



Coyote Crier



Tools of the Trade: How Incident Meteorologists Provide Forecasts In a Land Far, Far Away

By Steven M. Reedy

Fire Weather Program Leader and Incident Meteorologist



"The system that is currently in use, using pibals and a theodolite, is slowly being phased out. This is nothing more complicated than filling a balloon a little bit bigger than any balloon you'll find at a birthday party and tracking it through the sky with a device called a theodolite, which is a surveyor's tool...a small scale telescope that measures azimuth (angle from the ground into the sky) and direction (north, south, east, west...measured in degrees)."

When wildfires potentially threaten life, structures or other interests, the Incident Command Teams responsible for the fire will often feel the need for real time weather data in order to help plan their containment strategy. There are many levels that this can be performed at, the first being spot forecasts from the local Weather Forecast Office (WFO), calling the local WFO for a briefing from the fire weather forecaster, or, should the fire be active enough, the Incident Commander can request an Incident Meteorologist (IMET). But, what happens to a meteorologist's knowledge and ability to collect the data he or she needs when they are removed from their home office? This article will explain the tools IMETs use in the field which allows them to become, essentially, their own miniature WFO. First and foremost is what is called the All-Hazards Meteorological Response System, or AMRS. While the heart of AMRS is nothing more than a laptop with the ability to connect wirelessly to the internet (which, thanks to the increasing size of wireless networks, is often times the only internet connection an IMET needs!), it is the software on this laptop that proves invaluable. On this laptop, there is software which allows the IMET to collect and interface with data almost the exact way he or she would in their home office. This includes, but is not limited to model data, radar data, satellite imagery, upper air soundings and so on. In fact, even at a remote location, an IMET has at least 85% to 90% of the data they're accustomed to getting in the WFO...using the exact same interface as they did as when they were back at the WFO! Now, should a wireless connection to the internet not be available, the IMET isn't dead in the water just yet. Often times, many Incident Command Teams have either their own internet support that the IMET can plug into. The worst case scenario involves

another piece of AMRS, the BGAN satellite dish. This isn't like the satellite dishes you're used to for satellite television...even though such dishes used to be part of AMRS. In fact, prior to the BGAN, IMETs went through yearly training on dishes so similar to those used for satellite television that they had the same certification as technicians from such providers as DirecTV and Dish Network! BGAN is far less complicated...and MUCH smaller! The dish itself is only the size of a laptop computer and there is minimal adjusting. All the IMET has to do is point it south-ish, and, while it is a slow connection, it works nearly anywhere. Given the varied locations used for fire Incident Command Posts (ICPs), that ability to function anywhere is a great advantage, which is why the BGAN system is also used by the US Military. The final part of AMRS is what is called a Kestrel. Some of you, as weather spotters, may be familiar with these devices or even own one. For those of you that don't, these are hand-held devices that allow one to measure the current weather conditions wherever the user is standing, collecting temperature, dewpoint, relative humidity and wind speed. After all, knowing what is happening now is vital to trying to predict what's going to happen in the near future! While AMRS is what the IMET is first sent out with, sometimes it's not enough. As wildfires can and often do happen at remote locations, additional remote sensing equipment may be needed to help get a better picture of what's happening with the weather. While a Kestrel may be fine for taking weather conditions at ICP, sometimes ICP may be located miles away from the fire itself! To get what conditions are on the fireline, an IMET can order a Fire RAWS (Remote Automated Weather System). This RAWS station provides observations very similar to the ASOS stations used mainly at air-

ports that provide WFOs with weather observations. The observations from this RAWS station can be pulled up from the internet or called directly on the same hand-held radios that firefighters use for communication. This handles sites that are far away on the ground, but, as fires happen in complex terrain, an understanding of what's happening at higher elevations is also necessary. The system that is currently in use, using pibals and a theodolite, is slowly being phased out. This is nothing more complicated than filling a balloon a little bit bigger than any balloon you'll find at a birthday party and tracking it through the sky with a device called a theodolite, which is a surveyor's tool...a small scale telescope that measures azimuth (angle from the ground into the sky) and direction (north, south, east, west...measured in degrees). Reading off the azimuth and direction every minute and inputting it into AMRS, this provides a vertical wind profile, giving the IMET an idea of what the winds aloft are doing. In the near future (as they are being tested with select IMETs now), IMETs will be able to launch radiosondes very similar to those launched at WFOs, allowing for a complete profile of the atmosphere for the IMET's specific location, providing not only wind data, but temperature, dewpoint and stability information as well! So as the above shows, an IMET is not helpless when sent out into the field. The equipment they're sent out with provides them with the weather data they need to provide the real time support that Incident Commanders need to create plans to quickly contain potentially threatening wildfires. Now, if only IMETs could get hot showers and comfortable beds!

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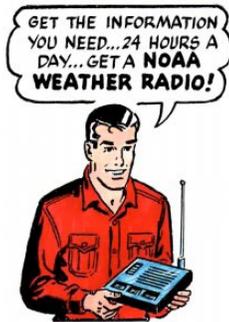
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NOAA Weather Radio

Scott A. Minnick, Meteorologist Intern



“NOAA Weather Radio is an "All Hazards" radio network, making it your single source for comprehensive weather and emergency information.”

NOAA Weather Radio All Hazards (NWR) is a nationwide network of radio stations broadcasting continuous weather information directly from the nearest National Weather Service office. NWR broadcasts official Weather Service warnings, watches, forecasts, and other hazard information 24 hours a day, 7 days a week.

NOAA Weather Radio is an "All Hazards" radio network, making it your single source for comprehensive weather and emergency information. In conjunction with Federal, State, and Local Emergency Managers and other public officials, NWR also broadcasts warning and post-event information for all types of hazards – including natural (such as earthquakes or avalanches), environmental (such as chemical releases or oil spills), and public safety (such as AMBER alerts or 911 Telephone outages).

Known as the "Voice of

NOAA's National Weather Service," NWR is provided as a public service by the National Oceanic and Atmospheric Administration (NOAA), part of the Department of Commerce. NWR includes 1000 transmitters, covering all 50 states, adjacent coastal waters, Puerto Rico, the U.S. Virgin Islands, and the U.S. Pacific Territories. NWR requires a special radio receiver or scanner capable of picking up the signal, and can be found at most retailers or online. Southern Arizona is covered by three transmitters. These transmitters are located on Mt. Lemmon, Mt. Graham, and on Crawford Hill near Nogales. Each transmitter broadcasts at ranges of 50 to 100 miles, depending on terrain and weather conditions.

During severe weather and other life-threatening emergencies, specialty built receivers will alarm on the NWR alarming of an impending hazard immediately after the hazard is issued

by the forecaster. Weather Radio Specific Area Message Encoding (SAME) is used to activate only those special receivers programmed for specific emergency conditions in a specific area, typically a county. SAME codes are normally included with your NWR, but can also be found online. The Tucson National Weather Service Office conducts weekly tests every Wednesday between 11:00 am and noon to test transmitters and for you to test your radio for proper functionality. However, tests will not be conducted if severe weather is possible.

For more information, including coverage maps, transmitter frequencies, SAME Codes, and more, please refer to the NWR webpage. (<http://www.nws.noaa.gov/nwr/>)

National Weather Service Tucson Office Staff

Meteorologist in Charge.....Glen Sampson

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Service Hydrologist.....Erin Boyle

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Meteorologist Interns.....Scott Minnick, Raymond McLeod

Observation Program Leader.....Mic Sherwood

Hydrometeorological Technician.....Hans Hanson



Monsoon Safety (Monsoon Safety Awareness Week Is June 5–10, 2011)

Although the monsoon brings welcome rains and relief from the summer heat, the thunderstorms that come with the monsoon bring their own hazards. This is the most dangerous time of year weather-wise in Arizona, so before and during the season, it is a very good idea to review these safety tips:

Lightning:

- If you hear thunder, you are close enough to a storm to be struck by lightning. Go to a safe place immediately! The safest locations are sturdy buildings and hard-topped vehicles.
- Get away from open areas, including armadas, porches, trees, convertible cars, swimming pools, and open areas.
- Plan outdoor activities to avoid being outside between mid afternoon and mid evening, especially in higher elevations where lightning is more common.
- Do not touch any wires or plumbing inside a building
- Remember that it does not have to be raining for you to be struck by lightning. Lightning can strike up to 60 miles away from the nearest rainfall!
- Bring pets indoors. Lightning and thunder are very scary for pets, and they are likely to panic or even run away to try and escape the storm.
- If someone is struck by lightning, call 911 immediately!

Flash Floods:

- Flash floods are common in Arizona. There are thousands of low water crossing and dips which flood every summer. Know where they are, and avoid them during heavy rains.
- Never ever drive into a flooded roadway. The water depth is very easy to misjudge, and the road itself may be damaged or destroyed underneath. It only takes about 1 to 2 feet of water to float most vehicles, including SUVs.
- Never drive around barricades. They are there for a reason – usually because flash flooding is about to take place, is already happening or the road is damaged by flooding and is unsafe.
- Never allow children to play near washes or storm drains after any rainfall, no matter how light. These flood easily and rapidly, and storm drains are usually so large that children can be swept away.
- Beware of distant thunderstorms, especially if they're over mountains. Flash flooding can occur many miles away from the thunderstorm as the runoff flows into the valleys and deserts.
- Do not camp overnight near streams during the monsoon. Although many of our thunderstorms occur during the afternoon and evening, some of our worst flash floods have occurred in the middle of the night.
- Hikers and mountain bikers should try to get out early in the day to avoid the dangers of not only flash flooding, but also lightning. Wherever you are hiking during the monsoon, be aware of your escape routes, follow ranger instructions, and be prepared to move to higher ground quickly.

Dust storms:

- These are an underrated killer in Arizona! Straight line winds in any thunderstorm can lift huge clouds of dust and reduce visibilities to near zero in seconds, which can quickly result in deadly, multi-vehicle accidents on roadways.
- Dust storms are more common in the early part of the monsoon, near agricultural areas, and near the Willcox Playa in Cochise County. Use caution in these areas any time thunderstorms are nearby.
- If you encounter a dust storm, pull off the road immediately. Turn off your headlights and put your vehicle in "PARK," and take your foot off the brake. Other motorists may tend to follow taillights in an attempt to get through the dust storm, and may strike your vehicle from behind.
- Dust storms usually last a few minutes, and up to an hour at most. Stay where you are until the dust storm passes.

Straight-line winds:

- Thunderstorm wind gusts in Arizona almost always exceed 40 mph. The strongest straight line wind gusts can exceed 100 mph, and can produce damage similar to a tornado! Anytime a thunderstorm approaches, no matter how weak it seems, move indoors to avoid flying debris. Winds rushing down from a thunderstorm can develop very quickly.
- When a Severe Thunderstorm Warning is in effect, it means damaging wind gusts of 60 mph or higher are likely. Move into a central interior room. Stay away from windows.
- Unanchored mobile homes are NOT safe in any severe thunderstorm, and even anchored mobile homes can be heavily damaged in winds over 80 mph. Move to a more sturdy structure.
- Stay away from trees. The vast majority of people are killed or injured in severe thunderstorms by falling trees, from flying debris, or from downed power lines.
- Never touch a downed power line, even if it appears dead. Assume that it is live. Call for help instead.
- Straight line winds can travel dozens of miles away from the thunderstorm that produced them. If the wind suddenly shifts and blows toward you from an approaching storm, while the temperature either becomes much colder or much hotter, the winds are likely to become even stronger. Move indoors!
- Before the monsoon, it is a good idea to either secure loose outdoor furniture and garbage cans, or move them indoors. These are frequently blown around in our summer thunderstorms – even the weakest ones.



"Flash floods are common in Arizona. There are thousands of low water crossing and dips which flood every summer. Know where they are, and avoid them during heavy rains."





Several New Employees at the NWS Tucson Office

Greg Mollere, Senior Forecaster and Spotter Program Leader

Within the past 10 months several of our employees have moved on to other positions, either within the National Weather Service or other government agencies. Below are short biographies along with pictures of our new hires.

Stephanie Spease, Administrative Support Assistant



I was born and raised in Ellitsburg, PA and in 1984 joined the U. S. Army. As a Transportation Coordinator, spent most of my career in Germany, 12 yrs, but was also stationed at Ft. Bragg, NC, Ft Hamilton, NY, Alexandria, and Ft. Lee, VA, and retired with 20 yrs of service. I began my civilian career working for the State of PA, Dept of Welfare, as a Case Worker, until I decided to move to Arizona and start working for the federal government. I began at the Dept of Interior, U.S. Fish & Wildlife, where I worked for 4 yrs as a Fire Program Technician and on 21 Nov 10, transferred to Dept of Commerce, National Weather Service as an Administrative Support Assistant. My family consists of two daughters, one in Maricopa and one still at home, and 2 dogs. I like the outdoors, so my favorite activities include; hiking, swimming, gardening, seeing the sites in AZ by horse, ATV and motorcycle, and cooking out with family and friends.

Keith Sapp, Electronics Technician



Originally, I am from Millen, GA, a small rural town in southeastern Georgia located about 50 miles south of Augusta, GA the site of the PGA Masters. I joined the Navy in January 1989 and retired after 20 years of military service on January 31, 2009. As a U. S. Navy Sailor, I embarked on many countries. Specifically, I deployed to the Arabian Gulf for three operations, Operations Desert Storm/Shield, Operations Southern Watch and Operations Enduring Freedom, and visited Japan, Singapore, Thailand, Hong Kong, Dubai, and Diego Garcia. As an Electronics Technician in the U. S. Navy, I primarily maintained meteorological satellite receiving systems, computer systems and the Mini-Rawin System (the Navy's version of upper air), and RADAR equipment. After retiring from the U. S. Navy, I worked for one year as a System Administrator II for a company named Bosh Global Services. I hired on with the NWS on July 5, 2010.

John (J.J.) Brost, Science and Operations Officer



I am the new Science and Operations Officer here in Tucson. I come directly from Amarillo, Texas but grew up in Arizona. My family runs a cattle ranch outside of Globe and I spent much of my childhood in Chandler. I became fascinated by the summer Monsoon thunderstorm season and knew from an early age that I wanted to learn more about weather. After college, I traveled to Eureka, California to learn how to forecast for oceans and the marine community. I then headed east to tornado alley and spent nearly seven years forecasting in the Texas and Oklahoma Panhandles.

Now I am back close to home and am very excited to be working with the outstanding staff of the National Weather Service in Tucson. While I still love forecasting the weather, I am becoming more involved in learning how weather impacts people. Specifically, I am learning why people make either a good or bad decision during significant weather events like flooding, or winter storms, or severe thunderstorms. I then want to apply this understanding to the forecast communication process so we can achieve our mission of protecting lives more effectively.

Several New Employees at the NWS Tucson Office



Chris Carney, Electronics Systems Analyst

I have been with the National Weather Service for the past nine years serving in Kansas City Missouri, Atlanta Georgia, and El Paso Texas. Prior to the National Weather Service I worked for Lockheed Martin Aerospace in their Electronic Warfare division, and also served a six year commitment in the US Army. I have been happily married for thirty years, my wife and I have four children and four grandchildren. My hobbies and passions are photography, backpacking and golf.



Ray McLeod, Meteorologist

I am the Southeast Arizona Regional CoCoRaHS co-coordinator. I recently retired from the US Air Force and am now a Meteorologist with the National Weather Service in Tucson. I received my B.S. degree in Meteorology from Florida State University in 1995 and earned my M.S. degree in Atmospheric Science from Colorado State University in 2001. My main meteorological interests are Hydrology and Fire Weather. Other interests are skiing, golf, sailing and coaching my two children in soccer and baseball.



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Spotter Training Schedule 2011

Please keep your personal information up-to-date. Do we have your correct mailing address, location, phone number and e-mail address? If not, please update us so that our database is as current as possible. The best way to update your information is by e-mail, or to call and speak with Greg Mollere. Thanks!

Greg.Mollere@noaa.gov

04/11 Mon	Safford	Graham County Admin. Bldg. 921 Thatcher Blvd. Safford, AZ 85546 6:00 PM
04/19 Tue	Tucson	Environmental and Natural Resources Building 520 N. Park Ave., Room 253 Tucson, AZ 85719 6:30 PM
04/21 Thu	Sierra Vista	Oscar Yrun Community Center 3020 East Tacoma Street Sierra Vista, AZ 85635 6:30 PM
04/29 Fri	Benson	Benson City Hall 120 W. 6th Street Benson, AZ 85602 6:00 PM
05/17 Tue	Nogales	Santa Cruz County Bldg. 2150 N. Congress Drive Nogales, AZ 85621 6:30 PM
05/31 Tue	Oro Valley	Oro Valley Town Complex 11000 N. La Canada Dr. Oro Valley, AZ 85737 Council Chambers 6:30 PM
06/04 Sat	Tucson	Environmental and Natural Resources Building 520 N. Park Ave., Room 253 Tucson, AZ 85719 2:00 PM
06/11 Sat	Oro Valley	Oro Valley Town Complex 11000 N. La Canada Dr. Oro Valley, AZ 85737 Council Chambers 2:30 PM