NASA Spacecraft Captures Best-Ever View of Comet's Core

In a risky flyby, NASA's ailing Deep Space 1 spacecraft successfully navigated past a comet, giving researchers the best look ever inside the glowing core of icy dust and gas.

The space probe's close encounter with comet Borrelly on Saturday, Sept. 22 provided the best-resolution pictures of any comet to date. The already-successful Deep Space 1, without protection from the little-known comet environment, whizzed by just 2,200 kilometers (1,400 miles) from the rocky, icy nucleus of the 10-kilometer-long (more than 6-mile-long) comet.

Exceeding the team's expectations of how this elderly spacecraft would perform, the intrepid spacefarer sent back black-and-white photos of the inner core of the comet. It also measured the types of gases and infrared waves around the comet, and how the gases interacted with the solar wind.

"Deep Space 1 plunged into the heart of comet Borrelly and has lived to tell every detail of its spine-tingling adventure!" said Dr. Marc Rayman, the project manager of Deep Space 1 at the Jet Propulsion Laboratory (JPL), Pasadena, Calif. "The images are even better than the impressive images of comet Halley taken by Europe's Giotto spacecraft in 1986."

Rayman added, "After years of nursing this aged and wounded bird along -- a spacecraft not structured to explore comets, a probe that exceeded its objectives more than two years ago -- to see it perform its remarkably complex and risky assignment so well was nothing short of incredible."

"It's mind-boggling and stupendous," said Dr. Laurence Soderblom, the leader of Deep Space 1's imaging team, and a geologist with the U.S. Geological Survey, Flagstaff, Ariz. "These pictures have told us that comet nuclei are far more complex than we ever imagined. They have rugged terrain, smooth rolling plains, deep fractures and very, very dark material."

Scientists also realized that Borrelly was different than they expected as Deep Space 1 flew through the coma, the cloud of dust and gas surrounding the nucleus. They had expected that the solar wind would flow symmetrically around the cloud, with the nucleus in the center.

Instead, they found that though the solar wind was flowing symmetrically around the cloud, the nucleus was off to one side shooting out a great jet of material forming the cloud that makes the comet visible from Earth. "The formation of the coma is not the simple process we once thought it was," said Dr. David Young of the University of Michigan, Ann Arbor, leader of the team that made the measurements. "Most of the charged particles are formed to one side, which is not what we expected."

Deep Space 1 completed its primary mission testing ion propulsion and 11 other advanced, high-risk technologies in September 1999. NASA extended the mission, taking advantage of the ion propulsion and other systems to undertake this chance but exciting encounter with the comet.

Deep Space 1, launched in October 1998 as part of NASA's New Millennium Program, is managed by JPL for NASA's Office of Space Science in Washington. The California Institute of Technology manages JPL for NASA.

Contributors to this month's Journal:
Gary Garzone: Star Party reports; Leigh Pierson: observing report; Jim Sapp: monthly solar system stuff; Brian Simpson: monthly star chart; Pam Wheaton: observing report

Special thanks to MCDATA Corporation for the use of their copier.
Sorry if I missed anyone!

The Longmont Astronomical Society, a nonprofit educational organization, was founded in 1987 to enhance public awareness of amateur astronomy. The society's activities include lectures on various astronomical topics and related space sciences at local schools and other organizations, monthly public sky observing sessions, and monthly meetings featuring select speakers. The society serves the Boulder, Estes Park, Longmont, and Loveland, Colorado areas. Regular meetings are held on the third Thursday of every month at 7:00 PM in the Longmont Christian School basement, 550 Coffman St., Longmont. Annual dues are $20. All meetings are open to the public. Visit the LAS web page at http://haps.fsl.noaa.gov/cgi/las.cgi for timely reminders of upcoming events and maps to monthly star party sites.
15 September, Foxpark, Wyoming

There is a moose on the loose in Foxpark these days. Steve Lynch, his son Zach, and I were setting up my scope when I told Steve to turn around slowly. There were three moose coming to check out what we were up to. They very tamely walked right up to our camp.

I know the weather looked real bad, but it turned out to be an excellent night despite the heavy frost. Steve has Kendrick dew heaters and I have one of Randy's diagonal heaters that kept us going till 3:30 in the morning. We got to see Orion, Jupiter, Saturn, and NGC 891 edge on galaxy. NGC253 galaxy was so big it stretched out of the eyepiece so we kept changing eyepieces to get it just right. All in all it was an exceptional good night with the moose to boot. Fox park is still the most awesome dark sky site we use, lets keep it going.

- Gary Garzone

22 September, Camp Jack, Wyoming

Well, it turned out to be a very good night again Friday at Camp Jack. Leroy Gutney, Doug Walton, Kimon Berlin, my son Vincent, my wife Carol, and I showed up about a very crowded party. I clocked the miles and it is 32 miles further than if I went to Pawnee, not 25 like I thought. The elevation is almost 7500', not 7000'. The aspen are just starting to turn up here.

The wind blew throughout the night. Sometimes even too much, so I took the light shroud off of the 30 scope, so I thought I would not blow me off my ladder. Saturn and Jupiter were real good at times with some periods of half descent seeing late in the night. Doug Walton's new 20 inch Starmaster was the new toy of the night and very nice to be able to track an object at high powers and not drift out of the eyepiece. Next generation dob's are here now. The veil nebula in my 30 was awesome, being almost straight up when we were looking at it. Leroy was working on his Herschel 400, and we searched out some small globulars on my 30 to try to resolve some of the stars. Vincent set up my 16 scope and was finding objects faster than his old man sometimes. Maybe I am slowing down?

Well, it was once again a worth while trip to see the heavens in dark skies.

- Gary Garzone

22 September, Girl Scout Camp

We, too, had a most lovely evening under the stars. I took a trek with approximately 25 girls and 7 adults all the way to the parking lot to get out of the ambient lighting of the Latrines. All in attendance enjoyed magnificent views of Sagittarius, Mars, and the Northern Crown. All 5 circumpolar constellations were clearly visible, so I told the story of Cassiopeia, Cepheus, Andromeda, Perseus and Draco. For some of my little darlings, we trekked back into the ambient light to use as a filter to let the major constellations "pop" through. Then back to the darkness to try to pick them out amidst the brightness of the Milky Way. This was particularly effective for Cygnus. I was in hog heaven, as the coolness of the evening kept bugs at bay and allowed me to sleep without my tent. I enjoyed the night well into the wee hours of the morning...which is when the last of my little cherubs dozed off.

Sorry I missed you folks at Camp Jack...but my Friday was storytelling perfect as well so I don't feel quite as left out as I sometimes have in the past.

- Leigh Pierson

It was nice to pick out passing planes along with the satellites once again.
- Pam Wheaton

25 September, Niwot Colorado

I just got back from a fun night with Niwot high school kids and Al Hack, their Astronomy teacher. Fifty kids showed up and 7 of us volunteers on small scopes. I brought my 8 inch Meade only, not the big boy. The moon is waxing toward full here soon, so there was a pretty bright sky, but we still got many good objects in for their viewing pleasure.

The kids had to name 10 constellations or stars or Messier objects on their own. I was checking the kids out and if they got them all right we signed them off for their class. We showed them the objects after they named them to burn some photons into their brains. Maybe they'll even think it was cool enough to remember. As usual, a few kids always shine and the rest just wanted to pass the class. I met some interesting new people in astronomy and of course invited them to check out the LAS club in Longmont. I wish Saturn or Jupiter were up. It would have made it so much more fun than just Mars.

- Gary Garzone

30 September, Longmont, Colorado

I was out earlier this evening at my house in Longmont. I had just finished up the new mirror cell for the LAS 10" club scope, and was letting the primary mirror cool down. I was doing my usual "which star will be first seen through my binoculars?". I happened to be looking towards zenith, as Vega is more often spotted first. I saw a blury object. Ok, focus the bino's. It's red. Hey! Who moved Arcturus? I don't know what it is, but there it is red and shining in the blue sky. Get up and try to find it in the 10" with a 32 mm Plossl. No luck. Back to Bino's. Still there. Only this time a bright white star next to it. That's Vega for sure. Red thing seems to be moving away from Vega. Back to scope. Still can't find it. Now remember this is blue sky. I have just assembled the scope and have no focus or reference point. Dang worst of luck. I don't know what it was. My guess a slow moving satellite reflecting the sun. But I have never seen one reflect red before. This is about 1820 MST.

Okay, Mars should be visible by now. Scanning to the south, still blue sky. Whoa! Look at that! Focus. A clear translucent sphere. Too cool. I gotta get this in the scope. I locate this object and bring it in to focus. Nice. This one's easy. Weather balloon trailing a tail with a florescent red object close to the balloon, and a silver glittery thing on the end. Pop in the old 12 mm Nagler. Nice. This thing is huge. I'll follow this thing just for kicks (Dobsonians rule for manual tracking). Going up! What are those white plasma fingers where the balloon just was? That's the balloon burst. Nice tume powder burst is what remains at it's maximum altitude. Going down! Tracked the package as it dropped and saw pieces of the balloon separating as it plunged back to Earth. Or, rather, until the neighbor's roof line blocked my view.

Better than TV any day. Was able to split the double double in Lyra before it was dark with the 12 mm Nagler. Love this 10" mirror figured by Thom Peck, formerly of the NCAS. Uranus is still where it's supposed to be. I didn't have any luck finding Neptune. Clouds kept moving through the area. Mostly overcast and I need to wind down for the night. Work will come too early tomorrow. Finish up the evening with the Moon, almost full. Really clear view with the bino's. A nice tranquil feeling came over me while looking at the Moon. I thought about what was going on in the world, and I wished that everyone would be able to just look at the wonders of universe and the wonders that we have added to the universe. In peace.

- Leigh Pierson
HEADS UP!
Things to See This Month Only!

Keep you eye on Mercury and Venus during the first week of November as they remain within 1 degree of each other in the morning sky before dawn.

The asteroid Vesta makes a nice slow pass by the Hyades cluster this month as it brightens to about magnitude 6.5 at opposition late in the month.

Watch 4.3 magnitude 1 Geminorum reappear from behind the Moon at about 9:33 p.m. on the evening of the 4th.

This year’s Leonid meteor shower provides a better than average chance to view a major meteor storm in a dark sky. Major activity is expected to begin around 3 a.m. on the morning of the 18th.

The Moon occults Saturn at about 5:55 p.m. on the 30th while low in the east. Reappearance will be at about 6:11 p.m.

MINUTES of the
LONGMONT ASTRONOMICAL SOCIETY’S
MONTHLY MEETING
held on
Thursday, 20 September, 2001

The minutes are missing in action again, so the editor will fake it as best as he can.

The meeting opened with an extended session of visiting and hobnobbing, and there were a great many visitors and first time attendees present.


President Dave Street announced that treasurer Michael Hotka had reported that both accounts are well into the black. He also mentioned that it was brought to the club’s attention that it is important to the school that we leave the facility in exactly the condition we find it on meeting nights (chairs straightened up, etc.).

Brian Kimball showed his stunning results obtained with digital imaging of the planets, the lunar occultation of Saturn of particular note.

Jim Sapp gave a slide presentation covering the telescope making at Leigh Pierson’s house, and the past summer’s star parties. That’s all I remember, folks!

L.A.S. CLASSIFIED ADS

This is a service provided free of charge by the LAS for the members and associates of the society.

Send ad submissions to the LAS Editor, 1209 Vail Lane, Longmont, Co. 80503, or e-mailed to jsstars@worldnet.att.net

WANTED TO BUY

USED COMPUTER, at LEAST 250Mhz, with printer, scanner, and astronomy software such as The Sky ver. 5.0 level II or III, and Starry Night Deluxe. Call Michael Hutchinson at 303-776-5322 with the Colo. Relay: 1-800-659-3656 after 5:30 pm or write: 1121 Sumac St., Longmont, Co. 80501-3134.

Older Meade Research Grade eyepieces, especially 20mm Erfle, and any orthoscopics. Call Jim at (303)776-5098

FOR SALE

Nisur Systems “Capella II” altaz mount. Similar to but larger than a TV “UpSwing” head. It also has a better design and can carry more weight on the right tripod. Rated capacity is in excess of 10 lbs. I’ll sell it for what I paid for it. $99 in order to keep from shipping it back. Since I bought it the price has risen significantly, so this is a major good deal. Contact Archer at (303) 543-9276 or (303) 717-4005. Email: archer@meer.net

Takahashi FLC-90 + P2-Z combo, the outfit I took with me to Madagascar. It served its purpose, and now the pipe must be paid. This is the whole system, ready to go: Takahashi FCL-90 90mm f/5.6 fluorite refractor with 1-1/4” prism diagonal, 18mm LE eyepiece, 6x30 finder w/bracket, 2” focuser, 1-1/4” adapter, and 2” extension tube (for photography). All of the above fits in a Pelican 1500 case, which is included. 32mm TV Plossl tube holder, P2-Z mount with short wooden legs and tray, 4 D-Cell batteries for the drive. The mount just came back from Texas Nautical, where Art went over it and fixed the odd problem that it had. It’s still in the boxes that it was shipped back in, and frankly, I’d rather not take it out. I’m offering it to my friends first before going on Astromart with it. Retail is ~$4600 (incl. case). I’ll sell it for $3900. Asking price will be $4000 when it hits astromart.

archer@meer.net

ASTRONOMY PUBLICATIONS


FREE TO GOOD HOME

I have totally switched to CCD imaging but have many hundreds of dollars worth of scientific film. It has been frozen for years and in some cases decades. I will give it to anyone that is still doing serious astronomical photography.

gemerson@att.net
### November 2001

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