

Odyssey

Pushing the Edges

August
2006

Official Newsletter of OASIS: the Los Angeles Chapter of the National Space Society

The OASIS MER Model Project

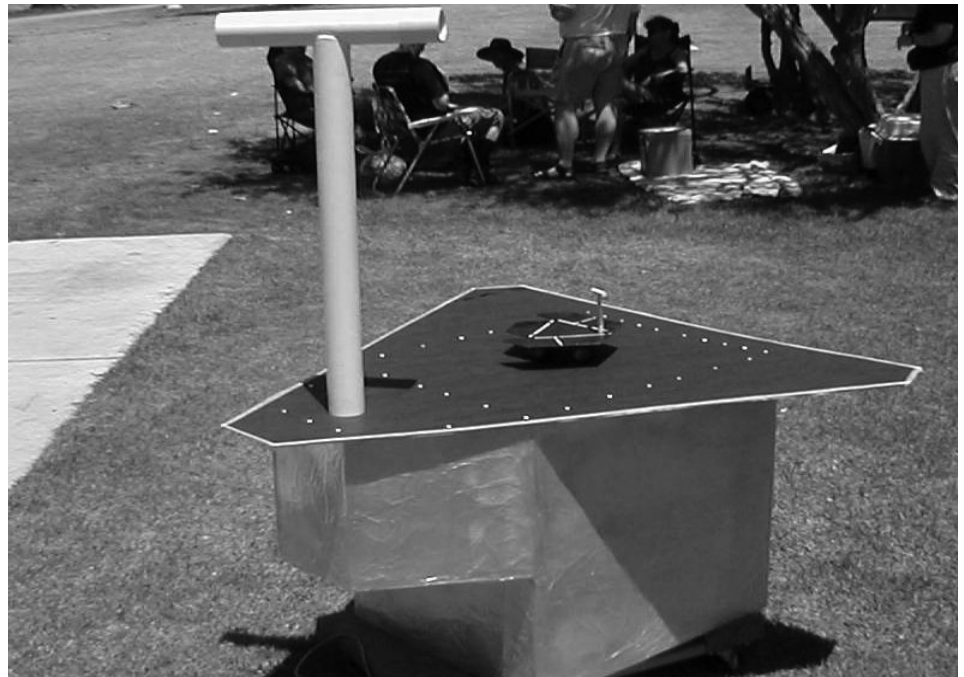
By Steve Bartlett

Scientists at the Jet Propulsion Laboratory are slowly bringing the two Mars Exploration Rovers, Spirit and Opportunity, back to full operation after their winter hibernation on the Red Planet. Meanwhile, OASIS has recently restarted its own Mars Rover project after an 18-month hiatus.

The Model Project

Members of your chapter began a project to build a full-scale model of the Mars Exploration Rover about two years ago. The plan was to build a simple, static model first and then incorporate improvements that would allow the rover to move about, turn its camera mast, collect video imagery, and operate its robotic arm. We would take the model with us to various public events to get the people excited about space travel.

Because I proposed the project, I was put in charge of getting it going. In the first few months after



The MER model is already way ahead of Spirit and Opportunity, finding abundant life (not to mention food) on Mars! *Photo: Steve Bartlett*

inception, we first built a ¼-scale model of the rover out of plywood, fiberglass, and PVC pipe. It featured hinged solar panels, an articulated arm, a pancam mast and simulated antenna that could be turned, and wheels that could roll.

Then we started work on the full-scale rover model.

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Last call for Worldcon, August 23-27! Advertisement on page 6.

OASIS MER Model Project

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Progress included building the main rover body out of plywood, purchasing sheet aluminum for the simulated solar panels, and cutting some of the solar panel shapes out of the aluminum. Then, due to various personal and financial obligations, we had to put the rover work on hold for several months.

I realized in late June that we had not made any progress on the rover in over a year and that the upcoming OASIS picnic (see page 3) would provide us with an excellent opportunity to show off the model. So I decided to restart the project.

New Construction

The first step was to dig out the

model plans, as well as NASA photos and drawings of the actual Mars Exploration Rover, and images of rover models that other groups had constructed over the years. The main body of our model had been sitting in a corner of my garage for some time, piled high with bits and pieces of other projects I've been working on. I dug it out, cleaned it up, and moved it into a more accessible area.

I then found the triangular aluminum piece for the central solar panel section. It had several jagged metal edges that had to be filed and sanded to make them safe to work with.

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An artist's rendition of a NASA Mars rover. *Illustration courtesy of NASA/JPL*

Editor's note: As the reader can see above, Steve Bartlett had a rather difficult act to follow, but (as usual) he more than proved himself to be up to the task! (see picture on the cover page)

Member Donates Space Memorabilia



Longtime OASIS member Garrett Paine has donated 30 or so space-related commemorative pins, patches, stickers, and buttons to the chapter. They can be used for a variety of purposes, such as new member bonuses, party raffle prizes, or as augments to the displays we use at recruiting and membership tables.

The items date from the 1980s to the early 1990s and come from Garrett's career at places like JPL and other space businesses.

We want to give Garrett a big thank you for donating this memorabilia to OASIS. Thanks, Garrett!

OASIS Summer Picnic, July 15, 2006



OASIS plants the flag at Polliwog Park yet again! Karin Ward keeps a watchful eye on it. *Photo: Seth Potter*



July 15th marked yet another OASIS summer picnic at Polliwog Park, Manhattan Beach. It also marked the debut of Steve Bartlett's model Mars Exploration Rover (see the cover story.)

The recent heat wave melted one OASIS picnic tradition; Steve's stash of liquid nitrogen boiled away shortly before picnic day, leaving nothing to chill the ice cream maker.

Above (clockwise from left): Steve, Seth Potter, and Lisa Kaspin help themselves to the store-bought stuff, along with plenty of other good food (*photo: Craig Ward.*) Below (left to right) Tina Beychok, (who's hiding behind Tina?) Craig Ward, Diane Rhodes, David Bliss (*photo: Steve Bartlett.*)



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Contributions may also be mailed as .doc or .txt files on PC-formatted CDs, or as hard copy to:

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The first actual construction activity would be to mount the triangular solar panel section onto the main rover body. I marked the outline of the rover body onto the aluminum piece and marked the locations for a set of attachment screws to hold the panel to the body. Because the rover would have to hold together during transport and handling and because it would eventually have to accommodate the weight and the loads from the fold-out solar panels without bending or flexing too much, we would need quite a number of screws to attach the triangular panel to the main body to

ensure a strong, rigid structure. I decided to be conservative and elected to use over two dozen screws for the attachment. Then it was time to do some drilling!

The next step was to build a model of the pancam mast. If you're familiar with the design of the actual Mars Exploration Rover, the pancam mast is the white, T-shaped section that sticks up out of the triangular solar panel piece. The pancam mast holds the motors and optics for collecting the images of Mars that the rovers have been sending back to Earth. For our model mast, I went to the local hardware store and bought two pieces of 2" PVC pipe. I cut the pieces to the proper length and then drilled and filed a cradle into the longer, ver-



tical pipe so that the crosspiece of the "T" would fit onto it correctly. I attached the two pieces together with five-minute epoxy and then let them dry.

The vertical section of the mast attaches to the triangular solar panel piece. The mast on the actual MER can rotate to the left and right to allow the cameras to create a panoramic image, so our model would also have to allow the mast to rotate to the left and right. To accommodate this feature and to properly distribute the mast loads during handling and model transport, I cut out two wooden disks: one to bond onto the triangular panel and one to bond into the mast upright section. These disks, along with a center bolt and some nuts and washers, would give us a mast that could stand upright and be rotated without wobbling and without risk of accidental breakage.

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More MER Model Project

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Decorating the Model

At this point, the model looked like an oddly-shaped wooden box, a raw piece of sheet aluminum panel, and a "T" made from some shiny PVC pipe. Not too impressive. If you're familiar with the actual Mars rovers, you know that the solar arrays on top are black (or nearly so), the main body is covered with gold-colored foil, and the pancam mast is a flat white color. I took a look in my garage for decorating supplies and then went over to my local craft supply store to see what might give the model the right look.



The main body of the rover is covered with gold-colored foil. Unfortunately, most inexpensive foils are silver colored. I found that the craft store carried rolls of translucent gold-colored plastic sheeting of the type often used for gift baskets and such. By using one layer of aluminum foil and two layers of the plastic sheeting, I could achieve the gold foil effect for just a few dollars. So I used spray adhesive to bond the aluminum foil to the rover model body and then to bond the plastic sheeting to the aluminum foil.

For the triangular solar panel piece, I debated using high-gloss black spray paint, black contact paper, and a matte black paper with an epoxy topcoat. I finally settled on the third option for appearance, cost, and flexibility reasons. I applied spray adhesive to the aluminum panel and attached the paper to it and allowed the adhesive to dry. I applied a tape trim to the perimeter of the panel and then applied the epoxy topcoat. (The accompanying photos show the model without the epoxy topcoat because the topcoat could not be applied before the OASIS annual picnic. The topcoat was applied after the picnic.)

The flat white color of the pancam mast could be achieved in a few different ways: with flat white spray paint, by removing the

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reflective surface from the PVC pipe with an acetone wipe, or with some judicious sanding. Because I had a good supply of sandpaper in my garage, sanding turned out to be the easiest and least expensive option.

I finished decorating and assembling the "work in progress" model on the night before the OASIS picnic.

Next Steps

The rover model project is far from complete, as the accom-

panying photos clearly show. The fold-out solar panels need to be cut out of the aluminum sheet and attached to the center triangular panel. Then, we need to construct a set of wheels and their attachment hardware so that the rover can roll around. After that, the model could use its robotic arm, an antenna, and additional features on the pancam mast.

These improvements would give us a static model that we

could take to airshows, conferences, and the like. Eventually we plan to incorporate motors, cameras, batteries, and electronics to allow the rover to, well, rove around.

If you have interest and skills that could be applied to the rover project, we'd like to hear from you. We can certainly use the help.

For more information on the project, email me, Steve Bartlett, at spahseebah@aol.com.

NOASS to Invade Worldcon 2006... Be a Part of the Action! LAST CALL FOR VOLUNTEERS!

**Like meeting people from all over the world?
Like talking about space to space and science fiction enthusiasts?**

Here's your opportunity!

The 64th World Science Fiction Convention (Worldcon) will be at the Anaheim Convention Center from August 23rd-27th, 2006. This is the main gathering for general-interest science fiction fans from around the world.

NOASS will be providing space programming, hosting a room party on the Friday and manning a fan table. We need volunteers to help us with all of these activities. Spend an hour or so at the fan table chatting up con-goers. Help decorate for our party. Talk to party guests about **NOASS** activities.

And the best part is that you'll have fun in the meantime!

PLEASE NOTE that if you are interested in volunteering, you **MUST** purchase a membership. You will not be allowed inside the door without a valid membership.

NOASS will not be providing memberships to volunteers. For membership information, please visit: <http://www.laconiv.org/2006/reg/reg.htm>

If you are interested, please send an e-mail to: convention_liaison@oasis-nss.org

Saturday, September 16, 3:00 p.m. -- OASIS Monthly Business Meeting. Home of Bob Gounley & Paula Delfosse, 1738 La Paz Road, Altadena, CA. Phone the OASIS HOTLINE AT (310) 364-2290 or visit <http://www.oasis-nss.org>

Monday, September 22, 9:03 p.m. -- Autumnal Equinox (04:03 UT September 23).

Saturday, September 30, sunset to 10:00 p.m. Los Angeles Sidewalk Astronomers Star Party.
Autry Museum of Western Heritage, 4700 Western Heritage Way, Los Angeles, CA 90027-1462.
Phone (323) 664-1191 or visit http://www.laas.org/Events_StarParties-Public.htm

Saturday, October 7, 3:30 - 4:30 p.m. OASIS Lecture Series: "First Light: a Presentation on the Renovated, Expanded Griffith Observatory" by Kara Knack, Renovation Communications Officer, Friends of the Observatory (FOTO). Admission is free. Long Beach Public Library, 101 Pacific Avenue, Long Beach, CA. Phone the OASIS HOTLINE AT (310) 364-2290 or visit <http://www.oasis-nss.org>

Thursday and Friday, October 12 and 13, 7:00 p.m. "Looking for Life in all the Strange Places, with all the Right Tools" presented by Tim Krabach, Manager, JPL Life Detection Science and Technology Program. Admission is free. Seating is limited. Phone (818) 354-0112 or visit <http://www.jpl.nasa.gov/events/lectures/oct06.cfm>

October 12 -- Von Kármán Auditorium at JPL, 4800 Oak Grove Dr, Pasadena.

October 13 -- Vosloh Forum at Pasadena City College, 1570 E Colorado Blvd., Pasadena.

Saturday, October 14, 1:00 - 2:00 p.m. -- Reuben H. Fleet Science Center

Lecture: Mars Rover Update. Nagin Cox, Deputy Team Chief of the Spacecraft/Rover Engineering Flight Team on the JPL Mars Exploration Rover (MER) Mission. Lecture Hall, Reuben H. Fleet Space Center, 1875 El Prado, Balboa Park, San Diego, CA 92101. Phone (619) 238-1233 for the daily schedule or (TDD) (619) 685-5744 or visit www.rhfleet.org



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OASIS Memberships

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Mail check and completed form to:

Wednesday through Sunday, August 23-27 -- L.A. Con IV: 64th World Science Fiction Convention. Anaheim Convention Center, 800 W Katella Ave. Sponsored by the World Science Fiction Society. Full registration \$200; one-day registration \$75; "taster" registration \$20. For more information visit <http://www.laconiv.org>. PLEASE SEE ADVERTISEMENT ON PAGE 6

Sunday, August 27 -- STS-115 launch, Space Shuttle Atlantis, MEPSI 3A & 3B, International Space Station 12A. Visit http://www.nasa.gov/mission_pages/shuttle/news/status-20060804.html

Sunday, August 27, 2:00 p.m. -- Lecture by Don Sweetnam of JPL on the "Genesis" space mission. Altadena Public Library, 600 E Mariposa St. Sponsored by the Mount Wilson Observatory Association. Phone Bob Eklund at (310) 333-3478 or email beklund@sprynet.com. Also visit <http://www.mwoa.org>

Friday, September 1, 7:30 p.m. -- "A Day in the Life of a Rocket Scientist and the James Webb Space Telescope," by Michael Harrison. El Camino College Planetarium, Torrance Sponsored by the South Bay Astronomical Society. Phone (323) 217-1512 or email ReneckeRUs@aol.com

Saturday, September 2, sunset to 10 p.m. -- Public Star Party. Sponsored by the Los Angeles Astronomical Society. Griffith Observatory Satellite, 4800 Western Heritage Way (park in the Los Angeles Zoo parking lot). Email outreach@laas.org or visit http://www.laas.org/Events_StarParties-Public.htm

Thursday and Friday, September 14 and 15, 7:00 p.m. -- "Beyond Pluto: the Discovery of the '10th Planet'," by Dr. Michael Brown, Professor of Planetary Astronomy, Division of Geological and Planetary Sciences, California Institute of Technology. Sponsored by Theodore von Kármán Lecture Series. Admission is free. Also broadcast and webcast on NASA TV. Phone (818) 354-0112 or visit <http://www.jpl.nasa.gov/events/lectures/sep06.cfm>

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