

Packerland Weather News



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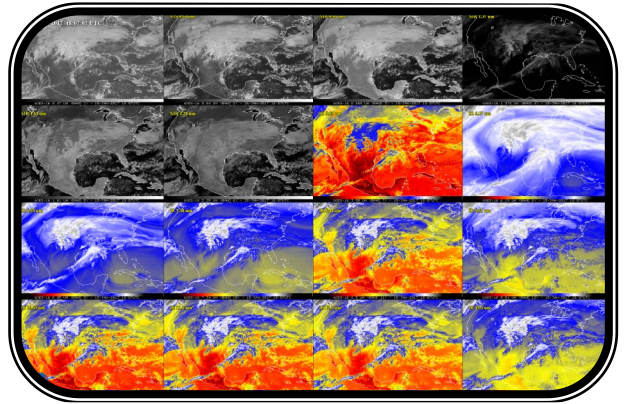
Inside this issue:

Be Prepared For Storms!	3
Storm Spotting & Safety	4
COOP Awards	5
Weather Safety For Campers	6
NWS GRB Cline Award Winners	7
New Headline For Boating Season	8
NWS GRB Radar Upgrade	9
Your Mobile Device Could Save Your Life	10
Word Search	11

GOES-16 Satellite Data Now Available in NWS Operations

By Phil Kurimski, Senior Meteorologist

GOES-16, the first of NOAA's highly advanced geostationary weather satellites, lifted off from Cape Canaveral, Florida on November 19, 2016. This new satellite will boost the nation's weather observation network and NOAA (National Oceanic and Atmospheric Administration) and NWS's (National Weather Service) prediction capabilities. GOES-16 will lead to more accurate and timely forecasts, statements, watches, and warnings.



This 16-panel image shows the continental U.S. in the two visible, four near-infrared and 10 infrared channels on the Advanced Baseline Imager (ABI).

GOES stands for Geostationary Orbiting Environmental Satellite with the 16 representing its launch order. Currently GOES-13 and GOES-15 cover the CONUS (Contiguous United States), with GOES-13 covering the eastern and GOES-15 covering the western CONUS. GOES-14 is being retained in orbit as a spare in case there is an outage. The first test images from GOES-16 were sent to NWS offices on March 1, 2017. When GOES-16 becomes operational, it will replace GOES-13.

The GOES-16 satellite has an Advanced Baseline Imager (ABI) on board, offering 16 distinct wavelength (or channel) bands (see image above), compared to five on the current GOES satellites. This gives NWS offices three times more wavelength information and four times the spatial resolution compared to the current satellites. GOES-16 will also provide images every five minutes across the CONUS, with two smaller floating sectors updating every minute depending on the areas of interest for that day. This compares to every 15 minutes with the current GOES satellites, with updates every 7.5 minutes if Rapid Scan Operations (RSO) are implemented. The images themselves will be at a much higher resolution with the visible bands as high as 0.5 km and the infrared (IR) at 2 km. The current GOES resolution is 1 km and 4 km respectively. These improvements offer NWS offices the ability to use satellite data in conjunction with Doppler radar for severe weather operations. The new data can determine where cumulus clouds are growing into thunderstorms and which thunderstorms are evolving into supercells. Figure 1 (on page 2) shows the contrast between the current operational GOES-13 and the higher resolution GOES-16 visible satellite data. The early detection of thunderstorms will also be very helpful for decision support services (DSS) to our local partners.

(story continues on page 2)



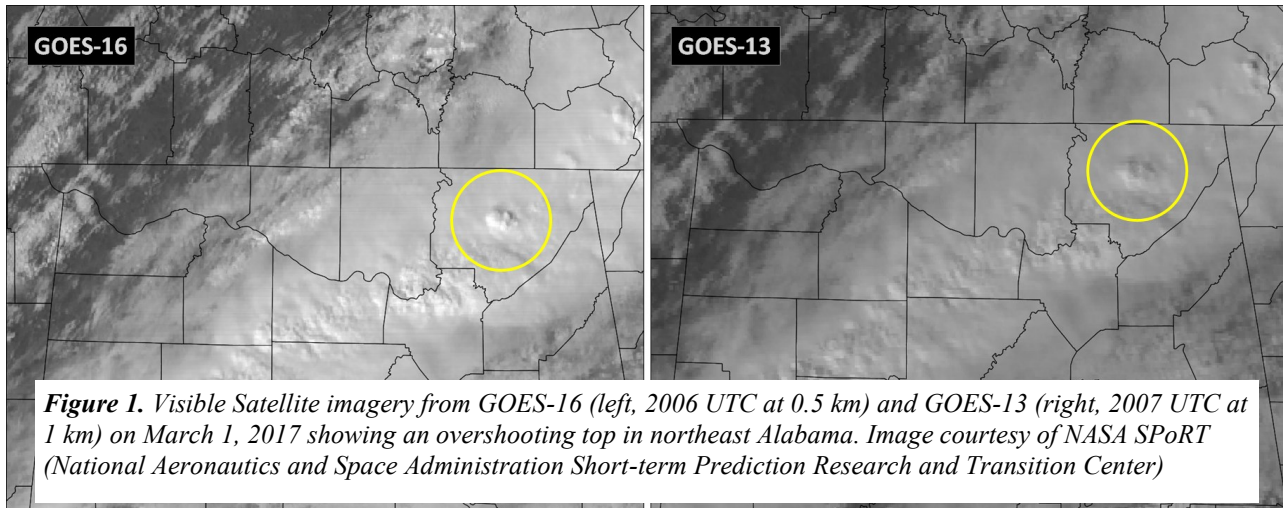


Figure 1. Visible Satellite imagery from GOES-16 (left, 2006 UTC at 0.5 km) and GOES-13 (right, 2007 UTC at 1 km) on March 1, 2017 showing an overshooting top in northeast Alabama. Image courtesy of NASA SPoRT (National Aeronautics and Space Administration Short-term Prediction Research and Transition Center)

Additional bands offered by the ABI provide a host of new applications to help forecasters detect and monitor fires and, smoke, aerosols and air quality, flooding, ice and snow cover, storm development and even vegetative health. These products can provide improved hurricane track and intensity forecasts, aviation flight route planning, warning lead time for severe storms, air quality warnings, fire detection and intensity

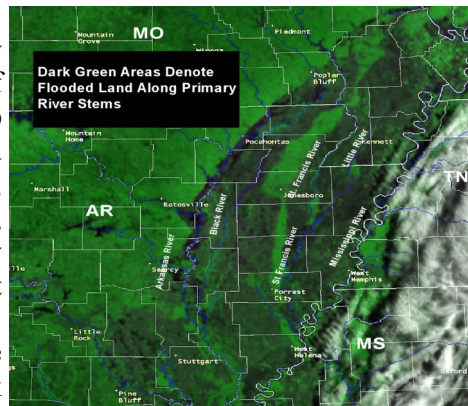


Figure 2. GOES 16 RGB composite satellite image from May 5, 2017 showing swollen rivers in northeast Arkansas. Dark green areas denote flooding land. Courtesy of NWS Memphis, Tennessee.



Figure 3. Enhanced visible GOES 16 image showing the significant West Mims, Georgia fire (solid yellow circle) with its expansive smoke plume blowing over the Atlantic Ocean east of the Florida coast.

estimation, and data for long-term climate variability studies. The additional spectral bands can be combined in different ways to enhance certain land or cloud characteristics. **Figure 2** is a combination of visible and near IR imagery used to highlight flooded land areas along several main stem Arkansas rivers. **Figure 3** shows an color-enhanced visible image highlighting a major fire and its associated smoke plume, in addition to smaller fires over the southeast United States. Another important instrument aboard GOES-16 is the Geostationary Lightning Mapper (GLM). In contrast to the ground-based National Lightning Detection Network (NLDN), the GLM observes intra-cloud flashes near the upper portion of thunderstorms (**Figure 4**). The GLM can provide earlier detection of lightning activity providing forecasters additional lead time that a storm is intensifying due to an increase in lightning activity. The GLM also detect lightning over the oceans, benefitting pilots and mariners across the globe. While GOES-16 data is currently being ingested

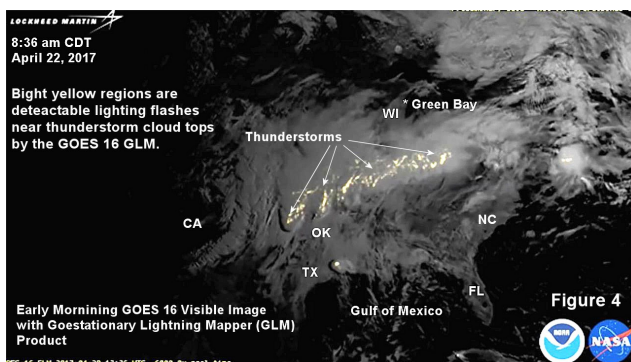


Figure 4

at the NWS offices, it is still considered non-operational while it continues to undergo more testing. Additional information can be found at: <https://www.nesdis.noaa.gov/GOES-16> and <http://www.goes-r.gov/>.

Be Prepared Before the Storms Arrive!

This time of year means vacations, outdoor activities, and fun in the sun! It's a time when families hit the road to visit national parks or distant relatives, or stay in Wisconsin to enjoy everything the state has to offer. The warm months and long days mean that there is plenty of time for baseball games and barbecues. The sultry temperatures practically invite you to take a dip in the pool or lake.

But don't let the sunny days and warm nights fool you. Summer also holds significant weather hazards. Each year across the U.S., many people are killed or seriously injured by lightning, tornadoes, and severe thunderstorms despite forecasts and warnings of hazardous weather.

Preparing before the storms strike could save your life. Here's what you can do before severe weather hits:

- ⇒ **Develop a plan for you and your family at home, work, school, and outdoors.**
- ⇒ **Identify a safe place to take shelter.**
- ⇒ **Have frequent drills.**
- ⇒ **Know the county name in which you live or visit.**
- ⇒ **Keep a highway map nearby to follow storm movement from weather bulletins.**
- ⇒ **Use a weather app on your smart phone to monitor severe weather.**
- ⇒ **Have a NOAA Weather Radio with a warning alarm and battery back-up.**
- ⇒ **Check the weather forecast before leaving for extended periods outdoors.**
- ⇒ **When going outdoors, bring along a portable weather radio.**
- ⇒ **Watch for signs of approaching storms: "When thunder roars, move indoors!"**

When conditions are becoming favorable for severe thunderstorms with high winds, hail, or tornadoes, the National Weather Service issues a severe thunderstorm or tornado **WATCH**. A severe weather watch is usually issued two to six hours before storms form. When a watch is in effect, it means severe storms may develop. Keep an eye to the sky and stay tuned to weather radio or local media for weather updates.

When severe weather is developing or moving into your area, **WARNINGS** are issued to alert the public and emergency officials. Warnings for severe weather are usually issued 10 to 60 minutes before the storms hit. When a warning is issued for your area, put your emergency weather plan into action.

Learn more about severe weather safety at:

www.weather.gov/grb/prep



Tornado Watch means
be prepared:
A tornado is possible

- Check for forecast updates
- Plan where to take shelter if needed
- Stay weather ready

weather.gov/tornado 



Tornado Warning means
take action!
A tornado is expected

- Take shelter indoors immediately
- If driving find the nearest shelter
- Check forecast updates
- Stay weather ready

weather.gov/tornado 

DID YOU KNOW?

You can find the NWS Green Bay on Facebook & Twitter:

www.facebook.com/NWSGreenBay

twitter.com/NWSGreenBay

Storm Spotting and Safety

By Phil Kurimski, Senior Meteorologist

Storm spotting has always had an inherent risk associated with it. For most people, putting yourself in the path of a dangerous storm on purpose would be preposterous! However, for the thousands of storm spotters and chasers around the country who call in their reports to the National Weather Service (NWS), this act serves to provide the latest updates on severe weather for the public. While there have been relatively few deaths associated with this activity, recent events have brought to light the very dangerous nature of these activities. Having nearly two decades of storm chasing experience, I wanted to highlight safety reminders associated with this activity.

For most of the history of storm chasing there were relatively few high profile deaths. That all changed on May 31, 2013, when several well-known and respected storm chasers died in El Reno,

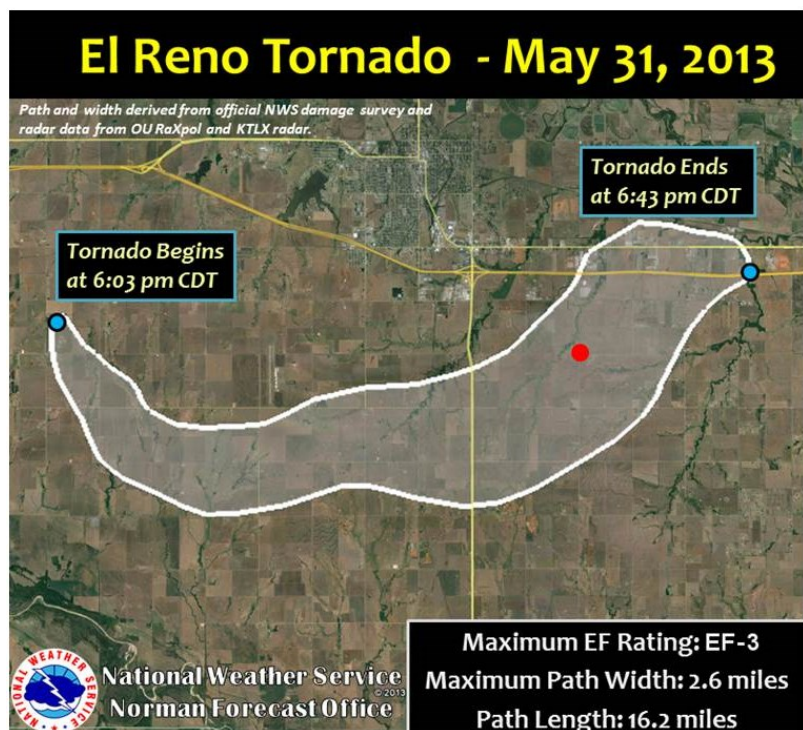


Figure 1 Path of the El Reno, OK tornado on May 31, 2013 and approximate location of Tim Samaras, Carl Young and Paul Samaras (red dot) when they died.



Figure 2 Chevy Cobalt containing Tim Samaras, Carl Young and Paul Samaras 4.8 miles southeast of El Reno, OK

Oklahoma chasing a large and dangerous tornado. Tim Samaras, his son Paul Samaras, and Carl Young lost their lives on this day while conducting lightning research for the TWISTEX project. They were on the north side of a tornado that was tracking southeast when it took a sudden and unexpected turn to the north and engulfed them in the large multiple vortex tornado (Figure 1). Figure 2 shows the remains of the Chevy Cobalt the three individuals were in when they died. This seminal event has been dubbed the end of the age of innocence for storm chasing, mainly because it marked a point where veteran storm chasers who were thought of as experienced and responsible lost their lives conducting research. Up to that point, the risk associated with storm chasing was mainly seen as something that affected amateurs or irresponsible chasers. This event caused many in the community to re-evaluate their tactics. If this could happen to people who knew what they were doing, it could happen to me.

Fast forward several years later and tragedy once again struck the community. On March 28, 2017, Kelley Williamson, Randy Yarnall, and Corbin Jeager lost their lives in Texas while chasing storms. Again, these were well known and veteran chasers, with

Randy and Kelley featured on a popular TV show “Storm Wranglers” on The Weather Channel. This time the hazard was not from a tornado overcoming these individuals; rather, it was Randy and Kelley running a stop sign to get in position that ended up killing all three. Corbin was crossing paths along a road perpendicular to the one the other two chasers were travelling on when he was hit. While there has been quite a bit of controversy surrounding the events that led to this tragedy, we will focus on the safety aspect and point out that when storm spotting, it is imperative to follow traffic laws and remain focused. Spotters and chasers should only take the time to document what they see and take their attention off the road when they are in a safe position to do so.

Several days later on April 2, 2017, Bart Comstock and his crew drove through a weak tornado during a high risk tornado day in Louisiana. They were not accidentally caught off guard; rather they drove through the tornadic circulation on purpose. The backlash amongst storm chasers was swift and damning. Many veteran chasers were aghast at the recklessness of these chasers in light of what transpired just days before. Despite being a weak tornado there is no guarantee that the tornado will remain weak. There is always a real possibility it will rapidly strengthen in intensity, especially given the meteorological setup on that day.

These unfortunate events should remind everyone that storm spotting and chasing are very dangerous activities that require the participants’ full and undivided attention. It is always safer to do these activities with another person so that one person can devote themselves to driving or getting into position, while the other keeps an eye on the storms. These events should also remind us that no matter how experienced you are, you are always at risk during dangerous weather. You should maintain a safe distance between you and the storm so you have time to maneuver to a safe location if the storm increases in intensity or speed. No storm or report to the NWS is worth your life; your safety is always the most important thing to consider whenever performing these activities.

2017 COOP Awards!

Name	Location	Years
Bob Friberg	Florence WWTP	20
Scott Cultice	Appleton	15
Richard Olson	Forestville	15
Jerry Wagner	Summit Lake	15
NWS Green Bay	Green Bay	15
Erika Sisel	Denmark WWTP	10
Warren Howard	Marinette WWTP	10
Don Imlah	Minocqua WWTP	10



DID YOU KNOW?

In the GRB county warning area, severe thunderstorms have occurred in every month of the year except February.

Weather Safety For Campers

By Tim Kieckbusch, Senior Forecaster & Jeff Last, Warning Coordination Meteorologist

Weather Hazards...

Lightning, flooding rains, large hail and **severe wind gusts** can turn a pleasant afternoon at a campground into a dangerous adventure. If unprepared, a fast approaching storm can become deadly.

Severe thunderstorms can produce damaging winds, tornadoes, large hail, and flooding rain. Winds over 60 mph can topple trees, and tear awnings off campers. Wind gusts over 80 mph can cause severe damage to mobile homes, and overturn campers and RVs. Tornadoes can have winds over 100 mph, creating a narrow but deadly path of destruction.

Even non-severe thunderstorms can cause damage. Wind gusts over 45 mph may overturn tents, break branches off trees, and knock down small, rotted or shallow-rooted trees.

When A Storm Approaches...

- ◆ Campers and mobile homes offer little protection from severe winds and falling trees. They should be abandoned in favor of a sturdy shelter.
- ◆ Move to a pre-designated shelter. If a storm shelter is not available, move to a sturdy building, preferably one with concrete, brick or stone walls. Shower or bathroom stalls, closets or interior hallways provide the best protection.
- ◆ If no shelter is available, consider whether you have enough time to drive to a safer location.

Lightning occurs with all thunderstorms. People who are outdoors are at risk. If you can hear thunder, you are close enough to be struck by lightning!

- ◆ Move to a sturdy building or hard-top car.
- ◆ Get out of boats and away from water.
- ◆ Never take shelter under an isolated tree. If in the woods, take shelter under a grove of shorter trees.
- ◆ Stay away from metal objects, such as piers, playgrounds, poles, and fences.

Prepare To Be Safe...

When you get to your campground, find the answers to these questions:

- ◆ What county and city are you visiting?
- ◆ Does this campground or park have a designated storm shelter? If not, where will you go if threatening weather is approaching?
- ◆ How will you find out if a severe storm is moving toward your area? There may be limited or no cell phone service. A NOAA Weather Radio is a great option!



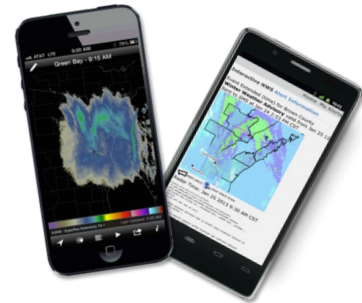
The time to prepare for severe weather is before the storms hit!

(story continues on page 7)

When Setting Up Camp...

Many campgrounds are heavily wooded. When deciding where to place your tent or camper, avoid setting up near dead, damaged, diseased/decayed, shallow-rooted or leaning trees.

- ◆ Signs of root or tree defects and decay include the presence of mushrooms or shelf fungus, large cavities or hollows, cracks or splits, deadwood, loose or missing bark, bulges, nesting holes, carpenter ants or bees.
- ◆ A good indicator of a dangerous leaning tree is the presence of a soil mound at the base of the tree on the opposite side of the lean.
- ◆ Some tree species, like maple, elm, willow, ash, and cottonwood are more susceptible to wind damage due to weak branch unions, insect damage, shallow roots or brittle wood.



A small amount of preparation and planning can make a huge difference in the safety of your family. If the weather turns nasty on your next camping trip, be sure to monitor the latest forecasts and warnings from the National Weather Service!

DID YOU KNOW?

The Green Bay county warning area holds the record for the two largest hailstones in the state of Wisconsin. The largest hailstone of 5.70 inches occurred in May 1921 at Wausau. The second largest hailstone of 5.50 inches in diameter was reported in Port Edwards on June 7, 2007.

2016 Cline Award Winners

The National Weather Service office in Green Bay recently recognized eight employees for the 2016 local Cline Award. The employees and the category for which they were nominated for were:

- ◆ Hydrometeorology: Tom Helman
- ◆ Engineering, Electronics, Facilities: Ed Kindred
- ◆ Leadership: Jeff Last and Tim Kieckbusch
- ◆ Outreach: Jeff Last, Phillip Kurimski, Scott Berschback, Ashley Allen and Sean Luchs

Congratulations to all award winners!



New Headline For The Boating Season: Small Craft Should Exercise Caution

By Mike Cellitti, Forecaster

During the boating season, typically May through October, the size of vessels that set out on the waters of Green Bay and Lake Michigan can vary from as little as 12 feet in length to large freighters. However, there are a higher percentage of smaller fishing boats under 25 feet in length that frequent the waters of Green Bay versus Lake Michigan. Feedback obtained from mariners indicate that these smaller boats, fishing boats in particular, are more sensitive to increasing wave heights than larger vessels, and conditions can become hazardous when wave heights rise above 3 feet.



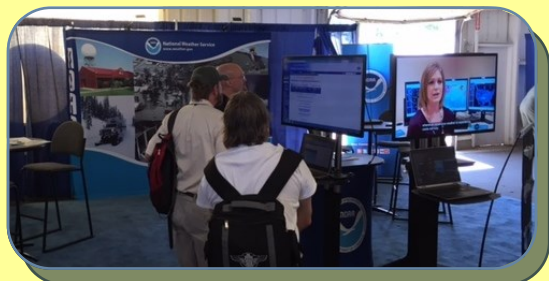
In light of these facts, the NWS forecast offices in Green Bay and Marquette have adopted the “Small Craft Should Exercise Caution” (SCEC) headline that will appear in the Nearshore Marine Forecast and also on the internet for the waters of Green Bay from May through October. (Example shown below)

...SMALL CRAFT SHOULD EXERCISE CAUTION from Thursday morning through late Thursday night...

It is a cautionary headline that is designed to alert mariners of wave or wind conditions that are just below Small Craft Advisory criteria, but which may still pose a hazard to operators of small vessels. The SCEC headline is widely used to alert mariners of potentially adverse conditions along the Gulf of Mexico and East Coast.

The SCEC headline will be issued for the waters of Green Bay when wind gusts of 20 to 25 knots and wave heights of 3 to 4 feet are expected in the first 12 to 24 hours of the forecast. You can find the Nearshore Marine Forecast and much more boating weather for the waters of Green Bay and Lake Michigan by visiting the website www.weather.gov/grb/marine.

**Come see us at the EAA AirVenture!
We will have a booth with weather
brochures, experts to answer
questions, and a hurricane simulator!**



NWS Green Bay Radar Unavailable August 7-11 for Signal Processor Replacement

By Ed Kindred, Electronic Technician

From August 7 to August 11, 2017, the Doppler Radar at Green Bay (GRB) will be down for the signal processor replacement. This upgrade is one part of the Service Life Extension Program or SLEP. The SLEP consists of four parts:

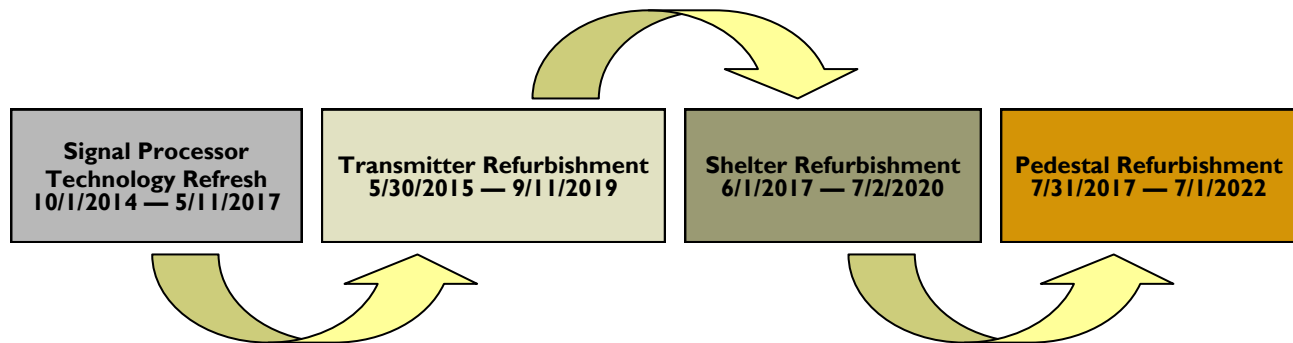
- 1) Signal processor replacement
- 2) Transmitter refurbishment
- 3) Pedestal refurbishment
- 4) Equipment shelter refurbishment

The signal processor is the “brains” of the radar. This piece of equipment is necessary to collect and process data. This upgrade replaces old hardware with new digital, electronic equipment. The hardware being replaced is more than 20 years old, obsolete, and some pieces are no longer supported by the manufacturer after 2017. These upgrades will result in faster and more precise data processing, paving the way for new radar technologies and algorithms in future software builds. The signal processor upgrade is approximately \$55,000 per site. The entire SLEP program, which will upgrade all NWS radars across the country consisting of all four updates, will cost approximately \$150 million.



New Signal Processor

Below is an approximated timeline for the entire SLEP project Weather Service wide.



DID YOU KNOW?
 Severe weather was reported across Brown, Winnebago, and Outagamie counties during the evening of January 24, 1967 when a line of thunderstorms produced damaging winds.

Your Mobile Device Could Save Your Life

There are multiple ways to **receive warnings** at your fingertips

text messaging service



social media



mobile.weather.gov

weather apps



from your family and friends



wireless emergency alerts - WEA




mobile.weather.gov



Spending Time Outdoors?



- ⚡ Be Aware of the Forecast Before You Head Out
- ⚡ Know How You Will Receive A Warning If One Is Issued
- ⚡ Know Where The Nearest Shelter Is Located
- ⚡ When Action Needs to be Taken, **DON'T WAIT!**

weather.gov/thunderstorm 

WORD SEARCH

W S C F B V P M H Y B Q O I M Z R T Z X
 F A E I L J U E F D N T B P K P E H M S
 R X R V V Z A R E N I H S N U S T U Z C
 L A P N E T Z U U H C T A W O H T N C G
 Z F I H I R D C P O G Z S W A E O D V L
 E M O N X N E Z P Q P R L I H R P E Y Y
 Y W I Q M Q G A V F A N L R W I S R U A
 G N I N T H G I L I G A W Z D F J P Q H
 E H X R D K T U N O F M B O O D Z Y O D
 L K A Q O O W B I O J Z P D D L R T I D
 F O Z Q R R O L Y D N I W O N I N M R S
 N B Q N O W G N I D O O L F K W U R L O
 J F A U V W U R K T S P T H O H B S V V
 X D N O L P B O X A N Z J C I N A J A K
 O A U Q C H Z K Y R P M G N Y Z K I W K

Downpour
Flooding
Hail
Heat
Hot
Humid

Lightning
Rain
Rainbow
Severe
Spotter
Sunshine

Thunder
Tornado
Warning
Watch
Wildfire
Windy

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