MEMORANDUM

TO:   Board of Trustees  
Members’ Representatives  
President's Advisory Committee on University Relations  
UCAR Academic Affiliates

FROM: Richard A. Anthes

SUBJECT: President's Report for the October 2011 Meetings of the Board of Trustees, UCAR Members' Representatives, President's Advisory Committee on University Relations, and Academic Affiliates

Ladies and Gentlemen:

It is with mixed feelings that I write this, my last, annual report to you as UCAR President. It is hard to believe it has been 23 years since the UCAR Board of Trustees, under the Chairmanship of Bob Street (Stanford University) appointed me president. I have enjoyed nearly all aspects of this interesting position, not the least of which is the interactions with the UCAR Member Representatives and the Board of Trustees. In January I will step down as UCAR President and transition into a new, part-time position at UCAR, where I plan to do some research, continue community service, and perhaps write a book on my experiences since coming to NCAR in 1981.

At the 2010 50th Anniversary celebration, I was surprised and honored when the Board of Trustees named our new building at Foothills Lab after me. The building, now designated FL-A, was purchased in 2009 as part of our long-range strategic plan for space. It was opened in August and will house the UCAR Community Programs, Communications, and Government Affairs during the next ten months while FL-4 is undergoing a long-delayed and badly needed refurbishment. I am especially pleased that FL-A was remodeled to be UCAR’s greenest facility; it is on track for LEED Gold certification. Significant features of this include: a ground-source heat pump/bore field mechanical system; 100kW roof-mounted solar photovoltaic system (which will generate approximately 25% of the building’s total energy usage); high efficiency glazing; smart building controls including mechanical, occupancy, and lighting; high efficiency plumbing fixtures; and low VOC/non-toxic paints, materials, adhesives, and finishes.
The UCAR Board of Trustees is in the process of searching for a new president; the search committee is headed by Board Chair Dennis Hartmann (http://www.ucar.edu/ucar-president-search/)

In the rest of this report, I summarize a few of UCAR’s program highlights over the past year. Roger Wakimoto’s and Jack Fellows’ reports for NCAR and UCAR Community Programs (UCP), respectively, contain additional examples of progress in the areas of science, facilities, and service to the universities and broader community:

Roger Wakimoto and I prepare to cut the ribbon at the opening of FL-A


1.0 SEVERAL HIGHLIGHTS OF THE PAST YEAR

The following are some of the highlights since the 2010 UCAR meetings.

1.1 NCAR-Wyoming Supercomputing Center Completed

As you may recall, NCAR's computing facility at the Mesa Lab cannot keep pace with supporting the needs of the atmospheric and related sciences community due to its limited space and power. In a partnership with NSF, the State of Wyoming, the University of Wyoming, and the Wyoming business community, we have been planning for a number of years to build a new center in Cheyenne, Wyoming. In August 2011 we completed construction of the facility on time and on budget. A web cam at the construction site shows a time lapse movie of every 15 minutes from June 2010 to the present (http://oxblue.com/pro/open/saunderci/ucar). We are now in the final stages of procuring the computer system, which is expected to deliver about 30 times the current capability of the NCAR Mesa Lab system.
1.2 NSF Review and UCAR SPEC and NCAR Advisory Committee Reviews

The NSF reviewed the NCAR laboratories and HAO in the spring of 2011, using teams of outside experts. Following these reviews, the UCAR Scientific Programs Evaluation Committee (SPEC), a committee of the UCAR members, met on 16-17 August to: 1) examine the results from the recent NSF reviews of NCAR science, 2) assess whether these results and other factors such as budget stress warrant changes in NCAR’s strategic plan, and 3) evaluate the progress made on the proposed activities in the 2007 UCAR proposal to manage NCAR. Members of the NCAR Advisory Committee and UCAR Trustee Scott Sternberg attended the meeting as well.

The SPEC report can be found at: [http://www.ucar.edu/governance/meetings/oct11/spec_report.pdf](http://www.ucar.edu/governance/meetings/oct11/spec_report.pdf). UCAR’s response can be found at: [http://www.ucar.edu/governance/meetings/oct11/ucar_response_spec.pdf](http://www.ucar.edu/governance/meetings/oct11/ucar_response_spec.pdf). Jim Anderson (Arizona State University) on behalf of the SPEC Chair, Mary Jo Richardson (Texas A&M University), will present the SPEC report at the meeting. I very much appreciate the time and energy that the SPEC and Advisory Committee attendees gave to this part of the review.
1.3 Visit of NSF Director Subra Suresh

On 6 and 7 June, we were fortunate to host a visit to UCAR by the new NSF director, Subra Suresh. Dr. Suresh was accompanied by Marge Cavanaugh, NSF Deputy Assistant Director for Geosciences; Michael Morgan, NSF Division Director of Atmospheric and Geospace Sciences; and Steve Nelson, NSF Program Director for UCAR/NCAR. Dr. Suresh and his NSF colleagues participated actively in the meetings and briefings.
1.4 HIPPO – A New Paradigm for Global Field Experiments  (http://hippo.ucar.edu/)

The HIAPER Pole-to-Pole Observations (HIPPO) of Carbon Cycle and Greenhouse Gases Study is a field campaign that measures cross sections of atmospheric concentrations approximately pole-to-pole, from the surface to the tropopause, five times during different seasons over a three-year period. HIPPO is providing the first comprehensive, global survey of atmospheric trace gases – pertinent to understanding the carbon cycle and covering the full troposphere in all seasons and over multiple years. Atmospheric pressure, temperature, wind speed, aerosols, water vapor and chemical composition are being measured.

HIPPO is a collaborative project involving scientists from Harvard, Princeton, the University of Miami, Scripps, NOAA, and NCAR. It represents a major paradigm shift in research aircraft operations. Prior to HIPPO, NCAR’s support for aircraft operations during field experiments had remained essentially unchanged for decades. Typically, an airport was selected as a home base for operations. Offices and computer facilities were set up at the airport, and local housing was identified for the principal investigators and NCAR support staff for the duration of the field experiment.

HIPPO required a new approach. The HIPPO investigators wanted to take full advantage of the G-V capabilities by proposing flight tracks that would take the aircraft from “pole to pole” in an effort to map out the vertical profile of trace gases. The proposed flight tracks, however, provided a logistical challenge that had never been previously encountered by NSF and NCAR in the support of field experiments. Instead of a single home base, a series of airports around the globe had to be identified so the aircraft could “hopscotch” as it executed its mission. This paradigm shift in operational support required the provision of logistical support and supplies at multiple sites and a plan to transport personnel ahead of the aircraft’s arrival at an airport. At the end of HIPPO, all parties agreed that the experiment had been an overwhelming success. The community now uses the phrase “Global Operations” to describe the HIPPO experience, and it is the new paradigm for the atmospheric sciences community that will likely become commonplace in the future.

The fifth phase of HIPPO occurred between 9 August and 9 September 2011 and took the G-V from Anchorage, Alaska to near the South Pole and back; a video of the flight track is available at: http://hippo.ucar.edu/itinerary/hippo_v_flight_plan.
1.5  Modeling and Animation of Sunspots

I chose my last highlight from some of the excellent science being done by HAO, an award winning study on sunspot modeling by Matthias Rempel. Rempel developed a model of sunspots that revealed unprecedented details of the structure of sunspots and their relationship to flows and magnetic fields in the solar convection zone. His work, which is illustrated in some spectacular animations, won the 2011 Karen Harvey Prize.

![Snapshot from Matthias Rempel's simulation of a pair of sunspots. Lower panel shows magnetic field strength in a vertical cut. The top panels show (left) inclination angle of the field with respect to the vertical direction, and (right) radial outflow velocity (red indicates outflows).]

2.0  UCAR CORPORATE AFFAIRS

2.1  Governance and Membership

UCAR Board of Trustees. Chair: Dennis Hartmann (University of Washington)

This year the Board welcomed new and re-elected members Steve Ackerman (University of Wisconsin), Ken Bowman (Texas A&M), Amy Clement (University of Miami), Kerry Cook (University of Texas), Dennis Hartmann (University of Washington), Molly Maccauley (Resources for the Future), and Scott Sternberg (Vaisala).

The UCAR Board regularly meets three times per year – in February, May and October. As is customary, the May meeting was held in the Washington, DC area, in order to meet with agency heads and policy makers. This year the Board hosted the following people at their meeting: Mary Glackin, Deputy Undersecretary for Operations at NOAA; Christine McEntee, AGU Executive Director; Tom Armstrong, USGCRP Director; Michael Freilich, NASA Earth Science Director; and Michael Morgan, NSF AGS Director. On the second day of that meeting, the Board hosted a breakfast for various heads of governors’ and states’ associations and organizations and NGOs who are interested in climate
change adaptation. Later that day, a number of Board members met with various congressional staff on their own after the meeting.

The Board Committees – Personnel, Budget and Program, and Audit and Finance – met throughout the year, in person and by conference call.

At each regular meeting, the Board is updated on UCAR, NCAR and UCP activities; and through reports of the Board committees, the Board reviews financial statements, UCAR general fund and investments, as well as the NCAR budgets. In addition, the Board approves various personnel actions – specifically NCAR Senior Scientist (and now Scientist III) and Affiliate Scientist appointments. This year in particular the Board has spent time on the NCAR Wyoming Supercomputing Center and the NCAR budget. The Board has also spent considerable time on the search for a new UCAR President.

President’s Advisory Committee on University Relations (PACUR). Chair: Greg Hakim (University of Washington)

The PACUR advises the UCAR President. It meets twice a year – in the fall after the annual Members’ Meeting in Boulder and at a university campus in the spring. The Spring 2011 PACUR meeting was hosted by Bob Hart at Florida State University in Tallahassee. University President, Eric Barron (former NCAR director), hosted a dinner for the committee at his home. As usual, the committee discussed in detail the NCAR and UCP non-core proposal process and various other issues. The PACUR also heard updates on NCAR, UCP, UCAR, and the Faculty Fellowship Program. In addition, the PACUR spent time planning the October Meeting agenda.

Members’ Nominating Committee. Chair: Nicole Mölders (University of Alaska)

The Members’ Nominating Committee met for one day in Boulder this past June to consider the nominations submitted in response to the community solicitation for candidates for the Board of Trustees and Member committees.

The Nominating Committee selected a great slate of candidates; I wish all of them could be elected. The Nominating Committee report with candidate biographies and personal statements, along with a list of committee nominees, is available at: http://www.ucar.edu/governance/meetings/oct11/nom_comm_rpt.shtml.

Membership Committee. Chair: William Beasley (University of Oklahoma)

The Membership Committee conducted their work of reviewing UCAR Membership and Affiliate renewal application materials and writing its report by email and conference call again this year. You can read the report of the committee at: http://www.ucar.edu/governance/meetings/oct11/memb_comm_rpt.shtml.

This year we have one institution applying for membership in UCAR – the University of North Dakota. Many thanks to Bill Beasley, Jack Fellows, and Lourdes Aviles for taking the time to visit UND, introducing them to many UCAR programs and opportunities, and exchanging information on their programs. The Membership Committee will recommend that the Members vote to approve them as our 77th UCAR Member at this year's meeting. There were no new applications for Academic Affiliation this year.

2.2 Communications

New Communications Director.

In June we hired Matt Hirschland, as UCAR’s new Director of Communications. Matt replaces Lucy Warner, who retired after successfully leading the shared UCAR-NCAR news and information service for most of her 27 years with UCAR. Matt comes to us from the global management consultancy firm, McKinsey & Company. He has strong expertise across traditional and social media, web, and print communications. He also brings excellent skills in reputational risk mitigation and has a penchant for convening key voices around the debates that shape and affect our work. With the media landscape shifting and communications more important to our community than ever, Matt and his team are well positioned for the challenges and opportunities that lie ahead.

Stories Making the News.

Media organizations worldwide covered research findings and events highlighted by the UCAR-NCAR Media Office throughout the year. Highlights include:

- drought research from NESL/CGD, reported by news organizations across North America, plus a broadcast on China’s national television network that reached an estimated audience of tens of millions;
• research on the cost of weather variability that was featured in hundreds of news stories across the United States and spurred discussion about the benefits of improved weather forecasting; and
• updates on the NCAR-Wyoming Supercomputing Center, widely covered by regional and specialized news organizations.

Media Day at the NCAR-Wyoming Supercomputing Center (NWSC).

In June UCAR Communications and NCAR’s Computational and Information Systems Laboratory (CISL) hosted a media day at the Cheyenne site to give Wyoming and northern Colorado media an opportunity to tour the facility and report on the Center’s progress. In attendance were Wyoming Governor Matt Mead, University of Wyoming President Tom Buchanan, and officials from the Business Council, Cheyenne Leads, Black Hills Corporation, and Cheyenne Light, Fuel & Power. The media day garnered wide news coverage, with more than 60 news stories pre- and post-event. More important, the stories all echoed our key messages: the Center’s benefit to researchers, planners, policymakers, the public, and the economy; the facility’s sustainable and flexible design; the project timeline (with a year to go before full operations); and the NSF, UCAR-NCAR, and Wyoming partnerships.

Training Science Communicators.

To position members of our scientific community as effective communicators, this year UCAR Communications, in collaboration with external trainers, offered expanded training for all types of interview formats, including:

• three-hour sessions on getting your message across to reporters,
• practice interviews conducted in person, on camera, or over the phone, and
• intensive one-on-one training to hone skills on specific topics or prepare for specific interviews.

Scientists who have taken the training have conducted successful interviews with high-profile general and specialized media outlets, such as ABC World News, National Public Radio, the Associated Press, and Science News.

Investing in Imagery.

Bringing our science to life is a critical component of any story we tell. In a web-based and visuals-hungry world, UCAR Communications has worked closely this year with several graphics experts to create clear and easy-to-understand illustrations and animations that communicate scientific concepts to non-specialized audiences. We distribute these products to the media and share them with collaborators, funding agencies, and other partners for use in slide presentations, websites, multimedia, and print documents.
Field Projects.

Our efforts to share the excitement and power of field work continued this year with photography and videotaping of the PREDICT field project in St. Croix; BEACHON in Manitou Springs, Colorado; and HIPPO in Anchorage, Alaska. Media outlets have used our still photos in their coverage of these projects. The photos have also been featured in many publications and brochures, including UCAR Magazine, lab and project websites, and other collateral material. Video footage has been used by the media, NSF, and NCAR's Earth Observing Laboratory; and it was a valuable resource for the new introductory video (see next section).

New Introductory Video: Air/Planet/People.

In partnership with Education and Outreach, UCAR Communications worked to write and produce a new introductory video to be displayed in the Mesa Lab visitor theater, on our websites, at professional meetings, and other venues. It replaces the current “lobby video,” produced more than a decade ago and last updated in 2005. In the new ten-minute video, Air/Planet/People, viewers meet some of our staff, who describe what we do and why our mission matters – fostering the transfer of knowledge and technology for the betterment of life on Earth. The video will debut this fall in the Mesa Lab theater and online, and it has already been well received by test audiences.
Web, Multimedia, and Social Media.

This year Communications produced 21 new videos for viewing on our website and on YouTube (youtube.com/NcarUcar). The YouTube channel, launched in May 2009 and featuring animations of scientific results, brief interviews, and field program footage, has logged 1.7 million views of more than 60 videos since its inception.

Our Facebook page (facebook.com/AtmosNews), highlighting news and events of interest to the community, garners over 23,000 post views a month. Our core base of engaged fans has grown steadily (over 1,400 in the last year). Demographic data show this base is largely composed of students and early career scientists (ages 18–24 and 25–34 combined), with young women well represented at 18% and young men at 23%. The mid-career-faculty age range (35-44) makes up the second-largest group, at near parity between women (12%) and men (13%) as a percent of total fans.

Our Twitter feed (http://twitter.com/AtmosNews) is approaching 5,000 followers as of late August (up from about 2,000 in 2010). We also saw a jump this year in the number of TV weathercasters and meteorology students, who joined our diverse Twitter audience of science reporters, geoscience and environment faculty, NGOs, and members of the interested public.

From July 2010 to June 2011, Communications has shared 27 articles via a relatively new channel – NCAR & UCAR Currents (http://www2.ucar.edu/currents). This web-only series spotlights recent and ongoing events, such as new research and breaking weather stories, and puts them in a broader context. Currents readership continues to grow. The article “Recipe for calamity,” which was filed the day after the 27 April super tornado outbreak in the southeast U.S., received more than 11,000 page views, and the article “Cold comfort,” which analyzed record-breaking Canadian warmth in January, drew more than 6,000 page views.

We will continue to grow our digital footprint in the coming year. We do so recognizing the importance of not just the digitization of our science, education, facilities, and community news, but the need to make these more mobile-device friendly and accessible for members of our scientific community and beyond.

2.3 Office of Government Affairs (OGA -- see www.ucar.edu/oga)

U.S. election results in 2010 and the continued worldwide economic downturn somewhat altered this year’s approach to UCAR education and advocacy activities with Congress and the Administration. It became clear very quickly that climate change legislation would not be a legislative priority and that past positive budget trends for much scientific research could end. Given efforts to reduce the country’s debt and to cut annual deficits, out-year budgets (beyond FY12) are of particular concern as is the dismissive attitude, in certain political circles, about climate research. Our strategy has been to communicate to Congress and the Administration the key role that the atmospheric and related sciences play in jobs creation, economic growth, resilience to changing weather patterns and climate, citizen health and safety, and the security of the country. The tumultuous severe weather this year – along with the continuing, obvious signs of climate change – have enabled us to make a strong case for the resources (such as observing systems), tools, and people that make our scientific accomplishments possible.

In making and communicating our case, we have considerable expert help from Lewis-Burke Associates in Washington, DC. April Burke and her staff, Wendy Naus in particular, provide advocacy
strategy, agency and Hill contacts, UCAR representation within scientific groups in DC, and assistance with events on Capitol Hill. They alert us to relevant legislation and provide analyses of pending bills which we then share with all of you.

The following is a partial list of the education and advocacy activities undertaken by UCAR this year on behalf of the community.

**Budget and Legislative Issues.**

I submitted testimony on FY12 appropriations for NSF, NOAA, NASA, the Department of Energy Office of Science and Energy Efficiency and Renewable Energy program, the Federal Aviation Administration, the Federal Highway Administration, and the U.S. Geological Survey. This written testimony is posted on the OGA website at: [http://www.ucar.edu/oga/html/advocacy/index.html](http://www.ucar.edu/oga/html/advocacy/index.html). On behalf of the UCAR community, Roberta Balstad, member of the UCAR Board of Trustees, testified in person before the House Committee on Appropriations concerning science agency budgets.

In addition to supporting robust, strategic funding for science agencies, UCAR advocated for:

- a National Climate Service, which appears unlikely to be implemented in the near term;
- America COMPETES Act of 2010, which authorizes higher levels of research and STEM education funding and was signed into law in January of this year;
- the importance of Earth Science funding in the NASA Reauthorization Act of 2010, which was signed into law in October, 2010 and supports the missions prioritized in the decadal survey; and
- the National Hurricane Research Initiative Act of 2011 (reported out of committee with a favorable recommendation).

UCAR continues to staff the Weather Coalition, an advocacy group that includes universities, associations, consortia, and corporations that have a common interest in advancing U.S. weather observation, prediction, and warning capabilities. The coalition has been very active this year, sending multiple letters to Congress concerning funding issues, holding town halls at AMS meetings to engage the community, and providing early leadership in the formulation of a transition document for the 2012 elections.

**Visits to Congress and the Executive Branch.**

UCAR leadership visits with Congress and the Executive Branch throughout the year regarding community priorities. Offices visited this year included:

- the Office of Management and Budget;
- the Office of Science and Technology Policy;
- the House and Senate Appropriations Committees, especially the Subcommittees on Commerce, Justice and Science (handles NSF, NASA, NOAA) and Energy and Water (handles DOE);
- the Senate Committee on Commerce, Science and Transportation;
- the Senate Committee on Energy and Natural Resources;
- the House Committee on Science, Space and Technology;
- the House Committee on Transportation and Infrastructure; and
- the Congressional Research Service.
Action Alerts and Washington Updates.

Since the UCAR meetings adjourned last October, I have issued nine action alerts regarding the reauthorization of America COMPETES, the funding situation of the Joint Polar Satellite System, funding for climate research in the DOE budget, FY11 funding for science in the Omnibus Bill, and science funding for FY12. Thanks to those of you who responded quickly when called upon! The collective advocacy activity of the atmospheric sciences community is going to become more and more important as budget pressures and attacks on science increase.

Capitol Hill Briefings and Hill Events.

We have continued to enlist partners (some listed below) to hold briefings for congressional staff on scientific subjects of relevance to social events and/or pending legislation. The partnerships have increased our reach and enlarged our audiences, with most now numbering close to 100. We continue to draw expert panelists from across the broad community, as you will see below. This year we held the following briefings (to view video of them on-line, go to: http://www.ucar.edu/oga/html/hill/index.html):

Solar Storms: Disruptions to Technology & Risks to the Economy.

UCAR teamed with a number of organizations including the American Meteorological Society, the Senate Science and Technology Caucus, and the Congressional Hazards Caucus, to hold this briefing. Panelists were:

- Congressman Jared Polis (D-CO)
- Kathy Sullivan, NOAA
- Jon Malay, Lockheed Martin
- Joan Burkepile, NCAR High Altitude Observatory
- Captain Rocky Stone, United Airlines
- Ron Hatch, NavCom Technology/John Deere
- Elizabeth Zimmerman, Federal Emergency Management Agency (FEMA)

Tornadoes: Understanding the Risks & Providing Early Warning

UCAR joined the Congressional Hazards Alliance to offer this timely briefing. Speakers were:

- Senator Mary Landrieu (D-LA), Co-Chair, Congressional Hazards Caucus
- Yvette Richardson, Pennsylvania State University
- Jim Stefkovich, NOAA National Weather Service
- Marc Levitan, National Institute of Standards and Technology (NIST)

Winter Wonderland: Extremes, Hazards and Blackouts – What Gives?

This briefing examined the causes of recent harsh winters and what patterns may hold for the future. Speakers were:

- Jim Hurrell, NCAR
- Lance Bosart, University at Albany/SUNY
- Steve Bennett, EarthRisk Technologies
3.0 UCAR FINANCE AND ADMINISTRATION

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

3.1 FinTools Project

UCAR Finance and Administration continues to work closely with NCAR and UCP/EO to implement a suite of new financial management tools through the Financial Management Tools (FinTools) project. Through FinTools activities, UCAR is upgrading its core financial system, SunGard Integrated Financial and Administrative Solutions and implementing commercial, financial management tools to better enable managers to make informed decisions on how best to allocate resources, maintain the financial health of their programs, and anticipate future opportunities and challenges. The project remains on budget, although project schedules have slipped due to internal resource constraints.

3.2 Mesa Lab Improvements

In 2010, the 1-1/2 mile Mesa Lab access road was taken down to the sub-grade and paved. A concrete pedestrian sidewalk was added to the downhill side of the road and a concrete bike lane was added to the uphill side. Structurally and functionally these two concrete improvements provided added stability to the paved asphalt driving lanes by restraining the asphalt edges. Programmatically, the Mesa Lab hill/road is of major importance to Boulder’s biking and running community, and the new bike and pedestrian access lanes provide enhanced pedestrian and bicycle safety, as well as increasing community goodwill between the Mesa Lab and the city of Boulder.

Mesa Lab commuters and public enjoy the safety of a new bike and pedestrian path alongside the 1.25 miles road to the Mesa Lab.

The Mesa Lab parking lot was also taken down to sub-grade, and existing poor soil conditions were addressed before paving work was commenced. Before the new paving work took place, UCAR was
able to replace the obsolete lighting and underground conduit system with new conduit runs. UCAR also placed additional conduit in the parking lot to address the future possibility of electric vehicle (EV) charging stations. The new paving and lighting efforts combine to create enhanced site safety and visibility for many years.

3.3 Sustainability

Building on two decades of successful sustainability efforts, UCAR is currently developing a comprehensive Sustainability Management Plan (SMP) to institutionalize and adopt sustainability across the organization. An SMP leads the way to cost savings, improved environmental impact, enhanced staff comfort and wellness, and leadership in the community. The plan will create a framework to measure and track key performance data for environmental and social impact areas, creates goals for improvement, and maps out a direction and steps towards meeting those goals.

Consistent with best practices in sustainability, UCAR’s SMP will delineate goals, action steps and quantitative metrics to track progress in ten “impact areas:” energy, water, waste reduction and recycling, transportation, procurement, indoor environmental quality, staff comfort and well-being, greenhouse gas emissions, land use, and construction/green building. The plan will be completed in early 2012, and implementation will begin immediately.

4.0 EDUCATION AND OUTREACH

4.1 Context

The office of Education and Outreach (E&O) helps NCAR, UCP, and UCAR member universities enhance public scientific literacy and contribute to a diverse next-generation workforce for the atmospheric and related sciences. E&O assists the NCAR Labs and the UCAR Community Programs by supporting their individual lab- and program-led efforts; coordinating these efforts; and creating overarching programs and activities involving NCAR and UCP.

In 2010, UCAR convened an internal committee to ensure that E&O’s management, funding model, and institutional home were aligned with its role as a service to NCAR, UCP, and the University community. As a result of the committee’s recommendation, E&O was placed under the auspices of UCAR Corporate Affairs, integrated with SOARS, and now relies primarily on indirect funds to fulfill its service mission. Raj Panda was appointed new E&O Director, succeeding Susan Foster who capably led E&O as Interim Director over the past year. One of the first activities of the new E&O office was the development of a new strategic plan http://eo.ucar.edu/images/EO_Strategic_Plan_draft_02-14-11_to_BOT.pdf. The plan is important as both a living document to guide planning and for day-to-day operations as well as a process for continuing to engage with E&O’s partners and constituents.

4.2 Vision and Mission

E&O’s aspirational vision is “a world in which people understand, value, and use the atmospheric and related sciences to improve their lives and life on Earth.” We support this vision through access to relevant, engaging, and accurate educational experiences. Our mission is two-fold:
• educate as diverse an audience as possible on the efficacy of Earth science and how it works so that people can make informed choices, and
• engage all communities in a research agenda that serves their priorities and advances the science.

Finally, in all our activities, we seek to have a national impact commensurate with our position as both a national lab and a university consortium.

The strategic plan can be summarized in a simple slogan: Build it, Test it, Give it Away – to kids from every background, the people who reach them, and to future scientists. We support K-16 education in formal and informal environments, with a focus on developing broad, scientific understanding for all children and their teachers, while encouraging interested children to go on to careers in science. All our efforts are rooted in enhancing the diversity of people who engage in science and science education, since both public literacy and our future workforce depend on a better ability to communicate with an increasingly multi-cultural nation.

4.3 E&O Programs and Activities

A few of the E&O programs and activities are summarized here.

Undergraduate Leadership Workshop.

The Undergraduate Leadership Workshop (ULW) helps undergraduate students, majoring in atmospheric or related fields, learn about research careers. ULW participants spend a week in Boulder learning about leadership, interacting with scientists, touring Boulder-area labs, participating in education and outreach activities, and establishing a professional network of peers.

University undergraduate departments, who also provide travel support, nominate participants. UCAR provides for housing and other expenses during the students’ time at NCAR. In its ten-year history, the ULW has served 63 institutions across the U.S. and Canada. Forty six UCAR member institutions (61%) and 14 UCAR affiliate institutions (56%) have sent students. More than 40 percent of ULW participants, who have completed their undergraduate degrees, have gone on to pursue or have completed Master’s or Ph.D. programs.

Participants in the Undergraduate Leadership Workshop, 2011.
New Exhibits.

In June of 2011, the NCAR Mesa Lab unveiled a new exhibit focused on Sun-Earth connections. The exhibit, developed in collaboration with scientists from the High Altitude Observatory, features a mural of discoveries and milestones through time, an interactive touch screen that allows visitors to learn more about the mural and explore the Sun-Earth system, panels designed to introduce key concepts (e.g. the Sun is a dynamic system and changes in its magnetic field influence Earth), as well as real-time displays of the Sun as viewed through different parts of the spectra.

For 2012, the ground floor of the Mesa Lab will be reworked around the theme of weather and will feature new interactive pieces as well as new interpretive pieces to provide context for many of the existing interactive exhibits.

Tour and Visitor Program.

The NCAR Mesa Lab hosts thousands of visitors each year from all over the world. E&O staff offer regular tours for the general public as well as hands-on, standards aligned science programs to K-12 classes on field trips, especially early-elementary grades. During the past 12 months, 610 scheduled tours were offered to over 5,000 adults, some in family groups, and to over 8,500 students from Pre-K to graduate school levels. Approximately 400 teachers visited the Mesa Lab with their classes and/or for professional development. In addition to these personal interactions, a guide-by-cell audio tour, written and produced this year by E&O staff is available. Visitors reported that they were “welcomed and treated as valued guests” in a program evaluation with an overall score of 5.0 out of 5.0.

In addition to tours and field trips, E&O regularly hosts events for the local community. Activities noted in previous years continue, such as the ASP/E&O Girl Scouts at NCAR Day; Science Is Everywhere; Bring Your Child to Work Day; Super Science Saturday; and coordination of Science Fair judges for the local schools.

Finally, the Mesa Lab Tour and Visitor Program makes a concentrated effort to reach students from diverse backgrounds. Travel grants, funded by the NCAR diversity committee, have allowed 662 students from 18 schools with large minority populations to visit the Mesa Lab last year. E&O is also working with Sanchez Elementary, a school with a large Latino population. In 2010, 15 Sanchez fourth- and fifth-grade students participated in two weeks of immersion in the atmospheric sciences and 21st Century Skills. In keeping with our “test-it” principle, pre- and post-assessments showed a significant improvement in participants’ atmospheric science content knowledge, and these participants had a positive science experience. E&O also offered customized tours to nearly 200 students with disabilities or special needs and over 300 senior citizens.

Three students from Sanchez Elementary examining clouds.
SOARS protégé Sandra Maina by her science poster documenting strategies to quantify the economic and social impact of hurricanes.

From 1996 to 2006, less than four percent of doctoral degrees in atmospheric science went to students from historically under-represented groups, in spite of the fact that these groups represent over 30% of the United States population. SOARS’ mission, therefore, is to increase the number of students from historically under-represented groups who enroll and succeed in graduate programs in the atmospheric and related sciences.

SOARS is a multi-year, undergraduate-to-graduate bridge program that focuses on three strategies:

- building a strong and supportive learning community,
- offering students multiple mentors, and
- providing hands-on experience in research.

The SOARS experience centers on ten-week summer research internships that also include a weekly communication workshop and culminate in end-of-summer research presentations by protégés. During the summer, each protégé is supported by multiple science, computing, and communication mentors at UCAR, NCAR, and partnering labs. SOARS’ staff and returning protégés provide career- and life-choice mentoring throughout the year. SOARS protégés also receive need-based tuition support, GRE and graduate-school training, and financial and logistical support to present their research at scientific meetings.

In the 16 years since SOARS’ founding, 147 students have participated in the program. Of those participants, ten are still enrolled as undergraduates, and 126 have earned undergraduate degrees in
STEM. Thirteen SOARS alumni have already earned their Ph.D., and an additional 25 are in Ph.D. programs after completing their Masters or equivalent. Perhaps the most telling statistic is that the 15-year investment in SOARS will likely yield over 39 Ph.D.s, over three times the number of Ph.D.s earned by members of underserved communities in the 15 years before SOARS was created.

HIRO.

Now in its second full year, 20 high school students participated in the High school Internships and Research Opportunities (HIRO – pronounced hero) summer program. In addition to 14 students from the Denver metro area, we also hosted six visiting students, supported through the Ana Mendez University System in Puerto Rico. Students worked with scientists and staff at NCAR and partnering laboratories in Boulder and learned methods of scientific inquiry. All students participated in a weekly writing workshop and a poster session at the conclusion of their summer program. In addition, HIRO students served as the case group in a case-controlled study of the impact of research experience on career aspirations and understanding of science.

Community-Partnership Efforts.

E&O continues the long-term investment in working with communities in the U.S. and internationally that was begun under the auspices of the Community Building Program (now part of E&O). A key focus remains working with Tribal communities in the U.S., and several activities are described below:

- NCAR and the Inter-tribal Council on Utility Policy are interested in examining the overall wind-energy potential in the Missouri River Basin, understanding climate change impacts on future hydroelectric power availability as part of a balanced wind-hydro generation capability, and optimizing a distributed wind-energy capability across sites on multiple reservations.
- Diné College students and faculty are very interested in understanding air-quality on the Navajo Nation, and NCAR has hosted two week-long workshops focusing on air-quality measurements.
and geospatial tools to analyze the collected data. In addition, NCAR, the University of Colorado, and Diné College have placed a carbon-dioxide detector on the reservation, which is important for quantifying regional variations in greenhouse gases.

• The North Dakota Association of Tribal Colleges is leading a NASA-funded effort that uses geospatial tools to investigate current and future impacts of climate change and other land-use changes. As part of this project, four tribal college faculty members have participated in mini-sabbaticals at NCAR.

In addition to working with Tribal Colleges, the Community Building Program has worked extensively in Africa on the link between meningitis and environmental factors. The Google-funded project, now wrapping up, yielded several scientific insights (see box). The collaboration between NCAR and scientists in Ghana will continue, however, under the leadership of NCAR scientists. This represents a successful effort to nurture a collaborative scientific relationship between NCAR and an under-served community, and it is a model for future E&O efforts to catalyze science that addresses priorities of under-served communities.

*Cooking over open flames, as in this kitchen, may lead to increased risk for meningitis, especially during conditions of low humidity and high temperature.*
Meningitis in Africa and Weather

- Meningitis is verifiably linked to humidity (and maybe heat), and this relationship allows improved prediction of the number of cases.
- Using current global weather models, we can forecast humidity two weeks ahead.
- A single case of meningitis costs more than three-years’ wages to treat.
- Seasonal migration can protect from meningitis.
- Early meningitis symptoms are often mistaken for less serious illnesses, delaying treatment, and decreasing the likelihood of good outcomes.
- Airborne matter (especially from burning) may increase the risk of meningitis.

5.0 UCAR FOUNDATION AND TECHNOLOGY COMMERCIALIZATION

The UCAR Foundation continues to focus its activities on the spin-off companies it has created to commercialize UCAR technology.

5.1 Peak Weather

Since 2005, Peak Weather, Inc. functioned as the UCAR Foundation’s incubator for new start-up companies commercializing UCAR technology. During this time, Peak incubated two companies – Advanced Radar Corporation (ARC) and Global Weather Corporation (GWC). ARC was formed to commercialize NCAR’s radar technology and know-how to global markets. GWC was formed to provide weather data services for their retail and business-to-business products using NCAR’s automated weather forecasting and decision making technology. At its meeting in June 2011, the UCAR Foundation Board of Directors resolved to dissolve Peak because the UCAR Foundation does not have the capacity to sustain more than two start-up companies at one time. Should the need for an incubator arise in the future, the UCAR Foundation can either resurrect Peak or create a new incubator company for that purpose.

5.2 ARC

Advanced Radar Corporation (ARC) developed a dual-pole X-band mobile radar system for the government of South Korea in 2009/2010. This new radar system has become the flagship product for ARC, which is now installing this radar system for the Pacific Northwest National Laboratory and the governments of Thailand, Italy, and the United Arab Emirates. ARC has a total contract backlog for both new radars and radar upgrades of about $8.5 million and is projecting revenue of $5.6 million in FY2011. As a result of this increased business, ARC has tripled in size and hired about 15 new staff in the past year. ARC entered into an OEM marketing agreement with a Chinese radar manufacturer that builds portable, relatively inexpensive X-band radars. ARC is upgrading these radars to Doppler for marketing outside of China.

5.3 Global Weather Corporation

Global Weather Corporation (GWC) is using RAL’s DICast technology and wind prediction system to provide wind powered forecasting services to industries. In July, GWC took over operation of the NCAR end-to-end system for wind powered forecasting that RAL developed for Xcel Energy’s wind farms. GWC now provides the forecasts as a service to Xcel. GWC plans to extend the services
initially developed for Xcel to similar customers throughout the U.S. and internationally. GWC also entered into a partnership with MDA EarthSat to offer a similar advanced wind powered forecasting service to MDA’s customer base. GWC has several other clients under contract and is in negotiations with a venture capital firm for a $5M investment in the company to provide operating capital and an expansion of GWC’s business operations.

ACKNOWLEDGMENTS

I thank Carlye Calvin, Susan Friberg, Matt Hirschland, Raj Pandya, Jeff Reaves, Cindy Schmidt, and Katy Schmoll for their contributions to this report. Susie Siders and Susan Montgomery-Hodge did a great job of editing and formatting it. I also thank the National Science Foundation for their continued support.

-END OF REPORT-

Back to the UCAR October 2011 Meeting Site