Observer

The Magazine for Air Force Weather

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The changing face of weather

What's inside:

Observer

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On the Cover

As Air Force weather constantly evolves to meet the ever changing needs of the warfighter, this issue features a look at the changes taking place in the world of weather.
The photo illustration on the cover is a mosaic of weather related images arranged in a manner that recreates the image to the right of a lighting storm and cloud formation connected by the heraldic weather badge anemometer. Photo illustration by Mrs. Eileen Williamson.

Most of you are domino pushers

by Col. Tom Frooninckx
1st Weather Group Commander
Offutt AFB, Neb.

That's right, domino pushers. Recognize it and take pride in it. I do.

Okay, what am I talking about? I'm referring to the awesome responsibility of operational weather squadrons, combat weather flights, special operations weather teams, and all other organizations producing weather information.

When you provide an analysis or forecast, a chain reaction of decisions and actions occurs, and a series of events unfolds which resembles a path of falling dominos. Aircrews, ground forces, mission schedulers, maintenance troops, fuels specialists, civil engineers, command posts, installation commanders, and many others make decisions and take actions which, in turn, lead to further decisions and actions. Eventually the last domino falls, representing mission success or failure.

Although there may be twists and turns, the destiny of the entire path is at the mercy of the first domino, pushed by a weather forecaster. Was it pushed in the right direction with the right amount of force? If you've ever watched a string of dominos fall, you know it moves quickly once it starts and can split into multiple paths with little opportunity to alter the course. Whether the path is long or short, simple or complex, it is first and foremost triggered by someone who pushes the first domino.

Here's one example to illustrate the point. A forecast is issued in the morning for widespread thunderstorms to occur in the late afternoon. Aircrews who are scheduled to fly in the late afternoon and the troops who support those sorties await decisions by the schedulers or the unit commander. Do they reschedule the mission for an earlier or later time in the day, or do they stick with the original plan and risk ground or air aborts? If they stick with the original schedule, when will the aircraft be fueled? When will lightning be too close? Are the weather forecasts for nearby airfields suitable as alternates? If they choose to reschedule earlier or later, whose duty schedule will be changed at the last minute to support those missions? And what family plans will be affected as a result?

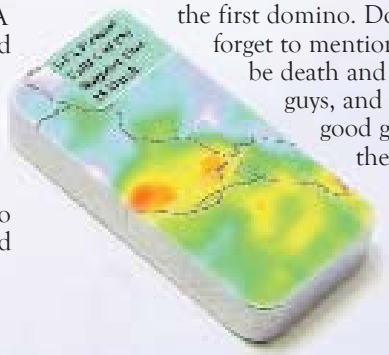
Now, consider a few wintertime dominos. Does the civil engineering snow-removal team stand-up or stand-down? Are flight operations adjusted or canceled? Does the wing commander send people home? Did anyone get into an auto accident because of road conditions?

And finally, consider wartime dominos. Does the air operations center proceed as planned and risk not achieving the objective because of weather? Is there another strike package available to launch from another base? Is a wholesale change to the Air Tasking Order necessary? Are enough tankers available to support a different schedule? What changes are needed to ensure ground maneuver forces are synchronized with air support? These decisions, actions, and events represent a fraction of the number of dominos that fall in response to just one analysis or forecast.

Unfortunately, we typically don't see all these dominos fall [this is one of the greatest frustrations of being in the weather career field]. Worse yet, we're not even aware of every domino that is falling. We're oblivious to most of what happens after we issue a forecast. Even combat weather flights at the pointiest end of the spear aren't aware of every domino. Here's the key: ***you must trust that the dominos are indeed falling, and thus you must treat every analysis and forecast as if it is the most important domino you've pushed- even the easiest forecast issued on a lazy Sunday night can have enormous impacts.***

So, when you tell your family or friends what your job is in the Air Force, don't tell them you're a weather forecaster. Instead, tell them you're a domino pusher. Then explain it. Explain how you are responsible for triggering a path of decisions, actions, and events, and describe how that path ultimately leads to mission success or failure depending on how well you push the first domino. Don't forget to mention that the final domino can be death and destruction for the bad guys, and safety and victory for the good guys. And, finally, remind them very few people get to push the first domino.

Be proud that you push the first domino – I am.



The new face of the Pacific

By Col. Wendall T. Stapler
Chief of the Weather Division
Air and Space Operations Directorate
Headquarters PACAF, Hickam AFB, Hawaii

I was once told you can't control how the world is changing around you, but you can control how you react to that change. Col. John Murphy did an excellent job in the Jan/Feb '06 issue of the *Observer* outlining some of the changes we face as a career field and our game plan to meet the accompanying challenges and succeed. As we move along the path he outlined, it will be important to keep situational awareness on some of the specific actions going on in individual theaters. I'll focus in this forum primarily on a number of Pacific Air Forces weather organizational initiatives that are either in progress or completed.

It's important to first consider some of the defining features of the Pacific Theater. It is a vast region, more than 100 million square miles, and is relatively data sparse, forcing us to rely heavily on satellite technology. We face virtually every forecasting challenge from Alaska's arctic conditions, to sea fog and lake-effect snowshowers, to typhoon alley in the western Pacific. The Pacific also remains a strategically vital theater of operations. It contains more than one-half of the world's population and is undergoing unprecedented economic growth. Potential flashpoints and the ever-present threat of a natural disaster in this far-flung theater require a state of continuous vigilance. That requirement has caused us to initiate a number of organizational changes.

In April 2006, we officially deactivated the 20th Operational Weather Squadron in Japan and transferred its responsibilities to the 17th Operational Weather Squadron in Hawaii (for more information see "Soyanara Japan and Aloha Hawaii" in the March/April '06 issue of the *Observer*). This allowed us to achieve some efficiency by consolidating operational weather support previously provided by two OWSs and streamlining weather operations for our 13th Air Force Warfighting Headquarters in Hawaii.

Another OWS merger was approved recently and initial planning activities are already underway. Under this plan, the 11th OWS at Elmendorf AFB Alaska will deactivate by September 2008 and the 17th OWS will take over responsibility for the Alaskan theater of operations. This will leave us with a single OWS for the entire PACAF area of responsibility.

Army transformation and planned force reductions on the Korean Peninsula have driven a reevaluation of Army support provided by the 607th Weather Squadron. We have reshaped weather operations in Korea by closing down Camps Stanley, Page, and Stanton, within the last year. The 607th Weather Squadron is on-track for reorganization and an eventual move from Seoul to Camp Humphreys.

In addition, Army Transformation has prompted an Air Force-wide planning effort to restructure Army weather support for increased efficiency and flexibility in order to meet the requirements of a more modular Army. If the concept is approved, a second PACAF weather squadron would be stood up or transferred from another MAJCOM to provide theater-wide,with the exception of Korea, Army weather support and oversight.

Something that hasn't changed in this area of responsibility, or the rest of the Air Force, is the tremendous performance, sacrifice, and dedication to duty of all our weather personnel. Whether deployed or at home station, your contributions and effort have directly contributed to making us the most professional and capable Air Force in the world. I look forward to working with each of you in the future.

Pacific Air Force Facts

Mission:
Provide Pacific Command integrated expeditionary Air Force capabilities to defend the homeland, promote stability, dissuade and deter aggression, and swiftly defeat enemies

Area of Responsibility:
105 million square miles, more than 50 percent of the earth's surface; covering 43 countries; 20 territories and possessions; and 10 U.S. territories, more than 60 percent of the world's population.

Personnel and Aircraft:
54,000 personnel and 400 aircraft at 80 locations

Weather Personnel:
Approximately 400 at 18 air bases, Forward Operating Locations, and Army locations

Humanitarian relief efforts:
More than 140 since the command was created

Agency employs new computer forecast model

by Mr. Miles Brown
HQ Air Force Weather Agency Public Affairs
Offutt AFB, Neb.

In July, the Air Force Weather Agency, headquartered at Offutt AFB, Neb. took the first steps to utilize the new Weather Research and Forecasting model, known as WRF, for operational forecasts. This WRF model, the first new worldwide fine-scale computer forecasting program in nearly a decade, was created through a collaborative effort involving the National Center for Atmospheric Research, the National Oceanic and Atmospheric Administration, the Air Force, and universities from around the world.

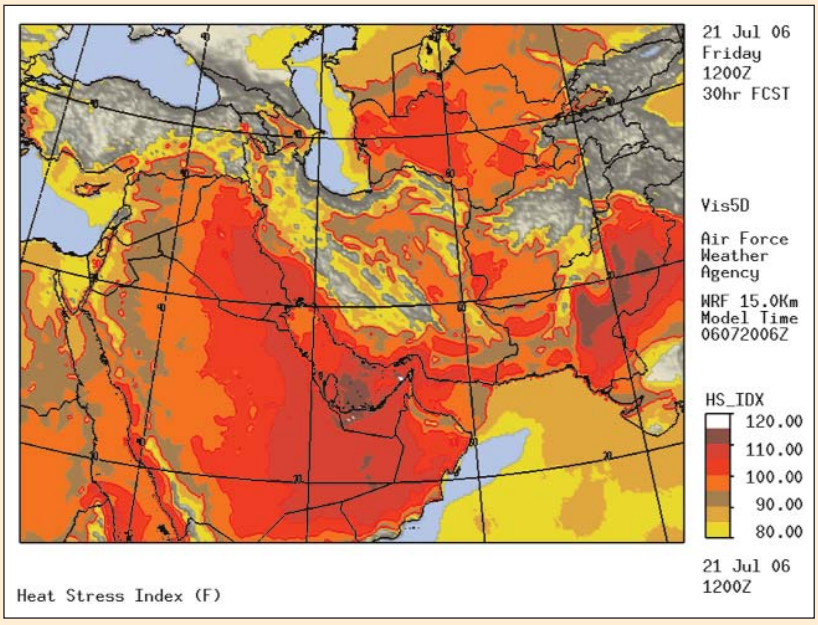
The program's implementation follows a year of evaluation and testing, according to Col. Ron Lowther, Director of the Air and Space Science directorate at AFWA.

"This process ensured the new model forecasts would meet our standards for accuracy and reliability – WRF meets the needs of the warfighter and met our expectations."

The transition of the WRF model will be seamless to the warfighters and will provide a more accurate forecast now and in the future.

"The new model outperformed the older MM5 [Mesoscale Model 5] in more than 70 percent of test situations at AFWA," said Maj. Lee Byerle, Branch Chief of the Meteorological Models branch at AFWA. "Not only is the WRF model more accurate and efficient, it is also fully supported by research and operational weather communities. This support will ensure future improvements to the model reach Air Force operators without delay."

In the future, the WRF model will add even finer scale resolution and improved accuracy for mission execution. This will positively impact warfighters by improving products delivered to garrisoned and deployed forces worldwide such as: mission execution products for the Precision Airdrop System, Target Acquisition Weapon Software, and Field Artillery targeting applications, Major Byerle said.



Shown here is a heat stress index forecast for southwest Asia generated by the new Weather Research and Forecasting model. This model is now available to Air Force weather professionals around the world via the Joint Air Force and Army Weather Information Network on the Internet. Air Force Weather Agency image.

The implementation of WRF demonstrates how AFWA's forecast model efforts continue to focus on warfighter needs. By leveraging the national and international weather communities, AFWA can continue to focus on operational requirements without shouldering all the costs to design and develop state-of-the-art model forecast capabilities.

"WRF will continue to improve and evolve thanks to the research and development pouring into it from our Nation's leading academic and scientific institutions," said Col. Patrick M. Condray, AFWA Commander. "This will directly and positively impact the warfighter by improving forecast accuracy, model resolution, and mission execution products."

Air Force Weather Transformation questions answered

by Weather Resources and Programs Division
Staff Report
Washington D.C.

Why are we transforming?

Transformation has been the buzzword of change in the Department of Defense and the military for some time. Although transformational efforts began before the 9/11 terrorist attacks, the resulting Global War on Terrorism brought a new sense of urgency to the effort. This urgency has increased emphasis on joint operations; integrated command and control systems, machine-to-machine information transfers; net-centric operations; training on-battlefield skills; and many other areas. Recently announced Air Force manning and budget cuts designed to finance force modernization have also increased the need to implement transformational initiatives.

The Air Force weather community is an integral part of Air Force transformation as weather information becomes more relevant and vital to operations planning and execution with improvements in forecast models and battlespace sensing. As the military transforms the way they conduct operations, Air Force weather operations will transform in response to the changing operations environment. The need for weather operations transformation is clearly outlined in DoD, Air Force, and Army transformational guidance, the Quadrennial Defense Review, the Air Force Concepts of Operations and Army Future Combat Force guidance. AFW transformation will address fundamental questions that arise from the changes DoD and the Air Force is implementing:

What is the best way to digitally integrate environmental information into joint mission planning and execution systems and enhance the decision superiority of command authorities?

How does Air Force weather provide decision-makers with consistent weather information that automatically identifies environmental limitations when/where needed - available in less than ten minutes for time-sensitive targets?

How do weather professionals provide decision-makers with a consistent near real-time picture of the battlespace (weather on the Common Operational Picture)?

How do weather forces provide weather capabilities within resource allocations?

How can Air Force weather units exploit technology and improve processes, gain efficiencies, and maximize mission effectiveness?

What are the acceptable risks necessary to increase efficiency or save resources?

Clearly, these are very tough questions with no easy answers. Fortunately, over the past few years the Air Force weather leadership has developed a plan - Air Force Weather Transformation - to transition weather operations to meet tomorrow's fast-paced, automated, machine-to-machine, net-centric battlespace environment.

Additionally, the Air Force weather community has been working with our sister services through the Joint Meteorological and Oceanographic Board and other initiatives to ensure consistency of effort between Services. Consistency of effort extends beyond the DoD to other government agencies through initiatives such as the Next Generation Air Transportation System's Joint Program Development Office and the National Polar-Orbiting Operational Environmental Satellite System. The Next Generation Air Transportation System is a congressionally mandated initiative that seeks to improve the efficiency of the United States air traffic system of which the DoD is an integral participant. Operating in a net-centric world provides an opportunity to implement a consistent United States government environmental "worldwide national datacube." The goal is for all government environmental stakeholders - Department of Defense, Department of Commerce, National Aeronautics and Space Administration, Department of Transportation, Department of Homeland Security, and the Federal Aviation Administration - to use this environmental datacube. Ultimately, the goal is for the DoD to contribute to the population of this datacube and exploit it for all military operations. Finally, Air Force Weather has to consider how to work with coalition partners in this new environment.

What is the plan?

To meet all these requirements and objectives for the future, Air Force weather leaders have developed a deliberate plan that leverages numerical weather model improvements, ensemble forecasting techniques, Operational Risk Management techniques, technological advancements, and machine-to-machine processes, known as M2M, to transform the way Air Force weather will do business in the 21st century. The plan fundamentally alters the forecast process we all have grown to embrace and the way environmental information is integrated and exploited in Air Force, Army, and joint mission planning and execution.

The goal is to effectively and efficiently characterize the environment in order to deliver timely, relevant, accurate and consistent environmental information, also known as "TRAC", to C2 systems. Providing on "TRAC" weather information to decision-makers provides new

capabilities that will enhance operational effectiveness, efficiency, and safety while operating in a net-centric battlefield environment.

Successful execution of the plan will affect Air Force weather force employment, manpower, funding priorities, system development and procurement, policy development, training, data sensing strategies, testing and evaluation, etc. Air Force Weather will implement the plan deliberately across all strategic, operational, and tactical levels of warfare with the most significant changes taking place through process changes at the operational and tactical levels.

Under the transformation plan, numerical weather models become the "center of gravity." Culturally, this represents the beginning of a shift away from current processes where forecasters rely heavily on the 'art' of meteorology to develop forecast products. In the end state, forecasters will still "quality control" model data, primarily in the first 24 hours of the forecast period and issue Weather Warnings and Advisories. Forecasts beyond 24 hours will mainly be automated, with M2M weather inputs integrated directly into C2 systems.

In the future, Air Force weather will utilize new modeling techniques such as ensembling of numerical predication models to assist in institutionalizing Air Force-wide ORM techniques similar to those currently being used in the Tanker Airlift Control Center. Air Force weather will test ensemble forecast processes and techniques in Pacific Air Forces in 2007/2008. Ultimately, ensemble model output will include forecast solution data ranges, confidence intervals, and probability data - stochastic data for use by forecasters and for direct integration into tactical (Wing) and operational Air and Space Operations Center, C2 systems for mission planning and Air Tasking Order development activities. The goal is to have operator-defined automated business rules evaluate the ensemble stochastic data against acceptable risk levels and mission-limiting environmental thresholds to provide decision-makers with the integrated on-demand digital environmental data necessary to exploit environmental advantages or mitigate impacts. Weather forecasters at weather flights/detachments and operational mission centers will offer advice and courses of action to decision-makers to mitigate environmental risks and maximize operational effectiveness for every mission the C2 system identifies as "at-risk" or ensemble forecast confidence is low.

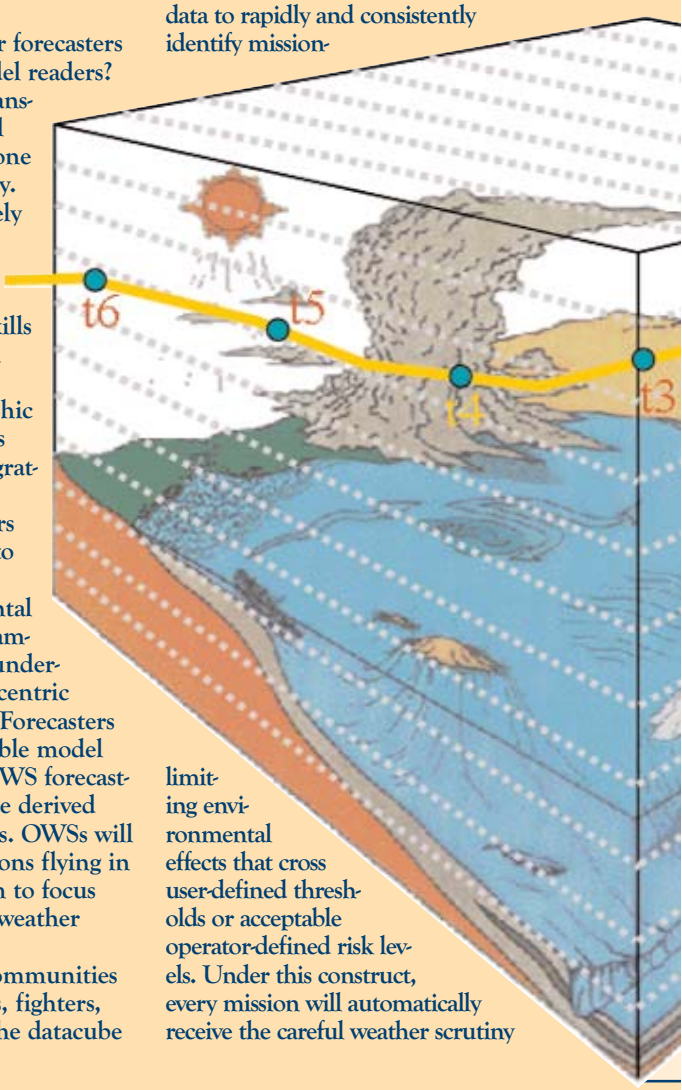
Under the new paradigm, OWS forecasters will focus their technical skills and talents on characterizing and exploiting environmental data when model confidence is low and operations are being impacted by the weather. They will provide "forecaster-in-the-loop" to help minimize the impact to operations. In many cases, this will equate to focusing efforts on high-visibility or high-risk mission areas where ensemble model confidence is low, and/or the weather threat is too serious to leave to automation.

Does this mean weather forecasters will become obsolete model readers? Absolutely not! Under transformation, forecasters will continue to be the backbone of the weather community. These new processes merely maximize how efficiently and effectively the weather community marries our forecaster's skills and talents to operational priorities. In the future, instead of producing graphic or alphanumeric products that are not digitally integrated into mission planning and C2 systems, forecasters will now have the ability to "quality control" and save select derived environmental data gridded fields for example, turbulence, icing, thunderstorms, to the virtual net-centric environmental datacube. Forecasters will use ORM and ensemble model data to determine if an OWS forecaster is needed to manipulate derived environmental parameters. OWSs will have visibility on all missions flying in their AOR, allowing them to focus resources on areas where weather truly impacts operations.

Decision-makers and communities of interest such as tankers, fighters, and bombers will access the datacube through the global information grid, or GIG to get a single consistent forecast, a key component of net-centric operations.

There is really no alternative for the future. The M2M pace of operations necessitates a major shift away from operators and forecasters using graphics and alphanumeric based products to identify environmental impacts. Rather than interpreting environmental information from a suite of non-interrogatable graphical and alphanumeric forecast products, decision-makers will primarily use automated processes to pull or discover information or build products-on-demand from the datacube - from long range planning, through mission execution, to post-mission analysis.

Furthermore, transformation seeks to develop and integrate automated business rules that interact with the gridded data to rapidly and consistently identify mission-limiting environmental effects that cross user-defined thresholds or acceptable operator-defined risk levels. Under this construct, every mission will automatically receive the careful weather scrutiny



desired to avoid unanticipated impacts to mission execution.

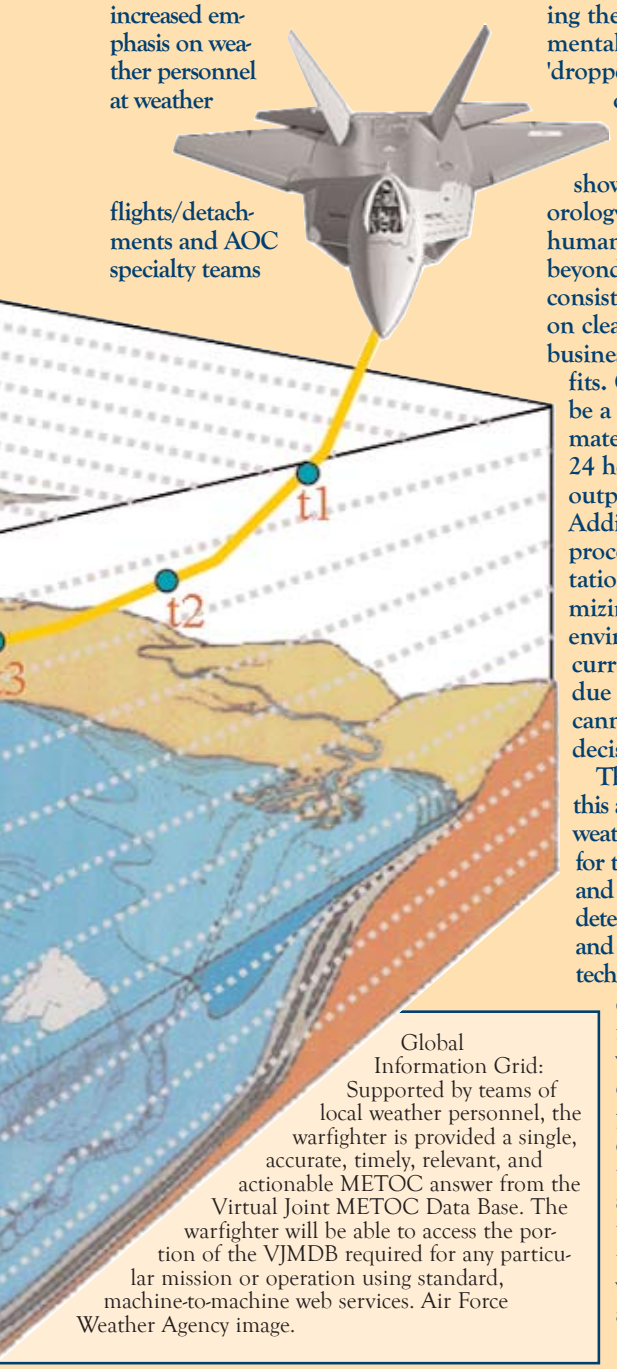
This increased awareness of environmental impacts will, in turn, result in weather forces becoming a key "environmental consultant" as operators are consistently prompted to consider alternatives for mitigating environmental effects to friendly force operations while simultaneously exploiting environmental impacts on enemy forces. In this regard, transformation of weather operations will ultimately result in an increased emphasis on weather personnel at weather flights/detachments and AOC specialty teams understanding the art of war and how environmental factors impact our nation's ability to wage war - strategically, operationally, and tactically.

The key to successfully implementing transformation and recognizing the mission effectiveness and operations efficiency gains desired, is to apply consistent, repeatable processes in the tactical and operational mission centers. Automated integration processes will maximize the exploitation of enviromental data, minimizing the amount of pertinent environmental information that is currently 'dropped on the floor' due to data overload that humans cannot possibly incorporate into decision-making. Studies have shown that when viewing the meteorology community as a whole, the human adds little forecast value beyond 24 hours and implementing consistent, automated processes based on clearly defined and repeatable business rules will realize huge benefits. Over the long haul, there will be a greater dependency on automated processes, especially beyond 24 hours, when models routinely outperform the human. Additionally, automated integration processes will maximize the exploitation of environmental data minimizing the amount of pertinent environmental information that is currently 'dropped on the floor' due to data overload that humans cannot possibly incorporate into decision-making.

There are recognized limitations to this approach and the Air Force weather transformation plan accounts for these limitations. Theater sensing and numerical model capabilities will determine the amount of automation and the level of risk management techniques used to characterize the environment and exploit environmental capabilities. Theaters with robust, net-centric sensing capabilities and better model physics will benefit from the efficiencies and effectiveness gained through greater reliance on automation and robust ORM techniques. In data denied battlespace areas, and/or in areas where modeling is not as advanced and minimal net-centric capabilities exist, ORM techniques will require greater human involvement. Therefore, the efficiencies gained and resulting decrease in human workload will be theater specific. However, a positive aspect of transforming to the new way of doing business is that the Air Force will use similar processes across the spectrum of warfare and that no matter where specific battlespace operations occur, as sensing capabilities, model accuracy and model algorithms improve, the amount of human involvement in ORM processes will gradually decrease over time without any new changes in basic processes. Additionally, using similar process will also produce training efficiencies - shorter spin-up times when transferring between theaters or between a weather flight/detachment or AOC.

In effect, as technology advances over time, manpower will move from "quality controlling" gridded data, to characterizing the environment and exploiting environmental information. As greater efficiencies are gained at OWSs, more forecasters will act at the tactical and operational levels as an "environmental consultant." Processes for future "consultants" at the weather flights/detachments and AOCs will become identical in the M2M era as tactical mission planning systems also automatically integrate digital weather data.

At this time, other than the organizational re-alignments associated with the Air Force Warfighting Headquarters initiative and the re-alignments associated with Army Transformation, there are no plans to change the organizational structure of weather forces. There will be OWS consolidations in the future. Current plans call for the consolidation of the 11th into the 17th OWS at Hickam. In the OWSs, the processes for producing Terminal Aerodrome Forecasts, hazard products, Weather Warnings, and Weather Advisories will change significantly - over time we will move to an environment where models will generate first-guess TAFs, hazard charts, WWs and WAs. Eventually, terminal aerodrome environmental information may get derived directly from the datacube. There are no plans to change the look and feel of the TAF in the foreseeable future to remain consistent with international standards.



Global Information Grid: Supported by teams of local weather personnel, the warfighter is provided a single, accurate, timely, relevant, and actionable METOC answer from the Virtual Joint METOC Data Base. The warfighter will be able to access the portion of the VJMDB required for any particular mission or operation using standard, machine-to-machine web services. Air Force Weather Agency image.

How will the plan be implemented?

Through 2015, forecast processes, training, and operating concepts will gradually change in phases as new technological capabilities are fielded. Air Force weather leadership will carefully monitor the anticipated delivery of new capabilities and proceed to the next phase when there is high confidence of timely fielding. This will require making best guess estimates of fielding dates 12-18 months before actual fielding to allow time to write new techniques, tactics and procedures and implement new training and policy. Changes will also affect the schoolhouse. It is recognized that fielding delays will occur impeding plans. Air Force weather leadership will make an effort to minimize turbulence to the field.

The first phase of transformation focuses on implementing institutional use of ORM. Most Air Force members are familiar with ORM, the process used to evaluate the risks involved with performing certain actions. The weather community will use ORM to decide where weather personnel should apply their skills and experience. Initially, weather flights/detachments will use ORM to take advantage of benign weather days relying on un-augmented observations so they can conduct training on tactical equipment or gain a better understanding of how weather impacts operations. The ORM in this example is assessing the weather for the day as benign and allowing the sensing system to run in automated mode. In this example, even if an erroneous data element entered the datacube, there would be no risk to life, property, or missions.

The second transformation phase, in mid-2007, will focus on fielding the new Joint Environmental Toolkit, or JET, replacing the New-Tactical Forecast System and Operational Weather Squadron Production System II. In this phase, JET will simplify product development, especially at the weather flight/detachment level, and allow for the integration of forecaster developed products directly into C2 systems. Eventually JET, coupled with Air Force Weather Agency's Weather Data Analysis System and Ensemble Forecast System, will provide robust M2M integration, ingestion of sensor data, automated product build, first-guess product generation, automated product development from the datacube, and the ability for forecasters to manipulate and save digital environmental data to the datacube. The JET development contract award was in April 2006. Fielding of JET Increment 1.0 is scheduled for Fiscal Year 2007. JET development and field-implementation will occur in incremental spirals, providing the Air Force weather community with the flexibility to ensure the system meets future operational requirements. JET increment 4.0 fielding will be in Fiscal Year 2013. Each increment of JET will parallel another phase of Air Force Weather transformation.

Air Force Weather Transformation is here now, and poised to set our course for the future. This transformational endeavor is challenging and will not be easy – no large-scale change ever is. However, it is imperative that we all work together to transform as deliberately and thoughtfully as possible to enhance our nations' warfighting capabilities.

– Col. Don Berchoff, Chief, Weather Resources and Program Division

The third phase of transformation will coincide with the delivery of the second increment of JET and the delivery of ensemble capability in the Continental United States in the 2009 timeframe. In this phase, forecasters will begin "quality-controlling" select model derived parameters before it enters the datacube. In this phase, the OWS will focus personnel and quality control efforts on areas of forecast uncertainty and/or on a current or forecast weather threat that is critical to operations or safety.

The ability of weather forces to apply ORM techniques will improve once ensemble model data and operational ensemble products become more robust during the final phases of transformation in the 2011-2013 timeframe. These phases will include the running of ensembles for overseas theaters, increased automation for notifying weather personnel when operator-defined mission-limiting environmental thresholds are met and automated decision rules in mission systems. Air Force Weather Transformation is relying on numerical weather prediction and ensemble techniques that look promising and are currently being refined and operationally tested by the Air Force Weather Agency. Ensemble forecasting uses several different models and/or perturbations of the same models to identify areas where model solutions converge and diverge. Convergence indicates strong model agreement or more confidence in the model data. Divergence indicates disagreements between the models. Ensemble data is ideally suited for use with ORM techniques because it provides objective data for consistently determining risk to operations. Additionally, ensemble data will continuously update the environmental datacube to support future M2M operations and seamlessly integrate environmental data into mission planning, execution, and into Command and Control systems. Ensemble testing will be complete in Fiscal Year 2008.

In short, Air Force Weather Transformation is coming, and poised to set our course for the future. This transformational endeavor is challenging and will not be easy - no large-scale change ever is. However, it is imperative that we all work together to transform as deliberately and thoughtfully as possible to enhance our nations' warfighting capabilities. By taking the correct course now, the Air Force weather community is on "TRAC" to provide vital weather capabilities for current and future operations.

AIR FORCE PROVIDES ARMY WEATHER SUPPORT

Right: Tech. Sgt. Gina Faulds measures visibility during field training at Wiesbaden Army Airfield, Germany, June 21. Sergeant Faulds, of Chino, Calif., is a battlefield weather forecaster and the NCO in charge of the 7th Weather Squadron, Detachment 6. The 7th WS has provided the Army's weather support in Europe since 1959. Photos by Master Sgt. John E. Lasky.

Left: Tech. Sgt. Jessica Boyle gathers weather data during field training June 21 at Wiesbaden Army Airfield, Germany. A native of Swanzey, N.H., Sergeant Boyle is a battlefield weather forecaster with Wiesbaden's 7th Weather Squadron, Detachment 6 in southwest Germany. Det. 6 supports operations for the 1st Armored Division. They are one of 26 weather detachments throughout Europe forecasting at home base or deployed.

Right: Staff Sgt. Craig Gaillardet attaches the lightning detector to the TMQ-53 Tactical Meteorological Observing Station at Wiesbaden Army Airfield, Germany, June 21. Sergeant Gaillardet, a Pecos, Texas, native, is a battlefield weather forecaster with the 7th Weather Squadron headquartered in Heidelberg, Germany. Battlefield weather teams predict the impact weather will have on Army and joint operations giving leadership at all levels the ability to adjust operational and tactical strategies helping to further mission success.

1st Weather Group

Stateside operational wea squadrons under one umb

by HQ Air Force Weather Agency
Staff Report
Offutt AFB, Neb.

The stage is set for big changes in Air Force weather forecasting across the United States. By aligning stateside operational weather squadrons under a single command, the Air Force has created a more efficient and effective organizational structure to support Total Force and combatant command operations in CONUS.

The process began with the reactivation of the 1st Weather Group at Offutt AFB, Neb., May 25. First activated in 1944, the group is now aligned under the Air Force Weather Agency, continues its long and decorated history of providing weather information to Air Force and Army units.

The new group includes four OWSs located at four Air Force bases - the 9th OWS at Shaw AFB, S.C., the15th OWS at Scott AFB, Ill.; the 25th OWS at Davis-Monthan AFB, Ariz.; and the 26th OWS at Barksdale AFB, La. These organizations had previously been aligned under two separate major commands.

"The organizational change is seamless to all military units requiring weather information – they will continue to receive complete environmental situational awareness as we work to improve the accuracy, timeliness, and efficiency of our operations," said Colonel Tom Frooninckx, the new group commander. "We are not so much changing what we do, at least not initially, but we are changing how we do it."

Each of the four squadrons provides forecasts for a specified area of the United States. The overseas missions performed by the squadrons before the realignment did not transfer to the 1WXG; those overseas missions have remained attached to the warfighting numbered Air Force at each base.

Left: The 25th OWS, located at Davis-Monthan AFB, Ariz., joined the 1st WXG July 6. Their area of responsibility includes Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Washington, Wyoming, Utah, and the western panhandle of Nebraska. Photos by Mr. Miles Brown

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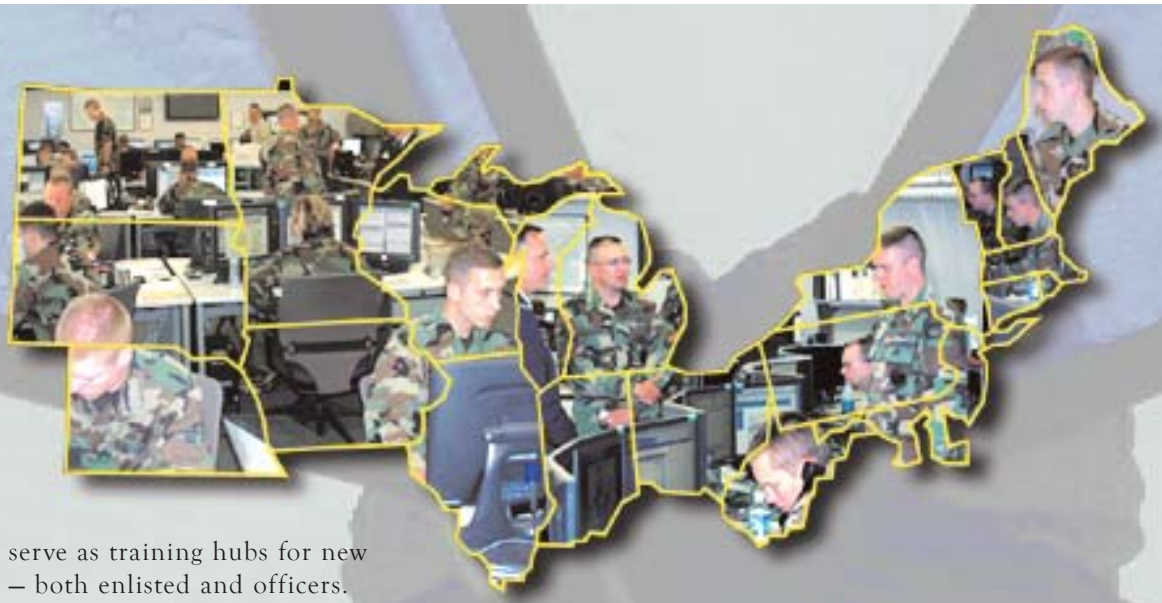


Above: The 15th OWS, located at Scott AFB, Ill., joined the 1st WXG June 7. Their area of responsibility includes Connecticut, Delaware, Illinois, Indiana, Iowa, Maryland, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, North Dakota, Ohio, Pennsylvania, Rhode Island, South Dakota, Vermont, Washington D.C., West Virginia, Wisconsin, and parts of Nebraska and Virginia. Photos by Mr. Miles Brown.

The squadrons also serve as training hubs for new weather professionals – both enlisted and officers. Graduates from the initial skills course at Keesler AFB, Miss., serve their first operational tour at an OWS where they learn how to apply the art and science of meteorology under the mentorship and guidance of experienced weather technicians.

According to Chief Master Sergeant Jeff Fries, the Superintendent for 1WXG, "It is our job to arm our weather professionals with the knowledge and skills necessary to deliver environmental intelligence for commanders and military decision makers." With all the stateside OWSs under the 1st Weather Group, we can take that first step down the road to improving the efficiency and effectiveness of weather operations for the Total Force."

The 1st Weather Group has a long and proud heritage starting as the Far East Air Forces Weather Group in October 1944. In September 1945, the 1st WXG was assigned to the 43rd Weather Wing and later that year to the Headquarters Army Air Forces Weather Service. They were inactivated in 1948, and reactivated and assigned to the Air Weather Service at Offutt AFB through the Military Air Transport Service from 1952 to 1956, after which they were again inactivated. The group reactivated once again under the 1st Weather Wing from 1966 to 1972 at Tan Son Nhut AB, Vietnam. The most recent period of activation was at Fort McPherson, Ga., from 1992 to 1994 under the Air Combat Command.

The Group was distinguished with service and campaign streamers from World War II and Vietnam.

They also earned four outstanding unit awards and the Republic of Vietnam Gallantry Cross.

With the addition of the 1st Weather Group's 600-plus weather professionals, the Air Force Weather Agency continues to lead the way with essential air and space environmental intelligence, training, and technical services to ensure battlespace awareness and decision superiority – anytime, anywhere.

Left: The 26th OWS, located at Barksdale AFB, La., joined the 1st WXG June 22. Their area of responsibility includes Alabama, Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas. Photos by Mrs. Eileen Williamson

Below: The 9th OWS, located at Shaw AFB, S.C., joined the 1st WXG July 20. Their area of responsibility includes Georgia, Florida, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, and parts of Virginia. Photos by Tech Sgt. Claudette Hutchinson.

Navy, Air Force weather in Europe combine operations

By HQ U.S. Air Forces in Europe Weather Division
Staff report
Ramstein AB, Germany

The Air Force and Navy military weather communities in Europe are coming together.

They are embarking on a new concept, providing full spectrum support to warfighters throughout the European Command.

Four Naval Meteorology and Oceanography offices will see this change. The Naval Activities Rota, in Spain; Naples, Italy; Sigonella, Sicily; and Souda Bay, Crete are closing their doors. They are transferring their functions to the Naval Aviation Forecast Detachment and the 21st Operational Weather Squadron, Sembach, Germany.

In order to realize Chief of Naval Operations' recapitalization and realignment efforts, the Navy METOC footprint in the European theater will be streamlined from 239 personnel to 37 by Fiscal Year 2008. This will co-locate Navy and Air Force European weather at one location, the 21st OWS, allowing both services to align weather support and maximize the use of Department of Defense resources throughout the theater. As a result, all Naval European aviation weather and resource protection requirements are being transferred from the local Navy detachments to the 21st OWS by October of this year.

The Navy detachment at Sembach AB will receive 14 personnel in order to execute this transition. First to arrive was Lieutenant Shawn Gallaher, Navy, who came to Sembach AB from the recently disestablished Naval European Meteorology and Oceanography Center in Rota, Spain. Shortly afterward, all NAVEUR Web products were migrated from the Mediterranean detachments to the 21st OWS Web page. In May, following the arrival of a senior NCO and 2 forecasters, Navy flight weather briefing support for the entire NAVEUR theater transitioned to Sembach AB. Previously, the briefings were provided by Navy forecasters located at the airfields in Rota, Naples, Sigonella and Souda Bay. The transition will complete in October with the Air Force and Navy team at the 21st OWS providing 24 hour resource protection and Terminal Aerodrome Forecasts for all four Navy sites remotely from Sembach AB.

Operationally, the Navy detachment has integrated into the Squadron mission through close synchronization with the 21st OWS leaders. Coordination between both operations directors has given the squadron a better joint service perspective. This ensures relevant products for

Left to right: Chief Petty Officer Jamie McClain, Tech Sgt. David Isler at the Synoptic Desk, and Production Supervisor, Master Sgt. Leonard LaForest provide quality assurance to 21st OWS products. Photos by U.S. Navy Lt. Shawn Gallaher.

In the foreground, Petty Officer 2nd Class Evelyn Michael and Staff Sgt. Rikki Bland, in the background Petty Officer 1st Class Scott Belt with Staff Sgt. Jeremy Reynolds. Air Force and Navy forecasters work together to provide flight weather briefings for Air Force, Army and Navy operations in the Mediterranean Region.

EUCOM customers, particularly products originating from the 21st OWS Contingency Cell are available.

Additionally, at the flight weather briefing desk, Navy and Air Force forecasters have completely integrated and have been operating jointly since June. Either a Navy or an Air Force forecaster independent of the service specific platform making the request may support EUCOM pilots needing flight weather briefings. The 21st OWS will use the Product Generation Server/Scheduler along with the naval flight weather briefer program to manage all EUCOM flight weather requirements.

While some functions are integrated, others have to remain separate based on the particular service's unique needs.

A Navy personnel specialist handles navy specific administrative needs. However, by combining the Air Force and Navy organizations, the efficiencies in the areas such as security management, systems integration, building utilization, administrative infrastructure and command sustainment, costs and programs have improved significantly.

Combining the Air Force and Navy weather services in Europe at the 21st OWS has been a tremendous success. Over time, the benefits of this merger will continue to flourish as more and more Air Force and Navy forecasters work together side by side. Not only does this arrangement foster a healthy cross service relationship, but also the efficiencies gain by this merged organization allows Department of Defense to reallocate resources to higher priority missions. As the successes of this union manifest, the value of expanding this model to other theaters may be realized and executed, making military weather a true joint organization.

Integrated meteorology

How NATO weather operation is transforming, and what it means

by Lt. Col. Zena Tucker
HQ U.S. Air Forces in Europe Weather Division
Ramstein AB, Germany

Because many major operations in the last few years led by the United States have involved NATO or NATO partners, it is important to understand how NATO nations have agreed to conduct future weather operations. NATO has compiled many documents describing different concepts of operations and NATO member-nation's weather operations capabilities.

The newest concept called the Integrated Meteorological and Oceanographic Support Concept was approved in October 2005. It states that an "IMETOC Lead Nation" is designated to provide or arrange for the meteorological and oceanographic products required for specific NATO Response Force-cycles and request assistance from other nations to assist with capabilities, which are not available from the lead nation. Previously, the policy stipulated that each nation would provide required meteorological support to its own forces. The goal of this new concept is to achieve unity of effort and efficiency.

"IMETOC overcomes the old ways of doing business and is designed to guarantee METOC support to all NATO missions by providing the best METOC data and products available to all nations participating to achieve 'one-theater, one forecast' and to avoid duplication of efforts and redundancies. ," said Mr. Uwe Bielding, Chief METOC Officer, Chief Environmental Section, Joint Operations Support Branch, SHAPE, J-3 Operations.

> *The IMETOC concept, an integrated Meteorological and Oceanographic plan to support any NATO mission out of one national METOC center, is a big step forward for NATO.*
>
> *– Mr Uwe Bieling*

This is similar to the Joint METOC Forecast Unit concept establishing one METOC center to provide the "control" products from which all others are derived.

For NATO's International Security Assistance Force in Afghanistan, the proposed IMETOC lead nation is the United States. The 28th Operational Weather Squadron, at Shaw AFB, S.C., already produces most of the weather products supporting the NATO forces in Afghanistan.

METOC professionals from Central Command, Joint Staff, Air Combat Command, U.S. Air Forces in Europe, the 28th OWS, 21st OWS and NATO are working to solve the question of how METOC products will be shared with the International Security Assistance Force. They are communicating frequently, working together to create the documents necessary to implement this program.

Currently, the plan is for the European Command, working through the 21st OWS, to act as a conduit between CENTCOM. CENTCOM will be working through the 28th OWS; and NATO working through Supreme Headquarters Allied Powers, Europe, based on its existing relationship with NATO. The 21st OWS will make 28th OWS products available via the NATO Automated Meteorological Information System. NATO nations participating in the International Security Assistance Force all have NAMIS access that will provide operators with the METOC information they need to perform their mission.

There are further implications for Air Force weather operations with respect to IMETOC. Forecasters must be willing and able to use another nation's products when the United States is not the IMETOC lead Nation.

To ensure the IMETOC concept is tested, improved and implemented in a way that supports NATO smartly and efficiently with no impacts to METOC operations specific to the United States, Mr. Bielding says, "...As a plan to provide METOC support for force and resource protection, it requires periodic assessment and updates as NATO and [NATO] nations work together on implementing and further developing the concept the agreement will require regular assessment and updating."

Weather-savvy Airmen assist with operational success

by Master Sgt. Andrew Gates
407th Air Expeditionary Group
Public Affairs
Ali AB, Iraq

In a combat environment, knowing what the weather will be can be crucial to operational success. A team of Airmen here is dedicated to doing just that.

"We provide accurate, mission-specific weather information and products to Ali Base warfighters and coalition forces," said Master Sgt. Milton Threet, 407th Expeditionary Operations Support Squadron chief of weather station operations.

To do that, the four-person shop monitors local and theater weather conditions around-the-clock. They stay familiar with what's going on not only at Ali Base, but also at destinations of the aircraft leaving here.

"People at Ali need to know the weather at all times, since knowing that can enhance the mission of everyone, especially those involved with flying operations," Sergeant Threet said. "If weather dictates that a mission is delayed or scrubbed, the mission is degraded."

"If I can tell a pilot there is a weather situation that may be hazardous to his flight, and he takes the proper precautions, that helps the mission," said Staff Sgt. Aaron Wood, deployed from the 46th Weather Squadron at Eglin Air Force Base, Fla.

Forecasting the weather in advance — up to at least five days — helps commanders plan missions, Sergeant Threet said. Besides forecasting, the station also passes severe weather warnings to the command post to allow people to protect themselves. During the upcoming summer at Ali Base, bad weather will usually be strong winds and dust storms.

The mission at Ali is somewhat different from that at the Airmen's home stations. For instance, Sergeant Wood forecasts high temperatures and blowing dust instead of thunderstorms and hurricanes.

"The scope and area of our responsibility is much different," said Tech. Sgt. Jared Ey, a forecaster deployed here from the 17th Operational Weather Squadron at Hickam AFB, Hawaii.

"At the 17th OWS, we produce weather charts and products for nearly half the world," Sergeant Ey said. "Here at Ali, we use the charts and products created at those weather squadrons and tailor them to the warfighters here."

To accomplish the mission, the team relies strongly upon the Tactical Meteorological Observing Set , or TMOS. The "all-in-one" piece of equipment measures the wind, temperature, dew point, precipitation, atmospheric pressure, visibility and sky conditions, Sergeant Threet said.

"The TMOS has some inherent limitations, so our forecasters verify and correct, as needed, the visibility and sky condition before issuing their hourly official observation," he said.

The team uses weather radar to monitor incoming thunderstorms or areas of precipitation, something Sergeant Threet doubts they will see during the next four months of their rotation. They also access satellite imagery and other products through the Internet, using the Joint Air Force and Army Weather Information Network.

For the four-person forecasting team, adjusting to the weather environment can be somewhat of a challenge.

"In many respects, it is an easier type of forecasting because the weather can remain unchanging for weeks at a time," Sergeant Threet said. "The challenge for us will be to remain alert to the potential for strong winds that generate dust storms where visibility may go to nearly nothing."

The team is excited about supporting the Ali Base mission as well as the burgeoning Iraqi democracy.

"The change to democracy has been long overdue," Sergeant Wood said. "I feel good about being here."

Sergeant Ey agreed. "It is amazing to be a part of something so historic," he said.

"While my name will not likely be singled out in a history book, I can look at this as an opportunity few in the world can do. I am playing a part of world history."

Whether or not history will remember them, the team enjoys the various aspects of the job.

"The best part of this job is the interaction with other people," Sergeant Ey said.

Sergeant Wood finds he likes a bigger challenge. "I like doing the five-day forecast and seeing how close I really came on the fourth and fifth days," he said.

Top Left: Staff Sgt. Aaron Wood checks wind speed and direction with a portable monitor. Sergeant Wood is with the 407th Expeditionary Operations Support Squadron and is deployed from Eglin AFB, Fla.; Bottom Right: Tech. Sgt. Jared Ey checks visibility during a dust storm. Sergeant Ey is with the 407th EOSS and is deployed from Hickam AFB, Hawaii. Photos by Master Sgt. Andrew Gates.

Interactive Grid Analysis and

Gets praise from the field

by Senior Airman Randall Jennings
HQ Air Force Weather Agency Public Affairs
Offutt AFB, Neb.

Customers are singing the praises of one of the Joint Air Force and Army Weather Information Network's most powerful and cost-effective tools.

The Interactive Grid Analysis and Display System, known as IGrADS, offers the on-demand weather information that assists warfighters in making life-or-death decisions. A greater familiarity with IGrADS capabilities provides operational forecasters with more customizable, easily-accessible meteorological information in graphical or textual format. The system was initially developed to meet field units' most requested weather products. Customers were demanding everything from vertical cross sections and forecast maps to user-defined meteograms and numerous alphanumeric products.

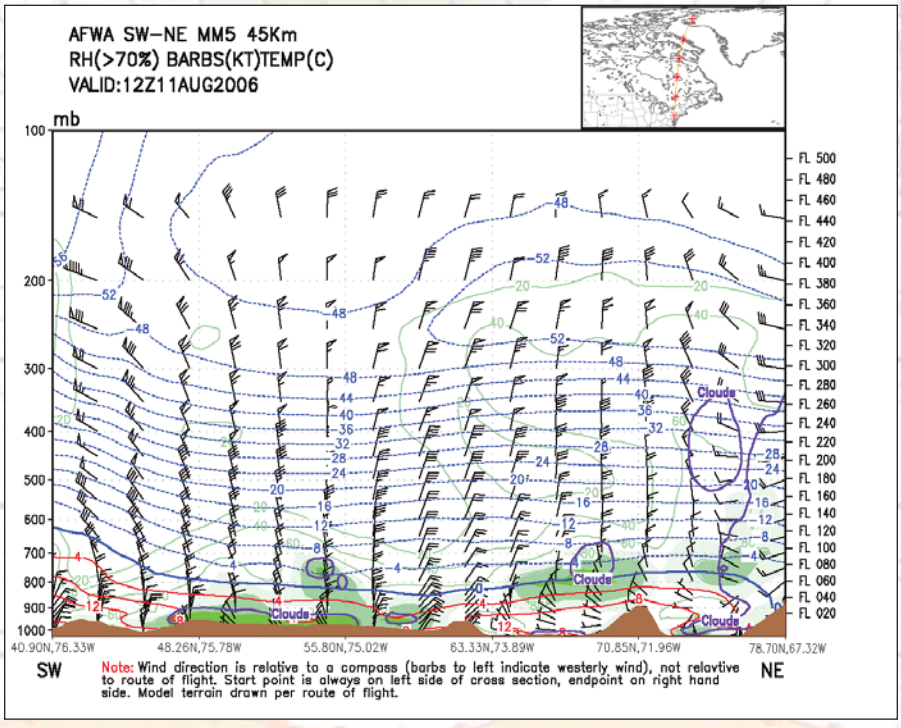
Forecasters of the past were completely unable to receive weather data pertaining to their exact location. They relied on data for their region and not for specific longitudinal or latitudinal coordinates. With IGrADS, forecasters are able to retrieve more relevant weather information for their specific location – on demand – a capability that simply did not exist before.

Mr. Bruce Telfeyan, Chief of the Technology Exploitation Branch at the Air Force Weather Agency, Offutt AFB, Neb., says, "We frequently obtain feedback from IGrADS users of how much they appreciate the tool and benefit from using it. Pilots, navigators, Army and Marine field artillery operators, all have provided glowing reviews of IGrADS."

"I can tell you for a fact that we often utilize your site [IGrADS] for planning missions up to 72 hours out, and have found that the forecasts have been frighteningly accurate," said Chief Warrant Officer Mike Fahmer, a navigation officer from Kadena AB, Okinawa. "They aid greatly in our decision making during the planning phase as well as the execution phase of the numerous missions...air refueling, air delivery, low level flight, short field landings and basic point A to point B logistic flights."

Another great example of the system's importance comes from a field meteorologist.

Operational meteorologist, Captain Kris "Crash" Long wrote from Afghanistan, "...We have found that the IGrADS wind forecasts derived from the Mesoscale Model, version 5, Afghan five-kilometer grid do very, very well. Feedback from aircrews out here has been glowing. Recently an airdrop of supplies to special operations forces downrange landed



A Vertical Cross Section product depicting the route from Thule AB, Greenland to McGuire AB, N.J. Mr. Phil Eddy, Chief of weather station operations at Thule, says aircrews rave about this product he provides with their pre-takeoff briefing package. Air Force Weather Agency image.

Display System

Chief Warrant Officer Mike Fahmer, a navigation officer from Kadena AB, Okinawa, says IGrADS is a great asset to have at his fingertips. As an aerial navigator, he is required to have a weather knowledge-base. According to the Chief Warrant Officer, IGrADS greatly enhances his knowledge and improves his decision-making process. Courtesy photo.

within 40 meters of its designated target in part due to the highly accurate winds produced with the IGrADS precision airdrop wind product on the Secure Internet Protocol Router side 5KM Afghanistan grid. In another case, supplies were airdropped to a 16,000 foot mountain peak using the same IGrADS/MM5 grid, and the results were, by the aircrews words, 'dead-on accurate."

The system is constantly being improved. Dust forecasts were added May 18, 2006, and the Weather Research and Forecasting Model on the secret and top secret side went into effect in late July. The WRF Model will be implemented on the unclassified side in the near future.

IGrADS is a password-protected site except for users accessing the site from ".mil" accounts. Those working from ".gov" accounts can obtain access to JAAWIN by applying for an account on-line.

JAAWINs, "best kept secret," is IGrADS. Customizable, easily-accessible meteorological information that is available anytime, anywhere.

IGrADS includes the following capabilities:

Map displays (within the graphical user interface):
- World Map centered on Prime Meridian
- World Map centered on International Dateline
- All MM5 theater maps
- United Kingdom Meteorological Office Middle East domain
- Continental United States Eta domain
- Coupled Ocean/Atmospheric Mesoscale Prediction System domain

Meteorological model output:
- AFWA MM5
- AFWA Diagnostic Cloud Forecast Algorithm (Eylander and Evans 2003; Norquist 2000)
- AFWA Advect Cloud Model
- NCEP GFS
- NCEP Eta
- US Navy NOGAPS
- US Navy COAMPS
- UKMO Middle East Theater
- AFWA Stochastic Cloud Forecasts
- AFWA Worldwide Merged Cloud Analysis

Products offered:
- Meteograms (MM5, Advect Cloud, GFS, Eta, NOGAPS, COAMPS, and UKMO)
- MM5 Army low-level meteograms
- MM5 severe weather meteogram
- GFS (0 to 180 hour and 192-384 hour) meteograms
- GFS and NOGAPS stratospheric meteograms
- User defined meteograms
- Forecast skew-Ts
- Vertical cross-sections
- Multiple leg cross-sections
- Forecast maps (color filled, contoured, both)
- Four-Panel Forecast Maps
- Alphanumeric output products

Alphanumeric output:
- MM5-based
  - Forecast vertical profile
  - "FOUS" bulletin (similar to Eta and NGM output from NCEP)
  - RAOB bulletin
  - Precision airdrop wind profile
  - Chemical downwind message
  - Basic wind message
  - Field artillery forecast
  - Effective downwind message
- GFS-based
  - "FOUS" bulletin (0 to 180 hours at 3 hour intervals)
  - RAOB bulletin
  - Precision airdrop wind profile
  - Chemical downwind message
  - Basic wind message
  - Effective downwind message
- COAMPS-based
  - Basic wind message

Delivering weather forecasts, faster

Joint Expeditionary Force Experiment
Weather Team 2006
Staff Report
Nellis, AFB, Nev.

Net-Centric Weather Integration was one of the many important initiatives being tested during the Joint Expeditionary Force Experiment 2006 at Nellis AFB, Nev. Sponsored by the Air Force Weather Agency, NCWI demonstrates the capability to provide critical, time-sensitive weather information to Combined Air and Space Operations Center users.

In 2004, AFWA introduced the Joint Weather Impacts System into the CAOC environment. JWIS is a forward-staged weather database that allows for machine-to-machine transfer of critical weather information.

"NCWI is an extension of our JEFX 04 initiative, interfacing with the Web-Enabled Execution Management Capability application for Time Sensitive Targeting coordination and Tactical Targeting Network Technology for providing real-time weather information to the cockpit," said Mr. James Reardon, Plans and Programs for JEFX.

"In the past, weather within the CAOC was provided through stovepipe processes which meant weather information was not fully integrated into CAOC Command and Control applications," said Maj. Dean Carter, Senior Weather Officer for JEFX 06.

"Weather information had to be passed to warfighters via Power Point briefings or word of mouth. Now with NCWI, weather is fully integrated into CAOC processes and provides "heads-up" weather information for operators to incorporate into quick decision-making."

According to Major Carter, who was deployed to the CENTCOM CAOC for six months in early 2003 supporting operations in Afghanistan and Iraq, weather information is critical to fighting an air war. Leadership within all divisions of the CAOC, from strategy to execution, requires weather information.

"If we don't use the weather to our advantage, the enemy will," he said.

"During Air Tasking Order execution, instant weather information is vital because targeting decisions happen fast," Major Carter said. "Warfighters need access to instant information; they cannot wait to get verbal briefs from the weather support team," he said.

Web-Enabled Execution Management Capability is a CAOC collaboration application that allows the entire CAOC floor to coordinate time sensitive targeting and combat search and rescue missions. Prior to JEFX 06, weather coordination was accomplished via manual processes. With NCWI, weather is instantly made available. "It's important to make weather information accessible to the warfighter as fast as possible," Mr. Reardon said. "NCWI gets the weather to the decision-makers in seconds, making it a factor in the TST process."

"In addition to the CAOC, we now have the capability to provide instant weather updates to aircrews flying over the battlefield through the Tactical Targeting Network Technology capability," according to Mr. Reardon. This information becomes critical in supporting safety of flight operations.

JEFX is an Air Force Chief of Staff-directed series of experiments that combines live, virtual and constructive air, space, naval and ground force simulations, and technology insertion into a near-seamless joint and coalition warfighting environment. This highly focused, multinational, multi-service experiment rigorously assess and makes recommendations on selected capabilities that fill identified gaps or produce desired effects in the battlespace.

The CAOC is the experiment's environment, designed to execute the air and space component of a war, combining operators and systems from all different air assets and coalition forces to make one integrated system. The goals of this experiment are to better integrate CAOC processes, expand the use of data links and extend networks to link the operational and tactical levels of execution.

Controllers in the Combined Air Operations Center at an air base on the Arabian Peninsula monitor the status of ongoing missions supporting Operation Iraqi Freedom.
Photo by Royal Air Force
Sgt. Gareth Davies

Defense weather satellites key for situational awareness

by Mr. Miles Brown
HQ Air Force Weather Agency Public Affairs
Offutt AFB, Neb.

Officials from the Air Force Space and Missile Systems Center at Los Angeles AFB, Calif., said they are on track to launch a third weather satellite in November that will join two primary satellites already in orbit essential in tracking global weather conditions and providing data for distribution to Department of Defense and civilian government agencies.

The Defense Meteorological Satellite Program, or DMSP, has been providing environmental support to the nation for five decades. A DoD program run by the Air Force Space and Missile Systems Center, DMSP designs, builds, launches and maintains satellites, which monitor the meteorological, oceanographic and solar-terrestrial physics environments.

"DMSP satellites are designed to meet unique military requirements for worldwide space and terrestrial weather information; however, this data is fully shared with civilian agencies," said Col. John Wagner III, DMSP director.

"Through these satellites and accompanying data, military and civilian weather forecasters can detect developing weather patterns, track existing weather systems over remote areas and alert the civil and military communities of anticipated hazards to people and resources," Colonel Wagner said.

These DMSP satellites provide meteorological data in real time to Air Force, Army, Navy and Marine Corps tactical ground stations and Navy ships worldwide. This data is also stored in recorders on the satellites for later transmission to ground stations.

From these ground stations, information is relayed to the Air Force Weather Agency at Offutt AFB, Neb., and to the U.S. Navy's Fleet Numerical Meteorological and Oceanographic Center at Monterey, Calif. It is then compiled into numerous worldwide weather and space environmental products. AFWA and FNMOC distribute these products to DOD and civilian government agencies.

The new digital image recorders and gyroscopes on DMSP F-17 will greatly enhance the satellites usefulness and longevity, according to Mr. James Keane, a meteorological satellite analyst with AFWA.

"The new digital recorders on F-17 can provide streams of fine data, which is five times more detailed than the smooth data also available from DMSP satellites," Mr. Keane said. "Earlier DMSP satellites used analog recorders which could not store and transmit large swaths of fine data, so analysts could only capture small pieces of the detailed environmental picture. With this latest digital capability, more complete fine-scale images will be accessible - providing military satellite analysts with the best tools in the sky. This helps us to create the most complete environmental situational picture for our warfighters, military planners, and decision makers."

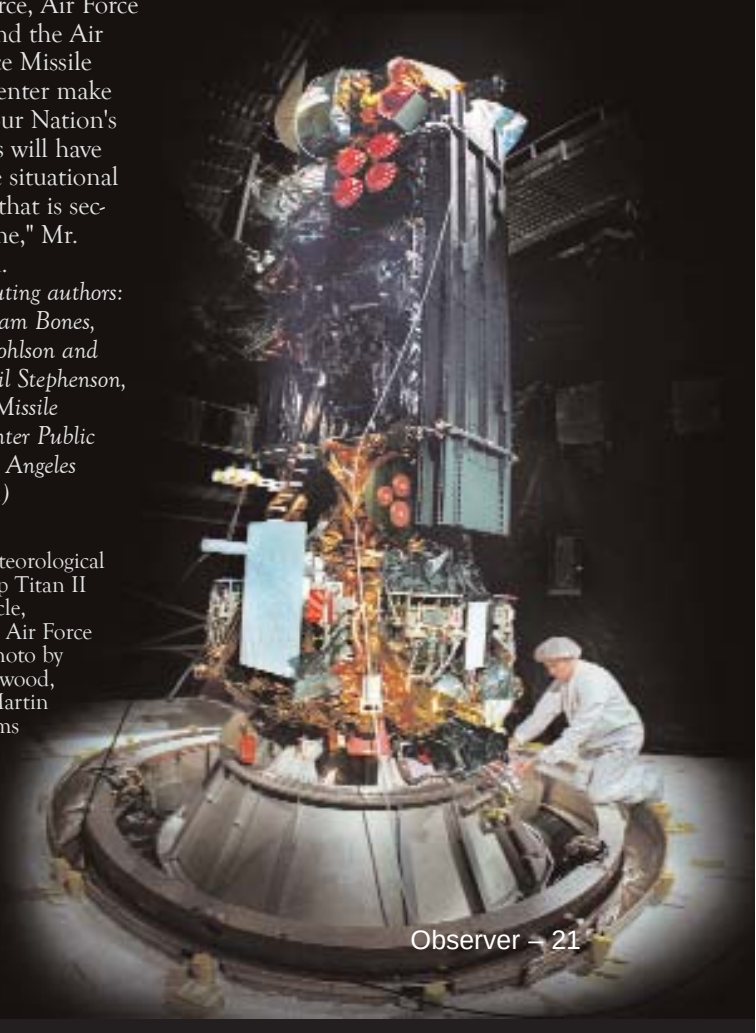
At the heart of DMSP's sensing capability is the Operational Linescan System. The OLS sensor uses a moving telescope technique to scan the Earth in the cross track direction, while forward motion of the satellite provides the along track incremental motion. It is designed to provide pictorial meteorological cloud imagery for continuous global coverage. OLS imagery is used by forecasters to locate severe storms and estimate their strength.

The Special Sensor Microwave Imager Sounder is another mission sensor. The SSMIS utilizes microwave data. This information is considered essential to accurate positioning of storm centers and forecasting storm development and motion because SSMIS wind speed and rainfall rate data are not obscured by cloud cover. Hurricane and typhoon forecasting have improved significantly with the use of DMSP microwave imagery.

The last three DMSP satellites, F-18 through F20, are scheduled to follow in two-year intervals beginning in April 2008 and ending in April 2012. The expected lifespan for DMSP satellites is four years, so coverage is expected until 2014 to 2016. DMSP will be replaced by a combination of the National Polar-orbiting Operational Environmental Satellite System and European MetOP satellites.

"The continued efforts of the Air Force, Air Force weather, and the Air Force Space Missile Systems Center make sure that our Nation's warfighters will have battlespace situational awareness that is second to none," Mr. Keane said.

(Contributing authors: Capt. William Bones, Mr. John Bohlson and Ms. Jo Adail Stephenson, Space and Missile Systems Center Public Affairs, Los Angeles AFB, Calif.)



Defense Meteorological Satellite atop Titan II launch vehicle, Vandenberg Air Force Base, Ca. Photo by Russ Underwood, Lockheed Martin Space Systems Company.

Promotions

Congratulations to weather's newly selected staff sergeants

The Air Force has selected 13,298 of 37,071 eligible senior airmen for promotion to staff sergeant, a 35.87 percent selection rate.

Beginning with this promotion release eligible Airmen who tested will find their Weighted Airman Promotion System score notices posted on the Virtual Military Personnel Flight.

Score notices allow Airmen to see how their Promotion Fitness Examination and Specialty Knowledge Test scores rank against those they're directly competing with for promotion within their Air Force Specialty Code.

The average score for those selected was 273.15 points, with the following averages:

- 131.59 points for Enlisted Performance Reports
- 59.76 for Promotion Fitness Exam
- 53.82 for Specialty Knowledge Test
- 17.90 for time in grade
- 11.28 for time in service
- 0.83 for decorations

The average selectee has 2.02 years time in grade and 4.59 years in service. Those selected will be promoted to staff sergeant from September to August 2007.

(Courtesy of Air Force Personnel Center News Service)

Daniel Alexander, Tyndall AFB, Fla.
James Barham, Sembach AB, Germany
Jeremy Battles, Scott AFB, Ill.
Heather Bellar, Offutt AFB, Neb.
Russell Beye, Sembach AB, Germany
Joshua Bland, Sembach AB, Germany
Daniel Blankinship, Kadena AB, Japan
Achantee Blocker, Langley AFB, Va.
Linda Bourland, Andrews AFB, Md.
Richard Boyd, Illesheim, Germany
Kimberly Bradford, RAF Mildenhall, UK
Chad Brink, Sembach AB, Germany
Brandon Brinkman, Sembach AB, Germany
Carissa Brittain, Offutt AFB, Neb.
Michael Broady, Ft. Carson, Colo.
Cassandra Camberos, Aviano AB, Italy
Michael Campbell, Kadena AB, Japan
Andrew Carpenter, Yongsan, Korea
William Caskey, Sembach AB, Germany
Michael Chase, Offutt AFB, Neb.
Nathalie Chasse, Offutt AFB, Neb.
Gayle Christianson, Scott AFB, Ill.
Christopher Combs, Shaw AFB, S.C.
Sean Cory, Ft. Benning, Ga.
Robert Curry, Fort Bragg, N.C.
Leslie Dailey, Spangdahlem AB, Germany
Mark Dellaquila, Scott AFB, Ill.
Christopher Dempsey, Incirlik AB, Turkey
Aaron Dominique, Creech AFB, Nev.
Matthew Drew, Charleston AFB, S.C.
Sirrena Drummond, Fort Eustis, Va.
Carl Edwards, Sembach AB, Germany
Christopher Eklund, Hickam AFB, Hawaii
Terry English, Little Rock AFB, Ark.
Michael Eudy, Offutt AFB, Neb.
Steven Fanis, Scott AFB, Ill.
Megan Farej, Luke AFB, Ariz.
Mark Faulkner, Eielson AFB, Alaska
John Ferderer, Fort Lewis, Wash.
Jason Foote, Scott AFB, Ill.
Nathan Fried, Fort Drum, N.Y.
Paige Frye, Tinker AFB, Okla.
Marquita Gaines, Shaw AFB, S.C.
Natalie Giampolo, Barksdale AFB, La.
David Gladbach, Offutt AFB, Neb.
Wesley Green, Offutt AFB, Neb.
Paul Gulli, McGuire AFB, N.J.
Jennifer Haban, Offutt AFB, Neb.
Sara Hadlock, Shaw AFB, S.C.
Glenn Harrison, Fort Wainwright, Alaska
Brandon Healy, Scott AFB, Ill.
Charles Higgins, Kadena AB, Japan
Sara Holton, Wiesbaden, Germany
Alan Horton, Hickam AFB, Hawaii
Scott Hose, Fort Drum, N.Y.
Jason Howard, Norman, Okla.
Nathan Hutchings, Eglin AFB, Fla.
Eli Huven, McConnell AFB, Kan.
Roderic Jackson, Seoul AB, Korea
Robert Johnson, Scott AFB, Ill.
Collin Jones, Little Rock AFB, Ark.
Richard Jones, Asheville, N.C.
Ryan Kardell, Davis-Monthan AFB, Ariz.
Kasey Krehbiel, Offutt AFB, Neb.
James Kuntzsch, Elmendorf AFB, Alaska
David Litwin, Sembach AB, Germany
Theodore Ludovissie, Offutt AFB, Neb.
Luisgabriel Maldonado, Offutt AFB, Neb.
Matthew Mattern, Kadena AB, Japan
Travis McDonald, Barksdale AFB, La.
Rachel McDowell, Offutt AFB, Neb.
Jennifer Melvin, Hickam AFB, Hawaii
Adria Mercader, Ramstein AB, Germany
Brandon Meyers, Elmendorf AFB, Alaska
Christina Milner, Altus AFB, Okla.
William Montgomery, Fort Campbell, Ky.
Cliffton Moore, RAF Mildenhall, UK
Cole Moreland, Randolph AFB, Texas
Michael Odell, Wheeler AAF, Hawaii
Brian Patnode, Coleman Barracks, Germany
Gretchen Paulson, Creech AFB, Nev.
Amanda Peterson, Shaw AFB, S.C.
Lemau Pisia, Holloman AFB, N.M.
Brandon Proctor, Coleman Barracks, Germany
Cody Pryer, RAF Lakenheath, UK
Christopher Quimby, Shaw AFB, S.C.
John Radovan, Spangdahlem AB, Germany
Michael Ragsdale, MacDill AFB, Fla.
Jason Ramos, Scott AFB, Ill.
Corey Reimer, Scott AFB, Ill.
Brandon Renko, Moody AFB, Ga.
Hiram Rivera, Sheppard AFB, Texas
Neel Rodgers, Fort Hood, Texas
Robert Royals, Barksdale AFB, La.
Marissa Ruiz, Sembach AB, Germany
Daniel Rygiel, Patrick AFB, Fla.
Adam Salter, Vandenberg AFB, Calif.
Kametra Samuel, Shaw AFB, S.C.
Sunita Sankpal, Offutt AFB, Neb.
Steven Sauermann, RAF Mildenhall, UK
Lindsey Schaefer, Offutt AFB, Neb.
Robert Schmidt, Davis-Monthan AFB, Ariz.
Lawrence Scott, Holloman AFB, N.M.
Coby Sebastian, Nellis AFB, Nev.
Trenton Seegmiller, Fort Bragg, N.C.
Wesley Sheppard, McConnell AFB, Kan.
Brian Smith, Offutt AFB, Neb.
Chyann Smith, Davis-Monthan AFB, Ariz.
Mark Stevens, Creech AFB, Nev.
Thomas Stevens, Hickam AFB, Hawaii
William Strasshofer, Offutt AFB, Neb.
Billy Tate, Shaw AFB, S.C.
Kelly Tobin, Incirlik AB, Turkey
Dylan Tucker, Fort Wainwright, Alaska
Greggari Tucker, Elmendorf AFB, Alaska
Jonathan Tucker, Fairchild AFB, Wash.
Deric Van Bree, Davis-Monthan AFB, Ariz.
Paul Warren, Holloman AFB, N.M.
Willis Warren, Vance AFB, Okla.
Peta Watts, RAF Lakenheath, UK
Rebecca Wells, Sembach AB, Germany
Cassandra White, Offutt AFB, Neb.
Nikeshia Williams, Offutt AFB, Neb.
Tricia Williamson, RAF Mildenhall, UK
Anthony Wilson, Cannon AFB, N.M.
Joshua Wisnewski, Sembach AB, Germany
Genelle Yarbrough, Shaw AFB, S.C.
Michael Yost, Davis-Monthan AFB, Ariz.
Tyler Zernicke, Offutt AFB, Neb.

WEATHER WARRIOR

Tech. Sgt. Richard Landsverk
18th Operations Support Squadron, Kadena AB, Japan
NCOIC Mission Weather Element
Time in Service: 7 Years
Hometown: Stoughton, Wis.
Role Model: My father is my role model, because he has always been there for me. He has instilled a sense of motivation and drive towards everything that I do. He has also taught me how to take pride in anything I do with humility.
Hobbies: Football, gymnastics, biking, anything active, playing with my kids
Most memorable weather experience: I was working at the 25th Operational Weather Squadron as zone supervisor. In the middle of a METCON with the Combat Weather Team at Malmstrom AFB, Mont., for issuing a severe thunderstorm warning, the CWT forecaster suddenly yelled, "Oh, a boat just flew by, gotta go!" The hub was full of unexpected instances like that. It was definitely a great experience for growth as a weather forecaster and supervisor. It provided many opportunities for mentorship and grooming of future weather forecasters and leaders.

Tech. Sgt. Elizabeth Covairt
607th Combat Operations Squadron, Osan AB, Korea
NCOIC, Korean Air Operations Center Weather Operations
Years in Service: 10 years
Hometown: Grand Prairie, Texas
Role Model: My role model is my mother; her commitment throughout the last 25 years as a registered nurse caring for premature babies instilled in me a strong work ethic and drive to do well in my own career.
Hobbies: My hobbies are snowboarding with my husband Paul, gardening, and painting.

Most memorable experience: I was stationed at Camp Stanley, Korea four years ago, when North Korea was labeled as a member of the "axis of evil." That made for a tense year, until two months ago, when Kim Jong il launched six short-range and one long-range missile. It's been exciting to be stationed here defending our Korean allies during these pivotal moments in international stability.

Where in the weather world is ...

Mr. Bill Boyd just before commissioning at Navigator training, Harlingen AFB, Texas, September/October 1955. Photos provided by Mr. Bill Boyd

By Senior Airman Randall A. Jennings
HQ Air Force Weather Agency Public Affairs
Offutt AFB, Neb.

When most people embark on an Air Force aviation career path, they don't expect a medical grounding to turn into four decades of supporting aircraft through weather. However, the door of opportunity that closed, opened the door of a four-decade career in weather for Mr. Billie Boyd, the Assistant Systems Division Chief at the 45th Weather Squadron, Patrick AFB, Fla.

Mr. Boyd started his career graduating from Florida Southern College in June 1954 with a major in math and minor in chemistry. He received his draft board reclassification from student deferment to "1A" the day of his graduation with a notice to report the next day. Choosing to join the Air Force, he had already applied, and been approved, to enter navigation training under the Aviation Cadet Program. Lieutenant Boyd received his commission November 9, 1955.

Mr. Bill Boyd taken during preflight training at Lackland AFB, Texas, October, 1954.

Following navigation and bombardier training, 2nd Lieutenant Boyd was grounded due to a medical condition. This temporary setback left him seeking a new direction. With less than one year as a 2nd Lt., he wasn't sure what he wanted to do. A commander suggested weather, but he wasn't sure and passed on the advice. Instead, he was assigned to a Supply Squadron, with his first duty as the base salvage officer. Knowing that was not what he wanted to do, 1st Lt. Boyd answered the door when his weather opportunity knocked a second time. In June 1959, he was assigned to a one-year tour through the Air Force Institute of Technology at Pennsylvania State University, and his 40-year career in weather was launched.

"My big break in the weather world came as a result of my grounding. I completed my weather training and proceeded to my first weather assignment," said Mr. Boyd.

It was June 1960, and then-1st Lt. Boyd left for his first weather assignment at Torrejon AB, Spain, to support the 16th Air Force and the North African Area Transport Control center. While there, he deployed to the Congo as the single weather person in support of the United Nations troop lift operations center in Léopoldville, now called Kinshasa.

"During the Cuban crisis, we were forecasting good visibility in the air refueling area over southern Spain, but we were repeatedly receiving pilot reports of much lower visibility. We soon came to realize it was persistent contrails from the many aircraft in the air," recalls Mr. Boyd on his assignment to the Torrejon Forecast Center.

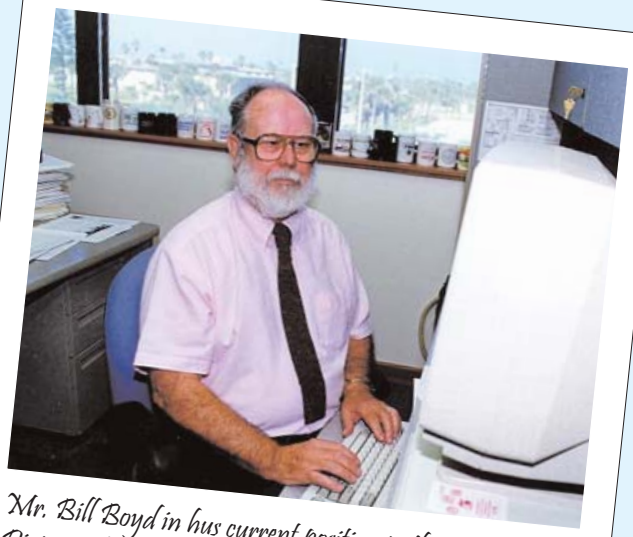
Upon returning to the states, the Air Force provided a second opportunity for education via graduate work at the University of California, Los Angeles in June 1965, which led to his assignment as a climatologist at the Environmental Technical Applications Center, Washington, D.C., until 1968. While there, he worked on several projects and learned the importance of climatology to America's defense efforts.

A unique challenge arose from tragedy during his next assignment at Udorn Royal AFB, Thailand.

"I went over originally as the operations officer of OL-2, 1st Weather Group," said Mr. Boyd."My commander had a heart attack, and I was given the opportunity to serve as Officer in Charge for the final six months of my assignment."

While at Udorn, Major Boyd earned a Distinguished Flying

Mr. Bill Boyd, at the Indonesian Met Office, during assignment with the World Meteorological Organization under the United Nations Development Program, 1977-1978.



Mr. Bill Boyd in hus current position in the Systems Division of the 45th WS, Patrick AFB, Fla., in support of America's space program.

Cross in September 1968, only one of two weather officers to receive that distinction during his time there. He flew on 101 missions guiding crews, evaluating and reporting results, and forwarding mission summaries to an analysis section in Saigon.

"The aircraft didn't have a seat for me. I had to sit on a metal folding chair, and, of course, there was no seatbelt. I was often asked to stand while we were landing as an extra set of eyes to watch for anything out of the ordinary," he said.

In the 70's, satellite imagery threatened the need for weather reconnaissance flights. "The satellite people claimed that there no longer a need for these observations." But, to this day, we (the U S government) have weather reconnaissance. "The National Hurricane Center in Miami brings up the importance of aircraft data on almost a daily basis in their hurricane forecast discussions," said Mr. Boyd.

Lt. Col. Boyd retired from his Air Force career after 20 years in 1974. His last assignment was at the Weather Reconnaissance Wing at McClellan AFB, Calif., as the Aerospace Sciences Division Chief.

Six weeks after Lt. Col. Boyd's retirement, he started his new job. Within five minutes of his arrival, he was offered a different job studying air pollution models for the California Air Resources Board. He accepted. After all, his career had shown him that every challenge truly was an opportunity for growing and changing, and if he was meant for the job, it would come back to him.

"Within less than a year, I had three great offers, including two to leave California employment, one at Air Force Global Weather Central, and the other with the World Meteorological Organization, United Nations Development Program," Mr. Boyd said. Mr. Boyd passed on AFGWC and took the UNDP assignment which was only supposed to be a one-year assignment. "The UNDP assignment, originally for climatological work, grew into a full-blown project to modernize Indonesia's weather service." After almost six years, when the project became self-sufficient, Mr. Boyd decided it was time to return to the States.

After another brief position in Arizona, he accepted an offer to return to AFGWC in 1981; the same position he had declined to take six years earlier.

Mr. Boyd transitioned into his current position in 1984 as the assistant systems division chief of the 45th WS, where he has enjoyed working the last 22 years. There he provides weather systems support to the Air Force and NASA, helping to improve weather service to America's Space Program.

He has experienced the modernization of weather from supporting flying missions to space missions and through the continued technological advancements of observation and modeling computers. As one who faces each challenge as an opportunity, Mr. Boyd's experience and knowledge are invaluable to others. The man who joined the aviation cadet program in the early 1950s is still an integral thread in the Air Force weather community and was awarded fellow status in 2001 by the American Meteorological Society. Today, reflecting back on his career, Mr. Boyd says, "I suggest everyone keep all options open and never close any door of opportunity. I fully expected to serve only two years in the service, not the twenty-year career in uniform, followed by another twenty-plus years as a civilian. The people were too great and the opportunities too fantastic."

Major Boyd is having lunch at the Officers' Club, Udorn Royal Thai AFB, Thailand in 1968. Left, Major Bill Boyd with Captain Gus Panos, a navigator-weather man. Photo by Col. Castor Mendez-Vigo, Air Force retired.

Salutes

RETIREMENT

Master Sgt. Mark Russell,
AFCWC, Hurlburt Field, Fla.

AWARDS AND DECORATIONS

DEFENSE MERITORIOUS SERVICE MEDAL

Maj. David Runge,
9th OWS, Shaw AFB, S.C.

MERITORIOUS SERVICE MEDAL

Col. Michael Babcock,
HQ AFWA, Offutt AFB, Neb.
Col. Andrew Boerlage,
HQ AFWA, Offutt AFB, Neb.
Lt. Col. William Cade,
HQ AFWA, Offutt AFB, Neb.
Lt. Col. Ricky Carter,
HQ AFWA, Offutt AFB, Neb.
Lt. Col. Daniel Edwards,
HQ AFWA, Offutt AFB, Neb.
Lt. Col. Ann Gravier,
AFCCC, Asheville, N.C.
Lt. Col. Steve Renner,
HQ AFWA, Offutt AFB, Neb.
Maj. Steve Cabosky,
HQ USAFE, Ramstein AB, Germany
Maj. Michael Hinson,
15th OWS, Scott AFB, Ill.
Maj. Herbert Keyser,
Det. 2, Hanscom AFB, Mass.
Maj. James O'Connor,
607th COS, Osan AB, Korea
Maj. David Runge,
9th OWS, Shaw AFB, S.C.
Maj. Frank Tersigni,
HQ AFWA, Offutt AFB, Neb.
Master Sgt. Cynthia Farmer,
HQ AFWA, Offutt AFB, Neb.
Master Sgt. John Gist,
Det. 1, Learmonth, Australia
Master Sgt. John Homan,
AFCCC, Asheville, N.C.
Master Sgt. Shane McIntire,
Det. 5, Palehua, Hawaii
Master Sgt. Mark Russell,
AFCWC, Hurlburt Field, Fla.

AIR FORCE COMMENDATION MEDAL

Maj. John Cornicelli,
Det. 4, Holloman AFB, N.M.
Maj. Robert Kraetsch,
HQ USAFE, Ramstein AB, Germany
Capt. William Bagby,
Det. 1, Learmonth, Australia
Capt. Sean Campbell,
HQ AFWA, Offutt AFB, Neb.
Capt. Mark Cooke,
HQ AFWA, Offutt AFB, Neb.
Capt. Ryan Maxon,
HQ AFWA, Offutt AFB, Neb.
1st Lt. Kenneth Roberts,
15th OWS, Scott AFB, Ill.
Master Sgt. Donald Kusz,
AFCCC, Asheville, N.C.
Master Sgt. Richard McCarthy,
Det. 1, Learmonth, Australia
Tech. Sgt. Jose Chavarria,
OL-A, AFCWC, Camp Blanding, Fla.
Tech. Sgt. John Lawless,
AFCWC, Hurlburt Field, Fla.
Tech. Sgt. Manuel Matute,
AFCCC, Asheville, N.C.
Tech. Sgt. Jon Portillo,
OL-K, Norman, Okla.
Tech. Sgt. John Sanders,
HQ AFWA, Offutt AFB, Neb.
Tech. Sgt. Elise Thompson,
Det. 1, Learmonth, Australia
Staff Sgt. Timothy Cook,
AFCCC, Asheville, N.C.
Staff Sgt. Bo Deaton,
HQ AFWA, Offutt AFB, Neb.
Staff Sgt. Timothy Dixon,
AFCWC, Hurlburt Field, Fla.
Staff Sgt. Damon Drake,
HQ AFWA, Offutt AFB, Neb.
Staff Sgt. Jennifer Kaminski,
HQ AFWA, Offutt AFB, Neb.
Staff Sgt. Brian Landrum,
607th COS, Osan AB, Korea
Staff Sgt. Maricia McLennon,
607th COS, Osan AB, Korea
Staff Sgt. Jacob Richmond,
HQ AFWA, Offutt AFB, Neb.
Staff Sgt. Guillermo Rosas,
HQ AFWA, Offutt AFB, Neb.
Staff Sgt. Jennifer Schultz,
HQ AFWA, Offutt AFB, Neb.

AIR FORCE EXEMPLARY CIVILIAN SERVICE MEDAL

Mr. Bryan Goforth,
HQ USAFE, Ramstein AB, Germany
Mrs. Eileen Williamson,
HQ AFWA, Offutt AFB, Neb.

AIR FORCE ACHIEVEMENT MEDAL

Capt. Samuel Moore,
HQ AMC, Scott AFB, Ill.
1st Lt. Kenneth Chilcoat,
26th OWS, Barksdale AFB, La.
1st Lt. Adam Dea,
15th OWS, Scott AFB, Ill.
1st Lt. Brandon Drake,
15th OWS, Scott AFB, Ill.
1st Lt. Alexander Hoon,
15th OWS, Scott AFB, Ill.
1st Lt. Daniel MacKeen,
15th OWS, Scott AFB, Ill.
Senior Airman Javier Acosta,
25th OWS, Davis-Monthan AFB, Ariz.
Senior Airman Eric Burnsed,
26th OWS, Barksdale AFB, La.

EDUCATION

NCO ACADEMY

Technical Sergeant Carl Schuett,
Distinguished graduate and Academic award winner,
HQ AFWA, Offutt AFB, Neb.

AIR OPERATIONS CENTER INITIAL QUALIFICATION TRAINING – OFFENSIVE COURSE

Maj. Robert Edwards,
607th COS, Osan AB, Korea
1st Lt. Audra Goldfuss,
607th COS, Osan AB, Korea
Staff Sgt. Justin Falcon,
607th COS, Osan AB, Korea

JOINT AIR TASKING ORDER PROCESS COURSE

Tech. Sgt. Elizabeth Covairt,
607th COS, Osan AB, Korea
Staff Sgt. Bobby Baum,
607th COS, Osan AB, Korea

WEATHER OFFICER COURSE

Capt. Jamie Hansen,
26th OWS, Barksdale AFB, La.
Capt. Scott Lutz,
164th WF, Columbus, Ohio
1st Lt. Jeffrey Goddard,
3rd WS, Foot Hood, Texas
1st Lt Ryan Leach,
28th OWS, Shaw AFB, S.C.
2nd Lt. Jennifer Bardalamas,
28th OWS, Shaw AFB, S.C.
2nd Lt. William Belville,
21st OWS, Sembach AB, Germany
2nd Lt. Danele Elliot,
25th OWS, Davis-Monthan AFB, Ariz.
2nd Lt. Eric Elliott,
11th OWS, Elemendorf, Alaska
2nd Lt. Paul Hayes,
15th OWS, Scott AFB, Ill.
2nd Lt. Chris Homan,
28th OWS, Shaw AFB, S.C.
2nd Lt. Jeremy Hromsco,
28th OWS, Shaw AFB, S.C.

2nd Lt. Donald McCaffery,
15th OWS, Scott AFB, Ill.
2nd Lt. Sarah Mooney,
25th OWS, Davis-Monthan AFB, Ariz.
2nd Lt. Janelle Palatas,
21st OWS, Sembach AB, Germany
2nd Lt. Derek Smith,
21st OWS, Sembach AB, Germany
2nd Lt. Kimberly Spusta,
21st OWS, Sembach AB, Germany
2nd Lt. William Whisel,
15th OWS, Scott AFB, Ill.
2nd Lt. Andrew Williams,
28th OWS, Shaw AFB, S.C.
2nd Lt. Thomas Wittman,
26th OWS, Barksdale AFB, La.

COMBAT WEATHER TEAM COURSE

1st Lt. Kenneth Chilcoat,
Distinguished graduate,
78th OSS, Robins AFB, Ga.
Tech. Sgt. Samuel Gutierrez,
47th OSS, Laughlin AFB, Del Rio, Texas
Tech. Sgt. Corey Jacobsen,
51st OSS, Osan AB, Korea
Staff Sgt. John Cloutier,
607th WS, Yongsan, Korea
Staff Sgt. Angela Gales,
21st ASOS, Fort Polk, La.
Senior Airman Paul Alfred,
48th OSS, RAF Lakenheath, UK
Senior Airman Austen Ayers,
15th OWS, Scott AFB, Ill.
Senior Airman Charles Carr,
352nd OSS, Mildenhall, UK
Senior Airman Jesse Duffy,
Distinguished graduate,
Det. 2, 607th WS, Camp Humphries, Korea
Senior Airman Keith Flanigan,
26th OWS, Barksdale AFB, La.
Senior Airman Zachary Grandin,
Det. 1, 18th WS, Ft Eustis, Va.
Senior Airman Benjamin Hall,
3rd WS, Fort Hood, Texas
Senior Airman Eva Jurado,
347th OSS, Moody AFB, Ga.
Senior Airman Hayley Lewis,
4th OSS, Seymour-Johnson AFB, N.C.
Senior Airman Douglas McQuern,
757th OSS, Creech AFB, Nev.
Senior Airman Chad Nabinger,
3rd WS, Fort Hood, Texas
Senior Airman Robert Schmidt,
Distinguished graduate, 25th OWS, Davis-Monthan AFB, Ariz.
Senior Airman Simon Swengler,
57th OSS, Nellis AFB, Ill.
Senior Airman Joseph Yount,
Det. 1, 607th WS, Camp Red Cloud, Korea
Airman 1st Class Gregory Glover,
612th OSS, Soto Cano AB, Honduras
Airman 1st Class Brianna Riedel,
18th OSS, Kadena AFB, Okinawa
Airman 1st Class Chad Tieman,
Det. 1, 18th WS, Ft Eustis, Va.

CONTINGENCY WARTIME PLANNING COURSE

Master Sgt. Dennis Anglin,
HQ AMC/A3W, Scott AFB, Ill.

WEATHER FORECASTER APPRENTICE COURSE

Petty Officer 2nd Class Karen Aquino,
USCG Polar Sea, Seattle, Wash.
Master Sgt. Steven Strick,
26th OWS, Barksdale AFB, La.
Tech. Sgt. John Endzelis,
183rd FW, Springfield, Ill.
Senior Airman Michael Kolenic,
124th WG, Boise, Idaho
Airman 1st Class Alison Archangeli,
127th FS, Selfridge ANGB, Mich.
Airman 1st Class Aaron Barnes,
21st OWS, Sembach AB, Germany
Airman 1st Class Rory Berg,
25th OWS, Davis-Monthan AFB, Ariz.
Airman 1st Class Jason Bohnet,
21st OWS, Sembach AB, Germany
Airman 1st Class Mason Cairns,
15th OWS, Scott AFB, Ill.
Airman 1st Class Angela Campbell,
21st OWS, Sembach AB, Germany
Airman 1st Class Andres Castellon,
21st OWS, Sembach AB, Germany
Airman 1st Class Meghedie Dersarkissian,
28st OWS, Shaw AFB, S.C.
Airman 1st Class Sean Doyle,
21st OWS, Sembach AB, Germany
Airman 1st Class Adam Duncan,
25th OWS, Davis-Monthan AFB, Ariz.
Airman 1st Class Andrew Farley,
21st OWS, Sembach AB, Germany
Airman 1st Class David Ford,
15th OWS, Scott AFB, Ill.
Airman 1st Class Alejandro Gomez,
28th OWS, Shaw AFB, S.C.
Airman 1st Class Eric Hartigan,
21st OWS, Sembach AB, Germany
Airman 1st Class William Hashman,
28th OWS, Shaw AFB, S.C.
Airman 1st Class Jason Jarman,
21st OWS, Sembach AFB, Germany,
Airman 1st Class Eli Johnson,
15th OWS, Scott AFB, Ill.
Airman 1st Class Carl Kemper,
25th OWS, Davis-Monthan AFB, Ariz.
Airman 1st Class Herbert Makimaa,
21st OWS, Sembach AB, Germany
Airman 1st Class Bradley Martin,
28th OWS, Shaw AFB, S.C.
Airman 1st Class Peter McAward, *Distinguished graduate,*
21st OWS, Sembach AB, Germany
Airman 1st Class Laura Mickus,
25th OWS, Davis-Monthan AFB, Ariz.
Airman 1st Class Krastina Mitzina,
26th OWS, Barksdale AFB, La.
Airman 1st Class Ustem Nu,
15th OWS, Scott AFB, Ill.
Airman 1st Class Regina Owens,
25th OWS, Davis-Monthan AFB, Ariz.
Airman 1st Class Stephen Perkis,
21st OWS, Sembach AB, Germany,
Airman 1st Class Vinson Ponto,
25th OWS, Davis-Monthan AFB, AZ
Airman 1st Class Kimberly Savitz,
21st OWS, Sembach AB, Germany
Airman 1st Class Zachary Scott,
26th OWS, Barksdale AFB, La.
Airman 1st Class Luis Torres,
17th OWS, Hickam AFB, Hawaii
Airman 1st Class Jonathan Vasquez,
26th OWS, Barksdale AFB, La.
Airman James Abbey,
15th OWS, Scott AFB, Ill.
Airman Janice Anderson,
28th OWS, Shaw AFB, S.C.
Airman Ashley Babich,
21st OWS, Sembach AB, Germany
Airman Stephanie Clark,
25th OWS, Davis-Monthan AFB, Ariz.
Airman Broc Eichhorst,
15th OWS, Scott AFB, Ill.
Airman Houston Green,
25th OWS, Davis-Monthan AFB, Ariz.
Airman Charles Henderson,
21st OWS, Sembach AB, Germany
Airman Jonathan Lash,
21st OWS, Sembach AB, Germany
Airman Kyle Marshall,
21st OWS, Sembach AB, Germany
Airman Christopher McIntyre,
26th OWS, Barksdale AFB, La.
Airman Alexia Rice,
26th OWS, Barksdale AFB, La.
Airman James Scott,
17th OWS, Hickam AFB, Hawaii
Airman Irati Victoria,
21st OWS, Sembach AB, Germany
Airman Tyler Walker,
26th OWS, Barksdale AFB, La.
Airman Brian Wilder,
28th OWS, Shaw AFB, S.C.