McIDAS - Man-computer interactive data access. 1974/1994

[Madison, Wisconsin]: [s.n.], 1974/1994

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NEWS TIPS

UNIVERSITY OF WISCONSIN–MADISON

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News & Information Service
19 Bascom Hall • 500 Lincoln Drive
Madison, Wisconsin 53706–1380

July 29, 1994

TO: **Editors, news directors**
FROM: **Brian Mattmiller, (608) 262-9772**
RE: **Summer workshop in atmospheric science**

A group of talented Wisconsin high school students and science teachers visiting the university next week will be in for some nasty weather.

More than two dozen students and science teachers will visit UW-Madison's Space Science and Engineering Center (SSEC) Aug. 2-4 for an in-depth workshop on space, earth and atmospheric science. While here, they will get presentations on the hard science of geology and geophysics, a primer on land remote sensing and satellite technology, and finally a chance to put that knowledge to work.

The highlight of the visit will be hands-on work with McIDAS, shorthand for Man-computer Interactive Data Access System. McIDAS is the nerve center for literally billions of bits of real-time satellite data on the weather, all translated and presented visually through computers.

Students will be given a region of the world to study for a day, then come up with weather forecasts for the next day. They will also develop forecasts for their home towns. For fun, they'll also have a chance to view "McIDAS' Greatest Hits," a collection of spectacular satellite images of past hurricanes, thunderstorms, volcanoes, the Kuwaiti oil fires and nearby planets.

"Working with McIDAS is like having a blank canvas, where you can just start creating things," said Thomas Achtor, an SSEC program manager and coordinator of the third annual workshop. "That's what we consider the most powerful part of having McIDAS in the school system, that total interactivity."

Achtor will work with the 10 science teachers attending the workshop on integrating McIDAS into the curriculum. Any school with access to the Internet can tap into some of the McIDAS information. Teachers from Madison, Milwaukee, Racine, Whitewater, Watertown, and other cities will attend.

The workshop is funded by a grant from NASA. Achtor said it is part of a wave of outreach activity by groups across the U.S. to use exciting technology like McIDAS in teaching the physical sciences.

(Editor's note: Media visits would be best on Tuesday afternoon. At 1:30 p.m., the group will observe the launch of a weather balloon from the SSEC rooftop, followed by an introduction to McIDAS. To arrange a visit, contact Achtor at (608) 263-4206, or the center's public relations specialist, Terri Gregory, at (608) 263-3373.)

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uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

Release: Immediately 3/1/88

CONTACT: Steve Silberberg (608) 262-0798; Steve Jascourt (608) 262-2828

STUDENT FORECASTERS SEEK A PLACE IN THE SUN

By ELIZABETH McBRIDE
University News Service

MADISON--It is a competition with no risk of injury, unless, says co-captain Steve Silberberg, disappointed players throw themselves out the window.

But weather forecasters learn early to let mistakes bounce off them like hail off a tin roof, and University of Wisconsin-Madison's team members in the National Collegiate Weather Forecasting Contest are, you might say, "seasoned."

Since October, 16 UW-Madison students have predicted the weather in Brownsville, Texas; Sioux Falls, S.D.; Astoria, Ore.; Sault St. Marie, Mich.; and Portland, Me. Before the school year is out they will forecast for eight other cities across the country, hoping to match the record of the 1986 UW-Madison weather forecasting team, which out-predicted 19 other U.S. schools to become national champions.

This year, teams from 21 schools have entered the annual competition, run this year by the Pennsylvania State University.

The teams actually are collections of individuals who submit individual forecasts. Students must predict daily high and low temperatures and amount of precipitation for each of eight days in a specific two-week period for each city. The forecasts are scored for accuracy and, in the end, prizes are awarded based on the combined scores of a team's members.

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Individuals also are recognized. In 1986, UW-Madison graduate student George Phillips was named best forecaster among about 200 participants in the contest.

The format is in keeping with the solitary and demanding nature of weather forecasting, said Silberberg. "In a crude sense, it's like assembling a big jigsaw puzzle," he said. "We're mentally integrating 100 to 200 separate pieces of information."

The students rely on numerous sources for their data, including the sophisticated McIDAS computer system developed at UW-Madison.

McIDAS -- short for Man-computer Interactive Data Access System -- combines earthbound meteorological readings -- like air temperature and wind speed -- with weather satellite images collected via dishes on the roof of the UW-Madison Space Science and Meteorology Building.

The system, developed in the early 1970s, displays the pictures and maps on a color TV monitor and also generates maps that show temperature, wind speed, wind direction, the amount of moisture in the air and other conditions at ground level and various elevations for numerous locations around the world.

The students also obtain local climatological data for each site from the National Oceanic and Atmospheric Administration. Knowing normal high and low temperatures and average precipitation gives the team some idea of what to expect, Silberberg explained.

But, he added, it's the variation from the norm that makes forecasting a challenge.

For example, the normal high for Portland, Me., on the night of a recent forecasting session was 31 degrees Fahrenheit and the low 12 degrees. But the temperature at 5 p.m. that day was already an unusually warm 33 degrees.

What would happen in the next 24 hours? Would the clouds covering Portland like a blanket keep temperatures high through the night? How quickly would a storm system then in the south move up the coast, and how much rain or snow

might it drop? Would a breeze off the Atlantic Ocean, five miles away, cool the air?

To answer questions like these, Silberberg likes to spend time alone gazing at maps and pondering. He describes his particular style of forecasting as "intuitive." Others, he said, might be more collaborative or intellectual in their method. But one team member admitted to what non-meteorologists might suspect: in the end, after all the variables are considered, it's an educated guess.

Neither Silberberg nor his co-leader, Steve Jascourt, actually want to be weather forecasters when they finish school. Both hope to do research on weather phenomena such as tornados. They believe the contest keeps them in touch with weather patterns that affect people every day and gives them insight into how weather forecasting methods can be improved.

There's been no official word on how the team is doing, but Silberberg and Jascourt are not concerned. They know they've made mistakes -- Portland, for example, was eight degrees cooler than they predicted.

"You always like to get it right," said Silberberg. But, he added philosophically, "You know you're never perfect."

Besides, since contest winners receive only trophies and plaques, rewards for competing seem to be mainly personal. Explains Jascourt: "We're weather buffs."

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-- Elizabeth McBride (608) 262-9772

uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

McIDAS

Release: Immediately 6/3/86

CONTACT: William P. Birkemeier (608) 262-3131

CHALLENGER COMMISSION: WIND DID PLAY ROLE IN SHUTTLE DISASTER

MADISON--A University of Wisconsin-Madison professor has received thanks from the presidential commission studying the shuttle Challenger explosion for showing how changes in wind velocity contributed to the accident.

William P. Birkemeier, former chairman of the electrical and computer engineering department, began forwarding information to NASA shortly after the Jan. 28 flight. Studies of wind-profiling radar are among his research interests and Birkemeier had noticed evidence of a wind shear in the shuttle's smoke trail while looking at videotapes of the accident.

In a letter thanking Birkemeier for his "contribution to the understanding of winds aloft" during the flight, presidential commissioner Eugene E. Covert said, "(Your) computations ... followed a line that several people had. Yours were the more helpful because they were more complete.

"It seems likely that the wind shear did play a role in the accident as one of a sequence of events that in total led to the catastrophic break-up of the Challenger," Covert said.

Birkemeier used data from the McIDAS weather research computer system at UW-Madison's Space Science and Engineering Center as well as launch videotapes. He concluded that the leak in the Challenger's right booster rocket corresponded with its entry into a zone of 84 mile an hour winds. Just four-tenths of a second later, the shuttle broke through into winds of only 14 mph.

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Add 1--Shuttle thanks

Birkemeier said that shear, along with turbulence throughout the flight--turbulence that NASA has termed "busy winds"--resulted in strong forces on the rockets as their engines adjusted to keep the vehicle on its proper course.

Astronaut Brewster Shaw, a UW-Madison engineering graduate, sent Birkemeier information NASA had obtained on high-altitude winds from a weather balloon on the morning of launch. Birkemeier said this data showed strong winds at about 33,000 feet, the same altitude he had calculated, but the balloon indicated a gradual calming above that height, not the sharp drop-off of a shear.

But Birkemeier noted the balloon had drifted a considerable distance as it rose and said that wind shears could have developed in the two hours between the balloon's flight and the flight of the shuttle.

The UW-Madison professor agrees with Covert's statement that the entire sequence of events produced the accident. "We know there was a problem with the seals between booster segments," he said. "But I have the gut feeling that if there had been nice calm air all the way up Challenger would have escaped clean."

###

-- Tom Murray (608) 263-2982

uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

Release: Immediately 12/23/85

CONTACT: William L. Smith (608) 263-4085, Christopher Velden (608) 263-4206

WISCONSIN SCIENTISTS TO PARTICIPATE IN STUDY OF EAST COAST STORMS

MADISON--For two months this winter, University of Wisconsin-Madison scientists will participate in the largest study of East Coast storms ever attempted.

The study, involving some 25 universities, federal agencies and private institutions, is aimed at improving short-range forecasting of coastal storms, storms which cause extensive property damage and loss of life each year, according to UW-Madison researcher William L. Smith.

Smith said the study, known as GALE for Genesis Atlantic Lows Experiment, is intended to learn more about the interaction between large storms and the ocean. Scientists also hope the study will help them create better computer models to predict major storms.

UW-Madison scientists, working through the Space Science and Engineering Center (SSEC) here, will provide support through a state-of-the-art, computerized imaging system called McIDAS, for Man-Computer Interactive Data Access System. It provides immediate access to satellite images and other important weather data as it is being gathered.

Information processed by McIDAS here will be funneled to a McIDAS workstation at the Raleigh-Durham, N.C., airport, field headquarters for the $10 million project.

Smith said the field phase of the experiment will begin Jan. 15 and continue through March 15. After that, the information collected will be used

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to help UW-Madison researchers at the Cooperative Institute for Meteorological Satellite Studies develop and refine improved rain forecasting techniques.

While GALE is under way in the U.S., Canadian scientists will be conducting a similar experiment in Canada's Atlantic provinces with similar support from UW-Madison's SSEC.

The SSEC portion of GALE's $10 million budget is $300,000.

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-- Terri Gregory (608) 263-3373/271-1358

uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

McIDAS

Release: Immediately 9/27/85

CONTACT: Christopher S. Velden (305) 350-4460

WISCONSIN COMPUTER SYSTEM HELPED HURRICANE CENTER TRACK GLORIA

MADISON--As Hurricane Gloria raked the eastern seaboard this week, a computer system developed at University of Wisconsin-Madison was key to providing enough warning for hundreds of thousands of people to flee areas endangered by one of the most powerful Atlantic storms in memory.

A sister version of the same computer-driven imaging system, known as McIDAS, was credited this June with saving thousands of people when a Bay of Bengal hurricane lashed the coast of Bangladesh.

National Hurricane Center forecasters in Florida used McIDAS's computer-generated pictures and information to track and predict Gloria's path as it swept toward a 750-mile stretch of seacoast between North Carolina and Maine. Christopher S. Velden, a McIDAS specialist from UW-Madison's Space Science and Engineering Center, was in Florida helping NHC meteorologists learn how to use the recently-installed system.

"McIDAS has been enormously useful for giving us a look at weather like we've never gotten before," Velden said in a telephone interview. "Its graphics make the (weather) systems very easy to visualize."

Many of those same computer-generated pictures have shown up in newspaper and television reports as Gloria stalked north toward landfall.

The system at NHC -- which got its baptism under fire by tracking Hurricane Elena -- draws information from weather satellites, radar and teletyped weather reports. It then creates computer images of the weather as

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it happens, and can overlay numbers and symbols representing factors such as wind speed, temperature and humidity. It also is linked to the master McIDAS system at UW-Madison's space science center.

The computer does not do the actual forecast, Velden said, but makes the job easier for meteorologists. "McIDAS is a tool that puts all the data together on one screen, allowing a forecaster to think clearer and quicker," he said.

By tracking storms in "real time," meteorologists are better able to predict the time and place the storm will strike. These predictions of Gloria's path let those in its way flee or find shelter in time.

The first version of McIDAS, which is short for Man-computer Interactive Data Access System, was developed at UW-Madison's space science center in the early 1970s. Designed originally to use satellite pictures to track wind patterns, it has evolved into a much more sophisticated system that handles billions of bits of data involving almost every aspect of Earth's atmosphere.

Although McIDAS can display weather within minutes of the time it happens, observers now can view the weather only from a satellite's perspective -- looking straight down. A planned upgrade, however, will allow users to alter their perspective up and down, and in effect "fly" the video terminal through weather systems of interest. Another feature gives a three-dimensional effect if a user wears special 3-D glasses.

Scientists at the Space Science and Engineering Center said that McIDAS was developed as a research tool that would let UW-Madison meteorology and planetary atmosphere professors study and develop theories to explain the weather. A number of U.S. agencies and foreign governments, however, have bought versions of the system for uses that include operational weather forecasting.

Besides the hurricane center, other users now include the National Severe Storms Forecast Center, National Aeronautics and Space Administration, U.S. Air Force, People's Republic of China, Bangladesh and Australia.

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-- Jeff Gregory, University-Industry Research Program, (608) 263-2876

uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

Release: Immediately 9/6/85

REGENTS ACCEPT UW-MADISON GIFTS, GRANTS OF $50.05 MILLION

GREEN BAY--University of Wisconsin System's Board of Regents accepted two month's worth of gifts, grants and contracts totaling $70.08 million here Friday (July 6), including $50.05 million bound for UW-Madison.

Research awards to UW-Madison for August and September were $38.64 million, or 95.9 percent of the system's research grant total.

UW-Madison's gifts and grants were headed by $7.80 million in Wisconsin Alumni Research Foundation grants for individual faculty research, visiting and traveling professors, special research equipment and fellowships. At least three dozen additional WARF awards were accepted for named professorships and support of specific projects.

Other major grants and awards included:

-- $3.64 million in U.S. Department of Education Pell Grants to students;

-- $1.72 million as part of National Science Foundation's $4.62 million in support this year for the Aladdin synchrotron radiation lab near Stoughton;

-- $1.45 million to Space Science and Engineering Center from the U.S. Air Force for a McIDAS weather computer display system at Cape Canaveral;

-- $1.14 million from National Institutes of Health for the Eastern Cooperative Oncology Group's Operation Office in the human oncology department;

-- $1.08 million from NIH for tumor biology research; and

-- $1.02 million from NIH for speech research using a new X-ray microbeam machine in the Waisman Center.

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-- Joseph H. Sayrs (608) 262-8290

uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

Release: Immediately 7/18/85

CONTACT: Tom Achtor (608) 263-4206

UW-MADISON COMPUTER SOFTWARE HELPING HURRICANE-PRONE BANGLADESH

By TERRY DEVITT
University News Service

MADISON-- From 400 miles up, through a satellite's eye, the massive delta at the mouth of the Ganges and Brahmaputra rivers looks fertile and calm.

But when powerful hurricanes blow up the Bay of Bengal and lash the Bangladesh delta, the low-lying islands and coastal lowlands become watery death traps for thousands of people.

The most recent hurricane struck Bangladesh just last month and claimed nearly 15,000 lives. But it might have been even worse, according to University of Wisconsin-Madison meteorologist Thomas H. Achtor.

A recently-installed satellite receiving station and a computer system powered by software developed at the UW-Madison Space Science and Engineering Center (SSEC) enabled thousands of people to flee the powerful storm and the devastating tidal surge that accompanied the hurricane.

Provided to Bangladesh by the U.S. Agency for International Development, the receiving station and computer had just been dedicated when the latest storm loomed off the coast of the populous Asian country.

"Bangladesh news reports are crediting this new satellite receiving and processing station with saving thousands of lives," Achtor said. "They never had direct access to weather satellite pictures before, and when they got the

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system going, they were able to see this big cyclone moving up the Bay of Bengal."

To accurately predict the course and strength of tropical storms, forecasters need vast amounts of temperature and moisture information from the middle and upper parts of the atmosphere, information a satellite is particularly suited to provide.

Usually, meteorologists rely on weather balloons to monitor the atmosphere. But balloons can gather information at just one point. A satellite's sensors can sweep much broader areas, including remote ocean areas where little or no meteorological data has previously been collected.

According to Achtor, the computer is fed a constant stream of this data from a U.S. polar-orbiting weather satellite. This information -- pictures and radiation measurements which give forecasters a read on atmospheric temperatures, moisture and winds -- is processed by the computer in seconds and can give storm watchers so-called "real time" images of storms.

Achtor said the quick access to weather information provided by the system is crucial so that people in the path of a hurricane can be warned in time.

"To save lives, a 24-hour lead time is needed for a hurricane forecast," he said. "People need time to evacuate low-lying areas, where most hurricane fatalities occur. In Bangladesh, the delta lands are very, very flat and barely above sea level."

Aside from helping monitor killer storms, the system also will benefit farmers and fishermen in Bangladesh, Achtor said. The polar-orbiting satellite, known as TIROS, can provide information on moisture content of the soil, important for agricultural forecasts, and it can give fishermen an idea of where warm and cold ocean currents are, a help in locating fish.

Achtor will travel to Dacca, Bangladesh in August to show meteorologists there how to use the large computer software library provided by UW-Madison.

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-- Terry Devitt (608) 262-8282

uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

McIDAS

Release: Immediately 4/10/85

CONTACT: Robert J. Krauss (608) 262-9523

McMURDER, IT WROTE: THE CASE OF THE FUZZY VIDEOTAPE

By TERRY DEVITT
University News Service

MADISON--Bob Krauss, scientist and student of extraterrestrial weather, solves mysteries.

Usually, Krauss and his co-workers at the University of Wisconsin-Madison's Space Science and Engineering Center help unlock the secrets of the planets. By carefully analyzing space probe pictures of Jupiter, Saturn and the other planets in our solar system, Krauss has shed new light on mysteries that have puzzled planet watchers for hundreds of years.

But using UW-Madison's McIDAS, a sophisticated meteorological research computer, Krauss helped solve a different kind of mystery recently -- a murder mystery that could have ended with two sailors going to prison for a crime they did not commit.

"The case involved the robbery and murder of a Racine cab driver last Memorial Day," said Krauss, a UW-Madison academic staff member. "A couple of sailors from the Great Lakes naval base in northern Illinois were arrested and charged with the crime."

At the trial last November, the prosocution introduced a surveillance videotape that purported to show the defendants in a gas station near the scene of the crime. According to Krauss, the tape was a key piece of evidence, but the images of the suspects' faces were not clear.

The prosecution contended that the accused were the two people shown on

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the videotape, which was made shortly after the crime was committed. The defense claimed the sailors were elsewhere and were not the people shown on the tape.

That's when Krauss, who spends much of his time poring over thousands of TV images sent to earth by the two Voyager spacecraft, got into the picture.

"Originally, the public defender's office just wanted somebody who could process the videotape and enhance the images similar to what is done with the pictures taken for the space program," said Krauss. "They asked us to run the same type of program on the surveillance videotape that we use to analyze the Voyager cloud pictures from Jupiter, Saturn and Uranus.

"They wanted us to come up with clearer pictures so that it would be possible to tell for sure if the defendants were or were not the people on the videotape," he said. "It became clear to me, after working on the tape and running the enhancements on it, that it was highly unlikely that the people on the videotape were the sailors suspected of the crime."

Using McIDAS, Krauss was able to make the images clearer by removing the distortion. He also was able to bring out certain facial features, but he emphasized that the computer enhancements in no way changed the basic information on the videotape images.

"We are able to bring out or subdue certain features in an image, but of course you have to be careful that you don't destroy meaningful information. What we try to do is improve the ability of the viewer to see what is really in the image."

Taking his analysis a step further, Krauss noticed certain fixed features in the station -- shelves, counters and furniture -- that could be used to determine the exact height of the person shown on the tape.

"I went to the filling station in Racine and made some measurements of the room and the various pieces of furniture. Then, by using some very simple geometry and the results of my measurements, I was able to demonstrate rather

conclusively that one of the people on the tape was only about 5 feet 8 inches tall whereas the defendant was 5 feet 10 inches tall," Krauss said.

"He would have had to have walked around with his knees bent the entire time he was in the filling station in order to show up on the videotape the way he did," Krauss added. "That evidence was virtually incontrovertible. You could look at the enhanced pictures and say 'Well, that could be the suspect or it couldn't be the suspect,' but there was no way to fake the geometry."

Richard J. Johnson, the public defender who represented one of the accused sailors, said Krauss's expertise was crucial to the defense.

"He was very important to our case," Johnson said. "He couldn't make the picture crystal clear, but he could make it better and he also proved that the guy (in the picture) was just too short."

According to Johnson, he discovered Krauss and McIDAS in a rather roundabout way. He said he spent the better part of a day calling various institutions around the country to find someone who could enhance the tape.

"I did locate one person at the Jet Propulsion Laboratory in California," Johnson said, "but he said he couldn't do it unless it was a national emergency."

Johnson said someone finally put him in touch with Verner E. Suomi, director of the Space Science and Engineering Center, who told him that the center could accommodate his request.

The only sad note to the whole affair, said Krauss, was that while two men were tried for a crime they didn't commit, the trail of the real killer or killers grew cold and is unlikely to be picked up, even with the help of space-age technology.

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-- Terry Devitt (608) 262-8282

research news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

McIDAS

Release: Immediately 1/18/84

CONTACT: Fred Mosher (608)262-3755; John Bates (608) 262-6361

SPACE-AGE TOOLS IMPROVING 'TORNADO WATCH' FORECASTS

by Mark Bello,
University News Service

MADISON--Using new tools to track the erratic movements of violent storms, scientists at the National Severe Storms Forecasting Center in Kansas City, Mo., have improved the accuracy of their tornado forecasts by 20 percent.

That's one encouraging development cited in a recent review of the center's two-year-old Centralized Storm Information System, an experimental computer system intended to help forecasters evaluate the huge amount of weather information gathered on land, at sea and in space.

At the heart of the storm information system is McIDAS, the Man-computer Interactive Data Access System. It is the product of a decade of research and development at University of Wisconsin-Madison's Space Science and Engineering Center (SSEC). Through McIDAS, forecasters in Kansas City have almost immediate access to satellite images and other important weather data as it is being gathered.

During 1982, the first year the storm information system was operating, tornado forecasts were correct more than half the time, as compared with a success rate of about 40 percent in 1981, according to an evaluation done by Fred Mosher, a UW-Madison scientist, and J.T. Schaefer, head of the National Weather Service's Techniques Development Unit in Kansas City.

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Mosher and Schaefer also reported that when Kansas City forecasters sounded a generalized severe storm watch for a particular area, a record four out of five predictions were correct in 1982. Preliminary data indicate the same rate of forecasting precision for 1983.

Severe storms include tornadoes, dust storms, thunderstorms, snowstorms and other types of violent weather. Forecasters at the Center are responsible for issuing severe-storm "watches," which means they must contact local agencies when they diagnose conditions as ripe, say, for a tornado or snowstorm. "Warnings" are the responsibility of local officials and are issued only when a funnel cloud or severe storm is sighted.

Mosher, who directed the installation of McIDAS at the Kansas City center, said the computer provides a way to pull together the deluge of weather data coming into the facility into meaningful patterns -- maps, graphs, charts, enhanced and superimposed images -- on a television screen.

"The forecasters are looking at more data," said Mosher. "But because the data presentations have a higher information content, forecasters spend less time staring at data and more time understanding what's happening with the weather."

Rather than evaluating radar blips to assess the growth and movement of severe storms, many forecasters in Kansas City now monitor storms using real-time satellite images on the screens of their computer terminals. That capability not only permits better storm surveillance, but also allows forecasters to monitor more storms than is possible with radar.

As a result, forecasters have a better vantage point for identifying conditions that could spawn tornadoes and other types of short-lived but destructive storms.

Within the torrents of data streaming into the McIDAS computer terminals at the severe storms center are temperature and humidity soundings from a satellite-borne device called VAS. Like McIDAS, the experimental sounding

device originated at UW-Madison's SSEC. And it, too, promises to be a boon to severe-storm forecasting.

Able to detect infrared light, VAS probes the earth's atmosphere to gather temperature and humidity data at several levels. Prior to VAS, which was conceived in 1971 by SSEC Director Verner Suomi, such data was available only from scattered weather balloons and a polar-orbiting satellite that has a field of view smaller than higher-orbiting VAS satellites.

VAS can monitor the same storm system almost continuously because the satellites carrying the instrument are in geosynchronous orbit -- seemingly fixed in one position above the earth. Perched 22,000 miles above the earth, three VAS-equipped satellites are providing scientists with their first glimpses of the energy exchanges believed to trigger hurricanes, tornadoes, thunderstorms and other violent storms.

As researchers refine their VAS methods, they also are discovering new uses for the instrument.

In its most recent battery of tests, VAS provided the most accurate measurements to date of sea surface temperatures, a key variable in modeling large-scale and seasonal weather systems, concluded researchers participating in a workshop at NASA's Jet Propulsion Laboratory in California.

In tests conducted over the Pacific and Atlantic Oceans during March and July 1982, temperature estimates based on measurements made by VAS's closest competitor, a device called an Advanced Very High Resolution Radiometer that is aboard a polar-orbiting satellite, were confounded by volcanic aerosols.

As a result, said UW-Madison space scientist John Bates, VAS was the only instrument to detect the onset of El Nino, the warming of eastern Pacific Ocean waters that has been blamed for much of the world's unusual weather during 1982-83.

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-- Mark Bello (608) 262-8282

uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

McIDAS

Release: Immediately 9/30/82 jhs

CONTACT: Robert J. Fox (608) 262-0544

LICENSE GRANTED TO SHIP COMPUTERIZED WEATHER SYSTEM TO CHINA

MADISON--University of Wisconsin-Madison scientists expect to ship a sophisticated weather research system to the People's Republic of China about Oct. 15, according to the executive director of the University's Space Science and Engineering Center.

The center received its export license on Monday, said Robert J. Fox, about 14 months after it asked permission to ship a version of its McIDAS system to the Institute for Atmospheric Physics in Beijing. Fox traced the delay to recent concerns about shipping U.S. technology, expecially computers, to communist nations.

Delays in getting the license came both from the U.S. government and from an international coordinating committee made up of Japan, Australia and all the NATO countries except Iceland, he said. Although filed July 13, 1981, the application wasn't approved by the U.S. Department of Commerce's Industry and Trade Administration until last Feb. 1. The international committee took another seven months to add its okay.

China contracted with the center in early 1981 to build a $500,000 version of the McIDAS system, which has been under development at UW-Madison for a decade. The system pulls together weather information from a variety of sources, including satellites and ground-based stations, and displays it on television screens.

McIDAS stands for "Man-computer Interactive Data Access System," with the "man-computer" part implying that it requires a human researcher to interpret the information.

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research news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

McIDAS

Release: Immediately 6/2/82 dls

CONTACT: Charles E. Anderson (608) 262-0783

'BLACK HOLES' MAY POINT TO TORNADOS

MADISON--Researchers at University of Wisconsin-Madison are studying a phenomenon that could let weather forecasters spot severe tornados from space before they cause damage on earth.

"Black holes," or cloud-void areas that appear on satellite photographs of some severe storm clouds, seem to be associated with "killer tornados," says meteorology Professor Charles E. Anderson.

One such cloud-void area showed up on 1981 satellite photographs of the Binger, Okla., area about 30 minutes before a powerful tornado actually touched down, Anderson said, suggesting the phenomenon might constitute a warning signal when it is better understood.

"We're looking at any possible help we can get," he remarked.

Anderson currently heads a team that has been studying severe storms for the past 11 years with funding from the National Science Foundation. The researchers use the McIDAS system, developed by UW-Madison's Space Science and Engineering Center, which pulls together satellite images and other weather information into a single TV picture, and can then calculate and display other results.

Anderson had speculated on the significance of the black holes in an article three years ago, but until recently there was no proof that they were anything more than shadows cast by irregularities on top of the cloud formations.

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Last month, however, the National Severe Storms Forecast Center in Norman, Okla., released a report based on Doppler radar observations. Among other firsts, the scientists found an echo-free center, a place in the tornado where there was almost none of the precipitation, dust, or other objects that reflect radar beams.

The echo-free center coincided in size and location with the tornado funnel. Moreover, Anderson observed, it coincided with the cloud-void area in the satellite photographs. "They had a hole in the radar, and we had a visual," he explained. "This is the first time for visual and Doppler radar confirmation of the same phenomenon."

The Binger twister, which struck May 22 last year, generated winds up to 196 miles per hour and averaged a half-mile in width during its 14-mile journey along the ground. It picked up and hurled from its funnel cattle, farm combines, a semi-trailer truck, oil storage tanks and other debris.

The UW-Madison team is now reviewing photographic records of a number of other storms, including a tornado that killed 66 people in Wichita Falls, Texas, on April 10, 1979.

Anderson and scientists at the Norman center believe that, unlike the rest of a tornado where updrafts produce condensation and precipitation, air within the funnel is sinking, and so must be dry and clear. It is also probably warmer than air in the surrounding vortex, Anderson noted, so that infra-red nighttime satellite observations may reveal the same phenomenon that is visible as a black hole in daylight cloud photographs.

"Tornados are so widespread, so frequent," said Anderson, that "there must be some common denominator--some way of explaining them." So far, cloud-free voids have been spotted in the clouds of only the most violent of tornados, but that is significant, according to the scientist. "It's the killer tornados that the public needs to be warned about," he said.

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UIR/RESEARCH NEWS

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FILE

McIDAS

UIR SCIENCE WRITING DIVISION
(Graduate Student Science Writing Program)

Additional Information: J.T. Young (608/262-6314)
May 6, 1982

McIDAS: LIBRARIAN, ARTIST AND MATHEMATICIAN

by Joseph Alper
UW Science Writer

Madison, Wis.--During the past decade, a team of scientists at the University of Wisconsin's Space Science and Engineering Center (SSEC) has designed and continued to improve an interactive computer system that transforms multitudinous data into useful information. Along the way, the scientists have also developed several technological innovations that are now spilling into consumer markets.

The SSEC creation is called Man-computer Interactive Data Access System, and meteorologists, resource managers, planetary scientists, physicians, even commodity traders have--or will soon--benefit from what is more affectionately known as McIDAS.

Since the advent of weather satellites and radar, meterologists have been inundated with data. Every day, for example, the two geostationary satellites surveying the western hemisphere send down two hundred billion bits of information, enough to record the name

-more-

and birthdate of every person on earth.

Add to that, data from two polar orbiting satellites, radar, radiosonde balloons, and ground stations and you have a data glut beyond the grasp of those who need it. McIDAS was created to tame this data monster.

Just what is McIDAS? It is a librarian, constantly receiving and archiving a steady stream of meteorological data. It is a mathematician performing complex calculations. It is an artist, producing color pictures and short movies that make data analysis easier.

But McIDAS is much more than a standard conglomeration of hardware and software that crunches numbers to produce pretty pictures. It is an impressive tool kit, mainly in the form of over 700 applications modules, that offers flexibility in decisions as to how to best manipulate and analyze a given data set.

"McIDAS, as the name implies, is a data access system, not a data processing system," says SSEC project manager J.T. Young. "The researcher is the processor and McIDAS merely provides the tools to assist in the research process."

Besides the hundreds of applications modules, which Young values at over $12 million, McIDAS is made of the following components:

- a network of eight Harris midicomputers.
- a large room filled with video cassettes containing more information than all the libraries in the United States.

- an interactive graphics system consisting of a standard television; a computer keyboard, display screen, and twin joysticks; and a modified instant replay machine and Sony home video recorder.

Until now, McIDAS has been primarily a research tool, although it has aided forecasters indirectly by providing valuable information for their computer weather models. Meteorology classes at the UW are also taught with McIDAS's help, allowing students to see film loops of weather as it develops, along with wind and radar data.

In mid-February, however, the National Weather Service Severe Storm Forecasting Center in Kansas City received the first McIDAS built to help predict the weather on a daily, even hourly basis. Meteorologists there are now learning how to use McIDAS for such tasks as calculating wind speeds from satellite pictures of cloud motions, and it is hoped they will acquire enough skill using the system to test it in this spring's severe storm season.

In the meantime, SSEC engineers and programmers are busy updating McIDAS, improving the hardware, and adding new applications modules. In addition, they are preparing to deliver a complete McIDAS to the Peoples Republic of China; they have already sent McIDAS's to West Germany and Canada.

As word gets out about McIDAS's amazing and unique capabilities, meteorologists and other scientists should find its assorted skills most useful. Experiments in the planning stages or already in progress include:

measuring rainfall using a combination of radar and satellite data.

add three--McIDAS

determining worldwide crop acreage from multi-channel infrared data measured by the Earth Resource Technology Satellite.

measuring heat loss from buildings using aerial infrared images.

developing new techniques for electrophoresis, a technique for analyzing complex chemical mixtures.

analyzing the weather of Jupiter, Saturn, and Venus with the same applications modules McIDAS uses to analyze earth weather data.

measuring soil moisture using geostationary satellite-generated infrared data.

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uw news

From the University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: 608/262-3571

McIDAS

Release: Immediately 3/2/82 jhs

CONTACT: James A. Weinman (608) 262-1905/2828

U.S. RACING SLOOP GETS HELP FROM SPACE

MADISON--A lone American racing sloop in a round-the-world race got some unexpected help from home last week--a look at Atlantic Ocean weather from space.

The 65-foot Alaska Eagle, holding ninth place against 29 other entries, left Mar del Plata, Argentina, Saturday bound for Portsmouth, England, on the fourth and final leg of the Whitbread Around the World Race. With them, the crew took a description of the South Atlantic weather from the University of Wisconsin-Madison's Space Science and Engineering Center (SSEC).

"They can only get weather information while in port," said James A. Weinman, a meteorology professor and sailing fan, "so they'd have to use whatever the Argentinians could give them. Maybe they'd have satellite imagery, maybe they wouldn't. So we thought we'd send them these."

Working with John T. Young, an SSEC program manager, Weinman processed three consecutive pictures taken Thursday of the weather between South America and West Africa. The weather they showed was described to the Alaska Eagle crew before they broke port.

The satellite pictures were received on the center's own antennas, displayed on a computer terminal and processed by an SSEC research innovation called McIDAS, short for Man-computer Interactive Data Access System. McIDAS let Weinman and Young pick the part of the globe they wanted and enhance the pictures to show aspects of the weather important to sailors.

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The McIDAS system is also used by the National Severe Storms Forecast Center, several other universities and NASA, and has drawn some international interest.

The Whitbread race is coordinated by the Royal Naval Sailing Association of England and was sponsored by the Whitbread Brewery. The association describes the event as one that "tests and stresses people and equipment to the extreme limits and provides a degree of adventure seldom achieved elsewhere in our modern world."

This year's race, the third since its inception in 1973, started last Aug. 29 from Portsmouth with ports of call in Cape Town, South Africa; Auckland, New Zealand; and Argentina. The finish is expected in the last 10 days of March.

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McIDAS

Release: Immediately 11/3/81 jhs

CONTACT: John T. Young (608) 262-6314

UW-MADISON WEATHER EYE HAS ROLE IN SHUTTLE LAUNCH

MADISON--Shortly before the Space Shuttle's scheduled launch Wednesday morning, NASA weathermen in Huntsville, Ala., will bend over a TV screen connected to a University of Wisconsin-Madison computer named Liz.

Then they will decide if everything's "go" for Columbia.

The screen will supply NASA with a computer-enhanced picture from space showing weather patterns around the Cape Canaveral launch site as well as the planned landing strip at Edwards Air Force Base. It will combine, with the picture, data from a variety of weather information centers. The space agency will use it to help decide if the weather is good enough at both sites for launch and landing.

The computer called Liz is one of eight identical Harris computers--all named by scientists after nobody in particular--that make up a weather-analyzing system known as McIDAS. Created by UW-Madison's Space Science and Engineering Center, McIDAS taps several weather satellites for pictures, draws weather information from a number of other sources, and can display combinations of pictures and data with just a few keystrokes.

Meterologists, working from any of dozens of video terminals, can use McIDAS to calculate wind speeds from cloud movements and temperature profiles from infrared satellite measurements.

NASA's McIDAS terminal is connected to Liz through phone lines, and microwave relays will carry the pictures to Houston and the Cape.

- more -

John T. Young, a McIDAS project manager, noted that the UW-Madison system isn't the official shuttle weather forecasting tool. But while traditional means provide the main forecasts, "We provide some unique data and more rapid access to current weather," he said. McIDAS, he added, is "an augmentation."

At Madison, Young said, the shuttle launch will mean adding a midnight-to-7 a.m. shift in the computer operations room Wednesday morning. The Space Science and Engineering Center also has provided some specialized computer programming that, for instance, permits a split-screen look at the weather over both Cape Canaveral and Edwards Air Force Base.

NASA's shuttle team will continue to monitor McIDAS through the planned landing time about Monday noon, he said.

The McIDAS system, under development since 1973, has drawn interest in weather forecasting circles worldwide. The Severe Storms Forecast Center in Kansas City has been investigating its potential in storm forecasting since March of 1980. This year the Peoples Republic of China ordered a scaled-down version of the entire system. The NASA terminal at Huntsville was installed last spring so the agency can study better ways of using information from space.

William Vaughn, chief of the atmospheric physics branch at Marshall Space Flight Center, was quoted in an interview with The Huntsville Times (Sept. 30) as calling McIDAS "a rather fantastic tool." Meteorologist Gary Jedlovec, at Huntsville with the Universities Space Research Association, noted that McIDAS "doesn't answer the questions. You still need a meteorologist to find the answer. But it alleviates all this trivial data handling and massaging."

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research news

From the University of Wisconsin-Madison / University News and Publications Service, Bascom Hall, Madison 53706 / Telephone (608) 262-3571

McIDAS

Release: Immediately 8/28/80 jhs

SEVERE STORM FORECASTERS EYE UW-MADISON'S McIDAS

MADISON--A weather research tool developed at University of Wisconsin-Madison points the way to faster and more precise forecasts of severe storms and tornadoes, say officials of the National Severe Storms Forecast Center in Kansas City, Mo.

Since St. Patrick's Day, federal severe storms forecasters have been testing the capabilities of a system of computers and color TV screens named McIdas by its creators here at UW-Madison's Space Science and Engineering Center. The system pulls together weather satellite images and normal earthbound readings, and can display combinations of the information on a color TV screen.

"McIdas has given us, as forecasters and as researchers in severe storms, a viewpoint of the data we have never really had before," according to Joe Schaefer, chief of the National Weather Service's Techniques Development Unit in Kansas City.

He noted that McIdas' satellite information is received 24 minutes faster and shows more detail than the present pictures relayed through Washington, D.C. The advantage of being able to "superimpose and juxtapose observations from different sensors on the same color screen" is unmatched, Schaefer added.

This ability to pull the information together into a meaningful pattern is what makes McIdeas so valuable to a forecaster sitting in front of its screens and keyboards, developers say. That's also why, when they began putting it togehher six years ago, they named it McIdas--short for Man-computer Interactive Data Access System.

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More than just a display unit, McIdas can use the raw information to calculate tables, graphs, contour lines and wind speeds. It then can overlay them in a single, multi-colored picture--superimposing, for example, high altitude temperature readings on a live, infra-red satellite image.

Edward W. Ferguson, manager of the Satellite Field Services Station in Kansas City, praised the ability of McIdas to fill the gaps between weather station reports with calculations and satellite information. "What we did before in our minds," he noted, "we do at the touch of a button. It upstages the heck out of our present way of operating."

The move to test McIdas' abilities came from the Weather Service's knowledge of how the system has developed since 1974, and from a Texas tornado which slammed into Wichita Falls with scant warning last year. A congressional delegation led by Reps. Don Fuqua, D-Fla., and Larry Winn Jr., R-Kan., both of the House Subcommittee on Space Science and Applications, was shown McIdas videotapes last summer which indicated the warning time might have been increased with a system like McIdas.

Representatives of both the federal forecast services and UW-Madison stress that McIdas is not being used as an "operational" system--it's an experiment to show what can be done.

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research news

From the University of Wisconsin-Madison / University News and Publications Service, Bascom Hall, Madison 53706 / Telephone (608) 262-3571

M-IDAS

Release: Immediately 8/28/80 jhs

CONTACT: William L. Smith (608) 263-4085

--SIDEBAR WITH SEVERE STORM STORY--

SCIENTISTS SEE BRIGHT SPOT AMIDST THE STORMS

MADISON--Tornadoes are a painful and elusive thorn in the side of weather forecasters.

They disappear as fast as they come--in minutes. They hop and skip in capricious fury. Often less than 100 yards across, they are the tiniest of blemishes among the cold fronts, low pressure ridges and jet streams on a forecaster's map.

There is some hope, however, says William L. Smith, a weather scientist for the National Environmental Satellite Service. He says the bright spot lies in the growing ability of weather theory to recognize the conditions which spawn severe storms.

"The conditions responsible for severe weather are set up hours, even a day in advance," he explained. Meteorologists now understand better, Smith said, how the jet stream can affect cold and warm fronts, sometimes making room for warm, moist air to billow into towering thunderstorms through cooler air aloft.

This growing ability is responsible, Smith said, for the success of the tornado and thunderstorm "watch" alerts issued by the National Severe Storms Forecast Center in Kansas City, Mo.

Smith is chief of the satellite service's Mesoscale Applications Branch, which probes the features of large-scale weather formations. He and his team of government scientists have their offices and labs in the Space Science and Meteorology Building at University of Wisconsin-Madison.

- more -

Add one--sidebar

Working with UW-Madison weather scientists, Smith has been instrumental in adapting a computerized weather information system called McIdas for evaluation by severe storms forecasters. The system pulls together a broad range of weather information from satellites and ground stations.

The hope, Smith said, is that the combination of better theory and sophisticated technology can narrow the area of severe storm watches and increase the alert time.

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From The University of Wisconsin-Madison / News Service, Bascom Hall, 500 Lincoln Drive, Madison 53706 / Telephone: (608) 262-3571

Release: Immediately 7/28/77 cmb

CONTACT: J. T. Young (608) 262-0118

McIDAS SHOWS 'EM HOW TO SCAN NORTH TO SOUTH POLES IN 18 MINUTES

MADISON--There's a 99 per cent chance of 50 meteorologists leaving town Friday with plenty of notes on the University of Wisconsin-Madison's weather computer.

The meteorologists, representing universities, television stations, airlines, NASA, NOAA (National Oceanographic and Atmospheric Administration) and private meteorologists nationwide, have been attending a workshop on "McIdas," the "Man-Computer Interactive Data Access System."

Designed and built in 1972 by UW-Madison scientists, the system is a "general purpose image processor" for, among other things, analyzing the atmosphere of Venus and the spectra of stars, or photographing temperatures and heat loss from buildings.

McIdas's dominant use in collecting data and photographing cloud movement from a satellite situated over the Colombia/Peru/Ecuador border. The system is a "real time" data access machine, able to scan about one-third the globe from the north to south poles in 18 minutes and then have the data visible on the screen 30 seconds later.

The satellite pictures, transmitted to dish-shaped antennas atop the Space Science and Engineering Building, can photograph objects down to one-half a mile, so even Lakes Mendota and Monona and Picnic Point can be charted. It's also possible by looking at the video screen to pinpoint the position of a nearby cloud and then look out the window and find it in the sky.

The workshop's purpose is to discover what would best suit the other universities' and institutions' future needs, according to UW-Madison scientist J. T. Young.

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feature story

McIDAS Space Science & Engineering

From The University of Wisconsin-Madison / University News and Publications Service, Bascom Hall, Madison 53706 / Telephone: (608) 262-3571

Release: Immediately 7/24/75 meb

WEATHER FORECASTERS HOPE TO GET BETTER DATA, IMPROVE LONG-RANGE PREDICTIONS

MADISON--Chances are one out of three that anybody's guess whether the average temperature during the next month will be normal, above normal or below normal will be correct.

So how do professional meteorologists using complicated maps and charts and jet stream data do on their 30-day forecasts? Not much better. They were right about 35 per cent of the time, according to a university professor who kept track of the forecasts and compared them with actual temperatures.

Meteorologists say the chief barriers to accurate forecasting are that they can't get any information about weather over the oceans where there are no stations to collect data, and that information from Africa and South America is scarce and unreliable. But meteorologists hope to close the data gaps.

The 24-foot dish antenna mounted atop the University of Wisconsin-Madison meteorology and space sciences building will be used in a test of data systems that one day may provide more accurate long-range forecasting.

The antenna here collects pictures of clouds transmitted from a weather satellite every half hour. A series of pictures taken over a period of time show which way and how fast the wind is blowing. The information is fed into a computer.

During the two-month long test which begins in August, the UW-Madison system's wind data will be correlated with information about atmospheric temperatures and moisture collected by other U.S. scientists from weather satellites and balloons.

- more -

What the meteorologists do here is imaginatively called "wind getting" and Fred Mosher, who will be coordinating this part of the test, believes the University has the most sophisticated system for gathering wind information. He says use of meteorological satellites and computers will take some of the guess work out of forecasting:

"The difficulty in accurately predicting weather is that the rules of physics don't apply. In physics, if you drop a pencil you can use an equation and find out what direction it will go and how fast it will be traveling when it hits the floor. But in weather forecasting the equations are of the nonlinear, differential type. They can't be solved. The only answer you can get is by using a computer to make approximations based on a numerical model."

Mosher said the numerical models, consisting of temperature, moisture, and wind data on a grid, are now only good for a couple of days before the model breaks down and another must be constructed. Meteorologists believe models would last longer and be more accurate if more complete global weather information was available.

Meteorological satellites can fill in the gaps over the oceans if the data gathering systems can be perfected. Mosher said models based on more complete global weather information might last a week or two before breaking down.

Although satellites can gather information where there are no weather stations, Mosher thinks they will never completely replace weather balloons. Satellite-gathered information on winds is very good, but the satellite is not as accurate as balloons in collecting data on atmospheric temperatures and moisture levels.

"The satellite can get temperatures at only about 10 levels (distances from the earth's surface). The weather balloon can get temperatures at 30 to 40 levels. And the satellite's temperatures are accurate to about two degrees while the balloon temperature readings are accurate within one degree."

The UW-Madison antenna, severely damaged in a wind storm in May, has been repaired and remounted. It will be fully operational again before tests begin Aug. 18.

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UIR / RESEARCH NEWS

UNIVERSITY OF WISCONSIN-MADISON

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UIR SCIENCE WRITING PROGRAM
(Graduate Student Science Writing Program)

Further Information: Thomas Haig (608/262-0544)

October 21, 1975

Research Satellites McIdas

by Robert Ebisch
UW Science Writer

Madison, Wis. --A super-human machine named McIdas is fomenting scientific revolution at the University of Wisconsin-Madison.

McIdas, short for the brain-stunning title, "Man-Computer Interactive Data Access System," unites man's qualitative judgement with the computer's speed and analytical abilities.

The machine was developed slowly from a seven-year effort by Wisconsin scientists to accurately measure winds from satellites.

It includes a computer, a teletype through which the operator can talk to the computer, and a color television screen through which the computer can talk back.

McIdas also controls a number of specialized electronics packages which color the TV-picture, choose appropriate views of earth, filter image data, and help the human operator get along with McIdas.

-more-

add one--McIdas

A serious problem in many research fields is that satellite data pouring in at rates of up to one TV picture every three seconds, 24 hours a day, produces an information glut totally beyond the grasp of those who need the information.

McIdas assimilates the avalanche of data with ease. The scientist sitting before McIdas' screen can scan thousands of electronic pictures quickly and efficiently.

From instant to instant he can order up visual displays from the computer's vast information stores, manipulate the picture, and view changes as he commands the machine to make complicated mathematical analyses.

The results can be amazing.

In a month-long test during August and September, for example, McIdas used pictures from a satellite 20,000 miles in space to measure wind speeds on the earth's surface within two miles per hour.

"This is more accurate than the resolution of the camera that took the pictures," says Tom Haig, director of Wisconsin's space science and engineering center. "McIdas made 1,100 measurements of the wind's speed, direction and altitude every six hours and automatically distributed them to forecast centers.

"And each wind measurement costs us only 28 cents," he adds. "This is remarkable when you consider that the conventional method of measuring winds with a balloon costs $15 or $20 per reading."

Haig also points out that the balloon system is limited because the world is mostly water with no weather stations on it.

"The conventional monitoring systems are doing well if they keep track of 15 to 20 per cent of the earth," Haig continues. "We have to make it 100 per cent if we're ever going to forecast effectively.

"You have to look to the Pacific Ocean to see what kind of weather Wisconsin will have in four or five days."

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uw news

From The University of Wisconsin-Madison / University News and Publications Service, Bascom Hall, Madison 53706 / Telephone: (608) 262-3571

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(PICTURE AVAILABLE)

NEW ANTENNA WILL BRING BETTER PICTURES FROM WEATHER SATELLITE

MADISON--An antenna 24 feet in diameter is being assembled on the roof of the Meteorological and Space Science Building at the University of Wisconsin-Madison. It is one of only three antennas capable of receiving retransmitted pictures of the earth from a new weather satellite to be launched next March.

The pictures, retransmitted in the same way communications satellites send TV signals, will be brighter and sharper than pictures previously redistributed over telephone lines.

Two meteorological satellites are now in orbit. One of them stopped transmitting last fall after sending pictures at half hour intervals for seven years.

Thomas O. Haig, associate director of space science, said the new satellite would orbit 22,000 miles high over a fixed point on earth. It will have the same "spin scan" camera earlier weather satellites used. That camera, developed by Prof. Verner E. Soumi, director of space science at the UW-Madison, with the cooperation of the Santa Barbara Research Institute, is really a telescope, Haig said.

As the satellite spins at a rate of 100 rotations each minute, a mirror that reflects the image of the earth below changes position slightly. On each spin, the picture of a thin strip of the earth is sent to a central receiving station with a 60-foot antenna on Wallops Island, Va. After 2,400 rotations, or about one-half hour, those strips form a complete picture of the earth and its cloud cover.

Then the process begins again. In another half hour, the next picture begins to show which way the clouds are moving.

- more -

Add one--antenna

Transmission of each section of the photograph takes only a small fraction of the time required for each rotation. The new satellite's transmitter will re-adjust itself during the rest of the rotation period and retransmit the image, in a modified form, to smaller antennas like the one being constructed here.

When the signal is received, it will be fed into a computer system UW-Madison meteorologists call McIDA--Man Computer Interactive Data Access System. Using complex mathematical juxtapositions, they can accurately plot the direction and speed of winds and estimate rainfall. This information is especially valuable in determining weather at sea where there are no stations to take measurements.

The antenna was purchased from the National Oceanic and Atmospheric Administration with a grant from the National Science Foundation. Assembly of the antenna will be completed soon--if the weather is good.

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