



Odyssey

Pushing the Edges

October
2006

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

OASIS Guest Sheds "First Light" on Griffith Observatory Upgrades

By Steven Bartlett

The Griffith Observatory is set for its grand reopening on November 3rd after a closure of nearly five years, according to Kara Knack, Renovation Communications Officer of the Friends of the Observatory. Ms. Knack described the facility's improvements in her talk "First Light" at the Long Beach Library on October 7.

The Hollywood Hills landmark has undergone extensive upgrades, both above and below ground, though most of the improvements aren't readily visible. "A lot of people are telling us that 'it doesn't look any different inside!'" said Knack. "That was intentional." The Friends of the Observatory, along with the City of Los Angeles, the Griffith Trust, and the renovations contractor, worked hard to maintain the art nouveau feel of the 1930's building while turning it into a first-class 21st-century facility. The biggest change is a new 36,000 square-



Kara Knack tells OASIS and guests what to anticipate at the renovated Griffith Observatory! Photo: Craig Ward

foot exhibit space beneath the observatory. Work crews excavated 2-1/2 stories down into the earth to create the new building.

The north wall of this building features a large, true depiction of the night sky based on images from the 12" telescope atop Mount Palomar. This 150-foot-long, 22-foot-high image has been engraved and painted into a set of large ceramic panels built into the wall. These panels depict the stars, galaxies, and quasars that

the telescope photographed "in a region the size of your finger held out at arm's length," said Knack.

The Observatory's extensive meteorite collection is housed in the new "Edge of Space" entry to the new building. A timeline of the Universe, with 2,100 pieces of cosmic jewelry, are part of the "Cosmic Connection" area.

"There's a new generation of telescopes and a spectrograph showing the 'extended vision of our eye' across the full electromagnetic spectrum," said the speaker.

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Mark your calendars for LosCon! November 24-26, 2006

OASIS Election 2006 Instructions

By Craig Ward

Members should find a ballot in this issue of the Odyssey. The ballot is not included in complimentary or exchange copies.

Vote by placing an "X" or checkmark next to the name of the candidate. If a member wishes to vote for a candidate not listed for a position, use the blank space provided to write the candidate's name. A member may vote for at most one candidate for the officer positions of President, Vice President, Secretary, and Treasurer. A member may vote for at most five candidates for At-Large Director.

The ballot may be returned by mail to the OASIS Post Office Box (see the return address of the newsletter) by folding in thirds, sealing with tape, and supplying proper postage. The ballot may also be returned in person at the November 18, 2006 General Meeting. Members who wish to vote at the General Meeting and who do not have a ballot can receive a replacement ballot. Each member may vote only once. Ballots returned by mail must arrive at the Post Office Box by Friday, November 17, 2006 so that they may be picked up prior to the General Meeting. Late ballots will not be counted.

It is important that members cast a vote. Voting provides a means of influencing the direction and policies of the chapter and shows the volunteers standing to be officers of the chapters that their efforts are acknowledged and appreciated.

Kara Knack: Griffith Observatory Renovation *(continued from page 1)*

For public lectures, the new Leonard Nimoy Event Horizon auditorium allows large groups to learn the mysteries of the cosmos in comfort. The new building also has an extensive set of offices for the Observatory staff.

Another new exhibit space is the "Depths of Space" building. This area features astronomical discoveries made with man-made probes since the dawn of the Space Age. Each planet has its own display, as do the comets and asteroids. The findings of the major orbiting observatories have substantial exhibit space.

The above-ground main building of the Observatory has itself been

substantially improved. Since its original construction, the building has suffered extensive corrosion and spalling because the 1930's-era concrete had allowed rainwater and smog to chemically react with the concrete and steel in the building. Renovation construction crews replaced the damaged areas with new steel and modern concrete designed to avoid these problems.

The main building included a set of alcoves near the entryway. Because these tended to focus and reflect sound back to the people in the gallery, they created a cacophony in the gallery. Observatory work crews filled in these alcoves by 1950 to reduce

the noise. The renovation team decided to restore these alcoves to their original, stylish appearance and removed the filling materials. To keep down the noise, they've installed new sound-absorbing baffles and panels that do not detract from the beauty of the architecture.

The main planetarium has been greatly improved, according to Knack. The old, uncomfortable seats and their awkward arrangement around the planetarium room have been replaced with new seats that allow all members of the audience to see the sky show without straining their necks and backs.

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COTS, or Space Transportation: The Next Generation

SpaceX Tames the (Orbital) Dragon

Steve Davis -- OASIS Lecture Series

By Steven Bartlett

Delivering people and cargo to orbit is a key requirement for building a spacefaring culture. Making a profit from that delivery is essential if the culture is to go much beyond "flags and footprints" in space. NASA recently awarded commercial contracts to two companies to ship crews and materials to the International Space Station. One of those companies, the El Segundo-based Space Exploration, Inc. (SpaceX) is developing its Dragon space capsules for just those missions. Steve Davis, the Dragon team lead systems engineer, described the company's efforts to build and fly the spacecraft in a talk on September 30 in Long Beach.

Under the Commercial Orbital Transportation Services (COTS) contract, SpaceX and its competitor, Rocketplane Kistler, are to build and fly a series of demonstration vehicles to show that their systems can "deliver the goods" to orbit safely, reliably, and at a fair price. The service contractors must show that they can fly unpressurized cargoes and crews to and from the Station.

The COTS program arose when NASA realized that there would be a gap between when the Space Shuttle was retired in 2010 and when its replacement, the Orion Crew Exploration Vehicle, would fly in 2014. During this gap, the only way to deliver crews and equipment to and from the Station would be via the Russian Soyuz capsules. To fill the gap with an American space system, the space agency initiated COTS.

SpaceX is designing its Dragon capsule to carry a crew of seven, or combination of crew and cargo, to and from the Station. It will be launched atop the company's reusable Falcon 9 booster, already under
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And Away We Go!

Randy Brinkley -- AIAA Dinner Meeting

By Robert Brodsky

At the Los Angeles American Institute of Aeronautics and Astronautics (AIAA) Section Dinner Meeting talk, "Rocketplane Kistler & the Commercial Orbital Transportation Services (COTS) Contract," it became clear to me that the United States, financed by NASA and a few venture capitalists, is embarking on a new and very dicey era in space endeavors.

The speaker at the September 28 meeting was Randy Brinkley, President of Rocketplane Kistler, which recently won one of two COTS contracts awarded by NASA to get private enterprise into the space launch and transportation business. Lurking in the wings is SpaceX, awarded a similar COTS contract. In addition, multi-millionaire Richard Branson has his Rutan-designed-and-built SpaceShip Two, which will vie with Kistler for the business of taking folks who have \$200,000 or so available in spare change into suborbital space. The race is on!

If either Kistler or SpaceX or both COTS efforts realize their low-cost launch vehicle/cargo/manned capsule carrier systems, they will have a presumably assured assignment of replacing the \$64 million-a-shot Russian Soyuz vehicles as supply and crew carriers to the International Space Station (ISS). If neither succeeds, NASA will still have its Crew Exploration Vehicle. So the gauntlet has been thrown and both companies are talking about first flights within the next year and a half for their launch vehicles and, in Kistler's case, for their suborbital tourist plane. Branson's six-passenger plane entry is anticipating first tourist flights in 2008. Ain't we got fun!

Brinkley joined Kistler as CEO in August 2004, after a distinguished career as an aviator in the Marine
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SpaceX Tames the (Orbital) Dragon

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development when the government announced the award in early September.

The company, founded and largely financed by Internet entrepreneur Elon Musk, has been building a family of boosters around its Merlin rocket engine. Davis described SpaceX as a "Silicon Valley Rocket Company," where employees routinely work 80-90 hours per week to meet the firm's goals of dramatically reducing the cost to reach orbit. Most of their people are young (the average age is about 27), capable, and highly motivated.

In COTS, the firm will receive \$280 million for six demonstration flights. The first, in mid-2008, will show that the launcher and spacecraft can achieve orbit. The next mission will fly in mid-2009 and must simulate a delivery mission to the Station using the Falcon 9 second stage as a rendezvous target. The third launch will deliver cargo to the Station and return material to Earth in the third quarter of 2009.

The next three flights will focus on safely launching and recovering a crew of astronauts. In late 2009, the Dragon capsule is slated to carry out a "shakedown" flight with its first crew. The next launch, in mid-2010, will fly a small crew to the Station. The final flight, in late 2010, will show

that the Dragon capsule can safely carry a crew of seven to and from space.

In an operational mission scenario, a Falcon 9 booster would launch a loaded Dragon capsule to a 185 X 300 km initial orbit to verify that everything is working correctly. If the orbit and spacecraft are in good condition, the orbit will be circularized at 300 km.

The capsule then gradually catches up to the Station and flies up to its orbit. When the craft is less than 100 feet from the Station, the Dragon's control system is put into a standby mode so that the Station's robotic arm can reach out, grasp the capsule, and berth it to an open berthing port.

The crew then opens the hatches between the capsule and the Station and begins unloading the craft. The Dragon remains attached to the Station while it waits for the departure order. The capsule is designed to remain attached to the Station for up to six months.

At the end of this mission, the capsule is loaded with equipment and trash to be returned to Earth and the departing crew boards the craft. The capsule separates from the Station, fires its de-orbit rockets, and re-enters the Earth's atmosphere. At a designated altitude, the capsule deploys its drogue and main parachutes and splashes down

in the ocean for recovery via ship. The crew exits, the cargo is unloaded, and the capsule is refurbished and readied for another flight.

Besides its COTS missions, SpaceX has a full slate of launches scheduled over the next few years for governmental and commercial clients. These missions are divided about evenly between Falcon 9 flights and those employing the company's smaller, less expensive Falcon 1 booster. The company made its first launch attempt with the Falcon 1 earlier this year from the Kwajalein atoll in the Pacific Ocean. That launch was unsuccessful due to a leak and some corrosion on a nut on a pressure transducer. The company plans to try again with a new Falcon 1 in December of this year.

Davis conveyed to the audience the excitement that the SpaceX team feels working there. His enthusiasm was evident when he described the team's joy in being able to design, build, and test equipment quickly and easily with minimal bureaucracy. He invited OASIS for a future tour of the company facilities. (OASIS organized a tour of their facility in mid-2004, enjoyed by all attendees.)

OASIS wishes the Dragon team success with its development and flight program and hopes that the Falcon 1 and Falcon 9 flights achieve their mission objectives.

Rocketplane Kistler

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Corps and later as NASA Program Manager for the ISS, where he managed the integration of Russia's participation in ISS activities. He is also helping integrate Andrews Space into the RpK activities. Previously, he guided the company in a merger with Rocketplane Limited Inc. Dr. George Mueller, who formerly ran the Apollo program, is one of the founding fathers and the chief conceptual designer for Kistler. He is assisted by other top ex-NASA engineer/administrators such as Max Faget and Aaron Cohen.

Brinkley described the program RpK was conducting at its Oklahoma City plant to develop fully re-usable orbital and sub-orbital launch vehicles/systems. The K-1 two-stage-to-space launch vehicle with interchangeable cargo/crew carrier modules is being designed for a five-day manned mission to the space station and return. Its performance is "spec"ed to 3000# to GEO (equivalent to a Delta 2 or Soyuz) and its cargo version could perform with a nine-day LEO mission turn-around time. Initial test and launches will be conducted out of Woomera, where the launch azimuth is no problem; later a transfer of operations to a US base, perhaps in New Mexico, will be considered. The first stage rises to 110,000-135,000 feet and is recovered near the launch location, using a six-parachute

system yoked for horizontal carriage, landing on four large airbags, two fore and two aft. No parachute tweaking is deemed necessary, because of prior-to-launch wind analysis and consequent first-stage steering adjustment.

Three modules will carry payloads; one is a five-crew version and two are cargo versions of different sizes. All are equipped with heat shields for reentry and all will be recovered by a three-parachute-four air bag system. Landing is planned in the immediate vicinity of the launch site. The key to economy for the K-1 is aluminum tankage and LOx-RP propellants for the pressure-fed gimbaling main engines. Orbital Maneuvering engines are LOx-Ethanol, and ACS engines are GOx/Ethanol. Aerojet supplies all three engine types. Draper Labs supplies the electronics/controls. Most E-systems are triply redundant.

The RpK suborbital vehicle is essentially a Lear Jet with a new wing and a rear-installed LOx-Kerosene rocket engine. Its maximum speed will be approximately Mach 3.8. It will climb to 24,000 feet using jet engines and will then undergo a 3g rocket acceleration. It will attain a maximum altitude of 64 miles in a one-hour flight with 6 passengers. A big market - enough for both competitors - is predicted: 14,000 potential by 2021! Let the games begin!!



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

OASIS, PO Box 1231
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Griffith Observatory Reopening Preview

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Additionally, the old plaster dome has been replaced with a finely-perforated aluminum dome that better accommodates installation of speakers and upgraded room lighting. A new Zeiss projector will show audiences the beauty of the heavens.

Atop the building, renovation crews replaced the old, deteriorating copper dome with a new and improved dome. The old dome had suffered decades of galvanic corrosion because the US Army had installed a steel antenna tower atop the dome for communications during World War II. As a result, the copper had worn down to less than a

paper's thickness. The new dome is substantially thicker and is protected from the corrosive effects of the elements. In addition, a new, composite sealing dome has been installed beneath the segmented copper dome. "The old dome leaked like a sieve whenever it rained," said Knack. "We had to have at least a hundred buckets to catch all of the drips. Now that won't happen."

For dining, the facility now features the "Café at the End of the Universe" on the east side of the main building. The café will be operated by Wolfgang Puck and the fare will include sandwiches, soups and chili, and other dishes.

A study of traffic and visitor patterns predicts that the renovated facility could see up to 20,000 people per day; the Fire Department has raised major objections to the safety of this many visitors in the event of a fire or other disaster. As a result, the Observatory has developed a reservation system to limit the number of visitors at the facility at any point in time. The free reservations are available online at www.griffithobservatory.com. In addition, due to the limited number of parking spaces available in the Observatory parking lots, shuttle buses will take visitors from parking areas near the LA Zoo up to the Observatory.

○ to Invade LosCon 2006... Be a Part of the Action!

Like meeting new people?
Like talking about space to space and science fiction enthusiasts?

Here's your opportunity!

The **33rd annual Los Angeles Science Fiction Convention (LosCon)** will be at the LAX Marriott from Nov. 24-26, 2006 (Thanksgiving weekend).

○ will be providing space programming, hosting a room party 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 ○ activities. If you're a shutterbug, we'd love to have pictures!

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.

For more information, please visit: <http://www.loscon.org/newsite/index.html>. The site is just now being ramped up, so check back again closer to the dates for more updated information. If you are interested, please send an e-mail to: convention_liaison@oasis-nss.org

Saturday, November 4. San Diego Aerospace Museum International Aerospace Hall of Fame Celebration, San Diego Aerospace Museum, 2001 Pan American Plaza, San Diego, CA. For directions, visit <http://www.aerospacemuseum.org/visit/directions.html>. Email cgaranian@sdasm.org or fax (616) 233-4526, attn. Carolyn. Visit <http://www.aerospacemuseum.org/upcoming/investiture2006.html> for the latest information.

Thursday and Friday, November 16 and 17, 7:00 p.m. "Black Holes in the Universe" by Curt Cutler, European Space Agency, Laser Interferometer Space Antenna Team and Member, Max-Planck-Institute for Gravitational Physics, Potsdam Admission is free. Seating is limited. Phone (818) 354-0112 or visit <http://www.jpl.nasa.gov/events/lectures/nov06.cfm>.
Thursday, November 16 -- von Kármán Auditorium, Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena
Friday, November 17 -- Vosloh Forum, Pasadena City College, 1570 East Colorado Blvd., Pasadena

Friday, November 17, 8:00 p.m. "On the Fringes: What's an Interferometer, and Why Does NASA Want to Build Them?" Andrew J. Booth, Senior Engineer, JPL Interferometry Architecture and Systems Group with the Keck interferometer in Hawaii. Science Lecture Hall 140, Santa Monica College Planetarium, 1900 Pico Blvd. Santa Monica, 90405 Phone (310) 434-4003 or visit <http://www.smc.edu/planetarium/>

Saturday, November 18, 3:00 p.m. -- OASIS Monthly Business Meeting followed by a Potluck Party. Home of Steve Bartlett & Tina Beychok. 7108 East Peabody Street, Long Beach, CA
Visit www.oasis-nss.org/ or phone OASIS HOTLINE AT (310) 364-2290.

Friday to Sunday, November 24 - 26, 2006. Los Angeles Science Fantasy Society LOSCON 33 "Exploring the Golden Ages of Science Fiction." Membership Rates: \$35 adult or \$17.50 kids. Come visit us at the OASIS booth. Los Angeles Airport Marriott, 4855 West Century Boulevard, Los Angeles, CA. Visit www.loscon.org.

SEE LOSCON ADVERTISEMENT ON PAGE 6



Organization for the Advancement of Space Industrialization and Settlement
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___ \$150 Explorer

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Total Enclosed: \$ _____

Rates listed are for yearly dues

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OASIS Memberships

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Friday, October 27, 8:00 p.m. "Mars Reconnaissance Orbiter: Initial Science Results" Dr. Richard Zurek, JPL, Project Scientist, Mars Reconnaissance Orbiter. Santa Monica College Planetarium, Science Lecture Hall 140, Santa Monica College, 1900 Pico Blvd. Santa Monica. Phone (310) 434-4003 or visit <http://www.smc.edu/planetarium/>

Saturday, October 28, 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

Saturday, October 28, 2:00 p.m. to 11:30 p.m. The Local Group - Astronomy Club of the Santa Clarita Valley Public Star Party. Vasquez Rocks Natural Area Park, 10700 Escondido Canyon Rd, Agua Dulce. Visit <http://www.lgscv.org/>

Saturday and Sunday, October 28 and 29. Edwards Air Force Base 2006 Open House and Air Show. Parking is free and bleachers will be available on a first-come, first-serve basis. Gates open at 7 a.m., flying starts at 10 a.m., closes at 4:30 p.m. Phone (661) 277-3510 and visit <http://www.edwards.af.mil/openhouse/>

Sunday, October 29, 6:00 p.m. to 9:00 p.m. Friends Of The Observatory Griffith Observatory Reopening Galactic Gala. Phone Cindy Johnson at (213) 236-2361 or send her an e-mail at cjohnson@lasec.us; also visit <http://www.friendsoftheobservatory.com/> for more information.

Friday, November 3. Griffith Observatory Reopens BY RESERVATION ONLY. Reservations may be made through 1) www.GriffithObservatory.org; 2) (888) 695-0888 from 8 a.m. to 6 p.m. PT. Reservations also may be made in-person at a reservation center at the Griffith Observatory Satellite (4800 Western Heritage Way, Los Angeles, CA 90027), opening October 30, 2006. Charges for timed-entry and shuttle reservations are: General reservations: \$8.00 each Children 5-12 years: \$4.00 each. Children 4 years and under: Free. Seniors 60 years and over: \$4.00 each. Timed-entry reservations only: hikers and cyclists: Free 48 hours in advance. Hours of operation: noon to 10 p.m. Tuesday-Friday and 10 a.m. to 10 p.m. Saturday and Sunday. Closed Mondays.

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