



Astronomy Club News

May, 2006

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A group of twenty Cub Scouts from Wurtsboro and their parents joined us for our April 29th observations session. The sky conditions were very clear. Six telescopes were set up to show the group the night sky. Early in the evening the crescent moon, Saturn, and Jupiter were viewed. Later on the group was given a look at various doubles stars, star clusters, and galaxies. Dave Barrett from Highpoint Scientific also joined us for the evening. He brought his 24 inch Tectron dobsonian reflector. It provided amazing views of many deep sky objects. These included views of the Whirlpool Galaxy (M51), the Blackeye Galaxy (M64), and the edge on spiral galaxy NGC 4565. We were also able to view Comet Schwassmann-Wachmann 3 which is now near the constellation Corona Borealis. The view through a telescope allowed us to see its bright nucleus and short tail. The following images show some of the scouts enjoying the night sky.





A lunar observation session was held on April 8th at Walnut Mountain Park. Three members attended. We had some nice views of the first gibbous moon. Volcanic domes near the crater Hortensius were viewed clearly when the seeing was steady. We also observed a few double stars including Cor Caroli in Canes Venatici. The galaxies M81 and M82 in Ursa Major were also viewed even though the moon was bright. We also had an opportunity to view some open star clusters including M41 in Canis Major.

The observation sessions for May are on the 20th and 27th.

The Northeast Astronomy Forum at Rockland County Community College in Suffern will take place on May 6th and 7th. Our club will have a table on the balcony near the entrance to the field house on Saturday. We will be giving out club information and NASA outreach materials. We need some volunteers to help out at the table. Anyone interested in helping out please contact John at kocis@verizon.net. See <http://www.rocklandastronomy.com/neaf.htm> for details about the show.

Please be reminded that club membership renewals are due. Contact our treasurer Lisa Brody for your current status at jimandlisa@pronetisp.net. The club currently has \$2226.05. Any suggestions about what to do with our excess money are appreciated. We are considering giving a scholarship to a local high school for a student interested in pursuing Astronomy in college.

A dark sky observation session hosted by Dana Duke at the Big Twig recording studio near Roscoe, NY has been confirmed for July 29th. The Walnut Mountain site will be used by another group that evening. Directions and more details will follow as the date approaches.

Anyone interested in submitting an astronomical observation or photograph for the newsletter, please contact John at kocis@[verizon.net](mailto:kocis@verizon.net).

The club has selection of astronomy books, Stardate audio CDs, a Macintosh computer with astronomy software, and a Meade eight inch reflector for members to borrow. Please contact John at 791-5240 or kocis@verizon.net if you are interested in borrowing any of these.

Here are some comments by Derryl Cocks about the club telescope.

I wanted to let you know how happy I was tonight to take the club telescope to an area on our property where there is minimal lighting and actually see Saturn! The sky looked pretty clear for viewing at the Clear Dark Sky website <http://cleardarksky.com/c/WIntMtnPkNYkey.html?1>. I had already printed the free March sky map available at <http://www.skymaps.com/downloads.html>. I also had read an article on aligning the finder at <http://vegas.astronomynv.org/Tutorials/FinderScope.htm>. I aligned the finder and got oriented as to how the stars are laid out on the map. I was familiar with where Orion was in the sky. The 3 stars in the center of Orion pointed to Sirius in Canis Major. From there I found Procyon in Canis Minor. Lining up Sirius and Procyon pointed to Saturn! I would have liked to have found Mars as well but I ran out of time. It was my best telescope viewing evening ever! Thank you for the loan of the telescope. I hope that other members without a telescope take advantage of this valuable resource.

Regards, Derryl

Astronomy News:

Here are some articles from various NASA sources that might be of interest.

News Release: 2006-049

April 5, 2004

NASA's Spitzer Finds Hints of Planet Birth Around Dead Star

NASA's Spitzer Space Telescope has uncovered new evidence that planets might rise up out of a dead star's ashes.

The infrared telescope surveyed the scene around a pulsar, the remnant of an exploded star, and found a surrounding disk made up of debris shot out during the star's death throes. The dusty rubble in this disk might ultimately stick together to form planets.

This is the first time scientists have detected planet-building materials around a star that died in a fiery blast.

"We're amazed that the planet-formation process seems to be so universal," said Dr. Deepto Chakrabarty of the Massachusetts Institute of Technology in Cambridge, principal investigator of the new research. "Pulsars emit a tremendous amount of high energy radiation, yet within this harsh environment we have a disk that looks a lot like those around young stars where planets are formed."

A paper on the Spitzer finding appears in the April 6 issue of Nature. Other authors of the paper are lead author Zhongxiang Wang and co-author David Kaplan, both of the Massachusetts Institute of Technology.

The finding also represents the missing piece in a puzzle that arose in 1992, when Dr. Aleksander Wolszczan of Pennsylvania State University found three planets circling a pulsar called PSR B1257+12. Those pulsar planets, two the size of Earth, were the first planets of any type ever discovered outside our solar system. Astronomers have since found indirect evidence the pulsar planets were born out of a dusty debris disk, but nobody had directly detected this kind of disk until now.

The pulsar observed by Spitzer, named 4U 0142+61, is 13,000 light-years away in the Cassiopeia constellation. It was once a large, bright star with a mass between 10 and 20 times that of our sun. The star probably survived for about 10 million years, until it collapsed under its own weight about 100,000 years ago and blasted apart in a supernova explosion.

Some of the debris, or "fallback," from that explosion eventually settled into a disk orbiting the shrunken remains of the star, or pulsar. Spitzer was able to spot the warm glow of the dusty disk with its heat-seeking infrared eyes. The disk orbits at a distance of about 1 million miles and probably contains about 10 Earth-masses of material.

Pulsars are a class of supernova remnants, called neutron stars, which are incredibly dense. They have masses about 1.4 times that of the sun squeezed into bodies only 10 miles wide. One teaspoon of a neutron star would weigh about 2 billion tons. Pulsar 4U 0142+61 is an X-ray pulsar, meaning that it spins and pulses with X-ray radiation.

Any planets around the stars that gave rise to pulsars would have been incinerated when the stars blew up. The pulsar disk discovered by Spitzer might represent the first step in the formation of a new, more exotic type of planetary system, similar to the one found by Wolszczan in 1992.

"I find it very exciting to see direct evidence that the debris around a pulsar is capable of forming itself into a disk. This might be the beginning of a second generation of planets," Wolszczan said.

Pulsar planets would be bathed in intense radiation and would be quite different from those in our solar system. "These planets must be among the least hospitable places in the galaxy for the formation of life," said Dr. Charles Beichman, an astronomer at NASA's Jet Propulsion Laboratory and the California Institute of Technology, both in Pasadena, Calif.

The Jet Propulsion Laboratory manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center at Caltech. JPL is a division of Caltech. Spitzer's infrared array camera, which made the pulsar observations, was built by NASA's Goddard Space Flight Center, Greenbelt, Md. The instrument's principal investigator is Dr. Giovanni Fazio of the Harvard-Smithsonian Center for Astrophysics.

For more information about Spitzer, visit:

www.spitzer.caltech.edu/spitzer

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NASA Mars Rovers Head for New Sites After Studying Layers

NASA's Mars rover Spirit has reached a safe site for the Martian winter, while its twin, Opportunity, is making fast progress toward a destination of its own.

The two rovers recently set out on important -- but very different -- drives after earlier weeks inspecting sites with layers of Mars history. Opportunity finished examining sedimentary evidence of ancient water at a crater called "Erebus," and is now rapidly crossing flat ground toward the scientific lure of a much larger crater, "Victoria."

Spirit studied signs of a long-ago explosion at a bright, low plateau called "Home Plate" during February and March. Then one of its six wheels quit working, and Spirit struggled to complete a short advance to a north-facing slope for the winter. "For Spirit, the priority has been to reach a safe winter haven," said Dr. Steve Squyres of Cornell University, Ithaca, N.Y., principal investigator for the Mars Exploration Rover project.

The rovers have operated more than eight times as long as their originally planned three-month explorations on Mars. Each has driven more than 6.8 kilometers (4.2 miles) about 11 times as far as planned. Combined, they have returned more than 150,000 images. Two years ago, the project had already confirmed that at least one place on Mars had a wet and possibly habitable environment long ago. The scientific findings continue.

Opportunity spent most of the past four months at Erebus, a highly eroded impact crater about 300 meters (1,000 feet) in diameter, where the rover found extensive exposures of thin, rippled layering interpreted as a fingerprint of flowing water. "What we see at Erebus is a thicker interval of wetted sediment than we've seen anywhere else," said Dr. John Grotzinger of the California Institute of Technology, "The same outcrops also have cracks that may have formed from wetting and drying."

In mid-March, Opportunity began a 2-kilometer (1.6-mile) trek from Erebus to Victoria, a crater about 800 meters (half a mile) across, where a thick sequence of sedimentary rocks is exposed. In the past three weeks, Opportunity has already driven more than a fourth of that distance.

At Home Plate, Spirit found coarse layering overlain by finer layering in a pattern that fits accumulation of material falling to the ground after a volcanic or impact explosion. In one place, the layers are deformed where a golfball-size rock appears to have fallen on them while they were soft. "Geologists call that a 'bomb sag,' and it is strong evidence for some kind of explosive origin," Squyres said. "We would like to have had time to study Home Plate longer, but we needed to head for a north-facing slope before winter got too bad."

Spirit is in Mars' southern hemisphere, where the sun is crossing lower in the northern sky each day. The rovers rely on solar power. The amount available will keep dropping until the shortest days of the Mars winter, four months from now. To keep producing enough electricity to run overnight heaters that protect vital electronics, Spirit's solar panels must be tilted toward the winter sun by driving the rover onto north-facing slopes. However, on March 13 the right-front wheel's drive motor gave out. Spirit has subsequently driven about 80 meters (262 feet) using five wheels and dragging the sixth, but an initial route toward a large hill proved impassable due to soft ground. Last week, the team chose a smaller nearby ridge, dubbed "Low Ridge Haven," as the winter destination. Spirit reached the ridge Sunday and has a favorable 11-degree tilt toward the north.

"We have to use care choosing the type of terrain we drive over," Dr. Ashitey Trebi-Ollennu, a rover planner at NASA's Jet Propulsion Laboratory, Pasadena, Calif., said about the challenge of five-wheel driving. In tests at JPL, the team has been practicing a maneuver to gain additional tilt by perching the left-front wheel on a basketball-size rock.

Spending eight months or so at Low Ridge Haven will offer time for many long-duration studies that members of the science team have been considering since early in the mission, said Dr. Ray Arvidson of Washington University in St. Louis, deputy principal investigator. These include detailed mapping of rocks and soils; in-depth determination of rock and soil composition; monitoring of clouds and other atmospheric changes; watching for subtle surface changes due to winds; and learning properties of the shallow subsurface by tracking surface-temperature changes over a span of months.

JPL, a division of the California Institute of Technology, Pasadena, manages the Mars Exploration Rover Project for the NASA Science Mission Directorate.

For images and information about the rovers, see www.nasa.gov/rovers or <http://marsrovers.jpl.nasa.gov> . For information about NASA and agency programs on the Web, visit www.nasa.gov .

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News Release: 2006-055

April 13, 2006

Mars Cameras Debut as NASA Craft Adjusts Orbit

Researchers today released the first Mars images from two of the three science cameras on NASA's Mars Reconnaissance Orbiter.

Images taken by the orbiter's Context Camera and Mars Color Imager during the first tests of those instruments at Mars confirm the performance capability of the cameras. The test images were taken from nearly 10 times as far from the planet as the spacecraft will be once it finishes reshaping its orbit. Test images from the third camera of the science payload were released previously.

"The test images show that both cameras will meet or exceed their performance requirements once they're in the low-altitude science orbit. We're looking forward to that time with great anticipation," said Dr. Michael Malin of Malin Space Science Systems, San Diego. Malin is team leader for the context camera and principal investigator for the Mars Color Imager.

The cameras took the test images two weeks after the orbiter's March 10 arrival at Mars and before the start of "aerobraking," a process of reshaping the orbit by using controlled contact with Mars' atmosphere. This week, the spacecraft is dipping into Mars' upper atmosphere as it approaches the altitude range that it will use for shrinking its orbit gradually over the next six months.

The orbiter is currently flying in very elongated loops around Mars. Each circuit lasts about 35 hours and takes the spacecraft about 27,000 miles (43,000 kilometers) away from the planet before swinging back in close.

On Wednesday, a short burn of intermediate sized thrusters while the orbiter was at the most distant point nudged the spacecraft to pass from approximately 70 miles (112 kilometers) to within 66 miles (107 kilometers) of Mars' surface.

"This brings us well into Mars' upper atmosphere for the drag pass and will enable the mission to start reducing the orbit to its final science altitude," said Dan Johnston of NASA's Jet Propulsion Laboratory, Pasadena, Calif., deputy mission manager.

After hundreds of passes through the upper atmosphere, the drag will gradually reduce the far point of the orbit until the spacecraft is in a nearly circular orbit every two hours.

After the spacecraft gets into the proper orbit for its primary science phase, the six science instruments on board will begin their systematic examination of Mars. The Mars Color Imager will view the planet's entire atmosphere and surface every day to monitor changes in clouds, wind-blown dust, polar caps and other variable features.

Images from the Context Camera will have a resolution of 20 feet (6 meters) per pixel, allowing surface features as small as a basketball court to be discerned. The images will cover swaths 18.6 miles (30 kilometers) wide.

The Context Camera will show how smaller areas examined by the High Resolution Imaging Science Experiment Camera -- which will have the best resolution ever achieved from Mars orbit -- and by the mineral-identifying Compact Reconnaissance Imaging Spectrometer fit into the broader landscape. It will also allow scientists to watch for small-scale changes, such as newly cut gullies, in the broader coverage area.

The new test images from the Context Camera and the Mars Color Imager are available online at www.nasa.gov/mro , www.msss.com/mro/ctx/images/2006/04/13/ and www.msss.com/mro/marci/images/2006/04/13/ .

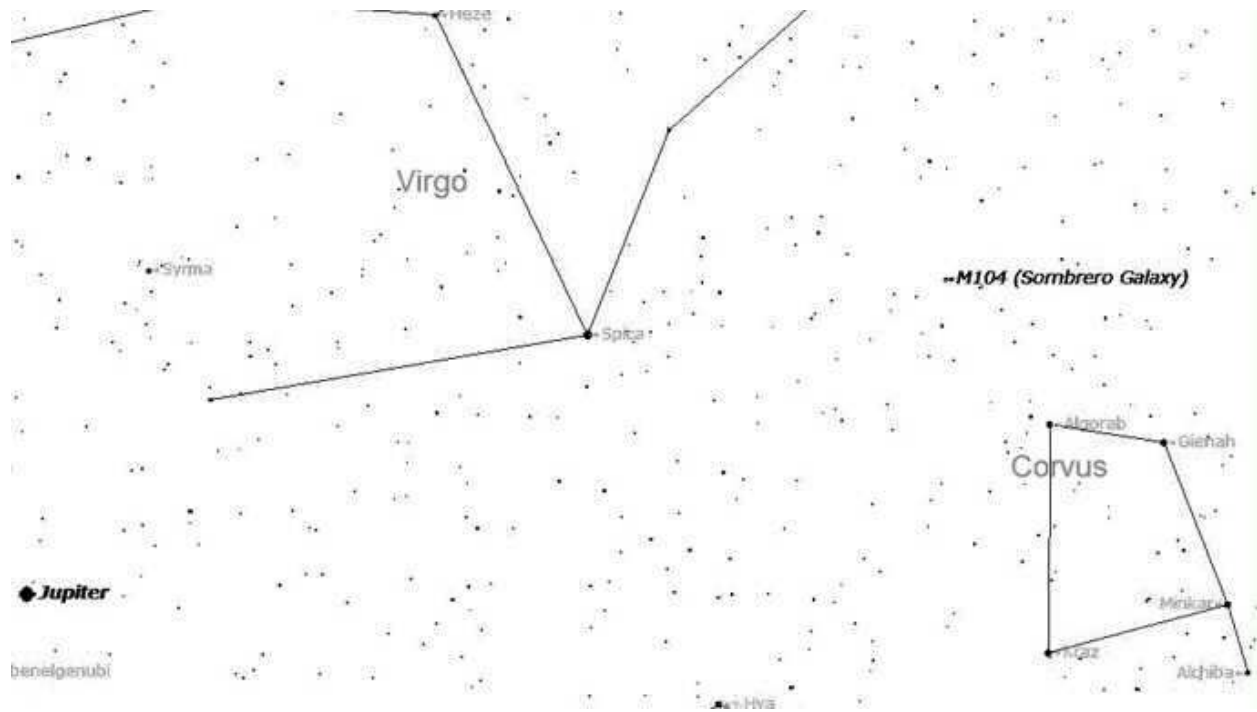
For more detailed information about Mars Reconnaissance Orbiter, see <http://mars.jpl.nasa.gov/mro> .

NASA's Mars Reconnaissance Orbiter is managed by JPL, a division of the California Institute of Technology, Pasadena, for the NASA Science Mission Directorate, Washington. Lockheed Martin Space Systems, Denver, is the prime contractor.

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Mid Evening Observing Highlights for April

May is also good month to observe galaxies. Leo, Virgo and Coma Berenices have many galaxies within them to observe. All three constellations are almost directly overhead. The Sombrero Galaxy (M104) in Virgo can be found almost due south in the sky just west of the bright star Spica. The Ursa Major is high in the northern sky. The bright star Arcturus is high in the eastern sky. The keystone of Hercules is rising in the east. It contains the globular cluster M13. Gemini is setting in the west. Saturn is in the western sky and Jupiter is in the southeastern sky. New moon occurs on May 27th and full moon occurs on May 13th. The image below shows the location of M104 in relation to Spica and Jupiter.



BARLOW BOB'S CORNER

Barlow Bob is a member of the Rockland Astronomy Club.

STAR PARTY U

You know that you are destined to attend Star Party University, when your parents refer to your birth as: “Baby’s first light”.

Your amateur astronomy education begins in early childhood, when sunlight through a whole in the wall, projects an image of the Analemma, on the floor of your nursery. A telescope at the window with a solar filter, projects an image of sunspots on the wall. You are encouraged to trace the sunspots on the wall, during your first solar cycle. Your parents take you out in your stroller, only at night, to observe the night sky. Your bedtime stories are read, from Curious George, written by Margaret and H.A. Rey and The Stars, written by H.A. Rey. You watch Mr. Rogers on television, during the day and The Star Hustler at night.

Holidays are special. You go out on Halloween, dressed as your favorite constellation. You create your own costume, using florescent paint, to draw your constellation, on a T-shirt. You also spray your hair silver, to simulate the Milky Way. On Christmas, you arrange your Christmas lights, in the form of constellations, observing the spectrum of the lights, through a holographic diffraction grating. You arrange the candles on the Hanukkah menorah, in the shape of Sagittarius.

Education continues into childhood, as you fail to catch a baseball, at a Little League game, while observing large sunspots, through your sunglasses, coated with mylar solar filters. On your

first Boy Scout hike, you create the Thousand-Yard Model of the Solar System. You use the money earned from the sale of Girl Scout cookies, to buy your first telescope. Reading Night Watch, you learn more about the night sky. You subscribe to “Odyssey” magazine.

You explore a variety of subjects in High School. In Computer Science, you use an Astronomy program, to create a spreadsheet, for your first Messier marathon. The topic of your term paper in History is “Women in Astronomy”. You create a rocker box in Occupational Education class, for your first dobsonian telescope. You also subscribe to “Sky and Telescope” magazine.

Amateur astronomers pledge to join their local fraternity/sorority astronomy club. These “Newbee” pledges learn about the basics of amateur astronomy and discover Star Party University.

NASA Space Place

Who Wants to be a Daredevil?

By Patrick L. Barry and Dr. Tony Phillips

When exploring space, NASA naturally wants to use all the newest and coolest technologies—artificial intelligence, solar sails, onboard supercomputers, exotic materials.

But “new” also means unproven and risky, and that could be a problem. Remember HAL in the movie “2001: A Space Odyssey”? The rebellious computer clearly needed some pre-flight testing.

Testing advanced technologies in space is the mission of the New Millennium Program (NMP), created by NASA’s Science Mission Directorate in 1995 and run by JPL. Like the daredevil test pilots of the 1950s who would fly the latest jet technology, NMP flies new technologies in space to see if they’re ready for prime time. That way, future missions can use the technologies with much less risk.

Example: In 1999, the program’s Deep Space 1 probe tested a system called “AutoNav,” short for *Autonomous Navigation*. AutoNav used artificial intelligence to steer the spacecraft without human intervention. It worked so well that elements of AutoNav were installed on a real mission, Deep Impact, which famously blasted a crater in Comet Tempel 1 on July 4, 2005. Without AutoNav, the projectile would have completely missed the comet.

Some NMP technologies “allow us to do things that we literally could not do before,” says Jack Stocky, Chief Technologist for NMP. Dozens of innovative technologies tested by NMP will lead to satellites and space probes that are smaller, lighter, more capable and even cheaper than those of today.

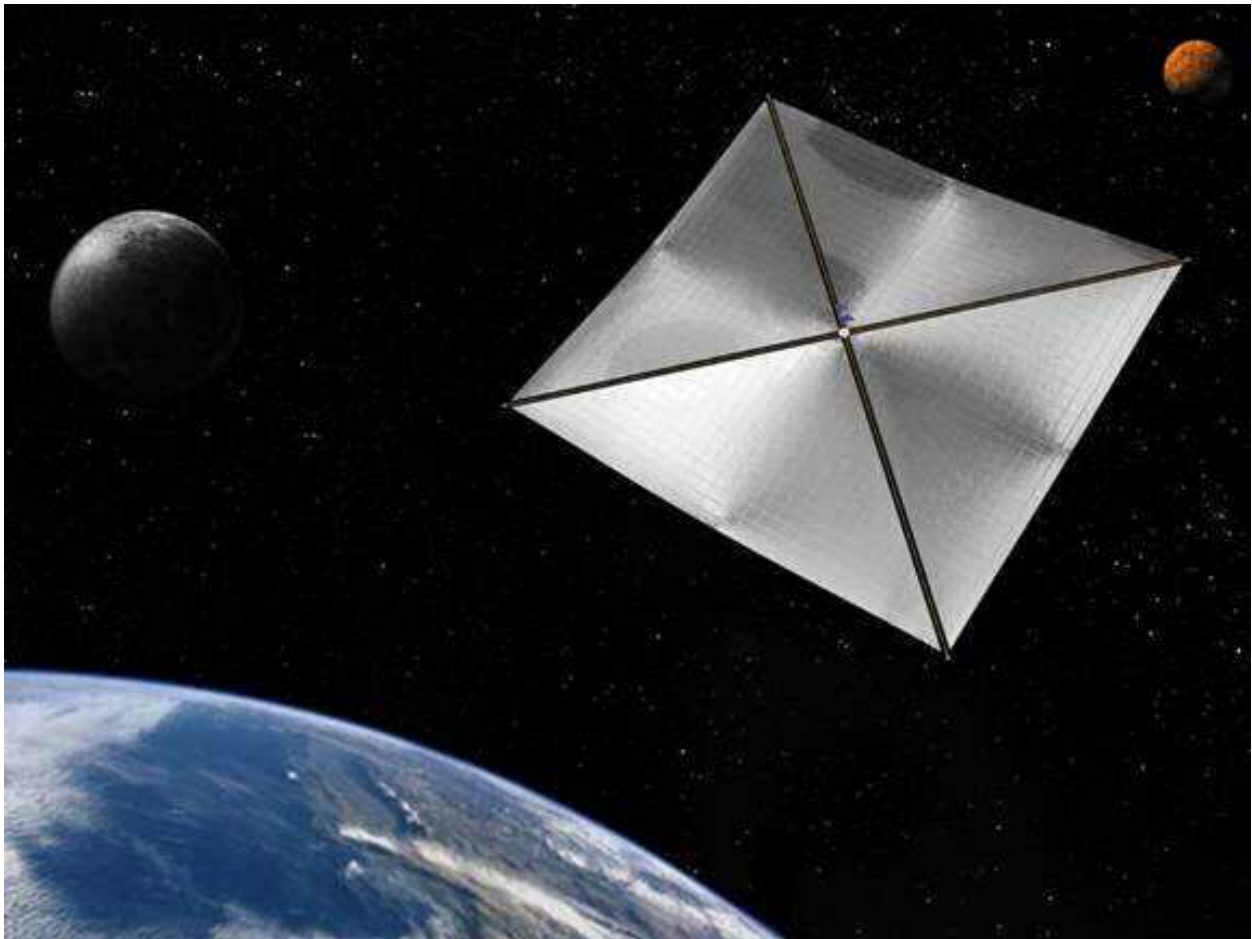
Another example: An NMP test mission called Space Technology 9, which is still in the planning phase, may test-fly a solar sail. Solar sails use the slight pressure of sunlight itself, instead of heavy fuels, to propel a spacecraft. Two proposed NASA missions would be possible only with dependable solar sails—L1 Diamond and Solar Polar Imager—both of which would use solar sails to fly spacecraft that would study the Sun.

“The technologies that we validate have future missions that need them,” Stocky says. “We try to target [missions] that are about 15 to 20 years out.”

A menagerie of other cool NMP technologies include ion thrusters, hyperspectral imagers, and miniaturized electronics for spacecraft navigation and control. NMP focuses on technologies that have been proven in the laboratory but must be tested in the extreme cold, vacuum, and high radiation environment of space, which can't be fully recreated in the lab.

New NMP missions fly every year and one-half to two years, taking tomorrow's space technology for a daredevil test drive.

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



Caption:

Artist's rendering of a four-quadrant solar sail propulsion system, with payload. NASA is designing and developing such concepts, a sub-scale model of which may be tested on a future NMP mission.