

Newsletter

**Volume 14
Number 1
October 1999**

Hello Tucson AIAA!

by Kevin Kremeyer

My name is Kevin Kremeyer. I've been asked to serve as the Chair of the AIAA Tucson Section, while we reorganize and take advantage of some of the dramatic changes taking place in town. This is truly an exciting time for technology here in Tucson, particularly for aspects pertaining to the aerospace industry. It's not just airframes anymore. The optics, communications, and signal processing fields are booming here in Tucson, and this technology is vital to satellites, missiles, and every other facet of aerospace. One of the biggest recent developments in Tucson is the acquisition of Hughes Missile Systems by Raytheon Systems Company. This has resulted in thousands of new jobs in our city. A quick run-down of Raytheon's entry into Tucson as provided by Kelly Sinnock. She is an Illinois alumna, and was transferred here by Raytheon from the East coast:

Raytheon Systems Company formed in January of 1998. This company consists of former Raytheon Electronic Systems, Raytheon E-Systems and Raytheon TI Systems along with former Hughes Missile Systems. In October of 1998, the company announced the reorganization plans that would take place over the next year or so. The plans that would greatly impact Tucson were the consolidation and relocation of strike weapons and missile businesses into one location in Tucson. This brought people from Texas and New England to the desert. A good percentage of employees relocated from New England, but the turnout from Texas was not as high. Raytheon Missile Systems Company (RMSC) is still hiring in most areas which is, in turn, increasing the local AIAA membership list.

In addition to Raytheon, there are many other large and medium-sized traditional aerospace companies located in Tucson (Learjet Bombardier, AlliedSignal, Sargent Controls, Huck, Evergreen, etc.).

Another strong contingent here in Tucson is the optics community. One clear reason for this is the large number of related world-class University programs, focused primarily around the Optical Sciences Center and Steward Observatory. These programs have led to great research at Kitt Peak National Observatory,

NOAO, and the Steward Observatory Mirror Laboratory. Due largely to this strong foundation, over 80 optics companies now call Tucson home (resulting in the regional nickname "Optics Valley"). Signal processing and communications companies have also discovered the allure of doing business and research in our valley. Much of the funding for these companies comes from military/defense projects, centering about high-speed flight, reconnaissance, satellite communications, and other work falling under the domain of AIAA.

A clear goal of the AIAA Tucson Section will be to provide its members with a network of social and business contacts, along with some fun speakers, dinners, activities, and excursions. However, in addition to this, we plan to provide Tucson industry with a forum for collaboration to successfully push the limits of aerospace in a safer and more cost-effective fashion. One way we'd like to accomplish this is to hold mini-conferences and short courses. The local conferences will showcase the current research thrusts and developments, as well as the needs of the different companies in town. Such information is vital to effective and efficient collaboration. The short-courses will provide background on a variety of topics. This can be geared toward general or special audiences (One example is to present pertinent aspects of optics or signal processing to a focussed group of communications or satellite engineers. Another example might be to present shock, solar, or radiation physics to integrated-circuit manufacturers.)

Beyond this continuing or "collaborative" education, a main thrust of our Section is going to be educational outreach on all levels. AIAA national already has many programs in place to support science and math education for grades K-12. We want to make these programs known, and help educators take advantage of them. They include not only funding for classroom projects, but free kits, videos, televised programs, and entire course outlines are available. Educators also receive AIAA membership for free. The magnitude is impressive. At the University level, the national organization is sponsoring a "design/build/fly" competition. This experience teaches students not only about flight, but also how to work together on a large project. This project as well as a separate rocket project are being supported by our local section with both money and help/advice from members.

As you know, the AIAA is a non-profit organization, and really stretches its finances to provide these kinds of services to the membership and community. We have great support coming from the national organization, but the most important part is an active local membership. Two months ago, the Phoenix Section drove down and organized a phenomenal weekend for everyone (We've included their write-up of this event!). Prior to this, I'd only presented my research at AIAA conferences around the country, and had no idea of how the organization can actually help to build and nurture a community. I really want to see this happen here in Tucson. I want to see people getting involved in activities that excite them, teaching, learning, playing with new toys, and even flying. However, in order to really have this work, the main ingredient is to find out what the community wants. We are holding a meeting Saturday, November 13th at 4:00 PM at the University of Arizona AME building on the Northeast corner of Speedway and Mountain. You should have a flyer for this, but even if you don't, just show up. In addition to introducing ourselves, we will be asking for your input. We want to know what you you'd like to do, what you'd like to learn about, what you'd like to see us offer. The sky is the limit, so if you have ideas beyond those presented, you can bring them up and we can work together to make them a reality.

As further incentive, we'll stuff you with FREE PIZZA (ahhhhh yes...it just completes the campus flavor, and may bring back some old memories). We'll also be giving away a free first flight lesson donated by a local flight school, and we'll tell you about some of the discounts that AIAA members will receive from local establishments on all sorts of flight-related activities!

I look forward to meeting you and hearing what kinds of things you'd like to see offered. If you enjoy participating, or if you'd like to take an active role in defining one or more programs we're offering, your presence is very very welcome. Attendance is certainly not limited to AIAA members. Engineers, educators, pilots, hobbyists, or anyone with an interest in the aerospace field is invited to come hear what we have to offer.

Once we have your input, we'll put together a GREAT line-up of events and activities.

See you soon!

<u>Tucson Section Officer Roster 1999-2000</u>	
Chair	Kevin Kremeyer
Vice Chair	(open)
Secretary	Kelly Sinnock
Treasurer	Darren Hayashi
Membership	Rina Shivashankara
Director of Technical Activities	Robert Wagoner
Webmaster	Robert Wagoner
Newsletter Editor	Frank Manning



AIAA Student Design/Build/Fly Competition

by Matthew Anguilo
 UA AIAA Student Branch President

While I have been a member of the Student Branch of the AIAA at the University for a few years, I have seen it change dramatically. When I first started attending meetings last year, we were a quiet and small group of mostly aerospace and mechanical engineering students.

Although the members were excited to build on the previous year's thirteenth place finish in the Design/Build/Fly competition, there seemed to be a lack of drive and focus as the majority of the members had their sights on upcoming graduation and their entry into the professional world.

Now, however, gears have shifted once again. We have a fresh and energetic group of engineers and we have already started making much progress. We've taken it upon ourselves to redefine the AIAA at the U of A, and start including more people and increase participation, not only in our project, but other student projects around campus.

At this point we've tripled our participation from the beginning of the semester and have taken a very active role in getting this year's Design/Build/Fly entry underway. I'd like to thank your members and the local chapter for taking us under your wing and giving us your support; both professionally and financially.

Special thanks go to Kevin Kremeyer, Robert Wagoner, Brian Biswell and Frank Manning for working with us and providing much appreciated guidance in our project. I am confident that with your help, and with our current group of dynamic, young engineers, this will be the finest year the AIAA has ever had at the U of A.

Although it seems as if our club and our project are often dwarfed by the more impressive Solar Car and SAE's "Mini Baja," I am sure that this year's winning, first place entry will get the recognition the AIAA Student Branch deserves. Thank you once again for your support.



Design/Build/Fly team members

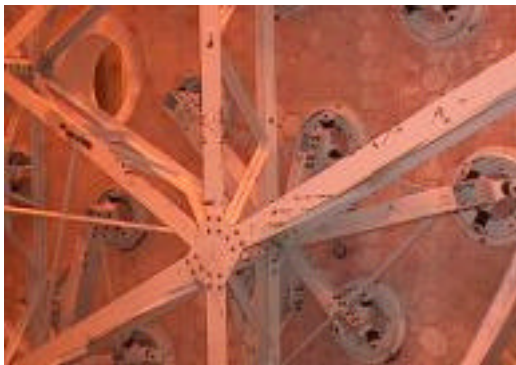
(Left to right): Michael Rodgers, Chris Miller, Matthew Anguilo, Jason Nichol, James Harader (back), Brent Hampton (front), Patrich Haley, Nathan Warner, Faizal Riza Abd.Rahman

Joint Tucson/Phoenix Trip

by Michael Mackowski
AIAA Phoenix Section

The clear and dry desert climate of southern Arizona means fair skies for aviators and astronomers. Two of the most famous attractions in these two realms were the venue for a weekend outing of the Phoenix and Tucson sections last fall. Over fifty members and guests from both sections attended a series of functions and tours over the weekend of September 25 and 26, 1999, organized by the Phoenix Section. After lunch at a Tucson restaurant, the group rendezvoused across the street at the Plaza Hotel and boarded a tour bus for the Pima Air and Space Museum. This great collection of vintage and modern aircraft just keeps growing. They have new hangars with beautifully restored aircraft protected from the desert's intense sun and heat. These also house many smaller artifacts and interpretive exhibits. The Museum also hosts the southern Arizona Challenger Center for space education, which simulates a space station mission for young students. After several hours there, the group took the bus to the campus of the University of Arizona.

Under the high-rise stands on the east side of Arizona Stadium is the Mirror Lab of the Steward Observatory. Here, a team of engineers and technicians fabricate some of the largest astronomical telescope mirrors on the planet. Dean Ketelson and Jim Burge led a tour of this facility. Within the cavernous high bay area the members viewed an 8.4 meter mirror mounted in a gigantic holding fixture.



Mirror on holding fixture

This giant single piece of glass had just had its rear face polished, and still needed to have the front optical surface shaped. It was an impressive sight, this huge, perfectly flat honeycombed structure, hanging from its side by large pads of adhesive attached to a handling frame. Two of these 8.4 m diameter mirrors will be used for the Large Binocular Telescope on Mt. Graham, in Arizona. Then it was back to the hotel, where Region VI staffer, Elizabeth Carter, and Region VI Director, Ken Sanger, hosted a reception on the pool deck. After a fine

dinner at the Plaza, Dr. Burge explained how his team's researchers are designing concepts for even larger space-based telescopes that could have the capability to image Earth-sized planets around other stars.

The next morning the group loaded up the bus for a pleasant 90-minute drive to Kitt Peak and its famous mountain top observatory. Jeff Henrickson, of the National Optical Astronomy Observatories, led a tour of several of the most notable telescopes there. There was a close look at the WIYN 3.5 meter telescope, whose mirror was fabricated at the Mirror Lab in Tucson.



McMath-Pierce Solar Telescope

Then the tour was treated to an inside view of the McMATH-Pierce solar telescope, including a look at the control room where observations were taking place.



Kitt Peak

After the hike amongst the telescopes at nearly 7000 feet altitude, the now-tired group wrapped up with tasty boxed lunches at the mountain's picnic grounds.

About a dozen AIAA members from Tucson attended, and many of them were new to either AIAA or section activities. One of the goals of the event was to get out some new people. They showed tremendous enthusiasm, and contacts were established within the group and with the Region VI staff. This bodes well for the future of the Tucson Section, which had been dormant for a few years, and we in Phoenix wish them the best of luck.

Article reprinted courtesy of Phoenix Section

Photographs by Keith Jenkins



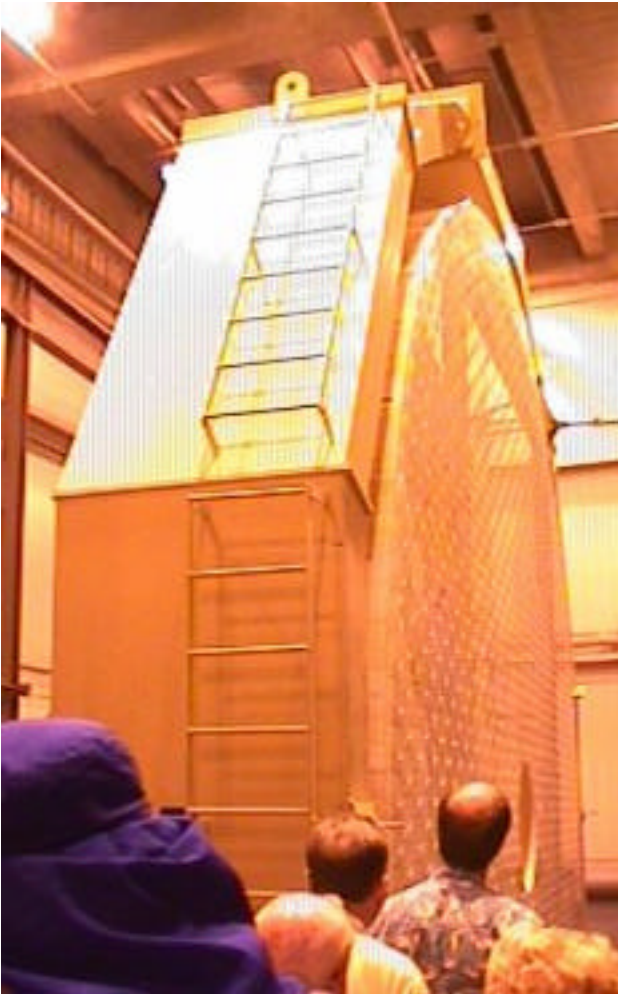
High Power Rocket Project

by Nathan Warner
Director, High Power Rocketry Project
UASEDS

The University of Arizona club Students for the Exploration and Development of Space (SEDS) is working on a large high power rocket capable of reaching altitudes of well over 16 km carrying small payloads. The rocket will be a two stage design using large composite rocket motors burning propellant similar to that used in the Space Shuttle's boosters, and generating thrusts of 1 kN or more. Structural materials will most likely be fiberglass composites, although other lighter composites are being investigated.

Maximum payload capacity will probably be in the 4.5 kg to 6.8 kg range depending on the motor configuration used. One payload that is guaranteed to be flown is a video camera recording the flight or transmitting its images to a ground station. Atmospheric research will probably be the primary source of payloads for the rocket as it will be capable of reaching almost any portion of the atmosphere at relatively low cost.

Funding, labor and technical expertise for the project will be provided by SEDS members, U of A's AIAA Student Branch, AIAA Tucson Section, U of A's Lunar and Planetary Lab and The Arizona Space Grant Consortium.



8.4 m mirror in high bay

Solar primary mirror





**American Institute of
Aeronautics and Astronautics**

Tucson Section Informational Meeting

Saturday, November 13th, 4pm

Main Auditorium, Room 202
University of Arizona
Aerospace and Mechanical Engineering Bldg.
(NE corner of Speedway and Mountain)

Free Parking on East Side of Building

- *Drawing for a Free Introductory Flight Lesson*
- *Free Pizza*
- *Learn more about Membership Benefits*
- *Information about Upcoming Events and Elections*

Come Share Your Ideas!

For more information, contact :
Kevin Kremeyer kremeyer@physics-math.com
(520) 882-7349
Or visit our webpage at [www.ejets.com / aiaa](http://www.ejets.com/aiaa)