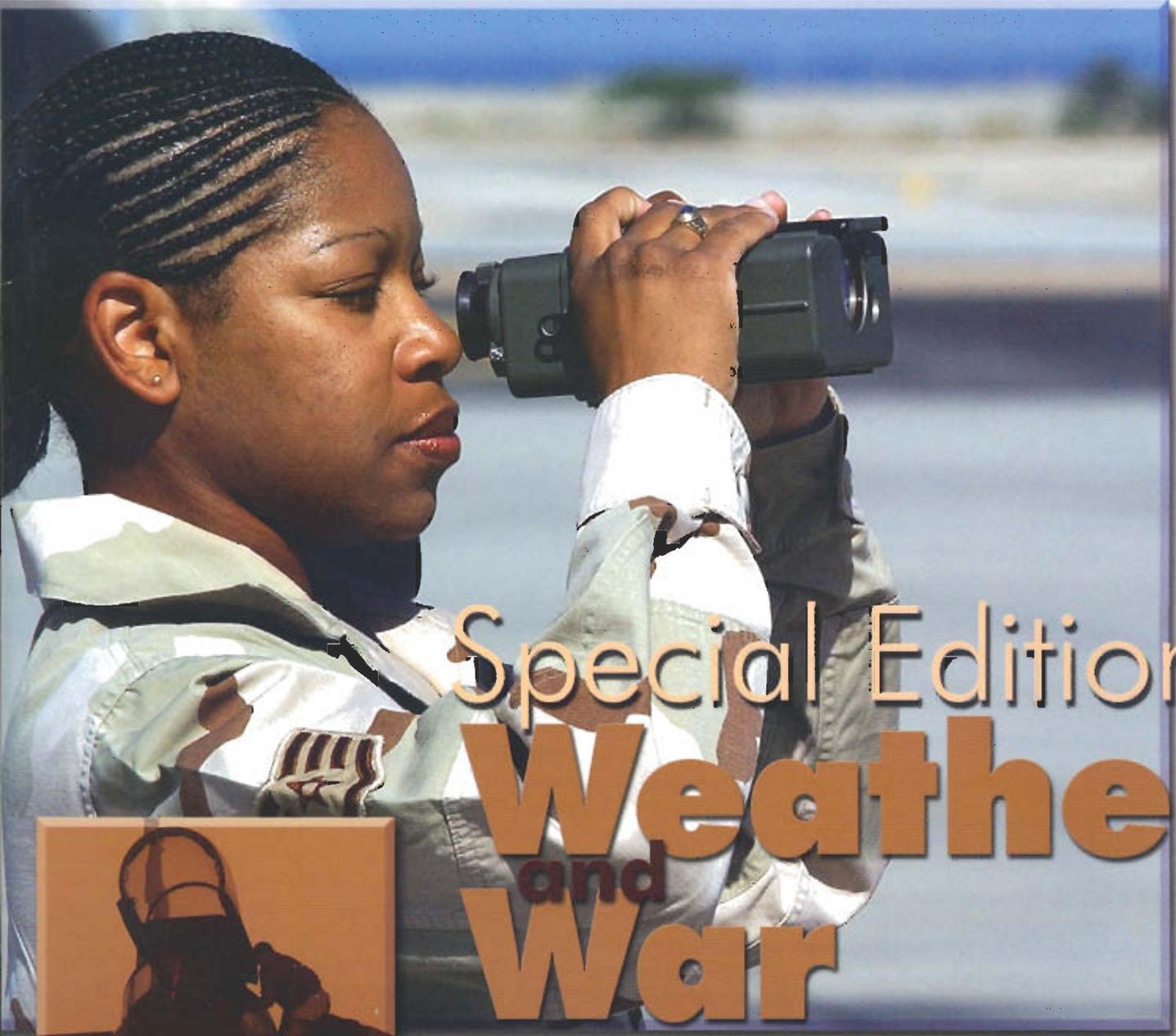




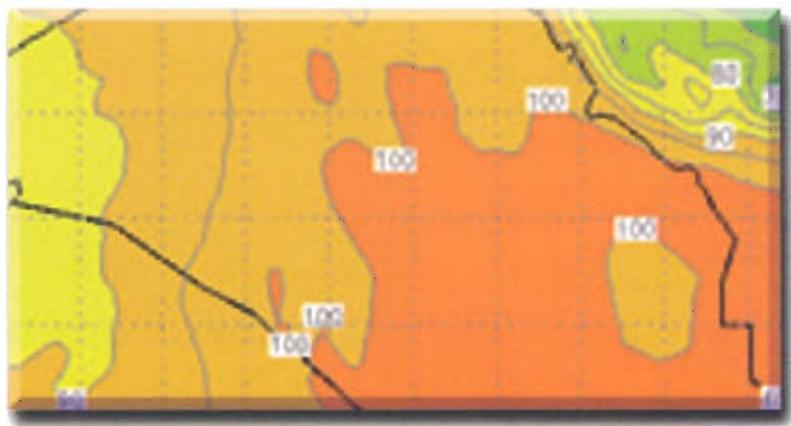
June '03

The Magazine for Air Force Weather

Observer



Special Edition- Weather and War





Observer

**AIR FORCE
DIRECTOR OF WEATHER**
Brig. Gen. David L. Johnson

**AIR FORCE WEATHER
AGENCY COMMANDER**
Col. Charles L. Benson, Jr.

PUBLIC AFFAIRS
Paige D. Hughes, Director
Jodie A. Grigsby, Deputy Director
Christy L. Harding

OBSERVER EDITOR
Master Sgt. Miles Brown

The Air Force Weather magazine is an authorized, funded publication for members of the U.S. military services. Content of the *Observer* is not necessarily the official view of, or endorsed by, the United States Government, the Department of Defense or the Department of the Air Force. Editorial content is edited, prepared and provided by the public affairs office of the Headquarters, Air Force Weather Agency, Offutt AFB, Neb. All photographs are Air Force photographs unless otherwise indicated. All written material and photos must arrive by the first week of the month prior to the publication date to be considered for publication.

HQ AFWA/PA
106 Peacekeeper Dr., Ste. 2N3
Offutt AFB, NE 68113-4039

CMCL: (402) 294-3115
DSN: 271-3115

Observer E-mail:
Observer@afwa.af.mil

AFW Public Access Site:
<https://afweather.afwa.af.mil/>

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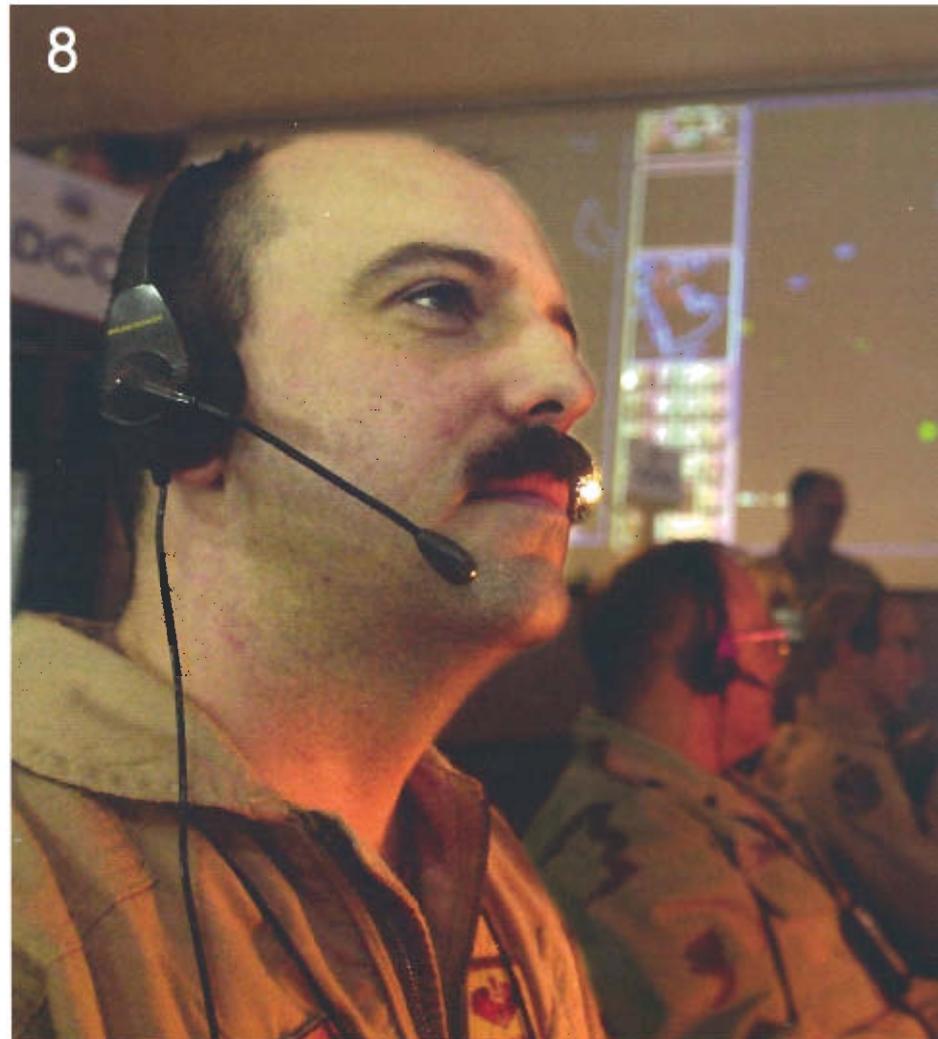
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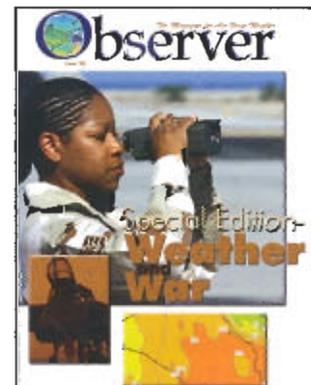
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On the Cover

Staff Sgt. Yasmeen Wilson, a weather specialist assigned to the 321st Expeditionary Operations Support Squadron, fires a laser range finder at a forward-deployed location in support of Operation IRAQI FREEDOM, March 25, 2003. OIF is the multi-national coalition effort to liberate the Iraqi people, eliminate Iraq's weapons of mass destruction and end the regime of Saddam Hussein. Staff Sgt. Wilson is deployed from Kadena AB, Japan. (Photo by Staff Sgt. Tony R. Tolley)



A Leader's Perspective:

Focus on the Fight

By Brig. Gen. Mark A. Welsh III
Mission Area Director of Global Power Programs, HQ USAF

(Editor's note: General Welsh gave the following speech in the fall of 1999 to Air Force Academy cadets while he was the Commandant. This speech has been reprinted in the *Wall Street Journal*, *Airman Magazine*, and numerous local newspapers. Although these experiences cited are from Operation DESERT STORM, they are no less relevant to the recent conflicts in Afghanistan and Iraq.)

Not long ago I was asked to give a presentation on personal lessons learned from my experiences in combat during Operation DESERT STORM. I made a list that only had about 15 items, and I realized that none of them were lessons learned, not one of them. Every one was a person, or an event, or just a feeling I had.

It's important, before I start, for you to remember that every kind of combat is different. Aerial combat happens at about a thousand miles an hour of closure. It's hot fire and cold steel; it's instant death and big destruction; it happens like this [snapped fingers] and it's over.

Combat, especially your first, is an intensely personal experience.

One week before the DESERT STORM air campaign started, we were flying missions to northern Saudi Arabia to practice dropping simulated bombs at night on targets in the desert, so those of us who didn't routinely fly night missions would be ready if the war started.

One night, after we'd "destroyed" our target, we hit a post-strike tanker and headed back to our base almost 400 miles away. We climbed to about 42,000 feet, plugged into afterburner, put the autopilot on and leaned back in that 30-degree, tilt-back seat and just kind of stared at nature.

It was a gorgeous night. I remember thinking: I can't believe how bright the desert moon is. Out around its horizon was something I had never seen before and haven't seen again to this day, a halo - a beautiful, huge, white halo all the way



Brig. Gen. Mark A. Welsh III

around the moon. My wingman and I stared at it all the way home. I'll never forget that halo.

I also won't forget when I landed that night. My assistant operations officer, Maj. J.D. Collins, met me. He said, "Boss, we lost an airplane."

The pilot was a young captain named Mike. He and his wife had been married two weeks when he told her that he had to go to war. He'd just finished his third local checkout ride and was on his second night ride. We think that somehow Mike got a light on the ground confused with his flight lead's rotating beacon and tried to rejoin on it as he headed for the tanker.

Mike hit the ground going more than 600 mph, 60-degree nose low, inverted and in full afterburner. He died relaxed.

I don't think dying relaxed was good news to his wife when I called her after we had confirmed he was in that smoking hole - or to his mom and dad, when I called them. I won't forget those phone calls, or that great young American, who like so many before him, died in a place where warriors were called, at a time when warriors were needed most. I'll never forget Mike.

And I won't forget sitting at his memorial service, looking at an airplane with his name on the canopy, the helmet with his name on the visor cover, his spare G-suit hanging under the

wing, and his crew chief saluting the jet as the bagpipe tape of "Amazing Grace" played. And I won't forget thinking, how many more of these are we going to have when the war starts?

Readying for war

The night before the war started, we gathered our squadrons and gave them a briefing on the first real combat mission we were going to fly. Then I told 'em all to go back to their rooms and write a letter to their families. And in that letter, they would shed all the emotional baggage they'd otherwise take into combat - like "I didn't tell my wife this, I didn't hug my daughter, I didn't tell my son I loved him, I didn't call my parents."

I told them they didn't fly until I got that letter. My ops officer, Lt. Col. Zappo Adams said, "By the way boss, you can give me a letter before I give you your tail number in the morning."

If you haven't tried to tell your children that you're sorry you won't be there to see their first ballet recital, watch them play little league baseball or high school football, graduate from college, meet their future spouse, get to know your grandkids - or if you haven't had the pleasure of telling your parents how important they are to you - or tried to tell your spouse how the sun rises and sets in her eyes - and done it on a piece of paper at midnight, 9,000 miles away from them, then you haven't lived. I recommend it. I won't forget writing that letter.

That next morning, at 1:30, all my guys met in the chow hall for breakfast and then jumped into cars to drive down for our mass briefing. As we drove, two things happened.

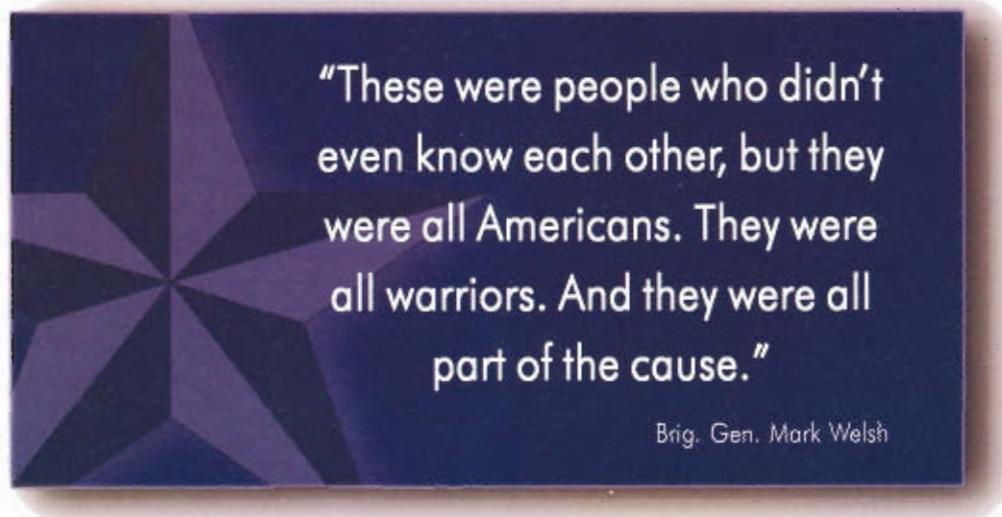
The first was [watching] the folks from Lt. Col. Tom Rackley's 421st Fighter Squadron when they lit their afterburners as part of the first launch of the [Persian] Gulf War. I realized it was the first time I'd seen airplanes take off with no lights, which were turned off for combat. It was sobering.

Halfway down the road, I looked and saw that thousands of people, the population of tent city that wasn't working that night, had come out when the first afterburner lit and were standing along the road. They were in uniform, jeans, cutoffs, underwear, pajamas, everything. No one was talking. They were

just watching the airplanes take off.

I noticed that all of them were somehow in contact with the person next to them. They were holding hands, or had their arm around shoulders or on backs, or they were just leaning on each other. These were people who didn't even know each other, but they were all Americans. They were all warriors. And they were all part of the cause. I will never, ever forget their faces coming into those headlights, then fading out. They're burned into my memory.

Father John was our squadron chaplain. The first day of DESERT STORM, I got to my jet and standing right in front of



the nose was Father John. As I got to the airplane, he said, "Hey, I thought you might like a blessing before you go." So I knelt down on the cement in front of the jet, and Father John gave me a blessing.

As I'm getting ready to climb up the ladder, I see all these guys running out of the darkness. All my pilots were running to the airplane to get Father John to bless them. So he did. When everybody came back safe from the first sortie we kind of decided, that's it, Father John has to bless everybody. It didn't matter if you were Jewish, Baptist or Islamic, whatever, Father John gave the blessing for the 4th Fighter Squadron.

The amazing thing was that it didn't matter whether you flew at two in the afternoon or two in the morning, Father John was there.

Later on, after talking to Colonel Rackley, I found out that Father John did the same for his guys. I don't know how he did it, but he did.

And every time I landed from a combat sortie and my canopy opened, I'd shake hands with my hero and crew chief, Tech Sgt. Manny Villa. And at the bottom of the ladder was

Father John to bless me and welcome me home.

When I came back from DESERT STORM, I ended up as a single ship returning to Hill AFB, Utah. When I pulled my jet into the parking spot, my family – and Father John – were waiting for me.

I'd written my wife, Betty, and told her about Father John and his blessings. You want to know how cool she is? When the airplane stopped, and the canopy came up, Manny Villa climbed the ladder and shook my hand. At the bottom of the ladder, Betty told Father John, "you first." And Father John blessed me and welcomed me home.

A year and a half later, Father John dropped dead of a massive heart attack. By the week after he died, 16 of the 28 pilots who flew in my squadron in DESERT STORM had contacted his family. They called from Korea, Europe, Australia and all over the United States to tell his family how much they loved Father John and that they'd asked God to bless him and welcome him home. I'll never forget Father John.

The sound of silence

One of the most important things about combat is sound. Anybody who has been there will tell you that the things you hear are the things you remember the longest. There were two things I heard that I'll never forget. The first was during one of our missions in the Baghdad area.

An F-16 from another unit was hit by a surface to air missile. We listened to him and his flight lead talk about his airplane falling apart as he tried to make it to the border so rescue could get to him. He'd talk about the oil pressure dropping and vibrations increasing. And his flight lead would encourage him to stick with it, "We can get there, we can get there."

This went on for about 14 minutes. Until finally he said, "Oil pressure just went to zero." Then, "my engine quit." And then, "That's all I got. I'm outta here."

There wasn't another sound on that radio, and the silence was deafening. I'll never forget those 14 minutes.

After the ground war started, an F-16 was shot down right in the middle of the retreating Republican Guard. A call went out from the AWACS [Airborne Warning and Control System] for any aircraft with ordnance remaining and the fuel to get to where the pilot was down, in case they needed them for a SARCAP [search and rescue combat air patrol].

A lot of people responded. But the first one I really paid attention to was an Army Chinook helicopter pilot, who came on the radio and said, "I've got this much gas, here's my location, I can be there in this many minutes, give me his coordinates. I can pick him up."

A Chinook is about the size of a double-decker London bus with props. It doesn't have guns. We kid around a lot about inter-service rivalries, but I'd follow that Army helicopter pilot into combat anytime, and I'll never forget her voice.

The highway of death – you've seen pictures of it before. It leads north into Iraq out of Basra. It's the retreat route of the Republican Guard. They got cut off.

I killed people here. Me. Combat is an intensely personal thing. I think I mentioned that. I'd killed people before, during this war. But this time I saw them. I saw the vehicles moving before the bombs hit. I saw soldiers firing up at me, then running, and I dropped my bombs to make sure they wouldn't get away.

War is a horrible, horrible, horrible thing. There is nothing good about it. But sometimes it's necessary. And so somebody better be good at it. I am. You better be.

I was flying with Colonel Rackley's squadron on the way back to the East Coast of the United States. When we contacted the first U.S. air traffic control site that we had talked to the entire route, Colonel Rackley checked in with something along the lines of: "Boston Center, this is Widow flight; 24 F-16s coming home."

The air traffic controller responded, "Welcome home, Widow."

And then at regular intervals for the next five or six minutes, every airliner on the frequency checked in and said something. "Welcome back. Great to have you home. God bless you."

About 10 minutes after that, I got my first glimpse of the U.S. coastline, the coast of Massachusetts. I sat in my cockpit and sang "America the Beautiful" to myself. I'll never forget how bad it sounded, or how proud I was when it was over.

Take a look at the flag, folks. Those white stripes represent the integrity that you cherish here at the Air Force Academy and that you better carry with you into our Air Force. Those stars carry the courage of all the people who have gone before you; they belong to you now. And that red is for Mike, and for Father John, and for the millions more like them who died serving this great country.

And in the not too distant future, one of you is going to be standing up here talking about your experiences in combat to the classes of 2015, or 2016 or 2017. This is who you are. And this is what you face in the U.S. Air Force.

If you're not ready for it, let me know, and I'll help you find another line of work. You're damn good. You need to get better.

All these people I just talked about are counting on it. ♪

XOW Perspective: AFW – critical piece of OIF Intelligence

By Brig. Gen. David L. Johnson
Air Force Director of Weather

I am honored and proud to inform you that your Air Force and Army leaders considered weather a critical piece of intelligence for Operation IRAQI FREEDOM! From the planning phase through the completion of all operational endeavors, weather information was integrated into operations – allowing the warfighters to anticipate and exploit environmental conditions to the fullest. Every weather airmen, officer, and civilian on the weather team should stand taller today!

The weather support from the Operational Weather Squadrons and the Air Force Weather Agency was timely, focused, and accurate – especially from the lead OWS, the 28th, and the supporting OWSs, USAFE and the 15th. A great deal of media coverage during the war documented the impacts the weather on the war operations and the value of our efforts.

The 28th OWS and AFWA's Special Operations Forces Weather Operations Center forecasts for the battle area provided the Combat Weather Teams with key weather parameters to help the pilots put the bombs on target or for the Army to get into the area to operate. These units provided climatology with the help of the Air Force Combat Climatology Center, which enabled lead decision makers of DoD units worldwide to make those tough choices on where, when, and how to complete the missions.

AFWA provided the means to get the communication (FirnWSS, IRIDIUM SATCOM and INMARSAT SATCOM) and tactical observing equipment (Kestrel 4000, Pocker Weather Tracker) to the CWTs and units deploying as well as other equipment and supplies needed to sustain the troops. AFCCC provided not only the climatology data but also other

computer generated products such as ACMES data, wind tables, etc., to help advise the war leaders on how weather may affect operations and missions.

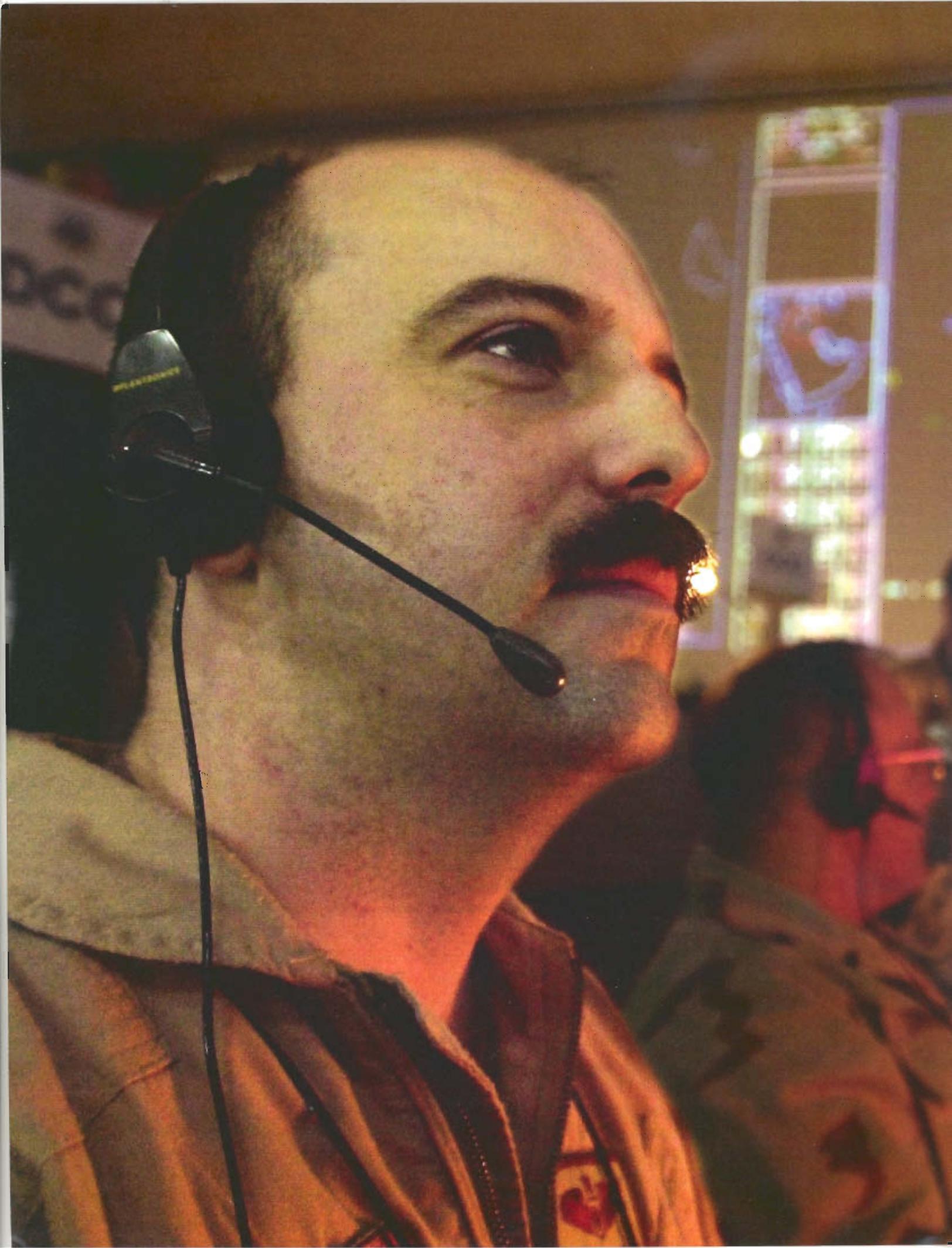
Acting as the lead for the CWTs, the Air Force Combat Weather Center provided tactical training for any individuals or units that requested assistance on tactical gear and ensured our deployed warriors were prepared to keep the weather data flowing to the key decision makers.

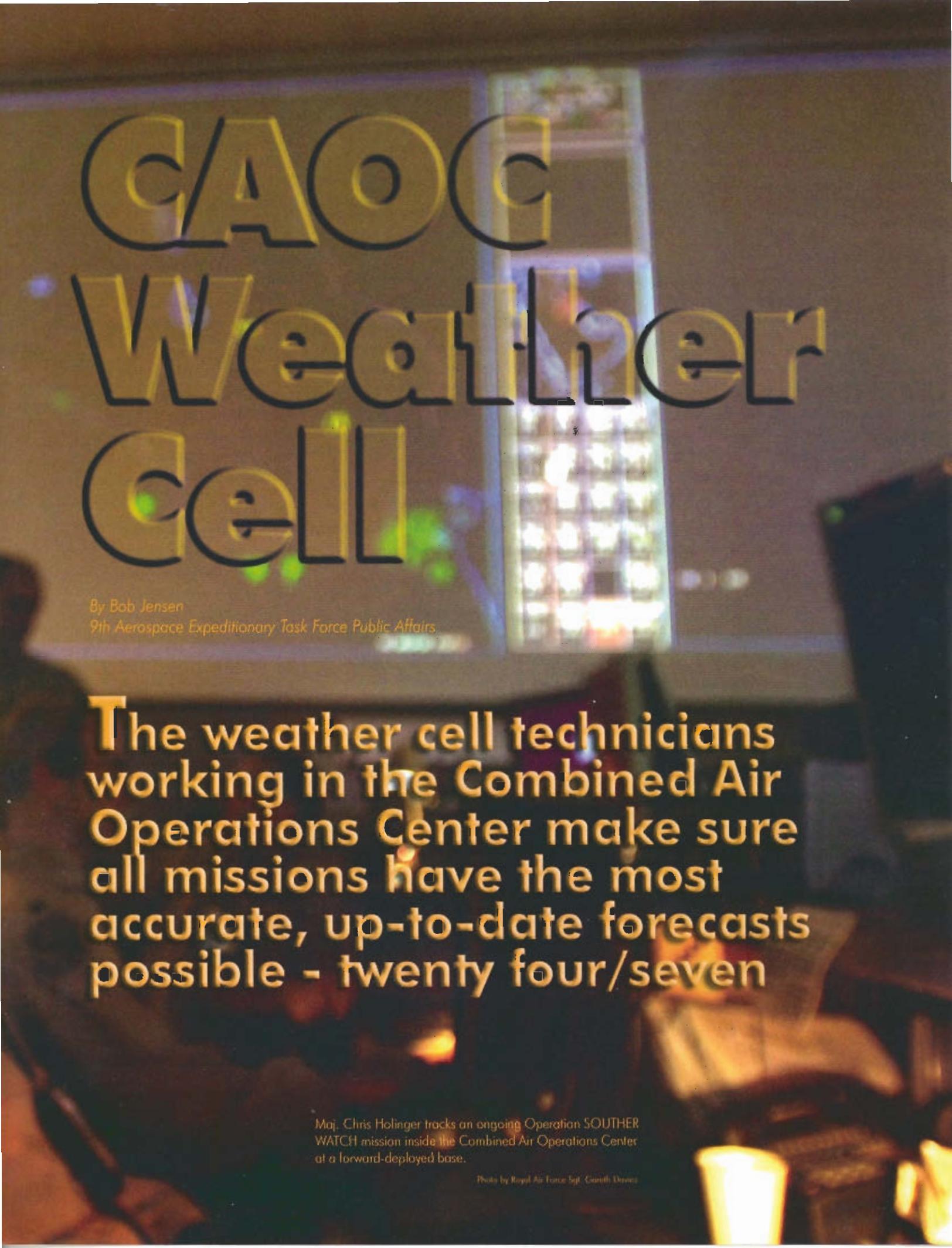
We also saw many Army support CWTs deploy with their companies and battalions – some even jumped into the combat areas and set up weather units within the first hour of arrival and started supporting the operations. As the Army moved, so did the weather CWTs supporting their customer mile by mile. Both the Air Force and Army CWTs reached back to the 28th OWS, AFWA, or USAFE to get products required to provide the timely accurate Mission Execution Forecast that help troops move deeper into enemy territory.

I also want to praise the support units from the states to the units overseas – your support is vital as it gets the troops to the battle and keeps the homeland safe from terrorists and other enemies. Every weather airman, officer, and civilian should be proud of his or her part they played in this war effort – no matter how large or small. Not everyone can go in to the battlefield first, but everyone can get a chance at helping to ensure our counterparts are safe and have what they need to stay alive. Later, a few units or individuals may help with the clean up operations or get an assignment to maintain the new freedom for the Iraqis or others.

As you read the accounts of our weather warriors, understand that we prove our worth with each forecast for the airdrome for each specific mission. Warfighters are listening to what we have to say, and what we are saying is timely and accurate. We provide environmental situational awareness – No, make that environmental situational **understanding**. Because it takes understanding to be able to anticipate and exploit the weather to find that point where our radio still works despite the solar flares – and the enemy's doesn't. Where our UAVs can still find, fix, and track the location of a target. Where our planes can drop those humanitarian supplies (or bombs) masked from detection.

I know America's team of weather professionals can meet any challenge and succeed. We are organized, trained, and equipped to do the job well... I salute your successes now and in the future! ✨





CAOC Weather Cell

By Bob Jensen
9th Aerospace Expeditionary Task Force Public Affairs

The weather cell technicians working in the Combined Air Operations Center make sure all missions have the most accurate, up-to-date forecasts possible - twenty four/seven

Maj. Chris Holinger tracks an ongoing Operation SOUTHER WATCH mission inside the Combined Air Operations Center at a forward-deployed base.

Photo by Royal Air Force Sgt. Gareth Davies

Asking about the weather is not a casual question in the Combined Air Operations Center at a desert airbase. In fact, it is one of the key questions asked during every phase of the air tasking order, or ATO, cycle.

"Most systems we have are weather sensitive, so weather predictions must be integrated into the planning at all times," said Lt. Col. Fred Fahlbusch, CAOC weather cell chief. "There are some systems and weapons that are all-weather, there's no doubt about that; however, these systems and weapons have to take off and land so there's always the (weather factor) at the base."

Even though a pilot may be able to drop a bomb guided by the global positioning system, the pilot still has to land despite bad weather at the planned recovery base. Low visibility because of sand storms or fog can cause aircraft to divert to another base. This diversion can cause a domino effect because the plane will not be available for future missions.

Weather affects every air mission, not just air strikes and reconnaissance. For

example, humanitarian operations planners need to know the conditions at their location and at the target zone. When dropping humanitarian rations, knowing wind patterns helps pilots hit the right drop zone.

"It's the same with dropping leaflets," Fahlbusch said. "You have to know what the winds are like at the required altitudes to drop the leaflets to hit the target or they'll wind up somewhere else."

"So even though the weather may not be a factor over the target area, somewhere in ... (the) process it always is," he said. "During launch, recovery, dropping the bomb, refueling the plane or imaging the target."

Fahlbusch, who is also the staff weather officer for the air component commander, outlined the ways the cell supports each step of the ATO planning process.

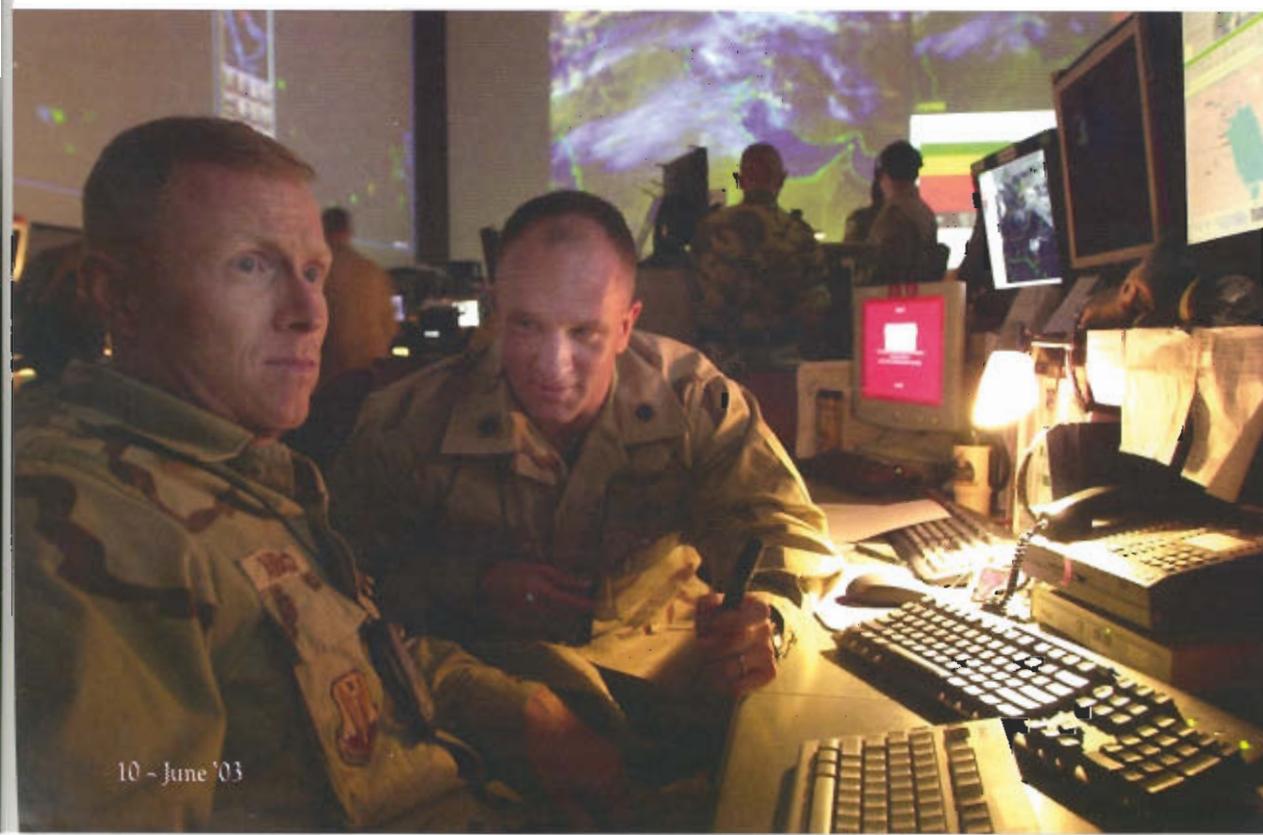
The ATO contains the marching orders for aircraft in the theater.

"The execution of an ATO requires synchronization at many levels and across

many units," he said. "Our goal is to make sure the people who are executing the ATO are not surprised, and they're able to continue to execute it despite what weather challenges they encounter. If the product we put out is accurate, then weather is a force multiplier in the execution of the ATO."

The weather cell staff provides information to planners from the beginning of the ATO process to the completion of actual missions, according to Fahlbusch. It is a complicated process that involves hundreds of military experts taking mountains of information and transforming that into the actual mission plans.

Beginning five days out from each mission date, the weather cell workers provide a forecast of what to expect down the road. The team continues to provide input to the CAOC staff doing combat planning, guidance, apportionment, targeting and creating the master air attack plan. Weather forecasts help planners decide which weapons to use on specific targets.



Master Sgt. Shawn Ambrisco (left), a duty weather forecaster, and Lt. Col. Fred Fahlbusch, the senior weather officer for the Combined Air Operations Center, discuss critical weather data at a forward-deployed location.

Photo by Capt. Jim Fabio

The weather cell workers share real-time weather conditions over the targets and forecasts of what the weather will be like over the areas where planes may need to refuel or land.

After each mission, the weather workers provide input for combat assessment of the missions and how weather played a part in their success or failure.

Just like the weather, the work changes every day for the weather cell. ✎



Photo by Royal Air Force Sgt. Gareth Davies

Controllers in the Combined Air Operations Center at a forward-deployed base monitor the status of ongoing Operation Southern Watch missions.

Inside the CAOC: **WEATHER, AIR TACTICS**

Taking advantage of weather

By Bob Jensen
9th ETF Public Affairs

Students of military strategy are familiar with the phrase “the fog of war” and the tactic of striking on a moonless night. There are many other ways to use weather to our advantage and work around it to achieve the goals of an operation.

“If we know the airfields in a target area are going to be fogged in bad and we know that generally under those conditions our adversary’s pilots won’t fly,” said Lt Col Fred Fahlbusch, the Combined Air Operations Center’s weather cell chief here at a deployed location, “we can give planners the information that those airfields are not going to be flyable for our enemy and that is a point of advantage to our side.

“We use adverse weather to our advantage because if they can’t fly, then they can’t take off and come at us,” he said.

As the planning process for an air tasking order rolls from the strategy and plans portion to the combat operations portion, weather cell members look at the near-term weather. These weather experts provide information on every aspect of the flying missions for that ATO, which helps decisions about going to a certain target area or skipping it because of potential bad weather.

“We can make recommendations prior to and during execution,” said Fahlbusch. “We sit right next to the chief of combat ops and throughout the entire ATO process we’re making inputs.

“So if the launch and recovery site has weather problems and they’re not going to be able to take off or land from the

base, we’ll recommend postponing a mission,” said Fahlbusch. “Other situations include low ceilings, cloud decks and low visibility over the target area or an aerial refueling area filled with clouds, thunderstorms and ice; then we’ll recommend the aircraft don’t go there for safety reasons.”

Weather events like icing, turbulence, high winds, major thunderstorms and sand storms can affect missions.

“When I was here during the first part of (Operation Enduring Freedom), the ground force insertion into Mazar-e-Sharif in Afghanistan was delayed two days based on the weather call we made, because they would not have been able to get close air support (due to bad weather),” said Fahlbusch. “So the decision to delay was made by the theater commander, which probably saved some lives.” ✎



U.S. Marine Corps photo by Master Sgt. Edward D. Kriery

CH-53 Super Stallions, Helo Support Team at LZ East, LSA VIPER Ammunition Supply Point conduct external lift operations April 1, 2003. Sgt. Donald Fields of LS Co. acts as the outside guideman. The force of the propellers create a sand storm that the HST team must work in. The HST provides loading and unloading of aircraft to include external lift operations. Transportation Support Group, Logistics Support Area Viper, 1st FSSG Forward Headquarters, IMEF, Iraq, supports all logistics for IMEF in theater during Operation Iraqi Freedom.

Life in the Early Entry Command Post

Small team tactics mean large scale responsibility for Army Air Force weather team

By Capt. Bruce Stansbury
Combined Forces Land Component
Command C2 SWO

For the past several months a small weather team has been thriving in a team environment within a self-sufficient command post. The command post is air delivered into a semi-permissive area, and provides information superiority to the Combined Forces Land Component Command.

The Combat Weather Team assigned to the Early Entry Command Post provides battlefield and situational awareness to the CFLCC Commanding General, Army Lt. Gen. David McKiernan. This is the environment that Master Sgt. Jim Vinson and I have worked in during Operation IRAQI FREEDOM, but the real challenges started with our airlift into Baghdad.

Capt. Bruce Stansbury, EECP weather specialist, displays a load ramp designed by the CWT. The EECP generator trailers were too long for the angle of the C-17 tail ramp. Damage would occur during loading. The team conferred with air force loadmasters and engineers, they orchestrated the design, manufacture, and testing of specialized ramps critical to load the generators onto C-17, GlobeMaster III aircraft. The new ramps permitted rapid on-load and off-load of generators saving effort and precious time as landing zone is semi-permissive. The ability to fly vice road convoy saved precious time, countless dollars and, given the threat environment, lives.



Photo courtesy of CFLCC

The flight into Baghdad International Airport was to take one hour. Shortly after takeoff, our aircrew commander informed us that there was a firefight on BIAP and we might not land. However, at 1954Z, after being up since 0200Z, our team arrived at BIAP.

The six expanded cargo vans housing our command post are filled with state-of-the-art digital network and are housed within an abandoned aircraft maintenance hangar on BIAP.

"There was no electricity available outside of what our EECP generators provide. There was no running water on our portion of the airport. Water was in short supply so no hygiene was permitted with bottled water. A water buffalo was available for facial hygiene. Ditches were dug for latrines," Vinson recalls.

Since the EECP CWT was equipped with Night Vision Goggles, we were able to marshal vehicles from the aircraft to the staging area for assembly of the entire seven-pallet, 54-vehicle, 168-person package - while the entire airport was blacked out. With NVGs, an isolated area of low cumulus could be seen to the south, no impact to aviation - a great night to seize an airfield.

A layer of smoke was also visible. Several oil fires could be seen surrounding BIAP. Anti-Aircraft Artillery fire was witnessed to the west approximately 10 miles away. Soon after the AAA, there were explosions further north and then the AAA site erupted in smoke. More AAA was evident off and on throughout the night.

As aircraft arrived and launched, the dust on the runway and taxiways was kicked up and took visibility to zero for two minutes after each take-off. The dust is the same silty, flour type consistency as the dust of Afghanistan. Truck convoys on

the other side of the runway also disturbed the dust. The rising dust reduced visibility to 20-30 feet in the night air.

The whine of turbine engines and the clatter/screaming of tank treads was heard as a column of a dozen or more Bradleys disappeared into their own dust and the night as they sped away from the airfield. Shortly after, in the direction of their departure, firefights erupted among a row of out buildings. The fights were mostly one sided, HUA! (HUA! means AIR POWER!) Other thunderous explosions were heard and felt, preceded by flashes of light to the east.

Once all chinks were downloaded, we convoyed to the setup site. A 2.5-hour combat nap was taken. We slept on the taxiway under an abandoned Iraqi commercial aircraft tow vehicle. This was to prevent or minimize personnel injury in the event of an accidental "hit and run" by moving vehicles. The sweat in our clothes under the body armor was cold in the night air.

The sound of rotor blades lapped the air throughout the following day. As evening approached, the comforting hum of the rotor blades was accompanied by the returning clatter of tank treads. During that evening's MREs, two loud explosions were heard and felt. The windows in our room flexed inward then rattled to rest with no damage.

Uniforms are worn until they are no longer clean, dry, and serviceable. Then a serviceable uniform is pulled from the b-bag - no laundry services are available. Chow is MREs - no chow schedule yet. We work, we eat, we rest as work allows. "This is the life," we send our thanks out to the CFLCC/SWO and the 18th Expeditionary Weather Squadron.

As for equipment, we have available to us the full gamut - STU-III, Tactical Telephone, SIPRNET, NIPRNET, IRIDIUM,

TMQ-53, MOS KIT, Kestrel 4000, E-Trex, FInWS, PVS-7B, JLISTS NBC Gear, M16s, and M9s.

Shortly after our arrival on BIAP, the EECP moved to a nearby presidential palace. The CWT participated in a 10-man advance scout party (1 five-ton, 2 HMMWVs) sent to seize and secure the new site. Vinson took charge the operations shelter 5-ton vehicle and its preparation for convoy movement the day of the EECP relocated to the Abu Guryhab Palace. Under constant threat of enemy fire, he completed the 54-vehicle convoy to the Abu Guryhab Palace without incident.

Our work within this command post is extremely rewarding. We provide staff weather functions to CFLCC/CG and the EECP leadership. As a small team in the much larger Air Force Weather community we managed the staff weather functions from the Operations and Intelligence shelter 24 hours per day and alert the leadership to micro-scale impacts to operations.

Our technology allows us to work with weather technicians around the AOR to expertly analyze and forecast blowing dust events, which empowered our leadership to facilitate a video tele-conference between COMUSCENTCOM and the President of the United States. Additionally, we have accurately forecasted another adverse weather event, which allowed for aggressive planning and resourcing for the arrival of the most senior enlisted member of the army, the Sergeant Major of the Army.

The extensive training and team building our weather team received greatly increased our multiple discipline proficiency and gained us much needed acceptance from our Army teammates and the trust of the leadership. This would not have happened without our weather training and the support of the entire Air Force Weather team. ♪

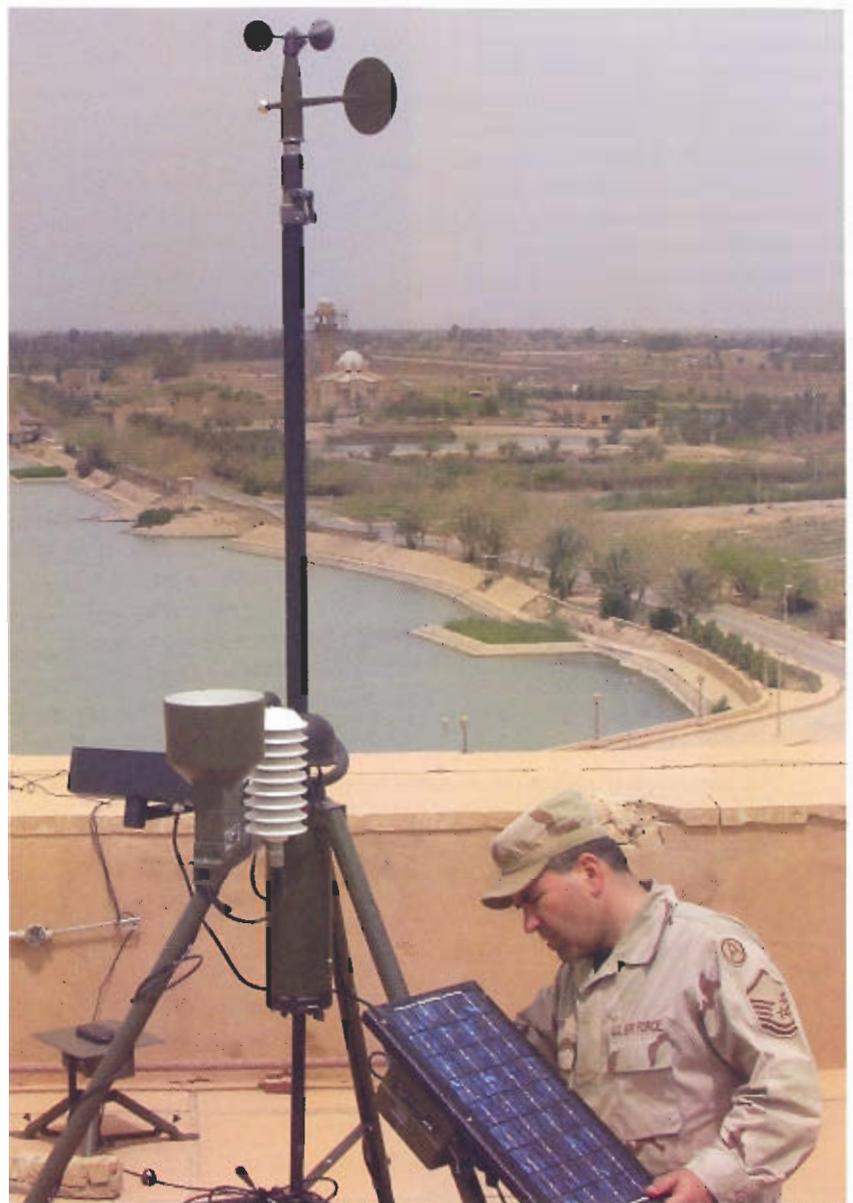


Photo courtesy of CFLCC

Master Sgt. Jim Vinson, EECP weather technician, sets up a TMQ-53 on a roof top in Baghdad.

V Corps Rolls

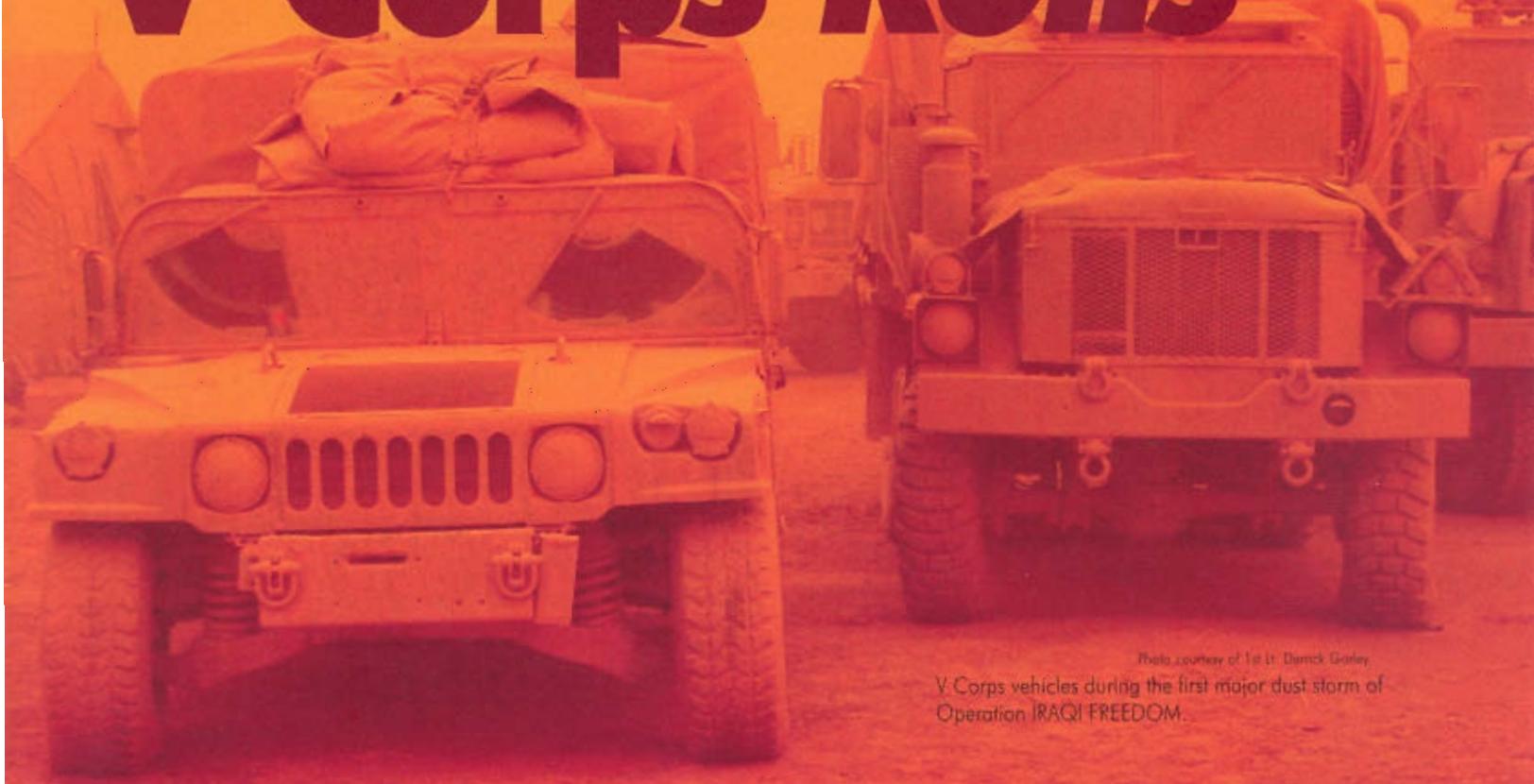


Photo courtesy of 1st Lt. Derrick Gurley
V Corps vehicles during the first major dust storm of Operation IRAQI FREEDOM.

By 1st Lt. Derrick Gurley
V Corps Combat Weather Team

It was a tough decision for Maj. Jay Des Jardins, Commander of the V Corps (U.S.) Combat Weather Team from Heidelberg, Germany, to dispatch two unit members to provide forward support to the V Corps Tactical Command Post. The unit members chosen were Staff Sgt. Davie Lewis and myself. However, the fact remained - the mission to collect weather data from the data-sparse regions of Iraq had to be done.

The events were put into motion to permanently attach us to the V Corps Tactical Command Post, a series of rapid assembly modular tents that would command and control the "close fight" of the 3rd Infantry Division. We were set to cross the line of departure and provide forward weather support shortly after the

3ID began its combat operations.

As the ground offense commenced, the CTAC moved to its first of many temporary locations, known as Objective Rams. Our team sent the initial weather observations from this region that greatly assisted in the delivery of supplies to forward units and the eventual establishment of a logistics base. Due to the CTAC's mobile nature, our team had minimal weather equipment with us, however, Lewis and I used the Kestral 4000, a standard MOS kit, secure laptops, and satellite communication assets to receive and relay battlefield weather data from Iraq to the V Corps Main Command Post CWT handling missions in Kuwait.

Our team was responsible for providing the V Corps Commanding

General, Lt. Gen. William Wallace, weather updates outside the normal briefing schedule and provide him situational awareness of any weather changes that could affect the decision making process on the battlefield. This was displayed after the first sandstorm during the hostilities reduced visibilities to "next to nothing" across the battlefield and halted some activities. Aviation assets could not be employed due to weather and the decision was made to aggressively re-supply units via ground. After the re-supply effort and the excessive winds and sandstorm broke, it was time to conduct another "jump" or forward movement of the CTAC.

At another forward location, our two-man CWT, with more than 20 years of combined technical and tactical experi-



Photo by Master Sgt Terry L. Eberns

Above, Airman 1st Class Jason Fahner, 5th Combat Communications Group, fills sandbags to help secure the bottom of a tent during a severe sandstorm that hit the area. The 5th is from Robins AFB, Ga., currently deployed to Tallil Air Base, Iraq, supporting Operation Iraqi Freedom.

Right, V Corps camp at Objective Grady.



Photo courtesy of 1st Lt. Derrick Gurley

ence, continued providing the initial weather observations at new locations. The operations tempo at Objective Grady significantly increased to include producing and providing numerous stand-up briefs, flight weather briefings and special support products. At this point, units were being shuffled across the battlefield into new positions and the CWT picked up numerous briefing responsibilities of units that were "on the move."

The weather journey culminated when the CTAC arrived at Objective Lions, also known as Baghdad International Airport, to take command and control of the Baghdad area of operations and wait for the V Corps Main to arrive and consolidate assets. The 3ID CWT was already in place sending the "official" observation and thus, the need ended for the CTAC to relay observations.

The experience of providing weather support and directly brief the major combat units that participated in Operation IRAQI FREEDOM and seeing the elation of the newly liberated Iraqi people cannot be replicated. Additionally, witnessing the dreaded "shamal" firsthand will provide a conversation topic for years to come. However, our Combat Weather Team could not have provided the exemplary weather support without the assistance of the entire team and the weather technicians at locations around the globe that helped provide the weather for battle. ✎

Army Aviation Weather

By Staff Sgt. Julie Moretto
15th ASOS, 3rd Infantry Division (M),
4th Brigade Aviation

The day I received notification of our deployment to Kuwait and possibly Iraq with the 3rd Infantry Division, I was excited. The closer the deployment date came, the less excited I became. January 24 finally arrived and we took off from our home station, Hunter AAF, Savannah, Ga., to join the others already in country.

Once we finally arrived at our respective locations, we got straight to work familiarizing ourselves with the climate. This process didn't take long because we were on AEF orders during the same time frame last year supporting the Aviation Task Force at Camp Doha.

I am in theater currently supporting the 3rd Infantry Division (Mechanized), 4th Brigade Aviation. The aircraft assigned to this unit include the Apache Longbow, Blackhawk, and the Kiowa Warrior. I have also supported unmanned aerial vehicles - the Hunter and the Predator.

During the historic sandstorm in late March, I was still with the Aviation CWT. That day is a day none of us will forget. It first looked like a scene from *The Mummy* when the dark cloud rolled in. In less than five minutes it was completely pitch-black and it was only 4:30 p.m. local time - then it started to rain. But the rain was not the typical rain we're used to. It literally was raining mud. All of our aircraft were stuck at an airfield until the storm cleared. And it seems like the worse the weather, the lower everyone's morale. The day the storm lifted so did our morale. The aircraft finally started coming in and we actually had a job once again!

The weather here in Iraq is as unpredictable as anywhere!

Master Sgt. Ray Perez, 41D Aviation Brigade CWT, with a TVSAT and an IMETS setup in front of the newly named Baghdad International Airport.

Photo courtesy of 41D

Just when you think you've found a general rule-of-thumb, Mother Nature throws you a curve. We have seen the winds from the south at about 20kts or more, especially at Udayir, will restrict your visibility to as low as 1/8 of a mile.

My most memorable and unique experience during Operation IRAQI FREEDOM was being with the Brigade Tactical Assault Center the night we rolled into Baghdad in early April and having the distinction of being the first weather person at Baghdad International Airport. That was the closest any of us had been to the frontline. I saw more artillery that night than I had any other night. By the time we arrived near the airport we were driving under black out lights. We were welcomed to the newly named Baghdad International Airport under continuous fire. We set up our cots in a hangar and were so tired we fell asleep to the sounds of live fire so close the hangar shook.

Operation IRAQI FREEDOM has affected me personally and professionally. I have handled the combat environment better than I anticipated. I have newfound patience for individuals and sticky situations. I have found that I can survive in a hostile environment and maintain a sense of calm. I hope that everything I have learned through this experience will carry over when I return to my leadership position, chief, Weather Station Operations, Hunter AAF, Ft. Stewart. 🙌



A crew chief with the 332nd Air Expeditionary Wing works on the wing of an A-10 fighter March 29. From a forward-deployed location, the fighters are flying missions into Iraq in support of Operation IRAQI FREEDOM.

Photo by Senior Airman JoAnn S. Makinano



Forecasting for the Wings of War

By Staff Sgt. Karen Tomasik
386th Air Expeditionary Wing Public Affairs

Following the mission of anticipating and exploiting the weather for battle, four forecasters came together to provide weather support for the warfighters of the 386th Air Expeditionary Wing during the buildup and execution Operation IRAQI FREEDOM.

"We started out just supporting the wing's assigned aircraft and the occasional transient aircraft passing through," said Master Sgt. Michael Maytes, chief of the 386th Combat Weather Team. "But when the war started and we were donning our chemical gear in response to real-world attacks while providing the forecasts and other weather products, it makes this deployment stick out from others I've been to in the past."

Quiet times didn't linger for very long though, and from December to April, the base transformed from a small steady-state base to the largest base in the area of responsibility. The wing's weather specialists then fulfilled the role providing weather to a much larger audience of warfighters.

"I started out working as the weather forecaster for the Predators from when I got here Christmas eve until the end of February when the Predator forecasters got here," said Senior Airman Alisha Lawson, 386th CWT forecaster. "Master Sgt. Maytes and I were working pretty standard shifts. Then, when

the base built-up, we often worked nearly 14-hour shifts without breaks due to the sheer numbers of pilots who needed the most current weather briefing we could give them."

"After a while we were supporting more than 200 Marine and Army aircraft each day, flying training missions for several weeks leading up to Operation IRAQI FREEDOM until their units received forecasters to support their missions," said Maytes. "After the Predator forecasters arrived Senior Airman Lawson and I were able to split the shifts and workload of supporting the majority of the base's aircraft."

Just when the forecasting job started to take on a steady tempo once again though, OIF started and the responsibilities of the CWT increased even more.

"We were still supporting the majority of the aircraft coming through here," said Maytes. "Then we started preparing very extensive daily weather briefings of the area of responsibility for the battle staff briefings for planning in case we had to be used as divert base for transient fighter aircraft during bad weather at the fighter bases."

With the base being one of the primary targets of the Iraqis during the initial stages of the war, the CWT also provided essential chemical downwind messages every six hours in case the base was hit with chemical weapons.

The impact of the weather wasn't lost on anyone though as the pilots and senior leadership of the base understood how important the forecasts were on whether or not a mission could happen or not.

"Since I've arrived here to support my first deployment I've seen how important our job really is," said Lawson. "The pilots really want to hear what we have to say about the weather. I didn't always get that impression back at my home station."

Forecasting conditions that included late-winter thunderstorms, high winds and often-unpredictable sandstorms, the CWT coordinates with many agencies, including the 28th Operational Weather Squadron hub at Shaw AFB, S.C., weather technicians at the base's tenant units, British weather counterparts who provide the official observations for the base, and the Combined Air Operations Center weather specialists.

Each weather technician has their own view of what has been the most difficult thing for them to forecast since being deployed to the area, but all are major concerns for the warfighters during OIF and future humanitarian missions in Iraq.

"The hardest thing for me to forecast out here has to be the sandstorms. On a daytime visual satellite shot I can see sandstorms easily, but since I work the night shift I can't see them on the infrared views," said Lawson. "Since we've started getting weather observations out of Iraq, forecasting the sandstorms has been much easier."

The weather conditions weren't the only challenge the CWT faced – the base also started supporting various other airframes, including several types of helicopters, heavy aircraft and occasional transient fighter aircraft.

"I found the most challenging thing to do was adjust to the differences in the airframes," said Maytes. "I was used to providing weather data for aircraft flying at 30,000 feet back at Tinker [AFB, Okla.], and when the base received Army Blackhawks and several types of Marine helicopters I had to readjust to provide the weather at 500 feet or less."

Despite the challenges to the CWT, Maytes and Lawson have both come away with memories and lessons learned from forecasting the weather in such a unique environment.

"I've actually worked with some of the same British forecasters I knew when I was working out of Gioia del Colle, Italy," said Maytes. "Just when you think the Air Force weather family gets a little smaller, you find it's the same way in other services as well."

"Having the opportunity to work with Master Sgt. Maytes has greatly increased my knowledge of the weather field since I've only been working the counter for about six months now," said Lawson. "Working with members of the other service and countries has also broadened the scope of what I do. Working with the British, Kuwaitis, United Arab Emirates, and Australians in additions to the Marines, Navy and Army units is not something everyone gets the opportunity to do." ✎

Staff Sgt. Jason Nipp, a crew chief deployed from Ramstein AB, Germany to the 363rd Expeditionary Equipment Maintenance Squadron (EEMXS), protects his eyes during a sand storm while loading Air to Ground-88 missile wings and fins into the universal wing and fin container for download to an F-16CJ aircraft on a flight line in preparation for a mission on March 25, 2003.

Photo by Staff Sgt. Matthew Hansen



The Domino Pushers

By Paige Hughes
AFWA Public Affairs

When a military weather forecaster issues a forecast, a series of decisions gets made, and a chain of events unfolds that resembles a path of falling dominos. These decisions and events lead to the final domino, one that represents mission success or failure. Even with all that separates the two, this last domino is, in part, at the mercy of the first domino...one that is pushed by a weather forecaster.

Lt. Col. Tom Frooninx,
Commander, 28th OWS

Situated in a densely wooded military base in South Carolina, the view from the organization's front door is a mere 100 feet. However, from inside the facility, members of the 28th Operational Weather Squadron have an unobstructed view of an area ten thousand miles away – the battlefields of Iraq.

Their mission at Shaw AFB is to provide accurate, timely and relevant weather forecasts and other weather services in support of military operations in U.S. Central Command's area of responsibility as well as the south-east United States.

The 28th OWS is the designated lead forecasting unit for Operations IRAQI FREEDOM, ENDURING FREEDOM and SOUTHERN WATCH. The weather technicians have been watching that area for four years and know the unique weather patterns that can churn up mission halting sandstorms. When the United

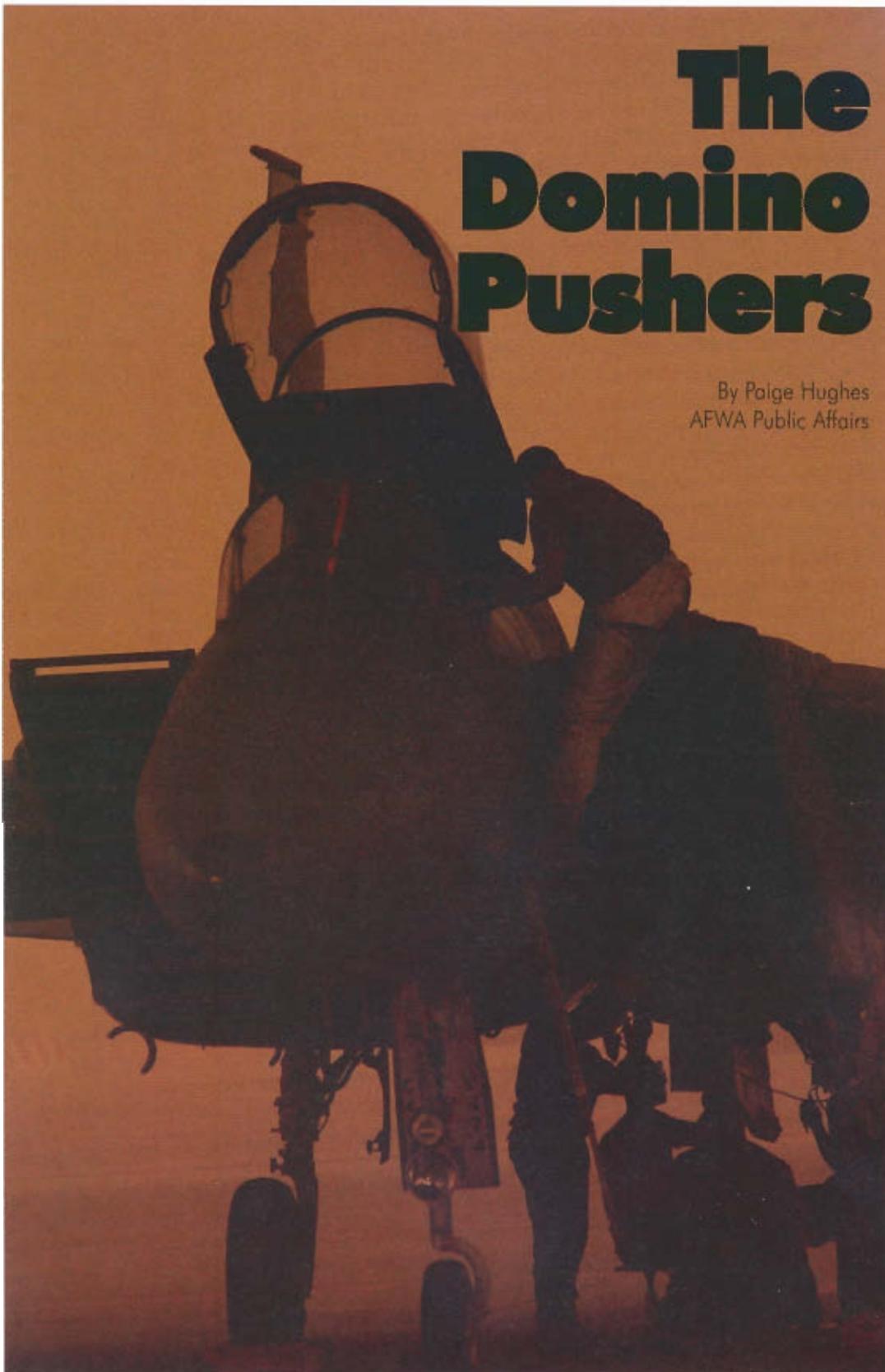


Photo by Staff Sgt. Matthew Harries

Air Force maintenance technicians deployed to the 363rd Expeditionary Maintenance Squadron, prepare an F-15C eagle aircraft for a mission during a sand storm on March 26, 2003. Aircraft move around the clock to support Operation IRAQI FREEDOM at a forward deployed location in Southwest Asia. Operation IRAQI FREEDOM is the multi-national coalition effort to liberate the Iraqi people, eliminate Iraq's weapons of mass destruction and the regime of Saddam Hussein.

States went to war in March, the 28th OWS went to work arming the warfighters and their decision makers with unsurpassed environmental situational awareness.

"I was simply in awe at the way the unit was able to adjust to around the clock changing requirements and still generate high quality products," said Lt. Col. Tom Froominckx, commander of the 28th OWS.

The products they generate are made in a secure room known as the USCENTAF Weather Operations Center. The small room is filled with as many as 22 weather technicians at one time. At first glance, they appear to be bumping into one another, yet their tasks are deliberate and precise, their skill is tuned and their focus sharp. They use their monitors to search, watch, and wait for signs of changing weather.

One of their most valuable tools is Mark IVB high-resolution satellite imagery and data. The capability proved useful at 'filling in the gaps' of a data-sparse region.

"Mark IVB's ability to enhance, zoom, animate and manipulate imagery as well as interrogate it for precise latitude and longitude, temperature and identify information made it an order of magnitude," said Maj. Christopher Pinta, chief USCENTAF Weather Operations Center.

The enhanced imagery, coupled with available upper air data, surface observations and PIREPs gives them an unsurpassed ability to accurately forecast. The advantage was

magnified by the ability to communicate instantly with field units using secure chat on the internet.

"We tie chat notification into almost every product we issue. It's often times the only reliable means to coordinate weather support," said Finta. In-theater phone and e-mail communication was overwhelmed during the war.

The resourcefulness of the 28th OWS keeps them in touch with the needs of their diverse customers. Weather support is provided to an impressive cross section of military leaders and operators ranging from the command center in Qatar to one of 30 deployed Combat Weather Teams in theater.

Their vital role in the war became apparent to the world during the first week of the war when weather conditions in Iraq turned brutal.

A significant sand and dust storm hit Iraq on March 25, however weather technicians at Shaw began seeing the makings of a huge system five days earlier. The timing of a major short wave trough and a frontal system were in sync and ejected out over central Iraq.

Satellite imagery allowed forecasters to track the upper level trough and developing system over the Mediterranean Sea. The system began to reveal itself as the 'Storm of the Century' with the potential to impact operations during the middle of the war.

On the morning of March 25, the system pushed through



Photo by Staff Sgt. Andrew Robinson

Weather technicians in the 28th Operational Weather Squadron's USCENTAF Weather Operations Center keep the weather products flowing to DoD decision makers in support of Operation IRAQI FREEDOM.

giving the region an almost unprecedented amount of dust coverage in a very short period of time and obstructing visibility.

"We were pretty much dead on in our thinking of how intense the system was going to be and got as much as 12 hours advance in actual warning level winds," said Tech. Sgt. Jason Noe, weather forecaster.

According to Noe, the squadron succeeded at informing key personnel of imminent weather conditions so planners could expedite or cancel missions. Ground operations received ample lead-time and were able to properly prepare.

"In retrospect we did more than forecast this storm, we

raised the confidence of the war fighters reliance on us as well as their trust, and we continue the traditions of being the CENTCOM weather experts," said Noe.

The success of the 28th OWS can be pinned on more than resourceful communication and detailed weather tools; a great deal of responsibility rested on the 'total force' of men and women issuing the forecast at the squadron.

Ten Air National Guard augmentees, two Navy forecasters, one Marine forecaster and 12 active duty Air Force forecasters deployed from 11th OWS, 15th OWS, 17th OWS, 25th OWS and 26th OWS and Air Force Combat Climatology Center worked along side the permanent members of the squadron

bringing the number of skilled forecasters for the USCENTAF Weather Operations Center to 83.

"From a commander's perspective, my most valuable resource is vary talented people, and their most valuable tool was flexibility," said Froominckx.

The experience base at the squadron proved that AFW reengineering works. In most cases the squadron exceeded component and combat weather team requirements through reach back.

Being one of the first reengineered squadrons to operate in direct support of a war, they were also able to identify areas to improve. On the forefront is building a single integrated theater METOC picture. The ability would enable United States military services and functional components to share data and develop a joint/combined theater forecast.

"With a data sparse battlefield, we cannot afford to miss a single observation or radar image, and every Air Force, Navy and Marine forecaster must sing from the same sheet of music," said Finta.

Recognizing this and other operational needs, meteorologist from the military services formed the Joint METOC Interoperability Board. The mission is to improve joint use of meteorology, oceanography and space information.

Today, the 28th OWS remains focused on the continued military effort being conducted thousands of miles from their front door. What remains certain is that freedom will triumph and the 28th can proudly celebrate the success they brought to the war. ♪



Airman 1st Class Anita Longton, a weather technician with the 28th Operational Weather Squadron, tailors weather forecasts in support of Operation IRAQI FREEDOM. The 28th OWS is the designated lead forecasting unit for Operations IRAQI FREEDOM, ENDURING FREEDOM and SOUTHERN WATCH.

Photo by Staff Sgt. Andrew Robinson



Special Operations Forces in any operation require specialized and specific weather forecasts

By Jodie Grigsby
AFWA Public Affairs

The hostilities faced by American and Coalition forces during Operation IRAQI FREEDOM were not just from the opposing troops – but also from the harsh and hostile weather in South West Asia. With temperatures peaking over 100 degrees daily, and with a constant threat of blinding sand and dust storms – timely, accurate weather products became the key to successful operations.

A large player in that success came from the Special Operation Forces Weather Operations Center, Air Force Weather Agency, Offutt AFB, Neb. The SOFWOC weather team acts as the key weather resource for Special Operation Forces, wherever they operate. SOFWOC was not only instrumental in daily operational decisions for SOF teams, but played key roles in several corner stones of the successful Iraqi operation.

“I think weather information was used better and more efficiently in this operation than ever before,” said Maj. Dave Wood, SOFWOC chief.

Right-on-target

One of SOFWOC’s biggest successes was the support the team provided to the 173rd Separate Infantry Brigade’s combat jump into Northern Iraq. With almost a thousand jumpers, and 16 C-17s, this jump was the largest combat jump since

Panama. The jump almost did not happen because of inclement weather.

“We noticed that there was going to be severe weather on the day of the jump. I picked the very best weather technician, and gave them the challenge of finding an acceptable window for the jump,” said Tech. Sgt. Matt Dearing, SOFWOC team leader.

The SOFWOC team provided the 173rd with a five day forecast, giving them a 2-hour window where the weather would clear up enough to meet the minimum condition required for such a massive jump. Dearing went on to explain that SOFWOC was in constant communication with the 173rd, reassuring them that the weather would in fact clear, although some were skeptical.

“We gave them the best forecast possible based on the information we had available. The models were consistent. We had confidence in what we were issuing, and stuck by it,” Wood added.

They stuck by their forecast, and nailed it. The weather cleared as predicted, when predicted, allowing the mission to take place.

Although the mission was a success, largely because of the confidence SOFWOC had in their original forecast,

Dearing is careful to share the credit.

“We couldn’t possibly do the support, without the entire Air Force Weather community. From the folks here at AFWA, the Operational Weather Squadrons, Combat Weather Teams, and that lone weather tech deployed with Special Operation Forces – it’s truly a team effort.”

The Storm of the Year

Another key accomplishment of SOFWOC’s wartime operations is their forecast of the large dust storm that hit the area March 25. The storm, which had 65 mile-per-hour winds and often reduced visibility often to zero, lasted four days.

Largely impart to the SOFWOC’s efforts, SOF forces not only expected the inclement weather, they were in place prior to it. The large push of military assets toward the Iraqi border in the early stages of the war, was impart because of the impending weather conditions.

SOFWOC saw the storm a week prior to the event and alerted USSOCENT, triggering the redeployment of special operations assets. This allowed the forces to gather intelligence during the massive storm, and enabled conventional forces to strike as the storm waned – as predicted by SOFWOC.



Photo courtesy of 173rd SIB

Members of the 173rd Separate Infantry Brigade jump into Northern Iraq during Operation IRAQI FREEDOM.

“We foresaw the storm a week out, and were able to tell the deployed teams not only what to expect, but when it would hit and when it would end,” said Dearing.

Although the team boasts 90 percent accuracy with their dust and sand products, the team was also focused on a forecasted temperature spike. The team forecasted for temperatures to reach well over a 100 degrees for the area. That piece of information was also essential in the decision to rapidly move troops forward toward the Iraqi capital.

“When temperatures rise it makes everything more difficult. Ideally we want to reduce the impact to troops by moving before the heat, and if commanders know when to expect the high temperatures they can act accordingly,” said Wood.

Tools of the Trade

One of the main tools that SOFWOC used successfully during OIF to provide information to their customers is a secure Internet chat room. Weather technicians, wherever they may be stationed or deployed, can simply log in to the secure chats and discuss anything from the weather conditions they are forecasting to questions on current weather conditions at specific location.

The chat rooms also allow the weather technicians involved with specific operations to have “private chats.” So not only do those logging in to these chats need to have the clearance, they must have the “need to know.”

The chat rooms allow direct and real time access to customers, allowing daily, hourly, and minute-by-minute updates. Essentially a member of SOFWOC team can type something to their deployed SOF weather customer, who can immediately brief it to an operational commander.

“It is great to have that direct line with your customer in the field, you can better understand what the mission is and why it is important. We know why we are putting all the time and energy into our products, and that makes a big

difference. It’s a real motivator,” Wood said.

The SOFWOC team credits the success of the secure chats, to that the chat room allowed not only direct access to SOFWOC’s customers, but to a worldwide pool of weather expertise, both of which are key to success said Dearing.

“We work together collectively, to come up with an answer, a forecast solution,” Dearing added.

The Team

During OIF the SOFWOC team, ranging from Senior Airman to Major, had a minimum of five people working at all times, three shifts a day, 24 hours a day. The team which normally operates with shifts of just three people, had to effectively utilize the talents of all of its 36 members during the period of increased operational tempo.

“It was a combination of time tested forecasting techniques, leadership and teamwork. But the key was teamwork” said Dearing.

SOFWOC acts as a functional OWS, forecasting for specific types of missions rather than an area of responsibility. Although SOFWOC does not receive Initial Skills Course



students, many of the team's forecasters still have little experience as weather technicians. During OIF, nine of the 36 team members were trainees, and not fully accredited forecasters. SOFWOC relies heavily on the seven civilians who work in the area, to not only provide continuity, but to assist in training.

Although many of the SOFWOC team has less than two years experience, they still must forecast for unique missions around the world. With the added pressure of knowing that their products go directly to support Special Operation Forces.

Wood admitted that forecasting for a wartime effort put a lot of pressure on his team. He said that many on the team were mindful that there were lives at

stake every time a forecast was issued. When asked what makes the inexperienced forecasters so successful, Wood said the high degree of motivation and dedication makes it work. He said all he ever asks of the members of SOFWOC is to come in everyday and issue the best forecast they can.

"They come to work everyday, and produce the best forecast possible. We are human, and so we are going to make mistakes. The key is to not make the same mistake twice. To learn from your mistake, to learn from others' mistakes," said Wood.

Now What?

The SOFWOC team doesn't expect their operational tempo to decrease just because operations have begun to slow.

"My workload today is at the same level it was during the height of OIF," said Dearing.

The team says they will be busy with ongoing efforts for the war on terrorism, and continued operations in Afghanistan, Iraq and around the world. Additionally as operational tempos ease up, many of the Special Operations Forces will resume their training exercises, getting their weather information from SOFWOC. The team admitted that although they may have a momentary breather, their commitment to the war fighter remains the same.

"Regardless of the mission or the product, the intensity and eagerness to get the job done, and do it well, remains the same," said Dearing. ✎



Airmen struggle to walk through a heavy sand storm at a forward-deployed air base March 26. Troops supporting Operation IRAQI FREEDOM are battling sand storms throughout Southwest Asia.

Photo by Staff Sgt. Derrick C. Goode

Weather clears skies for bomber pilots

By 1st Lt. Rickardo Bodden
457th Air Expeditionary Group
Public Affairs

While accurate bombs, jet-propelled missiles and well-trained crews mean the difference in a war, none of it gets off the ground without good weather.

As aircrews and others at a forward-deployed location will tell you, weather is paramount for the success of Operation IRAQI FREEDOM. No one knows that better than Staff. Sgt. Mike Wimmer, mission execution forecaster for the 457th Air Expeditionary Group and its complement of B-52 Stratofortress bombers.

"(Weather forecasting is) paramount here," said Wimmer. "It is critical whether a mission goes or doesn't go."

At the base weather support center, staffed with one meteorologist and four weather specialists, Wimmer provides weather updates to air traffic control, the combined information center and transient aircraft. That way, no matter if an aircraft is coming or going, the aircrews are aware of the current weather conditions.

Each day, Wimmer gets updated on current weather conditions and the forecast for the next six hours to five days. After that, he begins his daily research. He looks at satellite photography so he can see any developing weather patterns and gets more information from the forecasters in Germany, the hub of European weather forecasting.

During his shift, he is responsible for issuing local weather observations. Every 15 minutes, Wimmer or another weather technician walks outside and checks visibility, noting any weather changes.

Then he inputs his observations along

with data on wind speed and direction, temperature and barometric pressure into a database. Once complete, anyone in the world can read and use the information. Weather information is not just for aircrews, it is available for all base agencies, Wimmer said.

From turbulence to thunderstorms, the military weather grid affects all operations in the war against Iraq. Because of that, Wimmer said he gets a lot of job satisfaction from his job.

"I do love my job. It has been nothing but a fun ride for the last 12 years," said Wimmer. "When the pilots come in and say 'thank you, your weather was on target,' (that) is what I like to hear."

Senior Airman Mellissa Capestro is another weather specialist with the flight. She said she understands how her forecasts could affect the outcome of a mission. A self-confessed science nut and weather buff, Capestro said she enjoys being close to the mission.

"You feel included," Capestro said. "It gives me a great sense of pride."

It is not just the job that keeps Wimmer excited. Each day he sees his work help coalition aircraft lift off.

"Being next to the runway when the first [B-52s] took off and knowing our weather shop made an impact on their ability to conduct a mission is a huge highlight," said Wimmer. "It's rewarding seeing all your hard work and practice pay off watching that Buff take off ... knowing something good will come out of it." ✎



Photo by Tech. Sgt. Jim Fisher

Staff Sgt. Mike Wimmer reads a visibility chart at a forward-deployed location. Wimmer is weather specialist assigned to the 457th Air Expeditionary Wing.

Weather specialists provide critical support to war efforts

Contributed by 3rd Combat Communications Group

To do their part in the war on terrorism, members of the 31st Combat Communications Squadron's Weather Systems Support Cadre have been supporting weather shops around the Air Force by providing training on mission critical systems.

"The number of people we send out depends on the type of tactical weather system the Combat Weather Team requires training on," said Master Sgt. John Houghton, non-commissioned officer-in-charge of the WSSC. "Last year, two people [visited] 15 sites at five days per site, for about 300 days."

The WSSC was created in 1996 as a result of lessons learned in Desert Storm. During that campaign, Air Force Weather units deployed to Southwest Asia with tactical weather systems that had been procured in small numbers with an inadequate number of spare parts available and little-to-no maintenance support.

"These weren't robust systems, and [ended up being] incapable of sustained operation for long hours in the harsh desert environment," Houghton said. "After AWS reviewed lengthy after-action reports, two major objectives for future deployment operations were decided. First, they needed to design and procure lighter and more robust tactical weather systems to accomplish the mission. Secondly, a leaner, faster and more responsive maintenance concept needed to be developed, hence the birth of the WSSC."

Two groups of communications experts were chosen from the best of the best, and set up at the pair of combat communications groups, one at Tinker, known as WSSC-West, and the 51st Combat Communications Squadron, part of the 5th CCG, located at Robins AFB, Ga., known as WSSC-East.

WSSC-West covers the continental United States west of the Mississippi, Central and South America, and the Pacific. WSSC-East covers the CONUS east of the Mississippi, Europe and Southwest Asia. In 2000, a European WSSC was activated,



31st CCS's Tech. Sgt. Steven Smothers, left, and Staff Sgt. Billy DiCarlo use the Tactical Meteorological Observing Set in training airmen to forecast weather.

consisting only of Met-Nav personnel, covering Europe and Africa.

The wartime WSSC mission is to be the "first-look" at broken tactical meteorological equipment deployed in theater-wide weather operations. The unit deploys members and assists in-theater users with limited on-site maintenance and troubleshooting, and helps users order parts through supply channels. Each WSSC provides four-person deployable teams that support Air Expeditionary Force rotations, contingency operations and wartime operations.

The teams also maintain a technical support desk that provides a first look at systems failures. WSSC Technicians will assist in diagnosing the equipment failure over the phone or via e-mail with customers, provide subject matter expertise and ensure the customer is directed to the appropriate agency for resolution.

"You can be assured there will be some form of WSSC involvement in whatever road the world of TACMET takes," Houghton said. "WSSC technicians remain ready, able and willing to provide AFW customers TACMET SME, training or experienced repair capabilities should the need arise." ❧

All eyes focused on weather

By Christy Harding
AFWA Public Affairs

The world watched as U.S. military and Coalition forces built up their numbers in the South West Asia region. The question was 'when' would they get the call to act. The answer the media focused on was 'before the weather got too unbearable'. The media's self-derived answer led them to the supplier of military weather information for the war, Air Force Weather.

Col. David Urbanski, Air Force Combat Climatology Center commander, is interviewed by Randy Flinders, a Weather Channel reporter. The Air Force Weather Public Affairs office coordinated more than 40 media interview during the first two weeks of Operation IRAQI FREEDOM.

Photo by Jodie Grigsby



Clearly, weather became a major driving factor that would affect important missions. High temperatures and sand storms can have an impact on operations and affect equipment performance. The media turned to Air Force Weather to find out how weather meteorologist, climatologist and technicians kept military forces prepared.

"Air Force Weather members are proud of what they do, and that was apparent to our office with the support we received when looking for weather members to be interviewed," said Paige Hughes, director of Public Affairs for Air Force Weather Agency.

Key members of Air Force Weather responded to more than 50 media events during the weeks leading up to the war and as the campaign began. As a result, there were more than 60 print and broadcast segments used to document Air Force Weather's role in current operations.

AFWA PA prepared the interviewers with potential questions, key responses, media guidance and training. Once the cameras were rolling and the microphones were turned on, the weather professionals provided the insight on weather operations during war such as analyzing dust storms, the climatology for Iraq and how that information is communicated to the decision makers.

With high profile media queries coming in from USA Today, The Weather Channel, National Geographic, New York Times, NBC Nightly News with Tom Brokaw, CNN, Time Magazine, National Public Radio, and Federal Computer Weekly, the public affairs staff kept busy ensuring a consistent message was delivered to the public.

"The work done by Air Force Weather is second to none, and we ensured that was communicated to the media," said Hughes. AFWA PA worked in concert with other PA offices supporting 28th Operational Weather Squadron and forward deployed weather members to keep the message constant.

Besides boosting public support, the multitude of stories about Air Force Weather members also fed the increase in hits to the Air Force Weather public website. In March, the website had more than 300,000 hits and 40Gbytes downloaded.

"The men and women of Air Force Weather should stand tall. They're significant contributors to the success of Operation IRAQI FREEDOM," said Hughes, "and if you don't believe me, you can read it in the paper." ✨

Editorial – AFN builds Iraq show

Tech. Sgt. Darrin Hughes
AFN Weather Center

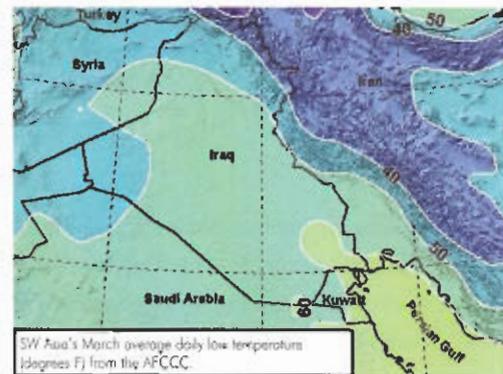
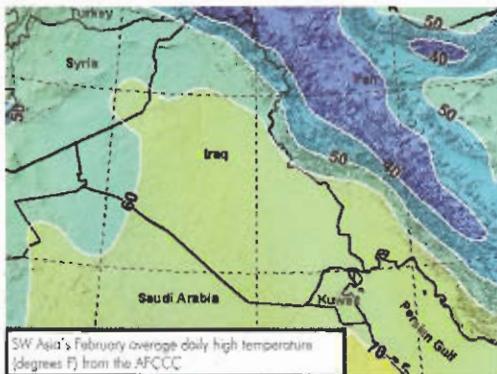
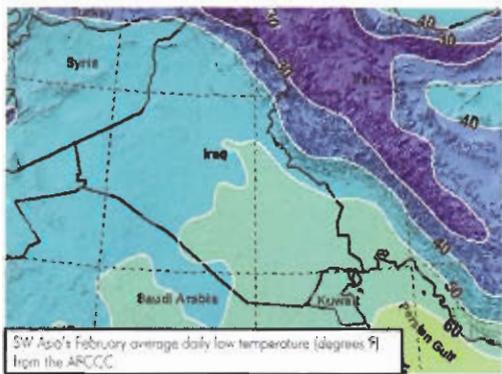
Just before Operation IRAQI FREEDOM kicked off, I, like many Americans, was glued to my TV. As media coverage of the war progressed I noticed that all of the major networks and even local TV news did segments on weather in the Middle East. I thought if there's such a huge interest in weather for the war here in the states, the people overseas who watch AFN would probably like to see it too.

The idea of the AFN Weather Center doing an Operation IRAQI FREEDOM Weather Update was pitched up our local chain of command and we were directed to make a demo version of the show to send up to AFN.

As we were making the demo, AFN sent a request down the chain asking if we had the resources to support an OIF Weather Update. They were pleasantly surprised to have a demo in their hands within hours of the initial request and even more pleased to have the first airing of an OIF Weather Update on the air within 48 hours of the request.

The reason the AFN Weather Center is able to provide top-notch support with a quick turn around time is because of the quality support found throughout all of AFW. We use Horizontal Weather Depictions from the 28th Operational Weather Squadron and 5-day forecasts from the USAFE OWS in addition to resources throughout AFWA.

While our contribution to OIF was a small one, we are proud to be a part of the major contribution AFW made to the operation. ✨



Weather Warriors Behind the Scenes

By Melody Higdon
Air Force Combat Climatology Center

Asheville, a small gem of a city in the mountains of western North Carolina, is home to a little-known weather unit, the Air Force Combat Climatology Center. AFCCC has had a big impact on the Operation IRAQI FREEDOM military campaign. Triple C, as unit members call it, played an integral role in preparing American and Allied forces for battle. Leading up to the war with Iraq, AFCCC contributed a virtual mountain of climate information on Southwest Asia, which helped planners lay out the ground rules for conflict.

"We're involved in planning for battle from the earliest stages of weapon design right up to the moment of engagement," said Col. David Urbanski, AFCCC commander. "We provide environmental tools and services for world-wide military operations and for the national intelligence community as well."

The Center provides information that lets customers factor in weather effects on everything from weapons and uniforms to protective gear and vehicles. AFCCC products are applied to force bed-down, weapons and target planning and airlift management, among other things. Climatology is an important part

of planning for all phases of any military operation. Strategic, tactical and logistical planners use climate information to help minimize the environmental difficulties encountered in the field. This is especially crucial to Special Operations folks, who often go to remote locations. AFCCC climate data offers them a "leg up" they need to succeed.

AFCCC is split into two divisions – operations and computer systems. Both divisions have a mix of weather people and computer programmers, and they work together to build the thousands of products our customers require. In the build-up toward the Iraqi conflict, this synergy became critical as demands for information went from a steady stream to a raging flood. Together, the Operations and Computer Systems Divisions handled it all with style.

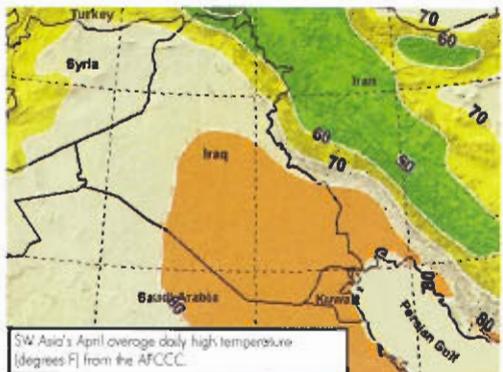
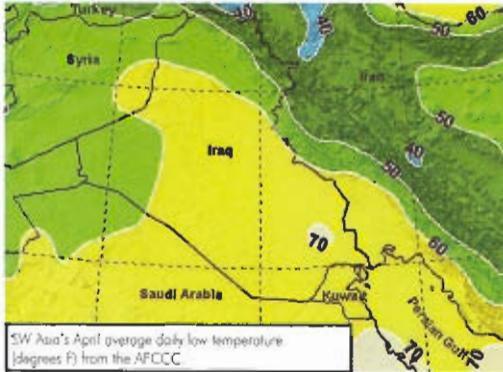
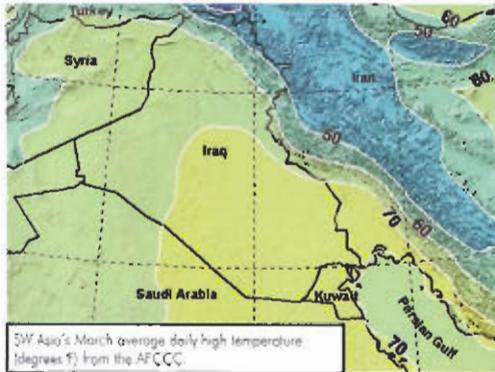
The Operations Division covers a lot of ground. Its branches gather, archive and manipulate data sent in from around the world. "The observations we get from the field are extremely important to us," Maj. Karl Pfeiffer, assistant director of operations reported. "They are the starting point for everything we do. Without the people in the field making

sure the data gets to us, we would be dead in the water."

AFCCC manages more than 26 terabytes of climate data from around the world and, with a sophisticated array of computers, can process this data in a myriad of ways to develop products from wind roses and graphs to verification of locally developed rules of thumb. This capability allows AFCCC to build products on demand with some turn-around times as short as a few minutes.

The process begins in Current Operations, the unit clearinghouse for requests. This team sorts tasks by urgency and importance and then sends them to the appropriate Operations section to handle. They also serve as an information source, researching current products. If there is something already done that could satisfy the request, they tell the customer where to find it. This often saves time for the customer and man-hours for the branches.

The Standard Climatology Products section provides data in both customer-defined formats and in standardized formats that fill common requirements. Analysts use a range of "canned" software programs to provide Surface Observation



Climatology products generated by the Air Force Combat Climatology Center depicting the average daily high and low temperatures in Southwest Asia.

Climatic Summaries, Wind Stratified Conditional Climatologies, Engineering Weather Data and a host of other products to customers, often with very short suspenses. They also try to anticipate future customer needs and pre-load products onto the unit web site to provide a self-service one-stop shop for most needs.

The Tailored Products Section handles highly complex requests for unique products. Customers get the exact information needed just by requesting it. Everything from the simplest one or two parameter products, to the most complex - those with numerous parameters that have to be integrated to produce a coherent result. The members of this section does not just use in-house databases; they also tap outside sources such as National Climatic Data Center and the National Geophysical Data Center. This means they must adapt data from outside sources to get it into the system and apply it to a product.

The Standard Climatology Products and the Tailored Products teams turned out numerous products in support of OIF. Among these products were 326 Airfield Reliability Summaries, 194 Weather Effects Summaries, 30 Rule of Thumb Verifications, and hundreds of other products such as wind roses, wind stratified conditional climatologies, and Surface Extracts and Summaries.

The Climate Analysis team does not do nearly the "number crunching" other sections do. Using written and numerical data sources, this group turns out

narrative climate studies for single points, small areas or countries, and large regions. They also write about phenomena such as dust, sand and heat in articles. This section gathers information and synthesizes it into coherent descriptions of how the climate operates. For Operation IRAQI FREEDOM, they wrote 21 studies in the time it usually takes them to complete less than half that many. They also became the AFCCC "Iraqi climate expert" for the many news media requests. They made posters, wrote articles and background papers, and gave newspaper, radio and television interviews. Another part of their task is technical publication. They edit, format and publish technical reports that are disseminated into the field. The information in these publications is invaluable to training and forecasting.

On the classified side, the National Intelligence Support team is unique in the DoD. It integrates multiple atmospheric parameters to reconstruct vertical atmospheric profiles for any given place and time. Exploiting the Atmospheric Slant Path Analysis Model, the team delivered more than 2,000 OIF-related point analyses for the intelligence and war-planning community. They included climatic evaluations of the potential threat posed by weapons of mass destruction to allies and coalition forces in Southwest Asia. The Pentagon used this information for briefing the President and his senior policy makers.

The Climatology Data Branch gathers, manages and archives the data

that forms the basis of most AFCCC products. The Climatology Development Team develops and implements new programs and techniques that allow AFCCC to continually expand its support capability. The Climatic Modeling Team uses Advanced Climate Modeling and Environmental Simulation and Geographic Information System to show weather probabilities for places where little or no data exists. These products are often the only information available to warfighters. The Modeling and Simulation team interfaces with DoD agencies to integrate weather information into war-gaming scenarios and simulations.

All this would be impossible without the Computer Systems Division. This group does more than keep computer hardware working, a feat in itself. It designs and maintains software and databases, implements equipment and software purchases and keeps the internal and external networks running. Programmers also manage "vintage" software, programs designed multiple "generations" ago for tasks still in operation today. They upgrade and update the old programs without changing the final products they were written to support and allow them to operate in current systems.

AFCCC does not operate on the front lines of any conflict but, by providing climate information to war planners across the military spectrum and beyond, it contributes significantly to the success and survivability of those who do. ♪

DTA predicts dust storms during OIF

By Evan Kuchera
AFWA Technology Exploitation Branch

In the first days of the Iraqi conflict, severe dust storms significantly impacted military operations. Fortunately for coalition forces, weather forecasters had state-of-the-art dust forecasting technology at their fingertips, enabling them to anticipate military disruptions due to dust storms days in advance.

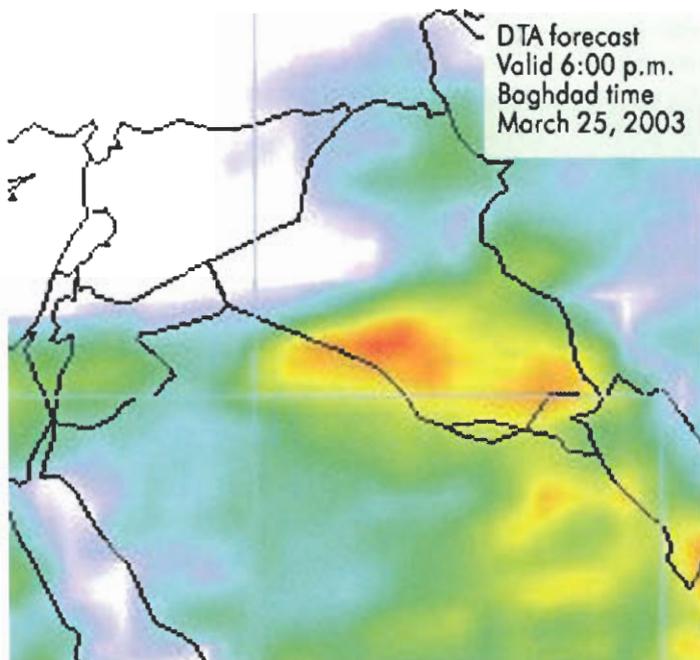
This new technology, the Dust Transport Application, is a specially modified version of the Community Aerosol Research Model from Ames/NASA, which is commonly referred to as CARMA-Dust. DTA is a version of CARMA-Dust, modified by Johns Hopkins University to incorporate the Air Force Weather Agency's Mesoscale Model 5 parameters. AFWA implemented DTA within the Joint Air Force and Army Weather Information Network Feb. 26, 2003, just prior to the initiation of Operation IRAQI FREEDOM.

DTA simulates the processes of dust transport, which

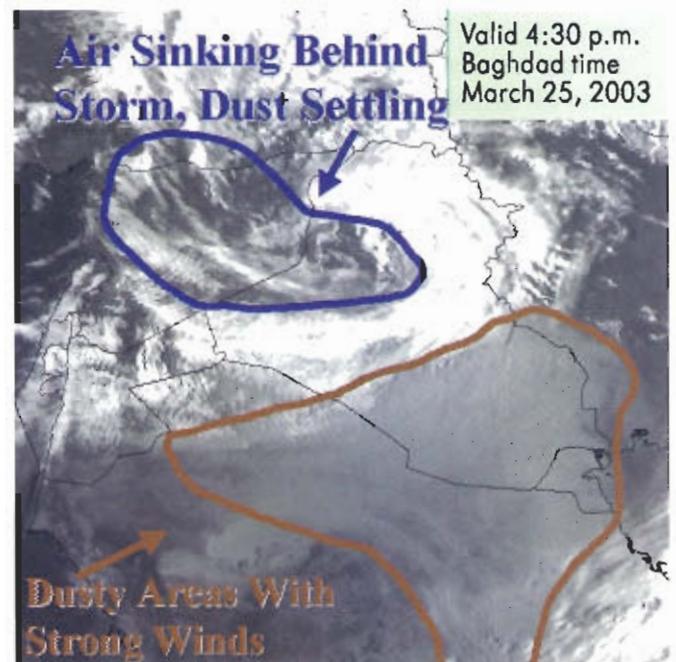
involves dust being lifted off of the ground by strong winds, advected or blown to different areas, and finally being brought back to the ground either by settling over time or by rain scouring it out of the atmosphere. DTA accomplishes all of these processes by ingesting wind speed and direction, precipitation, terrain, and stability parameters from the AFWA's MM5.

The DTA also uses a dust source region database encompassing the location, amount, and type of dust available for lifting. Extensive verification of DTA performance in Africa and Southwest Asia indicated the DTA is accurate in dust forecasts, with a 55-70 percent probability of detection rate and only a 10-25 percent false alarm rate, while having a low degradation of skill for forecasts more than two days out.

DTA starts by calculating the dust flux from the surface into the atmosphere. The amount of dust lifted into the atmosphere



The DTA dated March 25, 1800 local time in Iraq, forecasted high dust concentrations (indicated by the oranges and reds) in Southern Iraq, Northern Saudi Arabia, and Kuwait, while forecasting no dust in Western Iraq and Syria.



Satellite image from 1630 local time outlines in brown where strong winds created dusty areas, which matches with the DTA forecast. The blue outlined area behind the storm system shows the air is sinking and dust is not present, which also verifies the DTA product.

and the height it reaches depends on soil particle type and size, soil moisture, atmospheric stability, and wind strength. Soil moisture is a fixed climatological value unless the MM5 indicates precipitation has recently fallen. DTA then transports the dust according to the MM5 winds and stability, with some dust falling out due to gravity or precipitation as it travels, and more dust being picked up if the soil type and soil conditions are favorable. When the winds diminish and/or the air near the surface becomes more stable, the dust settles back to the ground.

The DTA forecast product displays an image with “warmer” colors indicating high dust concentrations – red being most severe, orange and yellow also indicate high dust. The three-day DTA forecast for March 25 at 1800 local time in Iraq showed

high dust concentrations in Southern Iraq, Northern Saudi Arabia, and Kuwait, while forecasting no dust in Western Iraq and Syria. The satellite image from 1630 local time outlines in brown where strong winds created dusty areas, which matches well with the DTA three-day forecast. Dust storms may also be occurring under the clouds near the area outlined in brown, though without observations, we cannot confirm this. The blue outlined area behind the storm system shows where air is sinking and dust is not present, which also verifies well with the DTA product.

Coalition forecasters, using this model along with other AFWA data and tools, can accurately anticipate where significant dust storms are going to occur, assisting our troops in battle planning. ♪

AFWA increases OIF data flow

By Lt.Col. Daniel Bates
AFWA Communications and
Information Directorate

The success of Operation IRAQI FREEDOM, in large part, can be attributed to the vision of our national leadership, the dedication of those who serve in our nation’s defense (military, civilian and contractors) and the painstaking, military planning efforts at all levels. As you watched OIF unfold on your television – tanks rolling across the desert – aircraft dropping bombs – ships/submarines launching cruise missiles – did you stop and think about the planning that was involved? These actions didn’t happen by accident. They were planned-out ahead of time and made available when needed.

The efficient and successful processing and exchange of information, both unclassified and classified, was paramount to the military

planning for OIF. An important, but less obvious part of our success in OIF was an effort planned and led by the Air Force Weather Agency’s Communications and Information Directorate. This effort, called the TACLANE project, increased the secure communications speed and data flow from AFWA to the AOR by a factor of more than 20.

By replacing AFWA’s aging, slow (4.2mb/s) network encryption device with a higher speed (100mb/s) encryption device called a TACLANE (KG-175), it is now possible to send several terabytes (one million megabytes) of critical, perishable weather information to the war fighters daily. This allowed for maximum environmental exploitation, which supports all aspects of the Find, Fix, Track, Target, Engage, Assess (F2T2EA) kill chain – we’re talking “bombs on target.”

The TACLANE project was originally scheduled for completion in September 2003 as part of an Air Force program called the Theater Battle

Management Core Systems. Early this year, as war with Iraq became eminent, project managers in AFWA’s Mission Systems Division realized that we couldn’t wait until September for this enhancement – we needed TACLANE immediately. The TACLANE project leader, Staff Sgt. Brian Tulaba, was given the task to “make it happen,” and he did. His team, made up of members from across AFWA and the 55th Wing at Offutt AFB, was able to accomplish all required efforts 8-months ahead of schedule and managed to save more than \$35,000 in the process.

Thanks to the thorough planning and skillful execution of the AFWA/55th Wing team, the war fighters at the pointed end of the spear received the classified weather data when and where they needed it with no delays. While you didn’t see them on TV, AFWA’s “Weather Warriors” are very proud of their contributions to OIF – one of which was TACLANE. ♪

Views from Above



Oil fires and resulting smoke plumes in and around Baghdad as seen 31 March, 2003, from NASA's Moderate Resolution Imaging Spectroradiometer satellite. The Air Force Weather Agency's Meteorological Satellite Applications Branch analysts use images like these to determine everything from visibility to snow depths.

By Master Sgt. Miles Brown
AFWA Public Affairs

Watching the battlefield from miles above the Earth's surface with the resolution to identify areas of smoke from a few oil-well fires would have only been a dream for military commanders in WWII. Today, the satellite imagery and analyses are used by DoD decision makers at all levels, everyday, in support of Operation IRAQI FREEDOM.

The Air Force Weather Agency's Meteorological Satellite Applications Branch provides expert satellite analysis in support of OIF. Even before the fighting began, they gathered and

analyzed dozens of satellite images identifying areas of smoke, dust, and low visibility.

"Our branch started focusing in on the Iraq region several months before the start of hostilities of OIF," said Master Sgt. John Kramer, METSAT Applications Branch superintendent. The branch started with about 30 images daily available to military commanders and Combat Weather Teams in the theater.

"Our customers were so impressed with the products we were supplying, they asked for more and more. We are

constantly tailoring our images to meet our customers needs," added Kramer.

During the height of operations in Iraq, the METSAT Branch generated a "First Look" at prevailing weather conditions, every three hours. Additionally, they produced images for areas of reduced visibility that might hinder air or ground operations. These images were analyzed and posted to the Joint Air Force and Army Weather Information Network in less than an hour of initial detection.

On a daily basis, the METSAT branch

also provided regional satellite analyses identifying active oil fires and the resulting smoke plumes in Southern, Central, and Northern Iraq.

"We used the high resolution DMSP products to locate the fires and created a presentation which pinpointed all active and inactive hot spots and their relative position to the oil fields and major cities," said Capt. Michael Darwin, METSAT satellite analyst.

"These products were generated every day during OIF and provided to a wide variety of customers," added Darwin.

Some of METSAT's regular customers include the Army Corps of Engineers, the Pentagon, Special Operations Forces forecasters, and the intelligence community.

During OIF, the satellite analysts at AFWA also worked with the Air Resources Laboratory at Camp Springs, Md., to load data from active oil fires into a smoke dispersion model.

"The dispersion model made it possible to identify high concentrations of harmful gases on the ground as a result of these oil fires," said Darwin.

The METSAT technicians are not limited to using only satellite data. They use every possible source of weather data to build their products. These include DMSP, NASA's MODIS high resolution satellite imagery, multiple polar and geostationary weather satellite imagery, model data, and ground observations.

With all these resources at their fingertips, the METSAT Applications Branch is constantly tailoring their images and analyses to meet the needs of their DoD customers, no matter where the battles are waged – any place, any time! ✧

Using Space Weather to the FULLEST

By Capt. Herbert Keyser
AFWA Space Weather Operations Center

Space is the ultimate high ground when fighting a war, and to exploit space to its fullest, HQ AFWA's Space Weather Operations Center provides extensive operational inputs to Operation IRAQI FREEDOM warfighters. Space weather touches all aspects of today's command and control mission – from HF communications on the ground, to satellite communications, to navigation – and the SpaceWOC provides commanders with the necessary tools to mitigate the effects of space weather.

OIF forces used the entire range of space weather products during the build-up and execution of OIF. In addition to the normal suite of Single-Frequency GPS Error Maps, HF Illumination Maps, and UHF SATCOM Scintillation Maps, SpaceWOC generated more than 200 daily products specific to OIF. Some were brand-new products designed to meet the emerging space weather needs of our Special Operations Forces. Most were the point-to-point forecasts for HF and UHF SATCOM communications. These forecasts let planners across the DoD decide the best frequencies to use for HF communications, and mitigate space weather degradation on SATCOM links. User feedback clearly shows these were vital to operations.

The space weather team at AFWA, which includes individuals from plans, requirements, communications, and contractors, in addition to the forecasters at the SpaceWOC, also created several OIF-specific product suites for modeled space weather products. Warfighters requested tailored HF Illumination Maps, allowing them to visualize not only their HF communication capabilities, but also that of the enemy.

The Weather career field's contributions to OIF highlight AFW's tradition of providing key operational inputs to decision-makers. The addition of space weather into Air Force Weather's arsenal of battlespace situational awareness tools catapulted this non-traditional capability into mainstream operations. ✧

Keesler training give AFW techs right start

By Susan Griggs
81st Training Wing Public Affairs

When sandstorms swirl in Iraq, the expertise of combat weather team members trained by Keesler's 335th Training Squadron can make the difference between success and failure of a battle plan.

"Wherever they're flying, we're there - whenever there's operational planning, we're there," said Senior Master Sgt. Richard Conklin, superintendent of the weather training flight.

"Many people trained here have been in harm's way directly supporting all echelons of the war," explained Maj. Christopher Cox, weather training flight commander. "I daresay there's not an instructor in our building that doesn't know someone right now in theater."

"We have a relatively small career field - about 15 percent of its current enlisted force is in our schoolhouse at any one time," Conklin pointed out. "We know people serving in Iraq because we all know each other."

Keesler's combat weather team operations/officer course began about 18 months ago to give enlisted weather forecasters and weather officers the skills that are crucial to support combat weather team operations worldwide. Annually, 210 enlisted members and 20 officers go through the 12-week course.

Enlisted students that come through

the course have already passed through Keesler's 20-week weather apprentice course while officer students have previously been through the 12-week weather officer course. The same students typically return to the weather schoolhouse for the combat weather team operations course after their first assignment, which is usually an operational weather squadron aligned with one of the numbered air forces. At the operational weather squadron, they receive on-the-job training under the mentorship of a senior-level forecaster.

Keesler's combat weather team course covers a variety of topics, including weather observations and laboratories, weather impacts on military operations, tactical communications and tactical operations.

Students learn to make mission-execution forecasts and provide expertise about the direct and indirect impacts that weather will have on the operation of various aircraft and equipment in the field.

"Our weather courses reach students how to provide resource protection forecasts to protect personnel and safeguard valuable aircraft and equipment resources," Cox commented.

"Our students have a direct impact on current operations," the major continued. "Through our courses, we train the folks on the ground in theater to provide timely and accurate weather support for

all facets of the command, especially in the operations centers. When 'go/no go' decisions are made, you can be sure that someone is there briefing weather.

"The more observations we have from around a battlefield, the more precise we can be in exploiting the weather for battle," Cox added.

Similar weather conditions can have widely varied impacts in different field environments, according to Cox. Weather conditions can affect everything from flight plans to refueling to selecting the right weapon for a particular task.

"A 30-mph wind has a much different impact on an aviation brigade in Iraq compared to one in Kentucky," the major noted. "In Iraq, the dust is like talc - visibility goes down dramatically.

"There are different weather thresholds for different types of equipment," he went on. "Crosswind, ceiling and visibility criteria for a C-5 are much different than for an Apache helicopter."

As another example, Conklin mentioned KC-10 air refueling missions that can be halted or the refueling area moved due to turbulence, adversely affecting fighter missions.

"If refueling is cancelled, fighters will need to return to an airfield, cutting their missions short," he pointed out. "If moved, the fighters will be taken from their roles in air and ground support for longer periods."

The major weapons systems used by the Air Force today rely on four major types of guidance systems, according to Conklin - infrared, visible, laser and global positioning satellite. Due to the sensitivity of the sensors the weapons employ, weather plays a crucial role in putting the munitions on target.

"Weather even has the ability to provide inputs to the mission commander during the planning stages on what the best time and angle of attack

will be based on each individual target and its sensor," Conklin noted.

Infrared-guided systems depend entirely on thermal contrast from the target, for example.

"Before battle, we need to be able to provide pilots with information on the thermal contrast of the targets to support a lock-on for an effective bomb run," Conklin emphasized.

"Weather effects include thermal clutter from the battlefield, thermal crossover times during nighttime cooling, thermal capacity of the object, high winds and heavy rain."

The Joint Direct Attack Munition, or JDAM, the latest addition to the arsenal, is guided using the GPS system.

"JDAM weather impacts come from outer space," Conklin said.

"Solar flares causing scintillation of the satellites will cause errors to be sent to the munitions to cause them to wander off-target. Weather forecasters provide accurate and timely information on space weather events to minimize this possibility."

In the field, forecasters use several types of tactical mobile weather equipment to take surface weather observations. Deployed weather troops use mobile observing system kits that contain devices for determining pressure values used for aviation and other facets of warfighting.

The kits include instruments to determine wind direction and speed, important for aviation, chemical

weapons protection and targeting. Other devices measure temperature, relative humidity, dew point, and liquid and frozen precipitation.

"The amount of precipitation helps in river flood stage forecasting and state of the ground for traffic reasons," Cox commented.

Surface observations are taken hourly during good weather, and as required during inclement weather to assure aviation safety. These observations are transmitted to the Air Force Weather Agency, where it's fed into computer models to produce weather charts used for forecasting and climate studies.

Cox said that most installations have a combat weather team, usually a small

contingent of five to 12 people who support the commander's mission. The team deploys just like a maintenance or intelligence team in the "hip pocket" of the customer.

About 30 percent of Air Force weather specialists directly support Army customers.

"When we're with the Army, we do things the Army way to support the mission," Conklin remarked.

Keesler's combat weather team operations course is only one of the many courses available to weather personnel. Other courses provide specialized skills in tropical analyses and prediction, radar, and space environment forecasting. ♪

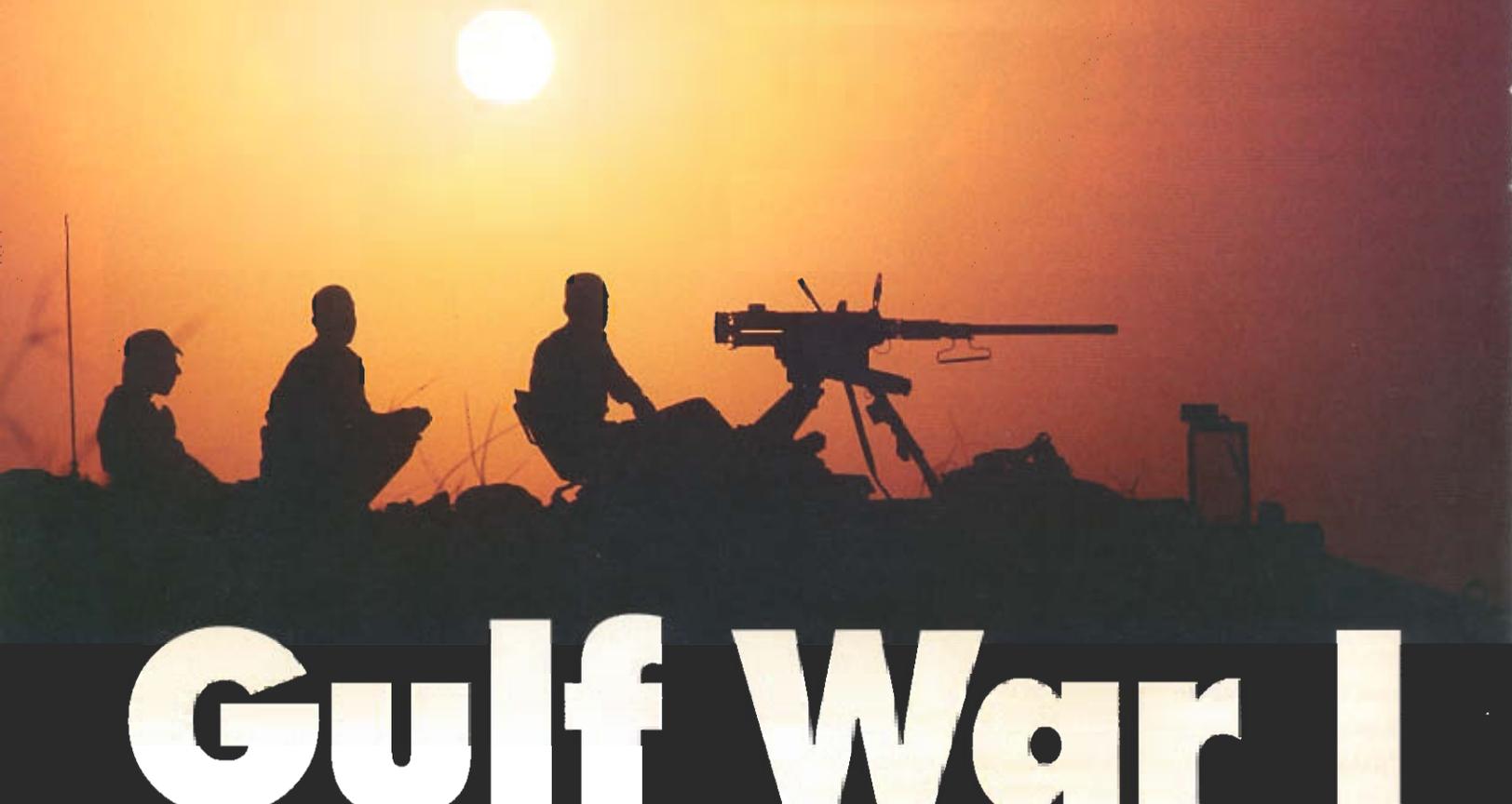


Photo by Kimberly Grove

Tech. Sgt. Doug Dibble, instructor, familiarizes Senior Airman Jackie Dalzell with one of the instruments in a mobile observing system kit on the observation deck of Keesler's weather school.

A look back:

Big Role, Major Weather



Gulf War I

By Al Moyers
Air Force Weather Historian

In his recently published book on Operation DESERT STORM, the first Gulf War, *On Target: Organizing and Executing the Strategic Air Campaign Against Iraq*, Air Force historian Richard Davis concludes that "throughout air power history weather has prevented or spoiled more combat missions than any other single factor." Undoubtedly, most involved in the planning and execution of an air campaign would agree that weather was and remains one of the major, and the most uncontrollable, factors in the conduct of combat operations.

The Air Force Chief of Staff during Operation DESERT STORM, Gen. Merrill McPeak, perhaps best summarized the impact of weather on the Gulf War air campaign at a post-war news briefing. General McPeak said, "There were several audibles called. Things didn't proceed precisely according to our pre-canned script."

General McPeak explained, "It was certainly the poorest

weather in 14 years in the Baghdad and Kuwait areas" and "as a consequence we lost a lot of targets." He clarified for reporters that "during the first 10 days of the air war, the weather was so bad that 40 percent of the primary targets were obscured."

Many of the war's planners might well have been lulled into a false sense of easiness given the prevailing favorable weather patterns during the buildup to the war. Late in December 1990, Brig. Gen. Buster Glosson, director of campaign plans for U.S. Central Command Air Forces, briefed Secretary of Defense Richard Cheney on the planned air operations for DESERT STORM.

Based upon the available climatology, General Glosson stated that the weather would be conducive for the conduct of an air campaign in January and February 1991. He reported that ceilings of 10,000 feet or greater with visibility of five or more miles should occur over Baghdad more than 60 percent of

the time in January and nearly 70 percent of the time in February.

However, as General McPeak explained to reporters after the war, such was not the case. Poor flying conditions prevailed throughout the first Gulf War. In sum, the ceilings were under 10,000 feet about 33 percent of the time.

For example, the master attack plan for the third day of the air campaign called for three large-package F-16 strikes against targets both in downtown Baghdad and against the nearby Baghdad Nuclear Research Facility. These attacks were canceled because of poor weather. On February 17, 1991, possibly the worst weather day in the Kuwaiti Theater of Operations, 300 sorties were cancelled. According to statistics compiled by the 37th Tactical Fighter Wing, which operated the F-117 during the first Gulf War, one-quarter of all the F-117 primary strikes rasked were aborred, principally because of bad weather.

The ground campaign opened on February 24 in "dismal weather" according to Air Force historian Perry Jamieson in his book *Lucrative Targets: The U.S. Air Force in the Kuwaiti Theater of Operations*. There was

cloud cover, gusty winds, and rain. Similar to the opening of the air campaign, bad weather, intensified by the soot-filled skies created from the burning oil wells, continued through the first three days of the ground war.

However, during the ground campaign many aircrews operated through the weather. Lt. Gen. Charles Horner, the Joint Forces Air Component Commander, told his staff, "The weather considerations that were valid last week are no longer valid. There's people's lives depending on our ability to help them, if help is required [then it is for us to be] over the battlefield, it's time to go to work."

Pilots flew under the low ceilings and in some cases operated in the rain. Maj. Gen. Tom Olsen, deputy commander for U.S. Central Command Air Forces, noted, "We lost airplanes under there doing that. But our guys went down under and did it anyway. So, weather is something you learn to take care of. That's part of your job." It was the job of Air Force Weather to provide responsive, accurate weather support that

provided the decisive battlefield edge.

Fifty-six Air Force Weather teams, approximately 500 people, effectively provided support to Operation DESERT STORM. Weather support did indeed prove to be a force multiplier. Missions were often redirected to less cloudy areas. In spite of the poorer-than-normal weather, the accuracy of weather forecasts for target areas was generally above 75 percent for periods out to 72 hours. The ability to deliver high-quality forecasts allowed mission planners and executers to minimize the impact of the poor weather.

At a briefing following Operation DESERT STORM, General McPeak released statistics showing that "smart" bombs—precision guided munitions—represented only 8.8 percent of the ordnance dropped by U.S. forces during the first Gulf War. The remaining 91.2 percent of the 84,200 tons of bombs dropped by the United States during the conflict were "dumb" bombs.

The state of the art of Air Force weaponry has changed dramatically in the decade since the first Gulf War. "The problem of hitting a fixed location target is solved," retired General McPeak stated this past October. "We can do it in any weather, we can do it at night and with relatively inexpensive munitions."

Yet, the history of warfare continues to be narrated with examples of superior military technology and strength being stymied by the vagaries of weather. For example, in 1999 the 78-day Operation ALLIED FORCE air campaign was consistently hampered by bad weather during the first two months. At a Pentagon briefing late in May 1999, Maj. Gen. Chuck Wald, vice director for Strategic Plans and Policy for the Joint Staff, reported that there were only nine days out of the first 61 that operations were not influenced by poor weather.

U.S. Army Gen. Wesley Clark, the supreme allied commander of North Atlantic Treaty Organization forces during Operation ALLIED FORCE, noted that poor weather caused nearly 50 percent of the planned strike sorties during the opening weeks of Balkan air campaign to be cancelled or aborted.

Knowledge of a weapon system's environmental sensitivities is as important in the employment of 21st century weapon systems as it ever has been – perhaps more so. The opening of combat in the current Gulf War, Operation IRAQI FREEDOM, has once again been influenced by rain and dust storms. For 65 years Air Force Weather professionals have been the vital link in ensuring that combat leaders anticipate and exploit the weather for battle. ♪

