We've all heard that airplanes are one of the safest ways to travel. But severe wind shear in a variety of forms can still play havoc, especially when aircraft are near the ground during takeoff and landing. Over the past 12 years, for example, a treacherous type of wind shear called the microburst has been implicated in three catastrophic air accidents, resulting in 398 deaths.

This summer, under the sponsorship of the Federal Aviation Administration (FAA), scientists from NCAR's Research Applications Program (RAP), part of the Atmospheric Technology Division and from other organizations are testing a new Doppler radar system that is being developed for airports to automatically detect and warn of microbursts and other events such as gust fronts (the violent, fast-moving, cold winds that often precede a rainstorm) and turbulence.

NCAR has previously conducted intensive field experiments to gain information about wind shear, research including the Joint Airport Weather Studies (JAWS) in 1982 and the Classify, Locate, and Avoid Wind Shear (CLAWS) experiments in 1984. RAP is now working to translate the knowledge gained from that research into...
useful products for the aviation community, such as wind shear sensing systems that can be given to pilots and controllers to improve air traffic safety and efficiency. RAP is currently participating in work on two such systems, the Terminal Doppler Weather Radar (TDWR) and the Low-Level Wind Shear Alert System (LLWAS).

The LLWAS, which has already been in use for many years at airports, is a ground-based network of anemometers that measure shifts in wind velocity. The problem with the existing LLWAS is that it was not designed to detect and warn of microbursts. RAP's LLWAS project manager Wesley Wilson is leading an effort to upgrade the existing LLWAS. The enhanced system is now being tested at Denver's Stapleton International Airport.

The TDWR, by contrast, is a totally new, automated remote sensing system for wind shear. It uses Doppler radar to scan the vicinity of an airport. The data go into a computer, which is programmed with special algorithms that search for microburst patterns, gust fronts, and other hazardous situations. RAP's TDWR project manager Cleon Biter explains that once the TDWR has identified a hazardous pattern, it will send a warning to the aircraft controllers, who then can transmit the message to pilots.

The TDWR is being field tested this summer near Stapleton in a cooperative program among NCAR, Massachusetts Institute of Technology's Lincoln Laboratory, the University of North Dakota, the University of Chicago, and the National Severe Storms Laboratory. At Buckley Air National Guard Base east of Aurora, Lincoln Laboratory is operating the TDWR test-bed Doppler radar it developed for the FAA. The University of North Dakota is operating a second Doppler radar northeast of Stapleton, thus giving researchers Doppler measurements from two directions of winds over the airport. Lincoln Laboratory is also operating a network of automated weather stations that are gathering weather data in the vicinity of Stapleton, and North Dakota is deploying its Citation jet aircraft equipped with instruments to measure wind shear and turbulence for comparison with radar observations.

Virtually all of the RAP staff are involved in the development and testing of these wind shear systems. Several are stationed at Buckley to monitor the performance of the existing TDWR system and to develop the scientific basis for future enhancements. Other RAP staff are at the Stapleton control tower to assess the LLWAS system's performance and to gather additional data for evaluating the TDWR system.

After the testing and validation of the computer algorithms this summer, the TDWR should be ready for an operational demonstration next year. If the demonstration proves successful, the FAA envisions placing about 100 TDWRs at major airports in the United States beginning in the 1990s. In future years, RAP hopes to further streamline the TDWR so that it can send its warnings directly to pilots. Another possible improvement is to combine information from both TDWR and LLWAS into a single display. 

(Continued)
Cleon says RAP has thus far identified ten "products" for use by the aviation community. Five of these—microburst detection, gust front detection, wind shift prediction, precipitation measurement, and measurement of storm movement—will be tested during the operational demonstration of TDWR next year. Other products, such as very short term forecasting (called "nowcasting") of convection initiation and microbursts, will be developed as future enhancements.

Cleon points out that these enhanced products tie in with the goals of the Convective Initiation and Downburst Experiment (CINDE), which recently was conducted near Stapleton (see Staff Notes, 16 July). TDWR and CINDE investigators cooperated closely to ensure that their field measurements were complementary.

"The really interesting part of this work for me is the application of research to a real-world problem," Cleon concludes. The TDWR and LLWAS will indeed go a long way toward enhancing aviation safety and efficiency. -JR

**EAC Discounts**

The Employee Activities Committee has arranged some new discount offers for NCAR employees. For more information on any of these, call Martha Lankton on ext. 1165.

- Denver Home Show tickets are available from Martha or Debi Koepke (ext. 8728) at $3.50 (regular price $4.00). The show is held on 17–20 September.

- Pace Membership Warehouse is offering a certificate for a free lifetime membership, and prices on your first visit are wholesale. (Regular prices are 5% above wholesale.)

- Cory Menghi is offering color consultations at a reduced price. Call Cory at 444-6289.

- Laurie Cohan of Sport Massage offers massages at a discount of $5.00 from the usual $30.00 price. Her number is 938-8769.

- Silvertree Hotel in Snowmass is offering a discount price of $39.00 per night for up to four people during September. Call 1-800-323-6494.

- Best Western Lake Dillon Lodge offers a night's lodging for $59.95 with the second night free. The offer is good until 19 November; call 1-800-727-0607.

**Lost Package**

A package mailed from NCAR Graphics Services to Jim Moore in RL-3 on 24 August never reached its destination. The package is a large interoffice envelope containing originals of photographs and graphic art. If you have any information about the package, please call the GALE Project Office on ext. 8841.

**Run for NCAR at Run for Love**

United Way is sponsoring a five-mile race called Run for Love at and around Boulder Reservoir at 8:00 a.m. on Saturday, 12 September. An NCAR corporate team is being organized for the race. A pancake breakfast will be served at the site from 8:30 to 10:00 a.m. for $2.50 ($1.25 for children 12 and under). The event will also include a hot-air balloon liftoff, a children's race, and drawings for prizes. Racers will receive a $3.00 discount to the University of Colorado football game against the University of Oregon later that day. Tickets for racers are $7.00, $9.00 (race plus T-shirt), and $11.00 (race, T-shirt, and breakfast); they are available at Colorado National Bank, Phidippides Sport Center, or Born to Run.

If you would like to join the NCAR team, please contact either Toni Biter (ext. 8955) or Chuck Purdy (ext. 1043), NCAR's United Way campaign coordinators.
Monday is a Holiday

Monday, 7 September, is an official NCAR holiday (Labor Day). Announcements for next week's Staff Notes are due in Information Services at noon on Tuesday (8 September).

Directory Change

**Room**  |  **Ext.**
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William Randel | ML 428B 1360

Rec Center Passes

The Boulder Parks and Recreation Department, through the Employee Activities Committee (EAC), is again offering NCAR employees the opportunity to buy annual passes at a discount. The annual pass allows year-round, unlimited use of the North and South Boulder Recreation Centers; admission to any of the fitness classes offered on a drop-in basis; admission to Spruce and Scott Carpenter outdoor pools; and a Boulder Reservoir Gate Pass.

The annual passes can be purchased on a payroll deduction plan, if desired. Their cost: $215 per year (as little as $8.27 per paycheck). In addition, family members may purchase their annual passes for half of the resident rate ($125 for the second adult in the household, $65 for teenagers, and $57.50 for seniors citizens and children). You may also have the cost of your family's passes deducted from your paycheck.

Sign-up sheets for the passes were recently distributed to the NCAR staff. If you did not receive one or if you wish further information, contact EAC representative Dennis Shea, ext. 1361.

Snow Seminar Tomorrow

Kazuhisa Tsuboki of Hokkaido University, Sapporo, Japan, is giving a seminar called "Recent Work on Snow Production–Precipitation Processes." The seminar will be held tomorrow (Friday, 4 September) at 10:30 a.m. in RL-6 room W179.

Free Lunch

Every week, NCAR Cafeteria staff draw a name from the bowl of signed lunch receipts near the cafeteria checkout stand. The chosen person receives a free lunch at the cafeteria. This week's winner is:

**Daniel Packman**

In the future, the winner's name will be printed on the cafeteria menu.

Visitors


—John Firor, Advanced Study Program


—Brian Heikes, Atmospheric Chemistry Division


—John Firor, Advanced Study Program
NAME __________________________ (Last) __________________________ (First) __________________________ APARTMENT # ________

MAILING ADDRESS ________________________________________________________________

CITY, ZIP CODE ______________________________________________________________

HOME ADDRESS ______________________________________________________________
(If different from above)

MAJOR INTERSECTION NEAREST YOUR HOME _____________________________________________

WORK ADDRESS ______________________________________________________________

USUAL WORK HOURS: ______________________ A.M. ______________________ A.M. ______________________ P.M. ______________________ P.M. ______________________ PHONE ______________________
(Start) (Quit)

1. How do you get to work? (Circle one.)
   DRIVE ALONE CARPOOL VANPOOL BUS OTHER

2. Are you interested in joining a carpool on a full-time or part-time basis? Yes ☐ No ☐

3. If you are currently carpooling, would you like additional names? Yes ☐ No ☐
   If you checked yes to Questions 2 or 3, you will receive a list of potential carpool partners who live near you.

4. Are you interested in an emergency carpool? (i.e., snowstorm or car in for repairs) Yes ☐ No ☐

5. Do you have a car available to drive in a carpool? Yes ☐ No ☐

6. Are you interested in obtaining bus schedule information? Yes ☐ No ☐
   If you checked yes to Question 6, RTD will be requested to send you schedule information.

7. Vanpooling usually consists of 11 to 15 people and is generally cost effective for commutes of 30 miles or more, round trip. With this in mind, are you interested in joining a vanpool, if one is available? Yes ☐ No ☐
   If yes, would you prefer to be a: DRIVER ☐ PASSENGER ☐
   If you checked yes to Question 7, your name will be given to Van Pool Services, Inc. to provide you with vanpool information.

The survey information is confidential and will be used only by the Denver Regional Council of Governments (DRCOG) for rideshare matching and by the Regional Transportation District (RTD) to encourage use of public transit. DRCOG is not responsible for unauthorized use by persons with whom you are matched, RTD, or others.

☐ Check here if you do not want this information to be distributed outside of NCAR.
CHEMISTRY ENCYCLOPEDIA AVAILABLE AS COMPUTER DATA BASE

For background information on any basic topic of chemistry the Kirk-Othmer Encyclopedia of Chemistry is the standard reference work. Now its complete text can be searched online. This means that any mention of a given topic in Kirk-Othmer can be pinpointed in minutes. With this list of references in hand, you can use the library's printed version of Kirk-Othmer to survey all discussions of your topic found in it. For a search, call the library at X1180.

My acquisitions recommendation for the Mesa, RL6, RL3, MAR, or RAF Library (circle one) is: Name:

The following new books for the Mesa and branch Libraries will be displayed in the Mesa Library September 3 through September 10. They may be reserved during display for subsequent checkout. NCAR staff located off the Mesa may borrow new books by checking the item(s) of interest below and sending this List to Gayl Gray. Reference material, however, does not circulate.

NEW BOOKS

ROCKY MOUNTAIN HIGH TECHNOLOGY DIRECTORY. 1987.
MANUAL ON THE GLOBAL TELECOMMUNICATION SYSTEM. WMO, 1986.
ROCKY MOUNTAIN HIGH TECHNOLOGY BUYER'S GUIDE. 1987.

NEW TECHNICAL REPORTS

Environmental Science:

Mathematics, Computer Science:
**CONSTRUCTION PROJECTS CLERK - #0795**

**DIR - Facilities Planning & Design**
Non-exempt Range: 28, $1,523 - 1,978/mo

**DUTIES:** Implements and operates a system for cost control and reporting for NCAR construction and remodeling projects. Assists in the preparation of project documents and maintains full-cycle project records. Assists in keeping the customer informed of the status of projects. Operates an off-line, subsidiary project cost system to track costs of construction and remodeling projects. Performs a month-end reconciliation of the off-line system records with NCAR's Budget Status Report and recommends correcting entries. Reviews the project coding for all expense documents. Reconciles actual expenses with engineers' estimates and prepares deviation report. Analyzes in-progress work to determine that materials-used documents are being prepared and submitted by the craftsmen, temporary help agency and contractor invoices are being received, and payments to vendors are correct and timely. Prepares weekly reports to customers giving project status, time and costs, change orders in progress, and projected final cost. Types specifications documents and flag notes for drawings, coordinates project documents reproduction, and makes distributions. Maintains full-cycle project files, vendor catalog files, cost of construction indices, and FPD office files. Prepares project spreadsheets showing schedules, funding sources and amounts, early completions and slippages, and in-queue projects by designer and Maintenance and Construction. Develops and maintains data bases, including distribution of architects and engineers' time, materials used per project, ratio of labor to materials, and cost per unit.

**REQUIRES:**
- Skill in working with numbers, keeping records and analyzing data from several sources
- Skill in using a personal computer and software packages such as MacWrite, Microsoft Word, MacProject, Excel or Lotus 1-2-3, and Overview
- Skill in performing general secretarial and office management functions
- Skill in dealing with customers, and craftsmen and engineers
- Demonstrated skill in verbal and written communications

**ALSO DESIRED, BUT NOT REQUIRED:**
- Skill in using a Macintosh Personal Computer

Becky Campbell X8729

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**USER SUPPORT PROGRAMMER I or II - #0791**

**HAO - Administration and Research Support Section**
Exempt Range: 60, $1,887 - 2,830/mo
61, $2,260 - 3,390/mo

**DUTIES:** Performs programming tasks focusing in the area of office automation. Maintains the present office automation system based on vi and troff. Consults with users on word processing. Maintains and improves software used for the HAO library. Performs scientific applications programming such as making minor changes to working programs, debugging, and running existing programs on a large number of datasets. ADDITIONAL DUTIES (Level II): Plans and implements future word processing systems. Writes new scientific applications programs.

**REQUIREMENTS:**
- B.S. in computer science, math, engineering, or physical science OR the equivalent combination of education and experience
-- Working knowledge of UNIX
-- General knowledge of scientific applications
-- Basic knowledge of computer and data processing terminology
-- Basic knowledge of FORTRAN
-- Skill in using UNIX word processing software
-- Willingness to perform routine programming tasks with care

ADDITIONAL REQUIREMENTS (Level II):
-- Knowledge of the internals of UNIX word processing software
-- Skill in programming in C

ALSO DESIRED, BUT NOT REQUIRED:
-- Knowledge of the CRAY computers and COS
-- Basic knowledge of numerical methods
-- Knowledge of computer graphics techniques and software

Becky Foco X8710

PART-TIME

*SECURITY GUARD - #0794*

ADM - Security Services
Non-Exempt Range: 25, $6.41 - 8.33/hour
HOURS: 0 - 40 with emphasis on the midnight to 8:00 a.m. shift
DUTIES: Makes inspection rounds by foot and vehicle; provides first aid when necessary; operates two-way radio and paging system; receives NCAR telephone calls during non-business hours; protects building and contents against loss by fire, theft and illegal activities.
REQUIRES:
-- Flexibility/ability to work on-call (any shift on any day), with primary emphasis on the midnight to 8:00 a.m. shift
-- Physical strength and stamina to make required rounds, move equipment and work alone in isolated areas
-- Possession of a valid Colorado driver's license and ability to qualify for and obtain a GSA driver's license (no more than two moving violations in the last three years)
-- Ability to qualify for and obtain American Red Cross Standard first aid certificate
-- Demonstrated skill in communicating effectively with a wide variety of people
-- Skill in remembering and following established procedures
-- Skill in working with minimal supervision
-- Skill in working independently at remote sites

-- Skill in performing more than one task at a time in emergency situations

ALSO DESIRED, BUT NOT REQUIRED:
-- Security guard, law enforcement or military guard duty experience
-- Skill in using a two-way radio
-- Previous first aid training

Becky Campbell X8729

ADDITIONAL POSITIONS
We are still accepting applications for positions listed below. For information on any of the following previously published job vacancies, please contact the Personnel/BOP office on extension 8693.

ASSOCIATE SCIENTIST II OR III - #0765
ATD - Field Observing Facility
Exempt Range: 81, $2,220 - 3,330/mo
82, $2,660 - 3,990/mo
Date first published in "Job Openings": July 1, 1987

CHIEF, INSTRUMENTATION GROUP - #0782
ATD - Research Aviation Facility (RAF)
Exempt Range: 59, $3,400 - 5,100/mo
Date first published in "Job Openings": August 12, 1987

NETWORKING AND DATA COMMUNICATIONS PROGRAMMER II or III - #0783
SCD - Distributed Computing Section
Exempt Range: 61, $2,260 - 3,390/mo
62, $2,707 - 4,060/mo
Date first published in "Job Openings": August 12, 1987

PROGRAMMER II or III - #0786
UCAR - UNIDATA Program
Exempt Range: 61, $2,260 - 3,390/mo
62, $2,707 - 4,060/mo
Date first published in "Job Openings": August 12, 1987

SCIENTIST AND RESEARCH POSITIONS AVAILABLE
UCAR - Institute for Naval Oceanography
Exempt Positions
These positions are located at the INO site, near Bay St. Louis, Mississippi.
For more information, contact Newton Spitzfaden, (601) 688-5737
SCIENTIST I or II - #0777
ASP - Environmental and Societal Impact Group (ESIG)
Exempt Range: 84, $2,513 - 3,770/mo
85, $3,167 - 4,750/mo
Date first published in "Job Openings": July 29, 1987

SCIENTIST II, III or SENIOR SCIENTIST - #0748
CGD - Cloud-Climate Interactions Group
Exempt Range: 85, $3,167 - 4,750/mo
86, $3,800 - 5,700/mo
87, $3,988 - 6,646/mo
Date first published in "Job Openings": May 19, 1987

SCIENTIST III OR SENIOR SCIENTIST - #0691
ACD - Chemical Modeling
Exempt Range: 86, $3,800 - 5,700/mo
87, $3,988 - 6,646/mo
Date first published in "Job Openings": February 21, 1987

SCIENTIST III OR SENIOR SCIENTIST - #0706
CGD - Coupled Climate Systems
Exempt Range: 86, $3,800 - 5,700/mo
87, $3,988 - 6,646/mo
Date first published in "Job Openings": March 3, 1987

SECRETARY - #0793
ADM - Information Services
Non-exempt Range: 26, $1,262 - 1,639/mo
Date first published in "Job Openings": August 19, 1987

SYSTEMS PROGRAMMER III OR IV - #0775
SCD - Systems Group
Exempt Range: 66, $2,840 - 4,260/mo
67, $3,413 - 5,120/mo
Date first published in "Job Openings": July 29, 1987

USER SYSTEMS SUPPORT PROGRAMMER II OR III - #0787
UCAR - UNIDATA Program
Exempt Range: 61, $2,260 - 3,390/mo
62, $2,707 - 4,050/mo
Date first published in "Job Openings": August 12, 1987

PART-TIME

FOOD SERVICES FINANCIAL CLERK - #0781
ADM - Food and Conference Services
Non-exempt Range: 25, $573 - 744/mo (.5 FTE)
HOURS: 20/week
Date first published in "Job Openings": August 12, 1987

STUDENT ASSISTANT I - #0789
ADM - Photographics Section
Flat Rate: $5.80/hr
HOURS: 20/week
Date first published in "Job Openings": August 19, 1987

STUDENT ASSISTANT II - #0761
MMM - Mesoscale Interaction Section
Flat Rate: $7.10/hr
HOURS: 20/week during school, 40/week during breaks
Date first published in "Job Openings": June 17, 1987

STUDENT ASSISTANT II - #0790
MMM - Mesoscale Research Section
Flat Rate: $7.10/hr
HOURS: 20/week during school, 40/week during breaks

STUDENT ASSISTANT III - #0740
ATD - Research Applications Program
Flat Rate: $9.80/hr
HOURS: 20/week during school, full-time during breaks
Date first published in "Job Openings": May 12, 1987

STUDENT ASSISTANT III - #0784
UCAR - Unidata
Flat Rate: $9.80/hr
HOURS: 20/week, full-time during breaks
Date first published in "Job Openings": August 12, 1987

STUDENT ASSISTANT III - #0785
UCAR - UNIDATA
Flat Rate: $9.80/hr
HOURS: 20/week, full-time during breaks
Date first published in "Job Openings": August 12, 1987

*Asterisked positions are appearing in "Job Openings" for the first time.
CALENDAR NOTES

SEPTEMBER 7TH THROUGH SEPTEMBER 14TH

MONDAY, September 7
HOLIDAY

TUESDAY, September 8
OPEN

WEDNESDAY, September 9
OPEN

THURSDAY, September 10

- HAO Seminar -- Modeling Magnetospheric Convection in the Internal Magnetosphere: Some Present-Day Results and Problems -- Michel Blanc, CNET/CRPE, St. Maur, France
  
  10:30 a.m.
  NCAR Mesa Lab, Damon Room

- CGD Seminar -- Selecting Stratification Schemes for Embedding in Ocean Climate Models -- Brian Henderson-Sellers, University of Salford, Salford, U.K.
  
  3:30 p.m.
  NCAR Mesa Lab, Damon Room

FRIDAY, September 11
OPEN

MONDAY, September 14
OPEN

Calendar Notes announcements may be mailed to Sheryl Meek, ML 140. Tuesday at 5:00 p.m. is the deadline for items to be included in Calendar Notes.