



## From the Flight Deck

Eric Heininger, Section Chair

This year started off with a visit from the AIAA National President, Dr. Don Richardson. As President, Dr. Richardson scheduled a series of Region and Section town hall meetings to both explain, and elicit comments and discussions from members on the AIAA Strategic Plan. We didn't let him down. San Diego has a wealth of very talented engineers and scientists who work on the many diverse products that make up our air transportation and military might. I think just about every point of the plan was argued in some manner. Of course it was all constructive, and was well received from the National office. Dr. Richardson also brought along Karl Grundman who is the Assistant Director of Communications for the Joint Planning and Development Office (JPDO). Mr. Grundman discussed the Next Generation Air Transportation System and the National Plan Goals. There was more than a little skepticism of the lofty plan coming from yet another government bureaucracy. Our local section members gave it to him straight, but respected the daunting task of revamping the nation's air transportation system. I would like to thank the section for the great turnout, and for the lively and respectful discussion. Good Job!

The AIAA Space Conference was held in San Diego from September 28-30. Local section members volunteered their support with the education alley, attended various panel

discussions, and even gave a few speeches. The inaugural Pickering Lecture was attended by nearly 400 people who enjoyed a presentation on the Mars Rover program. These lectures gave invaluable information on the trials and tribulations of complex, high profile missions. After the Inaugural AIAA Pickering Lecture, a short presentation from our own guest lecturers, Dr. Leonid Turchak and Dr. Gregory Smolinski on CFD analysis techniques was given.

The Section will be developing its own web site, [www.AIAA-SD.org](http://www.AIAA-SD.org). The site is part of the Councils plan to make communicating with your section easier. Since the Council is relying more on electronic information, it is important that you update your email to your preferred account. Be looking for the site in the near future: a link will be supplied in all future email distributions.

Another focus for this year's Council will be to increase the Educator Associate members. The Council would like to request volunteers to distribute Educator Associate information to local grade schools, Jr. High Schools and High Schools in San Diego County. The information can be used by classroom teachers to receive grants for aerospace related class projects. In addition, educators can call on our Council to provide assistance in demonstrations, or to provide lectures relating to aerospace activities. We have plenty of volunteers available for any teachers interested in this program. We do need your help in distributing

material to the schools. Simply contact me at EHeininger@pyramidSPACE.com and we will get you the materials to pass on to the schools.

The San Diego Aerospace Museum and the AIAA are continuing the 27<sup>th</sup> Aerospace Lecture Series November 11<sup>th</sup> with Donald W. Rethke –“Life after Lift-Off,” and November 18<sup>th</sup> with Dr. Sally Ride-“Reach for the Stars.” These events are held at the San Diego Aerospace Museum. AIAA members are \$10.00, and AIAA student members are free. For additional information go to [www.aerospacemuseum.org/upcoming/lectureseries.html](http://www.aerospacemuseum.org/upcoming/lectureseries.html) or call 619-234-8291.



Our local university sections continue to be active with both UCSD and SDSU entering this year's Design Build Fly contests. The University teams have obtained funding from local corporations, and are currently in the design phase of the projects. SDSU has also initiated a Liquid Fueled Rocket program and had a semi-successful launch on October 23<sup>rd</sup>.

**Local Aerospace News.** Perhaps the biggest news this year was the winning of the X-Prize by Burt Rutan's Spaceship One. A Southern California machine has once again captured the world's attention. The first commercially financed manned spacecraft, powered by the Poway-based company, Space Dev's Hybrid Rocket; Spaceship One successfully reached the 63 mile altitude twice within two weeks. So what's next for Mr. Rutan? Paying customers! An agreement with the Virgin empire for a larger 5 passenger vehicle is in the works. Of course, this vehicle will have to have stability augmentation for the higher mach areas of the

flight profile. High mach rolls doomed an X-15 and certainly got the attention of the Rutan team. Our section had field trips organized to the two different launches of Spaceship One. Unfortunately the early take-off time's required over-night stays which deterred many from attending, and the trips ultimately had to be canceled.

The UAV business continues to do well in San Diego. Both General Atomics Aeronautical Systems and Northrop Grumman continue to grow their UAV fleets. This growth brings more jobs for the San Diego Aerospace Community. Goodrich won substantial Boeing 7E7 contracts that will keep them busy for several years: more good news for San Diego.

Your local San Diego AIAA section has stabilized at around 440 members. We have numerous activities planned throughout the year that require volunteer time. I would like to encourage other members to join us in the council to help promote aerospace in the San Diego area. Council meetings occur every 2<sup>nd</sup> Wednesday of the month at Venice Pizza.

## Membership News

Jim Peterson, Membership Chair

Section membership stands at 439 as of October 1<sup>st</sup>. We would like to welcome the following recent new AIAA members to the San Diego Section:

### August

Alan Jacoby	Retired
Jorge Mendoza	Stillman Seal
David Poladian	Boeing
Aron Potur	UCSD
Nicholas Seid	UCSD
Heather Woods	U.S. Navy

### September

Thomas Brotherton	IAC
James Kohn	Northrop Grumman
Brad Lewis	
Michael Morris	Northrop Grumman

Tom Nietz  
Megan O'Connell  
Alfredo Ramirez  
Elias Razinsky  
Thomas Trimble  
Thomas Twomey  
Bruce Westermo

Northrop Grumman  
U.S. Navy  
Northrop Grumman  
Solar Turbines  
Titan Corp  
Northrop Grumman  
SDSU

#### October

Heidi Budd  
Tom Clay  
James Gerard  
Michael Grice  
David Hartzog  
James Loiselle  
Dave Mcgough  
William Nickolas  
William Rector

Maxim Systems  
BAE Systems  
Northrop Grumman  
U.S. Navy  
SPAWAR  
Maxim Systems  
Maxim Systems  
SPAWAR  
Rector Associates  
Intl

Frank Tirpak  
Anthony Tran  
Francisco Valero  
Hans Weber

Maxim Systems  
SPAWAR  
UCSD  
Weber Tech  
Applications  
Columbia University

Richard Willson

If you have any questions about membership or about advancing your membership grade, please contact Jim Peterson at (858) 279-1940, or email to: [jdpete@pacbell.net](mailto:jdpete@pacbell.net).

### **National Engineers Week 2005**

Warren Johnson, Professional Society Liaison

Make your plans now to participate in National Engineers Week 2005. National Engineers Week 2005 will be held February 20 – 26, 2005. Planning is already underway for San Diego's NEW 2005 celebration and will include tours, mall exhibits, and outreach to local schools. The week's major event will be the Awards Banquet. The Awards Banquet will feature a keynote speaker and the presentation of awards for excellence to local engineers, educators, and projects. It will be held on Friday, February 25, 2005 at the University of San Diego (USD) – Joan Kroc Institute for Peace and Justice, 5998 Alcalá Park, San

Diego, CA 92110 (Free parking). Banquet details are available on the NEW SD website, ([www.newsd.org](http://www.newsd.org)).

The keynote speaker at this year's banquet will be Larry Dumas; JPL Deputy Director (retired). His topic will be "The Cassini – Huygens Mission to Saturn and Titan". Mr. Dumas will describe these missions, the complex robotic spacecraft that carried them out, and the central role of engineers in their accomplishment.

Four standard NEW awards – Engineer of the Year, Outstanding Engineering Educator, Outstanding Engineering Project and Outstanding Service Award – as well as, several Society co-sponsored awards will be presented at the banquet. Please consider nominating a person or project you know for one of these awards. Nominations need to be submitted by December 15, 2004. Submit your nominations to Alan Herr at, [ajherr@mircoindustrie.com](mailto:ajherr@mircoindustrie.com), or by calling 858-292-9206 no later than December 15<sup>th</sup>. State in two pages or less, the award, person or project nominated, and justification for your choice. The list of qualifications for each award is on the NEW web site, ([www.newsd.org](http://www.newsd.org)).

### **FIELD TRIPS**

Doug Armstrong, Field Trips Chair

The field trips have not been too successful this year due to lack of participation during weekday trips. Maybe more people will be interested in the field trip set up for Saturday, January 29<sup>th</sup>. I have arranged for 2 tours of the Palomar Observatory so that we can take 60 people. The trip will leave the Mira Mesa Park & Ride at 11 AM. Since they will only take 30 people at one time, we have tours at 1 PM and 2 PM. Each group will have to wait on the bus for the other one, so we will bring food and entertainment. Or, you can probably have a snow ball battle. Yes, it will be cold. The facility is always kept at the outdoor temperature so remember to bring a winter coat. We will start

taking reservations right after the holidays so mark your calendars.

## SDSU Rocket Project

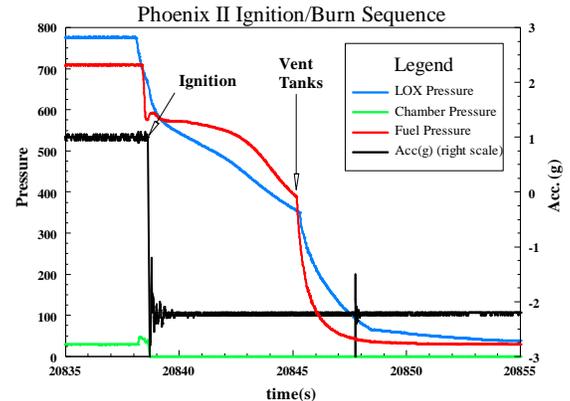
Nils Sedano, SDSU Student Chair

Update on the Rocket Launch attempt of October 23, 2004. The launch took place at facilities located north of Mojave. The San Diego State University Rocket is a Lox-Kerosene liquid, with a 1000lbf thrust and a 180lb dry mass. The tanks are pressurized to approx. 500 psi with a third helium pressure tank, and set by a pair of regulators. The rocket is actuated by a pneumatic system controlling a set of ball valves. The pneumatic system enables the aborting of a launch in the case of improper operation of the rocket systems. Flight is unguided with aerodynamic stability provided by fins, and a 50 ft. rail located about 250 ft. from the ground control blockhouse.

The payload carried in this rocket is a data acquisition system recording Lox, Kerosene, Helium and chamber pressures, as well as altitude, atmospheric pressure, and GPS tracking for recovery of the nosecone, and main rocket body.

On this launch attempt there was a hard start, which sheared off the bolts attaching the motor to the lox dome. A small fire ensued, burning the bottom two plywood bulkheads, before the abort was thrown and the fuel flow was stopped. Most hard starts are caused by the lack of a lox lead, which creates an explosion inside the combustion chamber instead of a steady burn. In this case the video footage eliminates that theory (400ms lox lead), and places it on the fact that previous to launch we had the misfortune of "burping" some fuel into the motor. Though the motor was subsequently removed, disassembled, and cleaned, with the lox plate and o-rings replaced, prior to the motor being reassembled and attached, the igniters had not been replaced, despite the fact that they were

soaked with kerosene. Therefore the igniters, being made of cardboard and filled with pyrogen, caused the hard start.



Data courtesy of Paul Breed and Steve Harrington.

Carl Tedesco, after speaking with some Rocketdyne engineers about our problems, came up with these ideas:

*Today we had a good conversation with a Rocketdyne engineer who knows the LR101 in detail. The LR101 was designed to be ignited using a hypergolic ignition, which in spite of the added complexity, has the benefit of a rather benign ignition. He thought that a pyro-igniter could work, but cited a few weaknesses with our current approach. First, he said that ignition should take place as close to the injector face as possible and furthermore cover as much of the injector face as possible. He suggested we have the igniter flames emit radially along the injector face (daisy pattern). This insures that the chamber walls cannot be wetted by kerosene (the LR101 has kerosene film cooling near the chamber walls). Our two pyro lances were mostly directing their flame energy at the center of the injector allowing an annular volume for atomized fuel to accumulate within. Also, by directing the pyro flame at the injector we were probably sending pyro soot, gases, and particulate into the injector holes. A purge can be used to keep igniter gases & particulate from going to places where you do not want them! We're unclear if*

*this is a problem for us; just making the igniter flame parallel to the injector face may solve this. Finally, make sure the ignition source stays put! In the past we glued the igniters to a wooden rod. In the future I would suggest some sort of mechanical fastener.*  
(Carl Tedesco)

Plans are to repair, modify, and launch by the end of this year. Since damage was very limited (mostly scorched wood on the very bottom), this should not be a problem.



## Membership Information Updating

If you have changed your mailing address or have a new email address, please call the AIAA Headquarters Customer Service Center at 1-800-NEW-AIAA and provide them with the current information. Remember- the mailing labels are printed using the information in the AIAA database. You may renew your membership on-line at [www.aiaa.org](http://www.aiaa.org) or via telephone at the above phone number, using a credit card. If you have become unemployed or retired, you may renew your membership at a lower rate.

**Email Addresses:** The San Diego Section is increasingly relying on email for communicating with our members. We are providing a monthly bulletin to notify you of upcoming events, so it is very important to

keep the Membership Chair informed whenever you change your address. To list or change you email address, contact Jim Peterson at [jdpete@pacbell.net](mailto:jdpete@pacbell.net).

## Special Events Calendar

### 2003

- |     |    |  |
|-----|----|--|
| Nov | 3  | Dinner Meeting   |
|     | 6  | SDSU DBF BBQ and Flight                                  |
|     | 11 | SDAM Lecture Series (Rethke)                             |
|     | 18 | SDAM Lecture Series (Sally Ride)                         |
| Dec |    | Student Outreach Month                                   |
|     | 3  | General Atomics Aerospace Predator facilities field trip |

### 2004

- |     |       |                                |
|-----|-------|--------------------------------|
| Jan | 19    | Dinner Meeting                 |
|     | 29    | Field Trip Palomar Observatory |
| Feb | 20-26 | National Engineers Week        |
|     | 25    | NEW Awards Banquet             |

## Note From the Editor

Katherine Miller, Newsletters and E-Bulletins

If you have any input for future newsletters, or if you would like more information about any upcoming events or about how you can be more involved, please contact me. Also, if you would like more information on the SDSU DBF and Rocket Projects, please call me at 619-925-3378, or email me at [k\\_dmiller@cox.net](mailto:k_dmiller@cox.net)



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