

Dallas Area RACES

Cloud Cowboy Reference Manual



SKYWARN



2023 Edition

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Welcome to the “Cloud Cowboy”

The first “Cloud Cowboy Reference Manual” was created in 1990 to give new members of Garland RACES basic storm spotting information. The cover was a hand-scrawled picture of a cowboy with a handie-talkie in his hand calmly reporting “... no rain, no wind in Mapsco ...” as a tornado approached from behind. It was six sheets of 8 ½” by 11” paper copied on both sides with “the basics.”

You will play like you practice.

Successful performance in an emergency depends on practicing your skills until using them becomes completely automatic. But skills don’t include only the obvious, individual skills like using Morse Code or applying a bandage; they also include the ability to follow correct procedures and to work together with many people and with teams of many kinds when the situation calls for it. Practicing when there’s no pressure lets us work like there’s no pressure—even when, to an untrained person, it would appear that there is.

The Cloud Cowboy Reference Manual outlines many of those procedural skills in a way that helps all the RACES operators in the Dallas area integrate as a well-trained team and provide actionable information to our served agencies. It also provides useful resources such as maps and equipment guidelines to help you prepare to serve your community, and then serve your community well.

Of course, this manual is only a starting point. To work together with other organizations, RACES appointees must be familiar with the Incident Command System, and I encourage you to review the FEMA IS classes IS-100, IS-200, and IS-700 if you have not done so lately. Look for ways to apply the ICS to your daily life and to events you participate in. Even a wedding can use an incident commander!

It’s also important to practice as much as you can with the equipment you will use in a real emergency. I remember reading about a surprise Army MARS drill which began with the instructions, “any piece of equipment you have not used in the 7 days prior to this drill will be considered to have failed while you weren’t using it. It will not be available for the exercise.” Know your radios, your antennas, your batteries, and your strengths and limitations. When a Bad Thing™ happens, we should be solving only new problems, not old ones caused by our own lack of preparedness.

As has been said many times, your Radio Officers and our served agencies desire your safety above all else. *Do not place yourself or your property in harm’s way to see or make a report.* If you have any doubt, play it safe. It is never embarrassing or a mistake to drop out of a net, or fail to make a report, because you needed to protect yourself or others.

If you find this reference manual useful, please thank the contributing Amateur Radio Operators, Dallas Area RACES Radio Officers, and organizations credited herein. Finally, thanks especially to all SKYWARN spotters for their many light nights and early mornings. We benefit our friends, families, neighbors, and communities

73 de



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SAFETY IS PRIORITY #1

Safety of the spotter community is paramount!

If you are not safe, you cannot make our communities safe!

SAFETY is EVERYONE’S primary JOB!

What is the Radio Amateur Civil Emergency Service?

RACES is an organization of licensed amateur radio operators who volunteer their time and equipment to provide supplemental communication to local, county, and state governments in time of an emergency or natural disaster. FCC regulations found in PART 97, Subpart E govern RACES operations. A major function performed by RACES in the Dallas/Fort Worth area is providing information to the National Weather Service during periods of threatening or severe weather.

Each local government within the Dallas area, together with the Federal Communications Commission per part 97, Subpart E, authorize RACES operation within the Dallas area. The City of Dallas and the many cities in the area have their own RACES organizations. Each organization is an independent entity. However, all belong to the Dallas Area RACES Council and cooperate in their basic requirements to provide mutual aid and support.

Who can participate?

By FCC regulations, only certified appointees may participate in RACES operations – including training sessions. Only RACES appointees who have attended a Skywarn school within the past two years may make minimum or modified criteria weather reports during Skywarn nets. Amateur radio operators that are not RACES appointees may report events that are an imminent threat to life or property as per Part 97 of the Rules and Regulations¹.

Any licensed amateur radio operator with VHF/UHF operating privileges may apply through his or her city's RACES Radio Officer to be certified by the authorizing agency. Except for individuals providing liaison with served agencies outside the Dallas area, each amateur operator should apply to the RACES organization closest to where they live or work. Identification badges containing the appointee's name, call sign, RACES unit number, and photograph may be issued to appointees, depending on local policy. The identification may be displayed only during official RACES operations including training, drills, and activations. **Use for any other purpose may be grounds for revocation.**

What is expected?

The expectation is that RACES appointees have a sincere interest in providing communications as a public service to amateur radio and the proper equipment to operate on the designated RACES frequencies.

Storm spotting is a major function of RACES in this area, and each RACES storm spotter must attend *National Weather Service (NWS) "Skywarn"* training at least once every two years. This training occurs throughout the area during the early spring, with a schedule posted at <https://www.weather.gov/fwd/>. The major Dallas County course is offered in Garland each February. Skywarn storm spotter training sessions usually last between two and four hours.

Completion of FEMA courses from the Emergency Management Institute Home Study Program within three (3) months of appointment.

- IS-100b -- <http://training.fema.gov/emiweb/is/is100b.asp>
- IS-200b -- <http://training.fema.gov/emiweb/is/is200b.asp>
- IS-700a -- <http://training.fema.gov/emiweb/is/is700a.asp>

We have regularly scheduled on-the-air training sessions for Dallas Area RACES organizations. A list of these nets appears in this document.

Training Nets

Although each RACES organization is independent, all require regular training and participation to maintain an appointment. Hams who wish to obtain a RACES appointment but have situations that prevent full participation should contact their RACES Radio Officer.

¹ Specifically, Part 97, subpart E, subparagraph 97.407 (a) of the FCC Rules and Regulations governing the Amateur Radio Service.

RACES Application

Contact your city's RACES Radio Officer to obtain an RACES application. Visit www.dallasraces.org/radio-officers to find email address information.

RACES Radio Officers in the Dallas Area

Carrollton	Steve Darrah, KD5YPB	Irving	Billy Geer, KA5OZC
Coppell	Mike Ridgely, KE5MAR	Mesquite	Ron Abraham, KC5IMJ
City of Dallas	Anthony Mendina, NT5TM	Richardson	Ken Noblitt, N5UA
Farmers Branch	Kevin Grantham, N5KRG	Rockwall County	Scott Hammond, KK5PP
Garland	John Galvin, N5TIM	Rowlett	Frank Seigler, KE5ETD
Grand Prairie	Anthony Guthrie, KD5TKN	Sachse	Greg Kent, KK6AXF

See www.dallasraces.org on the Internet for email addresses.

RACES Unit Numbers by City

Coppell	Units 400 to 499
Carrollton	Units 4000 to 4099
City of Dallas	Units 5000 to 5999
Garland	Units 500 to 599
Grand Prairie	Units 4200 to 4299
Irving	Units 700 to 799
Mesquite	Units 900 to 999
Richardson	Units 300 to 399
Rockwall County	Units 6000 to 6999
Rowlett	Units 9000 to 9999
Sachse	Units 200 to 299

RACES Appointees Basic Requirements

Each RACES entity operates and appoints radio operators independently and may require you to undergo a background check in order to participate. Check with your RACES Radio Officer for specific requirements.

1. Demonstrate a willingness to prepare for and participate in emergency communication events.
2. Willing to equip one's self with knowledge, skills, and equipment to meet basic mission requirements. (See RACES kit information on page 38)
3. Possess a valid Amateur Radio Operator's License for two-meter operation.
4. Own a two-meter FM transceiver appropriate for RACES operations.
5. Live in or be able to respond to activations in your authorized RACES group's city or county.
6. Be approved by a City or County RACES authority. (Check with your RACES Radio Officer)
7. Completion of FEMA NIMS IS-100b, IS-200b, and IS-700a courses².

Annual Renewal Requirements

(These vary by individual RACES organization)

1. Continue to meet BASIC requirements.
2. Participate in a minimum of twelve (12) RACES training nets each year, or as required by your individual organization.
3. Participate as a communicator as follows: A minimum of three consecutive hours in at least one approved special event³, simulated emergency net, or under drill with controlled net conditions or an emergency net other than a Skywarn Net. Or, participate in an alternate activity approved by your RACES Radio Officer.

² NIMS Course materials may be downloaded from <http://training.fema.gov/IS/NIMS.asp>

³ Your RACES Radio Officer must approve special events as to type and duration.

Skywarn Net Participation Requirements

1. Hold an active appointment from an authorized RACES organization in the Dallas area.
2. Attend National Weather Service certified Skywarn training within the last twenty-four (24) months.
3. Maintain a VHF transceiver capable of a minimum of twenty-five (25) watts output to the antenna.
4. Check with your RACES Radio Officer for additional requirements.

Skywarn Nets in the Dallas area operate under the auspices of RACES. All storm spotters making other than emergency reports during these nets must be a RACES appointee for a city or county entity in the Dallas area. Additionally, only Skywarn trained appointees may make weather reports during Skywarn Nets. While the minimum requirement is one session every two (2) years, appointees are encouraged to attend annual training to maintain and enhance their understanding of storm structure and spotter safety. The opportunity to see slides, videos and diagrams of recent severe storms, tornados and “look-a-likes” will enhance the spotter’s effectiveness in the field.

New RACES appointees are encouraged to check in to several training nets and monitor at least one Skywarn Net before participating, to develop familiarity with procedure and content. This manual documents and demonstrates the formats of the reports used.

Remember Our Mission

To locate possible threats to life or property
and provide information from which
warnings
may be issued!

RACES Training Nets in the Dallas Area

City/Agency	Day of Month	Start Time	Frequency (offset)	Tone
Addison	2 nd Sun. ARES	8:00 PM	145.210 (-)	110.9
Carrollton Farmers Branch	3 rd Sun. RACES	7:45 PM	145.210 (-)	110.9
City of Dallas	1 st & 3 rd Sunday	8:00 PM	146.880 (-) 442.075 (+)	110.9
Coppell ⁴	1 st Thursday	7:45 PM	444.225 (+)	110.9
Dallas area-wide training	1 st & 3 rd Sunday	8:00 PM	146.880 (-) 442.075 (+)	110.9
Garland RACES ⁵	1 st Thursday	9:00 PM	147.240 (+)	110.9
	2 nd Thursday	9:00 PM	146.660 (-)	110.9
	3 rd Thursday	9:00 PM	146.660 (-)	110.9
	5 th Thursday	9:00 PM	146.660 (-)	110.9
Garland ARES	4 th Thursday	9:00 PM	447.200 (+)	110.9
Irving	1 st Thursday	7:30 PM	146.720 (-)	110.9
Mesquite ⁶	1 st & 3 rd Tuesday	9:00 PM	145.310 (-) 147.040 (+)	110.9 141.3
Richardson	4 th Monday	9:00 PM	147.120 (+)	110.9
Rowlett	1 st Monday	8:00 PM	441.325 (+)	162.2
Sachse	2 nd & 4 th Sunday	8:00 PM	440.350 (+)	110.9

⁴ No training nets over Thanksgiving or in December.

⁵ No training nets on Thanksgiving and the last three weeks of the year.

⁶ Mesquite alternates between its VHF repeaters for training nets. 1st Tuesday is RACES, 3rd Tuesday is ARES. No training nets in December.

Dallas Area RACES ICS 217A Communications Resource Availability Worksheets

COMMUNICATIONS RESOURCE AVAILABILITY WORKSHEET					1. Frequency Band Amateur Radio VHF/UHF FM			2. Description Dallas Area RACES/ARES VHF Repeater List - 04/09/2022 - Page 1	
Channel Configuration	Channel Name Trunked Radio System Talkgroup	Eligible Users	RX Freq N or W	RX Tone/NAC	TX Freq N or W	Tx Tone/NAC	Mode A, D or M	Remarks	
VHF Repeater	V21R	RACES/ARES	145.2100 MHz W	-	144.6100 MHz W	110.9	A	Carrollton / Farmers Branch	
VHF Repeater	V27R	RACES	145.2700 MHz W	-	144.6700 MHz W	136.5	A	Kaufman Co. (Secondary)	
VHF Repeater	V31R	RACES/ARES	145.3100 MHz W	110.9	144.7100 MHz W	110.9	A	Mesquite	
VHF Repeater	V39R	RACES	145.3900 MHz W	-	144.7900 MHz W	136.5	A	Johnson Co.	
VHF Repeater	V14R	RACES/ARES	145.1400 MHz W	-	144.5400 MHz W	110.9	A	Ellis Co.	
VHF Repeater	V45R	RACES/ARES	145.4500 MHz W	-	144.5800 MHz W	110.9	A	Irving (Secondary)	
VHF Simplex	V40S	RACES	146.4000 MHz W	-	146.4000 MHz W	-	A	Sachse	
VHF Simplex	VCALL	ALL	146.5200 MHz W	-	146.5200 MHz W	-	A	Nationwide Calling Frequency	
VHF Simplex	V58S	RACES	146.5800 MHz W	-	146.5800 MHz W	-	A	Dallas	
VHF Repeater	V66R	RACES/ARES	146.6600 MHz W	-	146.0600 MHz W	110.9	A	Garland	
VHF repeater	V70R	RACES/ARES	146.7000 MHz W	-	146.1000 MHz W	110.9	A	Dallas Option	
VHF Repeater	V74R	ARES	146.7400 MHz W	-	146.1400 MHz W	110.9	A	Collin Co. (Secondary)	
VHF Repeater	V72R	RACES/ARES	146.7200 MHz W	-	146.1200 MHz W	110.9	A	Irving	
VHF Repeater	V76R	RACES/ARES	146.7600 MHz W	-	146.1600 MHz W	110.9	A	Tarrant Co. (Secondary)	
VHF Repeater	V88R	RACES/ARES	146.8800 MHz W	114.8	146.2800 MHz W	110.9	A	Dallas	
VHF Repeater	V92R	ARES	146.9200 MHz W	-	146.3200 MHz W	110.9	A	Denton Co.	
VHF Repeater	V94R	RACES/ARES	146.9400 MHz W	-	146.3400 MHz W	110.9	A	Tarrant Co.	
VHF Repeater	V96R	RACES	146.9600 MHz W	-	146.3600 MHz W	110.9	A	Dallas (Secondary)	
VHF Repeater	V04R	RACES/ARES	147.0400 MHz W	-	147.6400 MHz W	136.5	A	Kaufman Co.	
VHF Repeater	V12R	RACES/ARES	147.1200 MHz W	-	147.7200 MHz W	110.9	A	Richardson	
VHF Repeater	V714R	RACES/ARES	147.1400 MHz W	-	147.7400 MHz W	110.9	A	Arlington (Tarrant Co.)	
VHF Repeater	V18R	ARES	147.1800 MHz W	-	147.7800 MHz W	107.2	A	Collin Co. (Primary)	
VHF Repeater	V24R	RACES/ARES	147.2400 MHz W	-	147.8400 MHz W	-	A	Garland (Secondary)	

COMMUNICATIONS RESOURCE AVAILABILITY WORKSHEET					1. Frequency Band Amateur Radio VHF/UHF FM			2. Description Dallas Area RACES/ARES VHF Repeater List - 04/09/2022 - Page 2	
Channel Configuration	Channel Name Trunked Radio System Talkgroup	Eligible Users	RX Freq N or W	RX Tone/NAC	TX Freq N or W	Tx Tone/NA C	Mode A, D or M	Remarks	
VHF Repeater	V24R	RACES/ARES	147.2400 MHz W	-	147.8400 MHz W	-	A	Garland (Secondary)	
VHF Repeater									
VHF Simplex	V54S	RACES/ARES	147.5400 MHz W	-	147.5400 MHz W	-	A	Garland	
VHF Simplex	V55S	ARES	147.5550 MHz W	-	147.5550 MHz W	-	A	Grand Prairie RACES - Rockwall Co.	
VHF Simplex	V58S	RACES	147.5800 MHz W	-	147.5800 MHz W	-	A	Rowlett (Staging)	
VHF Simplex	VCALL	ALL	146.5200 MHz W	-	146.5200 MHz W	-	A	Calling Frequency	
UHF Repeater	U30R	RACES	441.3000 MHz W		446.3000 MHz W	179.9	A	Grand Prairie (Primary)	
UHF Repeater	U31R	RACES	441.3125 MHz W	-	446.3125 MHz W	100.0	A	Rowlett	
UHF Repeater	U35R	RACES/ARES	440.3500 MHz W	-	445.3500 MHz W	110.9	A	Sachse RACES	
UHF Repeater	U52R	RACES	441.5250 MHz W	-	446.5250 MHz W	141.3	A	Rockwall Co.	
UHF Repeater	U075R	RACES	442.0750 MHz W	-	447.0750 MHz W	141.3	A	Dallas - link to V88R	
UHF Repeater	U70R	RACES/ARES	442.7000 MHz W	-	447.7000 MHz W	110.9	A	Garland	
UHF Simplex	UCALL	ALL	432.1000 MHz W	-	432.1000 MHz W	-	A	Calling Frequency	
UHF Simplex	U80S	RACES	444.8000 MHz W	-	449..8000 MHz W	110.9		Grand Prarie (Secondary)	
HF Simplex	H727S	ALL	7.277.5 MHz W	-	7.277.5 MHz W	-	SSB	NTX ARES Tactical Net-LSB (Day)	
HF Simplex	H386S	ALL	3.860.0 MHz W	-	3.860.0 MHz W	-	SSB	NTX ARES Tactical Net -LSB (Night)	
HF Simplex	H728S	ALL	7.285.0 MHz W	-	7.285.0 MHz W	-	SSB	State ARES Net - LSB (Day)	
HF Simplex	H386S	ALL	3.873.0 MHz W	-	3.873.0 MHz W	-	SSB	State ARES Net - LSB (Night)	

The convention calls for frequency lists to show four digits after the decimal place, followed by either an "N" for a "W", depending on whether the frequency is narrow or wide band. Mode refers to either "A" or "D" indicating analog or digital (e.g. Project 25) or "M" indicating mixed mode. All Channels are shown as if programmed in a control station, mobile or portable radio. Repeater and base stations must be programmed with the Rx and Tx reversed

Skywarn Spotter Safety

Spotter safety is of paramount importance in RACES. Your Radio Officers and our served agencies value your life and safety more than weather reports. You are responsible for your safety when operating in and around the very dangerous environments that severe weather creates in North Texas. Remember, if you have any doubt, play it safe. We would rather you live to make another report on a different event than risk a bad situation, thereby injuring yourself or damaging your property. Net Controls on the Dallas county-wide net do not provide vectors to spotters to allow closure with storms.

Spotting Location Safety

You should choose your spotting location based on several criteria:

- SAFETY FIRST!
- A good view of the West, covering the 180 degrees from North through West, to South if possible since most weather moves West to East in North Texas.
- RF compatibility, some areas may be tremendous for spotting visually but not work very well for radio communications. If you cannot reliably reach or hear the Net, you are ineffective and unsafe.
- Too high, possible lightning risk. Too low, possible flash flooding risk.
- Make sure your location is well clear of any vehicle traffic!
- Your spotting location should be open to the public and not on private property; unless you own that property or have permission from the owner.
- Survey and scout your spotting location and the immediate vicinity in daylight and under clear conditions to familiarize yourself with the location. Pick out landmarks to determine directions and distances.
- Study maps of your spotting location, topographical and street-level, to ensure you understand the 'lay of the land.'
- Studying maps also allows you to find the landmarks you generated from your site survey to determine directions and distances.
- Have at least two 'bug out' exits from the area planned. Exits generally should be to the South through East in most severe weather situations⁷.
- Review planned exit routes for potential issues with flash flooding. Don't choose a spotting area where you will have to cross flooding or high water.
- Planned exit routes should be reviewed regularly, especially just before the storm season. Construction or other changes may have occurred that may cause you to re-evaluate. Do this in daylight and without severe weather to allow for appropriate review.
- Plan your spotting location so that you may get to substantial cover quickly if necessary.
- Be aware of tall objects that may attract lightning or blow over on you. Pay attention to any potentially downed power or high-voltage lines.

Thunderstorm Environment Safety

A lot is going on during severe weather, keep these things in mind:

- SAFETY FIRST!
- Situational awareness. The Dallas Area RACES requirement to attend a Skywarn school once every two years ensures that our spotters understand the thunderstorm environment and maintain a high level of situational awareness in these dynamic events.
- Keep your head on a swivel. Having sight of the wall cloud does not mean you should not be searching for or observing other storm features. The next wall cloud may be developing right above you!
- You should also include looking at the ground from time to time as part of your scanning process. More people die due to flash flooding than any other thunderstorm event.

⁷ As a spotter, you understand that weather conditions in the field can change nearly instantaneously. Although South through East is the typical escape vector from severe weather other scenarios should be considered as well.

- Develop a scanning methodology and follow it! South through West to North to East back to South, above and below.
- Lightning can strike great distances from a storm into apparently clear air. Staying in your vehicle offers some protection. The best protection would be inside your vehicle with the windows closed; this might be unrealistic. If you must exit your vehicle and feel your hair standing on end, squat with your head between your knees, do not lie flat!
- If you can hear thunder, you are close enough to the thunderstorm to be struck by lightning.
- Hail can be deadly. Planning for exits to acceptable cover is the only reasonable solution. Remember South through East are the best directions to escape most thunderstorm events.
- Even with the best of training, it is possible to get caught unawares. Should you encounter a tornado, leave your spotting vehicle and find a ditch or other low spot. Lie down flat and cover your head with your hands. Do not seek shelter under bridges, overpasses, or in non-sturdy buildings.
- Be aware of blowing debris.
- Do not turn off your vehicle's engine when spotting. You may not be able to restart your vehicle when you need to make a hasty exit.

Safety While Travelling

Getting to your spotting location and home again can entail risks:

- SAFETY FIRST!
- Reduce speed!
- Beware of hydroplaning! Hydroplaning occurs when water accumulates in front of your tires faster than the weight of the vehicle can push it out of the way, generally at speeds of 40 MPH or greater. Hydroplaning causes your tires to lose contact with the road leading to a loss of control. **DO NOT APPLY BRAKES OR MAKE LARGE STEERING INPUTS WHILE HYDROPLANING** - let off the accelerator and maintain as straight a course as possible to allow the vehicle to settle back on the road.
- Watch for water on the road, standing or running. Do not cross any area of significant water, either standing or running. It takes only a few inches of moving water to sweep away a vehicle.
- Watch for debris.
- Watch for downed power lines.
- Watch for all the normal road hazards and be aware that they may be obscured.
- Maintain your spotting vehicle's condition.
- Always maintain at least a half-tank of fuel. When the power goes out, the fuel stops flowing.
- If you have a partner, have them perform other duties such as navigation or spotting so that the driver may ensure the safety of the vehicle and occupants.
- If you must pull over to the side of the road, ensure you are well clear of traffic and that your hazard lights are visible. The use of strobes or other marker lights in RACES is strictly prohibited.
- If possible, do not turn off your vehicle's engine until you are clear of the storm environment or in a location where you may quickly reach the safety of a sturdy building.
- You cannot outrun a weather event!

Situational Awareness is ACES

The detailed information above is good for review at the beginning of each season. However, in the field, it is difficult to recall many such details quickly. A more effective mnemonic for ensuring your safety is ACES.

- **Awareness** – Even if you cannot recall all the training material from Skywarn schools, or the CCRM, ensure your awareness of the thunderstorm environment and other factors that may impact your safety remain high.
- **Communications** – Communicate the facts you observe.
- **Escape Routes** – Returning to awareness. Observe storm motion and other environmental indicators and be prepared to escape to safety.
- **Safe Areas** – A safe area should protect you from the immediate threats in the thunderstorm environment. Look up, down, and around to ensure the area is truly safe.

Repeater Alert Activities on 146.880

When a Severe Thunderstorm Watch is issued for the Dallas area

The message "Weather Alert" is announced every ten (10) times the repeater transmits. A Severe Thunderstorm Watch is a National Weather Service product indicating that a severe thunderstorm is possible. Conditions are more favorable than usual for the initiation of thunderstorms that may reach severe levels. Typically, a Severe Thunderstorm Watch may be issued many hours in advance of a Skywarn net.



When a Tornado Watch is issued for the Dallas area

The message "Weather Alert" is announced every four (4) times the repeater transmits. A Tornado Watch is a National Weather Service product indicating that severe weather with tornadic activity is possible. Conditions are more favorable than usual for the initiation of thunderstorms that may contain tornadoes. Typically, a Tornado Watch may be issued many hours in advance of a Skywarn net.

When a Skywarn Net is expected within an Hour

A RACES Pre-Net Alert/Advisory will be issued. Three DTMF zero tones are sent. The courtesy tone changes to single 1,200 Hz and the repeater transmits CTCSS of 114.8 Hz. A Dallas RACES Net Control Station (NCS) will describe the situation regarding anticipated activation. After advisory, CTCSS and single alert tone are turned off, but "Weather Alert" message occurs every 4th time the repeater carrier drops.

When a Skywarn Net opens

Three DTMF zero tones are sent. Courtesy tone changes to a single 1,200 Hz tone and the repeater transmits CTCSS 114.8 Hz. The repeater dropout delay is shortened, and the Dallas REACT repeater (442.075+, which sends and requires CTCSS 110.9 Hz) is linked to 146.880.

Watches and Warnings

WATCH - An NWS product indicating that a hazard is possible. I.E., that conditions are more favorable than usual for its occurrence. A watch is a recommendation for planning, preparation, and increased awareness (I.E., to be alert for changing weather, listen for further information, and think about what to do if the danger materializes).

WARNING - A product issued by NWS local offices indicating that a weather hazard is either imminent or has been reported. A warning indicates the need to act to protect life and property. The type of hazard is reflected in the type of warning.

Definitions courtesy of the National Weather Service Forecast Office, Norman, OK

Dallas RACES Area-Wide Net Alert Methods

The following occurs on 146.880 at the beginning of each Dallas RACES area-wide net.

Three DTMF zeros (0 0 0) are sent.

Additional activities associated with Dallas RACES area-wide Nets

CTCSS or Sub-Audible Tones - The 146.880 DARC (Dallas Amateur Radio Club) repeater does not require that operators transmit any sub-audible tone. A sub-audible tone of 114.8 Hz is transmitted during RACES Nets.

The 442.075 Dallas County REACT repeater is cross-linked to 146.880 during RACES Nets and requires the use of a 110.9 Hz tone on transmit and transmits a 110.9 Hz sub-audible tone.

Individual Organization Activations - Check with your RACES Radio Officer for further details on how your organization will provide activations either locally or when an area-wide RACES Net becomes active.

Skywarn Net Protocol

RACES units transmitting a report follow a two-step identification procedure to be recognized on the Net. The first step is to identify yourself and establish that you are an authorized RACES appointee. The second step identifies your location to assist the Net Control Stations (NCS), the National Weather Service and the many Emergency Operations Centers (EOCs) that are monitoring.

1. **Enter the net by transmitting your full call sign using ITU standard phonetics, followed by your RACES unit number and adding “mobile” if appropriate.**

Since RACES unit numbers identify the issuing organization, it is not necessary to state your organization or use the word “unit.” Numbers are to be given individually, five-two-eight instead of five-hundred-twenty-eight; except where the unit number is an even hundred or thousand such as five-hundred or five-thousand.

Examples: WT5Q, Garland RACES unit 501, who is mobile identifies as, “Whiskey Tango Five Quebec, five-zero-one, mobile.” K5HW, Garland RACES unit 528 identifies as, “Kilo⁸ Five Hotel Whiskey, five two eight.”

2. **When recognized by NCS, begin your report with your call sign and 5K or 1K US NATIONAL GRID and MAJOR THOROUGHFARE INTERSECTION**

Use either the four-digit grid from either the 5K USNG map included in the Cloud Cowboy Reference Manual or a 1K USNG grid from other sources. Resolution smaller than a 1-kilometer grid is not necessary for weather reports.

Major thoroughfare intersections should be identifiable by those that live within Dallas County without reference to mapping sources. Minor and neighborhood streets are not acceptable.

Example: “WT5Q, five-zero-one, one-five-four-five, Belt Line and Garland Road”

3. **End your report with your full FCC assigned call sign.**

There is no requirement to ID after every comment made during report exchanges, you must use your full FCC call sign during the last transmission of your report. If you file another report later in the net, you must use the two-step check-in procedure covered above.

USE STANDARD PHONETICS!

When a station uses non-standard phonetics in a transmission it is difficult to understand the message. In stressful situations, we revert to habit. Practice as if it were the real thing to reinforce habit.

⁸ The phonetic word Kilo is used for the letter “K”, and not “Kilowatt”, since kilowatt is appropriately abbreviated as kW. “Cute” or non-standard phonetics such as Bad for B, Germany for G, or Jumping for J, are inappropriate, slow down reporting or communications and cause misunderstandings.

Standard Skywarn Weather Condition Report

Call sign - Unit number - [USNG | Major Thoroughfare Intersections] - Flash flooding - Wind - Hail - Rain

Since there are numerous EOCs and other served agencies plotting our reports on maps or generating warnings for the public, consistency of transmitted information is imperative. Present weather reports in the following order:

1. US National Grid 5K or 1-kilometer grid square and/or major thoroughfare intersections⁹
2. Flash flooding
3. [Wind speed](#) and the direction it is coming from, state whether measured or estimated
4. [Hail size](#) in fractions of an inch and intensity (light, moderate, heavy)
5. [Rainfall rate in inches-per-hour](#), state whether it is measured or estimated

Example: "Whiskey Tango Five Quebec, five-zero-one, one-five-four-five, Belt Line and Garland Road, winds from the South at 30 miles per hour measured, moderate ½" hail, rain estimated 3" per hour. WT5Q"

Entering the net with a weather emergency

Weather emergencies are those items requiring urgent attention, such as a rotating funnel, rotating wall cloud, or tornado¹⁰. Enter the net using the pro-sign "Break, Break" followed by your call sign, un-key and await recognition by NCS.

Example:

Spotter: "BREAK, BREAK, WT5Q"

NCS: "ALL STATIONS STANDBY, WT5Q"

Spotter: "WT5Q, five-zero-one, one-five-four-five. I have a wall cloud with rotation 5 miles southwest of me, moving to the northeast. WT5Q"

NCS: "ALL STATIONS STANDBY. We have a report of a wall cloud southwest of grid one-five-four-five. Are there any stations that can confirm¹¹?"

Using an assigned tactical call sign

For example, "Dallas EOC," "Collin County," "Staging Area," "EVAC Center." Enter the net using the assigned call sign and end the report or conversation with your FCC-assigned call sign.

Example: *Spotter:* "EVAC Center," *NCS:* "EVAC Center," *Spotter:* "We are operational and have received the supplies asked about earlier. KC5EOR, five seven five."

⁹ Major thoroughfare intersections should be identifiable by most people who live in the Dallas area without reference to a map. Neighborhood and minor streets do not meet these criteria. We are more interested in the general area than absolute accuracy when reporting weather events.

¹⁰ These items are considered eminent threats to life or property and will be accepted by NCS even from non-authorized stations in accordance with Part 97, subpart E, subparagraph 97.407 (a) of the FCC Rules and Regulations. Non-authorized stations are solely responsible for their reports.

¹¹ Cloud formations can look radically different when viewed from different angles. NCS requests confirmation on all emergency weather reports. This allows for localization of the lowering and avoids false alarms.

Minimum Reporting Criteria

The minimum level of criteria required for reporting weather events on a Dallas RACES area-wide Skywarn Net. Defined as being equal to or greater than any of the following:

1. **Flash flooding**
2. **Wind greater than fifty miles per hour (50 MPH)**
3. **Hail three quarter inch (.75") or larger**
4. **One inch (1") per hour rain**

Do not report events not meeting these Minimum Reporting Criteria should on a Skywarn Net. Net Control Stations may institute Modified or Elevated Reporting Criteria at the request of served agencies or further limit traffic.

Modified Reporting Criteria

Net Control Stations will call for modified reporting criteria at the request of a served agency such as the National Weather Service. Modified Reporting Criteria may be, but not limited to, events such as wind or flooding reports with more specificity than implied in Minimum Reporting Criteria. When Modified Reporting Criteria is in effect, stations with Minimum Reporting Criteria may continue to submit reports.

Elevated Reporting Criteria

Net Control Stations will call for elevated reporting criteria for significant reports such as a rotating lowering, rotating funnels, flashes of light at ground level not associated with lightning, tornados or other immediate threats to life or property. When Elevated Reporting Criteria is in effect, stations with Minimum or Modified Reporting Criteria should hold their reports.

All Minimum or Modified Reporting Criteria reports stand by when a rotating lowering, rotating funnel, flashes not associated with lightning, or tornado (Elevated Reporting Criteria) are being reported and tracked.

Order of Precedence for reporting weather events

The following list shows the priorities of reporting weather events, necessary reporting details, and required criteria for reporting.

1. Tornado

- a. Defined as *visible debris cloud or surface damage* occurring
- b. What is *your USNG and/or major thoroughfare intersection*?
- c. *Direction and distance* from you to tornado?
- d. *Direction and rate of travel* of tornado?

2. Funnel

- a. Defined as *rotating funnel not apparently in contact* with the ground.
- b. Is funnel *visible halfway* to the ground?
- c. Is there a *visible clear slot*?
- d. What is *your USNG and/or major thoroughfare intersection*?
- e. *Direction and distance* from you to funnel?
- f. *Direction and rate of travel* of funnel?

3. Wall Cloud

- a. Defined as a *sustained, rotating lowering*
- b. Is *surface damage* occurring?
- c. Where is the *updraft* located on the wall cloud?
- d. Is there a *visible clear slot*?
- e. What is *your USNG and/or major thoroughfare intersection*?
- f. *Direction and distance* from you to wall cloud?
- g. *Direction and rate of travel* of wall cloud?

4. Flashes of light at ground level, not associated with a lightning strike

- a. Are there *multiple flashes* or a *continuous line of flashes*?
- b. What is *your USNG and/or major thoroughfare intersection*?
- c. *Direction and distance* from you to flashes?

5. Hail larger than three quarter inch (.75")

- a. What is *your USNG and/or major thoroughfare intersection*?
- b. *Size of the hail* in inches? (Do not report as object sizes)
- c. How much is falling? (intermittent, light, moderate, heavy, biblical)

6. Damaging Winds (over 50 MPH)

- a. What is *your USNG and/or major thoroughfare intersection*?
- b. Is the *wind speed* greater than 50 MPH? (*cannot walk against the wind*)
- c. What direction is the wind *coming from*?

- d. *Briefly describe any damage that is occurring*

7. Flash Flooding

- a. Is water *flowing across* the road?
 - i. Is there a *current*?
 - ii. Curb deep water *does not meet the minimum reporting criteria!*
- b. Is rising water an *immediate threat to life or property*?
- c. Are *children playing in culverts or flood waters*?
- d. What is *your major USNG and/or major thoroughfare intersection*?

8. Rain over 1" per hour

- a. Is visibility restricted to *less than five car lengths*?
- b. What is *your USNG and/or major thoroughfare intersection*?
- c. What is the estimated or measured [rainfall rate](#) in inches per hour?

Estimating Rainfall Rates

Reports of estimated rainfall rates and wind provide insight regarding the location of severe storm cells. This aids forecaster’s in issuing Watches and Warnings to communities that are in the path of the storm. The following charts should help to estimate rainfall and wind speed. The key word, however, is *estimate*. Exact numbers are less important than consistency in reporting.

Rainfall Rates	Category
½" to 1" per hour	Heavy Guideline: 1" per hour/Heavy rainfall makes it difficult to see beyond 75' to 100' (approximately five standard-sized car lengths) with any definition.
1" to 2" per hour	Very Heavy
2" to 5" per hour	Intense
>5" per hour	Extreme Guideline: Extreme rainfall rates restrict visibility to 20' or less with any definition.

Note: Do not attempt to estimate rainfall from a moving vehicle. Rain beating on the windshield can be misleading.

Estimating Wind Speeds

Miles per Hour	Observation
25 to 31	Large branches move; Whistling in high lines
32 to 38	Whole trees in motion
39 to 46	Twigs break off trees; Impedes progress while walking
47 to 54	Slight structural damage
55 to 63	Trees uprooted; Considerable structural damage (seldom seen inland)
64 to 75	Widespread damage (rarely experienced)

Estimating Hail Sizes¹²

Report Size	Common Object Size	Report Size	Common Object Size
¼"	Pea	1¾"	Golf Ball
¾"	Dimes or Pennies	2½"	Tennis Ball
7/8"	Nickels	4"	Grapefruit
1"	Quarters	4½"	Softball
1¼"	Half Dollar		

¹² Thanks to Bill Swan, K5MWC for assembling this information.

Some rules of “thumb” for use in measuring the sizes of objects. Your thumbnail is roughly ½” long. From the tip of your thumb to the first knuckle is roughly 1”.

Dallas Area RACES Use of the US National Grid

US National Grid Description

The United States National Grid (USNG) is a point reference system of grid references commonly used in the United States. It provides a nationally consistent language of location in a user-friendly format. It is similar in design to the national grid reference systems used throughout other nations. The Federal Geographic Data Committee developed the USNG.

The purpose of the USNG according to the FGDC, is to "create a more interoperable environment for developing location-based services within the United States and to increase the interoperability of location services appliances with printed map products by establishing a nationally consistent grid reference system as the preferred grid for NSDI applications. The U.S. National Grid is based on universally-defined coordinate and grid systems and can, therefore, be easily extended for use worldwide as a universal grid reference system."

It resembles the Military Grid Reference System (MGRS). Using the WGS84 datum or NAD83 datum, USNG and MGRS coordinates are "equivalent."

Also, it has the advantage of being easily plotted on USGS topographic and other properly gridded maps by using a simple "*read right and then up*" convention where the user measures to the East and then North in linear increments. The coordinates are easily translated to distance as they are actually in meters rather than the more complex degree-based increments of latitude and longitude. Thus, the distance between two coordinates can quickly be determined in the field.

USNG 1 km grid state-wide polygons for select states can be downloaded from <http://mississippi.deltastate.edu>. The website also provides more detailed information about the US National Grid.

USNG allows a common system based on the US Military Grid system using landmarks like hills or streams, anything permanent. It allows these maps to be printed anywhere by responders unfamiliar with the local area. The degree of precision is determined by the number of digits in the coordinates, 23 67 = 1000 meters, 23451 67345 = 1 meter.¹³

Dallas Area RACES Reasoning

Although Mapsco has long been our method of reporting grid squares, numerous issues were surrounding its continued use. Not the least of which is the march of technology. In addition to using a grid system that can be produced by any agency using common tools, the USNG allows the spotter in the field to use a GPS or Smartphone to locate themselves, reducing workload. Additionally, many emergency management agencies are transitioning to the use of USNG to allow for better interoperability. It is a public domain, well-known grid system.

The USNG grid became the primary location reporting mechanism from 2016 onward with Mapsco use completely deprecated.

A Mapsco major grid is approximately 2x3 miles in size. As the USNG is a metric grid, the RACES Council has selected 5-kilometer squares as our reporting grid as our served agencies generally do not require greater resolution for weather events. Where additional resolution is required, the USNG is capable. The number of digits used determines the accuracy. A four-digit report describes an area 1 km² in size. A six-digit report describes a 100 m² area, or about the size of a football field or roughly a city block. Eight digits define a 10 m² area, roughly the size of an average home and are generally the accuracy of current consumer grade GPS receivers. Ten digits define a 1-meter square.

¹³ Text sourced from http://en.wikipedia.org/wiki/United_States_National_Grid

Dallas RACES Skywarn reports will generally be four digits based on the 5K USNG grid map included here. Although spotters may also report their 1K grid squares as four digits when using GPS or a Smartphone application. To convert from 1K grid squares to 5K, *remember to round down to the nearest zero or five* in the second and fourth digits. For example, 06 28 in 1K becomes 05 25 in a 5K report.

Understanding the US National Grid

The USNG is a grid system. Each numbered grid defines a square area, not a point like latitude/longitude. The basic unit of measure is the meter, and the system is based on Universal Transverse Mercator (UTM) coordinates. For general purposes the Military Grid Reference System (MGRS) is functionally equivalent, meaning that if your GPS or smartphone has MGRS, you may use that coordinate system setting. The USNG provides a uniform mapping grid and a standard reference system during times of crisis¹⁴.

Other grid formats, such as Mapsco are useful only in a local area where such material is available. Systems such as latitude/longitude suffer from multiple format representations. In lat-long 32°46'34.075", -96°47'48.606" may be also represented as 32.776132, -96.796835, or 32°46.568, -96°47.810 leading to confusion in changing between representations. By providing a structured format, the USNG is clearer. For example, the coordinates shown above translate to 14S QB 06350 28618. For local usage, this could simply be communicated as 06350 28618 defining a 1m² location. In this example, the rough center of Dallas City Hall.

To return to the 14S QB 06350 28618 example. The first three digits, 14S, is the Grid Zone Designation (GZD). Grid Zone Designators are unique across the planet and are 6° x 8° longitude zone/latitude bands. For RACES purposes it is not necessary to report the GZD. The next two letters, QB, define the 100,000 km² Grid Square ID (GSID) inside the GZD. Two letter GSIDs are not unique outside of a Grid Zone Designator. The western third of Dallas County lies in 14S PB, the eastern two-thirds in 14S QB. Both GSIDs are unique inside of GZD 14S. For RACES purposes when reporting within Dallas County, it is not necessary to report Grid Square IDs. However, if we are interoperating with served agencies in the surrounding counties, it may be necessary to use GSIDs.

The last ten digits, 06350 28618, define a 1-meter square on a map. These should be read *right then up!* They may also be called easting and northing. The number of digits reported defining the size of the square.

10 digits define 1 m² - The size of a parking space

8 digits define 10 m² - The size of an average house

6 digits define 100 m² - The size of a football field or roughly a city block

4 digits define a 1000 m²

4 digits with the last digits rounded down to zero or five define 5000 m² - Rough equivalent to Mapsco

From the example, Dallas City Hall may be located with differing levels of resolution:

¹⁴ Material from Debbie Bridewell and the Missouri Department of Public Safety presentation on USNG. Located at <http://goo.gl/ZIYmQW>



Right	Up	Description
06350	28618	1-meter square in roughly the center of the building
0635	2861	10-meter square that includes the middle portion of the building and the accuracy to be generally expected from current consumer grade GPS receivers
063	286	100-meter square that includes city hall and the surrounding grounds and the accuracy generally expected from older consumer grade GPS receivers
06	28	1,000-meter (1 kilometer) square that includes several surrounding city blocks and the greatest accuracy required for standard RACES Skywarn reports
05	25	5,000-meter (5 kilometer) square that includes downtown and areas immediately to the east and south

Grid 06 28 is 1,000 meters *right* (east) from the 05 line, and 3,000 meters *up* (north) from the 25 line. Remember, always *round down to the nearest five or zero* to report 5K grids.

Reporting either 5K or 1K grids are acceptable as the weather features in which we are interested generally span these distances or larger.

Determining your USNG Location using Applications

In a desktop or smartphone browser visit the site <https://findmesar.com/>. This site will operate in any modern browser and will provide the user with several different coordinate systems, along with which emergency services employ them. We in RACES will use the USNG coordinates with the blue background.

In addition, you can select the “Display Map” option at the bottom of the page. This will provide a gridded USNG map that works as you’ve come to expect on-line mapping programs to work.

Skywarn Pre-Net Checklist

- Do I have *immediate* access to my Skywarn kit?
- Can I immediately go mobile to track severe weather providing information to the Skywarn net regarding my location and the direction of travel of severe weather?
- Does my storm spotting location have *at least two exits in different directions*?
- Can I give useful direction/USNG coordinates and/or major thoroughfare intersections?
- Can I identify myself to officials as a RACES member? How?
- Can I identify myself to officials as an Amateur Radio Operator?
- Can I identify my present location by USNG grid and/or major thoroughfare intersections?
- What will I eat and drink, and how will I stay physically comfortable?
- How will I power my portable unit without utility power?

Skywarn Severe weather report checklist

- *What is my present location?*
- Where is the severe weather in relation to my present location?
- What direction is the severe weather moving and how fast?
- *Am I in the path of the severe weather?*
- If I am in the path, what action should I take?
- If I am not in the path, can I provide any additional useful and important information?

Clear, Concise, Accurate and Timely Communications

What to do	Why we do
<h1 style="margin: 0;"><i>Silence IS golden!</i></h1>	
<ul style="list-style-type: none"> ● Listen, Listen, Listen ● Pause. Think. Transmit. 	<ul style="list-style-type: none"> ● To ensure your transmission does not interfere with another communication ● To be aware of the current Net condition and minimum reporting requirements ● To communicate effectively ● Minimum use of air time for report
<p>Making the call</p> <ul style="list-style-type: none"> ● Say the call sign or tactical call sign of the station you are calling ● Followed by “this is” or “from.” ● The call sign or tactical call sign of the calling station 	<ul style="list-style-type: none"> ● Use of a standard procedure ● To be understood reliably on the first call ● To be clear
<p>Communicate</p> <ul style="list-style-type: none"> ● Speak clearly and with moderate speed ● Use plain English, no codes ● Repeat critical items for confirmation 	<ul style="list-style-type: none"> ● To be understood ● To be fast ● To avoid confusion ● For accuracy
<p>Use phonetics</p> <ul style="list-style-type: none"> ● The initial call to NCS ● Station identification on long exchanges ● For names or words that are not easily understood 	<ul style="list-style-type: none"> ● To be clear ● To be accurate ● To be fast ● Following standard procedure
<p>Emergency Traffic</p> <ul style="list-style-type: none"> ● Use the pro-word “Break Break” for life-threatening emergencies or to enter a Net with Elevated Reporting Criteria ● Do not use “Break Break” for non-life-threatening situations or non-Elevated Reporting Criteria weather reports ● Be prepared to call 911 if possible and/or necessary 	<ul style="list-style-type: none"> ● To convey the emergency status of a life-threatening situation ● For silencing the Net and quickest response ● Following a standard procedure

Remember to be brief to give Net Control or emergency dispatchers and responders an opportunity to ask vital questions.

RADAR for the Skywarn Spotter

Radar can be a valuable tool for the Skywarn spotter. But, when used incorrectly it can be detrimental. Spotters should use radar data for positioning themselves for remaining clear of dangers such as the core area of a storm.

There are seven weather surveillance radar systems utilized by the National Weather Service Fort Worth Weather Forecast Office. The Fort Worth radar, a WSR-88D Doppler radar, is located at Spinks Airport in southern Tarrant County. Other WSR-88D radars are in Granger, TX at Dyess AFB near Abilene, Frederick, OK, and Shreveport, LA. In addition to these five network radar sites, the NWS has access to terminal Doppler radars at Dallas Love Field and DFW International Airport. Finally, several broadcast television stations have individual radars which can be accessed via the web.

Before, during, and even after an event periodically check your radar feed to maintain awareness of storms in the area. While using this data for situational awareness be especially cautious of some of the limitations of the radar and its beam. The WSR-88D focuses a one-degree beam width that spreads out with distance. The beam is approximately one mile wide at seventy-five miles from the radar site. Therefore, the radar is unable to effectively sample storms further away from the site. If a storm is too close to the site, it will not be sampled well in the upper levels, which may give the appearance of the storm weakening. In both cases, the Skywarn spotter is the missing piece that can put eyes on the storm and effectively observe what is occurring at ground level.

Algorithms are another serious limitation of weather radar. We have all seen the hail size estimation, tornado vortex signature (TVS), or mesocyclone markers on radar displays. These algorithms are designed to highlight storms for further interrogation and are not ground truth. Although some are useful, nearly all are wrong. It is recommended that spotters not use the algorithms. Should you use the algorithms, be aware that the scan-to-scan changes are much more important than any values given for any one scan.

Radar is a tool. The trained Skywarn spotter is a craftsman. Both have limitations. The radar is limited technically while the primary limitation on the spotter is safety. Use radar when appropriate but focus your eyes and training on the storm. When both sets of data are used in combination, good warning and safety of life decisions can be made.

Radar DOs and DON'Ts:

DO:

- Use the radar for situational awareness.
- Remain cognizant of the technical limitations of radar.
- Understand that radar is not real-time data. Scan updates may be five, or more, minutes behind real time.
- Pay attention to changes in the scan-to-scan updates.
- Put your eyes on the storm. Your ground truth observations are valuable.

DON'T:

- Make a radar observation report. Traffic regarding TVS, mesocyclone, or hook echo are obvious “armchair spotter” reports and have no value to our served agencies. Our served agencies have access to radar data. The National Weather Service is responsible for radar interpretation.
- Rely on radar algorithms for making spotting decisions. At worst you may endanger yourself. At best they only offer guidance to storm structure.

North Central Texas Outdoor Warning System

These guidelines are meant to describe the regional guidelines about the use of outdoor warning systems in the North Central Texas Area (NCT) and to establish recommendations for their use.

Outdoor Warning System

An Outdoor Warning System (OWS) consists of siren(s) designed to alert citizens of approaching or existing hazardous conditions, which will require immediate protective actions to save lives and property. Traditionally, these systems have been mistakenly referred to as “tornado sirens,” but the term fails to acknowledge all applications for sounding sirens. By verbal agreement, the NCT area shall refer to sirens as “Outdoor Warning Sirens” to reinforce the multiple conditions for which communities may sound sirens to alert citizens in outdoor areas. Additional work is necessary to change peoples' thinking of “tornado sirens” and instead think of Outdoor Warning Systems.

Reasons for Activation

Communities develop an outdoor warning system to alert and notify citizens in outdoor areas of emergencies. These situations include but may not be limited to natural emergencies, transportation accidents involving hazardous materials, emergencies at fixed facilities, acts of terrorism or other catastrophic events in which the community needs to be informed immediately. Citizens in indoor areas should not mistakenly wait to hear a siren as their only source of warning information. An NOAA All Hazards Radio with Specific Area Message Encoding (SAME) technology is a good method of receiving warning messages indoors. Additionally, some communities maintain other warning systems to alert citizens indoors.

Activation Guidelines

Even though communities vary in specific criteria for activating OWS, there are some commonalities in determining activation guidelines. Each community should review their activation criteria with policymakers on an annual basis to maintain a clear understanding of the community’s OWS and the capabilities by which the system can alert citizens in emergency conditions. Furthermore, at a minimum, efforts to brief the community of the OWS should be conducted annually.

The following are factors to consider as minimum activation guidelines:

- The National Weather Service issues a Tornado Warning or Severe Thunderstorm Warning with the phrase "Destructive winds more than 70 mph (or higher) are likely with this storm" for your immediate area. A community existing in multiple counties should pay close attention to the warning area.
- Trained storm spotters have reported a tornado in the jurisdiction, or in a neighboring jurisdiction that has the potential to affect your community. (Each community should determine satisfactory methods for verifying tornado activity reports).
- Reported hail of 1.25" in diameter or greater. (1 inch may be more appropriate for areas or events where large numbers of people are outdoors)
- Other emergency as directed by the community’s elected officials.

Notification of Activation

A community should make external notifications to neighboring communities as soon as possible indicating the OWS has been activated. During RACES net activations, the notification could be conducted by announcing the amateur radio net in progress or other means available.

Additional Preparedness Actions

Public education should include information regarding OWS. Explanation on when the OWS is activated, along with what actions should be taken during an OWS activation should be included in community public education efforts. Finally, communities are encouraged to complete the National Weather Service Storm Ready Program. According to the NWS, “StormReady communities are better prepared to save lives from the onslaught of severe weather through better planning, education, and awareness. No community is storm proof, but StormReady can help communities save lives”. Additional information about the StormReady Program can be found at www.stormready.noaa.gov.

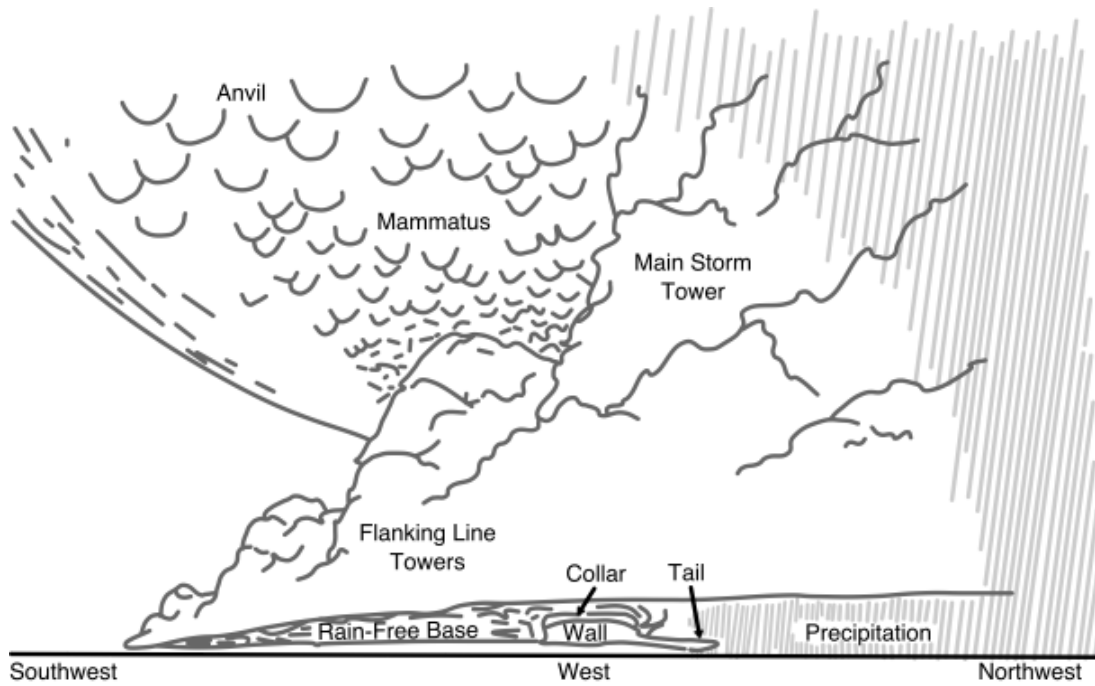
Monthly Testing

Communities in North Central Texas test their Outdoor Warning Systems (OWS) during the first week of each month based on their testing protocols. OWS will not be tested during periods in which severe weather is possible, to avoid confusion between actual severe weather and testing. Some cities may conduct additional testing to ensure systems are functioning properly as needed.

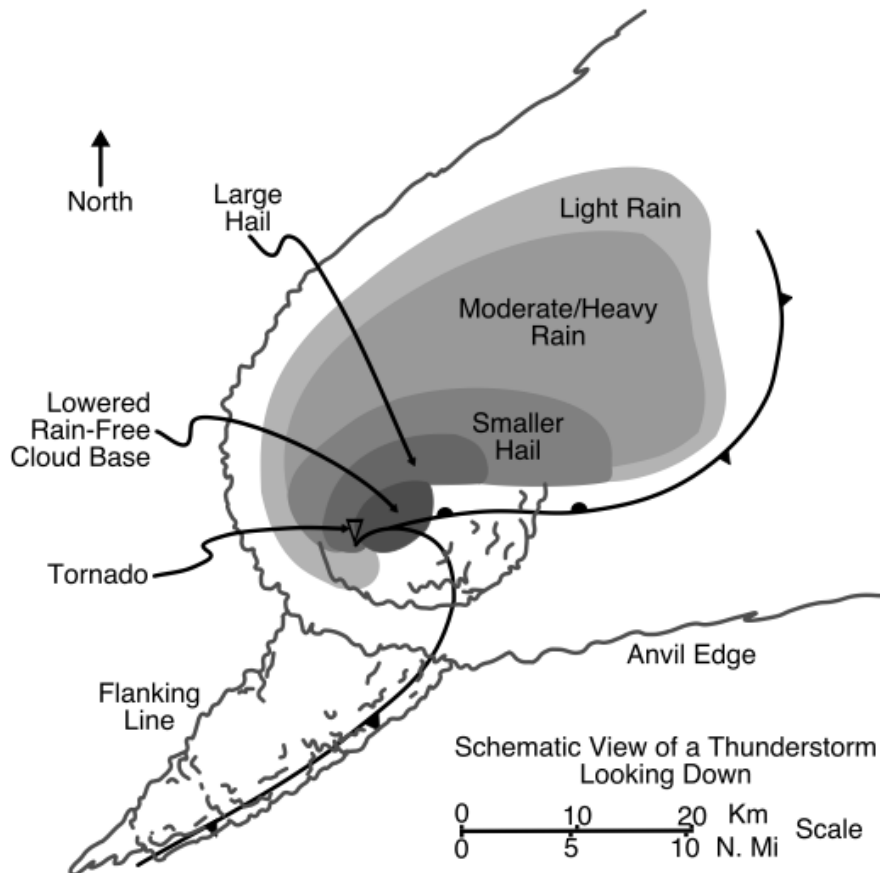
References

Federal Emergency Management Agency (FEMA) Outdoor Warning System Guide, CPG1-17R

Schematic Views of Thunderstorms



Schematic View of a Tornadoic Thunderstorm
Side View Looking West



Schematic View of a Thunderstorm
Looking Down

0 10 20 Km Scale
0 5 10 N. Mi

Storm Danger Area Guidance

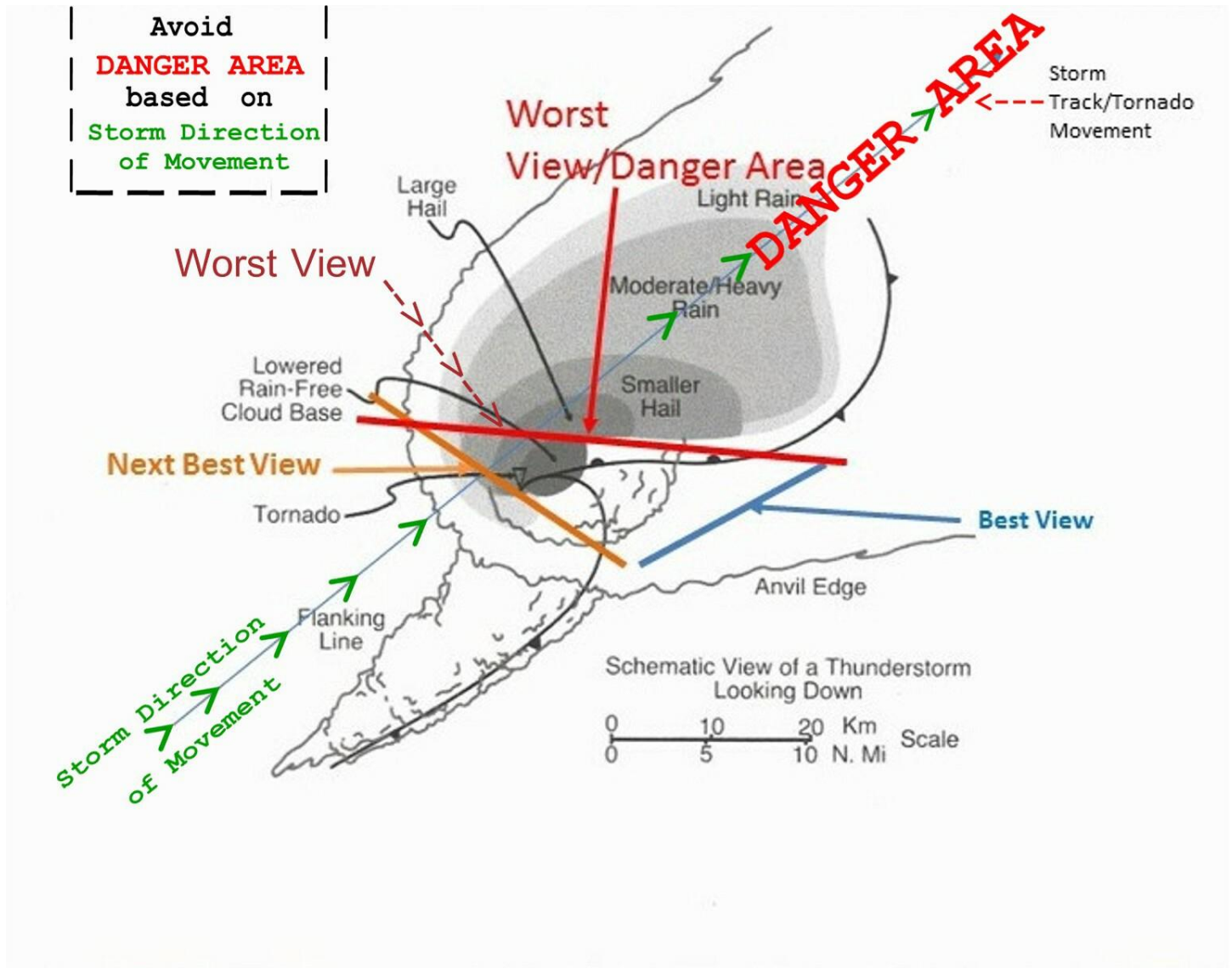


Figure courtesy of Billy Geer, KA5OZC

Tornado Safety Tips

If a Warning is issued or if threatening weather approaches:

- In a home or building, move to a pre-designated shelter, such as a basement.
- If an underground shelter is not available, move to an interior room or hallway on the lowest floor and get under a sturdy piece of furniture.
- Stay away from windows.
- Get out of automobiles.
- Do not try to outrun a tornado in your car; instead, leave it immediately.
- Do not use bridges or overpasses for shelter from tornadoes.
- Mobile homes, even if tied down, offer little protection from tornadoes and should be abandoned.
- Occasionally, tornadoes develop so rapidly that advance warning is not possible. Remain alert for signs of an approaching tornado.
- Flying debris from tornadoes causes most deaths and injuries.

Flash Flood Safety

When a flash flood Warning is issued for your area, or the moment you realize that a flash flood is imminent, act quickly to save yourself. You may have only seconds!

- Get out of area subject to flooding. These include dips, low spots, canyons, washes and the like.
- Avoid already flooded and high-velocity flow areas. Do not attempt to cross flowing streams.
- If driving, be aware that the road bed may not be intact under flood waters. Turn around and go another way. NEVER drive through flooded roadways!
- If the vehicle stalls, leave it immediately and seek higher ground if you can safely. Rapidly rising water may engulf the vehicle and its occupants and sweep them away. Remember, it's better to be wet than dead!
- Be especially cautious at night when it is harder to recognize flood dangers.
- Do not camp or park your vehicle along streams and washes, particularly during threatening conditions.

Severe Thunderstorm and Lightning Safety

Severe thunderstorms are dangerous environments:

- If you can hear thunder, you are close enough to the storm to be struck by lightning. Go to safe shelter immediately!
- Move to a sturdy building and stay away from windows. Do not take shelter in small sheds, under isolated trees, or in convertible automobiles.
- If a sturdy shelter is not available, get inside a hard-top automobile and keep windows up. Beware, though, since vehicles offer poor protection from downburst winds and only fair protection from hail.
- Get out of boats and away from water.
- Unplug appliances not necessary for obtaining weather information. Avoid using the telephone or any electrical appliances. Use landline phones ONLY in an emergency.

If caught outdoors and no shelter is nearby:

- Find a low spot away from trees, fences, and poles. Make sure the place you pick is not subject to flooding.
- If you are in the woods, take shelter under the shorter trees.
- If you feel your skin tingle, or your hair stands on end. Squat low to the ground on the balls of your feet. Make yourself the smallest target possible and minimize contact with the ground.
- If you are boating or swimming, get to land and find shelter immediately!

Wind Chill Effect Chart

		Actual Thermometer Reading °F												
		40	35	30	25	20	15	10	5	0	-5	-10	-15	-20
Wind Speed (MPH)	5	36	31	25	19	13	7	1	-5	-10	-16	-22	-28	-34
	10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41
	15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45
	20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48
	25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51
	30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53
	35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55
	40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57
	45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58
	50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60
	Time to Frostbite		30 Min.				15 Min.			10 Min.		5 Min.		

Wind speeds greater than 40 MPH have little-added effect on Wind Chill.

Heat Index Chart

		Air Temperature (°F)											
		90	92	94	96	98	100	101	102	103	105	106	
Relative Humidity (%)	100	132	143										
	95	132	137										
	90	122	131	141									
	85	117	126	135	145								
	80	113	121	129	138								
	75	109	116	124	132	141							
	70	106	112	119	126	134	143						
	65	103	108	114	121	128	136	140	144				
	60	100	105	110	116	123	129	133	137	141	149		
	55	97	101	106	112	117	124	127	130	134	141	145	
	50	95	99	103	108	113	118	121	124	127	134	137	
45	92	96	100	104	109	114	116	119	122	127	130		
40	91	94	97	101	105	109	112	114	116	121	124		
		Hot				Very Hot							
		Apparent Temperature (°F)											

Hot - Heat stroke, heat cramps or heat exhaustion possible with prolonged exposure or physical activity.

Very Hot - Heat cramps or heat exhaustion likely and heatstroke possible with prolonged exposure and physical activity.

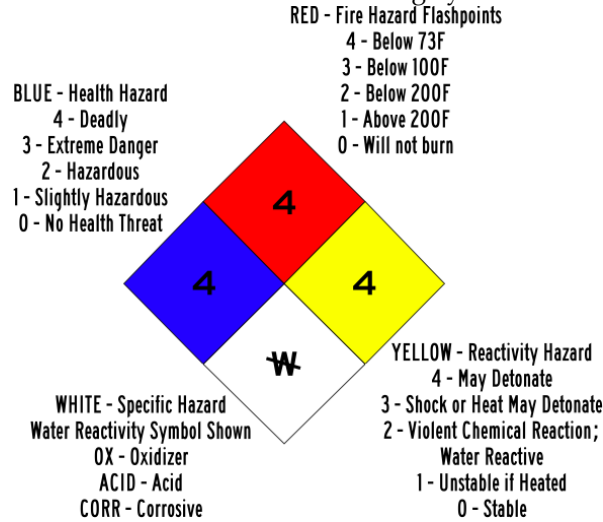
Extremely Hot - Heat stroke likely with continued exposure.

Charts created by John Galvin, N5TIM

Hazardous Material Labeling System

National Fire Protection Association – NFPA 704

Hazardous Material Labeling System¹⁵



Hazards are rated on a scale of 0 to 4. Level 4 is the most dangerous level.

Health Hazard	Fire Hazard	Reactivity Hazard
4 Materials which on very short exposure could cause death or major injury, even with prompt medical attention.	4 Materials which will rapidly vaporize at atmospheric pressure and normal temperature, or which are readily dispersed in air and will burn readily.	4 Materials which are readily capable of detonation or explosive decomposition or reaction at normal temperatures or pressures.
3 Materials which on short exposure could cause death or major injury even though prompt medical treatment is given.	3 Liquids and solids that can be ignited under almost all temperature conditions.	3 Materials which in themselves are capable of detonation or explosive reaction but require a strong initiating source or which must be heated under confinement before initiation or which react explosively with water.
2 Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical treatment is given.	2 Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur.	2 Materials which are normally unstable and readily undergo violent chemical change but do not detonate. Also, materials which may react violently with water or which may form explosive mixtures with water.
1 Materials which on exposure would cause irritation but only minor residual injury, even if no treatment is given.	1 Materials that must be preheated before ignition can occur.	1 Materials which are normally stable, but which can become unstable at elevated temperatures and pressures or which may react with water with some release of energy but not violently.
0 Materials which on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials.	0 Materials that will not burn.	0 Materials which are normally stable, even under fire exposure conditions, and which are not reactive with water.

¹⁵ Information from <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=704>

RACES/ARES Communications Resource Functions¹⁶

Resource Guide - For ARES, RACES, EmComm and Public Service Communications

This Guide is an aid in defining a communications resource standard for Amateur Radio communicators

Amateur Radio Resource Typing identifies amateur radio communicator function types and enables Emergency Managers, Staging Managers, EmComm Leaders and Event Coordinators to identify, request and receive standardized amateur radio resources in support of an emergency, disaster or event. This guide identifies resource types and equipment for each function amateur radio communicators typically perform. By implementing Resource Typing, amateur radio resources are easier to request and supply allowing assignments to be filled quickly. All ARR Resource kits are portable⁸

Basic Resource Functions

Amateur Radio Resource^A (ARR) Communications Types and Equipment Kits

◆ Amateur Radio Resource - Type S Function = Shadow | VHF/UHF

ARR-S - Denotes an amateur radio communicator and listed equipment functioning as a "foot mobile" amateur radio station shadowing a designated official. * Carried by all Resource Types

- Hand-held, 2 Meter (2M/70cm Recommended) FM synthesized transceiver with programmable CTCSS, 3.5 watts minimum output and earphone or headset attachment (VOX disabled)
- Adapter cable/bracket or magnetic mount antenna for temporary vehicle duty with shadow

◆ Amateur Radio Resource - Type M Function = Mobile | VHF/UHF

ARR-M - Denotes an amateur radio communicator and listed equipment functioning as a mobile amateur radio station temporarily installed in a vehicle (car, truck, van, bus, boat, Aircraft, etc.).

- 2 Meter (2M/70cm Recommended) Transceiver with programmable CTCSS, 25 watts minimum output
- Gain antenna (dual band recommended) with magnetic base with 15' of coax cable to PL259 connector

◆ Amateur Radio Resource - Type B Function = Base | VHF/UHF

ARR-B - Denotes an amateur radio communicator and listed equipment functioning as a portable amateur radio station temporarily set-up at remote locations providing communications to/from field bases, net control, EOC, CP, Shelter, Staging or rest/aid station, etc.

- 2 Meter (2M/70cm Recommended) FM Transceiver with programmable CTCSS, 25 watts minimum output
- Gain antenna (dual band recommended) with mast and support, 25' minimum coax cable with PL259 connectors, PL258 coupler (Additional 25' or longer RG-8X or RG-8 coax cable recommended)

◆ Amateur Radio Resource - Type H[] Function = High-Frequency | HF²

ARR-H[] - Denotes an amateur radio communicator and listed equipment functioning as a portable HF amateur radio station temporarily set-up at remote locations providing intermediate to long range communications.

A General Class or higher License is required. - [Sub Functions]: **f** - Field; **m** - Mobile (for in vehicle use)

- All modes High Frequency SSB DC Transceiver with auto-tuner, 100 Watts output minimum
- HF Antenna(s), mast and support accessories, 50' coax cable with PL259 connectors. (Additional 50' – 100' RG-8X or RG-8 coax cable recommended) PL258 coupler with each coax cable. Miscellaneous coax and power adapters. Common bands are 20, 40, 60, 80 & 160 meters. 40M, 60M & 80M preferred for EmComm support. NVIS capability recommended for tactical operations

◆ Common items included in all Amateur Radio Resource equipment kits

- Copy of amateur radio license, badge/ID, and photo driver's license
- Writing material; pen, pencil, writing pad, and message forms (ICS-213, 214, 205, Radiogram, etc.)
- Transceiver operating instructions or summary guide
- External speaker with 1/8" phone plug and earphones or headset attachment with VOX disabled
- Portable power source meeting equipment needs for a minimum of 12 hours of typical operation (Medium to Long Assignments may require additional power sources)
- Vehicle power port and clip lead power adapters, equipment fuses and power cords with all equipment ARES/RACES standardized (Powerpole™, PL-259, 1/8" speaker plug)

¹⁶ More information may be found at https://www.qsl.net/n5tim/DOCS/HamCom-2019_AR_ResourceTyping.pdf

- Duct tape, miscellaneous adapters and comfort items (food, water, optional chair and table)
- Mission suitable personal support gear (Refer to local group standard kit lists; adjust for duration/season)

◆ Amateur Radio Resource Operator^c – Type ARRO[] [Any Basic or Specialty Function]

ARRO-[] – An amateur radio communicator without radio equipment, capable of operating the designated resource functions. Append function designator to ARRO (i.e., ARRO-B) An ARRO will always carry a ARR Common items kit.

- ◆ **Assignment Durations:** **Short** – 12 hours or less in duration (Shift) **Medium** – 12 to 72 hour duration (Shifts)
 Long – 72 hour or greater duration (Typically an away assignment)
-

*** Resource Amateur Radio Operators are to be proficient in the designated Resource Function**

Specialty Resource Functions

Amateur Radio Resource^A (ARR) Communications Types and Equipment Kits

◆ Amateur Radio Resource - Type TM[] Function = Tactical Data Messaging | VHF/UHF

ARR-TM[] - Denotes an amateur radio communicator and listed equipment functioning as a "last mile" (Tactical) messaging system providing traceable messaging and/or "radio email" with attachments.

[Sub Functions]: **w** - Winlink capable; **u** - User group's messaging software (specify if known)

- ARR-B** Equipment Kit
 - Terminal Node Controller (TNC) with necessary data cables, accessories, and documentation
(A soundcard implementation may be used in lieu of a hardware TNC at user group's discretion.)
 - Computer (laptop or other w/min 2 serial ports or USB to serial adapters) suitable for portable operations, running mission applicable amateur radio software, with minimum of 25' CAT5 cable – (Printer, printing supplies, Scanner, AC adapter recommended), min 16GB Flash Drive
 - Software: Winlink Express program and/or user group's standard Data program(s)
-

◆ Amateur Radio Resource - Type SM[] Function = Strategic - Long Range Data Messaging | HF

ARR-SM[] - Denotes an amateur radio communicator and listed equipment functioning as a HF intermediate to long range (Strategic) data messaging system providing traceable messaging and/or "radio email" with attachments. (General Class or higher License required for operation)

[Sub Functions]: **p** - Pactor; **f** - forwarding station²; **m** - MARS; **s** - sound card (ARDOP/VARA/FLDIGI/PSK31, etc.)

- ARR-TM[]** Equipment Kit .
 - ARR-H[f]** Equipment Kit
 - Pactor II or III modem required for Sub Functions **[f]**, **[p]** & **[m]** plus data interface cable(s)
 - Winlink Suite of Programs and/or programs supporting user group's operational modes
 - Sound Card Interface w/accessories if required to support sound based communications mode **[s]**
-

◆ Amateur Radio Resource - Type DA Function = Data - APRS Operations | VHF/UHF

ARR-DA - Denotes an amateur radio communicator and listed equipment implementing a real-time tracking system providing officials a view of "tagged" assets. Data is received from ARR-RT tagged units direct or via the Automatic Positioning Reporting System.

- ARR-B** equipment
 - Terminal Node Controller (TNC) with necessary cables, accessories, documentation and 16GB Flash Drive
 - Computer (laptop or other) suitable for portable operations, running mission applicable amateur radio software, with minimum of 25' CAT5 cable and min 16GB Flash Drive
 - Software: User group APRS program with digipeating capability
-

◆ Amateur Radio Resource - Type RT Function = Data – Resource Tracking| VHF/UHF

ARR-RT - Denotes amateur radio equipment implementing an asset tracker. This resource is attached to designated assets and transmits position data for monitoring with the AAR-DA resource. Equipment is configured by an amateur radio communicator.

- Self contained pre-packaged portable equipment unit containing transceiver, antenna, Global Positioning Satellite (GPS) unit, APRS tracking encoder, power unit, and necessary internal/external cabling
-

◆ Amateur Radio Resource - Type DN[] Function = Data Networking | MESH / LAN / WiFi

ARR-DN[] - Denotes amateur radio equipment implementing the communications function for a 802.[b/g/n] resource providing a wireless LAN node(s) and "WiFi" in support of event or incident communications. Equipment is configured by an Amateur Radio communicator.

[Sub Functions]: **h** – HSMM MESH; **a** – AREDN MESH; **c** – Commercial

- Self contained wired or wireless 802.11[] capable unit functioning as a Bridge/Router/Access Point/MESH Node with antenna providing Ethernet or WiFi to the user. Capable of operating on +12 VDC power
- Minimum of 50' Cat5 cable with POE interface (NY Standard)
- Support equipment (Mast & Stand, aiming device, CAT5 cable jumpers, LAN hub/switch, power etc.)

Notes:

- A. Always assign as team of two unless for rotation.
- B. Local VHF/UHF data to/from out of area via HF stations requiring Pactor II or III
- C. To request a support/relief operator, See Amateur Radio Resource Operator (ARRO)

- ◆ **Assignment Durations:**
- Short** – 12 hours or less in duration (Shift)
 - Medium** – 12 to 72 hour duration (Shifts)
 - Long** – 72 hour or greater duration (Typically an away assignment)

BLMRS Completion Instructions

Front of Card

CALLSIGN		QUALIFIER	BLMRS		
FIRST NAME	LAST NAME	CELL PHONE			
LOCAL FREQUENCY	AVAILABLE UNTIL	PAGER			
ADDITIONAL INFO:					
VEHICLE:					
TAG	STATE	MAKE	TYPE	COLOR	
EMER:					
PHONE NUMBER	NAME	RELATIONSHIP			
aa5qx	March 19, 2003				

This side of the BLMRS card is filled out by the communicator.

Item	Instructions
CALLSIGN	Enter your callsign. Add unit number if applicable. ¹⁷
QUALIFIER	Indicate additional qualifiers that you can perform. See Qualifier form at Staging and/or indicate additional Resource Types.
BLMRS	Cross out qualifiers not applicable to you.
FIRST NAME	Enter your First name.
LAST NAME	Enter your Last name.
LOCAL FREQ.	Enter the frequency you will monitor while in the staging area.
AVAILABLE UNTIL	Enter the date and time you must deactivate.
PAGER	Enter your pager number if available.
ADD'TL INFO	Enter RACES unit number if applicable and any special conditions or situation you may have. If the Qualifier "L" is in effect, indicate the limitation to being assigned.
VEHICLE	Enter your vehicle information. This becomes important if the staging area is relocated and vehicle needs moving.
EMER	Enter your emergency contact information. <i>Do not leave blank.</i>

¹⁷ The location of a RACES member's unit number on the front of the card may be added to the call sign or placed in the Additional Info section. Group Radio Officer's discretion.

ICS-213 Message Form

1. Incident Name (Optional):		
2. To (Name and Position):		
3. From (Name and Position):		
4. Subject:	5. Date:	6. Time
7. Message:		
8. Approved by: Name: _____ Signature: _____ Position/Title: _____		
9. Reply:		

10. Replied by: Name: _____	Position/Title: _____	Signature: _____
ICS 213-NIMS	Date/Time: _____	

ICS 213 General Message Instructions

Purpose

The General Message (ICS 213) is used by the incident dispatchers to record incoming messages that cannot be orally transmitted to the intended recipients. The ICS 213 is also used by the Incident Command Post and other incident personnel to transmit messages (e.g., resource order, incident name change, other ICS coordination issues, etc.) to the Incident Communications Center for transmission via radio or telephone to the addressee. This form is used to send any message or notification to incident personnel that requires hard-copy delivery.

Preparation

The ICS 213 may be initiated by incident dispatchers and any other personnel on an incident.

Distribution

Upon completion, the ICS 213 may be delivered to the addressee and/or delivered to the Incident Communication Center for transmission.

Notes

The ICS 213 is a three-part form, typically using carbon paper. The sender will complete Part 1 of the form and send Parts 2 and 3 to the recipient. The recipient will complete Part 2 and return Part 3 to the sender.

A copy of the ICS 213 should be sent to and maintained within the Documentation Unit.

Contact information for the sender and receiver can be added for communications purposes to confirm resource orders.

Block Number	Block Title	Instructions
1	Incident Name (Optional)	Enter the name assigned to the incident. This block is optional.
2	To (Name and Position)	Enter the name and position the General Message for which the message is intended. For all individuals, use at least the first initial and last name. For Unified Command, include agency names.
3	From (Name and Position)	Enter the name and position of the individual sending the General Message. For all individuals, use at least the first initial and last name. For Unified Command, include agency names.
4	Subject	Enter the subject of the message.
5	Date	Enter the date (month/day/year) of the message.
6	Time	Enter the time (using the 24-hour clock) of the message.
7	Message	Enter the content of the message. Try to be as concise as possible.
8	Approved by Name Signature Position/Title	Enter the name, signature, and ICS position/title of the person approving the message.
9	Reply	The intended recipient will enter a reply to the message and return it to the originator.
10	Replied by Name Position/Title Signature Date/Time	Enter the name, ICS position/title, and signature of the person replying to the message. Enter date (month/day/year) and time prepared (24-hour clock).

RACES Kit for Mobile or Portable Stations

Bold type indicates suggested minimum equipment list

1. **VHF transceiver (25-watt minimum output to the antenna for Skywarn, Resource Type M¹⁸)**
2. **Fuses for radio and auto.**
3. **USNG reference map for Dallas County or battery-operated GPS receiver capable of displaying USNG coordinates at 1-kilometer resolution.**
4. **RACES identification card, if issued.**
5. **Valid Amateur Radio license or photocopy.**
6. **Spare glasses. (If you cannot function without them)**
7. **Medications. (If required during a long activation)**
8. **First Aid kit.**
9. **Compass.**
10. **Flashlight and spare batteries.**
11. **Watch.**
12. **Clipboard with a pencil or pen and paper.**
13. **Vehicle's fuel tank full.**
14. **Foul weather gear appropriate for the season.**
15. Portable or handheld radio with extra batteries.
16. RACES hat. (Ball cap with official RACES emblem)
17. Spare antenna. (Magnetic mount preferred)
18. Basic hand tools. (Pliers, screwdrivers, clip leads, etc.)
19. A small amount of cash including some change.
20. Magnetic RACES signs for the vehicle.
21. RACES hard hat (White with the name on front and callsign on the back)
22. Binoculars.
23. City/county maps for broader coverage areas.
24. Rope, chains, flares, etc.
25. Alternate band equipment (UHF/HF).
26. Camera. (Film or digital)
27. ARRL message forms.
28. Canteen or water bottle and food.

¹⁸ For more information on Resource Types visit: <http://home.comcast.net/~jrgalvin2/resourcetypeC.pdf>

RACES Power Connector Standard

Anderson Powerpole

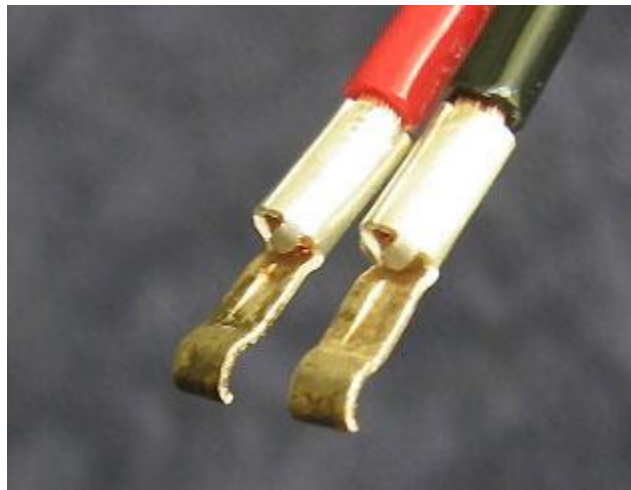
The Powerpole connector, designed by Anderson Power Products, is becoming increasingly popular with amateur radio operators around the country. Several major ham radio organizations have encouraged the use of these connectors in the theory that if everyone individually adopted this "standard", every operator's radio equipment would interface quickly and easily with one another's power supplies. Since amateur radio may be used in emergency communication situations, this level of portability is necessary to ensure interoperability of equipment.

Dallas Area RACES supports the use of Anderson Powerpoles. While the PP15, PP30, and PP45 models of the connector are interchangeable, we use the 1330 series, PP30, 30-amp connector.

Powerpole Assembly Instructions

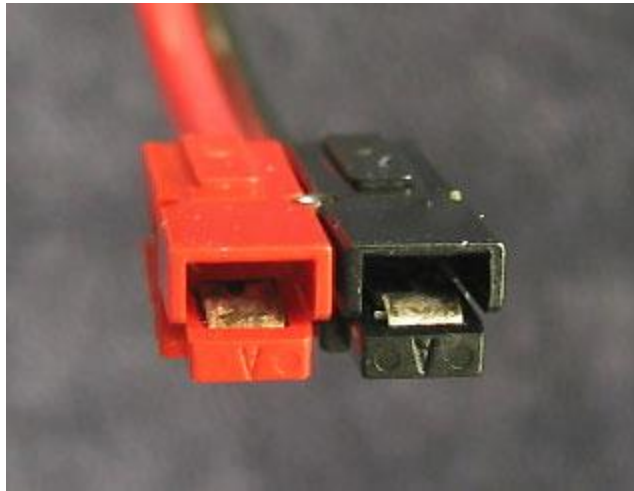
The 30-amp Powerpole connector is designed for use with wire sizes from # 12 to # 16 AWG. While you may use wire smaller than # 16 AWG for low current applications, wire larger than # 12 AWG will not enter the connector properly.

Strip 5/16" of insulation from the wire and insert the bare wire into the connector well. Either solder the connector onto the wire or use a crimp tool specifically designed for the Powerpole. If using solder, use sparingly and avoid solder on the connector tab. If using a molded wire, cut the wire to the same length. Assemble, so the ends of the connector tabs are flush with one another and are facing up with positive wire on the left, as viewed from the mating connector. Refer to the following picture.



As viewed from the mating connector, slide the red and black plastic housings together so that the red (positive) connector is to the left with connector hoods at the top. Take care to match the red and black housings correctly the first time as it may be difficult to separate them afterward.

Push the wire connectors firmly into the housing assembly. Each connector will click into position when fully seated. It may be helpful to use a jeweler's screwdriver or similar tool to push the connector into its housing. The final assembly should appear exactly like the one in the following picture.



Powerpoles may be found from numerous providers on the Internet, including:

PowerWerx.com
401 S. Harbor Blvd., F-320, La Habra, CA 90631
Tel: (714) 570-3303
Fax: (714) 990-5532
<http://www.powerwerx.com/>
info@powerwerx.com

SOURCE: Martin Schneider, K5GMS; pictures and text.

ITU Phonetic Alphabet

A	Alpha	N	November
B	Bravo	O	Oscar
C	Charlie	P	Papa
D	Delta	Q	Quebec
E	Echo	R	Romeo
F	Fox Trot	S	Sierra
G	Golf	T	Tango
H	Hotel	U	Uniform
I	India	V	Victor
J	Juliet	W	Whiskey
K	Kilo	X	X-Ray
L	Lima	Y	Yankee
M	Mike	Z	Zulu

HAND - Have. At. Need. Details.

To assist in emergencies the following reporting format has been developed that follows the letters of the word **HAND**.

H - Have - What type of emergency do you **Have**?

Is it a fire, accident with injury, a medical emergency?

A - At - You are **At** *location*?

An address or distance and direction from the nearest major intersection.

N - Need - What assistance do you **Need**?

Fire and Rescue, Police Officer, or Ambulance?

D - Details - What **Details** will help responders?

Details are those things that responders need to know before arriving on the scene. For instance: there is a fire; fuel or chemical spill; are there fumes; are there multiple victims; are there other hazards for which they need to prepare? If there is a Hazardous Material Placard on a vehicle involved in an accident, the numbers tell the responders the nature of the material involved. **Do not approach vehicles that display Hazardous Material Placards.** If the placard cannot be seen from your location, do not approach the vehicle and stay upwind if possible. Inform NCS or the emergency dispatcher if there is a Hazardous Material Placard.

PTT - Pause. Think. Transmit.

Before you press that key, use the following mnemonic to ensure your communications are clear, concise, and quick. If you are transmitting, we may not be able to hear the station with emergency traffic.

P - Pause.

Simply stop and give yourself a few breaths and the Net a bit of silence.

T - Think.

Consider what you are going to say and how you are going to say it. If it is a weather report are you following the procedures outlined in this manual?

T - Transmit.

Press the PTT key and make your transmission. Only after having paused and given appropriate thought.

Spotter Glossary

Anvil – The flat, spreading top of a cumulonimbus cloud. Often shaped like an anvil.

Beaver(s) Tail – An inflow band with a relatively broad, flat appearance suggestive of a beaver's tail. It is attached to a supercell's updraft and is oriented roughly east to west.

BLMRS -- The BLMRS card is RACES' equivalent to the NIMS Resource Status Card. It is used at staging to record incoming communicator contact information, resource capability, and to log assignment activity. The card provides the staging manager a tool to manage available and assigned resources, their status and location. See page .

Clear Slot – A local region of clearing skies or reduced cloud cover indicating an intrusion of drier air. Often seen on the west or southwest side of a wall cloud, believed to be a visual indication of a rear flank downdraft.

Cumuliform – Have the appearance of a cumulus cloud, a solid and lumpy or cauliflower-like in appearance. Cumuliform towers are often associated with strong updrafts.

Downburst – A strong downdraft resulting in an outward burst of damaging winds on or near the ground. Sometimes referred to as "straight-line winds." Downbursts can produce damage similar to a strong tornado.

Downdraft – A small-scale column of air that rapidly sinks toward the ground. Usually accompanied by precipitation as in a shower or thunderstorm.

Elevated Reporting Criteria – Net Control Stations will call for elevated reporting criteria for significant reports such as rotating lowerings, rotating funnels, flashes of light at ground level not associated with lightning, tornados or other immediate threats to life or property. When Elevated Reporting Criteria is in effect on a Skywarn Net, stations with only Minimum or Modified Reporting Criteria should hold their reports.

Flanking Line – A line of cumulus or towering cumulus clouds connected to and extending outward from the most active part of a supercell. Normally extends to the southwest of the main storm tower.

Flash Flooding -- A rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined flood level, beginning within six hours of the causative event (e.g., intense rainfall, dam failure, ice jam). However, the actual time threshold may vary in different parts of the country. Ongoing flooding can intensify to flash flooding in cases where intense rainfall results in a rapid surge of rising flood waters.

Funnel Cloud – A condensation funnel extending from the base of a towering cumulus or cumulonimbus. It is associated with a rotating column of air that is *not* in contact with the ground.

Glaciated – Having the appearance of a cirrus cloud. Thin in fibrous in appearance. Glaciated clouds are associated with the tops of thunderstorms, especially those with weaker updrafts.

Gust Front – The leading edge of gusty surface winds from thunderstorm downdrafts. It is sometimes associated with a shelf or roll cloud.

High Precipitation (HP) Supercell – A supercell with a large amount of visible precipitation encircling the mesocyclone. HP supercells can be difficult to observe visually, as the precipitation often obscures the updraft related cloud features.

Inflow Bands – Bands of low clouds, arranged parallel to the low-level winds and moving into or toward a thunderstorm. They may indicate the strength of the inflow of moist air into the storm, and hence, its potential severity.

Landspout – A tornado that does not arise from the organized storm-scale rotation and therefore is not associated with a wall cloud or a mesocyclone.

Low Precipitation (LP) Supercell – A supercell with little visible precipitation falling from it. LP supercells often have flared-out updraft towers with striations. Thus they are easy to recognize visually. However, they can be difficult to detect on radar.

Mammatus Clouds – Rounded, smooth, sack-like protrusions hanging from the underside of a thunderstorm anvil. Mammatus clouds often accompany severe thunderstorms but do not produce severe weather.

Mesocyclone – A storm-scale region of rotation, typically around two to six miles in diameter and often found in the right rear flank of a supercell, or on the front flank of an HP storm.

Minimum Reporting Criteria – The standard criteria required for reporting weather events on a Dallas Area RACES Skywarn Net. Defined as being equal to or greater than any of the following Flash flooding, wind greater than fifty miles per hour (50 MPH), or hail one inch (1”) or larger. Events that do not meet these Minimum Reporting Criteria should not be reported on a Skywarn Net. Net Control Stations may institute Modified or Elevated Reporting Criteria at the request of served agencies or to control or further limit Net traffic.

Modified Reporting Criteria – Net Control Stations will call for modified reporting criteria at the request of a served agency such as the National Weather Service. Modified Reporting Criteria may be, but not limited to, events such as wind or flooding reports with more specificity than implied in Minimum Reporting Criteria. When Modified Reporting Criteria is in effect on a Skywarn Net, stations with Minimum Reporting Criteria may continue to submit their reports.

Multiple-vortex Tornado – A tornado in which two or more condensation funnels or debris clouds are present, often rotating about a common center or each other.

Overshooting Top – A dome-like protrusion above a thunderstorm anvil, representing a very strong updraft and hence a higher potential for severe weather with that storm.

Power Flash – A blue-green flash caused by the arcing of electric power lines. They are often a visual indication of damaging winds.

Rain Foot – A horizontal building near the surface in a precipitation shaft, forming a foot-shaped prominence. A rain foot is a visual indication of a wet microburst.

Rain-free Base – A dark, horizontal cloud base with no visible precipitation beneath it. The rain-free base typically marks the location of the thunderstorm updraft.

Rear Flank Downdraft – A region of sinking dry air on the back side of and wrapping around a mesocyclone. The RFD is often visible as a clear slot wrapping around the wall cloud.

Roll Cloud – A low, horizontal tube-shaped cloud associated with a thunderstorm gust front.

Scud – Small, ragged, low cloud fragments that are unattached to a larger cloud base and often seen with and behind thunderstorm gust fronts. Scud clouds generally are associated with cool, moist air, such as thunderstorm outflow.

Severe Thunderstorm – A thunderstorm which produces tornadoes, hail 0.75 inches or more in diameter, or winds of 50 knots (58 MPH) or more. Structural wind damage may imply the occurrence of a severe thunderstorm.

Shelf Cloud – A low, horizontal wedge-shaped arcus cloud, associated with a thunderstorm gust front. The shelf cloud is attached to the base of the parent cloud above it.

Squall Line – A solid, or nearly solid line or band of active thunderstorms.

Striations – Groves or channels in cloud formations, arranged parallel to the flow of air and therefore depicting the airflow relative to the parent cloud. Striations often reveal the presence of rotation, as in the barber pole or “corkscrew” effect often observed with a rotating updraft.

Supercell – A thunderstorm with a persistent rotating updraft. Supercells are rare but responsible for a remarkably high percentage of severe weather events: especially tornadoes, extremely large hail, and damaging straight-line winds.

Tail Cloud – A horizontal, tail-shaped cloud (not a funnel cloud) at low levels extending from the precipitation region of a supercell toward the wall cloud.

Tornado – A violently rotating column of air in contact with the ground and extending from the base of a thunderstorm.

Tower Cumulus – A large cumulus cloud with great vertical development, usually with a cumuliform or cauliflower-like appearance, but lacking the characteristic anvil of a cumulonimbus.

Updraft – A small-scale column of rising air.

Virga – Precipitation which falls from a cloud base but evaporates before reaching the ground. Virga often has a streaky or stringy appearance as it hangs down from the cloud base.

Wall Cloud – A rotating, localized, persistent, often abrupt lowering from a rain-free base. Wall clouds can range from a fraction of a mile in diameter, up to nearly five miles in diameter and are normally found on the south or southwest side of the thunderstorm.

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