

AIAA SAN FRANCISCO SECTION



IN4M-LETTER

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AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS SAN FRANCISCO SECTION
P.O. BOX 1548, MOUNTAIN VIEW, CA 94042 <http://www.aiaa-sf.org>



Above: Astronaut shepherds the new WFPC2 camera toward the Hubble Space Telescope during the first servicing mission, STS-61. **At right:** the Hubble telescope seen from the shuttle during the second servicing mission, STS-82.



Thursday, April 28, 2005
Ramada Inn, Sunnyvale

Snatching Victory from the Jaws of Defeat Fixing the Hubble Space Telescope

Dr. Paul Scowen
Dept. of Physics & Astronomy
Arizona State University
Tempe, AZ

In its fifteen years of sending images back to Earth, the Hubble Space Telescope has delivered spectacular pictures of galaxies, planets, and nebulae. It is able to look back to a time before the formation of the Earth. When Comet Shoemaker-Levy 9 plunged into the atmosphere of Jupiter, Hubble sent back detailed pictures of the explosion.

But the story was not always so spectacular; Hubble's first years were marred by blurry vision, destined to be one of the great research program disasters of history.

In 1990, NASA launched its flagship observatory, the Hubble Space Telescope, only to find that the mirror had been shaped incorrectly introducing spherical aberration. There followed an intensive period of work to design replacement hardware that would fix the optical error. This presentation is the story of that fix from the perspective of a member of the science team for the replacement camera, WFPC-2. Technical issues will be discussed as well as science drivers and the kind of improvement the fix pro-

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- NOTE:** This newsletter and many back issues are available in PDF form at: <http://www.aiaa-sf.org/newsletter>. (Pages 3 and 4 only available in PDF.)

Section Program Notes

If you were wondering what happened to the March dinner meeting program, there isn't any. But following the quiet, there is a flurry of activity scheduled.

On April 25, **Dr. Paul Scowen** will speak on *Fixing the Hubble Space Telescope* -- not in 2005 or 2006, but the successful rescue which fixed the flawed optics of Hubble's original camera.

On May 24, AIAA President **Dr. Donald W. Richardson** will visit the San Francisco section for a noon-time meeting and discuss *AIAA and Aeronautics, Present, Future and Issues*. This is also a town-hall meeting, where members can bring their questions and comments to Dr. Richardson.

On May 26, NASA researcher **Dr. David Des Marais** will discuss the *Mars Exploration Rovers*. The section will also present a number of honors and awards at that time. This includes awards for the *Galileo Memorial Scholarship*.

The *Annual Essay Contest* for 7th and 8th graders is being rolled out. Students will be challenged with a general topic taken from aeronautics and astronautics. Awards will be given to winners at the July dinner meeting.

Behind the scenes, the AIAA SF Section council is already making plans for the 2005-2006 program year. A series of planning meetings will occur in May. Time and location will be posted in section e-mail updates.

Of course, please remember to visit the section website at <http://www.aiaa-sf.org> for current section program information. And if you are not receiving e-mail updates from either the San Francisco section or AIAA headquarters, please make sure your current e-mail address is on record in your on-line profile at <http://www.aiaa.org/members>.

Fixing the Hubble Space Telescope, continued from page 1

vided and what the legacy of the Observatory has become as a result.

About the speaker

Dr. Paul Scowen currently works as a Research Professional at Arizona State University in the Dept. of Physics & Astronomy. Over the past 13 years he has been actively working with the Hubble Space Telescope as a scientist and as part of the science team that designed, tested and verified the WFPC-2 camera that was one of the first devices to "fix" the optics on the Observatory back in 1993. Since then he has been active on at least a half-dozen science projects using HST. He is currently actively working towards several space mission proposals to NASA working with local aerospace industry partners in Phoenix.



Election of Section Officers

Ballots to elect officers for the 2005-2006 council year are being sent with this issue of the **IN4M-LETTER** to all members of the section.

All positions are open to write-in candidates. Candidates must be members in good standing with AIAA. If you wish to vote for a write-in candidate, please give the full name of the candidate. The elections committee will validate candidate names against the membership roster, as provided by AIAA headquarters.

Ballots must be returned by May 20. Results will be announced at the AIAA San Francisco Section banquet on May 26.

SVEC Career Workshop

The Silicon Valley Engineering Council (SVEC) will sponsor a career workshop on Saturday afternoon, April 30, 2005, at Mission College, Santa Clara. The SVEC sponsors this workshop to promote the interest in career advancement for technical professionals. The target audience is unemployed, displaced and technology professionals who are looking for a job or to be cross-trained to a different field. Topics include:

- Overview of the Job and Economic Conditions
- Career Management for Technical Professionals
- Starting a Professional Consulting Business
- Job Searching Made Easy
- Professional development and certificate programs in technology and business

Speakers Include:

- Patti Wilson, Founder, CareerCompany.com
- Kimberly Wiefing, Founder and Principal, Wiefing Consulting
- Cheryl Downing, CherylDowning.com

- Pam Bailey, Tinytechjobs.com
- Elizabeth Caselton, Principal, Marcom Choices Staffing
- Claudia Lindquist, Co-founder, TechniQuest
- Rose Mortilla, YES Partners

Additional info:

- Cost: \$20 pre-registered before April 25; \$25 registered between April 25 and April 29. \$30 on-site registration. Sign up early. Spaces are limited. <http://www.acteva.com/go/svec>
- Free parking provided.
- Program updates (including room number and speaker information) can be found on the SVEC website after April 12. <http://www.svec.org>
- No lunch will be provided. Drinks and refreshments will be served.
- Questions: Contact Connie Fang <fang_connie@yahoo.com>

About SVEC: Founded in 1989, the Silicon Valley Engineering Council is a non-profit educational organization. Its purpose is to assist its member engineering and technical societies in the Silicon Valley to better serve our members and the community.

The AIAA San Francisco Section is a member society of SVEC.

Pre-college Outreach

Section-Sponsored Team takes Mathcounts Honors

Dr. Prasada Rao Gogineni, chair
AIAA San Francisco Section

Mathcounts is a national math coaching and competition program that promotes 6th, 7th, and 8th grade math achievement through grass-roots involvement in every U.S. state and several territories.

Mathcounts stimulates student interest in math by making math achievement as challenging, exciting and prestigious as a school sport. Students compete as teams and individuals in written and oral competitions. Winners of local meets throughout the country progress to state contests in March. The top four scorers in California will earn an all-expense paid trip to represent their state at the national finals in May. At all levels, Mathcounts students win prizes and build self-confidence and math skills.

The California state (North) competition was held at the University of California, Davis on March 12, 2005. The AIAA San Francisco section sponsored a team from Miller Middle School in San Jose, and provided funding for some of the coaching materials.

The morning session had all the teams take a written test. Each team had about 4 people and there were 24 teams. The students were then ranked based on their performance on a written test. Top ten scorers were invited to participate in the countdown. This involved two students answering ques-

At right: kneeling in front. **Prasada Rao Gogineni**, Chairman, AIAA San Francisco Section; **Pallavi Shah**, Team Coach; **Mary Fay-Zenk**, Asst. Principal; and Assistant Coach **Stephen Giandomenico**. Standing are the five members of the Miller Middle School team. Now.. because they are minors, we can't give you their names. But.. we are very proud of them anyway.



The following two items are taken from the Mathcounts website: <http://www.mathcounts.org>. (Editor's note: the site spells the competition name with all capitals. We prefer to hold this convention for acronyms, which in fact it might be; but the site never defines it. Something like Math Achievement ... maybe...)

About MATHCOUNTS

MATHCOUNTS® is a national enrichment, coaching and competition program that promotes middle school mathematics achievement through grassroots involvement in every U.S. state and territory.

With over 21 years of experience, MATHCOUNTS is one of the country's largest and most successful education partnerships involving volunteers, educators, industry sponsors and students. President George W. Bush and former Presidents Clinton, Bush

and Reagan have all recognized MATHCOUNTS in White House ceremonies. The MATHCOUNTS program has also received two White House citations as an outstanding private sector initiative. Particularly exciting for our Mathletes® were the ESPN broadcasts of the 2003 and 2004 National Competitions.

tions projected on a screen with a max time limit of 45 seconds. Whoever answered correctly first 3 questions remained and the other was eliminated. Another student from the ten was invited to play. Finally, the one who remained was declared the champion. I am proud to be associated with a team which had 5 of the top ten scorers. Then, the countdown was exciting. Some of the problems, the students answered even before I finished reading the problem. I was elated when the state champion was from our school.

And to round it off, the team coach, Mrs. Pallavi Shah won the coaches award and was selected to be the coach to lead the state team in the National competition, to be held in Detroit, May 5-8, 2005.

The San Francisco section welcomes volunteers to help coach their local school teams. Contact chair@aiaa-sf.org for more information.

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About the MATHCOUNTS Foundation

The MATHCOUNTS Foundation is a nonprofit organization incorporated in 1984 to promote math excellence among U.S. middle school students. The foundation's headquarters are located in Alexandria, Virginia.

The MATHCOUNTS Foundation is primarily supported through the generous contributions of individuals, corporations, associations and foundations. All contributions are tax deductible.

General Call for Volunteers, but Also Your Concerns

**Rick Kwan, vice-chair
AIAA San Francisco Section**

The AIAA San Francisco Section is in general need of volunteers for various needs. But we are also at a time when we need to carefully evaluate our priorities in light of member interests. To get an idea of the scope of what the section does, simply visit the section website at <http://www.aiaa-sf.org>.

The section council shepherds at lot of different activities; some would even say too much. We are now faced with the prospect of reducing or closing down some activities. In general, it is not for a lack of funds. (We've been careful not to pursue projects we can't afford.) It is rather due to a lack of warm bodies to carry out the work. Among the activities which are critically short:

- technical programs — keeping members current on current and promising technologies that drive aeronautics and astronautics.
- career enhancement — exposing members to career strategies and alternatives in a volatile business climate.
- education — providing professional perspective to student members and improving the skills of professional ones.
- public policy. — keeping ourselves informed about policy decisions, and helping elected representatives to make informed decisions.

I cannot begin to describe here the issues and problems each of these activities faces. Suffice it to say that each of these has a significant impact on practitioners of aerospace sciences and engineering. Since the San Francisco section is one of the largest AIAA sections, it makes sense for members to collaborate to maintain excellence of the work force and prepare for challenges to come.

As a member, you have your own selection of key issues and challenges in aerospace. I ask you to make those known to us so that we can prioritize where the collaboration should happen. In fact, do it this month because in May, the council will start a round of planning meetings for next year. (The exact time and location will be announced in the section e-mail updates.) So this is your open invitation to inundate me and Prasad Gogineni, the current chair, for the next several weeks at these e-mail addresses: vicechair@aiaa-sf.org and chair@aiaa-sf.org.

As for volunteering, I personally am not interested in pigeon-holing unsuspecting volunteers into program management positions. I would rather that you thoughtfully consider what concerns are important to you, and see how working with the section council can address those concerns. In many cases, if you can supply some of the energy, we can supply the program management.

But we need to get a consensus on what we believe are the important priorities. I hope you will help us to do that.

Short Notes

FFMF on Hybrid Rockets

Following January's successful dinner meeting on *High-Regression Rate Hybrid Propulsion*, the section's Fermented Fluid Mechanics Forum (FFMF) met at a local pub on February 24. (This time, it was Molly McGee's on Castro Street in downtown Mountain View.) After several members finally found each other, two teams brought in actual flight hardware. These were hybrid rockets with roughly a 3-inch diameter casing. Team members talked about what went right, what went wrong, what they would change, etc.

Roughly 15 people attended the forum. Various members reward the establishment by purchasing fermented fluids.

Public Policy Notes

In preparation for *Congressional Visits Day* (CVD) on March 9, members met at the Region VI Public Policy Colloquium El Segundo to discuss regional issues and the overall AIAA agenda. The AIAA national website lists five top issues for 2005; the areas include: aeronautics, astronautics, defense, homeland security, and workforce & education.

Following CVD, there will be a forum for public policy for San Francisco section members. This will include discussion of what happened at CVD as well as plans for making contact with congressional representatives and their staffs at their offices in the Bay area.

SVEC Engineers Week Activities a Hit

Several members of the AIAA San Francisco Section attended the Engineers Week banquet put on the Silicon Valley Engineering Council (SVEC), February 23, at the Westin Hotel, Santa Clara Convention Center. The highlights included honorees for SVEC's Engineering Hall of Fame (HoF); awarding of scholarships to college students and, for the first time, some high school seniors; and the Discover "E" outreach.

This year's five HoF honorees all came from the semiconductor and computer engineering fields. What seemed unique this year was how familiar the honorees were with each other, which probably reflects how closely these fields work together in the valley. T. J. Rogers (of Cypress Semiconductor) told the story of how he makes chips for Doug Engelbart's invention (the mouse), fabricates them with Dan Maiden's equipment (from Applied Materials), which is checked by Ken Levy's equipment (from KLA-Tencor), and then needs to donate to Dave Patterson's programs (at UC Berkeley). (It was funnier than that.)

AIAA member **David Levinson**, who has spearheaded the engineer side of Discover "E" shared some of his most entertaining letters from classrooms he has visited. (The teacher side of Discover "E" is led by AIAA member **Juanita Ryan**.)

The AIAA San Francisco Section and other local chapters of engineering societies are member societies of SVEC.



Above: AIAA SF Section members and their guests gathered in front of a Boeing 757 at the United Services facility at SFO. Photo taken by our host, United Services Manager Byron May.

February Retrospective

Section Visits United Services at SFO

Members of the AIAA San Francisco Section and their guests were invited to get a close-up look at aircraft maintenance and repair operations arm of United Airlines, now known as United Services. The tour, on the afternoon of February 17, 2005, focused primarily on jet engine maintenance, but also looked at landing gear, and included a view in a Boeing 777 cockpit. (Yes, a few members really did kick the tires of a 777.)

The group saw engines on aircraft, engines totally disassembled into expensive large and small pieces, and an engine test facility.

For those who were not propulsion specialists, this was a jam-packed education in various technical and practical aspects of jet engines. Among the things they learned:

- what happens if one of the blades comes loose in flight.
- why a single jet engine cost costs so much. (Choose six or more digits. it's not because of labor.)
- where most of the thrust of a turbofan come from.
- how turbine blades behind the combustion chamber withstand the heat.

In the middle of the tour, the group entered a Boeing 777 which was undergoing maintenance. Members were allowed to try out the first class motorized reclining seats, which slide slowly into sleeping configuration. From first class, they made their way to the cockpit, where analog gauges have given way to computerized graphical displays.

Toward the end of the tour, members entered an engine test chamber, which in some ways resembled a cross between a wind tunnel, a blockhouse, and a rocket engine test stand. Vanes in front of the chamber straightened out the incoming airflow. A single re-assembled engine hung from the ceiling in the middle of the chamber, its exhaust directed to a (literally) jet black exhaust port. The

chamber was otherwise enclosed in thick concrete, except for a thick window from the control room.

Host for the tour was **Byron May**, Manager of Repair, Process and Materials Engineering at United Services. During the evening, following dinner at Buon Gusto, South San Francisco, Mr. May discussed further the operations at the facility, and how some lessons from cockpit flight practices are now applied in the maintenance operation. As a leader in repair and refurbishment of certain types of engines, United Services now provides some of its services to both commercial and military customers.

The **AIAA SAN FRANCISCO SECTION IN4M-LETTER** is a publication of the San Francisco Section of the American Institute of Aeronautics and Astronautics, a non-profit society whose primary purpose is to advance the arts, sciences, and technology of aeronautics and astronautics and to foster and promote the professionalism of those engaged in these pursuits.

Section Officers and Council: A complete directory of the section council can be found at <http://www.aiaa-sf.org>.

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AIAA SF Communications Committee staff: Rick Kwan, Corky Lakin, Bruno Geoffrion, Stephanie Gregg. Additional contributions: Prasad Gogineni.

Calendar

AIAA SF Section Events

Dinner Meetings:

- Thursday, April 28, 2005, 6:30-9:00pm: Dr. Paul Scowen on *Fixing the Hubble Space Telescope* – (Related article on page 1.) Ramada Inn Silicon Valley, 1217 Wildwood Ave, Sunnyvale, CA [Tel: 408-245-5330]

Cost: AIAA members and guests - \$20, students - \$15, non-members - \$25. Cash or check only. **Dinner Meetings Agenda:** No-host cocktails at 6:30pm, dinner & program from 7pm to 9pm.

Registration: By Monday preceding dinner. On-line at <http://www.aiaa-sf.org>, or contact Programs Director by e-mail or phone. **Cancellation:** By Wednesday preceding dinner. Please contact Programs Director. (AIAA pays for all reservations, including no-shows.) **More Info, Questions, Comments, Jokes:** Contact our Programs Director at programs@aiaa-sf.org.

Special Programs

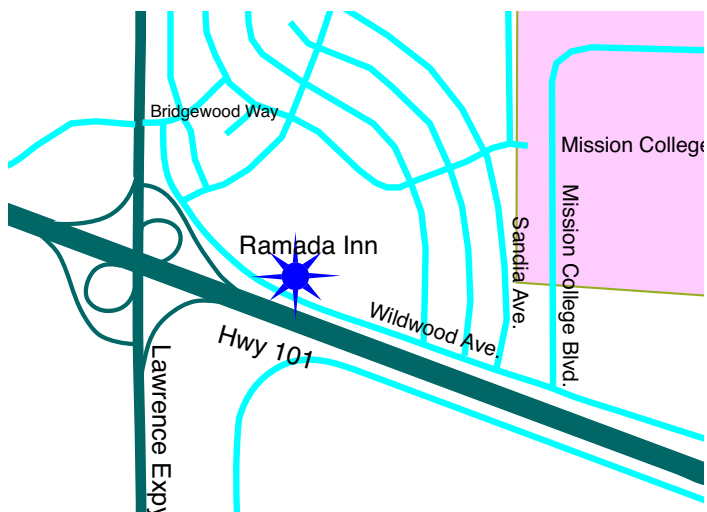
- Tuesday, May 24, 2005, 12noon-2pm (approx.): Dr. Donald Richardson on *AIAA and Aeronautics: Present, Future and Issues*. Eagle Room, Bldg 243, Moffett Field, CA. This is a town hall meeting with Dr. Richardson, president of AIAA.
- Thursday, May 26, 2005, 6:30-9:00pm: Dr. David Des Marais on *Mars Exploration Rovers in AIAA SF Section Honors and Awards Banquet*. Location TBD. Full details in next issue.

AIAA National Programs

Below are selected conferences, workshops, and other programs sponsored or organized by AIAA, including upcoming Region VI meetings.

- *2005 Regional Student Conference (Region VI)*, Cal Poly San Louis Obispo - Apr. 18-20, 2005
- *11th AIAA/CEAS Aeroacoustics Conference (26th AIAA Aeroacoustics Conference)*, Monterey, CA - May 23-25, 2005
- *AIAA/AAAF Aircraft Noise and Emissions Reduction Symposium*, Monterey, CA - May 24-26, 2005

Additional details may be found on the national AIAA website at <http://www.aiaa.org/calendar>.



**American Institute of
Aeronautics & Astronautics
San Francisco Section**

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Fixing the Hubble Space Telescope

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