

Report from the Chair



Greetings to All,

Most of us students have rolled into a yet another school year and are already occupied with classes, jobs, SEDS, etc. It is pretty incredible that with all the school obligations and numerous other activities that SEDS members are involved in, SEDS is still growing. I want to thank the National Executive Board for putting in the sincere effort to keep SEDS running strong, and more importantly, the members and leaders of all chapters who have contributed continuously in the smooth functioning of SEDS deserve a special mention. Also on behalf of the entire SEDS, I especially want to thank Chris Lewicki, a former SEDS National Chair from University of Arizona for keeping the online SEDS community going by single-handedly managing and running the SEDS server. I would also like to welcome a new member to the Executive Board: Ben Brockert from Iowa State University. Ben replaces Todd Romberger, who graduated in August, as Vice Chair.

The past months have been very eventful for SEDS, with many members taking part in various activities and projects. University of Washington flew with Zero-G in August out of Cape Kennedy. UCF also flew one of their members on the same flight. SEDS actively participated in the Next Generation Explorers Conference at NASA Ames Research Center, where they helped draft themes, objectives, action items and a final declaration in support of NASA's Vision for Space Exploration. NGEC was also a great opportunity for SEDS members from USA, UK, Spain, India and Canada got to meet each other. SEDS was represented at the Space Frontier Foundation's New Space Conference in Las Vegas in July.

Further on, preparations are underway for the SEDS-USA National Conference, SpaceVision2006, at University of Central Florida in November. I encourage all of you to attend and participate in the biggest SEDS event of the year, which brings together SEDS members, space and indus-

try professionals, and space enthusiasts at one common place. Since the beginning of the year, four new chapters have been founded and Expansion is working continuously to revive old chapters as well as set up new ones. There has been a great effort towards increasing interaction with other space and technology related websites by linking them to the www.seds.org and vice versa. Seds.org has been constantly updated and improved to include broader topics. SEDS also drafted its Students' Space Policy Proposal that aims at giving policy makers and industry leaders an insight into the views, opinions, and ideas of the current generation. With this intent, it has been presented to the policy makers, companies, and other space enthusiasts so as to consider the opinion of the future leaders.

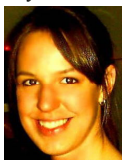
While there has been great progress in all departments, we are constantly working on new ideas to advance the spirit of space exploration. Attempts will be made to plan out new technical projects that will involve more than just one SEDS chapter to collaborate on common interest themes. We are also planning to reach out to other space and technology-related publications so that ideas and opinions of the SEDS members can reach to the larger space community. An effective outreach plan is in the making to cultivate and boost the interest of the younger middle and high school kids in space and space-related activities. In the near future, we also plan to pick up on the SEDS History Project started two years ago to compile the past documents, chapter histories and projects, as well as SEDS Alumni information, all at one place to serve as examples and useful reference.

That being said, I would conclude my part with asking for suggestions and help from any one who is interested. I hope you have enjoyed and found useful being part of the SEDS experience and will continue to do so.

Onwards and Upwards,
Megha Sharma

SEDS Members Draft Space Policy Proposal

By Elizabeth Bozek



The overriding goal of this project was to involve all of the SEDS chapters in making an impact on the space community beyond academia. A space policy proposal unifies the voice of SEDS chapters across the globe. The collaborated message forces the space community to consider the ideas of such an intelligent, courageous, and enthusiastic student organization when making space policy. As the old adage goes, the collective is greater than the sum of the parts. Political players, space agencies, and top space companies know that SEDS students will be the leaders of tomorrow, and the proposal gives them a preview of what SEDS students will

accomplish. Documenting these opinions is the first part of creating the future students want for themselves; the more people who know where SEDS stands, the less that will get in their way.

During space conferences, chapter meetings, and in conversation with peers, a number of questions continue to arise regarding space advancement. What was the largest problem with current space policy? Where is the space industry headed in the future? What are the domestic and international advantages of space advancement? And, most importantly, how would SEDS students like to be involved in

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the space industry when they graduate? An initial questionnaire was sent out to gather SEDS students' answers. These answers were then compiled and edited many times to help downplay any biases while maintaining the integrity of each student's opinion. It must be noted that the opinions in this document do not reflect the views of every student involved with SEDS, nor is it a piece of political propaganda. There were in fact students who helped with the proposal but did not want their names included as contributors to the document.

Using recommendations from other SEDS students, a master contact list was created which consists of everyone who the proposal would be sent to. These contacts ranged from senators and representatives who support space advancement, to large and small aerospace engineering companies, to space magazines and publications. Over 175 people and organizations were mailed a hard copy of the proposal. This master list is a valuable resource that can be used in future projects as well.

As of August 1, 2006, the proposal has been in circulation for about a week and a half. Responses are pouring

in. The SEDS executive board and the proposal contributors received the opportunity to review real space policy at NASA's Exploration Strategy Workshop at the Ames Center. With the help of George Whitesides, the proposal was published on SpaceRef.com as well as NASAWatch. Dr. Serge Plattard, Secretary General of the European Space Policy Institute replied with his views on the proposal. Various NASA scientists and engineers responded with their opinions as well. The Rocket Racing League and the Planetary Society have volunteered to help with SEDS outreach as a result of the proposal. Although not all of the respondent's opinions agreed with those of SEDS, all have been supportive and encouraging. The most important goals of the proposal have been accomplished: to make the professional space industry aware of SEDS students' views and to start global communication that will help students express themselves as they work toward space advancement. In a few months, this piece will be followed by a complete summary of all the responses the proposal receives as well as resulting plans for the organization.

The New SEDS-UW Weight Loss Program

By Annamarie Askren

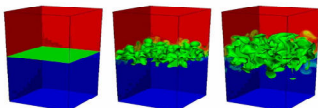


"The closest comparison is... swimming without water." That was how Jeff Boulware described the sensation of weightlessness to me as we were boarding the aircraft. Jeff had flown on the NASA 'Vomit Comet' two years before, and he was looking forward to his second experience in Zero-G. Of course, this time was completely different.

It all started exactly a year ago. Our SEDS chapter at the University of Washington was invited by SEDS-USA to submit a microgravity experiment for a flight onboard Zero Gravity Corporation's Boeing 727, a non-NASA affiliated program.

SEDS-UW decided to put together an experiment for investigating Rayleigh-Taylor Instability. The experimental results would provide validation data to a model proposed by Dr. Robert Breidenthal, a professor at the University of Washington, which predicts the entrainment rate of a denser fluid accelerating into a lighter fluid. Performing the experiment in microgravity allows the acceleration to be controlled solely by the motor used to drive a test cell containing two immiscible fluids. The results would provide data for inertial confinement of nuclear fusion and weather pattern prediction.

Jaime Hale was the original proponent of involving high school students in our project. A competition was hosted among several public high schools in Washington State in which a team from each school could present SEDS-UW with a microgravity proposal. The winning team was a group of students from Pasco High School in Pasco, WA. Dave Hege was the science teacher responsible for leading the high school students (Ariel Hale and Stephanie Garcia) as



CFD of Rayleigh-Taylor Instability, courtesy of Dr. Cook at LLNL



Photo of SEDS-UW team in front of Zero-G Corporation's Boeing 727

they brainstormed, designed, and built their own experiment. SEDS-UW made sure that no money was spent by the high school students or their school.

Little did we know what was in store for us. The national project run by SEDS-USA

fell apart due to inadequate fundraising, and our project almost fell with it. But we continued forward and eventually raised enough money to fly six people and two experiments. The total cost: \$22,500.

The Zero-Gravity flight took place on August 6, 2006 at the Kennedy Space Center. The aircraft took off and landed on the same strip as the space shuttle lands on, which sent goosebumps down my arms. We flew 40 parabolas, which is equivalent to about 14 minutes of weightlessness. The best moments were doing flip after flip or chasing after a rogue gummy space shuttle. Teacher Dave Hege described his weightless experience as so:

"Inside the plane all the visual cues were removed so there was no sensation of falling. Instead it felt like a giant hand came in and lifted me off the floor and held me."

The biggest



Michael Frostad and Teacher Dave Hege in Zero-Gravity

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disappointment in the entire project was caused by the carelessness of UPS. SEDS-UW shipped out its experiment so that it would arrive a full five days before flight. UPS managed to not only lose half our experiment (which, I might add, is impressive considering that it is a bright yellow box), but they also apparently took a baseball bat to the other package. Several internal parts were missing or ruined; thankfully, we were insured. Our flight and experimental data, however, have yet to be reimbursed.

Lesson learned: when UPS says they will "make sure it's safe," do not trust them. Do it yourself.

Even though the experiments were grounded, I still consider the project a success. The video footage will be great to show to schools, and the



View of Shuttle Atlantis on Launch Pad

high school students are now seriously considering engineering as a career when they had not in the past. To top it off, all of us were able to get a behind-the-fence VIP tour of the Kennedy Space Center. How many people get to walk down the same ramp as the astronauts and stick their head inside the space shuttle Atlantis? Next year SEDS-UW will host another competition and also participate in the Aerospace Camp Experience with the Museum of Flight in Seattle, WA.

Several companies and science organizations stepped forward to strengthen science and math education in Washington State.

- Aerojet/GenCorp Foundation
- Washington NASA Space Grant
- Vista Engineering
- Florida Space Research Institute
- National Space Society
- Space Generation Advisory Council
- Research Institute for Space Exploration
- University of Washington Department of Aeronautics and Astronautics
- American Institute of Aeronautics and Astronautics

SpaceVision 2006 Approaches

By Todd Romberger



This year's SEDS National Conference, SpaceVision 2006, will be held at the University of Central Florida in Orlando on November 9-12, 2006. Conference planners have a great event lined up, with top name speakers from across the space industry including: Dr. Peter Diamandis, Co-Founder of SEDS and Founder/Chairman of the X PRIZE Foundation; Dr. Robert Richards, Co-Founder of SEDS and Founder of SEDS Canada; Tony Taliancich, Deputy of Atlas East Coast Launch Operations, Lockheed Martin Space Systems Company; George Whitesides, Executive Director of the National Space Society; Dr. Robert Zubrin, Founder and President of the Mars Society

and Author of "The Case for Mars"; and more!

SpaceVision 2006 will be a time for SEDS students from across the country to come together to share their interests and goals, to hear and network with top name speakers and professionals in the space industry, and to experience the history and shape the future of humanity's climb to the stars.

So don't wait, start planning your trip today. More information about the conference as well as travel/hotel details can be found on the conference website at www.spacevision2006.org. Conference registration will be available there very soon!



X-Prize Foundation Plans Another Exciting X-Prize Cup

By Ryan McLinko



The X-Prize Foundation was started by Peter Diamandis, the founder of SEDS, in order to facilitate the commercial exploration and development of space. The first step in this process came in the form of the \$10 million Ansari X Prize, which Burt Rutan of Scaled Composites won with Space Ship One in October 2004 for designing the first spacecraft to send a human into space without government aid. Offering prizes to facilitate the development of space acts in much the same way as the many aviation prizes that were offered in the early 1900s. It provides a means for which a large amount of research is done for a relatively low cost to the sponsoring organization. For example, the development of Space Ship One cost about \$20 million. Many other companies and individuals competed for the prize and also spent a significant amount of money to this end. The, the X-Prize foundation paid the winner \$10 million in return for much more than \$10 million in private space flight re-

search.

The X-Prize Foundation is also responsible for the X-Prize Cup, which is an event that premiered last year and will happen again this year. Last year's Cup featured three large rockets, which were not launched due to wind conditions, and a static firing. This year's Cup will be much more extensive and will feature three competitions (the Lunar Lander Challenge, the Vertical Rocket Challenge, and the Space Elevator Games), sounding rocket launches, the premiere of the Rocket Racing League's X-Racer, static test firings, and numerous ground displays by prominent members in the space community. All of this will be crammed into Friday, October 20th and Saturday, October 21st in Las Cruces, New Mexico. This hub of activity will be the place to be for people who are interested in learning about and meeting prominent members of, seeing companies in, and seeing the recent developments in the space community.

SEDS-EARTH Hosts First International Conference

By Adolfo Vazquez



Two years ago, several SEDS members from chapters all over the world came together and started a new international framework for SEDS called SEDS Earth. It was established to take advantage of the opportunities available to us as a worldwide organization. The intent was to combine efforts of international members towards increasing the network of space-faring individuals and collaborate on projects with common interests to all. A very positive outcome of the formation of SEDS-Earth has been the useful learning from the cultural exchange between various SEDS Earth members from different parts of the world. It has also enabled students and individuals from regions with lesser opportunity and access to space-related student projects to participate in these projects. The flow of ideas and information to and from has helped open up avenues for bigger collaborations amongst the global community in the near future.

Discussions held at the Next Generation Explorer's Conference at NASA Ames in August this year identified current active space organizations as key players on the improvement of the public engagement by NASA. At the opening session of this conference, a global strategic partnership program among several national and regional space agencies worldwide for the next steps on the space exploration was announced. These latest developments on the space advocacy arena reaffirm the key role of global networks to improve the worldwide public space awareness. Thus, SEDS Earth is already on its way in building a framework for global communication of space-related ideas.

After two years, although SEDS Earth has been successful in uniting the young student community on a global level, much work towards the initial purpose still remains to be done. As a student leader, your experience in managing events and activities both at local and national levels is very valuable. This type of participation on such an endeavor can improve your focus and personal network not just on national level but on international basis. In this regard, SEDS-USA and SEDS-UK are already talking about a link-up between their National Conferences in order to share speakers and participants from both sides. This will serve as an example of a great endeavor in bringing together the SEDS-Earth community. There is also discussion going on in creating an international CUBESAT project, in which India and US have already shown keen interest.

In order to provide an appropriate environment to share our ideas, SEDS Earth has initiated an effort to hold a SEDS International Conference, the first of which will take place on Sunday, October 1st at Valencia (Spain) in between the Space Generation Congress and the International Astronautical Congress. More information and registration is available at <http://earth.seds.org/conference/>. Registration for the conference is free. Additional effort will be focused on providing a parallel virtual Conference for people who are not able to attend.

Now it's your time to take a step forward and become active in this international venture. What are your ideas, suggestions, and comments on this? Email it directly to seds-earth@seds.org mailing list or post it on the SEDS Earth forum at <http://forums.seds.org>.

SEDS Challenged to a Rocket Competition

By Ben Brockert



In July, Steven Griffin, president of the University of Missouri Rolla Advanced Aero Vehicle Group got into contact with the Iowa State Space Society via one of our newer members, Robert Grandin. Steven suggested a rocket competition between his group and ours, to build a boosted dart that flies to 23,000 feet (7,010 meters) on a M or N solid rocket engine.

Both groups' rockets would be launched at Midwest Power 4 on October 28th or 29th near Princeton, Illinois. Each rocket would carry an accelerometer-based flight computer, to record the flight data. The teams would then compare their flight data to the predictions they made before the launch. Those predictions — plus other aspects of the competition — would decide the winner of the competition.

The competition is open to all SEDS chapters. It requires a bit of an investment; the rockets are going to be supersonic and require composite construction. The motor reload would be around \$500 to \$700, depending on the reload chosen. Teams would share flight computers and motor casings to minimize required investment. ISSS will also provide a radio tracking transmitter.

This competition is a great opportunity for SEDS

chapters to show what their group is capable of doing. It includes many aspects of modern aerospace design, including design optimization, simulation, supersonic flight, and composites manufacturing. At the same time, it is a competition simple enough that a group without much prior experience would be able to take it on, drawing from resources at their school.

The timeframe is relatively short (exactly two months, as of writing), but long enough for an organized team to finish. The launch is centrally located in the US just off I-80 in central Illinois, 60 miles from Quad City International Airport. We hope to see some other SEDS chapters there.

Contact information:

Competition website:

http://wiki.seds.org/index.php/Rocket_competition

ISSS: <http://www.isuspace.com/>

Allen Ball, ISSS President: aball@iastate.edu

AAVG: <http://web.umn.edu/~aavg/>

Steven Griffin, AAVG President: swgmvd@umn.edu

NewSpace 2006 Had Something for all Space Enthusiasts

By Darrel Cain

I love being a space enthusiast. Life is all about the journey, and space is the next step.

Wait...hear me out before you move on to another article.

The space industry can only be described as challenging, awe-inspiring and essential to the future history of the human race.

Another perk of being interested is that once in a while we get the chance to visit places like Las Vegas. The Space Frontier Foundation Conference NewSpace 2006 was held in Las Vegas and ran from July 19th-23rd in the Flamingo Hotel.

The great thing about being a student interested in the exploration and development of space is that conferences want us to participate. By that virtue we attend the NewSpace conference at about one fourth the price of general admission. (I also carpooled and shared a room with some people to cut some of my costs.)

Space Frontier Foundation plans this event every year, and has both the location and the membership needed for the conference to be successful.

Conferences require a certain amount of time and financial investment, and as students it is often hard to find the funds to attend. The experience is worth the investment. Space Frontier Foundation boasts that its membership consists of people who are doing applicable things in the industry, and their conference reflected this perfectly. From competitors in the Lunar Lander Challenge, to rocket engine designers, to space simulator programmers, the attendees were producing tangible products within the space industry.

My personal experience at the conference was amazing as well. When I wasn't manning the SEDS booth, which was donated by Dr. Richards, I had the pleasure of seeing Buzz Aldrin, hearing Robert Bigelow speak about Bigelow Aerospace, and even got to ask Eric Anderson if Eric Anderson was attending the conference. (He was looking for his name tag.)

Some of the highlights included:

A Space Business Plan Competition which had proposals including launching ships from lighter than air balloons, Zero-G TV, and engine development.

A workshop on the NASA Centennial Challenges that included discussion of the current challenges put out by NASA and input on what future opportunities exist.

A formal dinner banquet was held on Friday night. Awards were given to various people within the industry, including Eric Anderson from Space Adventures and Josh Whedon for his work on the television show Firefly. This was followed by a space auction which included items donated by Armadillo Aerospace, Scaled Composites, Rocket Racing League, and various other groups.

The discussion on the NASA COTS (Commercial Orbital Transportation Services) program was informative. (They recently granted SpaceX and Rocketplane Kistler 500 million dollars to develop new commercial delivery systems for the space station.)

A forum discussion of sex in space was surprisingly relevant, as science does not know if successful gestation can occur at less than one Earth gravity.

There were various other speakers (more than twenty) from throughout the industry and the community, touching on everything from satellites, military applications, NASA, private industry, space fashion, FAA, ISRU (In Situ Resource Utilization) and more.

I'm a space enthusiast and these experiences allow me to find people with new ideas and passions. As a result I expand my horizons, refine my vision of what I want to do in the world, find people from Boston and all over the world who have similar interests and ultimately get closer to the goal of a sustained human presence in space. (And have fun along the way.)

Darrell Cain is a student pursuing an aerospace engineering degree from MIT. He's entering his junior year, has been involved with SEDS since the start of his freshman year, and is actively looking for people who have passion and ideas. He will be at the 2006 X PRIZE Cup and SpaceVision 2006 later this year. He can be contacted at cain@mit.edu

SEDS members help define NASA's Future

By Joshua Nelson



SEDS members from across the world gathered at the Next Generation Explorers Conference (NGEC) to discuss the future of space exploration. Over 200 leaders were present from various governmental, commercial, industrial, and student space organizations. Around 20 SEDS members were in attendance, representing chapters from the United States and abroad.

The conference focus was on defining global space exploration goals and recommendations for the Moon and beyond. Over the three days of the conferences, simultaneous working groups were held in the areas of Mars science/exploration, Mars settlement/society, Asteroids, Cis-Lunar, Earth 3.0, and Virtual Exploration/Virtual Worlds.

In their first day of group work, the six groups

worked on refining NASA's Lunar Exploration Objectives. After which the groups heard talks from leaders in that group's respective field and began addressing the key dilemmas facing the world's space agencies in their respective subject area. From their deliberations, each working group developed a statement expressing their recommendations to NASA and other global space agencies, along with a list of action items.

The work from the NGEC is continuing even after the conference, with a large group of volunteers solidifying the various group statements into a single conference declaration. This declaration will be distributed to various policy makers in NASA and other space agencies to articulate the opinion of the younger space generation. This document

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NGEC, continued from page 5

represents the opinions of those who will be building the spacecraft and stepping on the Moon and Mars during the fruition of the current 'Space Vision'.

Overall the conference received high praise from the majority of attendees, and in the opinion of this humble author, was a huge success. The NGEc provided an excellent opportunity for young space students and professionals to unite their opinions behind a single statement and make a real difference in the course of human exploration. Here's to seeing more SEDS members at next year's NGEc!

Action items from the Next Generation Explorers Conference:

- Space agencies should adopt funding opportunities and procedures that recognize the interdisciplinary nature of lunar science and resist the "old-fashioned" approach which only funds traditional areas of study. The funding opportunities for lunar science should be similar to the Mars program. Space agencies should support science that characterizes the lunar environment.
- Space agencies should utilize non-standard means of public outreach to support their goals and should use the tools at their disposal to engage the public in the space conversation.
- Space agencies should aim for permanent self sufficient settlement as primary goal and utilize commercial resources as much as possible. They should work to create a profitable legal environment for space based business and support the development of space technologies that can be commercialized. They should identify a clear transition plan to commercial interests to allow the private sector to engage from the outset. We believe that the days of exclusively government run space programs may be numbered.
- Space agencies should review planetary protection protocols to focus on enabling exploration while protecting the pristine Martian and Lunar environments and potential sub-surface ecology.
- Space agencies and commercial interests should establish an advisory body, consisting largely of young professionals, encompassing multiple nationalities and multiple disciplines to provide semi-annual or annual briefs, updates, and recommendations to those currently driving the exploration goals.
- Space agencies should promote to various stakeholders (policy-makers, public, engineers, scientists) the inherent beneficial characteristics of Near-Earth Asteroids which enable early, sustainable exploration of the inner solar system.
- Space agencies should protect and extend understanding of our home planet through a comprehensive focus on scientific research that incorporates both the physical and life sciences. We believe the move away from hard science may be ultimately of negative benefit to future generations.
- Space agencies should develop the 'language' of the future: a way of communicating intent, rather than vocabulary. Although the concept may appear relatively abstract, the necessity is real as is the possibility of its creation.



SEDS Members past and present take a break for pizza at the 2006 NGEc. Photo credit: Megha Sharma.

A Special Thanks To . . .

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Conference Opportunities

X Prize Cup

Date: October 19-22, 2006

Location: Las Cruces, New Mexico

Website: <http://www.xpcup.com/index.cfm>

Volunteer Opportunities Available

AAS National Conference

Date: November 14-15, 2006

Location: Pasadena, California

Website: <http://www.astronautical.org/>

SpaceVision 2006 Conference

Date: November 9-12, 2006

Location: Orlando, Florida

Website: <http://www.seds.org>

Please email Ben Brockert at vice-chair@seds.org if you or anyone from your chapter is interested in attending (or already planning on attending) any of these events. By communicating and cooperating in our travel plans we can pool resources, save money, and represent SEDS as a cohesive group.

Students for the Exploration and Development of Space



Visit us at <http://seds.org>