MEMORANDUM

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

FROM: Richard A. Anthes

SUBJECT: President's Report for October 2003 Meetings of Board of Trustees, UCAR Members' Representatives, University Relations Committee and Academic Affiliates

Ladies and Gentlemen:

This report includes some of the highlights of UCAR's corporate, education and outreach, and licensing and commercialization activities since the October 2002 meetings. Its been another busy and productive year. NCAR made significant progress on the acquisition and upgrading of two major community facilities – HIAPER (High-Performance Instrumented Airborne Platform for Environmental Research) and ARCS (Advanced Research Computing System), which now has a peak performance of about nine teraflops and will be upgraded to 11 teraflops by December to enable NCAR to contribute simulations by the Community Climate System Model (http://www.cccm.ucar.edu/) to the upcoming IPCC (Intergovernmental Panel on Climate Change) study. NCAR and UCAR received excellent reviews of our proposal for renewal of the next five-year cooperative agreement from the National Science Foundation (NSF) and the UCAR Members’ Scientific Programs Evaluation Committee (SPEC) in January, and the National Science Board approved renewal of the cooperative agreement in May. A major field program, BAMEX (Bow Echo and Mesoscale Convective Vortex Experiment) was successfully carried out from May 20 to June 6, 2003 (http://www.atd.ucar.edu/dir_off/projects/2003/BAMEX.html). We made good progress in refurbishing the Mesa Lab and occupying the new Center Green campus, both integral parts of implementing the UCAR strategic space plan. We also devoted increased emphasis on leadership development activities through a summer undergraduate leadership workshop, a summer junior faculty workshop, and an internal leadership academy for 24 diverse UCAR scientists and staff.

This report (and Tim Killeen’s and Jack Fellows’ reports for this meeting), contains additional details on the above items and many other examples of progress in the areas of science, facilities, and service to the universities.

NCAR report: http://www.ucar.edu/governance/meetings/oct03/ncar_report.pdf
UOP report: http://www.ucar.edu/governance/meetings/oct03/uop_report.pdf
Rick Anthes, Gerry Albright, Tim Killeen, Jeff Stith and John Pereira break ground for the new hangar at Jeffco Airport on August 21, 2003. The hangar, which will double the Research Aviation Facility’s capacity at Jeffco will have enough space to house the NCAR C-130 (seen in background), HIAPER and the NRL P-3. The HIAPER project is on schedule and budget; the aircraft is being modified at present and is scheduled for delivery to NCAR in October 2004.
NCAR ATD's ZEB display shows two aircraft tracks overlain on satellite and composite radar images during BAMEX on 24 May, 2003.

1.0 UCAR's Corporate Activities

1.1 Graduate student applications and “Recruiting For The Discipline”

As part of UCAR’s effort to assist universities with their educational efforts as well as with their research activities (see also [http://www.ucar.edu/student_recruiting/](http://www.ucar.edu/student_recruiting/)) we conducted our third enrollment survey of UCAR member institutions in March 2003. This survey added data for the academic years 2001-2002 and 2002-2003 to earlier surveys, which covered years 1995-1996 to 2000-2001. UCAR Trustee Gabor Vali and I summarized the survey update in the summer 2003 issue of the UCAR Quarterly: [http://www.ucar.edu/communications/quarterly/summer03/survey.html](http://www.ucar.edu/communications/quarterly/summer03/survey.html). As shown by the following graph, the downward trend in the average number of applications to graduate schools leveled off in 2001 and 2002, and the number of applications showed a slight upturn in 2003, reversing more than five years of decline.
Trends in number of applications for atmospheric and related science programs at UCAR member institutions. The graph includes the overall sample (full line), four groups of schools sorted by size (broken lines), and the 14 institutions with complete application records over the eight years. The numbers included in the legend show the yearly average numbers of applications for that group.

Additional details on the survey update may be found at:
http://www-das.uwyo.edu/~vali/grad_stud/surv03.html.

1.2 UCAR proposal for the next Cooperative Agreement

In September 2002 UCAR submitted its proposal to NSF to manage and operate NCAR for the next five years: UCAR Management of NCAR 2003-2008: A Vision for Leadership and Service in the Atmospheric and Related Sciences. NSF sent the proposal out for anonymous peer review and areas conducted a panel review on site December 17-19, 2002. The UCAR SPEC co-chairs, Bob Duce and Franco Einaudi, participated in the panel review. The NSF review process was comprehensive and thorough, and it resulted in a number of findings and constructive recommendations. We are pleased by the positive nature of the review and are working on implementing the recommendations, which challenge us and our primary partners—the NSF, other federal funding agencies, and the university community—to build upon the successful NCAR and UCAR programs for the next five years.
1.3 Demographics of NCAR scientific staff and increasing diversity

Like many institutions, NCAR has demographic challenges related to an aging scientific staff and diversity. In an effort to address both of these issues, UCAR and NCAR have made recruiting junior scientists an institutional priority. For the second year we made diversity an explicit goal of center-wide recruitment for Scientist Is. The effort is paying off as indicated in the demographics figure below. We are also making progress in other areas. For example, in 2003 six out of ten of the Advanced Study Program (ASP) postdoctoral fellowships were awarded to women and now almost half of the ASP post docs are women.
1.4 Legislation affecting the UCAR community

UCAR monitors and provides some input into pending legislation of relevance to the university community.

**NOAA Authorization.** S. 1401, the National Oceanic and Atmospheric Administration Reauthorization Act of 2003, authorizes appropriations FY04-08 for NOAA and includes a section of particular interest to the community with regard to establishing an external research program within NOAA’s Office of Oceanic and Atmospheric Research (OAR). It authorizes funding levels for this external program of $25 million in FY05, with $5 million increments through FY08. It tasks the NOAA Administrator to provide a management plan for the program “…the purpose of which shall be to provide funding for merit-based, peer-reviewed research grants and contracts to public and private organizations that will improve the efficiency and coverage of the nation’s operational observing system and accelerate the direct transfer of research results into operational programs at the National Oceanic and Atmospheric Administration providing operational weather monitoring, analysis, and forecasting services to the Nation. The management plan shall include a strategy to commit the Administration to spending 50 percent of new research funds (exclusive of adjustments to base) within the external community via merit-based, peer-reviewed processes.” Status of bill: Passed Senate Committee on Commerce, Science and Transportation. No comparable House bill has been introduced yet. It is unlikely this bill will be enacted into law this calendar year; however, it will most likely be considered next year.

**DOE Office of Science Funding.** S. 915, the Energy and Science Research Investment Act of 2003 authorizes appropriations for FY 2004-2008 for the Department of Energy Office of Science to ensure that the United States is the world leader in key scientific fields by restoring a healthy balance of science funding, to ensure maximum use of the national user facilities, and to secure the Nation's supply of scientists for the 21st century, and for other purposes. Status: Referred to the Senate Committee on Energy and Natural Resources. The House introduced a comparable bill, H.R. 34, the Energy and Science Research Investment Act of 2003; it has been referred to the House Science Committee’s Subcommittee on Energy. This bill will most likely be folded into the omnibus energy bill (below) and will not move forward as a “stand alone” bill.

**Climate Change.** A number of bills have been introduced this year related to global climate change. It is unlikely these bills will move forward this year, but they may be taken up next year when the 108th Congress reconvenes in January.

S.17, the Global Climate Security Act of 2003, sponsored by Senator Daschle calls for the federal government to initiate responsible actions that will reduce the risks from global warming and climate change to the economy, the environment, quality of life, and for other purposes. Status of bill: Referred to the Senate Committee on Environment and Public Works.

S. 139, the Climate Stewardship Act of 2003, sponsored by Senators McCain and Lieberman, provides a program of scientific research on abrupt climate change. The purposes are: a) to accelerate the reduction of greenhouse gas emissions in the United States by establishing a market-driven system of greenhouse gas tradeable allowances that could be used interchangeably with passenger vehicle fuel economy standard credits, b) to limit greenhouse gas emissions in the United States and reduce dependence upon foreign oil, and c) to ensure benefits to consumers from the trading in such allowances. Status of bill: Referred to the Senate Committee on Environment and Public Works.
S. 1164, the Abrupt Climate Change Research Act of 2003, was introduced by Senator Collins and provides 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.

H.R. 1578, the Global Change Research and Data Management Act, was introduced by Mark Udall, to promote and coordinate global change research as well as for other purposes. Status of bill: Failed in Committee, but Mr. Boehlert, Chairman of the House Committee on Science, may introduce his own version of the bill.

H.R. 6, introduced by W.J. Tauzin, and S. 14, introduced by Sen. Pete Domenici, the Energy Policy Acts of 2003, have a number of climate-related provisions, including establishing the Office of National Climate Change Policy within the Executive Office of the President, the Office of Climate Change Technology within the DOE, the development of a national climate change strategy, and instructing the Secretary of Energy to publish estimated annual net greenhouse gas emissions from all federally owned, leased, or operated facilities and emission sources. Status of bills: House and Senate conferees are reconciling their differences; however, enactment is not definitive, as there are a number of controversial items that have yet to be resolved (such as drilling in the arctic and the climate change provisions).

**Student Visa Regulations.** The research community, the Administration, and Congress continue to grapple with the implementation of new regulations and systems affecting student and researcher visas. While Congress has held numerous hearings raising its concern over some of the inconsistencies and delays in visa processing, the full implementation of SEVIS (Student Exchange Visitor Information System) as well as embassy security regulations, mandatory interview requirements, and other problematic policies have proceeded expeditiously by the Administration. In the coming year, the research community will be faced with further critical stages in the visa process as it adapts to these changes.

**Data Quality Act.** Inserted in the FY 2001 Omnibus Consolidated Appropriations Act was a provision allowing people to challenge the quality of information disseminated by Federal agencies. In August, the Competitive Enterprise Institute filed the first lawsuit under the Data Quality Act against the White House Office of Science and Technology. The suit challenges the “National Assessment of the Potential Consequences of Climate Variability and Change,” and seeks to prevent its dissemination to the public. We will pay close attention to the outcome of this case, as it is extremely important to all federally funded researchers.

**The National Weather Service Partnership with Academia and the Private Sector.** Over the last several years, there have been repeated congressional attempts to restrict the National Weather Service (NWS) from providing any service or product that a private sector company might be able to provide. In early 2003 the National Research Council’s Committee on Partnerships in Weather and Climate Services with John Armstrong (ret. IBM) and me as co-chairs released our report, *Fair Weather-Effective Partnerships in Weather and Climate Services* ([http://www.nap.edu/books/0309087465/html/](http://www.nap.edu/books/0309087465/html/)). Our report found that the overall partnership involving the government, private sector and academia was working well in general, although there are some sources of tension. Among its recommendations were that the AMS should consider establishing a
regular forum at which the three partners could discuss their views and issues in order to minimize conflicts among the sectors.

2.0 Education and Outreach (EO) Activities

In partnership with the university community, UCAR promotes scientific literacy and advances all levels of education and training in subjects related to Earth’s atmosphere. Activities are guided by the UCAR Education and Outreach Strategic Plan adopted in June 2001 (http://www.ucar.edu/educ_outreach/stratplan.html). Cornerstones of the education and outreach program include a growing web presence, workshops for teachers and undergraduates, informal science events, exhibits, and tours of the Mesa Lab for K-12 students, the public, as well as visiting scientists and dignitaries. Major accomplishments this year are the unveiling of a new Mesa Lab exhibit on global and climate change, the installation of an audio tour with English and Spanish versions for both adults and children, and the addition of a new workshop for teachers addressing modeling in the geosciences. Several teachers are currently collaborating with us on development of educational resources that translate NCAR’s science to K-12 classrooms. We initiated a project to document the modification of the HIAPER aircraft in anticipation of a future education and outreach program that will bring HIAPER to the public, students, and teachers through PBS documentaries, public events, a website, and associated curriculum materials.

2.1 NCAR Undergraduate Leadership Workshop (www.ucar.edu/educ_outreach/ulw/)

On June 17-21, 2003 EO hosted the second NCAR Undergraduate Leadership Workshop with the purpose of informing undergraduates in geoscience majors about exciting opportunities for graduate study, research, and careers in the atmospheric and related sciences. The five-day program establishes informal dialogue between students and research scientists as they explore laboratories, instrumentation, and computing facilities that support studies on weather, climate, solar physics, the Sun-Earth system, and the impacts of weather and climate on societies around the
Students are presented with a model for leadership at the beginning of the workshop and are invited to reflect on how their perspective on personal and professional leadership evolves as they interact with leaders in the sciences. Scientists are asked to share personal anecdotes with the students that highlight the importance of developing personal and professional leadership skills necessary to succeed in and support the atmospheric sciences in the coming decades.

2.2 Professional development workshops for educators

EO disseminates UCAR’s role in support of science, mathematics, engineering, and technology education in the nation’s schools by bringing a select and diverse group of K-12 educators to Boulder to learn about our scientific research and educational resources developed for classroom use. Attendance requires a commitment from teachers that they will each train a minimum of 40 other teachers to integrate this information into their local curriculum.

Second NCAR Geoscience Education Workshop (http://www.ucar.edu/educ_outreach/gew/). The Global and Climate Change Geoscience Education Workshop was held on July 21 to August 1, 2003, enrolling 19 master science teachers of grades 6 through 12 from across the nation. In addition to lectures from scientists on climate topics, teachers explored relevant computer software, web-based resources, and curriculum and inquiry-based activities. They also participated in field trips, were trained on numerous hands-on activities and demonstrations of fundamental principles, and engaged in dialogue about how climate change science can be brought into the classroom.

Modeling in the Geosciences Workshop (http://www.ucar.edu/educ_outreach/gew/). Between June 16 to 27, EO presented a workshop on modeling in the geosciences. Teachers selected from a national applicant pool spent two weeks with scientists from the UCAR community, GIS and modeling experts, and EO staff to explore the context of modeling in the geosciences.

Teachers used STELLA software to build models and develop applications of these and other tools to enhance classroom practice and student achievement in the sciences, technology, and mathematics. They will provide training for colleagues in their home districts and reconvene in
Atlanta in April 2004 at the National Science Teachers Association meeting to present modeling resources they have developed for implementation in their classrooms.

2.3 Informal science education and public programs

NCAR’s public education programs aim to increase the scientific literacy of the nation through numerous efforts, some of which reach teachers and students who visit the Mesa Laboratory for a tour or partake in other EO resources online. A primary goal is to enhance understanding among all ages about the atmosphere as part of the Earth system, the impact of weather and climate on society, and the application of scientific knowledge to decision making about careers, lifestyles, and public policies. In addition to coordinating special programs and events listed below, the Public Visitor and Exhibits Programs frequently recruit NCAR scientists to demonstrate scientific principles underlying the atmospheric sciences. An estimated 80,000 visitors a year come to the NCAR Mesa Lab to enjoy such activities and the Mesa Lab’s science center.

2.3.1 Events and exhibits

Super Science Saturday. In October NCAR holds its annual public science event, Super Science Saturday, an all-day event for participants of all ages featuring special science presentations, demonstrations, and workshops, some of which are designed to facilitate student participation in local science fairs. The theme of the 2004 event is “High Flying Science” in recognition of the Centennial of Flight.

Science Exhibits. EO has developed a five-year plan for the Mesa Lab Exhibits that includes assessment of content, the age and condition of present exhibits, and recommendations for exhibit replacement, enhancement, and development. The media-enhanced Climate Discovery exhibit communicates the connections between the Sun and the Earth, the distinction between climate and weather, a global view of climate in the news, the dynamic processes that moderate climate in the Earth system, our planet’s climate history, and predictions for its future climate. The exhibit includes colorful wall murals, graphic text panels, artifacts, interactive games, and large video screens presenting Earth and Space Weather Bulletins from the American Museum of Natural History. In addition to the new exhibit, the solar eclipse mural dominating the south wall of the Mesa Lab lobby and the atmospheric optics photography display have been updated.

Art Exhibits. The community art program was temporarily interrupted this year due to closure of the Mesa Lab for refurbishment. Art exhibitions by local artists may now be viewed on the walls of the NCAR cafeteria, since the balcony gallery is now occupied by the new Climate Discovery exhibit.
2.3.2 Education and tour

The Public Visitor Program (PVP) provided tours during October and November 2002 before suspending these activities due to closure of the Mesa Lab. During the closure, PVP staff focused their attention on developing content-based resources. Chief among these new resources are curricular materials for our continuing transition to an inquiry-based learning format for visiting school groups. Specific examples now completed include a series of topical weather modules and web-based educational supplements (on weather education, climate change, the Sun and space weather, and general science) that are compatible with state and national science education content standards. These new resources are being used in the PVP classroom and are distributed on the web and to visitors.

The other significant resource developed during the Mesa Lab closure is an audio tour program for visitors to NCAR’s Mesa Lab. We have now implemented two audio tours—one for adults, the other for young children, each with approximately a half-hour of programming in English and Spanish. Drawing on scientists’ recorded comments, as well as information from guided tours, these narratives make available access to full and accurate UCAR information for any visitor at almost any time during normal business hours. Our new audio tour represents the first such recorded information program we know of at a national science laboratory. Consultants representing those with vision and hearing impairments, and including native Spanish speakers, assisted PVP with the scripts to enhance the accessibility of UCAR/NCAR resources, programs, and public spaces to widely diverse audiences.

2.4 Web-based outreach

*Windows to the Universe.* UCAR science is increasingly highlighted through content developed and implemented within the award-winning *Windows to the Universe* website ([http://www.windows.ucar.edu](http://www.windows.ucar.edu)), which reaches over 400,000 users per month (over 4 million users per year) and is a prime educational resource for educators and students internationally. Major emphasis this year has been placed on expanding the content on Earth system science, space weather, space missions and technology, and translation of the website into Spanish. Systematic procedures have been developed for updating time-dependent site content, improving page layout, revising and making the format uniform for curriculum activities on the site, continuing development of metadata supporting digital libraries, and broadening space weather content and resources that support the Boston University Center for Integrated Space Weather Modeling and the University of Michigan Center for Space Environment Modeling.

*NCAR and UCAR Education and Outreach Web Presence.* We have made significant progress in developing a much more advanced web-based information introduction to NCAR and UCAR and demonstrate ways NCAR and UCAR serve the community. Content is being developed to appropriately meet the needs of students, teachers, and the general public. Please see:

**Web Weather for Kids.** First unveiled in 2000 and expanded in the past two years with support from the National Science Foundation’s Geoscience Education Program and Friends of UCAR fund, the award-winning Web Weather for Kids ([http://www.ucar.edu/educ_outreach/webweather/](http://www.ucar.edu/educ_outreach/webweather/)) is being incorporated into the NCAR EO website. This year’s enhancement to the website include an international online weather forecasting contest and the translation of the contest, the “Ingredients of Weather,” “Clouds,” and “Thunderstorms and Tornadoes” sections into Spanish.

### 3.0 Corporate Affairs

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

#### 3.1 Governance activities

The UCAR Governance office plans and manages the activities, responsibilities, and requirements of the UCAR Board of Trustees and Members and their respective governance committees. UCAR governance activities since the October 2002 meeting include the following:

**The Board of Trustees.** (Leo Donner, Chairman) The Board held three regular meetings over the past year: October 2002 and February 2003 meetings in Boulder and the May 2003 meeting in Washington D.C. For further information on these meetings, please see the Board minutes at: [http://www.ucar.edu/governance/bot/bot_minutes.html](http://www.ucar.edu/governance/bot/bot_minutes.html).

In February, the Board welcomed new Trustees elected by the Members last October: Eric Barron (Pennsylvania State University), Len Pietrafesa (North Carolina State University), and Lynne Talley (Scripps Institution of Oceanography). Mary Jo Richardson (Texas A&M) was elected for a second three-year term, and Barbara Feiner (Washington University), appointed by the Board in the summer to fill the position of Treasurer after the resignation of Patricia Woodworth, was elected to finish out the remaining one year of Woodworth’s term.
Leo Donner will report in more detail about the activities of the Board during the meeting.

*University Relations Committee.* (Eric Betterton, University of Arizona, Chairman) The spring meeting of the Committee was held at Stanford University. Steve Monismith and the Department of Civil and Environmental Engineering most graciously hosted the committee and set an open tone for two days of very interesting discussions on many topics including the current state of university funding, UCAR opportunities and future directions for enhanced interactions with the universities, how to teach new observational and other technologies, and planning the 2003 Members’ Meeting—as well as other topics.

The URC standing subcommittee, tasked with reviewing NCAR and UOP non-NSF proposals for university involvement and competition issues, also reported to the Committee during the April meeting. They determined that the proposals for the past six months have met the established guidelines. Eric Betterton 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/meetings/oct03/urc_report.html](http://www.ucar.edu/governance/meetings/oct03/urc_report.html).

For further information on the URC, the Committee website can be found at: [http://www.ucar.edu/governance/committees/urc/index.html](http://www.ucar.edu/governance/committees/urc/index.html).

*The Membership Committee:* (Arthur Few, Rice University, Chairman) The committee met in Boulder in June to consider applications for renewing Memberships.

The Committee's report can be found at: [http://www.ucar.edu/governance/meetings/oct03/membership_committee/index.html](http://www.ucar.edu/governance/meetings/oct03/membership_committee/index.html).

*The Members’ Nominating Committee.* (Mary Jo Richardson, Texas A&M, Chairwoman) 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.

Last year at the Members’ Meeting, the Members voted to change the UCAR by-laws to allow three more Trustee-at-Large positions added to the Board over a three-year period. This year the Nominating Committee is honored to commend for your consideration the first of these nominations: Frank Nutter, President of the Reinsurance Association of America.

The Nominating Committee Report can be found at: [http://www.ucar.edu/governance/meetings/oct03/nominating_committee/index.html](http://www.ucar.edu/governance/meetings/oct03/nominating_committee/index.html).

*The Scientific Programs Evaluation Committee (SPEC).* (Robert Duce, Texas A&M, Chairman) The SPEC is a committee appointed by the UCAR Members to observe the NSF reviews of NCAR programs, the UCAR and NCAR management review, and the review of the UCAR proposal to NSF to manage NCAR. This past December SPEC Chairman Duce and Franco Einaudi (NASA) participated in the site visit by the NSF panel convened in Boulder to review UCAR’s proposal to renew the cooperative agreement to manage NCAR for the next five years.
This successful review of our proposal to NSF marked the close of three years of intensive review by the NSF and the community. I want to thank the SPEC and the other panel observers for the time and effort they dedicated to UCAR.

Bob Duce will report in more detail at the Meeting.

3.2 Communications

*Highlights*. For the fourth time in a row, *UCAR Highlights* has garnered international communications awards. The biennial compilation of achievements at NCAR and UCAR, in glossy magazine format, walked off with top honors for both design and content at the Rocky Mountain regional competition of the Society for Technical Communication, the first time that the same publication has ever won the top prize in both categories. *Highlights* went on to win an international first place for design and third place for content. It has won international first place honors in the past for *UCAR at 40* (the 2000 variant of *Highlights*), and the 1996 and 1998 issues of *Highlights*. The publication can be obtained from UCAR Communications and viewed on the web at: [http://www.ucar.edu/communications/highlights/2002/](http://www.ucar.edu/communications/highlights/2002/) or in PDF format at: [http://www.ucar.edu/communications/highlights/2002/index.html](http://www.ucar.edu/communications/highlights/2002/index.html).

National Association of Science Writers Visit. The National Association of Science Writers, the major professional association of science reporters, paid an all-day visit to NCAR in conjunction with their annual meeting in February 2003. Approximately 70 journalists toured RAF, visited SCD computing facilities, and received briefings on field campaigns, climate research, and turbulence studies. Attendees represented the Los Angeles Times, U.S. News and World Report, UPI, National Public Radio, and numerous other influential media outlets.

BAMEX Media Day. UCAR Communications mounted a media day during the first week of the Bow Echo and Mesoscale Convective Vortex Experiment (BAMEX). Reporters from midwestern television stations and major newspapers attended a press briefing and were given demonstrations of the aircraft and ground equipment. UCAR and NSF shared the costs of video footage and interviews from the experiment for a permanent archive.

Archives. The Archives (formerly affiliated with the NCAR Library) joined UCAR Communications this past year. The staff has begun an instrument collection to document design, fabrication and deployment of instrumentation. They continue to conduct oral history interviews with atmospheric scientists. The Archives is also working with the University of Colorado to increase access to Walt Roberts' papers through a future joint project to digitize important segments of the collection.
3.3 Office of Development and Government Affairs (ODGA)

Congressional Activities. Many UCAR government affairs activities are accomplished with the extensive involvement and/or guidance of Lewis-Burke Associates, LLC 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 also an active member of ASTRA (Alliance for Science and Technology Research in America), the Natural Hazards Caucus Work Group, and the Coalition for National Science Funding. This year, we were instrumental in establishing the Weather Coalition, a group of 27 private sector companies, universities, and associations working to advocate for enhanced weather research capacity in the U.S. To keep the community informed about congressional activities, we continued to send the e-mail, Washington Updates, and maintain the Government Affairs website at: http://www.ucar.edu/oga/index.html.

Written Testimonies. On behalf of UCAR, I provided written testimonies on the President’s FY 2004 request regarding the budgets of NSF, NASA, NOAA, DOE, FAA, and the USGS. These can be found on the web at: http://www.ucar.edu/oga/advocacy_activities/testimony.html. In response to a request from Senator John McCain, I provided comments, for the record, on the state of climate change research. Subsequently, I have agreed to testify in a hearing tentatively scheduled for late September before the Senate Committee on Commerce, Science and Transportation chaired by Senator McCain.

Letter Campaigns. During the past year, we continued letter-writing campaigns on behalf of the community to support/provide comment on budgets for NSF, NOAA, NASA, FAA, and DOE as well as on relevant issues of concern to the atmospheric science community. A special effort was made regarding NOAA’s FY04 appropriations. We also provided comments to NOAA Administrator, Admiral Lautenbacher, on the NOAA strategic plan and remarked specifically on including wording that focuses on committing 50 percent of new funds to external grants and contracts.

Action Alerts. So far this year, we have issued the following Action Alerts:

- All UCAR members were asked to contact delegations to complete the FY03 spending bills.
- Arizona UCAR members were asked to urge Senator Kyl to lift his “stop passage” of the bill reauthorizing NSF, which includes language to double the agency’s budget in five years.
- All UCAR members were asked to contact House members to sign a "Dear Colleague" letter in support of funding NSF at the FY04 authorized level of $6.39 billion.
• All UCAR members were asked to urge Senators to cosponsor the "Energy and Science Research Investment Act of 2003."
• Specific UCAR members were asked to urge Commerce, Justice, and State appropriators to reinstate FY04 funding for the NOAA Profiler Network.
• All UCAR members were asked to urge Senators to contact the Senate VA-HUD-IA Appropriations Subcommittee in support of increased FY04 funding for NSF.
• Specific UCAR members were asked to urge Senate Commerce, Justice, and State appropriators to support the President’s request for NOAA, calling particular attention to the Climate and Global Change Program.

As you can see, when it is appropriate, we are targeting our requests to those of you who have members on key congressional committees. We thank those of you who have responded already this year and urge all of you to participate in this process, which is important in increasing resources to the community and strengthening the nation’s operational and research programs in atmospheric sciences.

Capitol Hill Briefings. In an effort to continue to spread the word about atmospheric sciences research and issues, UCAR coordinates Hill briefings for staffers. Last fall and this spring, UCAR and AMS sponsored the following briefings, each of which were attended by 50-70 congressional staffers:

• “Increasing Diversity in the Sciences: What Works!”
  Don Thompson (NSF), Everette Joseph (Howard University), Jon Cortinas (University of Oklahoma and National Severe Storms Laboratory), Judith Vergun (Oregon State University and University of Hawaii), and Tom Windham (UCAR SOARS Program).
• “What’s with the Weather? And What’s with the Climate? Weather and Climate Models, and Regional Impacts in the 21st Century.”
  Eric Barron (Pennsylvania State University), Kelvin Droegemeier (University of Oklahoma), and Jerry Meehl (NCAR).
• “Perfecting Weather and Climate Forecasts: The Grand Challenge”
  Rick Anthes (UCAR), and Ron McPherson (AMS).

Visits to UCAR: We hosted visits to UCAR for: David Trinkle, NSF Examiner, Office of Management and Budget; Allen Cutler, Professional Staff Member, Senate Appropriations Subcommittee on VA-HUD Subcommittee; Curt Suplee, Director, Office of Legislative and Public Affairs, NSF; Olwen Huxley and Amy Carroll, House Science Committee; Ken LaSala and Chan Lieu, Senate Committee on Commerce, Science and Transportation; Jennifer Barrett, Congressman Mark Udall’s Office; NASULGC Council on Government Affairs; Margaret Cozzens, Vice President and Chief Academic Officer, Colorado Institute of Technology; Chip Groat, Director, U.S. Geological Survey; Frank Cushing, VA, HUD and Independent Agencies Subcommittee, House Committee on Appropriations.
Visits to the Hill: UCAR, working with Lewis-Burke, was involved in arranging and making a number of congressional, Administration, and agency visits. Visit topics included FY04 appropriations, the FY05 budget, the NOAA authorization bill, the transportation authorization bill, national security, computing capacity for climate modeling, climate research, THORPEX, the Profiler Network, NOAA’s Climate and Global Change Program, and the Collaborations Fund. We targeted the following offices: House and Senate Science Committees; House and Senate Appropriations Committees; the Office of Management and Budget; the Office of Science and Technology Policy; Senator Allard (R-CO); Senator Campbell (R-CO); Congressman Mark Udall (D-CO); and NSF, NOAA, NASA, and DOE administrators. We met with Chairman Walsh to thank him for his work on HIAPER; with Congressman Ralph Hall (meeting arranged by UCAR Trustee David Skaggs), ranking member of the House Science Committee; with Congressman Udall to thank him for his climate observations bill and his efforts on behalf of the science community; with top staff in the Science and Technology Directorate of the Department of Homeland Security (DHS) and top staff for homeland security in DoD; and with Samuel Bodman, Deputy Secretary of Commerce; Admiral Lautenbacher, and James Mahoney, Assistant Secretary of Commerce for Oceans and Atmosphere, to discuss the Administration’s Climate Change Research Program and the proposed Collaborations Fund. UCAR Trustees Soroosh Sorooshian and Paola Malanotte-Rizzoli met with Senate staff regarding climate issues. (Soroosh’s meeting led to Senator McCain’s request for information from UCAR.) Trustees Kelvin Droegemeier and Len Pietrafesa met with members of their delegations to advocate for establishment of the Collaborations Fund. Eric Betterton met with Congressman Kolbe’s staff regarding the Collaborations Fund. Such advocacy, along with excellent efforts from Lewis-Burke, have resulted in the inclusion of external research fund language in the Senate Authorization Bill for NOAA.

Events/Meetings. UCAR participated in meetings of the Congressional Natural Hazards Caucus (UCAR is a member) and the annual Coalition for National Science Funding (CNSF) exhibit and reception for Members of Congress and Staff. At the University of Colorado, NCAR’s Tom Warner and Scott Swerdlin briefed the DHS Undersecretary for Science and Technology, Charles McQueary, on the role of atmospheric sciences in national security. Peter Thornton, CGD, participated in the 2003 Congressional Visits Day, organized by the Science-Engineering-Technology Work Group.
At the suggestion of UCAR Trustee Orlando Taylor, we began planning for GEO Forum 2004: Grand Experiences and Opportunities in the Geosciences which will take place on March 30, 2004, at the National Academy of Sciences Building in Washington, D.C. Hosted by UCAR, AMS, the Consortium of Universities of the Washington Metropolitan Area, as well as the National Academies Board on Atmospheric Science and Climate, the goal of the Forum is to increase the number of graduate students, particularly those from under-represented groups, in the geosciences.

Congressional Science Fellow and AMS-UCAR Summer Policy Colloquium. UCAR co-sponsors a congressional science fellowship program with the AMS. Fellow Johannes Loschnigg spent his year serving on the personal staff of Senator Joseph Lieberman (D-CT). The 2003-2004 Congressional Fellow will be Wendy Parker, who is finishing up her Ph.D. in the philosophy of science at the University of Pittsburgh, where she is writing a dissertation on the use of climate change scenarios to advance the science of meteorology. Three UCAR staff attended the Colloquium: Scott Swerdlin and Joanne Dunnebeck from NCAR’s Research Applications Program, and Shui Bin from NCAR’s Environmental and Societal Impacts Group (ESIG).

Walter Orr Roberts Distinguished Lecture. The 2003 Walter Orr Roberts Distinguished Lecture honored Dr. Joachim Kuettner, UCAR Distinguished Chair for Atmospheric Science and International Research. Open to the public, his talk, “The Joy and Adventure of Exploring the Atmosphere,” filled the Boulder Public Library’s auditorium to capacity.

Joach Kuettner presenting the 2003 Roberts Distinguished Lecture.

Friends of UCAR. This year, Friends supported Super Science Saturday, the Spanish translation of WebWeather, and the development of the audio tours for the Mesa Lab. As always, we welcome your contributions to this annual fund for the support of atmospheric sciences education programs. Please see the website at: [http://www.ucar.edu/friends/index.htm](http://www.ucar.edu/friends/index.htm) .
4.0 Finance and Administration

UCAR’s Finance and Administration (F&A) provides the necessary facilities and human resources support for UCAR.

4.1 Human Resources development

UCAR began a new development program, the UCAR Leadership Academy, with 24 participants from across UCAR, NCAR and UOP. The program is designed to provide knowledge and skills for current and future leaders. The program was extremely successful and will be repeated at least annually in the future.

UCAR has developed a new policy on research misconduct, consistent with NSF Regulations. The policy defines the various categories of research misconduct, and procedures for investigation of misconduct allegations are given.

UCAR instituted a Paid-Time-Off (PTO) program in which leave is given to the employee with no distinction between sick and vacation time. Employees were given a choice between PTO and traditional leave programs; 60% of employees chose PTO.

4.2 Facilities planning

NSF and the City of Boulder have approved the construction of FL-0, the new chemistry building on the Foothills Campus. The design process is underway. The design will emphasize safety as well as energy efficiency and functionality. Construction is expected to begin in May 2004.

The Mesa Lab Refurbishment project has completed the refurbishment of the “A” Tower and the common areas, such as the cafeteria, library and exhibit space. The rest of the project has been put on hold until construction of the FL-0 chemistry building is complete. At that time, the “B” Tower refurbishment will begin. The NCAR Director’s office moved back into the Mesa Lab in June and the Climate and Global Dynamics Division (CGD) moves back in September.
The High Altitude Observatory (HAO) Division will occupy the CG-1 building on the Center Green campus. It is expected that some other smaller groups will also be in the building. Construction of the CG-1 building expansion will begin next year.

The FL-4 building will undergo renovation to better address the needs of the UCAR Office of Programs. Renovation will begin this fall.

4.3 Business continuity

UCAR has fully developed and updated business continuity/disaster recovery plans for 11 of 16 critical divisions/programs/operations. Two plans are under development, one has been put on hold and development on one will begin soon. Upgrades have been implemented which allows coordinators to electronically update their plans. Electronic updates represent a major improvement in the timeliness and accuracy of these plans. Testing will occur in November.

5.0 Significant Opportunities in Atmospheric Research and Science (SOARS)

SOARS ([http://www.ucar.edu/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 under-represented 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. Since 1996, DOE-Global Change Education Program, NASA Goddard Space Flight Center, NASA Education and Public Outreach through NCAR HAO, NOAA Office of Global Programs, and the University of Colorado Cooperative Institute of Research in Environmental Sciences have joined NSF and UCAR as program sponsors.

At the heart of SOARS is a ten-week summer immersion program at NCAR or the laboratories of a SOARS sponsor, where SOARS students (protégés) are provided opportunities to experience working as research scientists. Each summer, protégés conduct research projects and participate in a nine-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. Protégés receive a competitive stipend, housing, local transportation, and round-trip airfare to participate in the summer program.

Second-year SOARS® protégé, Amber Reynolds, and her science research mentor, David Dowell (ASP), participating in the Bow Echo and Mesoscale Convective Vortex Experiment (BAMEX), St. Louis, 2003.
5.1 2003 Summer highlights

Twenty-eight protégés from across the U.S. and Puerto Rico completed the 2003 summer program. Sixteen protégés returned for their second, third, or fourth SOARS summer; 13 were new to SOARS. Each was paired with a science research and a scientific writing and communication mentor. All first-year protégés were also paired with a community mentor and a peer mentor. The 16 returning protégés served as peer mentors to one or more new protégés.

Each protégé conducted an individual research project, prepared a written research report, and presented their research results at the August 11-13 SOARS Protégés’ Colloquium. At least 16 protégés will be presenting their summer research results at student or professional meetings during the 2003-2004 academic year. A listing of the summer 2003 protégés, mentors, and research topics is available online at: http://www.ucar.edu/soars/research/researchtopics2003.html.

5.2 1996-2003 Program results

Since the 1996 inaugural summer, 85 protégés have participated in SOARS. Participants’ ethnicity and gender are outlined in Table 1.

<table>
<thead>
<tr>
<th>Ethnicity and gender</th>
<th>Number of protégés</th>
<th>Percent of protégé population</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>35</td>
<td>41%</td>
</tr>
<tr>
<td>Native American</td>
<td>11</td>
<td>13%</td>
</tr>
<tr>
<td>Asian American &amp; Pacific Islander</td>
<td>4</td>
<td>5%</td>
</tr>
<tr>
<td>European American</td>
<td>6</td>
<td>7%</td>
</tr>
<tr>
<td>Hispanic/Latino American</td>
<td>29</td>
<td>34%</td>
</tr>
<tr>
<td>Female</td>
<td>56</td>
<td>66%</td>
</tr>
<tr>
<td>Male</td>
<td>29</td>
<td>34%</td>
</tr>
</tbody>
</table>

Table 1. Ethnicity and Gender Representation of SOARS Protégés, 1996-2003

Seventeen protégés have completed their master's degrees; 12 are currently in the professional scientific workforce; five are enrolled in Ph.D. programs - three are Ph.D. candidates, one in computational and applied mathematics, and two in atmospheric science. By summer 2003, 59 protégés had completed bachelor's degrees in an atmospheric or related science; three completed associate's degrees and are now enrolled with a science major at a four-year research university. During the past eight years, more than 40 protégés presented papers and posters at regional, national, and international scientific conferences, with several receiving awards. The summer research of at least eight protégés has resulted in coauthored papers published in peer-reviewed journals. A listing of the presentations is available online at: http://www.ucar.edu/soars/pres.htm; an online list of publications is available at: http://www.ucar.edu/soars/pubs.htm.

As of the fall of 2003, 29 SOARS protégés are enrolled in graduate programs in an atmospheric or related science. Three are AMS graduate fellows; two are NSF graduate fellows. No SOARS protégé
(including the 17 who left the program – five to pursue careers in other fields, 11 due to unsatisfactory performance, and one for personal reasons) has withdrawn from college or university without having completed an undergraduate degree with a major in an atmospheric or related science.

5.3 SOARS: A model program

In December 2001 President Bush announced that SOARS had been selected as one of ten institutions receiving the sixth annual Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring. The award recognizes SOARS for “embodying excellence in mentoring under-represented students and encouraging their significant achievement in science, mathematics, and engineering.”

Jeffrey Gaffney, chief scientist for DOE’s Global Change Education Program (GCEP), visited SOARS several times. Gaffney’s observations led him and his colleagues to adopt the SOARS model in designing GCEP’s Summer Undergraduate Experience program. Other programs across the U.S.A. have recognized SOARS as a model and incorporated elements of the SOARS program into their undergraduate internship programs. SOARS received national attention when the National Education Association (NEA) featured the program in its May 2003 issue of NEA Today. The article, “Colorado mentoring program encourages minority students to pursue science careers” is available on line at: http://www.nea.org/neatoday/0305/infocus.html. SOARS is now a subject of study by the Ethnography and Evaluation Research Center to Advance Research and Teaching in the Social Sciences, University of Colorado at Boulder.

This past January, SOARS program director, Thomas Windham, received the Boulder Daily Camera’s prestigious Science/Medicine/Health Pacesetter Award in large part for his contribution to
the success of the SOARS program. In addition, the article, “Significant Opportunities in Atmospheric Research and Science (SOARS®): An Overview of the Program and its First Eight Years,” by Windham, A. Stevermer and Rick Anthes has been recently accepted for publication in an upcoming issue of the Bulletin of the American Meteorological Society.

6.0 Intellectual property and the UCAR Foundation

6.1 Business development

On June 6, 2003, the UCAR Foundation’s two-year effort to define and launch a new, for-profit technology commercialization company came to fruition. Peak Weather Resources, Inc., located in Boulder, Colorado, has received initial seed funding from the UCAR Foundation to operate independently as a commercial enterprise. Established to help fulfill UCAR’s mission to serve the research community and society, Peak Weather will adapt technical knowledge from NCAR and UOP for use by the commercial and public sectors. The company will provide marketing expertise; develop installation, operation, and maintenance procedures; maintain a data center; and more.

Peak Weather may create joint ventures that the UCAR Foundation can spin off as independent companies; however, Peak Weather itself will remain a permanent, for-profit arm of the UCAR Foundation, offering a number of technologies. The company’s target clients include the private sector, government entities, such as the Departments of Defense and Homeland Security, and international organizations. It may also assist UCAR member universities with their own commercialization efforts.

6.2 Licensing

In addition to its business development focus demonstrated by the launch of Peak Weather, the UCAR Foundation continues to pursue the commercialization of UCAR technologies through licensing. Several established technologies continue to grow their licensing base and produce steady annual royalties.

RAP’s Low-Level Windshear Alert System (LLWAS) has been licensed to a new company, Vitrociset, to install LLWAS systems for the first time in Italy including airports in Palermo, Genova and Reggio Calabria. An early licensee of LLWAS, Vaisala OYJ, continues to deploy systems throughout the world, installing a system most recently in Bangkok, Thailand.

NCAR’s Atmospheric Technology Division’s (ATD’s) GPS Sonde Data Processing System and its Airborne Vertical Atmospheric Profiling System (AVAPS) continue to account for significant royalties as the result of Vaisala’s marketing for these associated technologies.
A new RAP technology joined the UCAR Foundation’s licensing portfolio this year when Vaisala signed an agreement for the commercialization of the **NCAR Improved Moments Algorithm (NIMA)**, an algorithm that is capable of enhancing the data signal of Vaisala’s wind profilers. NIMA’s first customer is the German weather service, Deutscher Wetterdienst (DWD), who has requested NIMA software for three recently purchased Vaisala wind profiler systems.

RAP scientists and engineers continue to be the leading force for technology commercialization at UCAR. In recognition of RAP’s role in the Federal Aviation Administration's Aviation Weather Research Program (AWRP), NCAR, along with several other participating laboratories and universities, received this year’s annual **Excellence in Aviation Award** from the FAA.

Two new licensing arrangements for next generation RAP aviation technology offerings, the **Weather Support to Ground Deicing Decision Making (WSDDM)** and the **Hotplate Snow and Precipitation Gauge**, are nearing completion with the winning bidders of their respective Request for Proposal (RFP) programs. In addition, the WSDDM system has been licensed to the City and County of Denver for use at the Denver International Airport under the terms of a research agreement.
Other licensing prospects are also receiving serious commercialization consideration this year. The **NCAR Efficient Spectral Processing Algorithm (NESPA)**, a warning system to help pilots navigate storms without encountering air turbulence, earned the *NASA Turning Goals Into Reality* award in June for its RAP design team. The NESPA technology has broad utility in ground and onboard radar applications as a data quality enhancement technology.

![Aircraft Being Sprayed with De-Icing](image1)

![Hotplate Snow and Precipitation Gauge](image2)

**Simulation of the transport and diffusion of gas released near the surface in the Salt Lake Valley. Low-level winds (yellow lines), the concentration (green) of a gas that was released on the north side of the area, and the dosage (accumulated exposure, red).**

The **Four-Dimensional Weather (4DWX)** system, under development since 1995 within RAP with support from scientists from the Mesoscale and Microscale Meteorology Division (MMM), has received a great deal of attention from both federal and commercial organizations in the wake of September 11, 2001. 4DWX (pronounced 4-D Weather) brings to bear globally relocatable, high-resolution mesoscale weather modeling for near real-time projection of hourly weather conditions and predicted interactions with localized environmental events, such as accidental hazardous materials release or biological and nuclear weapons detonations. Terrorist threats are now the concern of a much broader range of civil and federal organizations. RAP’s state-of-the-art, real-time weather modeling, coupled with advanced dispersion modeling, has been delivering solutions for rapid response weather guidance to this community since 1999 when RAP began research to help federal agencies prepare for the 2002 Winter Olympics in Salt Lake City. In recognition of this early work, the 4DWX development team received the UCAR *Scientific and Technical Advancement Award* in 2001 for designing, developing, and delivering this technology to the U.S. Army Test and Evaluation Command.
(ATEC), and, more recently, to the Defense Threat Reduction Agency (DTRA). Both of these agencies are key contributors of technologies and research for the newly formed Department of Homeland Security.

RAP’s DICast forecasting technology achieved fame earlier this year when it was publicly announced that this technology has been generating millions of forecasts a day for The Weather Channel’s weather.com website. The Weather Channel licensed RAP forecast technology in 1998 and has been using the DICast system to generate zip code-level, location-specific weather forecasting for U.S. and international locations since 2000. RAP’s latest application of a next generation forecasting technology has been recently made available for licensing as the Road Weather Forecast System (RWFS). The RWFS technology resulted from RAP’s participation in developing the Federal Highway Administration’s (FHWA’s) Maintenance Decision Support System (MDSS). Highway officials and road crews in Des Moines and Ames, Iowa, tested the MDSS system during the 2003 late winter and early spring snowstorm seasons. Motor vehicle accidents involving bad weather (largely ice and snow) claim the lives of more than 6,000 Americans and injure almost half a million people each year. Nearly half of the nation's state transportation departments signed on as stakeholders in the MDSS system, along with more than a dozen private firms. Many of these firms are considering developing products and services around the core capabilities of the system.

Another related RAP forecast system deployment receiving recognition is the Advanced Operational Aviation Weather System (AOAWS) developed for Taiwan over the last six years. The AOAWS won UCAR's Scientific and Technical Outstanding Accomplishment Award in 2002. Taiwan’s Civil Aeronautics Administration (CAA) commissioned NCAR to design, build and implement the AOAWS in Taiwan as a technology transfer program between the U.S. Government and Taiwan.
6.3 Summary

In fiscal year 2003 the UCAR Foundation will receive approximately $240,000 in licensing revenue, exceeding its projected licensing revenue for the year. Three new technology disclosures have been made for intellectual property protection to-date this year. Four patents have been issued, including the Apparatus for Pivoting Mounting Instrumentation on a Line from NCAR’s Atmospheric Chemistry Division, and three patents awarded to RAP inventions, including Determining Temperatures of a Physical Medium Using Remote Measurement, Hotplate Precipitation Measuring System, and System for Measuring Characteristics of Scatters Using Spaced Received Remote Sensors (STARS). Two new technology patent applications, five continuation patent applications, and four trademark applications have been filed this year.

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

End of report

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