Astronomy Club News
August, 2006
John Kocijanski…. Editor

Jim McKeegan…… President
John Kocijanski…. Vice-President
Lisa Brody…….. Treasurer
Bud Wertheim…….. Secretary

A solar observation session was held at Morgan Outdoors in Livingston Manor, NY on July 1st to help promote the first year anniversary of the shop. Jim McKeegan gave a telescope help session before the observation session. Quite a few people stopped by to view the sun. The image below shows the sidewalk solar session.

The July 22nd and 29th observation sessions were canceled due to poor weather. The observation session that was scheduled for the Big Twig recording studio on July 29th may be rescheduled for September 23rd.

The August observation sessions are scheduled for the 19th and 26th.

The Gerry Foundation has invited us to participate in the Sweet Catskills promotional event taking place on September 17th at Bethel Woods near White Lake, NY. We will have a

table set up to promote the club and give out NASA outreach materials. If the weather is good we will also have a public solar observation session. If you would like to volunteer to help out at our table contact John at kocis@verizon.net.

Anyone interested in submitting an equipment review, astronomical observation, or photograph for the newsletter, please contact John at 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.

Astronomy News:

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

News Release: 2006-097 July 27, 2006

Cassini Finds Lakes on Titan's Arctic Region

NASA's Cassini spacecraft has found lakes on Saturn's moon Titan.

The lakes are most likely the source of hydrocarbon smog in the frigid moon's atmosphere. Finding the source of the complex soup of hydrocarbons in Titan's atmosphere has been a major goal for the Cassini mission and is a significant accomplishment.

Numerous well-defined dark patches resembling lakes are present in radar images of Titan's high latitudes taken during a July 22 flyby. At Titan's frigid temperatures, about minus 180 degrees Celsius, the liquids in the lakes are most likely methane or a combination of methane and ethane.

"This is a big deal," said Steve Wall, deputy radar team leader at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "We've now seen a place other than Earth where lakes are present."

This area of Titan has been in winter's shadow since before Cassini arrived, and the spacecraft had not flown over it before. During the flyby, Cassini's radar spotted several dozen lakes as small as 0.6 miles wide, with some nearly 20 miles wide. The biggest lake is about 62 miles long and may be only partly wet.

"What we see is darker than anything we've ever seen elsewhere on Titan. It was almost as though someone laid a bull's-eye around the whole north pole of Titan, and Cassini sees these regions of lakes just like those we see on Earth," said Larry Soderblom, Cassini interdisciplinary scientist at the U.S. Geological Survey, Flagstaff, Ariz. "Titan has turned out to be like a musical crescendo -- each pass is more exciting than the last."

Titan has not yielded its secrets easily because the dense smoggy atmosphere makes it very difficult to obtain good visible images. Radar can penetrate the smog and obtain clear images.

Dark regions in radar images generally mean smoother terrain, while bright regions mean a rougher surface. Some of the new radar images show channels leading in or out of a variety of

dark patches. The shape of the channels also strongly implies they were carved by liquid.

Some of the dark patches and connecting channels are completely black -- they reflect back essentially no radar signal, which means they must be extremely smooth and might contain liquid. In some cases rims can be seen around the dark patches, suggesting deposits that might form as liquid evaporates.

Scientists had predicted, but had no confirmation until now, that pools of liquid were contributing to the high concentration of methane and other hydrocarbons in Titan's atmosphere.

"We've always believed Titan's methane had to be maintained by liquid lakes or extensive underground 'methanofers,' the methane equivalent of aquifers. We can't see methanofers but we can now say we've seen lakes," said Jonathan Lunine, Cassini interdisciplinary scientist at the University of Arizona, Tucson.

Since lakes come and go with the seasons, they wax and wane over time. Winds might alter the roughness of their surfaces. Repeat coverage of these areas is expected to provide more information on these lakes. By passing over a lake in a different direction, Cassini may see the effect of prevailing winds in the changing brightness of the lake surface. On later passes toward the end of its prime mission, Cassini might see changes in the shape or size of lakes as winter yields to spring in the northern hemisphere.

Cassini's next flyby of Titan is on September 7. In October, Cassini's radar will look even closer to the north pole, searching for more lakes and mapping more of the polar region covered by these features.

The Cassini-Huygens mission is a cooperative project between NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory manages the Cassini-Huygens mission for NASA's Science Mission Directorate, Washington.

For images of the lakes and more information, visit: http://www.nasa.gov/cassini and http://saturn.jpl.nasa.gov .

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News Release: 2006-094 July 24, 2006

Planet-Forming Disks Might Put the Brakes on Stars

Astronomers using NASA's Spitzer Space Telescope have found evidence that dusty disks of planet-forming material tug on and slow down the young, whirling stars they surround.

Young stars are full of energy, spinning around like tops in half a day or less. They would spin even faster, but something puts on the brakes. While scientists had theorized that planet-forming disks might be at least part of the answer, demonstrating this had been hard to do until now.

"We knew that something must be keeping the stars' speed in check," said Dr. Luisa Rebull of NASA's Spitzer Science Center, Pasadena, Calif. "Disks were the most logical answer, but we had to wait for Spitzer to see the disks."

Rebull, who has been working on the problem for nearly a decade, is lead author of a new paper in the July 20 issue of the Astrophysical Journal. The findings are part of a quest to understand the complex relationship between young stars and their burgeoning planetary systems.

Stars begin life as collapsing balls of gas that spin faster and faster as they shrink, like twirling ice skaters pulling in their arms. As the stars whip around, excess gas and dust flatten into surrounding pancake-like disks. The dust and gas in the disks are believed to eventually clump together to form planets.

Developing stars spin so fast that, left unchecked, they would never fully contract and become stars. Prior to the new study, astronomers had theorized that disks might be slowing the super speedy stars by yanking on their magnetic fields. When a star's fields pass through a disk, they are thought to get bogged down like a spoon in molasses. This locks a star's rotation to the slower-turning disk, so the shrinking star can't spin faster.

To prove this principle, Rebull and her team turned to Spitzer for help. Launched in August of 2003, the infrared observatory is an expert at finding the swirling disks around stars, because dust in the disks is heated by starlight and glows at infrared wavelengths.

The team used Spitzer to observe nearly 500 young stars in the Orion nebula. They divided the stars into slow spinners and fast spinners, and determined that the slow spinners are five times more likely to have disks than the fast ones.

"We can now say that disks play some kind of role in slowing down stars in at least one region, but there could be a host of other factors operating in tandem. And stars might behave differently in different environments," Rebull said.

Other factors that contribute to a star's winding down over longer periods of time include stellar winds and possibly full-grown planets.

If planet-forming disks slow down stars, does that mean stars with planets spin more slowly than stars without planets? Not necessarily, according to Rebull, who said slowly spinning stars might simply take more time than other stars to clear their disks and develop planets. Such late-blooming stars would, in effect, give their disks more time to put on the brakes and slow them down.

Ultimately, the question of how a star's rotation rate is related to its ability to support planets will fall to planet hunters. So far, all known planets in the universe circle stars that turn around lazily. Our sun is considered a slowpoke, currently plodding along at a rate of one revolution every 28 days. And, due to limits in technology, planet hunters have not been able to find any extrasolar planets around zippy stars.

"We'll have to use different tools for detecting planets around rapidly spinning stars, such as next-generation ground and space telescopes," said Dr. Steve Strom, an astronomer at the National Optical Astronomy Observatory, Tucson, Ariz.

Other members of Rebull's team include Drs. John Stauffer of the Spitzer Science Center; S. Thomas Megeath at the University of Toledo, Ohio; and Joseph Hora and Lee Hartmann of the Harvard-Smithsonian Center for Astrophysics, Cambridge, Mass. Hartmann is also affiliated with the University of Michigan, Ann Arbor.

NASA's Jet Propulsion Laboratory, Pasadena, Calif., manages the Spitzer Space Telescope mission for NASA's Science Mission Directorate, Washington. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology. Caltech manages JPL for NASA.

For an animation depicting how disks slow stars and more information about Spitzer, visit www.spitzer.caltech.edu/spitzer .

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News Release: 2006-091 July 14, 2006

NASA Marks 30th Anniversary of Mars Viking Mission

Thirty years after the first successful landing on Mars by NASA's Viking spacecraft, the ambitious mission continues to evoke pride and enthusiasm for future space exploration. NASA's Viking 1 and 2 missions to Mars, each consisting of an orbiter and a lander, became the first space probes to obtain high resolution images of the Martian surface; characterize the structure and composition of the atmosphere and surface; and conduct on-the-spot biological tests for life on another planet.

Viking 1 was launched Aug. 20, 1975, and arrived at Mars on June 19, 1976. On July 20, 1976, the Viking 1 lander separated from the orbiter and touched down at Chryse Planitia. Viking 2 was launched Sept. 9, 1975, and entered Mars orbit Aug. 7, 1976. The Viking 2 lander touched down at Utopia Planitia on Sept. 3, 1976.

"The Viking team didn't know the Martian atmosphere very well, we had almost no idea about the terrain or the rocks, and yet we had the temerity to try to soft land on the surface," recalled Gentry Lee, Solar System Exploration chief engineer at NASA's Jet Propulsion Laboratory, Pasadena, Calif. Lee was the science analysis and mission planning director for the Viking mission. "We were both terrified and exhilarated. All of us exploded with joy and pride when we saw that we had indeed landed safely."

"The Viking mission looms like a legendary giant, an incredible success against which all present and future missions will be measured," said Doug McCuiston, Mars Exploration Program director at NASA Headquarters in Washington.

Originally designed to function for 90 days, the Viking spacecraft continued collecting data for more than six years. The landers accumulated 4,500 up-close images of the Martian surface. The accompanying orbiters provided more than 50,000 images, mapping 97 percent of the planet.

Viking provided the first measurements of the atmosphere and surface of Mars. These measurements are still being analyzed and interpreted. The data suggested early Mars was very different from the present day planet. Viking performed the first successful entry, descent and landing on Mars. Derivations of a Viking-style thermal protection system and parachute have been used on every U.S. Mars lander mission, including Mars Pathfinder and the Mars Exploration Rovers, Spirit and Opportunity.

NASA's Langley Research Center, Hampton, Va., managed the Viking Program. NASA's Jet Propulsion Laboratory, managed by the California Institute of Technology in Pasadena, Calif., built the orbiters, provided the deep space network and managed the science mission. NASA's Glenn Research Center, Cleveland, designed the Titan/Centaur launch vehicles that propelled the spacecraft on their journey. NASA's Kennedy Space Center, Fla., provided the launch facility for the program. Scientists from across NASA served on the Viking science teams.

For more information about Viking, visit: http://www.nasa.gov/viking .

For information about NASA and agency programs, visit: http://www.nasa.gov/home .

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News Release: 2006-093 July 19, 2006

Cassini Reveals Titan's Xanadu Region to be an Earth-Like Land

New radar images from NASA's Cassini spacecraft revealed geological features similar to Earth on Xanadu, an Australia-sized, bright region on Saturn's moon Titan.

These radar images, from a strip more than 4,500 kilometers (2,796 miles) long, show Xanadu is surrounded by darker terrain, reminiscent of a free-standing landmass. At the region's western edge, dark sand dunes give way to land cut by river networks, hills and valleys. These narrow river networks flow onto darker areas, which may be lakes. A crater formed by the impact of an asteroid or by water volcanism is also visible. More channels snake through the eastern part of Xanadu, ending on a dark plain where dunes, abundant elsewhere, seem absent. Appalachian-sized mountains crisscross the region.

"We could only speculate about the nature of this mysterious bright country, too far from us for details to be revealed by Earth-based and space-based telescopes. Now, under Cassini's powerful radar eyes, facts are replacing speculation," said Dr. Jonathan Lunine, Cassini interdisciplinary scientist at the University of Arizona, Tucson. "Surprisingly, this cold, faraway region has geological features remarkably like Earth."

Titan is a place of twilight, dimmed by a haze of hydrocarbons surrounding it. Cassini's radar instrument can see through the haze by bouncing radio signals off the surface and timing their return. In the radar images, bright regions indicate rough or scattering material, while a dark region might be smoother or more absorbing material, possibly liquid.

Xanadu was first discovered by NASA's Hubble Space Telescope in 1994 as a striking bright spot seen in infrared imaging. When Cassini's radar system viewed Xanadu on April 30, 2006, it found a surface modified by winds, rain, and the flow of liquids. At Titan's frigid temperatures, the liquid cannot be water; it is almost certainly methane or ethane.
"Although Titan gets far less sunlight and is much smaller and colder than Earth, Xanadu is no longer just a mere bright spot, but a land where rivers flow down to a sunless sea," Lunine said. Observations by the European Space Agency's Huygens probe, which Cassini carried to Titan, and by NASA's Voyager spacecraft strongly hint that both methane rain and dark orange hydrocarbon solids fall like soot from the moon's dark skies.

On Xanadu, liquid methane might fall as rain or trickle from springs. Rivers of methane might carve the channels and carry off grains of material to accumulate as sand dunes elsewhere on Titan.

"This land is heavily tortured, convoluted and filled with hills and mountains," said Steve Wall, the Cassini radar team's deputy leader at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "There appear to be faults, deeply cut channels and valleys. Also, it appears to be the only vast area not covered by organic dirt. Xanadu has been washed clean. What is left underneath looks like very porous water ice, maybe filled with caverns."

"In the 1980s, it took the shuttle imaging radar to discover subsurface rivers in the Sahara. Similarly, if it hadn't been for the Cassini radar, we would have missed all of this. We have a

newly discovered continent to explore," Wall said.

Cassini will view Titan again on Saturday, July 22, exploring the high northern latitudes. In the next two years the orbiter will fly by Titan 29 times, nearly twice as many encounters as in the first half of Cassini's four-year prime mission. Twelve of the planned flybys will use radar.

For Cassini images and information, visit: http://www.nasa.gov/cassini and http://saturn.jpl.nasa.gov .

The Cassini-Huygens mission is a cooperative project between NASA, the European Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory manages the Cassini-Huygens mission for NASA's Science Mission Directorate, Washington.

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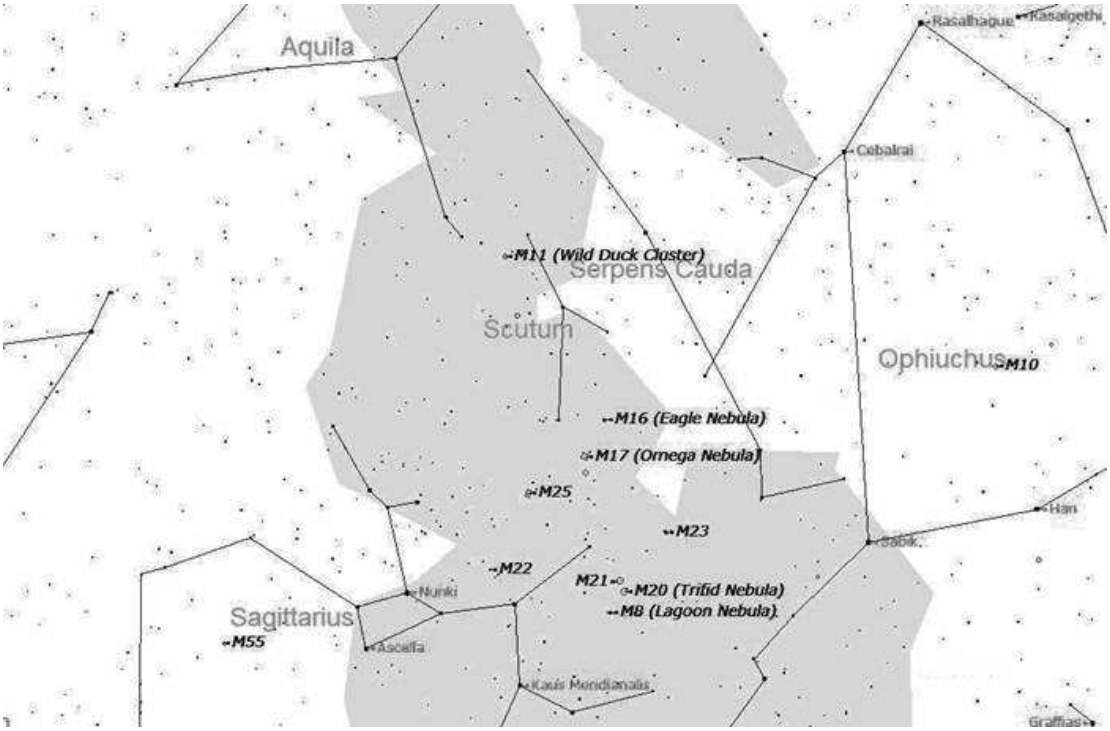
Middle Evening Observing Highlights for August

Jupiter is bright in the western sky. The Milky Way stretches across the sky from south to north. Sagittarius is in the southern sky. The globular cluster M22 can be seen at the top right of the "teapot". Slightly west of the "teapot" is M8, the Lagoon Nebula. Above Sagittarius there are a number of star clusters and nebula that can easily bee seen. Closer to the southern horizon and west of the "teapot" M6 and M7 can be seen. Both are open clusters in Scorpius. The Great Square of Pegasus is rising in the east. To the northeast of the Great Square the constellation of Andromeda can be seen and just above its center is M31, the Andromeda Galaxy. The bright star Arcturus is in the western sky. Uranus is in the southeastern sky in Aquarius. Neptune can be found in Capricorn. The image below shows the locations of many of the objects that can be found around Sagittarius.



Full moon is on August 9th and new moon is on August 23rd.

The Perseid meteor shower peaks on August 12th. Some Perseids are visible from July 23rd to August 20th. They are at about a quarter of their maximum intensity from August 9th to August 14th. An almost full moon will make for poor viewing.

NASA Space Place

Celebrating 40 Years of Intent Listening

By Diane K. Fisher

In nature, adjacent animals on the food chain tend to evolve together. As coyotes get sneakier, rabbits get bigger ears. Hearing impaired rabbits die young. Clumsy coyotes starve. So each species pushes the other to "improve."

The technologies pushing robotic space exploration have been like that. Improvements in the supporting communications and data processing infrastructure on the ground (the "ears" of the scientists) have allowed spacecraft to go farther, be smaller and smarter, and send increasingly faint signals back to Earth—and with a fire hose instead of a squirt gun.

Since 1960, improvements in NASA's Deep Space Network (DSN) of radio wave antennas have made possible the improvements and advances in the robotic spacecraft they support.

"In 1964, when Mariner IV flew past Mars and took a few photographs, the limitation of the communication link meant that it took eight hours to return to Earth a single photograph from the Red Planet. By 1989, when Voyager observed Neptune, the DSN capability had increased so much that almost real-time video could be received from the much more distant Planet, Neptune," writes William H. Pickering, Director of JPL from 1954 to 1976, in his Foreword to the book, *Uplink-Downlink: A History of the Deep Space Network, 1957-1997*, by Douglas J. Mudgway.

Mudgway, an engineer from Australia, was involved in the planning and construction of the first 64-m DSN antenna, which began operating in the Mojave Desert in Goldstone, California, in 1966. This antenna, dubbed "Mars," was so successful from the start, that identical 64-m antennas were constructed at the other two DSN complexes in Canberra, Australia, and Madrid, Spain.

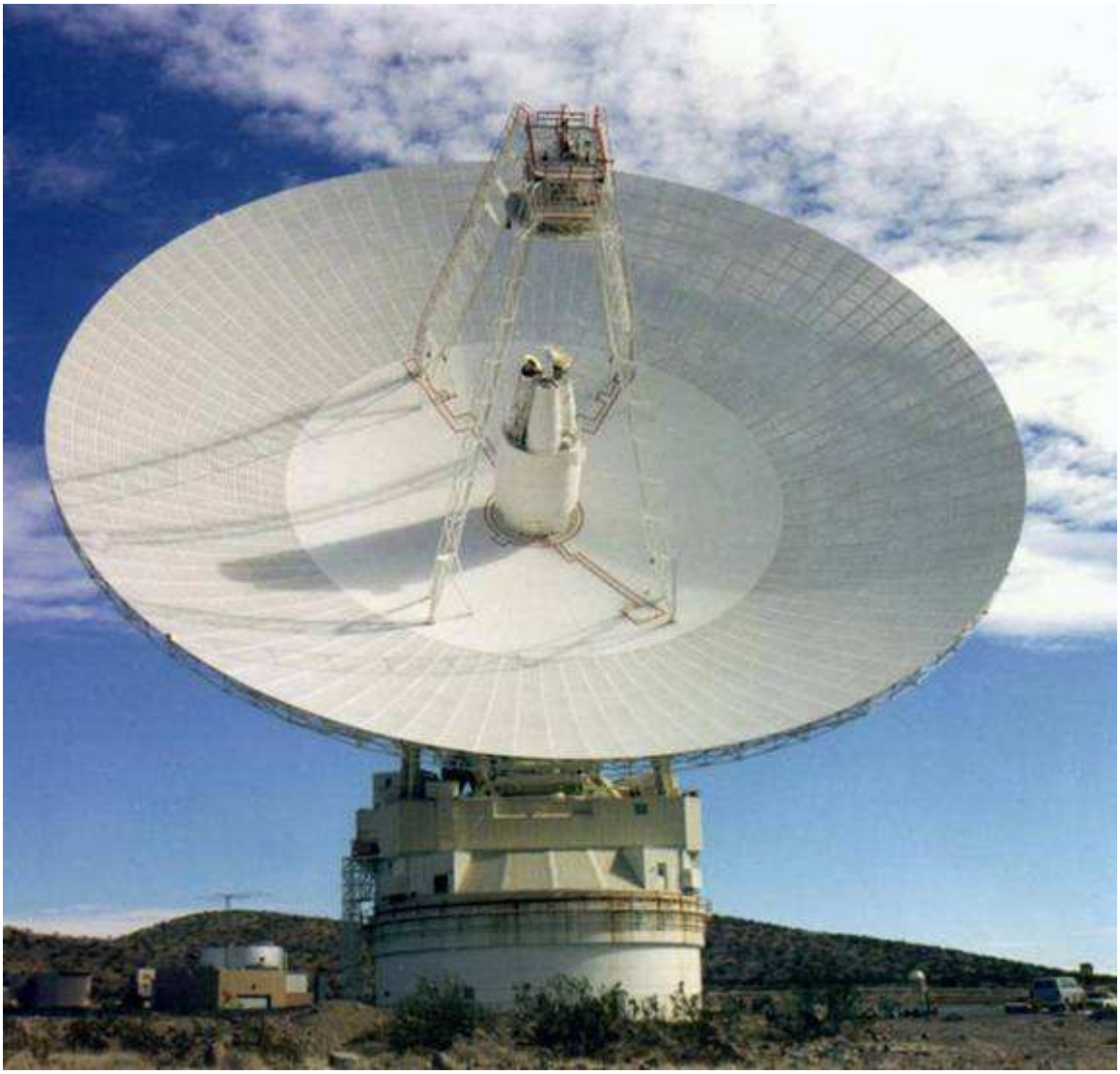
As Mudgway noted in remarks made during the recent observance of the Mars antenna's 40 years of service, "In no time at all, the flight projects were competing with radio astronomy, radio science, radar astronomy, SETI [Search for Extra-terrestrial Intelligence], geodynamics, and VLBI [Very Long Baseline Interferometry] for time on the antenna . . . It was like a scientific gold rush."

In 1986 began an ambitious upgrade program to improve the antenna's performance even further. Engineering studies had shown that if the antenna's diameter were increased to 70 m and other improvements were made, the antenna's performance could be improved by a factor of 1.6. Thus it was that all three 64-m DSN antennas around the world became 70-m antennas. Improvements have continued throughout the years.

“This antenna has played a key role in almost every United States planetary mission since 1966 and quite a few international space missions as well. Together with its twins in Spain and Australia, it has been a key element in asserting America’s pre-eminence in the scientific exploration of the solar system,” remarks Mudgway.

Find out more about the DSN and the history of the Mars antenna at http://deepspace.jpl.nasa.gov/dsn/features/40years.html. Kids (and grownups) can learn how pictures are sent through space at http://spaceplace.nasa.gov/en/kids/phonedrmarc/2003_august.shtml .

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



Caption:
For over 40 years, the “Mars” 70-m Deep Space Network antenna at Goldstone, California, has vigilantly listened for tiny signals from spacecraft that are billions of miles away.