

Odyssey

Pushing the Edges

July
2006

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

Stephanie's Turn

By Robert Gounley

The photograph above my desk shows a group of men and women in semiformal attire smiling and laughing for the camera. They're my friends and co-workers. We'd all just received NASA awards for the successful delivery of a robotic probe to Jupiter's atmosphere and a spacecraft into Jupiter's orbit. Thousands of overtime hours, fueled by hundreds of cups of coffee, were behind us and now we flashed our medals like novice Olympic athletes.

The young black woman seated at the far right holds no medal -- awards were being given in groups and hers wouldn't come until next year.

Still, her smile is the brightest of them all.

Her name is Stephanie Wilson and she'd stopped by to con-



STS-121 (Discovery) Astronaut Stephanie D. Wilson, mission specialist. *Photo: NASA*

gratulate us joining that year's class of NASA astronaut trainees.

Tonight, as I write this, Stephanie is aboard the International Space Station as it flies over the southern tip of India. She trained and waited 10 years while several dozen other astronauts flew their missions. Stephanie finally got her turn by launching

with the Space Shuttle Discovery on the 4th of July.

It doesn't get much better than that.

I'm very proud of Stephanie and hope her hard work is rewarded by many other spaceflights. She's probably too busy to think much about the hundreds of people she worked with before becoming an astronaut. At least a few of us spend too much time daydreaming about the view she glimpses while floating past a space station porthole.

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Mark your calendars: Worldcon, August 23-27! Advertisement on page 6.

By Craig Ward

As I write this, the Space Shuttle Discovery is in orbit, docked to the International Space Station. The mission has two goals. One is to bring badly needed supplies to the ISS and the other is to further test the changes made to the spacecraft after the loss of Columbia in 2003.

From the news reports, Discovery seems to have fared better this time than it did last year. It was not an absolutely perfect launch; at least one space walk is planned to get a closer look at and repair some damage to the heat shield. But with the current state of the art, it was a good one.

In the weeks leading up to the successful July 4 launch, the news media reported on the

swirling controversy within NASA on the launch decision. Some worried that the external tank was not good enough and risked damaging Discovery the way Columbia had been damaged. The decision to go for launch seems to have rested on the probability of a safe return of the crew with a significantly lower probability for the safe return of the ship. Even if the ship were damaged by the launch, the crew could wait for rescue at ISS.

To me, this was the right decision. You can't make everything perfect all the time; you can only do the best you can with what you have. The space shuttle fleet is what it is and, warts and all, it is the best we have at the moment. Some will complain that the space shuttle is poorly designed and has always been seriously flawed.

That might be true, but it is not the whole of the issue.

I am not an aerospace engineer, so I do not get involved with that kind of argument. I do, however, remember something said by one of the pioneers in the field I do work in. Admiral Grace Hopper is quoted as saying, "A ship in port is safe; but that is not what ships are built for. Sail out to sea and do new things." (http://en.wikiquote.org/wiki/Grace_Hopper) That, I believe, is what the senior leadership at NASA is trying to do.

According to the local paper, the docked Discovery and ISS will be visible from here tonight. If the sky is clear, I plan to go outside to my backyard and look up and marvel with a vicarious experience of some new things.



Astronauts Piers J. Sellers (right) and Michael E. Fossum, both STS-121 mission specialists, in their Extravehicular Mobility Unit (EMU) spacesuits, along with cosmonaut Pavel V. Vinogradov (center left), Expedition 13 commander representing Russia's Federal Space Agency; astronauts Mark E. Kelly and Stephanie D. Wilson, STS-121 pilot and mission specialist, respectively, prepare for the start of the mission's second scheduled session of EVA in the Quest Airlock of the International Space Station.

Photo: NASA <http://spaceflight.nasa.gov/gallery/images/shuttle/sts-121/html/s121e06315.html>

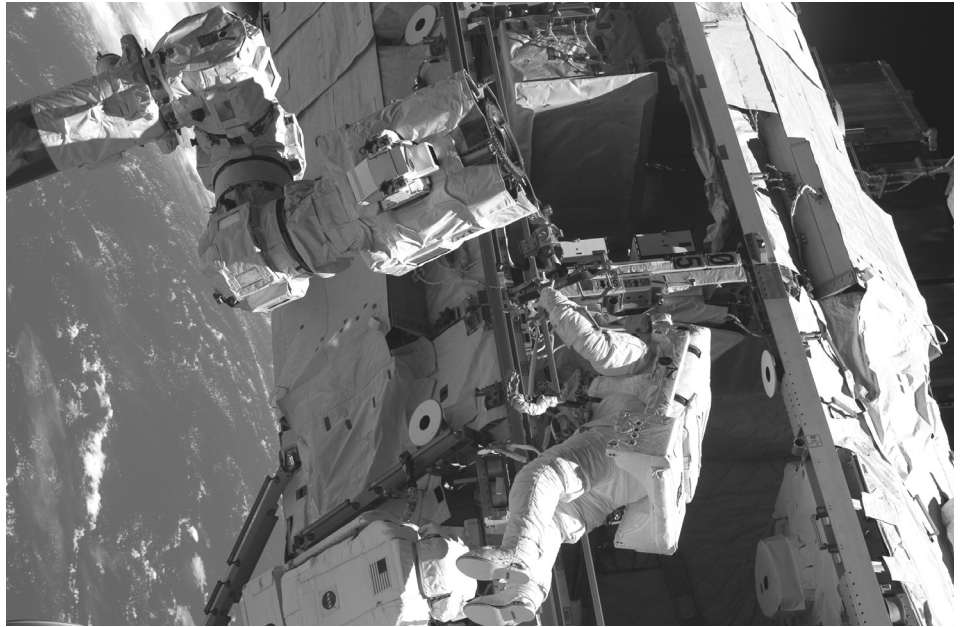
Stephanie's Turn

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Still, it's hard to foresee what the future will be like for Stephanie and her fellow astronauts. A generation of aspiring space travelers looked to the Space Shuttle for their future passage. They didn't have to be test pilots to fly. They could be engineers. They could be scientists. Or medical doctors. Anyone physically capable, technically adept, and possessing some vaguely-defined characteristics broadly termed "the right stuff" could become an astronaut.

Thousands applied. Thousands more sent for applications but held off sending them in until completing one more college degree, one more promotion, or one more scientific paper. I'm convinced that the chance to become an astronaut motivated thousands of technical students to excel in their disciplines. How many fortunes have been made because so many of our nation's most brilliant minds, disappointed by their first ambition, chose to dull the pain of rejection by becoming multimillionaire founders of high-tech industries instead? (And why didn't I spot them when they needed investors?)

The Space Shuttle program accomplished a lot, but it was not the magic wand for space



During a 6-hour 47-minute spacewalk, astronauts Michael E. Fossum and Piers J. Sellers restored the ISS's Mobile Transporter rail car to full operation and delivered a spare pump module for the station's cooling system.

Photo; NASA <http://spaceflight.nasa.gov/gallery/images/shuttle/sts-121/html/s121e06199.html>

development so many of us hoped it could be. Flights never became both safe and routine. Costs soared. Worse, two shuttle flights will now be remembered mostly for their untimely loss. The astronauts aboard them were people we could identify with; their loss touched us all. (Stephanie Wilson was working in Mission Control during Columbia's last flight; she was one of the last people to speak to the crew.)

Today, the crystal ball is cloudy. There won't be very many more Shuttle flights before the remaining fleet are retired. Their replacement is

years away. Trips to the Moon and Mars are planned, but costs are growing even as the launch date slips. Tourists may be the next big wave of space travelers, but will there be enough sub-orbital flights to provide the capital needed for a new generation of orbital vehicles? Or will routine human space travel come about in some completely different way?

It's all about answering the question, "When will I get my turn?"

Meanwhile, Stephanie, I hope you're enjoying the view.

Who Knew?

Now we go back to the early days of space exploration...

By Robert Brodsky

In 1962, space exploration was in its infancy and Space-General was a very new company. True, we were world class in the development of sounding rockets, like the Aerobees and the Astrobes. But with the exceptions of Jack Froelich and my new boss, Fred Eimer, both of whom had been involved with the USA's first successful satellite at JPL, none of us had ever even seen a spacecraft, let alone design and launch one. Thus we stumbled into the new Space Age as neophytes, and my troops and I had to learn on the job.

Fred came into my office and said, "Do you think we should propose to make a satellite?" Knowing my technical staff had zero experience in such things, it was easy for me to say "Hell, No!" Because I already had the reputation for being a bellwether for important decisions - whatever I opined, you should do the opposite- Fred persisted. He said we had the opportunity to go into the spacecraft business on a sole-source basis through a friendly back door.

I agreed to fire up the technical staff under my command, and together we would learn a new trade.

How this opportunity arose was rather whimsical. In addition to NASA, our other major sounding-rocket customer was the Air Force's Cambridge Research Laboratory, north of Boston, MA. CRL was dedicated to research concerning the space environment, in support of the Air Force's fledgling reconnaissance, communication, and spy satellite programs. To this end, they were flying 20 to 30 per year of our Aerobee 150 (100-pound scientific payload to 150 miles into space) sounding rockets, launching from White Sands, Ft. Churchill on Hudson Bay, Kiruna, Sweden, and other places; making key scientific measurements during the five or so minutes they spent in true space.

In getting into orbiting space flight, Cambridge saw the chance to make such measurements over a very long time - a year instead of minutes. However, they had no charter from the Air Force to develop or buy spacecraft. Their wily Sounding Rocket Group leader, our long-time customer, decided to make an end run. Because he was authorized to buy sounding rockets and their payloads, he decided to order a new-type sounding rocket: one that stayed in space longer than the normal 5 minutes. He gave the order to his usual supplier

so that no one would question the purchase order. This sounding rocket plus payload would enter orbit via the low-cost Scout launch vehicle that he also had at his disposal; thus the sporting offer to Space-General to play ball and get Cambridge into space. I am sure he probably had obtained his superior's tacit, but not written, agreement. Early space was a little Wild Westish!

So we knuckled down to design our first satellite, to be called the OV3. This connoted the Air Force's 3rd Orbiting Vehicle. Of course we weren't completely ignorant, and Jack and Fred reached back to JPL, from which they came, to get some excellent spacecraft-experienced detailed design help. We sought knowledgeable subcontractors to provide the solar cell arrays for our power system. We actually put a tape recorder company into the space supplier business by helping him get his recorder qualified for operation in the space environment. Temperature control of the satellite proved to be more difficult, because so few analytical techniques were available to figure the

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OASIS, PO Box 1231
Redondo Beach, CA 90278

Who Knew?

changes as the satellite went in and out of the sunshine.

But we had a large rudimentary passive analog computer, which only one guy could run, that provided some answers. In the end, we proposed to build four OV3s, guaranteed to operate a year in space: all for the paltry amount of \$1,800,000 (and subsequently only overran by around 200 grand.) We delivered the first one a little over a year after go-ahead.

As we assembled and tested the four, we developed some elegant procedures. The best one I remember was the way we balanced them, using a dynamic balance rig similar to the ones that balance auto tires. The OV3 was a spinning satellite and thus stayed in the proper attitude that it was placed in on spin-up, just as a spinning top does - if it is exactly balanced. Our ace balancers found that a well-placed, well-chewed wad of chewing gum usually did the trick. Once they found the right place to stick the right amount of gum, they sprayed the deposit with a light coat of gunk to assure its permanence. We also found that we could control the tem-

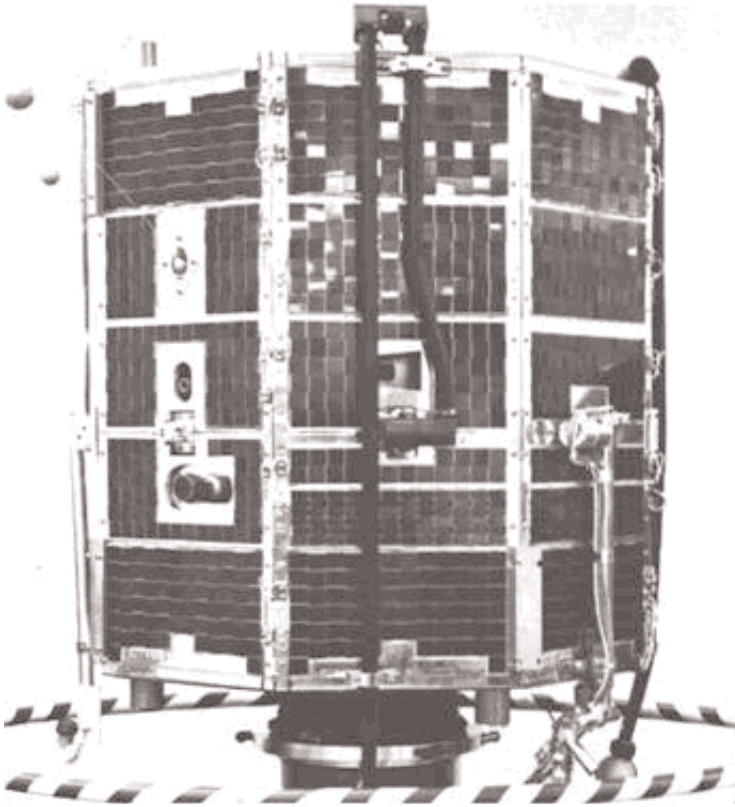
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perature, which generally ran towards the hot end of allowable, by temporarily shutting down one or more of the seven scientific payloads being carried.

Each of the OV3s was a great success and all four far exceeded their one year design goal. Kicking and screaming, I had been dragged into the real space age in the guise of chief engineer of one of America's earliest satellites. None of us really knew what we were doing, but in this case we were clearly on the right track.

To follow up this act we made the OFO, the Orbiting Frog Otolith satellite, which decisively demonstrated that a frog could still tell which way was up in space, even after a period of aimless tumbling. A frog was used because their ear-related sense of balance system is a close copy of (or precursor to?) ours. Later manned space flights proved that humans also had this ability. They always seem to know which way is up!

Please see page 6 for a more detailed description, along with an illustration, of the OV-3.



The OV3 General Utility Satellites were built for the Air Force as part of the OV3 satellite series. Four of the spacecraft were launched during 1967 and all were successful. The satellites were Scout-boosted, three from the Western Test Range and one from Wallops Island, Virginia. Apogees ranged from 1500 to 5600 km and perigees down to 330 km. The spacecraft was a right octagonal cylinder measuring 0.76 m by 0.76 m and weighing from 68 to 78 kg. Solar cells supplied power, with a cell area of 0.34 square m for experiments and .58 square m for support subsystems. The Prime Contractor was Aerojet-General Corporation (Space-General Plant).

Credit:

William R Corliss. Scientific satellites. Scientific and Technical Information Division, National Aeronautics and Space Administration, 1967.

***N*OASS to Invade Worldcon 2006... Be a Part of the Action!**

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.

***N*OASS** 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 ***N*OASS** 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.

***N*OASS** 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

OASIS Space Calendar and Sky Watch

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Thursday and Friday, August 17 and 18, 7:00 p.m. "How Satellites Have Revolutionized Oceanography: a Historical Perspective," by Dr. Jorge Vazquez, JPL, Physical Oceanographer. Admission is free. Seating is limited.

Phone (818) 354-0112 or visit <http://www.jpl.nasa.gov/events/lectures/aug06.cfm>.

August 17, von Kármán Auditorium, Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena

August 18, Vosloh Forum, Pasadena City College, 1570 East Colorado Blvd., Pasadena

Saturday, August 19, 3:00 p.m. OASIS Board Meeting. Home of Steve Bartlett and Tina Beychok. 7108 East Peabody Street, Long Beach. Phone the OASIS HOTLINE at (310) 364-2290 or visit www.oasis-nss.org/

Wednesday to Sunday, August 23-27. World Science Fiction Society (LA Con IV) 64th World Science Fiction Convention "Worldcon." Anaheim Convention Center, 800 West Katella Avenue, Anaheim, CA. Full registration \$200; one-day registration \$75; "taster" registration \$20. Visit <http://www.laconiv.org>

Saturday, September 2, sunset to 10:00 p.m. -- Public Star Party. Sponsored by 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 Michael Brown, Professor of Planetary Astronomy, Division of Geological and Planetary Sciences, California Institute of Technology. Admission is free. Seating is limited.

Thursday, September 14: Von Kármán Auditorium at JPL, 4800 Oak Grove Dr, Pasadena.

Friday, September 15: Vosloh Forum at Pasadena City College, 1570 E Colorado Blvd, Pasadena.

Phone (818) 354-0112 or visit <http://www.jpl.nasa.gov/events/lectures/sepl06.cfm>



Organization for the Advancement of Space Industrialization and Settlement
A chapter of the National Space Society

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Additional Contribution: \$ _____

Total Enclosed: \$ _____

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I wish to join as an:

____ \$15 Individual

____ \$25 Supporter

____ \$50 Adventurer

____ \$75 Pioneer

MMM yes/no*

MMM yes/no*

MMM yes/no*

Rates listed are for yearly dues

____ \$150 Explorer

MMM yes/no*

OASIS Memberships

PO Box 1231

Redondo Beach, CA 90278

Mail check and completed form to:

Thursday and Friday, July 20 and 21, 7:00 p.m. -- "Cassini Realtime Operations," by David Doody, Flight Operations Lead, Cassini Mission Support & Services Office. 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/jul06.cfm>

Thursday, July 20: Von Kármán Auditorium at JPL, 4800 Oak Grove Dr, Pasadena.

Friday, July 21: Vosloh Forum at Pasadena City College, 1570 E Colorado Blvd, Pasadena.

Saturday, July 22, dusk. Antelope Valley Astronomy Club Dark Sky Star Party - Mt. Pinos..

Phone Doug Drake (661) 724-0849 or email president@avastronomyclub.org

Saturday, July 29, sunset to 10:00 p.m. -- Public Star Party. Sponsored by 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-Saturday, August 10-12 -- Satellites & Education Conference XIX. Sponsored by Satellite Educators Association. California State University, Los Angeles, 5151 State University Dr. SEA members \$80; non-members \$105; full-time students \$40; Friday night banquet \$10 with registration, \$30 banquet only. Financial aid for teachers is available. Visit <http://www.sated.org>

Friday and Saturday, August 11 and 12. Orange County Astronomers AstroImage 2006 (Amateur Astronomy Conference) \$95 until 1 August 1; \$110 at the door.

Friday - 6:30 to 9:30 p.m. Saturday - 8:00 a.m. to 8:30 p.m.

Curtis Theater. City of Brea Civic & Cultural Center, 1 Civic Center Circle, Brea

Visit <http://www.ocastronomers.org/astroimage/2006/index.asp> or phone (714) 751-6867 for 24-hour recording

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