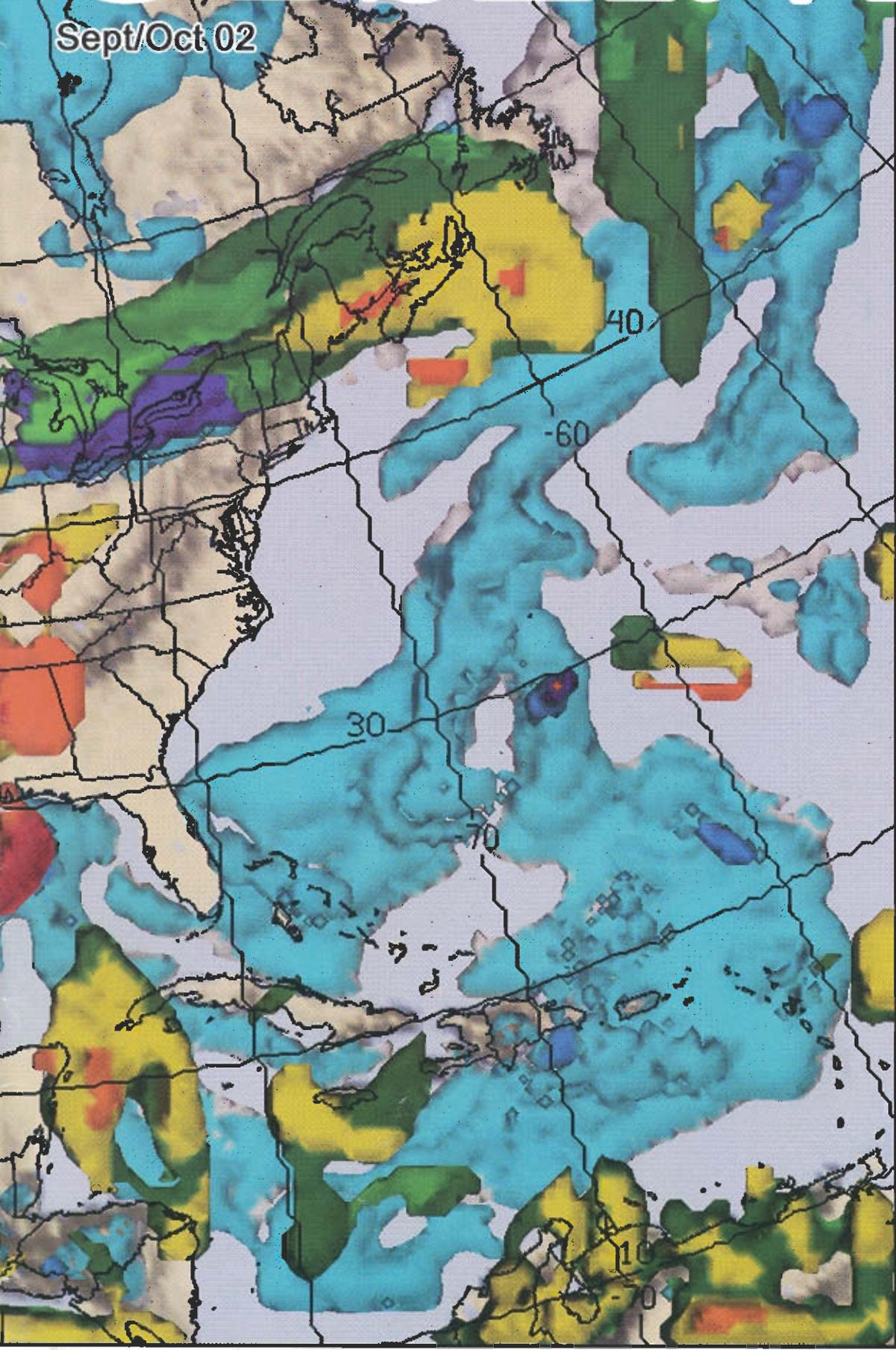


YOUR MAGAZINE FOR AIR FORCE WEATHER

# OBSERVER

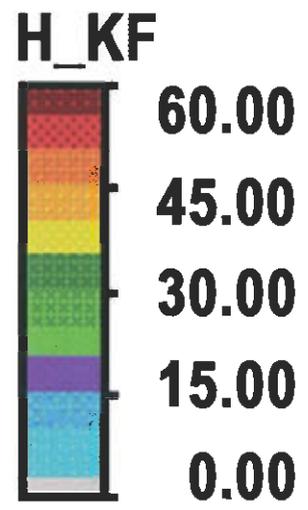
Sept/Oct 02



**3DVAR  
Up and  
Running**

**Academy  
Cadets  
Experience  
Combat  
Weather**

**Space  
Weather  
and  
Alaska**



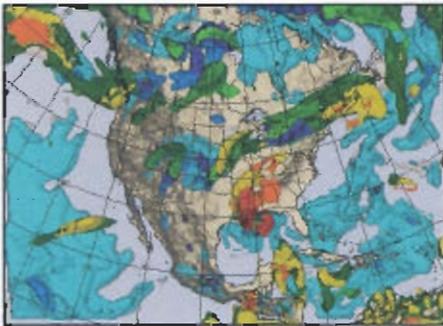
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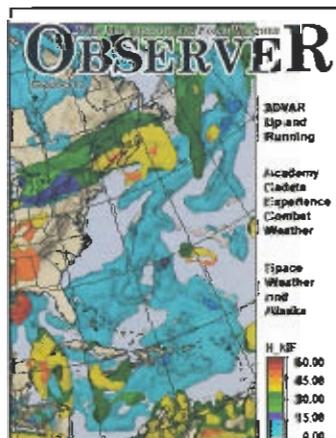
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A North American MM5 cloud depiction initialized with 3DVAR image from Oct. 3, 2002. For more information on 3DVAR, see page 14.



# OBSERVER

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# N-TFS

## The Future of Deployable Weather Systems



Photo courtesy of General Dynamics

An Air Force Weather specialist uses the N-TFS 3.1 laptop in a tactical environment.

**By Capt. Martin Sipula**

AFWA Production Tailoring/Warfighter Applications branch

Today's short notice deployments to support and defend our country's national security interests can take us anywhere around the globe! Our soldiers can live and die by the accuracy of their weather information — getting it to them has always been a difficult challenge. That's where the New "Tactical" Forecast System, Version 3.1 comes in to play — note the emphasis (finally) on "Tactical". Our deployed warfighters will now use equipment almost identical to the equipment they trained on in-garrison. With this big step forward, bulky, antiquated weather equipment will soon be a thing of the past.

During the fielding of the N-TFS 3.1 release, scheduled to start this fall, units identified in the Tactical Fielding Strategy will receive a tactical server/client laptop. The laptop, a Dell Latitude, will run the Linux Operating System on the server side and the Windows NT system for client applications. These can be set up quickly and begin receiving data within a matter of minutes after arrival at a deployed location.

N-TFS 3.1 will have a fully deployable configuration. The typical architecture will include a deployed laptop server connected to a deployable Tactical Very Small Aperture Terminal and a VSAT Comm Handler. Additionally, each deployable N-TFS 3.1 laptop server will be

fielded with network hubs and other equipment allowing the unit to set up a N-TFS private Local Area Network as a first-in capability. Once a deployed LAN is established, customers can connect laptops (or desktops) loaded with the N-TFS 3.1 client software and access critical weather data directly through the LAN. Weather personnel will be able to provide their deployed customers with the same weather data in the same manner provided in-garrison. This is an important milestone for Air Force Weather because N-TFS 3.1 realizes one of the key tenets of AFW Reengineering — a true "train-as-you-fight" capability for weather warfighters.

All Army and Air Force units with tactical/deployable missions are encouraged to take advantage of N-TFS 3.1 training. The AFWA training website has information on N-TFS 3.1, laptop server/client operations and the Local Weather Network System set-up. If you know your next deployment location, you can create your macros/composites for that area and take care of your Weather Subscription Service lists ahead of time. Taking care of this prior to your deployment may save you time once you arrive at the site. No matter where your mission takes you, you can depend on N-TFS 3.1 to provide reliable weather data to meet your customer's deployable needs. ✎

# AMC Weather Operations: Command Rolls Out M2K

**Col. Carl Daubach**  
Chief, Weather Division, HQ AMC

Mobility 2000 is Air Mobility Command's comprehensive global Command & Control integration and modernization initiative. State-of-the-art aircraft tracking and reporting equipment, a robust global communications network, and a flight dispatch operation called Integrated Flight Management combine to improve combat capability, mission effectiveness, and safety.

Under M2K, pilots no longer spend valuable crew duty time flight planning, filing their routes, requesting weather briefings, and coordinating cargo and fuel loads with ground personnel. Flight managers, located in the Tanker Airlift Control Center, complete these tasks for the pilot. The FM is a "virtual crewmember" who "papers the crew" with all necessary mission and flight information including weather, freeing the aircrew to spend more time in the air, delivering critical cargo and personnel. The FM addresses flight issues up to 24 hours in advance while the crew is still in crew rest. They also flight-follow missions, enabling them to quickly re-plan and re-route the aircraft, update the aircrew on weather, or smooth the way for operating in international airspace.

Only four percent of current AMC missions are dispatched under M2K, however, the command projects rapid expansion through 2005 to include all AMC missions, airframes, and operating theaters. The Air Mobility Operation Control Centers in USAFE and PACAF are also developing dispatch centers for theater-owned missions and resources.

The 15th Operational Weather Squadron has been an integral part of the M2K team since the beginning of the initiative. The prospect of dispatching and providing end-to-end weather operations for more than 300 missions daily, on a global scale, required new tools, tight processes, and innovative thinking.

The Integrated Management Tool, a primary C2 tool, has built-in weather alerts and a semi-automated weather package that replaced the traditional DD Form 175-1. Other tools in development will overlay graphical weather data with mission routes, alert FMs to mission-limiting weather and continually compare the winded flight plan to aircraft reports.

Operational Risk Management processes focus resources on at-risk missions and standard operating procedures institutionalize them. Special care is taken to collaborate with the OWSs and utilize their products in the Mission Execution Forecast Process.

Even more exciting than the new technology and processes is the burgeoning relationship between weather and the FMs. Successful mission planning and execution is truly a team effort in the TACC.

Prior to M2K nearly five percent of AMC missions were delayed each year due to weather. The delay rate for IFM missions is only 2.8 percent – a 40 percent reduction.

When weather forecasters identify a threat and offer risk-mitigating options, the flight manager will act on that recommendation 84 percent of the time. Routes are changed to avoid severe turbulence, diplomatic clearances are obtained to circumvent the path of a tropical storm, and crews are held in crew rest until the fog clears.

A short notice, high priority Predator deployment required a crew change on the East Coast. Mission-limiting weather at the destination threatened to delay the mission. The mission was redirected to an alternate airfield and the new crew was bussed in. Planning and execution decisions were implemented while the first crew was en route. The Predator arrived in theater on time.

An Operation ENDURING FREEDOM mission, to pick up troops for Operation ANACONDA, accepted a 4-hour controlled delay to avoid a 48-hour delay. Freezing rain was forecast to occur while the mission was on the ground loading troops, and limited de-icing capabilities would have prevented the mission from launching. The decision was made 24 hours in advance to delay the arrival 4 hours to avoid the threat.

Security Forces supporting the Al Qaeda prisoner move were transported to an alternate debarkation point when a winter storm was forecast for their home station 36 hours in advance. The storm hit. The alternate point was vital to ensure this high-visibility mission proceeded without delay.

Weather integration into M2K has been such a success that the 15th OWS's Global Mobility Flight was recently selected as an AMC nominee for the Chief of Staff Team Excellence Award for innovative processes that resulted in reduced delays. Additionally, WXM's risk management and OWS collaboration processes were benchmarked by the Air Force Weather Agency's Standardization and Evaluation Team following their April 2002 visit.

As the Mobility Air Force lead command, AMC will continue to work closely with AFWA, TACC, functional experts, and others to develop and refine processes, automate products, improve services to aircrews, and make M2K fully operational by 2006. ♣

# Chief's Mentoring: Writing Award Winning Packages

**By Chief Master Sgt. Penny Braverman**  
AFW Chief Enlisted Manager

At the end of each year, supervisors and commanders start thinking about the Air Force Weather Awards program and who should be nominated to represent their unit. The Air Force Awards program is alive and well, but some commanders and supervisors have a difficult time writing a winning award due to lack of practice. There are some simple guidelines to strengthen awards packages and make your people more competitive at a base, MAJCOM, and Air Force level.

Start by reviewing the criteria needed to apply for the award. Knowing the criteria ahead of time can help your people fill the data void throughout the year. Yes, it is a yearly process that involves you and your people. Supervisors must provide guidance and opportunities to fill the data blocks to be competitive.

An example of providing opportunities is selecting someone as the unit NCO Council representative for the unit. You provided the individual an opportunity to participate and to be a leader in that council.

Those looking for ways to excel must seek these opportunities as well. Let your supervisor know about your interests and how you would like to be involved in the base and community. You can help yourself by getting involved in base and local communities and doing volunteer work you enjoy – just make sure your supervisor is aware of your contributions.

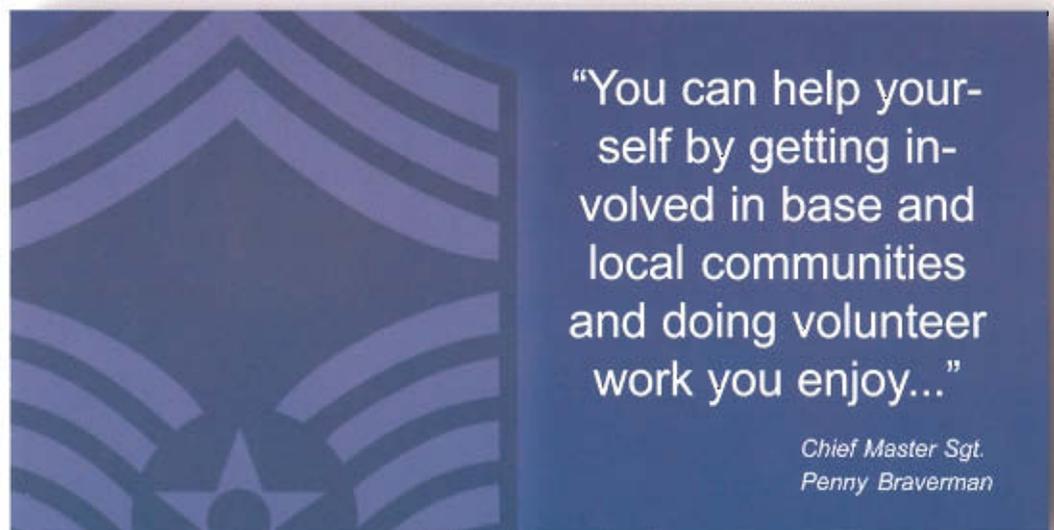
Writing the award is the next step. Good writing skills are learned through practice. I have found that using an outline of the key elements as bullet statements works well. I then go back and fill in the data to make a strong sentence. Remember, the data is the justification for the statement. Include facts, numbers, amounts, percentages, etc. – basically anything that can make the statement true and factual. Here are a few examples of hard-hitting statements:

*- Airman Smith spearheaded the quality control program for the unit observing function effectively reviewing more than 6000 observations that resulted in a 98 percent unit error free rate for the year*

*- Sergeant Jones deployed for Exercise XXXXX to base XXXXX, providing timely and accurate forecasting for three squadrons of F-15s for a 60-day period*  
*-- His superior tactical decision aid forecasts and warnings resulted in six F-15s rescheduling weapon types 30% of the time and he saw a 98% mission accomplished rate*  
*-- He saved the Air Force more than \$20K in resources*  
*- As the NCOIC of the briefing cell, he led his section in providing more than 2000 flight weather briefings monthly to 12 AF bases, 35 ANG units, and 4 other DoD units throughout the AOR*  
*-- The cell's work freed up 12 AF Combat Weather Teams to accomplish their local and wartime missions and saved the Air Force more than \$10K in resource protection*

Remember not to fill your statement with acronyms or jargon specific to your speciality. Just because you know what the acronym means does not mean the rest of the Air Force understands that same acronym or has the same meaning. I have seen good NCOs miss STEP promotions because the board members did not know the acronym CWSO – basically a NCOIC. If the term NCOIC had been used, the individual would have had a better chance to compete on a level playing field.

See Awards, next page



## Awards, continued from previous page

Additionally, be honest, truthful, and to the point with all your write-ups. Flowery language and stretching the truth are distracters. Most board members must go through numerous packages and see right through weak packages full of adjectives or unbelievable lists of items used as filler. An example of a wordy write-up is:

*- Sergeant Smith's superior and timely technical and military knowledge as NCOIC of the unit led to his outstanding and accurate forecast for exercise XXXX supporting five C130s and resulting in astronomical savings to the Air Force*

Not only is the sentence long, it's not specific. It could have been worded much stronger and clearer:

*- Sergeant Smith provided superior forecast support to five C130s supporting exercise XXXX—his forecasts allowed the crew to select weather free drop zones and directly saved the Air Force XXXK in fuel costs and flight time.*

Finally, don't forget the administrative details - spelling, grammar, size of type, margins, etc. These administrative details may appear as minor things to consider, but these details are a detractor. When these errors occur on an award package, it presents the appearance the supervisor and commander did not care enough to ensure correctness. This may indicate the individual is not worthy of the award. I know this sounds unreal, but subconsciously, some board members may discount these nominees. So you must take the time to check award packages for minor errors, and another set of eyes in the review process would not hurt.

There are many other ideas to improve and strengthen your award packages. Have one or two people, preferably someone outside of weather, review the package and check for acronyms and clarity. Get several supervisors to review packages as a group. Review the entire package line

by line. You will be surprised how a group of three people can improve an award significantly. Consider the possibility of submitting the individual for a different award if the facts don't support a particular award program. Match technical accomplishments to technical award programs versus the NCO of the Year program.

These are just a few of the tools to help you prepare a strong award package and make your people more competitive in any award program. You must guide potential nominees throughout the year to ensure you have award material that is factual and relevant.

Once you have all the facts, the writing part becomes easy. But you must do a thorough editing job on the package before sending it forward. Our people are worth the effort we put into award packages, and the dividends we get back from the people in reenlistments, commitment, and production speaks for itself. ✎



Photo by Master Sgt. Miles Brown

## Taking the tour

Brig. Gen. Carlos Minero Rodriguez, director of Military Meteorology Services, Mexican Secretariat of National Defense, receives a briefing in the Air Force Weather Heritage Center from Al Moyers, AFW historian. General Minero visited the Air Force Weather Agency, Offutt AFB, Neb., in August as part of a comprehensive AFW tour, which included stops at the 45th WS, Patrick AFB, Fla., and the weather schoolhouse at Keesler AFB, Miss. During General Minero's visits, he was shown all facets of AFW from training weather technicians to strategic planning at AFWA.

# PACAF Weather Operations: Warning: Tropical Forecasting Not for Faint of Heart

**By Lt. Col. Norbert Cordeiro**  
Deputy Division Chief, Weather Division  
Directorate of Air and Space Operations, PACAF

Thirty inches of rain from a typhoon? Winds gusting to 150 knots? Bring it on! Six inches of rain in an hour from a tropical downpour? No problem. The tropics is where it's happening. We don't need faint-of-heart forecasters here.

A "Pell's Kitchen" cartoon frame in the May/June issue of *Observer* magazine provided the inspiration for this column. I had to chuckle as I read the punch line and foreboding warning sign depicted in the final frame. After all, as anyone who's ever been assigned in the tropics knows, life is good for the tropical meteorologist. Who needs all that snow and ice stuff, and, oh yeah, those nasty meso-scale convective complexes, or MCCs, as opposed to MREs, that eat YOUR lunch! When the weather technician in the cartoon exclaims the wind speed doubled from two to four knots, he quintessentially hit the nail on the head

as to the essence of tropical forecasting. It's looking for and knowing the subtleties of weather in the tropics that make or break you as a tropical weather technician. I know what you're thinking: how tough can it be?

Consider all that's needed to get things going is a subtle, one-degree temperature

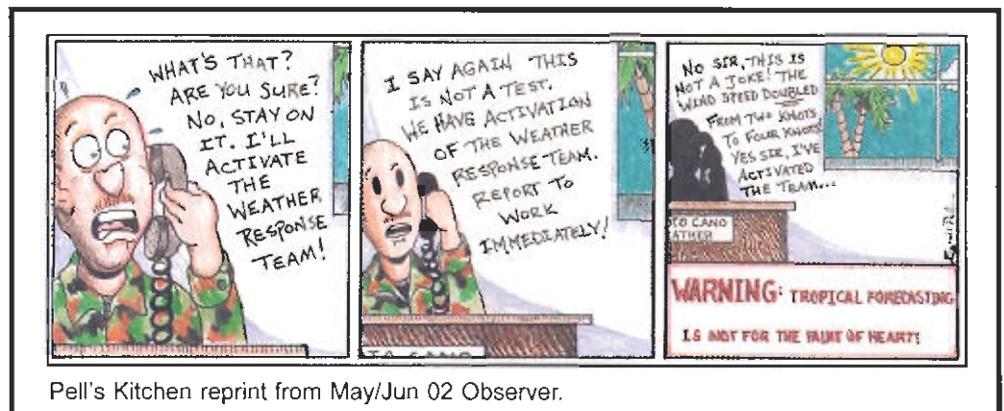
differential in a conditionally unstable, deep, moist tropical atmosphere to get cloud tops to 50,000 feet. And, voila! Just like that, you have yourself a forecast challenge! Not to mention your Ops Group commander imploring, "Where's that cell going to move and how much is it going to dump on my airfield? And I want to know right now, Stormy!" But not to worry, it's the tropics! No pressure.

Out here in the vast expanses of the Pacific, tropical forecasting is a breeze. Just go talk with the typhoon duty officers and satellite analysts over at the Joint Typhoon Warning Center. Now that's a laid back, stress-free kind of job! This select group of in-house, professionally-trained Air Force and Navy tropical meteorologists routinely monitor and issue warnings and advisories for an area of responsibility covering nearly half the Earth's oceans area. Relying almost exclusively on foreign and domestic satellite imagery, precious few surface observations, even less upper air observations, virtually no radar coverage nor aerial weather reconnaissance, and a bevy of forecast models that sometimes behave sort of like a gaggle of crusty, old weather guessers producing as many "opinions" as there are belly buttons in the gaggle.

JTWC's tropical experts congeal into a formidable team to accomplish a mission no other DoD entity does or can do as well as the JTWC. Every person on the team shreds every scrap of information in pursuit of the most insignificant detail that could be the most important clue in the evolution of the tropical cyclone system being dealt with at the moment. No pressure, right? Try turning off most of your surface obs and radar next time you have to get a forecast out the door. Like I said, it's a breeze. The folks over at JTWC do it all the time.

Weather specialist at OI-A, 25<sup>th</sup> ASOS over on the Big Island of Hawaii know forecasting in the tropics is a literally a breeze...a sea breeze to be exact. For the most part, it's a desert climate at Bradshaw right here in the tropics in the middle of the Pacific Ocean. At roughly 20° north latitude, Bradshaw AAF sits on the southern flank of Mauna Kea at about 6200 feet above sea level. Noctur-

See PACAF, next page



Pell's Kitchen reprint from May/June 02 Observer.

nal temperatures at that elevation will dip below freezing in the winter. It's dusty and dry. You could just as well be at Luke AFB, Arizona. There's not much difference, except for that sea breeze...at Bradshaw, of course. I'll save the Luke sea breeze discussion for another column.

Situated well above the trade-wind inversion layer between two massive volcanoes, Mauna Kea at 13,976 feet, and Mauna Loa at 13,680 feet and still very much an active volcano, winds at Bradshaw are typically light while low humidity keeps clouds to a minimum throughout much of the night and morning hours. Even with a blustery trade-wind regime dominating the entire Hawaiian archipelago, the island's sheer mass causes the trades to divert around its flanks much like water around a huge boulder in a rushing river, leaving an induced high pressure cell over it's western flank.

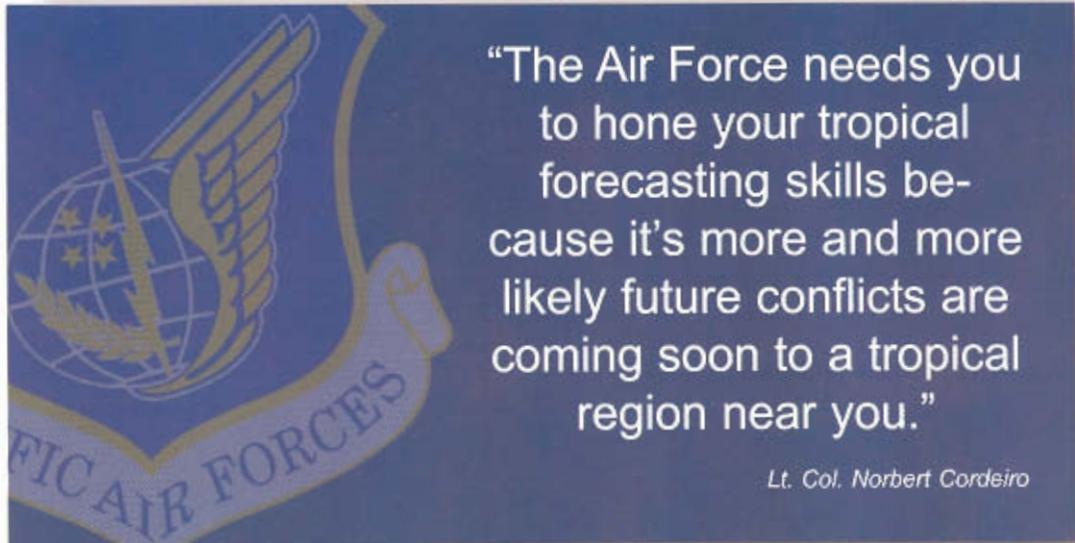
As daytime heating progresses on a typically bright Hawaiian sunny day, a sea breeze front, reinforced by direct insolation of sparsely vegetated, black lava fields, aggressively climbs the flank reaching Bradshaw's elevation by late afternoon. Most times, the front will progress and hang within several hundred yards to a few hundred feet west of the runway as evidenced by convection associated with the converging winds.

However, it's not uncommon for the front to breach the six-foot high perimeter fence surrounding the airfield, stop and hang dead center over the airfield, and for Bradshaw's wind socks at either ends of the runway to point towards the other. Okay, granted, it's not grapefruit-sized hail I'm talking about, but you go ahead and forecast the onset and duration of convergent winds over the runway when you're the only weather station at that elevation and others are anywhere from 10-30 miles away either at sea level or at the volcanoes' summits. Like I said, subtle.

If you're looking for a beautiful tropical setting with scads of World War II historical points of interest, check out very popular PACAF locations like Kadena or

Andersen Air Bases. Although technically in the subtropics, Yokota and Misawa Air Bases in Japan and US Army and US Air Force combat weather team locations in the Republic of Korea lay squarely in typhoon alley and frequently dodge several tropical "bullets" coming up at them each season from the equatorial Pacific.

I'd be remiss if I neglected to mention the Air Force's two newest operational weather squadrons are right here in PACAF. The 17th OWS at Hickam AFB, Hawaii and the



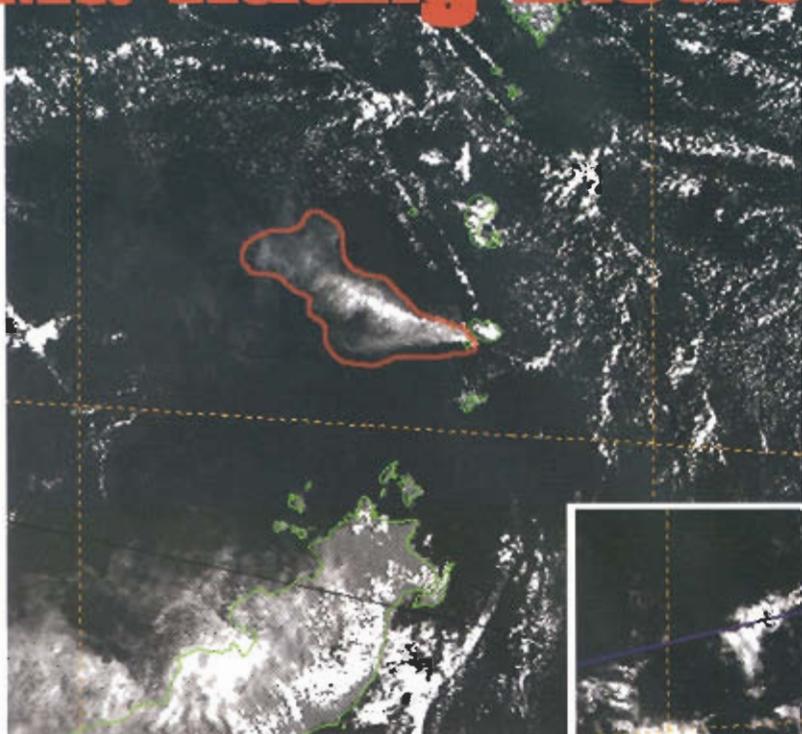
20th OWS at Yokota AB, Japan are exceptional locations to work with terrific people.

Okay, it's obvious, I'm marketing PACAF. Hey, it's a great place to live and work! I'll even plug the 11th OWS at Elmendorf AFB, Alaska, not only because they're part of the PACAF family, but because they're our northernmost "tropical" hub right in the middle of the 49th state's "banana belt" region. Okay, I know that was a stretch, but I needed to fill more blank space.

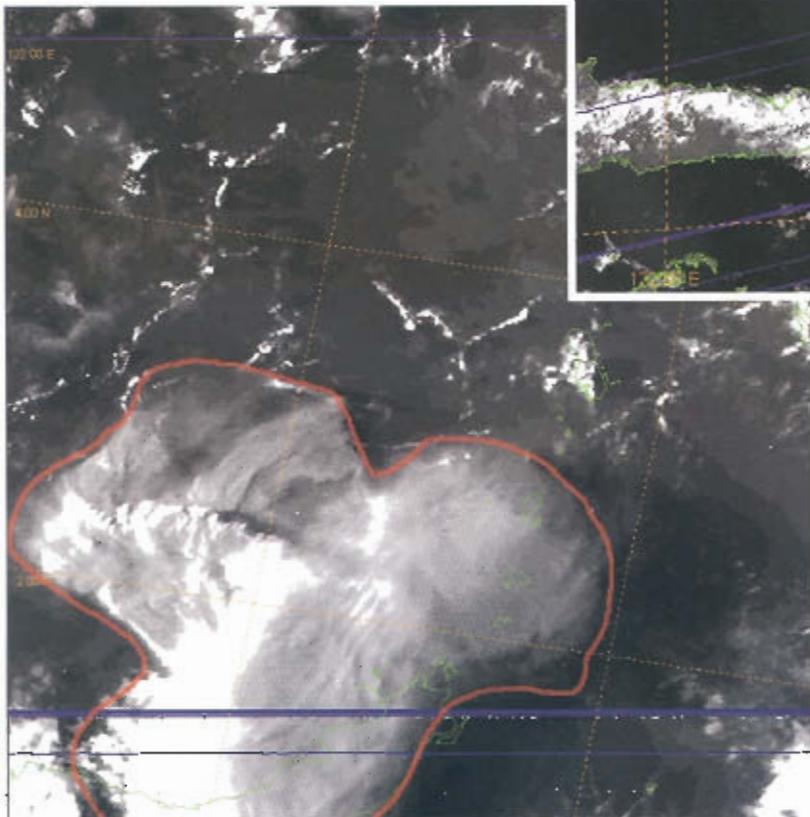
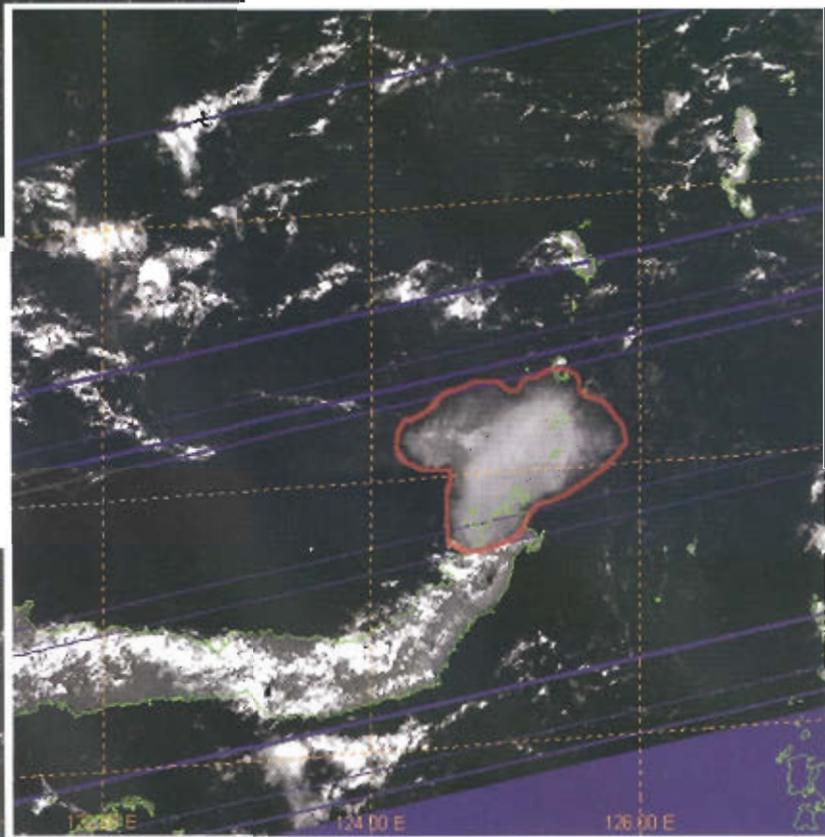
In fairness to other MAJCOMs, take a look at all the tropical locations Air Force Weather has to offer. What I'm really saying is the growth market in military meteorology is tending again back towards the tropics.

The Air Force needs smart people to take on the challenges of tropical forecasting. When you consider most of the world's hot spots, politically speaking of course, are in the tropics and/or influenced by seasonal tropical weather regimes, such as the southwest monsoon, you begin to appreciate the need for a robust pool of tropical forecasting expertise in Air Force Weather. The Air Force needs you to hone your tropical forecasting skills because it's more and more likely future conflicts are coming soon to a tropical region near you. Study hard! Play hard! And good luck! 🍀

# Mt. Ruang Blows its stack



These satellite images of the Ruang Volcano, Indonesia, show the rapidly spreading ash cloud from the largest volcanic eruption in the last 18 months. The Air Force Weather Agency's Meteorological Satellite Applications Branch tracked and forecasted the ash cloud as part of their volcano summary responsibilities for DoD. METSAT analysts watch, on average, 60 active volcanoes worldwide every day.



This ash cloud covered more than 22,000 square miles, twice the size of Vermont, and reached heights of 55,000 feet. Image one (top left), Sep. 25 at 8:48 a.m. local time, shows escaping steam becoming more vigorous and distinct. The second image (center right), Sep. 25 at 1:42 p.m., captures the initial burst of the major eruption. The final image (bottom left), Sep. 25 at 4:47 p.m., shows the ash cloud covering the island of northern Sulawesi, Indonesia.

# Special Operations:

## Combat Weather Specialists Lead the Way in OEF

**By Capt. Rob Lavine**

Commander, Det. 3, 10th CWS

It's a cold night early in November, 2001, in the mountains south of Mazer-E Sharif, Afghanistan. A bearded, plainclothes special forces team leader and his communications sergeant huddle around their radio, awaiting the latest transmission from their headquarters. In the few short weeks that we had been in country, the special forces team has managed to turn a ragtag tribe of almost 5,000 Northern Alliance soldiers into a respectable fighting force on the verge of offering the first real challenge to the Taliban footholds in the north.

Without air support, the Northern Alliance tribesman, some in vehicle, some on horseback, but mainly on foot, will be sitting ducks against the entrenched Taliban forces. So, on this night, the special forces team is waiting for the weather forecast giving them a favorable window for close air support and, essentially, telling them when to begin the first major combined air and ground offensive of the war.

"That was the forecast that was going to make it or break it for us," says Master Sgt. Stefan Padillo, a longtime Army special operations weather technician. "We were starting to bog down in the north, and we needed a key break in the action to ensure that we weren't still fighting during the winter, when the weather was going to get even worse for aviation. So, we slipped the initial start of the attack back just a few days to ensure good hunting weather and mission success," said Padillo.

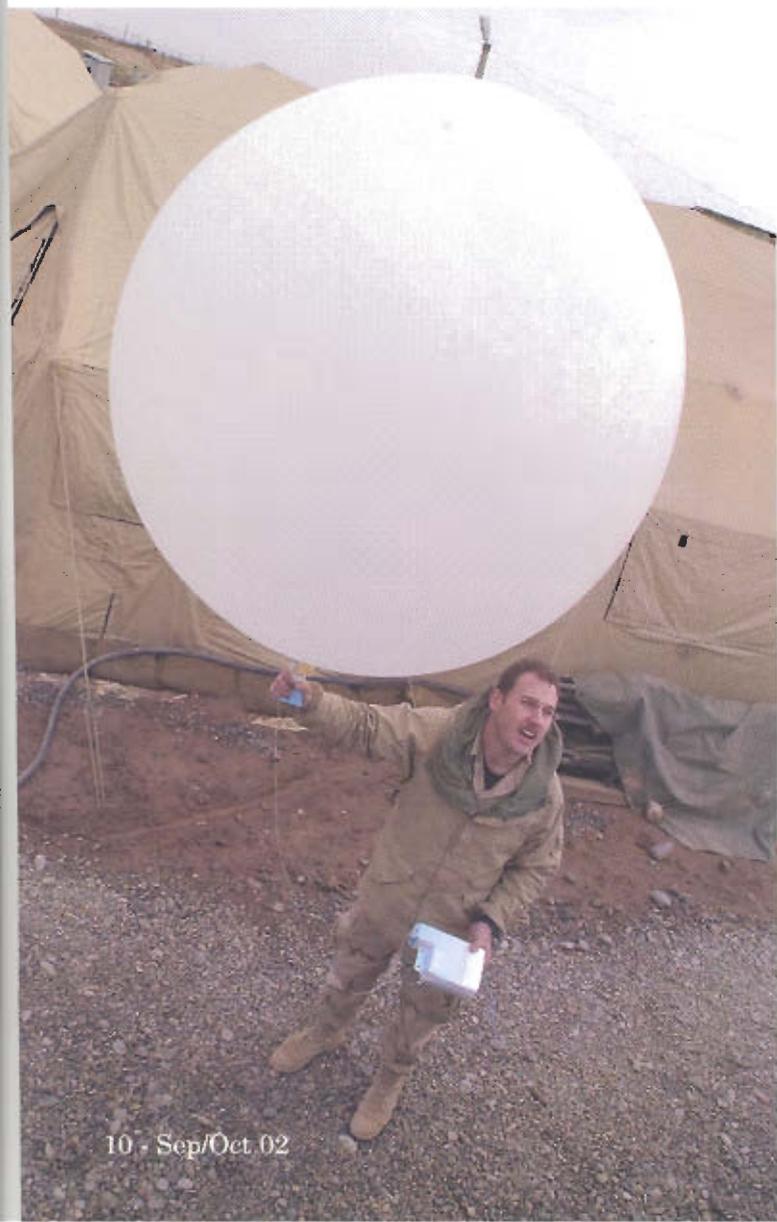
After five steady days of clear skies allowing coordinated bombing and ground assaults, the key city for control of northern Afghanistan fell and the Taliban were on the run. Widely publicized for the success it was, the fall of Mazer-E Sharif opened the floodgates for the advance of Northern Alliance forces as well as the insertion of even more special forces A-teams. The responsibility of providing daily forecasts to each team rested squarely on the shoulders of Staff Sgt. Eric McGee, a newcomer to the special operations community.

"Forecasting for Army SF teams was unlike anything I'd ever done with the conventional Air Force," recalls McGee, who at one point was tracking 24 separate ground units all over Afghanistan. "The teams move over, around, and through all sorts of terrain. At the same time, I was warning one team about a blinding sandstorm and another one about heavy snowfall." Beyond just providing a forecast, McGee informed each team how the weather would directly impact their given mission.

The flow of information, however, worked both ways. Prior to American forces entering Afghanistan, there hadn't been an indigenous weather network transmitting observations since the Taliban had come to power years before. In order to overcome this obstacle, we trained Special Forces teams on how to take a limited weather observation using the hand-held Kestrel 4000. The Kestrel has sensors for wind speed, temperature, dewpoint, and

Staff Sgt. Eric McGee prepares to launch a helium filled balloon supporting a radiosonde, which is traced by the MARWIN system.

Photo courtesy of Capt. Rob Lavine



pressure in a compact, all-in-one unit. In my opinion, part of the job of the special forces team is to report back on key intelligence, and in many cases, that key intelligence is the weather observation.

"There's definitely no substitute for having actual 'eyes-on' of the weather for a target area," agrees Staff Sgt. Kenny Harris, an Army special operations rotary-wing weather specialist. "When I could combine my forecast with the ground truth of what the team was reporting, we were giving the pilots the best possible picture of the current and future states of the atmosphere. Missions went much more smoothly, and we started to pick up trends in certain areas," said Harris.

This limited weather-observing network steadily grew, but deployed weather professionals continued to search for additional means of obtaining real-time weather data. One of the new technologies that came to the forefront was the Remote Miniature Weather System and Remote Miniature Ceilometer Unit. Solar-powered and hand-emplaced, these weather sensors are capable of reporting back via satellite atmospheric data such as barometric

pressure, wind speed and direction, temperature, dew point, visibility, and cloud heights. Staff Sgt. Edwin Gideons, another Army special operations rotary-wing weather specialist, and I placed two of the systems in a remote mountain valley that was often impassable due to low cloud ceilings, icing conditions, and turbulent winds.

"We took away a lot of lessons learned from that mission," notes Gideons. "Trying to emplace those sensors on strange terrain at night, using night vision goggles, is a real trick." Gideons would later develop and construct a platform that allowed for faster and more efficient placement of the systems. The thing I remember most about that night was the cold. It's not heated in the back of a Chinook helicopter, and with the tailgate open at over 12,000 feet above sea level in the mountains, we were reading about minus 20 degrees Celsius on our Kestrel 4000. About all we could do at that point was huddle.

As the special forces teams and their Northern Alliance counterparts pushed further south, the need to establish a new forward operating base at an airfield soon arose. The

See OPS, page 21



### Williams Watch

Entertainer Robin Williams views the satellite display with lightning strike data overlaid while visiting the 39th OSS/

Photo courtesy of 39th OSS/OSW

OSW Weather Station, Incirlik AB, Turkey, Oct. 14, 2002. Williams performed for a crowd of more than 2,400 military members in a hangar on base later that evening.



Aurora Borealis arc ray with background trees silhouetted. Photographed in Alaska with 50mm lens, Fstop at 1.4, and exposure time from 10 to 15 seconds.

Photo by Jan Curtis

## Space Weather and Alaskan Military Operations

**By Capt. Steve Stangl**

11th Air Force

and

**1st Lt. Greg Barnhart**

11th OWS

While visiting Alaska many people look forward to the chance of catching a glimpse of the beautiful Aurora Borealis. To the military men and women assigned to Alaska, the Aurora Borealis can be a sign of potential trouble. The Aurora is just one byproduct of our sun's emissions, which range from X-rays to radio waves and can have serious negative effects on Alaskan military opera-

tions. Alaskan military units use education and forecasts to mitigate the negative effects of space weather. These negative effects take on many forms and durations.

Space weather forecasts track the energy, in the form of charged particles, released by our sun into space. These particles come in the form of x-rays, ultraviolet, visible light, infrared, and radio waves. This energy can make the trip from sun to earth in just minutes or it may take days. However, the duration of the effects of these emissions can range from a few seconds to hours.

There are numerous effects on military operations caused by the sun's emissions. Some examples are high

frequency, ultra-high frequency, radio frequency, and radar interference, as well as solar conjunction. These effects can cause events like communications outages, false radar pictures, loss of or inaccurate GPS data, and false positioning of emergency locator transmitters used for search and rescue. To understand these effects, the military engages in exercises to polish tactics and apply lessons-learned from the past.

As our knowledge of space weather increases, we are able to apply and test this knowledge during exercises. The Alaskan region is well suited to military exercises. Two of the better-known Alaskan exercises are Northern Edge and Cope Thunder. NE brings together all branches of our military along with numerous government and non-government agencies, and at times includes foreign militaries to participate in a joint/coalition environment. CT is used to exercise our Air Forces' ability to conduct air operations and many times includes foreign militaries. Communication and navigation are critical to all military operations, and during the NE and CT exercises, the space weather effects must be dealt with. There are several steps to mitigate this solar factor.

Education is the first step. Assigned throughout the Air Force, both Space Weapons Officers and Combat Weather Teams are great sources of knowledge when it comes to space weather solar effects. An example of solar effects interfering with operations would be an electronic technician troubleshooting a radio without realizing that solar effects may be the cause of the problem. They may be attempting to fix a radio that is not broken. Once people know the effects, they can take space weather into account when building an operations plan.

Forecasts are the second means of mitigation. For instance, if the execution time for a plan is 0100Z, the planners use Air Force Weather Agency support or organic forecasting tools to ensure the frequencies used during the operation are not greatly affected by space weather. The 11th Air Force Rescue Coordination Center, which has Search and Rescue responsibilities for the entire Alaska theatre, uses space weather predictions to plan their operations.

"The space weather data provides us a prediction on the reliability of the SAR satellites given current conditions. For instance, if an Emergency Location Transmitter is going off from a crashed aircraft, and simultaneously there is heavy geomagnetic disturbance from sunspots, it could effect the SARSATs validation of that signal as a target," said Maj. Darrin Slaten, 11th AF RCC.

Space weather can't be controlled, but the effects of space weather on our Alaskan military operations can be diminished.

"Billy Mitchell was right when he spoke of the strategic value of Alaska, but the 'top of the world' also offers serious challenges for our radar and communications operators. If we can predict how space weather will affect our future operations then we can use this foresight to plan around these space weather problems," said Capt. Ryan "Fuzzy" Frederick, a 962nd AACS weapons officer.

By educating our personnel and exercising the planning and forecasting of space weather, Air Force Weather technicians increase our armed force's ability to fight and win our nation's battles through the use of space systems. ✧

## Space Weather training

Space weather can have a significant impact on the warfighter's mission. The ionized energy and particles emitted from the sun can cause disturbances in the near-Earth environment by interfering with satellite communications, ultra-high frequencies, navigation, and radar. By forecasting potential solar events and providing space support, we can present situational awareness information to aircrews and other customers.

Brig. Gen. David L. Johnson, Air Force director of weather, has placed Air Force Weather on the Air Force Chief of Staff's path to "mainstream space" into all Air Force operations. To meet the mission's need, the Air Force Weather Agency's Technical Training branch produced a training module on space weather. This module is not designed to make space weather experts, but it does educate AFW personnel on space weather and how it affects our near environment and the war fighter's mission.

The computer-based training was created using PowerPoint 2000. It incorporates narration, streaming video, graphics and interactive questions, and takes only about an hour and a half to complete. The Technical Training branch sent out a CD copy of the Space Weather presentation to all the MAJCOMs and OWSS. Other units desiring a copy of the presentation can either visit the AFWA military web site to request their copy or call the branch at (402) 294-2117 / DSN 271-2117.

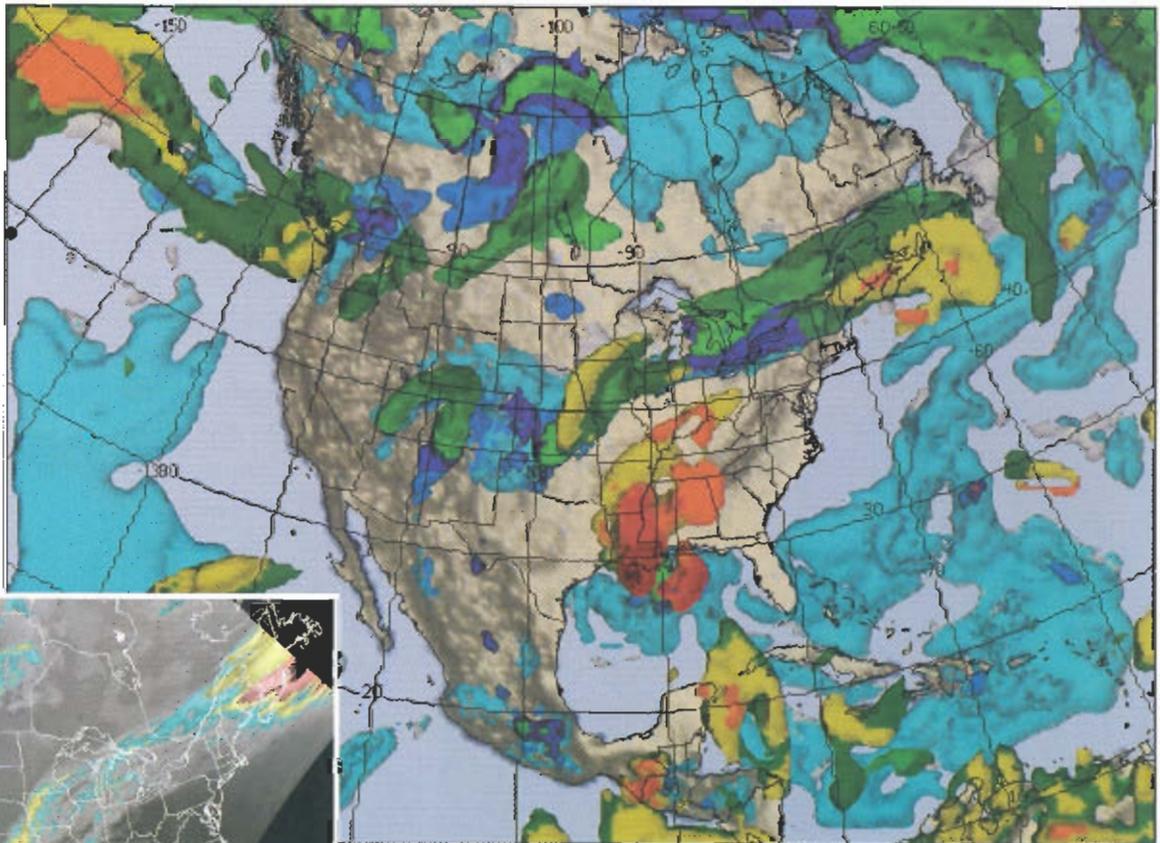
# 3DVAR

## AFWA's new forecast model ties research to operations

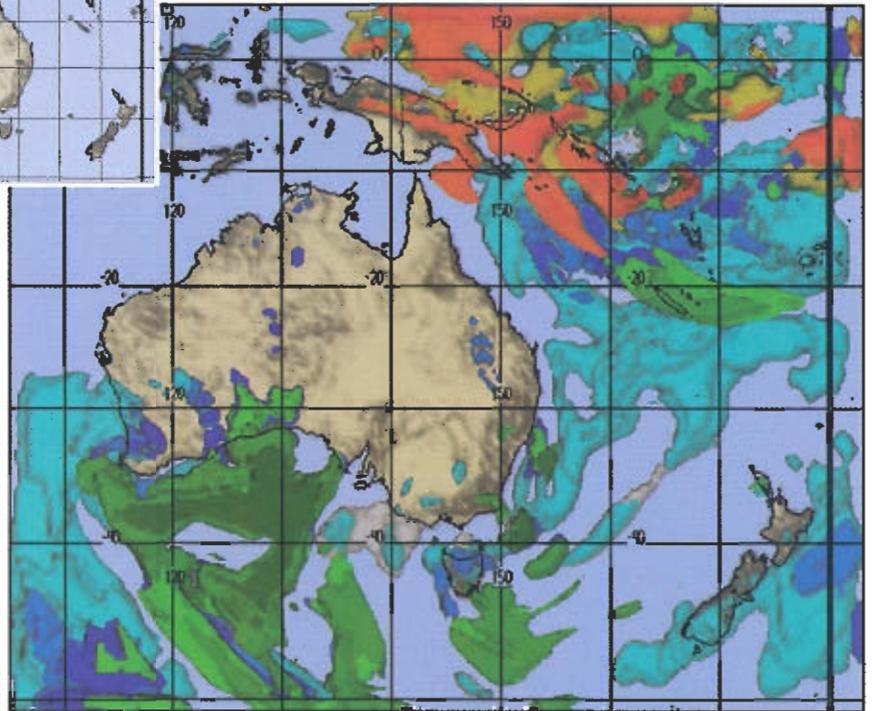
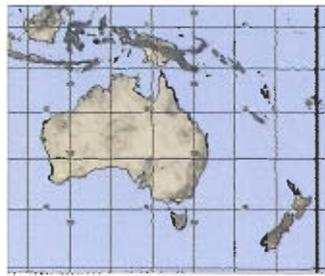
**By Paige Hughes**  
AFW Public Affairs

The Air Force Weather Agency implemented an advanced observation integration method Sep. 26, 2002, that significantly improves weather forecast model accuracy.

The three-dimensional variational data assimilation, 3DVAR, processes nearly four times the amount of weather observations than the previous method. Additionally, 3DVAR ingests a wider spectrum of observations, as many as 21 various data types. Developers contend that all of the forecasts produced using 3DVAR show significantly enhanced resolution.



This is a North American MM5 cloud depiction initialized with 3DVAR, with corresponding MB enhanced satellite image from Oct. 3, 2002. Thousands more observations are ingested with 3DVAR making the forecasts and initialization more accurate than ever before. Future enhancements will allow the ingest of even more non-standard data types like Unmanned Aerial Vehicles and satellite radiances.



These images demonstrate the difference between an MM5 00 hour cloud forecast as compared to the previous data assimilation scheme used at AFWA. The large image is a 3DVAR initialized cloud forecast over Australia, and the small image was initialized with 3DVAR's predecessor. 3DVAR produces clouds during all forecast time periods in tropical theaters, versus the previous program, which could not produce clouds in the first time panel.

3DVAR is capable of running on 45, 15, and 5 kilometer grids, further enhancing the analysis on initial conditions. Real-time verification of the data shows improved cloud and precipitation locations of the initial forecast time of the model.

"It's a more sophisticated way of determining the initial conditions, ultimately leading to a better forecast," said Dr. Jerry Wegiel, chief of Fine Scale Models team at AFWA and the principle investigator for 3DVAR. "This is a significant milestone for the operational and research community," he added.

AFWA is the first in the country to use this method operationally, and with the increased capability, AFWA is producing weather forecast products with greater accuracy for the warfighter. AFWA maximizes the nation's aerospace and ground combat effectiveness by providing accurate, relevant and timely air and space weather information to the Department of Defense, coalition, and national users.

3DVAR is one facet of a larger initiative to replace the current fine scale modeling process used operationally. As part of this initiative, developers are working on the Weather Research and Forecast model slated to replace the Mesoscale Model Five.

WRF is the object of major interest for meteorologists because it provides a common framework for research and operational modeling. WRF incorporates a portable modeling infrastructure with the latest atmospheric science allowing researchers to develop new numerical methods while incorporating real-time operations. The WRF initiative teams the nations top weather scientists from AFWA, the National Center for Environmental Prediction, National Center for Atmospheric Research, and various universities; in fact, more than 700 scientists are involved in this effort.

AFWA has long been the DoD's center of excellence for cloud analysis using high-resolution satellite data, and

now, with the implementation of WRF-3DVAR, AFWA is being touted as a leader in forecast model research and development.

Funding for the WRF-3DVAR initiative comes from the High-Performance Computing Modernization Program. The HPCMP provides the supercomputer services, high-speed network communications, and computational science expertise that enables the Defense laboratories and test centers to conduct a wide range of focused research, development, and test activities. This partnership puts advanced technology in the hands of U.S. forces more quickly, less expensively, and with greater certainty of success.

AFWA's fine scale models team is looking farther down the research road and has unveiled a concept called four-dimensional variational data assimilation. If HPCMP awards AFWA the funding for 4DVAR, the program could be implemented operationally as early as 2006.

"Research and development dollars are very difficult to come by, but AFWA is staying competitive," said Wegiel. "We're fast becoming one of the elite mesoscale modeling centers in the country," he added. ♣

# New turbulence forecast tool smooths low-level rollercoaster

By Gordon Brooks

AFWA Technology Transition Team

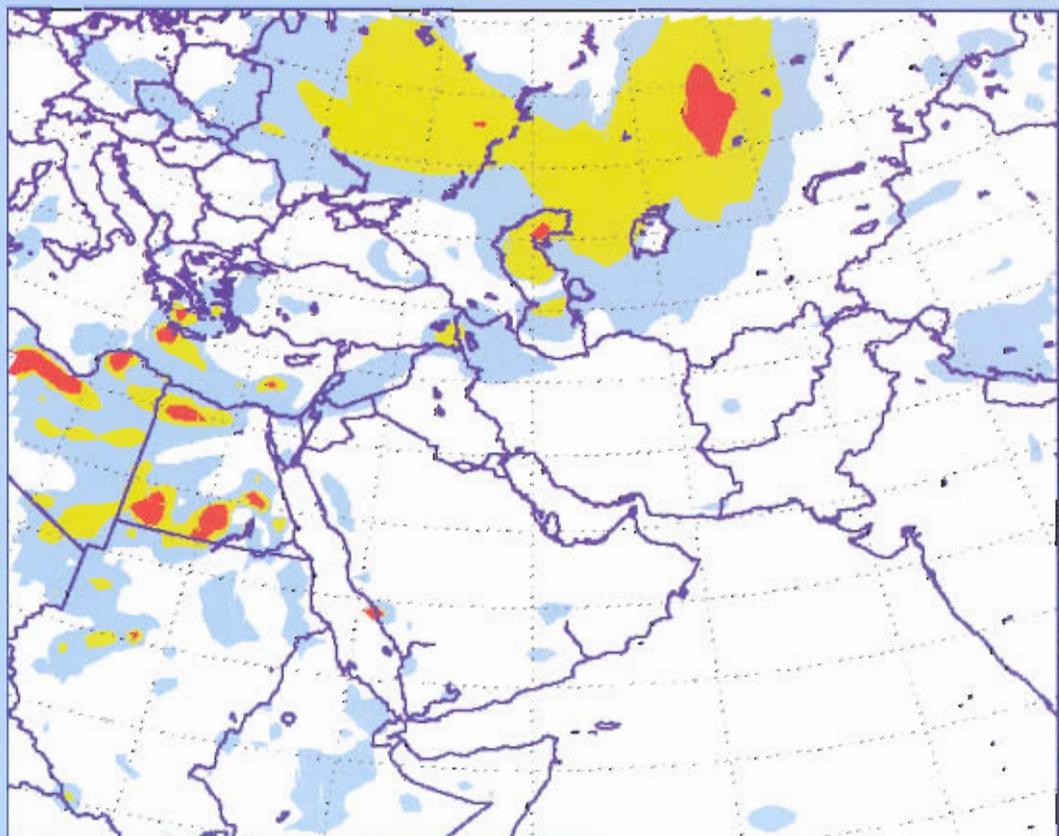
If you are planning for chopper sorties around Fort Drum, N.Y., or forecasting for a low-level test flight at Edwards AFB, Calif., then you may need to determine if low-level turbulence will impact your mission. At HQ Air Force Weather Agency, Offutt AFB, Neb., we have your concerns in mind. With the target of addressing the distinct nature of turbulence near the ground, AFWA's Technology Exploration Branch has developed and tested a new turbulence algorithm.

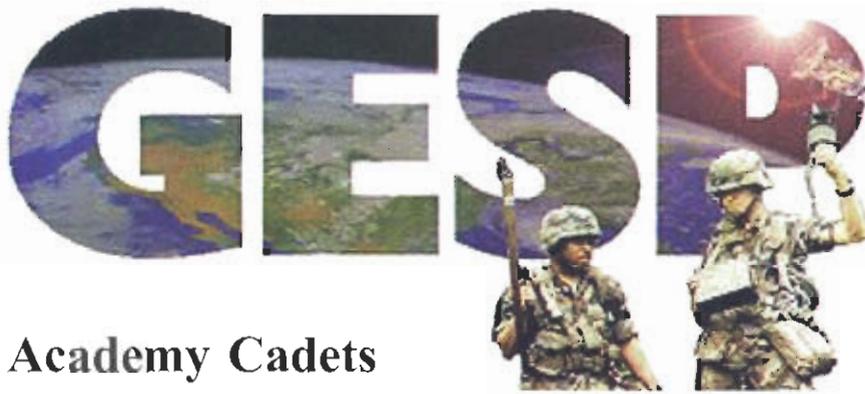
For the past six months, AFWA has performed long-term tests over the CONUS where pilot reports are readily available, and over Europe and Southwest Asia where appropriate OWS forecast products were used, as an overall performance guide. During the summer months, these tests yielded a 30 percent improvement in turbulence detection rates, while maintaining the same false detection rates. And although not as significant an improvement, the winter tests still improved turbulence detection by 18 percent.

The new turbulence algorithm is specifically designed for low levels of the atmosphere and is closely based on the Panofsky Index, tested with colleagues at the Army Research Lab, White Sands, N.M. Turbulence is calculated based on model-derived wind speed, wind shear, and buoyancy terms in a layer from the surface to 4,500 feet above ground level. As an above ground level product, output is shown at all locations regardless of terrain height. The suggested Panofsky turbulence thresholds, for those units receiving MM5, raw GRIB data, are: Light > 20; Moderate > 100; and Severe > 250. These are the thresholds that are used for the products on the Joint Air Force and Army Weather Information Network. If you find different thresholds that work better for your region, please provide that feedback to the Technology Exploration Branch.

These new products can be found on JAAWIN in the hazards section of the MM5 products. **T**

This example of the MM5-based, low-level turbulence forecast for the Southwest Asia theater, Aug. 2, 2002. Note that the western half of the theater is experiencing some daytime heating and model thermals are allowing the buoyancy term to locally boost the forecast turbulence intensity to moderate (yellow) and severe (red). Conversely, it is evening in the eastern half of the theater, and the buoyancy term is no longer significantly contributing. As the Northern Hemisphere moves into fall and winter, the buoyancy bubbles will become much less prevalent and the wind shear contribution will be more prominent.





## Academy Cadets Experience Combat Weather

**By the USAFA Meteorology Department**

Each summer, Air Force Academy cadets get a chance to experience what it's like to deploy as a member of an Aerospace Expeditionary Force. This year marks the fifth anniversary of the 34th Training Group's Global Engagement Summer Program, which exposes cadets to a wide variety of Air Force missions all operating within an austere environment.

GESP also provides an excellent opportunity for members of the Academy's meteorology faculty to discuss the Air Force Weather mission and scope of support – “mud to the sun” – inside a military general purpose, medium tent with plenty of heat, dirt, tactical meteorological equipment, and real-world environmental data. Combined, these elements make the weather tent one of the most popular features of the Academy's summer program.

“GESP is a great opportunity to get out of the classroom and into the field — meteorology faculty can set up shop in the field and immediately talk to the broad spectrum of environmental support we provide the warfighter,” said Maj. Kurt Brueske, assistant professor of Meteorology.

“Air Force provides environmental situational awareness,” said Brig. Gen. David L. Johnson, the Air Force

director of weather, during a July visit to speak with the cadets about the importance of the weather mission.

“Air Force Weather is in a unique position in the sense that we've been providing seamless space and terrestrial environmental support to the warfighter for some time now,” added General Johnson.

With the assistance of Air Force Weather Agency and the Combat Weather Center, members of the Academy meteorology faculty replicated a forward-deployed Combat Weather Team complete with an automated weather observing system

and a tactical very small aperture terminal. Throughout the summer, more than 1,000 cadets pass through the GESP weather tent, where each received a one-hour weather orientation about how weather can be used as a force-multiplier.

Capt. Mike Gauthier, an Instructor of Meteorology, provided a different perspective, talking about his experiences supporting Army operations at Fort Bragg, N.C. “Our primary goal with GESP was to provide cadets an early exposure to the impacts that space and terrestrial weather can have on military operations, not just Air Force operations,” said Gauthier.

In addition to exposing cadets to the operational support structure they will encounter on active duty, GESP also provides a setting to test advanced concepts and technologies developed by faculty members and cadets during the academic year. This year, cadet meteorology majors developed a weather effects matrix or “WEM” decision aid as part of a

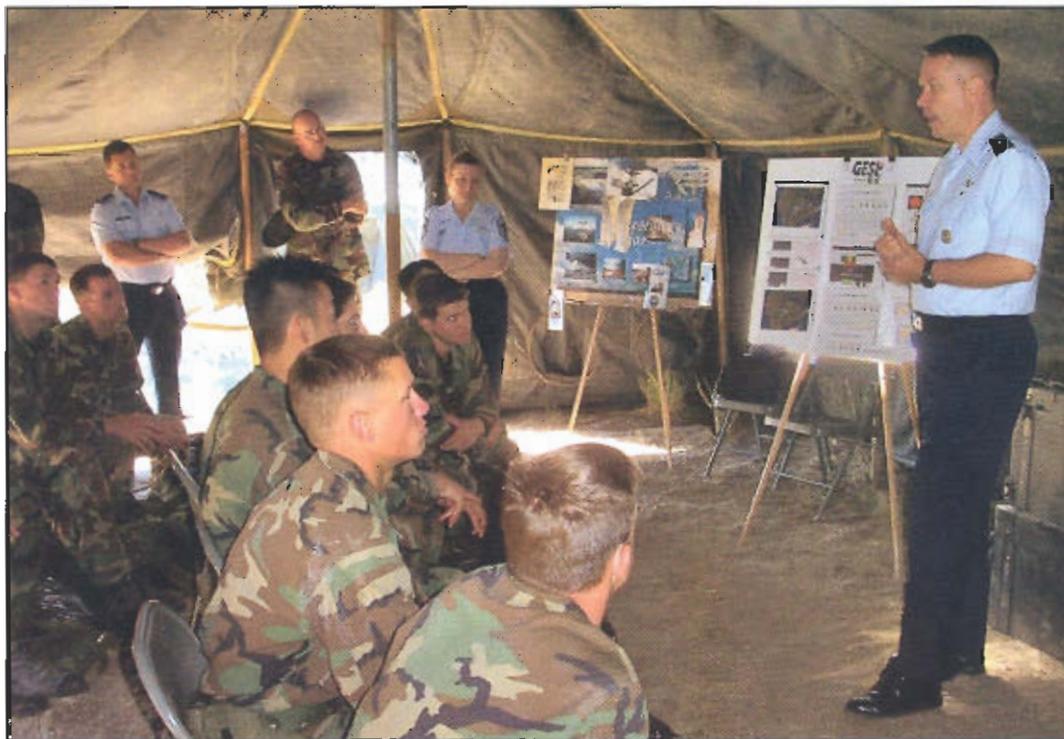
See **GESP**, next page



Photo courtesy of the USAFA meteorology department

Academy Cadets receive briefing from Maj. Kurt Brueske, assistant professor of Meteorology at the U.S. Air Force Academy, on in-field satellite communications.

Right, Brig. Gen. David L. Johnson, Air Force director of weather, speaks to Academy Cadets about the importance of weather and accurate forecasts to military operations. Below, Capt. Mike Gauthier, an Instructor of Meteorology, USAFA, briefs Cadets on the TMQ-53s capabilities.



## GESP, continued from previous page

semester-long meteorology senior seminar project.

“The idea was to develop a tool that would help the cadet wing leadership make sound decisions based on published wing instructions and near real-time weather conditions and forecasts,” added Gauthier.

With minor modifications, the

automated WEM was able to support this year’s GESP exercise scenario involving personnel, aircraft operations, combat search and rescue and the potential threat of nuclear, biological and chemical attacks. Real time observations provided by the AN/TMQ-53, coupled with MM5 model output data, were then used to drive the WEM through a web-based graphical user interface and wireless

access to a remote server.

“Cadets are pretty computer savvy and understand the need to simplify complex weather information and warfighter requirements using a tool like the WEM. Driving the WEM’s ‘red-yellow-green’ stop light indicators using observations taken from the deployed AN/TMQ-53 and using wireless connectivity was definitely an attention getter,” said Brueske.

Finally, for most Academy cadets, GESP is their first introduction to AFW and the diverse missions impacted by terrestrial and space weather conditions. More importantly, GESP also serves as a forum to discuss meteorology as a major at the Academy. Since 1995, USAFA has graduated approximately 56 Meteorology Majors, 30% entered the 15W career field while 66% became pilots.

“Approximately 40-50% of 3rd Class Cadets (sophomores) participating in GESP haven’t declared a major course of study. GESP is a great opportunity to raise awareness about the meteorology major and foster interest in the career field,” concluded Gauthier. ♪



Photos courtesy of the USAFA meteorology department

# Weather Specialists vital to Air Force mission

**By 2nd Lt. Jen Andrews**  
405th Public Affairs

"The forecast for today is heavy snow with temperatures dropping into the low 30s" is one weather prediction base personnel will probably never hear. But accurately forecasting and observing weather trends can keep aircraft, aircrews and base personnel safe.

That is the job of the deployed weather professional at Thumrait AB, Oman. The four-person weather team, from McConnell AFB, Kan., Robins AFB, Ga., and MacDill AFB, Fla., provides weather briefings to flight crews in support of their missions and also briefs base personnel on winds, temperature and pressure upon departure and landing.

"The most important stuff we brief aircrews are the potential hazards during their missions," said Capt. William Wood, from McConnell. "This includes anything from turbulence to thunderstorms."

Without weather information, unforecasted hazards could either delay or cancel missions.

"Weather affects everyone from pilots and their flying missions to people around the base," said Staff Sgt. Scott LaCroix, a weather technician since 1997.

There is a big difference when comparing weather here to the team's home stations.

"Every location has its own quirks. No two places are the same for weather," said Wood.

While the job can be quirky, it is vital to keep crews out of harms way.

"The job is different for every airframe," said Wood. "Every aircraft

has its own sensitivities to weather, so we tailor our briefings around those."

More than 40 percent of all weather personnel are assigned to Army units, allowing them to do a variety of things. The weather career field allows its people to attend jump school, ranger school or air assault school. There are also space weather personnel who forecast solar flares and atmospheric blooming, which causes satellites to drop from orbit.

"The job is never the same from day to day," said Staff Sgt. Amy Craine, a weather specialist for seven years. "There are always changing patterns and new products to explore with technological advances, making our job easier than ever before."

"The best part of this job is being able to forecast and know the weather for anywhere in the world," said Staff Sgt. Otis Pless, a six-year weather technician. ✎



Staff Sgt. Scott LaCroix initializes a TMQ-53 on the roof of the Thumrait AB, Oman, weather flight building.

Photo by 2nd Lt. Jen Andrews

# General Johnson Hosts Heritage Seminar

**By Al Moyers**  
AFW Historian

Air Force Weather turned 65 on July 1. In recognition of that major milestone, Brig. Gen. David L. Johnson, Air Force director of weather, hosted a daylong AFW Heritage Seminar July 9, 2002, at Rosslyn, Va.

The event provided a forum for AFW members to reflect upon the organization's long heritage and to hear first hand from some of its past leadership. General Johnson opened the day by reminding attendees that the successes of today's Air Force Weather were the fruition of the actions that the event's special guests had "planted seeds on." He emphasized to the special guests that AFW is "your legacy."

The special guests of the seminar were retired Brig. Gen.s Albert J. Kaehn, Jr., George E. Chapman, and Fred E. Lewis and retired Chief Master Sgt.s James A. Hoy and Anthony R. Ramirez.

General Kaehn was commander of Air Weather Service from 1978 to 1982. General Chapman assumed command from General Kaehn and served as commander of Air Weather Service until 1988. Brigadier General Lewis preceded General Johnson as Director of Weather, serving in that capacity from 1996 to 2000. Chiefs Hoy and

Ramirez both served as senior enlisted managers within the office of the Director of Weather.

Following a series of briefings on the current status of AFW, the special guests were asked to speak about the challenges that they had faced during their service. In light of current events, all the guests praised the work of AFW and spoke of their pride in the contributions that the organization provided to both operations in their day and today under these extraordinary circumstances.

Each of the guests related to the audience through narratives of specific events that happened during their time what they viewed as the continuities of leadership, the characteristics that provide mission success. They each challenged the participants to remain focused on these continuities to ensure success in their mission.

General Kaehn reminded the audience that personal relationships are an important part of mission success. He remarked, "I want to talk on a level about building relationships and knowing people. Know as many as you can. Get to understand them a little bit, because somewhere you are going to be asked to do something that isn't necessarily written down in a book and that doesn't have 42 coordination signatures. You are just going to have to do and go with it because you believe in the guy asking you



Photo by Al Moyers

to do it," said General Kaehn.

"Don't think these are new things. They are always going to be there, because as technology moves forward, you always have to move with it," summarized General Kaehn.

Similarly, General Chapman spoke of the permanence of the challenges of leadership for each generation.

"There is no way I am going to be able to tell you what you have to do and how you can do it better. . . ."

He noted that every leader faces the same problems, but has to deal with them from their unique perspective. "As you train people and educate people like yourselves to move on and take various positions, it is self-confidence . . . that is very important so you can address [the problem at hand], deal with it as fairly as you can, as smartly as you can. You move on at that point."

"I have every confidence that the kind of people that exist in this room can do things like that," concluded General Chapman.

General Johnson closed the day with praise of the work

of the special guests and those who had set the foundation for Air Force Weather. "I'm excited about the kinds of things happening [today] because of what you did. . . . Seldom do you get to live with the fruits of your labor; you live with the fruits of your predecessors and what they sowed. I really appreciate you establishing the foundation we are capitalizing on," said General Johnson.

"Thinking to DMSP [Defense Satellite Meteorological Program], NEXRAD [Next Generation Radar], AWDS [Automated Weather Distribution System];" he continued, "without those really basic tools, think where this nation would be right now in gaining environmental situational awareness. . . . We are trying to instill a sense of history and tradition," added General Johnson.

"My advice is to keep some of these lessons alive," General Kaehn emphasized. "Don't let them just get written in books and histories and get shoved away. There are some things to learn from them. I wanted to share those things with you today. I want to pass it to as many people as I can." ♪

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## OPS, continued from Page 11

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special forces ground force commander actually came to us to ensure that a special operations weather technicians would be on one of the first C-130's going in to Bagram. The commander remembered all the times that poor weather conditions had shut down our operations and how critical it was to have a trained weather specialist with his boots on the ground, so we sent in Staff Sgt. Gideons to take care of business.

"That was a really good thing," comments Staff Sgt. Adam Christian, an Air Force special operations fixed-wing weather technician. "Initially, we had a lot of concerns about the feasibility of using the Bagram airfield due to what the various forecast models were indicating and what we could interpret from satellite imagery." After two weeks of observations sent back by Gideons, however, the weather specialists realized that the airfield was well protected by the surrounding terrain.

In addition to working with special operations ground and air forces, the special operations weather technicians also found ways to support conventional air force assets. Scrapping together the parts of two malfunctioning MARWIN units into one workable system, they set up the first upper-air observing station in theater. Data obtained from the MARWIN was fed directly into the air weather network and subsequently uploaded by C-17 crews flying humanitarian airdrop missions over Afghanistan.

"One of the biggest challenges, outside of the equip-

ment setup, was coordinating balloon launches with the host nation," said Capt. Tim Dreifke, a special forces weather officer. "They weren't too pleased when they realized we were 'invading' their airspace by launching balloons up to 70,000 to 80,000 feet in the atmosphere. We learned quickly that a little U.S. good will and a few packets of cigarettes go a long way," Dreifke winks.

On reflection, this group of weather specialists experienced enough action and adventure to last them for some time. "Every day was like a stressed out groundhog day," notes McGee. "The constant was that the weather was always going to do something strange. We'd have a day of temperatures in the 90s and haze followed by ice pellets in less than 12 hours, strong thunderstorms, sandstorms that looked like walls moving across the screen on the satellite loop, and thick, heavy dust that would be suspended in high mountain passes, sometimes at elevations of 13,000 feet!"

Fortunately, the weather technicians were able to work as a joint team to ensure the concept of one mission, one forecast. "I learned a lot working with weather professionals from other special operations communities," says Christian. "That was probably the best part."

"Yeah, that and getting to meet Joan Jett," remarks Padillo, referring to a visit to the camp by the famous '80's rocker. "When she showed up, we knew things were well in hand and we'd be on that freedom bird with a one-way ticket home soon!" ♪

# Air Force Weather loses two of its own

## Calvert Walke "Bill" Tazewell



Recently, Air Force Weather lost one of its first members. Lt. Col. (Retired) Calvert Walke "Bill" Tazewell, 85, died in Chesapeake, Virginia, Sep. 27, 2002.

Tazewell was raised in Norfolk,

Va., and enlisted in the Army Air Corps in 1937. He was a licensed amateur radio operator prior to entering service and began his Air Force career at Randolph Field, Texas, copying weather broadcasts, where he worked with two other distinguished alumni of Air Force Weather, then-lieutenants Don Z. Zimmerman and Thomas S. Moorman, Jr.

He learned observing and forecasting skills while assigned to the Randolph Field weather station and completed the Air Corps forecaster school in 1940. Tazewell then transferred to Albuquerque AAB (later renamed Kirtland), N.M., as chief of the weather station. Following the U.S.'s entry into World War II in December 1941, he received orders to become the weather station chief at Waller Field, Trinidad, British West Indies.

From Waller, Tazewell moved to Albrook Field, Panama, where he received near-simultaneously a commission in both the Signal Corps and the Air Corps. He declined the Signal Corps commission and served the remaining war years as either a weather officer with Army Airways Communications Service or a communications officer with Air Weather Service. He returned to the U.S. in November 1945 and was placed on inactive status in February 1946.

He was recalled to active duty in December 1946 and assigned to Headquarters, AWS, then at Gravelly Point, Virginia. Tazewell transferred to Headquarters, AACS, in August 1949 and spent the remaining years of his career associated primarily with Air Force communications in East Asia. His last assignment was as Director of Communications-Electronics at the Semi-Automatic Ground Environment Air Defense Center at Duluth, Minn.

Tazewell retired from the Air Force in September 1959.

Tazewell remained active in communications, electronics, and computers throughout the remainder of his life. He was instrumental in the design of the first web sites for the Air Weather Association, National Weather Association, and Air Weather Service public affairs office. Several of his web sites, which featured his interests in history and genealogy, were nationally recognized for their excellence.

Bill Tazewell is survived by his wife, Theresa; six children, Lyn Hamilton, Pat Werner, Ann Innes, Will Dawson, Valera Strauser and Sabrina Tazewell; a brother, John Tazewell; a sister, Mrs. John Hawkes; six stepchildren; along with many grandchildren and several great-grandchildren, nieces, and nephews.

## Gregory Patterson



The Altus AFB, Okla., Weather Flight has lost a valuable member of their team. Master Sgt. (Retired) Gregory M. Patterson, 56, passed away Sep. 1, 2002, after he lost his battle with cancer. A memorial service was held Sep. 4 and he was buried with full military honors at the Fort Sill National Cemetery, Okla.

Retired Master Sgt. Patterson was born on April 30, 1946. He graduated from Drake University in 1969 with a Bachelor of Arts Degree in Geography.

Patterson began his military career as a weather specialist, serving July 1969 to July 1973 at Chanute AFB, Ill.; Thule AB, Greenland; and Offutt AFB, Neb. From August 1975 to March 1983, he was a member of the Airfield Management Staff with the Iowa Air National Guard in Des Moines. March 16, 1983, he returned to active duty serving as a weather observer at Davis Monthan AFB,

See Loss, next page



## Slice of history

On a recent visit to the Air Force Weather Heritage Center at Offutt AFB, Neb., Nan Stanfield admires the display of her late husband's uniform, which she donated to the center. Capt. Charles M. Stanfield, Jr., served with the 10th Weather Squadron in China during World War II.

Photo by Al Moyers

## Loss, continued from previous page

Ariz., until June 1984. Through December of that year he was assigned to Chanute AFB, Ill. for weather forecasting school. From December 1984 to February 1992, he served as the Assistant Chief, Weather Station Operations at Kirtland AFB, N.M. In February 1992, he proceeded to Incirlik AB, Turkey, as the Chief of Weather Station Operations returning to Altus AFB in May 1993. Here he was assigned as the Chief, Weather Station Operations for more than five years. He served his country proudly in the military with nearly thirty years of service, retiring Oct. 31, 1998, as a Master Sergeant.

Throughout October 1998, Mr. Patterson spent many hours teaching and providing his support to the local area school district in Altus, Blair, Wolf and Hobart, Okla. In July 1999, he was hired as a Federal civilian servant at Altus AFB serving as a computer assistant with the Communications Squadron, a equipment cleaner with the Logistics Group, and completed his career as a meteorological technician with 97th Operations Support Squadron, 97th Operations Support Weather.

Gregory Patterson is survived by his wife Rita and his son Glenn. The family requests any monetary donations be made to the American Cancer Society or the March of Dimes. ☛

## AFW Heritage Center

The Air Force Weather Heritage Center is overseen by and co-located with the Air Force Weather History Office at the Air Force Weather Agency, Offutt AFB, Neb. Dedicated in May 2000, the award-winning center highlights with images, artifacts, and storylines, more than a century of Air Force Weather, from its roots in the Signal Service's Division of Telegrams and Reports for the Benefit of Commerce through the Air Corps Weather Service to the inclusion of the Air Weather Service in the formation of an independent U.S. Air Force.

The AFW History Office is always looking for additional materials, such as weather equipment, memorabilia, images, documents, and personal paper collections, to document and narrate the long and rich heritage of Air Force Weather. For additional information on the Air Force Weather Heritage Center, to donate materials, or to learn more about the history of AFW, contact AFW History Office at:

HQ AFWA/HO  
 106 Peacekeeper Dr., Ste. 2N3  
 Offutt AFB, NE 68113-4039  
 Phone (408) 232-8682 / DSN 272-8682

**Master Sgt. Scott Copeland**

319th OSS/OSW, Grand Forks AFB, N.D.

Chief, Weather Station Operations

Years in Service: 24

Hometown: Chicago, Ill.

**Role Model / Why?** So many people have provided me with a model on how to do things the right way. I'd consider my parents, wife, children, supervisors, subordinates and peers the chief architects of any success I've had. They and so many others, (you know who you are) for no benefit of their own, showed me patience when I needed it and a swift kick when it was appropriate.

**Hobbies:** Reading, football, computers, and going to movies

**Most Memorable Air Force Weather**

**Experience:** Working as a forecaster at Patrick AFB, Fla., when Hurricane Andrew was approaching the coast. Nobody was certain yet if it was going to swing North toward us or keep going to the West toward Miami and the Keys. I saw a collaborative effort between the National Weather Service and the forecast facility at Cape Canaveral. This was similar to what we now have with the OWSs keeping operators and family members informed of approaching danger. We were able to get the early word out on Andrew, which reduced unnecessary actions and panic.



# WEATHER WARRIORS

**Tech. Sgt. Kenneth Lester Jr.**

OL-A, 374 OSS, Camp Zama, Japan

Weather technician

Years in Service: 12

Hometown: Valdosta, Ga.

**Role Model / Why?** My uncle - he's the reason I joined the Air Force. He's currently on active duty and works in transportation at Kadena. He accomplished a lot in his Air Force career and recently made Master Sergeant.

**Hobbies:** Basketball, football, bowling, and softball

**Most Memorable Air Force Weather**

**Experience:** I worked Hurricane George at Keesler AFB, Miss., Sep. 27, 1998.

Winds were 155 knots, gusting to 179!



# SALUTES

## Retirements

**Chief Master Sgt. Skip Evans**, HQ AFSPC, Peterson AFB, Colo.

**Chief Master Sgt. Dan Michalewicz**, HQ AFWA, Offutt AFB, Neb.

**Senior Master Sgt. Larry Jackson**, HQ AMC, Scott AFB, Ill.

**Tech. Sgt. Scott Thompson**, 88th WS, Wright-Patterson AFB, Ohio

## Awards and Decorations

### LEGION OF MERIT

**Col. Philip Yavorsky**, HQ AMC, Scott AFB, Ill.

### DEFENSE MERITORIOUS SERVICE MEDAL

**Maj. Kevin Trissell**, SHAPE, Mons Belgium

### MERITORIOUS SERVICE MEDAL

**Lt. Col. Thomas Lambert**, HQ AMC, Scott AFB, Ill.

**Lt. Col. Blaine Tsugawa**, 104th WF, Camp Fretterd, Md.

**Maj. Michael Stage**, 154th WF, Little Rock AFB, Ark.

**Maj. James Ulman**, HQ AMC, Scott AFB, Ill.

**Capt. Glenn Kerr**, 88th WS, Wright-Patterson AFB, Ohio

**1st Lt. Michael Marsicek**, 88th WS, Wright-Patterson AFB, Ohio

**Chief Master Sgt. Dan Michalewicz**, HQ AFWA, Offutt AFB, Neb. (5th OLC)

**Senior Master Sgt. Larry Jackson**, HQ AMC, Scott AFB, Ill.

### AIR FORCE COMMENDATION MEDAL

**Maj. Steven Ursell**, 88th WS, Wright-Patterson AFB, Ohio

**Capt. James Guffy**, 154th WF, Little Rock AFB, Ark.

**Senior Airman Thomas Richards**, 121st WF, Andrews AFB, Md.

### AIR FORCE ACHIEVEMENT MEDAL

**Senior Airman Timothy Humpal**, 126th WF, Milwaukee, Wisc.

**Senior Airman Tamara Morganson**, 3rd ASOS, Fort Wainwright, Alaska

### 2002 CHIEF OF STAFF TEAM EXCELLENCE AWARD NOMINEES

**15th OWS Weather Integration Improvement Team**, Scott AFB, Ill.

**USAFE OWS Training Team**, Sembach AB, Germany

### 2002 PRESIDENT'S QUALITY AWARD NOMINEES

**USAFE OWS**, Sembach AB, Germany

## Education

### WEATHER OFFICER'S COURSE

**1st Lt. Jennifer Hettinga**, 26th OWS, Barksdale AFB, La. (Distinguished Graduate)

**1st Lt. Andrew Robinson**, 88th WS Wright-Patterson AFB, Ohio

**2nd Lt. David Bieger**, 26th OWS, Barksdale AFB, La.

**2nd Lt. Gregory Demme**, 25th OWS, Davis-Monthan AFB, Ariz.

**2nd Lt. Matthew Jensen**, 18th WS, Fort Bragg, N.C.

**2nd Lt. Gregory Martin**, USAFE OWS, Sembach AB, Germany

**2nd Lt. Michael Norvell**, 26th OWS Barksdale AFB, La.

**2nd Lt. Melissa Parry**, 11th OWS, Elmendorf AFB, Alaska

### WEATHER CRAFTSMAN'S COURSE

**Tech. Sgt. Carl Jordan**, HQ AFWA, Offutt AFB, Neb.

**Tech. Sgt. Michael Laney**, 156th WF, Charlotte, N.C.

**Tech. Sgt. Rabi Tornero**, USAFE OWS, Sembach AB, Germany

**Staff Sgt. Brian Aragon**, 17th OWS, Hickam AFB, Hawaii

**Staff Sgt. Christina Bell**, 81st OSF/OSW, Keesler AFB, Miss.

**Staff Sgt. Jacquelyn Bills**, 45th WS, Patrick AFB, Fla.

**Staff Sgt. Katrina Blanchard**, 20th OWS, Yokota AB, Japan

**Staff Sgt. Adam Bolen**, AFCCC, AFWA, Asheville, N.C.

**Staff Sgt. Jim Butterworth**, 7th WS, Illsheim, Germany

**Staff Sgt. Brian Carnes**, 18th WS, Ft. Bragg, N.C.

**Staff Sgt. Robert Clark**, 20th OWS, Shaw AFB, S.C.

**Staff Sgt. Robert Coe**, Det. 1, 18th WS, Fort Eustis, Va.

**Staff Sgt. Steven Cole**, 156th WF, Charlotte, N.C.

**Staff Sgt. Stephanie Constantine**, 16th OSS, Hurlburt Field, Fla.

**Staff Sgt. Westley Cornett**, 18th WS, Ft. Bragg, N.C.

**Staff Sgt. Carlos Coronado**, 210th WF, March ARB, Calif.

**Staff Sgt. Jason Dobbins**, 1st WS, Fort Lewis, Wash.

**Staff Sgt. Gina Faulds**, 3rd WS Ft. Hood, Texas

**Staff Sgt. Steven Fisher**, HQ AFWA, Offutt AFB, Neb.

**Staff Sgt. Christopher Furtado**, 320th OSS/OSW, Tyndall AFB, Fla.

**Staff Sgt. Leah Harris-Lupton**, 366th OSS/OSW, Mountain Home AFB, Idaho

**Staff Sgt. John Harrison**, 17th OWS, Hickam AFB, Hawaii

**Staff Sgt. Jodi Janssen**, 36th OSS/OSW, Andersen AB, Guam

**Staff Sgt. Corey Lane**, 18th WS, Ft. Bragg, N.C.

**Staff Sgt. Tamiko Lopez**, 45th WS, Patrick AFB, Fla.

**Staff Sgt. James McKenzie**, 366th OSS/OSW Mountain Home AFB, Idaho

**Staff Sgt. Gerald McPherson**, 509th OSS/OSW, Whiteman AFB, Mo.

**Staff Sgt. Stephen Meunier**, 15th OWS, Scott AFB, Mo.

**Staff Sgt. Troy Misiak**, OLC-A, 320th STS, Okinawa, Japan

**Staff Sgt. John Murphy**, HQ AFWA, Offutt AFB, Neb.

**Staff Sgt. Kevin Nurre**, HQ AFWA, Offutt AFB, Neb.

**Staff Sgt. Erick Pedicone**, HQ AFWA, Offutt AFB, Neb.

**Staff Sgt. Alan Price**, Det. 2, 7th WS, Hanau, Germany

**Staff Sgt. Antonio Pressley**, 28th OWS, Shaw AFB, S.C.

Staff Sgt. Edward Pnttbrese, HQ AFWA, Offutt AFB, Neb.  
 Staff Sgt. William Reisner, 62nd OSS/OSW, McChord AFB, Wash.  
 Staff Sgt. Ernesto Ruiz, 325th OSS/OSW, Tyndall AFB, Fla.  
 Staff Sgt. Rodman Sonchek, HQ AFWA, Offutt AFB, Neb.  
 Staff Sgt. Eric Stoll, HQ AFWA, Offutt AFB, Neb.  
 Staff Sgt. Mark Stover, 1st WS, Fort Lewis, Wash.  
 Staff Sgt. Debbie Sweetland, HQ AFWA, Offutt AFB, Neb.  
 Staff Sgt. Michele Tarras, 6th WF, Ft. Rucker AIN, Ala.  
 Staff Sgt. Nathan Taylor, Det. 11, 7th WS, Heidelberg, Germany  
 Staff Sgt. Marlon Verasamy, 437th OSS/OSW, Charleston AFB, S.C.  
 Staff Sgt. Ceaser Webb, 28th OWS, Shaw AFB, S.C.  
 Staff Sgt. Hilton Wells, 21st ASOS, Fort Polk, La.  
 Staff Sgt. Tonya Winski, Det. 7, 7th WS, Grafenwoehr, Germany  
 Senior Airman Eric Bevard, 60th OSS/OSW, Travis AFB, Calif.  
 Senior Airman Michelle Carnot, 140th WF, Willow Grove, Penn.  
 Senior Airman Christine Collins, HQ AFETC, Randolph AFB, Texas  
 Senior Airman Heinz Disch, 4th OSS/OSW, Seymour-Johnson AFB, N.C.  
 Senior Airman Angelique Fabiano, 92nd OSS/OSW, Fairchild AFB, Wash.  
 Senior Airman Rodney Hattery, HQ AFWA, Offutt AFB, Neb.  
 Senior Airman Amy Hilbun, 13th ASOS/WF, Fort Carson, Colo.  
 Senior Airman Sonia Pritchett, 1st OSS/OSW, Langley AFB, Va.  
 Senior Airman Zachariah Ridgeway, 14th OSS/OSW, Columbus AFB, Miss.  
 Senior Airman Amber Stevens, 15th ASOS, Fort Stewart, Ga.  
 Senior Airman Hope Torres, 9th OSS/OSW, Beale AFB, Calif.  
 Petty Officer 3rd Class Edward Silman, International Ice Patrol, Groton, Conn.

#### FORECASTER COURSE

Staff Sgt. Randall Claar, 15th ASOS, Hunter AAF, Ga.  
 Staff Sgt. James Dillon, 341st OSS/OSW, Malmstrom AFB, Mont.  
 Staff Sgt. Kristine Haas, 89th OSS/OSW, Andrews AFB, Md.  
 Staff Sgt. Geoffery Lamson, 3rd WS, Fort Hood, Texas  
 Petty Officer 2nd Class Joshua Robinson, USCGC Healy, Seattle, Wash.  
 Senior Airman Jason Bazin, Det. 2, AGOS, Fort Irwin, Calif.  
 Senior Airman Kenyatta Carter, 88th WS, Wright-Patterson AFB, Ohio  
 Senior Airman Taneasha Evans, 11th RS, Indian Springs AAF, Nev.  
 Senior Airman Arneva Mason, 207th WF, Indianapolis, Ind.  
 Senior Airman Phillip Mohr, 56th OSS/OSW, Luke AFB, Ariz.  
 Senior Airman William Odonnell, 10th CWS, Fort Campbell, Ky.  
 Senior Airman Leslie Richman, 88th WS, Wright-Patterson AFB, Ohio  
 Senior Airman Natalie Roberts, 57th OSS/OSW, Nellis AFB, Nev.  
 Senior Airman Lorne Steuer, 3rd WS, Fort Hood, Texas  
 Senior Airman David Strickland, 19th ASOS, Fort Campbell, Ky.  
 Senior Airman Jessica Valianos, AFWA, Offutt AFB, Neb.

#### WEATHER FORECASTER APPRENTICE COURSE

Staff Sgt. Brian Raphael, 140th WF, Willow Grove, Pa.  
 Senior Airman Gregory French, 25th OWS, Davis-Monthan AFB, Ariz.  
 Senior Airman Jay Johnson, 25th OWS, Davis-Monthan AFB, Ariz.  
 Senior Airman Yetonda Payne, 121st WF, Andrews AFB, Md.  
 Airman 1st Class Jesus Barron, 26th OWS, Barksdale AFB, La.  
 Airman 1st Class Catherine Brandon, 25th OWS, Davis-Monthan AFB, Ariz.  
 Airman 1st Class Tasha Diaz, 25th OWS, Davis-Monthan AFB, Ariz.  
 Airman 1st Class Celia Eaves, 26th OWS, Barksdale AFB, La.  
 Airman 1st Class Michael Focht, 203rd WF, Indiantown Gap, Pa.  
 Airman 1st Class Michael Frisard, 122nd WF, Hammond, La.

Airman 1st Class Angela Gales, 25th OWS, Davis-Monthan AFB, Ariz.  
 Airman 1st Class Laurens Jones III, 200th WF, Richmond, Va.  
 Airman 1st Class Lee Shipley, 26th OWS, Barksdale AFB, La.  
 Airman 1st Class Ryeshod Spencer, USAFE OWS, Sembach AB, Germany  
 Airman 1st Class Chad Walker, 20th OWS, Shaw AFB, S.C.  
 Airman 1st Class Marquita Watts, 20th OWS, Shaw AFB, S.C.  
 Airman 1st Class Christopher White, 20th OWS, Shaw AFB, S.C.  
 Airman Micah Denton, 26th OWS, Barksdale AFB, La.  
 Airman Jason McCullough, 20th OWS, Shaw AFB, S.C.  
 Airman Blair Subhiyah, 26th OWS, Barksdale AFB, La.

#### NCO ACADEMY

Tech. Sgt. Scott Nych, Det. 1, AFWA, Learmonth Solar Observatory, Australia

#### AIRMAN LEADERSHIP SCHOOL

Senior Airman Daniel Gaynor, 26th OWS, Barksdale AFB, La.  
 Senior Airman Amanda Jenkins, 46th WS, Eglin AFB, Fla. (Levinow Award)  
 Senior Airman Chad Quin, 26th OWS, Barksdale AFB, La.

## Promotion

Selected for promotion to Major  
 Julie Novy, 88th WS, Wright-Patterson AFB, Ohio

## ANG Promotions

Promotion to Lieutenant Colonel  
 Jeff Peters, 165th WF, Louisville, Ky.

Promotion to Major:  
 James Guffy, 154th WF, Little Rock AFB, Ark.  
 Paul Helmbrecht, 126th WF, Milwaukee, Wisc.

Promotion to Master Sergeant  
 Harold Givens, 165th WF, Louisville, Ky.  
 Jeff Sarver, 165th WF, Louisville, Ky.  
 Scott Wirebaugh, 126th WF, Milwaukee, Wisc.

Promotion to Technical Sergeant  
 Charles Holloway, 121st WF, Andrews AFB, Md.  
 Ryan Marben, 210th WF, March ARB, Calif.

**Receiving General's coin:**

- Michelle Hammell**, HQ AFWA, Offutt AFB, Neb.
- Chris Imhof**, HQ AFWA, Offutt AFB, Neb.
- Joe Kuncel**, HQ AFWA, Offutt AFB, Neb.
- Gene Monroe**, HQ AFWA, Offutt AFB, Neb.
- Fawn Morley**, HQ AFWA, Offutt AFB, Neb.
- Maj. Kurt Brueske**, U.S. Air Force Academy, Colo.
- Capt. Michael Gauthier**, U.S. Air Force Academy, Colo.
- Capt. Mike Hunter**, HQ AFWA, Offutt AFB, Neb.
- Capt. Herbert Keyser**, HQ AFWA, Offutt AFB, Neb.
- Capt. Dawn Loisel**, HQ AFWA, Offutt AFB, Neb.
- Capt. Bruce Mueller**, 90th OSS/OSW, F.E. Warren AFB, Wyo.
- Capt. Charles Speicher**, 341st OSS/OSW, Malstrom AFB, Mont.
- 1st Lt. John McMillen**, 21st OSS/OSW, Peterson AFB, Colo.
- Chief Master Sgt. Skip Evans**, HQ AFSPC, Peterson AFB, Colo.
- Chief Master Sgt. Dan Michalewitz**, HQ AFWA, Offutt AFB, Neb.
- Senior Master Sgt. Alvin Hill**, HQ AFWA, Offutt AFB, Neb.
- Master Sgt. Donald Jeter**, HQ AFWA, Offutt AFB, Neb.
- Master Sgt. Jeffrey Struebing**, HQ AFWA, Offutt AFB, Neb.
- Tech. Sgt. Kendall Bengtson**, HQ AFWA, Offutt AFB, Neb.
- Tech. Sgt. Rachel Cox**, HQ AFWA, Offutt AFB, Neb.
- Tech. Sgt. Craig Lacy**, HQ AFWA, Offutt AFB, Neb.
- Staff Sgt. Jeremie Collins**, HQ AFWA, Offutt AFB, Neb.
- Staff Sgt. Jason McGimsey**, HQ AFWA, Offutt AFB, Neb.

**Tech. Sgt. Billy Cowgill**, HQ AFWA, received his General's coin for his unparalleled Space Weather Communications support. Not only did he pioneer three site surveys, identifying crucial requirements to improve the Space Weather Network, but he also increased vital Digital Ionospheric Sounding System data flow to the Space Weather Operation Center by more than 30 percent, ensuring improved accuracy of critical AFWA forecast models supporting Operation ENDURING FREEDOM. In addition, he helped redefine AF/XOW communications objectives to "Mainstream Space," resulting in achievable and measurable goals.



# General and Chief's Coin Corner



**Senior Airman Duane Holt**, HQ AFWA, received his Chief's coin for his managed configuration of office workstations to qualify for certification of network accreditation; analyzed and corrected 75 percent of the identified risks in only five percent of the required time. Holt was personally selected to help reengineer, design, and test the Space Weather Analysis and Forecasting System, which enabled the scheduled deactivation of the 55th SWXS to be moved up by two months. He also volunteered to lead the evaluation of Tivoli error tracking software, which reduced development time by more than 50 percent.

**Receiving Chief's coin:**

- Senior Master Sgt. Stephen McConnell**, 21st OSS/OSW, Peterson AFB, Colo.
- Master Sgt. Tim Lowman**, HQ AFWA, Offutt AFB, Neb.
- Master Sgt. Rodger Smith**, 50th OSS/OSW, Schriever AFB, Colo.
- Staff Sgt. Lois Anderson**, 21st OSS/OSW, Peterson AFB, Colo.
- Senior Airman Cameron Haberlein**, HQ AFWA, Offutt AFB, Neb.



