September 22, 2005

MEMORANDUM

TO: Board of Trustees
Members’ Representatives
UCAR University Relations Committee
UCAR Academic Affiliates

FROM: Richard A. Anthes

SUBJECT: President's Report for October 2005 Meetings of the Board of Trustees, UCAR Members' Representatives, University Relations Committee, and Academic Affiliates

Ladies and Gentlemen:

I start this report by acknowledging the worst natural disaster in the history of the United States, Hurricane Katrina. In spite of years of warnings about the potential catastrophe associated with a major hurricane striking New Orleans, and despite excellent forecasts of Katrina’s track nearly three days in advance and continuous news coverage and warnings, the response to the disaster was painfully slow and inadequate, with the results being huge losses of life, property, and misery for thousands of people. The disaster illustrates the value of accurate forecasts and warnings (the loss of life and property would have been even higher without these forecasts), but it also illustrates the many social factors that must be addressed to develop societal resilience and preparedness to such natural disasters. The response of the American people has been heart warming. At UCAR, I offered a Hurricane Katrina Challenge to the UCAR staff to contribute to the American Red Cross by offering to match employee contributions with contributions from the UCAR General Fund up to a maximum of $50,000. As of this writing we have raised over $50,000 from the employees, for a total UCAR contribution of over $100,000.
Turning to regular UCAR matters, I hope this report finds you well, and I look forward to seeing most of you at the meetings next month. In my annual report to you, I summarize some of UCAR’s program highlights over the past year, that include a rich and productive mix of science, facilities, field programs, education, service, and management activities. My report (and Tim Killeen’s and Jack Fellows’ reports) contains additional examples of progress in the areas of science, facilities, and service to the universities. You may view Tim’s and Jack’s reports at:

NCAR report:  http://www.ucar.edu/governance/meetings/oct05/nkar_report.pdf
UOP report:  http://www.ucar.edu/governance/meetings/oct05/uop_report.pdf

A major highlight of the past year was the delivery on March 11, 2005 of the HIAPER (High-Performance Instrumented Airborne Platform for Environmental Research) aircraft to the Jeffco airport and the final steps of readying this new community platform for its first research flights. The HIAPER project began over 25 years ago with community workshops that began building the scientific case for a “mid-range” research aircraft. NCAR personnel are now completing the test flight period and the installation and testing of various infrastructure and instrumentation systems in the aircraft. A description of HIAPER and access to the HIAPER photo gallery may be viewed at: www.hiaper.ucar.edu/brochure.html. The successful completion of the HIAPER program, one of the most complex Major Research Equipment and Facilities Construction (MREFC) programs ever supported by NSF, owes its success to the HIAPER Program Office Director Krista Laursen and many others at NSF, NCAR, and UCAR over several years.
The final supercomputer acquisition under the ARCS subcontract with IBM is currently being installed in the SCD’s Mesa Laboratory computing facility. Named **bluevista**, the IBM POWER5 p5-575 model supercomputer has a peak computational capacity of 4.7 TeraFLOPs, bringing our peak production computing capacity to over 15 TeraFLOPs (Fig. 1). While it doesn’t rival the peak capacity of **bluesky** (8.3 TeraFLOPs), the POWER5 system’s design is more efficient for our kind of applications (climate and weather models) and is expected to achieve the same sustained performance as **bluesky**. For more information, see: [http://www.scd.ucar.edu/news/05/lead/0903.bluevista.html](http://www.scd.ucar.edu/news/05/lead/0903.bluevista.html).

**Fig. 1: Peak teraflops in NCAR’s production systems since 1987**
A new version of the Community Climate System Model (http://www.ccsm.ucar.edu and www.ucar.edu/communications/CCSM) was used to complete many long climate simulations under various forcing scenarios to contribute to the IPCC (Intergovernmental Panel on Climate Change) Fourth Assessment Report. A successful tenth annual CCSM workshop was held in Breckenridge, Colorado June 21-23, 2005 and was attended by more than 300 members of the community; presentations and photos are available at: www.ccsm.ucar.edu/news/ws.2005/index.html.

A major field program, RICO (Rains in Cumulus over the Oceans), was successfully carried out from November 2004 to January 2005 (http://www.joss.ucar.edu/rico). This program involved many students and included components in cloud physics, dynamics, and chemistry.

NCAR and the community made major progress on the Weather Research and Forecast (WRF) model (www.wrf-model.org). The National Centers for Environmental Prediction (NCEP) is now running WRF operationally in their six High-Resolution Domains (eastern US, central US, western US, Alaska, Hawaii, and Puerto Rico). The NCEP schedule for switching to WRF for North America (replacing the CONUS Eta model forecasts) is sometime in 2006. The 4-km version of WRF has shown significant skill in forecasting the track and intensity of hurricanes during the very active hurricane season of 2004 and again this year. An animation of one of the forecasts of Hurricane Katrina can be viewed at: http://www.ucar.edu/governance/meetings/oct05/20050827_katrina_radar.avi. To download this file, please see the link next to my “UCAR President’s Report” on the October 2005 website.
University and UCAR/NCAR scientists participated this fall in a hurricane research project called RAINEX -- Hurricane Rainband and Intensity Change Experiment (http://www.joss.ucar.edu/rainex). The PIs are Bob Houze (University of Washington) and Shuyi Chen (University of Miami). Scientists flew missions into Katrina as it approached Florida and grew to a Category Five storm in the Gulf of Mexico, and they obtained a remarkable data set.

On September 7, 2005 HAO scientists at Mauna Loa Solar Observatory observed detailed images of an unusually energetic coronal mass ejection (CME). Even though the storm was not aimed directly at Earth, the event led to a complete blackout of high frequency communications in North and South America, according to the NOAA Space Environment Center.

The CME moved through the corona at a speed of about 5.8 million miles per hour, making it the fastest such disturbance that HAO has measured in more than 20 years of observations. NOAA’s Space Environment Center has warned that power grids, communications satellites, and navigation systems could be affected over the next two weeks.

We made major progress toward implementing the June 2002 UCAR strategic space plan “Strategic Analysis of Space Needs for UCAR and NCAR in the Boulder Area.” We completed the refurbishing of the Center Green Building 1 (CG-1) and NCAR’s High Altitude Observatory moved into it in July. We made major progress in the construction of the new chemistry laboratory, FL-0, which will be finished in November 2006, and finally obtained all the approvals for the bike path connecting the Center Green campus and Foothills Lab.

We were pleased when Colorado Parent magazine named UCAR as one of the state's top employers for working families. The magazine’s October 2005 issue ranks UCAR number one in the nonprofit category. The annual Colorado Parent contest, “Best Companies for Working Families”, recognizes employers that institute family-friendly policies. A panel of judges, composed of community leaders, used such criteria as flexible work arrangements, child care assistance and support, adoption benefits, extended

1.0 UCAR's Corporate Activities

1.1 Community Survey

As part of the process in developing the new UCAR strategic plan, we conducted an update of the 1999-2000 community survey, which I summarized in the Fall 2000 issue of the UCAR Quarterly (www.ucar.edu/communications/quarterly/fall00/president.html). Although the survey was quite long, the response rate of 38% out of approximately 3600 invitations is considered quite high. The 2005 survey asked many of the same questions as did the earlier survey, and in general the results are similar. The community expressed its interest and support of a very wide range of UCAR activities as shown in the chart below, which shows the percentage of the total responses in answer to the question “What additional or increased areas of service to the community should UCAR consider?”


1.2 Strategic Planning

As discussed in Tim Killeen’s report (http://www.ucar.edu/governance/meetings/oct05/ncar_report.pdf), NCAR has been working hard over the past several months revising its 2001 Strategic Plan “NCAR as an Integrator.” A highlight of this process was a week of discussion with NSF, UCAR, and NCAR management and representatives from the university community, including the UCAR Board of Trustees and the URC. The draft plan will be discussed at the October meetings and is available at: http://www.ncar.ucar.edu/stratplan/2006/stratplan06.pdf. We view the NCAR strategic plan and the planning
process as important first steps in developing a new UCAR Strategic Plan, which will begin in earnest in early 2006.

1.3 Metrics Study

In response to the 2002 NSF review panel recommendation to “develop a robust set of metrics (beyond citation analyses) that characterize the quality, effectiveness and efficiency of both science programs and service functions,” I appointed a committee to look into how the different aspects of UCAR could be measured. The result of the study was a report entitled "Measuring the Productivity, Quality, and Impact of UCAR Programs." This report surveys relevant quantitative and qualitative metrics and performance measurement approaches and highlights those that we believe would best characterize the productivity, quality, and impact of UCAR and NCAR programs. Based on the experience gained by developing this report, we can improve the assessment and, thus, the management of our programs and operations in the future by adopting a more formal system of gathering the performance measurements. A copy of the report is available at: www.ucar.edu/communications/metrics/metrics05.pdf.

1.4 Field Project Support Study

For many years UCAR has provided support to the community for field projects. This support has included end-to-end services, from planning to carrying out the field phase of the project, to processing the observations and archiving them for use by researchers many years after the field phase. While the two parts of UCAR that are most widely recognized for this project support are NCAR’s Earth Observing Laboratory (EOL) and UOP’s Joint Office for Science Support (JOSS), other parts of NCAR and UCAR also provide vital support. During the past year a UCAR Committee, chaired by Al Kellie, Associate Director of NCAR for Computational and Information Systems Laboratory (CISL),
conducted a survey of all UCAR activities that support field projects. I summarized the main results from this study in my President’s Corner for the Summer 2005 issue of the UCAR Quarterly (www.ucar.edu/communications/quarterly/summer05/president.html). The complete report may be viewed at: www.ucar.edu/fps/fps.pdf.

1.5 Community Meeting on Future of Weather Enterprise

UCAR, in partnership with the American Meteorological Society and the Weather Coalition, helped organize a community meeting on the future of the U.S. Weather Prediction Enterprise. Held on July 26-28, 2005 in Boulder, the objectives were to examine the strengths and weaknesses of the U.S. weather prediction enterprise, how community decisions should be made, and examine the need for a more cooperative and coordinated approach to weather prediction operations and research. It is difficult to summarize the outcome of this meeting, in which many parts of the community expressed very different points of view. The many interesting presentations may be viewed at: http://www.ametsoc.org/boardpges/cwce/meetcolorado.html.

1.6 Legislation Affecting the UCAR Community

As Congress returns from its August recess for its fall legislative session, both chambers have a very full legislative calendar. Dealing with the crisis caused by Hurricane Katrina along the Gulf Coast will be the most immediate priority, putting most other issues on hold.

The FY 2006 appropriations process is not yet finished, though there has been considerable progress. The House has passed all 11 of its appropriations bills, while the Senate has passed six of its 12. The two chambers must come to an agreement on appropriations levels before the President can sign the appropriations package into law. If this process is not completed by October 1 (the first day of FY 2006), Congress must pass a continuing resolution (CR) to keep the federal government operating. CRs have become commonplace over the last several appropriations cycles, as Congress has been unable to finish the process on time.

While appropriations bills deal with discretionary annual spending, Congress will also have to address mandatory spending in early September as part of the budget reconciliation process. In an attempt to scale back spending, all relevant committees have been directed to find a set amount of “savings” or cuts in the mandatory programs under their control by September 15th.

As a result of this packed schedule, it is hard to predict how much of the legislation described below will be completed this calendar year.

1.6.1 NOAA Legislation and Ocean Policy

H.R. 50, the National Oceanic and Atmospheric Administration Act, sponsored by Congressman Ehlers, establishes NOAA in the Department of Commerce, headed by an Under Secretary of Commerce for Oceans and Atmosphere who shall serve as the Administrator of NOAA. The Act, which would be the first organic statute for NOAA, would clarify and codify the agency’s authority and responsibilities. NOAA was created by Executive Order under President Richard Nixon in 1970 and has been operating without a clear mandate from Congress on what its role and responsibilities should be. The mission of the Administration under this Act is to understand and predict changes in the Earth's ocean and atmosphere and the effects of such changes on the land
environment; to conserve and manage coastal, ocean, and Great Lakes ecosystems to meet national economic, social, and environmental needs; and to educate the public about these topics. **Status of bill:** HR 50 has passed the full Science Committee, and the Resources Committee has taken it up and has held hearings. There is no companion bill on the Senate side.

**S. 786, the National Weather Service Duties Act,** sometimes referred to as the “Santorum Bill” after its sponsor, would restrict the National Weather Service from providing public forecasts and services, limiting it to the preparation and issuance of severe weather forecasts and warnings designed for the protection of life and property of the general public. **Status of bill:** Referred to the Committee on Commerce, Science, and Transportation.

**S. 361 and HR 1584, Ocean and Coastal Observation Act** is a bill to develop and maintain an integrated system of ocean and coastal observations for the Nation's coasts, oceans, and Great Lakes, improve warnings of tsunamis and other natural hazards, enhance homeland security, support maritime operations, and for other purposes. **Status of bills:** Passed the Senate and referred to the House Committee on Resources.

1.6.2 Student Visa Regulation

**S. 455, the American Competitiveness Through International Openness Now, or "ACTION," Act of 2005** is a bill to reform the visa application process and enhance the access of foreign students, scholars, scientists, and exchange visitors to the United States for study and exchange activities. This bill would remove the current burden of proof on students to demonstrate that they plan to return to their home country at the end of their stay and instead require that they show the intent and ability to "complete a course of study" while in the U.S. **Status of bill:** Referred to the Committee on Foreign Relations.

1.6.3 High-End Computing

**HR 28, High-Performance Computing Revitalization Act** is a bill to amend the 1991 High-Performance Computing Act. The bill sets broad priorities and goals for many relevant federal agencies in regards to high-end computing and strengthens the interagency coordinating process. **Status of bill:** Passed the House. Senate companion bill referred to the Committee on Commerce, Science, and Transportation

1.6.4 NASA Authorization

**S. 1281 and HR 3070, NASA Authorization Act.** Both bills generally support NASA’s new emphasis on manned exploration but also establish safeguards to prevent the agency from abandoning its other missions, such as science and aeronautics. For example, both the House and Senate bills require greater transparency in NASA’s annual budget request to the Congress. The request would have to include information on how much the agency intends to spend on specific areas such as space science and Earth science. In the past, NASA’s budgeting practices have sometimes made it unclear how much funding is actually being spent on such activities. The bills would also create five separate budget accounts within NASA: Science, Aeronautics and Education (SAE), Exploration Systems, Space Operations, and Inspector General. With the SAE account, the bill establishes proper protections to ensure that cost overruns in one account will not be taken out of another. **Status of bill:** HR 3070
has passed the House. S 1281 has been approved by the Senate Committee on Commerce, Science, and Transportation and awaits consideration on the Senate floor.

1.6.5 Climate Change

S. 342, the Climate Stewardship Act of 2005 is a bill to provide for a program of scientific research on abrupt climate change, to accelerate the reduction of greenhouse gas emissions in the United States by establishing a market-driven system of greenhouse gas tradeable allowances, to limit greenhouse gas emissions in the United States and reduce dependence upon foreign oil, and ensure benefits to consumers from the trading in such allowances. **Status of bill:** Referred to the Senate Committee on Environment and Public Works.

S. 245, the Abrupt Climate Change Research Act of 2005 is a bill to provide for the development and coordination of a comprehensive and integrated United States research program that assists the people of the United States and the world to understand, assess, and predict human-induced and natural processes of abrupt climate change. **Status of bill:** Referred to the Senate Committee on Commerce, Science and Transportation.

1.7 Classified Research at UCAR and NCAR

In the past few months UCAR and NCAR management and the UCAR Board of Trustees have been discussing the possibly of carrying out classified research at UCAR and NCAR. UCAR does not have a policy on this issue and it has never done classified research. However, NCAR has for many years done research on topics of great importance to national security and the protection of life and property, including weather prediction, transport and diffusion modeling, and remote sensing. For example, over the past several years, NCAR has been carrying out lidar observations and transport and diffusion modeling studies of flow around potential terrorist targets or other areas in the U.S. vulnerable to natural disasters such as forest fires, releases of toxic materials, etc. This unclassified research has been scientifically valuable, has benefited society, and has benefited the community through the development of community instruments and models. Recently the sponsors of some of this research have requested that NCAR extend this work by producing actual scenarios of potential terrorist attacks on U.S. targets. This work would involve inputting classified data into the models and would require Secret-level security clearances from certain NCAR researchers and UCAR staff. Although this research would help support continued research and development of unclassified observational and modeling facilities of value to society and the community, there would be risks to UCAR, including potential security compromises, inability for some NCAR scientists to publish the results of their research, and possibly adverse cultural changes.

The Trustees and UCAR and NCAR management are moving in the direction of developing a policy that no classified research will be done within UCAR, including NCAR. Research projects that require classification of parts of the research could be done in partnership with universities, private companies or federal laboratories that do classified research and are experienced in mitigating against the risks. We have done a web-based survey of UCAR Member institutions, and more than half either do classified research directly or in partnership with an associated laboratory, often near the campus.

We would appreciate any input from the UCAR Members on this topic, including expressions of interest in partnering with UCAR on projects requiring a classification of parts of the projects.
2.0 UCAR Office of Education and Outreach (EO) Activities

Highlights over the past year for UCAR’s Office of Education and Outreach (EO) include the addition and completion of the Climate Future section of the Climate Discovery Exhibit in the Mesa Lab lobby, the prototyping of sections of a new Teachers’ Guide to the exhibit, new capabilities for distance learning courses for teachers, and dramatic expansion of our outreach to Spanish language audiences through translation of the Windows to the Universe Web site. Hallmarks of our program continue to be our efforts to collaborate with other programs and institutions – both within UCAR as well as the university community - to integrate programs across formal and informal education and our continuing emphasis on multi-purpose resources for high leverage and high impact. This report highlights primarily our activities sponsored by UCAR; activities sponsored by NCAR or supported by NCAR-staff involvement are described in detail in the NCAR Education and Outreach report.

Assessment of UCAR’s full suite of educational program achievements in attaining goals and objectives in the UCAR Education and Outreach Strategic Plan 2001-2006 (http://www.ucar.edu/educ_outreach/stratplan.html) has begun in anticipation of updating the plan in FY2006.

The Friends of UCAR Program (www.ucar.edu/friends), housed since its founding in 1996 in UCAR’s Office of Development and Government Affairs, has been moved to the oversight of EO. The mission of Friends is to provide opportunities to contribute toward the development and support of education programs at UCAR that increase public and K-12 understanding of the atmospheric sciences. Contributors to Friends of UCAR have helped bring NCAR’s science to thousands of children and adults by supporting fun and exciting educational attractions, exhibits, and online resources.

2.1 Professional Education

EO is coordinating a new Communicating Science Program (www.eo.ucar.edu/commsci) in collaboration with the Advanced Studies Program, UCAR Communications, UCAR Human Resources, and the Early Career Scientists Assembly. The concept was developed over the past few years as a result of a “grassroots” staff needs assessment. Workshops, informal meetings, a website, as well as coaching and mentoring relationships are being planned and encouraged that will help scientific and technical staff improve their writing and oral presentations skills, outreach to the media, and participation in education activities for the public and K-12 students.

2.2 Professional Development for Educators

2.2.1 NCAR Professional Development Workshops

Beginning in 2002, EO initiated a state-of-the-art professional development program for middle and high school educators from across the country focused on NCAR’s science, mathematics, engineering, and technology. The program, offered through two workshop series (the Climate and Global Change Workshop - http://www.ucar.edu/educ_outreach/gew, sponsored by an NCAR Education Strategic Initiative, and the Modeling in the Geosciences Workshop - http://www.ucar.edu/educ_outreach/gew, sponsored by NASA) includes science content, training in hands-on and computer-based resources, pedagogical support, and interactive experiences. Acceptance to a workshop requires a commitment from each teacher to provide outreach and training to a minimum of 40 other teachers in their school district or region through which they share the new science content and resources accessed and
experienced in the summer workshop. Over the past three years, ~450 applications have been received from educators around the country for these workshops, and we have been able to provide training to ~100 educators. For both workshops, we have worked closely with a company called ESRI to provide training on GIS and associated curricular materials (ESRI generously has provided participating teachers free site licenses to ESRI software).

EO completed the third and final year of the *Modeling in the Geosciences Workshop* series through the Earth System Modeling Framework project, in collaboration with SCD and participating universities, and with the substantial support of ESRI and Professor John Snow of the University of Oklahoma. Over these three years, a three-part workshop series was offered twice, including a two-week workshop in Boulder, an on-line workshop in the fall, and an in-person mini-workshop the following spring. Teachers used STELLA and GIS software to build models and develop applications of these and other tools to enhance classroom practice and student achievement in their own classrooms through the development of classroom applications of their own choice. During fall 2004, they participated in an on-line workshop in which they received additional professional development on modeling, including an introduction to the Carbon Cycle, in addition to updating their project work and critiquing the work of their colleagues. The workshop series was completed in the spring of 2005, when the workshop participants again received further professional development on the Carbon Cycle and made final and impressive presentations of their project work. Teachers consistently mentioned the positive impact of a modeling approach when working with students and the particularly positive response elicited from students historically under-represented in science. EO is looking for opportunities to continue this program with educators in the future, perhaps in conjunction with the on-line course series described above.

2.2.2 GLOBE EO-based Activities

Three GLOBE Trainer Certification Programs (TCP) have been implemented over the past year. The TCP certifies new GLOBE Trainers through a three-part instructional sequence that includes a prerequisite online Orientation course, a five-day face-to-face workshop, and a post-requisite online follow-up course. The report from an external evaluator concludes that this expanded approach to trainer certification is effective. The participants report a strong sense of community, adequate preparation opportunities, and concentrated follow-up efforts as they begin their roles as GLOBE trainers.

The *GLOBE Professional Development Model* is based on five key components found in many professional development models – Introductions, Goals, Guided Practice, Classroom Implementation, and Feedback. The Guided Practice component is further defined with sub-components that are specific to GLOBE protocol instruction. The *GLOBE Professional Development Model* was designed to increase the effective instruction of GLOBE science and protocols in both formal and informal education venues.

Interactive Online Instructional Module Development. GLOBE EO developed an innovative, interactive education and science based online module addressing the cloud protocol. This was released during National Environmental Education Week in April (http://gpdi.globe.gov/advance). This interactive module was developed for use by GLOBE trainers as the primary audience, with GLOBE teachers as the secondary audience. It is a useful refresher tool and has information linking the cloud protocol with the five essential features of inquiry put forth by the National Research Council. It also has suggestions for classroom implementation suggestions.
**Elementary GLOBE** is a five-module unit consisting of a collection of books and classroom learning activities for grades K-3. The five topics align with GLOBE Investigation Areas -- Earth as a System, Clouds, Soils, Water, and Phenology. The need for credible, accurate, and engaging science information for K-3 at age-appropriate levels is great. K-3 is often overlooked, and the *Elementary GLOBE* ESS modules address this special developmental stage of learning and promote comfort with science. *Elementary GLOBE* promotes literacy in primary classrooms. Two of the modules are complete (*Do You Know that Clouds Have Names?* and *The Scoop on Soils*). The full unit will be released in early 2006 when the additional modules are finished. All modules are field tested in K-3 classrooms to ensure age/grade level appropriateness.

![Cover of book for K-3 audience *Do you Know that Clouds Have Names?*](image)

### 2.2.3 EO Educational Resource Development Partnerships with Scientists

**APOL** This fall marks the completion of a three-year grant that brought together EO staff; two local high school educators; two high school (now college) students; and NCAR’s Earth Observing Laboratory’s APOL Biocomplexity project scientists, Alan Fried, Dirk Richter, and Jim Welega. During year one, the education team focused on understanding the project’s science and state-of-the-art optical technology. During year two, focus shifted to bringing the project to high school teachers and students via the web and through online video interviews with NCAR and other scientists involved in the project. The education team also presented at the Colorado Science Convention during year two. Additionally, the education team completed the development of their educational materials entitled, *Climate, Carbon, and Laser Technology*, which will be presented for the first time at this year’s Colorado Science Convention in November and online beginning October 1st.
2.3 Public Education Programs

UCAR’s public education programs aim to increase the scientific literacy of the nation through numerous efforts reaching the general public, teachers, and students who visit the Mesa Laboratory for a tour or use EO online resources. The focus for all ages is on enhancing understanding about our atmosphere; the impact of weather and climate on society; the geosciences in general; and the application of scientific knowledge to decision making about careers, lifestyles, and public policies.

2.3.1 Events and Exhibits

Super Science Saturday. October 2005 will mark UCAR’s ninth year of hosting Super Science Saturday (SSS). UCAR’s largest, annual public science event attracts over 3,000 students, teachers, and parents to the Mesa Lab. The day-long science celebration features hands-on science activities, presentations, showcase demonstrations, and special workshops designed to facilitate understanding of science principles and the scientific process. The theme of this year’s SSS event is “Very Attractive Science”, addressing magnetism, with strong linkages to resources available through Windows to the Universe and associated programs.

Wild Science Saturdays is a collaboration with the Wild Bear Center for Science Discovery and Colorado’s Scientific and Cultural Facilities District (SCFD) --- a promoter of science and art literacy in the Boulder County community. Two new Science Saturdays, plus Wild Earth Day (a
multi-program Earth Day celebration), have grown out of the collaboration, broadening EO’s public offerings and allowing NCAR to leverage Super Science Saturday’s established reputation. Wild Science Saturdays bring several thousand families to the Mesa Lab in the winter and spring for environmental activities.

**Spanish Bi-Lingual Science Education Resources.** In September 2004, a workshop was held for bi-lingual science educators in the Denver-Boulder-Longmont area presenting the bi-lingual educational resources available through UCAR. Attendees included 29 teachers from across the region at elementary, middle, and high school levels. Participants were offered a tour of our facility, highlighting our bi-lingual audio tour (developed with funding from NSF Geoscience Education) as well as an introduction to the bi-lingual educational resources available through the *Windows to the Universe* project.

### 2.3.2 Public Visitor Program

Educational resources traveled far beyond the Mesa Lab this year, as EO’s Public Visitor Program (PVP) shared staff members and science education materials with offsite users. We accomplished this by increasing our presentations in school classrooms and at science and career fairs, at state and national meetings, and through increasing collaborations with other organizations. Onsite, we made a large number of published EO/PVP resources available to all who visit the Mesa Lab, including distribution at many after-hour and weekend conferences and receptions.

Students and their teachers continue to represent the primary source of PVP visitors, 9,241 for the year - including one high school class that has now visited annually for 21 years. Mixed noontime tours of adults and families, together with visits from adult groups comprise the remainder of the 13,502 recorded visitors over the past year.

**Audiotour.** The Mesa Lab audiotour has now been available daily to our visitors for two years. Many visitors opt to take an audio tour in order to learn more about UCAR/NCAR and the science, art, and architecture exhibits when the guided tour is not available. Narratives are available for adults and children, in both English and Spanish. In the last year, nearly 2000 individuals, over one fifth of whom were children, used the audio units. PVP staff observe that the audiotour has had a significant and positive impact on the quality of the visitor’s experience at the Lab, producing much longer and in-depth interaction with our exhibit resources. In addition, numerous visitors whose English comprehension is limited have told us that the paper adaptations of the audio tour scripts, which are available in six languages: Spanish, German, Italian, French, Chinese, and Japanese, are particularly welcome.
Educational Resources. EO PVP staff continues to develop inquiry-based learning activities that align with national and state science content standards for our student visitors - ages three to 23. Emphasis in these activities is placed on the process of science and observing and reporting, rather than on science facts. Modules include:

- Density Challenge
- Systems Thinking and the Earth System
- Magnetic Universe: What’s the Attraction? (Adapted from Windows to the Universe teacher activities)
- Geology of the Mesa
- Contrail Clouds (adapted from GLOBE K-3 curricula)
- Carbon Cycle Pursuit (developed w/ APOL educators)
- Under Pressure
- Air Apparent
- Wild Weather: Hurricanes
- Wild Weather: Thunderstorms (adapted from Web Weather for Kids)
- Convection Connection
- Computer Modeling and Scientific Visualizations
- In a New Light: The Color of Weather and Climate
- Water and Weather – The Two Go Together
- Cloud Watch

PVP educators also collaborated outside the Mesa Lab Classroom in an education program, Science is Everywhere, which brought an afternoon of science fun and learning to two schools in the Boulder Valley School District with a disproportionate enrollment of minority students. Collaborators include Thorne Ecological Institute, Fiske Planetarium, NIST, CU’s Science Discovery, CU’s School of
Engineering’s TEAM program; and the Boulder Water District’s WASH program. Funding has been renewed and increased for 2006. For a second year, with support from the NCAR Advanced Studies Program, PVP staff have teamed up with post-docs to welcome the Mile High Girl Scout troops to the Mesa Lab for Saturday Climate and Weather Workshop.

![Girl Scouts learn about climate and weather at the Mesa Lab](image)

2.4 Web-based Outreach and Distance Learning – Windows to the Universe

Windows to the Universe ([http://www.windows.ucar.edu/](http://www.windows.ucar.edu/)) continues to be the most highly visited website within the entire ucar.edu domain. Over the past year, our traffic has grown dramatically – far exceeding our anticipated reach of ~5 million visitors in 2004 to an actual reach of ~9.6 million visitors over the past 12 months, including ~2.2 million visitors to our Spanish version of the website. These visitors accessed over 76.5 million pages on the website, including ~11 million pages on the Spanish website. The growth in traffic is in part due to the popularity of our Spanish website. However, the increase in use of the English version of the website actually exceeds that achieved on the Spanish website, indicating further penetration in actual formal and informal geoscience education activities.

Translation of the website into Spanish continues, with about two-thirds of the content now translated into Spanish. Comments from users of the Spanish website are extremely positive, showing appreciation for the resources as well as recognition of the high quality of the translation. We are actively disseminating information about this resource in the Spanish-speaking community – both locally as well as nationally and internationally. We were invited to present Windows to the Universe at the UNESCO-sponsored Science and Technology Education for the Americas conference in Santiago, Chile in July 2005. The project and the resources we offer were very well received by the meeting participants, which included representatives from 17 countries across Latin America, including Ministers of Education from Mexico, etc. We are now discussing with UNESCO possible collaborations to bring our resources to their educators and students to help improve science and technology literacy in Latin America.
3.0 Corporate Affairs

UCAR Corporate Affairs activities include three components: governance, communications, and development and government affairs.

3.1 Governance Activities

The UCAR Board of Trustees, Members, and their respective governance committees held their regular meetings this past year.

3.1.1 The Board of Trustees

(Kelvin Droegemeier, Chairman) The Board held three regular meetings over the past year: October 2004 and February 2005 meetings in Boulder and the May 2005 meeting in Washington, D.C. In February, the Board welcomed new Trustees elected by the Members last October: Frank Cushing (who unfortunately had to resign because he was tapped to be the Staff Director for the House Appropriations Committee), Rana Fine (University of Miami), and Shirley Malcom (Directorate for Education and Human Resources Programs of the AAAS). Those re-elected for a second term were: Kelvin Droegemeier (University of Oklahoma), Neal Lane (Rice University), and Orlando Taylor (Howard University). I am very proud to be serving with this Board. It is important to have a strong and engaged Board at all times, but especially now as we navigate through difficult times for science funding, in general, and into the competition process for the management of NCAR, in particular. Kelvin will report in more detail during his report to the Members. Minutes of past meetings can be found at: http://www.ucar.edu/governance/bot/bot_minutes.shtml.

3.1.2 University Relations Committee (URC)

(John Merrill, University of Rhode Island, Chairman). The URC is advisory to the UCAR President, and I benefit greatly from their discussions and advice. This is a lively and thoughtful group...
of people who focus their agendas on how the universities and UCAR can more deeply interact and benefit each other for the greater good of the entire scientific enterprise. They also act as a conduit from the university community to UCAR. It bears noting for some of the newer Representatives that the URC is a good forum to bring up and discuss ideas and concerns. Information on the URC can be found at: http://www.ucar.edu/governance/committees/urc/index.shtml.

The spring meeting of the Committee was generously hosted by Chairman Merrill at the University of Rhode Island at Narragansett on April 6-7, 2005. We spent two days in discussion on various issues, including the NCAR Strategic Plan and review of the non-core and Non-NSF NCAR proposals for unfair competition. John Merrill will report in more detail at the upcoming Members’ Meeting. Detailed summaries of each of the meetings can be found in the URC report at: http://www.ucar.edu/governance/committees/urc/urc_minutes.shtml.

3.1.3 The Membership Committee

(Robert Talbot, University of New Hampshire, Chairman). The Committee met in Boulder in June to consider applications for renewing Memberships. During the very productive session, they finalized a more streamlined version of the new renewal application procedures and wrote the report that you all received. On September 14, 2005, I participated with Bob Talbot and Don Wuebbles in a visit to the University of Houston as part of their UCAR Membership application process. As summarized in their report (http://www.ucar.edu/governance/meetings/oct05/membership_committee/index.html), the University of Houston has an extremely active and growing program in the atmospheric sciences, with an emphasis on atmospheric chemistry. Providing information to our Members and Affiliates on UCAR, NCAR, and UOP activities and opportunities, and learning about the major concerns of university science departments is a very interesting and rewarding part of this job.
3.1.4 The Members’ Nominating Committee

(Fred Carr, University of Oklahoma, Chairman). The Committee met in May prior to the UCAR Board Meeting in Washington, D.C. to determine the slate of candidates you will vote on during Wednesday morning’s election of Trustees and Member Committees. I am honored that we continue to attract very capable and accomplished candidates for the Board. Once again you will have some tough choices to make among outstanding candidates as you vote for Trustees this year. The Nominating Committee Report can be found at: http://www.ucar.edu/governance/meetings/oct05/nom_comm_rpt.html.

3.2 Communications

3.2.1 Web Enhancements

New Community Tools Web site. This fall we are debuting a Community Tools gateway to the UCAR website, www.ucar.edu/tools. It provides access to resources for the research community from one place. The page focuses on community collaborations (community projects, field projects, collaborative research initiatives, and visitor programs) with links to resources such as data, facilities, models, computing, and educational materials. We will be soliciting feedback on the site during the Members’ meeting poster session and welcome your comments. A community calendar is in development.

New Webcast Site (http://www.ucar.edu/webcasts). A new page, Webcasts and Multimedia Offerings, features dozens of seminars ranging from research presentations to mentoring and leadership training. The goal is to make this site a one-stop-shopping page bringing together webcasts of events from around the institution that may be of interest to the community as well as staff.

News Center Enhancements. You can now access media coverage of NCAR and UCAR on line at: http://www.ucar.edu/news/pressclips. The site features summaries of the top stories of the past two weeks with links to full articles or video clips and also contains archives of past coverage. A new “On
the Record” page, http://www.ucar.edu/news/record, reproduces source material (verbatim transcripts and/or papers) that have been widely quoted or misquoted.

3.2.2 Print and Electronic Publications

UCAR Update. In response to a discussion at last year’s UCAR Members Meeting, we have instituted a new monthly email newsletter, UCAR Update (http://www.ucar.edu/update), featuring short news items with web links focused on “news you can use.” Items include postdoc openings, workshops, colloquia, and other activities sponsored by UCAR/NCAR for the research community. The Update goes to all Members’ Representatives and any other interested readers.

UCAR Quarterly. The UCAR Quarterly continues to feature stories that spotlight UCAR members. For example, the summer issue featured a discussion of the lightweight robotic aircraft known as UAVs, including work at Scripps/UCSD, NASA, the Swiss Federal Institute of Technology, Columbia/Lamont Doherty, Georgia Tech, and the University of Washington; the winter issue cover story was on extremes of weather and climate, featuring Purdue, NOAA, the Hadley Center, University of Reading, University of Wisconsin, and Scripps/UCSD.

Highlights 2005. The latest edition of our flagship Highlights, (http://www.ucar.edu/communications/highlights/) showcasing significant achievements of the past two years, appeared in January 2005. The theme of the document was prediction—from magnetic storms to severe weather, pollution, and climate—and the human face of our research shared the spotlight with technical achievements. Planning for the next edition in early 2007 has already begun.

International Brochure. Partnerships Around the World: Advancing Our Understanding of Earth’s Atmosphere is hot off the presses. The 36-page booklet profiles international collaborations UCAR-wide, from the international team building the Sunrise telescope to the worldwide educational activities of GLOBE (http://www.ucar.edu/communications/international).

3.2.3 Media

At this writing UCAR’s media office is being inundated with press inquiries about Hurricane Katrina. Questions have ranged from the relation of hurricanes to global warming to the role of supercomputers in hurricane forecasting to the infrastructure damage caused by Katrina. There is a great deal of media interest in the RAINEX field program, whose goal is to understand forecasting of hurricane intensity; print reporters from major newspapers are planning to cover the Florida-based project as well as film crews from the BBC, Discovery Channel, National Geographic, and others. Other topics of greatest interest to media during the past year include Jim Hurrell’s work on the South African monsoon, which garnered a New York Times feature, and Jerry Meehl’s Science article on the commitment to sea-level rise and warming temperatures that past greenhouse emissions represent.

3.2.4 Archives

There are currently two historians conducting in-depth research using the NCAR Archives—one studying the design and building of the Mesa Laboratory and the other tracing the development of postwar Boulder as a scientific center. The Archives has begun gathering documentation on the planning, design, and building of HIAPER.
3.2.5 Other Communications Activities

Cloudscapes Postage Stamp Event. UCAR photographer Carlye Calvin’s photograph of an altocumulus lenticularis was one of the images featured in the Cloudscapes U.S. postage stamp series last winter. In honor of the series, we co-hosted a public event with the Postal Service at the Mesa Laboratory. T.V. meteorologist Nick Carter presided over the event, at which members of the public received special commemorative envelopes franked, met two of the photographers, and heard a variety of talks on clouds.

Annual Award. UCAR Communications was honored with the Outstanding Accomplishment Award for Education and Outreach last December. The team was cited for six international publications awards and two awards for videos, and its ClimateStock video footage, which was designated a best practice in science communication.
3.3 Office of Development and Government Affairs (ODGA)

3.3.1 Congressional Activities

Many of UCAR government affairs activities are accomplished with the extensive involvement and/or guidance of Lewis-Burke Associates (LBA) in Washington, D.C. April Burke and her staff, Joel Widder, in particular, provide advocacy strategy, agency and Hill contacts, and assistance with UCAR events held in Washington. They alert us to relevant issues concerning legislation, as well as provide us with analysis of pending bills. UCAR is an active member of the Weather Coalition, the Coalition for National Science Funding, the Council on Competitiveness, the Congressional Hazards Caucus Coalition, the Alliance for Science and Technology Research in America, and the U.S. Geological Survey Coalition.

3.3.2 Written and Oral Testimony on the President’s Budget Request

On behalf of our community UCAR provided written testimony on the President’s FY 2006 request regarding the budgets of NSF, NASA, NOAA, DOE, FAA, and the Federal Highways Administration (for surface weather research). UCAR signed onto the USGS Coalition’s testimony regarding the U.S. Geological Survey’s budget. Tim Killeen, in his role as NCAR Director and President-elect of the American Geophysical Union, provided testimony for the new House Appropriations Subcommittee on Science, State, Justice and Commerce and Related Agencies which funds NSF, NASA, and NOAA. Tim was also a witness before the House Science Committee for a hearing on NASA’s Earth Sciences program. This testimony and other information about UCAR’s advocacy activities may be found at: http://www.ucar.edu/oga/html/advocacy/index.html.
3.3.3 Hearings

The Senate Committee on Energy and Natural Resources invited Jim Hurrell, Director of NCAR’s Climate and Global Dynamics Division, to testify at a hearing on the current state of climate change scientific research and the economics of strategies to manage climate change. Jim’s testimony is available at: [http://www.ucar.edu/oga/pdf/Hurrell_Testimony_7-05.pdf](http://www.ucar.edu/oga/pdf/Hurrell_Testimony_7-05.pdf).

3.3.4 Letter Campaign

During the past year, UCAR continued its letter-writing campaign on behalf of the community to provide comment on budgets for NSF, NOAA, NASA, FAA, and DOE as well as on relevant issues of concern to the atmospheric science community. To date, I have sent or signed onto the following letters:

- Coalition for National Science Funding letter regarding Rep. Barton’s investigation targeting climate change researchers and the director of NSF regarding research results, data, funding sources, etc. The letter, signed by 30 scientific associations and institutions, is available at: [http://www.ucar.edu/oga/pdf/barton_letter_8-05.pdf](http://www.ucar.edu/oga/pdf/barton_letter_8-05.pdf).
- Acknowledgment letters to Senators Bond and Mikulski for their outspoken support for NSF and pledge to augment the FY06 request.
- Letters to members of the Senate Commerce, Science, and Transportation Committee before the confirmation hearing of the new NASA administrator, offering confirmation questions concerning NASA science.
- Acknowledgment letter to Chairman Vern Ehlers, for his continued support for science.
- Comments on HR 50, the NOAA Organic Act.
- Comments on HR 2995, the Weather Modification Research and Technology Transfer Authorization Act of 2005.

3.3.5 Action Alerts

This year to date (Sept 3), I have issued the following Action Alerts to:

- UCAR Members with Senators on the Commerce, Science, and Transportation Committee regarding the confirmation hearing for NASA Administrator, Michael Griffin, and the community’s concerns about the fate of the agency’s science programs.
- All UCAR Members to contact House members to sign a "Dear Colleague" letter organized by Congressman Vernon Ehlers to Chairman Wolf and Ranking Member Mollohan in support of increased funding for NSF in FY06.
- UCAR Members with representatives/senators on the VA-HUD Subcommittee to complete work on the FY05 budgets and support the highest levels of funding for NSF and NASA.
- UCAR Members with representatives/senators on the Commerce-Justice-State Subcommittee to support the highest levels of funding for NOAA’s FY05 budget.

As the final phase of the FY 2006 budget process kicks into high gear, additional alerts will be issued, letters sent, and meetings requested on the Hill. When appropriate, we are targeting our requests to those of you who have members on key congressional committees. **Responding to these targeted requests is important for the entire community, especially now when the budget outlook is**
tight. We thank those of you who have responded already this year and urge all of you to participate as the budget process continues.

3.3.6 Capitol Hill Briefings

In an effort to continue to spread the word about atmospheric sciences research and issues, UCAR coordinates educational briefings for Hill staffers. A briefing is being organized for September addressing climate change impacts on water resources, particularly in the southwestern United States. Discussion is under way about holding a hurricane-related briefing in late September. A UCAR-sponsored briefing was held in April that was titled, “Understanding Changes in Earth’s Temperature and Climate: The Science Behind the Hockey Stick Graphs and Model Simulations.” Panelists were Ray Bradley from the University of Massachusetts, Amherst; Tom Crowley from Duke University; and NCAR’s Caspar Ammann.

3.3.7 Visits to UCAR

In addition to quite a few from the Colorado Delegation, the following staffers visited UCAR:

- Floyd DesChamps, Senior Professional Staff Member, Senate Committee on Commerce, Science and Transportation
- Eric Loewen, Senior Professional Staff Member, Senator Chuck Hagel (interested in climate change research)
- Jonathan Black, Legislative Assistant, Senate Committee on Energy and Natural Resources
- Michelle Burkett, Minority Staff Member, House Appropriations Committee
- Mike Ringler, Majority Clerk, Science, State, Justice and Commerce Subcommittee (SSJCS) of the House Appropriations Committee
- Anne Marie Goldsmith, Majority Staff Member, SSJCS, House Appropriations Committee
- Julie Hite, Division Chief, Budget Outreach and Communication, Office of the NOAA Chief Financial Officer, Washington, D.C.
- Christopher Porter, Office of Budget; Technology and Environmental Programs Division; Department of Commerce
3.3.8 Visits to the Hill

UCAR staff and leadership meet with Hill and Executive (Office of Management and Budget and Office of Science and Technology Policy) staff and the Colorado Delegation quite regularly. Of particular note this year, visits were made with Appropriations staff to discuss the budgets for NSF, NASA (Earth Sciences in particular), and NOAA (climate change budget in particular), as well as with the House Science Committee to talk about a number of issues including NOAA’s reauthorization bill.

In May, while in Washington, D.C. for the annual spring Board of Trustees meeting, UCAR Trustees had a very good discussion over breakfast with OSTP’s Kathie Olsen and Deborah Wince-Smith, the president of the Council on Competitiveness. Since then, Dr. Olsen has left OSTP to be NSF deputy director. The following UCAR Trustees also made visits to their delegation’s offices during the May meeting to address issues of concern to the whole community: Len Pietrafesa, Rana Fine, Frank Nutter, Rosina Bierbaum, and Eugenia Kalnay.

3.3.9 Events/Meetings

As described above, UCAR played a major role in organizing the summer community meeting on the future of the weather research enterprise. UCAR also participated in the annual Coalition for National Science Funding (CNSF) exhibit and reception for Members of Congress and staff where the National Science Digital Library (NSDL) and the Digital Library for Earth System Education (DLESE) were showcased. NSDL was invited by the House Science, Technology, Engineering and Mathematics Education Caucus to make a presentation to the caucus members on September 7th.

3.3.10 Congressional Science Fellow and AMS-UCAR Summer Policy Colloquium

UCAR co-sponsors a congressional science fellowship program with the AMS. The 2005-2006 Congressional Fellow is Paul Higgins from the University of California at Berkeley. His research focuses on biological responses and feedbacks to global change such as the exchange of carbon, water, and energy between the land surface and the atmosphere.

3.3.11 Publications

UCAR produced a number of publications, including:

- **OGA Web Page.** This site, [www.ucar.edu/oga/index.html](http://www.ucar.edu/oga/index.html), includes federal budget information, testimony, news and updates, advocacy priorities, and useful links.
- **Weather Coalition Web Page.** This site, [www.weathercoalition.org](http://www.weathercoalition.org), includes recent advocacy activities and current issues of importance to the weather research and operations community.
- **Washington Updates.** These e-mails provide information on appropriations activities as well as current information on relevant bills and initiatives.
- **Science Briefs.** The Winter 2005 issue, highlighting community programs and projects, was emailed to science legislative assistants and committee staff and may be found at: [http://www.ucar.edu/oga/pdf/SB_Winter_2005.pdf](http://www.ucar.edu/oga/pdf/SB_Winter_2005.pdf). The fall issue is about to be published.
- **Improved Weather and Climate Services for the Nation: An Urgent Priority for the President and the 109th Congress.** This document was designed to provide national policy makers relevant information as they address the weather and climate programmatic and policy agenda
for the country. It was the second in a series of "transition" documents done by UCAR and the AMS shortly after the Presidential election (http://www.ucar.edu/oga/pdf/transition2005.pdf).

- **In Session with Congress: A Guide for Scientists.** This brochure has been updated and is available to anyone who communicates with Members of Congress and Staff. Copies will be available at the October meeting.

### 4.0 Finance and Administration

UCAR Finance and Administration (F&A) provides human resources support; accounting and financial management; and safety, facility, and business services for UCAR.

#### 4.1 Human Resources Support

As noted above, *Colorado Parents* magazine recently announced that UCAR had been selected as the Best Non-Profit Company for Working Families in Colorado. This is a great honor, the result of UCAR’s commitment to attracting and keeping high-quality employees. One reason cited for the award was the UCAR Childcare Center. UCAR supported the Center by purchasing the land and building with its General Fund and subsidizing the Center for the first few years until it becomes self-supporting. The Center has been open a little over a year, and enrollment is continuing to grow. Based on surveys, parents are very satisfied with the care their children are getting. Financially, the Center has done better than our projections.

As reported last year, UCAR offered a new health care option to employees for this year: a High Deductive Health Plan (HDHP) coupled with a Health Savings Account. After numerous educational meetings, 25% of our employees selected this option over more traditional health plans. The HSA allows employees to contribute up to a specified amount to a pre-tax account if they are enrolled in a high deductible insurance plan. The HSA/HDHP is expected to save money for both UCAR and its employees.

#### 4.2 Facilities and Space Planning

This has been an extremely busy year in Facilities. First, our new hangar at JeffCo Airport was completed in December and is now housing the HIAPER aircraft.

Construction began in January on the expansion and renovation of the main building on the Center Green campus. The building now houses the UCAR Conference Center and the offices and labs of the High Altitude Observatory Division and the Geophysical Turbulence Program. The Conference Center includes an auditorium that seats up to 390 people, but can also be divided into three large rooms, the largest of which can seat 175. Additionally, there are numerous breakout rooms around the building. The Center Green cafeteria has been expanded and redesigned to include more dining space. The facility was designed with visitors in mind. Informal collaboration space is located throughout the facility and in an area adjacent to the library.
The new chemistry lab, FL-0, at the Foothills Campus is under construction. We anticipate that move-in will occur in phases, with some of the individual laboratories moving in October to accommodate field project schedules. The construction and all remaining moves are scheduled for completion in December 2005. FL-0 will feature state-of-the-art laboratory facilities.

After a considerable delay, the long awaited bicycle path that will connect the Foothills Lab and Center Green campuses will be completed in December. The bicycle path will also connect with City of Boulder bike paths. Bike path construction approval was complicated by the fact that approval had to be obtained from Burlington Northern Railroad, the Colorado Department of Transportation, and the City of Boulder.

Design will begin in September on the final phase of the Mesa Lab Utilities Refurbishment project, completing the updating of Tower B. Completion is scheduled for September 2006. This will be the final activity to complete the work envisioned in our 2002 Space Strategic Plan.
4.3 Financial Management

As reported last year, UCAR selected KPMG as its new outside auditor, after using another auditing firm since the beginning of the corporation. The KPMG auditors did not have any findings or recommendations, indicating that they were unable to find anything of concern. This is a testament to UCAR’s high standards for accounting accuracy and accountability.

5.0 Significant Opportunities in Atmospheric Research and Science (SOARS)

SOARS (http://www.ucar.edu/soars) was launched in 1995 to support the national goal of “a diverse, internationally competitive, and globally engaged workforce of scientists, engineers, and well-prepared citizens.” SOARS is dedicated to increasing the number of students from historically underrepresented groups enrolled in graduate programs in the atmospheric and related sciences, with the goal of increasing ethnic diversity within the scientific community of the future.

SOARS is a multiyear undergraduate-to-graduate bridge program that is equal parts learning community, mentoring program, and research internship. At the heart of SOARS is a ten-week summer immersion program at UCAR/NCAR/UOP or the laboratories of a SOARS sponsor, where SOARS students (protégés) do research and participate in an eight-week scientific writing and communication workshop. Protégés help define their individual project, conduct research, write a formal research paper, and present their results at a colloquium.

As part of the summer research experience, protégés are supported by a strong, formal mentoring structure. All SOARS protégés have a science mentor who guides their research and a writing mentor.
to help them improve their scientific communication skills. First-year protégés also have a community mentor to help them navigate scientific and local culture, and a peer mentor—a protégé who has participated in the program in previous summers—to model effective scientific and professional practices.

During the summer, a strong and supportive community develops from the critical mass of diverse protégés living together, working on related scientific projects, and collaborating to develop and refine their leadership, professional, and communication skills. This community is an important component of SOARS’ long-term success. In the summer of 2005, this learning community was initiated with a geocaching orienting activity, in which teams of protégés used GPS receivers to locate hidden “caches” or collections of objects. The geocaching events served as laboratories in which to introduce, practice, and reflect on communication and facilitation skills.

5.1 2005 Summer Highlights

Twenty-one protégés from across the United States and Puerto Rico completed the 2005 summer program. Thirteen protégés returned for their second, third, or fourth SOARS summer; eight were brand new to SOARS. One of the new SOARS protégés participated through our partner program Research Experience for Students in Solid Earth Science (RESESS), which seeks to broaden participation in geological sciences. Forty-eight UCAR/NCAR/UOP employees participated as SOARS mentors, along with ten scientists from outside UCAR.

A complete listing of summer 2005 protégés, mentors, and research topics is available online at: http://www.ucar.edu/soars/research/researchtopics2005.html.
5.2 1996-2005 Program Results

Since the 1996 inaugural summer, 98 protégés have participated in SOARS. Participants’ ethnicity and gender are outlined in Table 1, with the national and atmospheric science graduate school demographics included for comparison.

<table>
<thead>
<tr>
<th>Ethnicity and gender</th>
<th>Number of Protégés</th>
<th>Percent of Protégé Population</th>
<th>18-24 Year Olds in 2000 US Census</th>
<th>In Atmospheric Science Graduate Programs, 1994-2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American or Black</td>
<td>39</td>
<td>40%</td>
<td>14%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>34</td>
<td>35%</td>
<td>17%</td>
<td>1.6%</td>
</tr>
<tr>
<td>American Indian, Alaskan Native, or Native Hawaiian</td>
<td>13</td>
<td>13%</td>
<td>0.9%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Asian American</td>
<td>6</td>
<td>6%</td>
<td>4.3%</td>
<td>7.1%</td>
</tr>
<tr>
<td>White</td>
<td>6</td>
<td>6%</td>
<td>62%</td>
<td>85%</td>
</tr>
<tr>
<td>Female</td>
<td>59</td>
<td>60%</td>
<td>48.8%</td>
<td>33.6%</td>
</tr>
<tr>
<td>Male</td>
<td>39</td>
<td>40%</td>
<td>51.2%</td>
<td>66.4%</td>
</tr>
</tbody>
</table>

As of fall 2005, 32 protégés have completed their master's degrees, and three have successfully defended their Ph.D.s (in Computational and Applied Mathematics, Environmental Engineering, and Atmospheric Science). Sixty-three protégés have completed bachelor's degrees in an atmospheric or related science, and two have completed associate's degrees and are now enrolled with a science major at a four-year research university. Of the 27 protégés who have entered the workforce, 23 are currently in the professional scientific or engineering workforce. Overall, SOARS has a retention rate of 82%.

During the past ten years, SOARS protégés have presented more than 113 posters and 65 oral papers at regional, national, and international scientific conferences, with several receiving awards. Nine summer research projects have resulted in protégé-coauthored papers published in peer-reviewed journals. Three protégés have earned NSF graduate fellowships, and three have earned AMS graduate fellowships.

A summary of protégé contributions to the scientific community, with links to complete lists of publications, posters, and peer-reviewed publications, is available at: [http://www.ucar.edu/soars/4Factsx.html](http://www.ucar.edu/soars/4Factsx.html).
5.3 Current Funding and Future Directions

In 2005, NOAA’s Office of Global Programs, NOAA’s National Ocean Service, and the University of Colorado’s Cooperative Institute for Research in Environmental Sciences (CIRES) joined NSF and UCAR in continuing their sponsorship of SOARS. The Department of Energy declined to continue their support, citing declining budgets and investment in their own program, the Global Change Education Program Summer Undergraduate Experience, based on the SOARS model. New sources of funding for 2005 included NCAR’s Earth Observing Lab (EOL) and NCAR’s Biogeosciences Initiative. These two sponsors pioneered a new role for SOARS: partnering with NCAR divisions or projects to support their long-term workforce needs or to provide an educational component to competitive grants.

For 2006, CIRES funding will continue. SOARS will seek to renew NSF support for 12 protégé positions in FY2006, and also apply for competitive funding from NOAA in an effort to consolidate and institutionalize NOAA’s commitment to SOARS. These proposals provide an opportunity for SOARS to engage in discussions with UCAR universities about expanding their collaboration with the program.

This year SOARS partnered with the Research Experience for Students in Solid Earth Science (RESESS) to adapt the SOARS model for the solid Earth community. The three-year, NSF-funded project uses a “mentor the mentoring program” model; RESESS protégés will participate in SOARS
activities over the next three years as the RESESS program grows. At the end of three years, RESESS will be a completely independent program with between eight and 13 participants.

SOARS is currently the subject of an NSF-funded study being performed by the Ethnography and Evaluation Research Center to Advance Research and Teaching in the Social Sciences, University of Colorado at Boulder. This study will be completed and a report available in fall of 2005. Preliminary results are promising, and data from the study should strengthen future SOARS proposals and guide efforts to expand the program’s impact.

6.0 UCAR Foundation and Technology Commercialization

Peak Weather Resources, formed in June of 2003, continues to be the primary focus of the UCAR Foundation’s technology commercialization activities.

6.1 Peak Weather Resources, Inc.

Peak’s interim CEO, former Peak Board Director, Mark Flolid, took the reins at the beginning of 2005. Mr. Flolid has been successful at reducing Peak’s expenses while maintaining support for ongoing commitments, such as WSDM Technologies LLC and the DICast Forecast Server, while focusing selectively on a promising new business development activity called the Advanced Radar Corporation.

6.2 WSDM Technologies LLC

Governing leadership of the WSDM (Weather Supported Decision Making) Technologies LLC has undergone two significant changes since the last report. In April, CLH, one of three LLC partners, acquired Weather Decision Technologies’ (WDT) interest in WSDM Technologies, thereby consolidating a centralized communications and data serving capability with its sales, marketing, deployment, and support functions. In July of this year, CLH was acquired by The Vaisala Group, a Finnish corporation and global market provider of environmental measuring systems and solutions.

The WSDM System, installed at the Denver International Airport since the late nineties, will be installed this fall at the Minneapolis-St. Paul Airport. Every major hub airport throughout the world that experiences either winter snow and icing conditions or severe thunderstorm activity is a candidate for the WSDM System, which has been approved for funding in the U.S. under the FAA Airport Improvement Program (AIP).

6.3 DICast Forecast Server

Peak is working with new prospective partners for use of its DICast forecasting technology. Such commercial providers as WeatherBank, Weathernews, Weatherbug, WDT, and Vaisala have shown interest in the capabilities of this seasoned, automated forecasting system.
6.4 Advanced Radar Corporation

The formation of the Advanced Radar Corporation will enable the rapid deployment of the HIQ Radar Processor Upgrade for many existing radar systems deployed around the globe. The HIQ PC processor card is meant to provide an economical solution for obtaining research quality radar data from existing commercial radars, particularly those in foreign countries. When upgraded, these turnkey, multi-parameter radar systems include a connection to the TITAN display software developed at NCAR’s Research Applications Laboratory. Four upgrade proposals have been submitted to Saudi Arabia, Indonesia, Vietnam, and Greece, amounting to nearly $6 million in prospective upgrade activities.

6.5 Intellectual Property Activity

In fiscal year 2005, six new intellectual property disclosures were received. Five patents or continuation patents were issued, including:

(1) The Atmospheric Data Measurement System – (f.k.a.) Personal Digital Assistant for Logging Data from Tethered Balloon patent from NCAR’s Atmospheric Chemistry Division (ACD);
(2) An Aerial Sampler System – (f.k.a.) A Jet Aircraft Sampler for Atmospheric Trace Gases (Including Water Vapor) patent from the UCAR Joint Office for Science Support (JOSS);
(3) Method of Compensating for Atmospheric Effect while Using Near Horizon Radar Utilizing a Doppler Signal (a joint effort between Georgia Tech and UCAR);
(4) Method of Compensating for Atmospheric Effect while Using Near Horizon Radar (a joint effort between Georgia Tech and UCAR); and
(5) The Web Weather for Kids patent from the UCAR Office of Programs. One new patent application was filed in FY2005, and nine previously filed applications remain pending. Four trademark applications were issued in FY2005.

Information about these and other UCAR technologies that are available for licensing can be found on the UCAR Foundation’s website: http://www.ucar.edu/research/techtransfer.

- END OF REPORT -