered by any of these books, with complete confidence. No other observing guides offer such consistency.
• Contains a biography of Caroline Herschel, written by the pre-eminent female astronomer Barbara Wilson of Houston, Texas
• Contains star charts designed by the author to help observers find their targets quickly and effectively.

Saturn's Strange Moon Pan

"We think the only way these moons could have reached the sizes they are now, in the ring environment as we now know it to be, was to start off with a massive core to which the smaller, more porous Saturn ring particles could easily become bound."



Keeping the Encke Gap open as it orbits there in the A Ring around Saturn, Pan is half the density of pure ice water and only 16 miles (25 km) in diameter. How did Pan end up looking like a flying disc? French scientists in 2007 theorized, "Our computer simulations show that the ridges must have accreted rapidly when Saturn's rings were thin, forming small accretion disks around the equator. The ridge ring might be the remains of 'fossilized' accretion disks." Left image by NASA. Right illustration by NASA. See Saturn's Moons.



BEGINNER'S CORNER

By: Larry Logsdon

Welcome to the Beginner's Corner. Each month we'll address items which may need clarification for those new to the world of astronomy or something requested by any of you. If you'd like a topic covered, contact the webmaster.

This month we'll cover Latitude and Longitude (Lat. & Long.).

Some confusion exists since the terms may be expressed in two formats. Let's cover each.

Let's take Holland, MI. as an example. There are a couple ways of expressing the location as follows.

Holland Mi 49423

Latitude (North)	Longitude (West)
42 deg. 44 min. 25 sec.	86 deg. 6 min. 14 sec.
42.7402 degrees	86.1039 degrees

Notice the decimal format. A little confusing? This is the format typically used with GPS equipment. The degrees, minutes, and seconds are also the format we use in astronomy. What if you find the decimal format and need to convert? Thanks to the wonderful internet we can quickly make a conversion. There are several sites you can check out. Do a Google search for Latitude and Longitude. One source follows.

www.fcc.gov/mb/audio/bickel/DDDMMSS-decimal.html.

Keep in mind coordinates change in seconds by changing even a street location. You could move a few miles and you'll possibly change the degrees also. The example for Holland, MI. places those coordinates in the center of the city.

Hopefully this will help you understand degree, minutes, and seconds versus decimal format. Stay tuned, next month we'll tackle alignment of primary and secondary optics in reflector scopes. This is known as collimation and very critical for good visual observations.

Planets Put on Quite a Show at Dawn

By Peter Burkey

May's early morning sky will be a real treat as four planets gather near the eastern horizon just before sunrise. Two of them, Venus and Jupiter, should be easy to spot with the naked eye while the other two, Mercury and Mars, may require optical aid. Joining the group early and late in the month will be a thin crescent Moon.

Start looking about 30 to 45 minutes before sunrise (the sun rises around 6:40 a.m. early in the month and 6:10 a.m. toward the end of the month). Venus will be the brightest object and the first to appear above the horizon. On May 1, use binoculars to spot the crescent Moon and the planet Jupiter about 10 degrees to the left of Venus. If sky conditions are favorable, you may also be able to spot Mars very close to Jupiter and Mercury just to the lower left of Venus.

Watch these planets each morning as often as the weather and your schedule allow. You will then be able to see how their relative positions change over the course of the month. The most compact gathering of Mercury, Venus and Jupiter will be on the morning of Wednesday, May 11, with all three planets so close together that you will be able to cover them up with two fingers held at arm's length.

Keep watching all month. On May 29 and 30 the group is again joined by a crescent Moon, although the sun will be rising earlier, making the dimmer planets more difficult to find. Two good reasons to view this gathering as often as possible are because that makes it easier to find things and that allows you to notice changes from day to day.

This visible gathering of four naked eye planets will be the most compact in decades so I highly recommend that you make the effort to get out early and enjoy it. You will not be disappointed.

Hubble How It Works

Every 97 minutes, Hubble completes a spin around Earth, moving at the speed of about five miles per second (8 km per second) — fast enough to travel across the United States in about 10 minutes. As it travels, Hubble's mirror captures light and directs it into its several science instruments.

Hubble is a type of telescope known as a Cassegrain reflector. Light hits the telescope's main mirror, or primary mirror. It bounces off the primary mirror and encounters a secondary mirror. The secondary mirror focuses the light through a hole in the center of the primary mirror that leads to the telescope's science instruments.

People often mistakenly believe that a telescope's power lies in its ability to magnify objects. Telescopes actually work by collecting more light than the human eye can capture on its own. The larger a telescope's mirror, the more light it can collect, and the better its vision. Hubble's primary mirror is 94.5 inches (2.4 m) in diameter. This mirror is small compared with those of current ground-based telescopes, which can be 400 inches (1,000 cm) and up, but Hubble's location beyond the atmosphere gives it remarkable clarity.

Once the mirror captures the light, Hubble's science instruments work together or individually to provide the observation. Each instrument is designed to examine the universe in a different way.

The Wide Field Camera 3 (WFC3) sees three different kinds of light: near-ultraviolet, visible and near-infrared, though not simultaneously. Its resolution and field of view are much greater than that of Hubble's other instruments. WFC3 is one of Hubble's two newest instruments, and will be used to study dark energy and dark matter, the formation of individual stars and the discovery of extremely remote galaxies previously beyond Hubble's vision.

The Cosmic Origins Spectrograph (COS), Hubble's other new instrument, is a spectrograph that sees exclusively in ultraviolet light. Spectrographs acts something like prisms, separating light from the cosmos into its component colors. This provides a wavelength "fingerprint" of the object being observed, which tells us about its temperature, chemical composition, density, and motion. COS will improve Hubble's ultraviolet sensitivity at least 10 times, and up to 70 times when observing extremely faint objects.

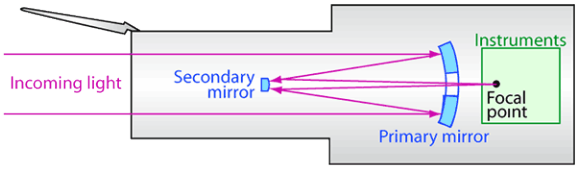
The Advanced Camera for Surveys (ACS) sees visible light, and is designed to study some of the earliest activity in the universe. ACS helps map the distribution of dark matter, detects the most distant objects in the universe, searches for massive planets, and studies the evolution of clusters of galaxies. ACS partially stopped working in 2007 due to an electrical short, but was repaired during Servicing Mission 4 in May 2009.

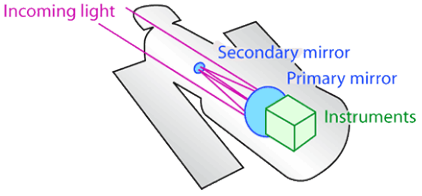
The Space Telescope Imaging Spectrograph (STIS) is a spectrograph that sees ultraviolet, visible and near-infrared light, and is known for its ability to hunt black holes. While COS works best with small sources of light, such as stars or quasars, STIS can map out larger objects like galaxies. STIS stopped working due to a technical failure on August 3, 2004, but was also repaired during Servicing Mission 4.

The Near Infrared Camera and Multi-Object Spectrometer (NICMOS) is Hubble's heat sensor. Its sensitivity to infrared light — perceived by humans as heat — lets it observe objects hidden by interstellar dust, like stellar birth sites, and gaze into deepest space.

Finally, the Fine Guidance Sensors (FGS) are devices that lock onto "guide stars" and keep Hubble pointed in the right direction. They can be used to precisely measure the distance between stars, and their relative motions.

All of Hubble's functions are powered by sunlight. Hubble sports solar arrays that convert sunlight directly into electricity. Some of that electricity is stored in batteries that keep the telescope running when it's in Earth's shadow, blocked from the Sun's rays.





WOMEN IN ASTRONOMY – III

By Martha K. Roldán

Henrietta Swan Leavitt the "Lady of Luminosity", was born on July 4, 1868 in Lancaster, Massachusetts. As a young child, her family moved to Cleveland, Ohio. Leavitt attended Oberlin College and in 1892 graduated from the Society for the Collegiate Instruction for Women, now known as Radcliffe College. She then traveled in America and in Europe during which time she lost her hearing.

Three years after graduation, she became a volunteer research assistant at Harvard College Observatory. Seven years later, in 1902, Edward Charles Pickering, Director of the observatory, hired her as part of the permanent staff at $.30 per hour.

Leavitt's interest in astronomy began during her senior year in college when she took an astronomy class. She furthered her studies in astronomy with graduate work. As an assistant at Harvard College Observatory, though she had the ability, she was given little theoretical work. Pickering did not like his female staff to pursue such endeavors. Instead, she was given the position of chief of the photographic photometry department and was responsible for the care of telescopes.

Leavitt also was required to perform research from the observatory's photographic plate collection. Using the plates, she was to determine a star's magnitude. There was no standard for ascertaining magnitudes at the time. Leavitt devised a system, using "the north polar sequence" as a gage of brightness for stars during her investigations. This was quickly recognized by the scientific community as an important standard and in 1913, was adopted by the International Committee on Photographic Magnitudes.

Another area of research that Leavitt pursued was on variable stars and in 1908 she made her most important discovery. By studying Cepheid variables in the Small Magellanic Cloud, which are all about the same distance from Earth, Leavitt determined the absolute magnitudes of stars. Her study led to the period-luminosity relationship of these variables, which in turn led to the ability to determine distances of stars from a mere one hundred light years to ten *million* light years. Ejnar Hertzsprung used her discovery to plot the distance of stars; Harlow Shapley used it to measure the size of the Milky Way; and Edwin Hubble used her work to ascertain the age of the Universe.

Leavitt died on December 21, 1921 from cancer. During her lifetime, she discovered over 1,200 variable stars, half the number of all such objects known at the time of her death. She was also a member of many organizations and a proponent for women in astronomy. She made monumental contributions to the advancement of astronomy and our understanding of our place in the Universe. There is no way of knowing what other contributions she would have made had she not died so young.

Are you a Martian?

So what?

If we are descendants from Mars, there might be important lessons to be learned about our own biological origins by studying biochemistry on our neighbor planet, where biological traces erased long ago here on Earth might have been preserved in the Martian deep freeze.

The MIT researchers' device would take samples of Martian soil and isolate any living microbes that might be present, or microbial remnants (which can be preserved for about up to a million years and still contain viable DNA), and separate out the genetic material in order to use standard biochemical techniques to analyze their genetic sequences.

"It's a long shot," Carr concedes, "but if we go to Mars and find life that's related to us, we could have originated on Mars. Or if it started here, it could have been transferred to Mars." Either way, "we could be related to life on Mars. So we should at least be looking for life on Mars that's related to us."

Even a few years ago, that might have seemed like more of a long shot, but recent Mars orbiter and rover missions have clearly shown that Mars once had abundant water, and many of the conditions thought to be needed to support life. And although the surface of Mars today is too cold and dry to support known life forms, there is evidence that liquid water may exist not far below the surface. "On Mars today, the best place to look for life is in the subsurface," Carr says.

So the team has been developing a device that could take a sample of Martian soil from below the surface — perhaps dredged up by a rover equipped with a deep drill — and process it to separate out any possible organisms, amplify their DNA or RNA using the same techniques used for forensic DNA testing on Earth, and then use biochemical markers to search for signs of particular, genetic sequences that are nearly universal among all known life forms.

The researchers estimate that it could take two more

Are you a Martian?

years to complete the design and testing of a prototype SETG device. Although the proposed device has not yet been selected for any upcoming Mars mission, a future mission with a lander or rover equipped with a drill could potentially carry this life-detection instrument.

No instrument has been sent to Mars specifically to look for evidence of life since NASA's twin Viking landers in 1976, which produced tantalizing but ambiguous results. An instrument on the Mars Science Lander to be launched in the fall will investigate chemistry relevant to life. The instrument from the MIT-Harvard team directly addresses Earth-like molecular biology.

Christopher McKay, an astrobiologist at NASA-Ames Research Center in California who specializes in research related to the possibility of life on Mars, says this work is "very interesting and important." He says, "it is not implausible that life on Mars will be related to life on Earth and therefore share a common genetics. In any case it would be important to test this hypothesis." But he adds that there is another motive for doing this research as well: "From an astronaut health and safety point of view and from a return-sample point of view, there is more to worry about" if there are organisms closely related to us on Mars, since a microbe that is similar is much more likely to be infectious to terrestrial life forms than would a totally alien microbe — so it is very important to be able to detect such life forms if they are present on Mars. In addition, this method could also detect any biological contamination on Mars that has been brought by spacecraft from Earth.

This kind of test is something we have the ability to do, he says, and therefore, although such an experiment has not yet been formally approved, "it seems improbable to me that we will do a serious search for life on Mars and not do this test."
http://www.physorg.com/news/2011-03-martian-scientists-instrument-proof.html

Thank Goodness the Sun is Single

by Trudy E. Bell

It's a good thing the Sun is single. According to new research, Sun-like stars in close double-star systems "can be okay for a few billion years—but then they go bad," says Jeremy Drake of the Harvard-Smithsonian Astrophysical Observatory in Cambridge, Mass.

How bad? According to data from NASA's Spitzer Space Telescope, close binary stars can destroy their planets along with any life. Drake and four colleagues reported the results in the September 10, 2010, issue of The Astrophysical Journal Letters.

Our Sun, about 864,000 miles across, rotates on its axis once in 24.5 days. "Three billion years ago, roughly when bacteria evolved on Earth, the Sun rotated in only 5 days," explains Drake. Its rotation rate has been gradually slowing because the solar wind gets tangled up in the solar magnetic field, and acts as a brake.

But some sun-like stars occur in close pairs only a few million miles apart. That's only about five times the diameter of each star—so close the stars are gravitationally distorted. They are actually elongated toward each other. They also interact tidally, keeping just one face toward the other, as the Moon does toward Earth.

Such a close binary is "a built-in time bomb," Drake declares. The continuous loss of mass from the two stars via solar wind carries away some of the double-star system's angular momentum, causing the two stars to spiral inward toward each other, orbiting faster and faster as the distance shrinks. When each star's rotation period on its axis is the same as its orbital period around the other, the pair effectively rotates as a single body in just 3 or 4 days.

Then, watch out! Such fast spinning intensifies the magnetic dynamo inside each star. The stars "generate bigger, stronger 'star spots' 5 to 10 percent the size of the star—so big they can be detected from Earth," Drake says. "The stars also interact magnetically very violently, shooting out monster flares."

Worst of all, the decreasing distance between the two stars "changes the gravitational resonances of the planetary system," Drake continued, destabilizing the orbits of any planets circling the pair. Planets may so strongly perturbed they are sent into collision paths. As they repeatedly slam into each other, they shatter into red-hot asteroid-sized bodies, killing any life. In as short as a century, the repeated collisions pulverize the planets into a ring of warm dust.

The infrared glow from this pulverized debris is what Spitzer has seen in some self-destructing star systems. Drake and his colleagues now want to examine a much bigger sample of binaries to see just how bad double star systems really are.

They're already sure of one thing: "We're glad the Sun is single!"

Read more about these findings at the NASA Spitzer site at http://www.spitzer.caltech.edu/news/1182-ssc2010-07-Pulverized-Planet-Dust-May-Lie-Around-Double-Stars.

For kids, the Spitzer Concentration game shows a big collection of memorable (if you're good at the game) images from the Spitzer Space Telescope. Visit http://spaceplace.nasa.gov/en/kids/spitzer/concentration.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.