

Taylor County, Texas  
City of Abilene  
Radio Amateur Civil Emergency  
Service  
Amateur Radio Emergency Service  
Big Country Fire Fighters  
Association  
National Weather Service



## **STANDARD OPERATING PROCEDURE**

The purpose of this document is to establish a Standard Operating Procedure for Skywarn and other Emergency operations that would require a cooperative effort between any or all of the agencies described in this document.

Skywarn and other Emergency “nets” will be operated as “Directed Nets” and under a modified Incident Command System.

### **DEFINITIONS:**

A “*net*” is a network of people in cooperation with each other for a given purpose.

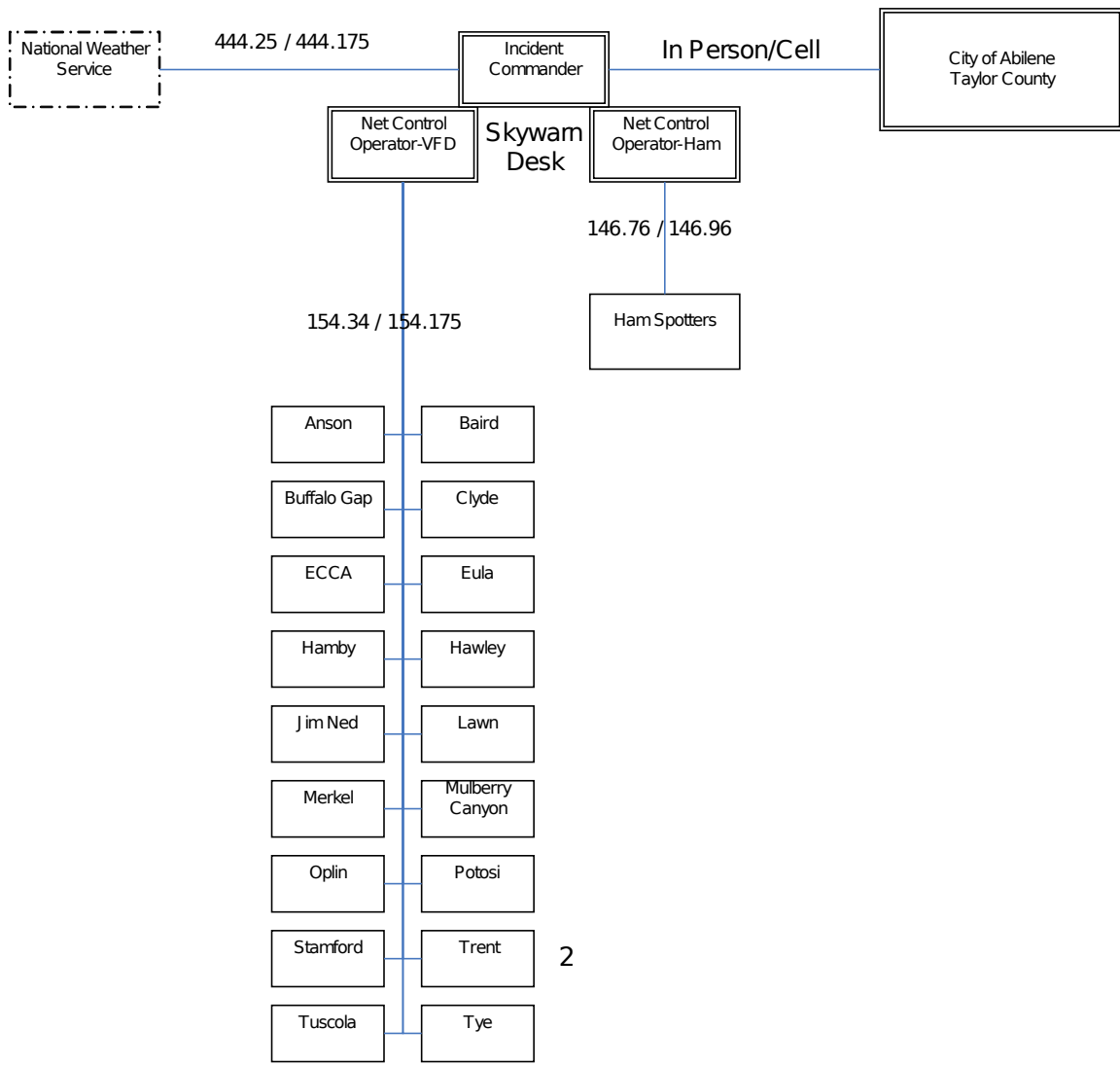
A “*Directed Net*” is defined as a communication under the control of a Net Control Operator (or Incident Commander). This person is in charge of the entire operation.

*“Incident Commander/Net Control Station”* oversees and directs the entire operation.

*“Net Control Operator”* is a person, under the direction of the Incident Commander or Net Control Station that will read statements of severe weather watches and warnings and handle of all net control operations including but not limited to;

- Check-ins
- Severe Weather Reports
- Priority and Emergency Traffic
- Severe Weather Statements
- Radar Reports
- Special Weather Statements
- Damage Reports

# Skywam Organizational Flow Chart



I. **Scope of Operation**

- Severe weather season runs from February through June. During this time, trained Skywarn storm spotters, in cooperation with the National Weather Service will provide information to the National Weather Service for the purpose of early warning to the general public.
- Storm Spotters should attend an annual Skywarn training session, which is conducted by the National Weather Service. After completing the training session, each spotter will be issued a “Skywarn Certified” spotter card.
- Storm Spotters will need some reliable means of communication. This can be either through ham radio channels, or volunteer fire department channels. Cell phones and CB radios are not reliable.

II. **Logistics of Operation**

- *THE NATIONAL WEATHER SERVICE* will provide the appropriate training to adequately equip Storm spotters with the necessary tools to be effective spotters. They will also publish on their web site various training sessions, dates, and locations.
- *THE NATIONAL WEATHER SERVICE* will establish several means of communications ahead of storm season between the various listed agencies. These communications will consist of a current list of phone numbers, e-mail addresses, and radio frequencies along with contact information. They will also test these communications prior to storm season.
- *THE CITY OF ABILENE* will provide a location where Skywarn operations can be housed. This location will include:
  1. An office area, with appropriate access privileges
  2. Cable TV connection
  3. High Speed Data connection
  4. Emergency Power
  5. Liaison between the city of Abilene and Skywarn spotters (either in person or via cell phone)
- *HAM RADIO OPERATORS* will provide personnel (as available) to run the Skywarn desk. Ham Radio operators are volunteers and will attempt to be available during severe weather nets, but because of circumstances such as employment, sickness, etc, may not be available when needed.

- *HAM RADIO OPERATORS* will be responsible for their own radio license and may provide radio equipment necessary for communication with spotters and the National Weather Service.
- *HAM RADIO OPERATORS and VARIOUS VFD MEMBERS* will provide additional training for Net operations as necessary.
- *VOLUNTEER FIRE DEPARTMENTS* will participate in National Weather Service training, and Net operations training.

### III. **Operations**

- When conditions appear to be right for a severe weather event day, the National Weather service will make the appropriate notifications to their contact list. This notification shall serve as a “heads up” notification for a potential severe weather event within the next few hours. Often, a conference calls to the appropriate contact list may be necessary.
- When conditions further deteriorate, the National Weather Service will send out text pages, and e-mail notifications as necessary. A Skywarn Net can be activated by either by the National Weather Service or by Ham Radio/VFD operators. Agencies within the activation area will be notified as quickly as possible, by what ever means is appropriate.
- Night Spotting is very dangerous because of limited visibility. Night activation will be held to a minimum and will be at the discretion of Emergency Coordinators, or VFD officers.
- Radio communications will be established as follows:
  1. Link between the Abilene Skywarn Desk and National Weather Service office: **444.250**. This frequency should only be used for communications by the NWS office and the Abilene Skywarn Desk. (Secondary Link will be **444.175**)
  2. Link between volunteer fire departments and the Abilene Skywarn desk will be via Big County Fire frequency: **154.340**. (Secondary link will be View VFD repeater **154.175**)
  3. Local Ham Radio spotters will use a primary frequency of **146.760** (Secondary frequency will be **146.960**).
  4. Volunteer Fire Departments will operate on their own frequencies. If someone needs to make a report a designated person will switch to BCFF frequency and make the necessary report or ask an appropriate question.

Frequencies:

Anson:	154.370
Baird:	154.355
Buffalo Gap	154.190
Clyde:	154.265
ECCA:	158.895

Eula:	153.950
Hamby:	154.295
Hawley:	154.130
Jim Ned:	158.740
Lawn:	158.955
Merkel:	156.210
Mulberry Cn:	154.040
Oplin:	154.220
Potosi:	155.940
Stamford:	154.400
Trent:	154.250
Tuscola:	155.205
Tye:	154.205

5. Storm spotting is vital, but also can be very dangerous. *No one should attempt storm spotting without first obtaining the proper training!*
6. Space between transmissions should be allowed so that stations with emergency traffic will be heard when they need to break in.

- **Net Operations:**

1. Potential spotters should be ready to take an assignment before checking into a net. This means that cars should already be gassed up, and radios in good working order.
2. Each entity will keep a record of spotters under their respective jurisdictions who have checked into their nets. Spotters should not leave their assignment without checking out of the network. This is done by: Hams contacting the Net Control operator; VFD personnel by contacting their appropriate officer in charge.
3. The Skywarn Desk will communicate all pertinent information received from the National Weather Service on both the Ham Radio network and VFD network. They will also be responsible for communication of pertinent information from these agencies to the National Weather Service office.
4. The National Weather Service office will provide Ham Radio operators at their office as necessary for communication between the San Angelo NWS office and the Abilene Skywarn Desk.
5. A *WATCH* means that conditions are right for the formation of severe weather. When a watch is issued by the National Weather Service, storm spotters should monitor the appropriate radio frequency in anticipation of a net activation.

6. A *WARNING* means that severe weather has been sighted and the appropriate action should be taken; i.e. activation of a Skywarn net. It may be necessary to activate a net prior to a warning as deemed necessary by the NWS personnel. When a warning is issued, a representative of Incident Command will contact the NWS office in San Angelo and obtain a quick update on weather conditions. This information will be immediately communicated on the primary Ham Radio frequency and BCFF frequency.
7. The Abilene Skywarn Desk will make a reasonable effort to support the communities around Abilene, even if there is no threat to the city of Abilene. The National Weather Service in San Angelo will also make a reasonable effort to support the Abilene area, even if there is no severe weather threat to San Angelo.
8. Unless otherwise noted, weather reports will be taken in order of severity. If no severe weather has been sighted, casual contacts and reports can be made via 2-way radio channels. Once severe weather is sighted, NO CASUAL CONTACTS should be made. Only reports of severe weather that are equal to or greater than the most current report should be made. In other words, if  $\frac{3}{4}$  inch hail has been reported, pea size hail is insignificant and should not be reported. If a tornado or funnel cloud has been reported, heavy rain, and  $\frac{3}{4}$  inch hail is insignificant and should not be reported unless requested by the Incident Command station.

Priority ONE is the spotting of:

**A Tornado** – A violent rotating column of air and moisture hanging from the cloud base and is in contact with the ground. The first sign may be a funnel at the cloud base. Your first clue may be debris or dust at the ground level, without actually seeing a rotating funnel. Be alert to events at ground level. A loud roar is frequently associated with a tornado. If you spot a tornado, always be alert for formation of others in the area.

**A Funnel Cloud** – Same as a tornado, except is not in contact with the ground.

**A Wall Cloud** – An isolated lowering of the cloud base. Watch this over a period of time. Persistence is very important. A wall cloud might have rotation.

**A Flash Flood** – Flooding that rises and falls rapidly with no advance warning.

Secondary Reports:

Hail – report larger than ¼ inch

High Wind

Heavy Rain

A storm is considered severe if the hail size is ¾ inch or greater.

**NOTE:** If you find yourself in large hail, you may be near an area where a tornado is likely to form.

9. After a storm has passed, spotters checked into the various networks should check out with their appropriate command officer. It may also be necessary to compile damage reports. If requested by the NWS office, call these reports into the Skywarn Desk. Otherwise, compile these reports and e-mail them to the NWS office.

Although reporting criteria may vary slightly depending on the spotter network and local needs, these are the events the National Weather Service would like to know about as soon as possible:

<b>TORNADO</b>		
<b>FUNNEL CLOUD</b>		Organized, persistent, sustained rotation
<b>WALL CLOUD</b>		Organized, persistent, sustained rotation
<b>HAIL</b>	Dime size or larger	Report the largest size hailstone
<b>WIND GUSTS</b>	58 mph or higher	Specify estimate or measurement
<b>FLOODING</b>		Flooding that impacts roads, homes or businesses.
<b>STORM DAMAGE</b>		Damage to structures (roof, siding, windows, etc) Damage to vehicles (from hail or wind)  Trees or large limbs down Power/telephone poles or lines down Damage to farm equipment, machinery, etc

### Some commonly used hail sizes

<b>Pea</b>	.25 inch	<b>Golf Ball</b>	1.75 inch
<b>Half-inch</b>	.50 inch	<b>Hen Egg</b>	2.00 inch
<b>Dime</b>	.75 inch	<b>Tennis Ball</b>	2.50 inch
<b>Nickel</b>	.88 inch	<b>Baseball</b>	2.75 inch
<b>Quarter</b>	1.00 inch	<b>Tea Cup</b>	3.00 inch
<b>Half Dollar</b>	1.25 inch	<b>Grapefru it</b>	4.00 inch
<b>Ping Pong Ball</b>	1.50 inch	<b>Softball</b>	4.50 inch

### General Guidelines for Estimating Wind Speeds

<b>30-44 mph (26-39 kt)</b>	Whole trees in motion. Inconvenient walking into the wind. Light-weight loose objects (e.g., lawn furniture) tossed or toppled.
<b>45-57 mph (39-49 kt)</b>	Large trees bend; twigs, small limbs break and a few larger dead or weak branches may break. Old/weak structures (e.g., sheds, barns) may sustain minor damage (roof, doors). Buildings partially under construction may be damaged. A few loose shingles removed from houses.
<b>58-74 mph (50-64 kt)</b>	Large limbs break; shallow rooted trees pushed over. Semi-trucks overturned. More significant damage to old/weak structures. Shingles, awnings removed from houses; damage to chimneys and antennas.
<b>75-89 mph (65-77 kt)</b>	Widespread damage to trees with large limbs down or trees broken/uprooted. Mobile homes may be pushed off foundation or overturned. Roof may be partially peeled off industrial/commercial/ warehouse buildings. Some minor roof damage to homes. Weak

	structures (e.g., farm buildings, airplane hangars) may be severely damaged.
<b>90+ mph (78+ kt)</b>	Many large trees broken and uprooted. Mobile homes damaged. Roofs partially peeled off homes and buildings. Moving automobiles pushed off the road. Barns, sheds demolished.

## **HOW TO REPORT**

Your severe weather report should be detailed but concise, and should address the following questions:

**WHAT** did you see?

**WHERE** did you see it? Report the location/approximate location of the event. Be sure to distinguish clearly between where you are and where the event is thought to be happening (“I’m 5 miles north of Mayberry. The tornado looks to be about 5 miles to my northwest”).

**WHEN** did you see it? Be sure that reports that are relayed through multiple sources carry the time of the event, NOT the report time.

Any other details that are important - How long did it last? Direction of travel? Was there damage? etc.

## TERMINOLOGY

**ANVIL** The spreading of the upper portion of a cumulonimbus cloud into an anvil-shaped plume. Strong or severe thunderstorms often have thicker anvils with the side and bottom having a slowly boiling appearance.

**CUMULONIMBUS CLOUD** The parent cloud of a thunderstorm. The cumulonimbus cloud towers above ordinary cumulus clouds with stronger or severe storms often having more sharply outlined “hard” appearance and relatively rapid rising motions. The cloud’s upper portion includes the anvil. Accompanying precipitation is often heavy with the usual occurrence of lightening and thunder.

**DOWNDRAFT** A column of generally cool air that rapidly sinks to the ground, most often accompanied by precipitation in a shower or thunderstorm.

**DRY LINE** This is the separation point between the warm and cold air. This is the place most likely where thunderstorms will begin building.

**FLANKING LINE** A line of clouds connected to and extending outward from the

most active portion of a parent cumulonimbus cloud, usually found on the southeast side of the storm.

**FLASH FLOODING** Flooding that develops quickly on streams or rivers, usually as a result of a thunderstorm. There is usually little time between the detection of flooding conditions and the arrival of the flood crest.

**FRONT** A transition zone between two different air masses.

**FUNNEL CLOUD** A funnel shaped cloud extending from a towering cumulus or cumulonimbus cloud base. It is associated with a rotating air column that is NOT in contact with the ground. The cloud is a tornado of a ground-based debris or dust whirl is visible below the funnel cloud.

**GUST FRONT** The leading edge of the thunderstorm downdraft air. The gust front is most prominent beneath the rain-free base and on the leading edge of any approaching thunderstorm. It is usually marked by gusty, cool winds, and sometimes blowing dust. The shelf or roll cloud sometimes accompanies the gust front.

**HOOK ECHO** A radar pattern sometimes observed in the southwest quadrant of a tornadic thunderstorm. Appearing like the number 6 or a fishhook turned in toward the east, the hook echo is precipitation aloft around the rotating column of air. The hook echo is often found in a favorable area for tornado development.

**MAMMATUS CLOUDS** These clouds appear as hanging, rounded pouches on the underside surface of a cloud mass. This is the underside of the anvil. These clouds do not produce tornados, funnels, hail or any other type of severe weather, although they sometimes accompany severe thunderstorms.

**RAIN FREE BASE** A horizontal, dark, cumulonimbus base that has no visible precipitation beneath it. This location usually marks the location of a thunderstorm updraft. Tornados usually develop from the wall clouds that are attached to the rain-free base or from the rain free base itself.

**ROLL CLOUD** A relatively rare, low-level horizontal, tube-shaped accessory cloud completely detached from the cumulonimbus base. It is usually located along the gust front and most frequently observed on the leading edge of a thunderstorm line. The roll cloud will appear to be slowly rolling along a horizontal axis. These clouds do not produce tornados.

**SCUD CLOUDS** Low cloud fragments often seen in association with and behind thunderstorm gust fronts. These clouds are ragged and wind torn and are not usually attached to the cloud base. Scud clouds do not produce severe weather. They can be mistaken for wall clouds, however.

**SEVERE THUNDERSTORM** A thunderstorm that goes from the mature stage to the severe stage. It is classed as severe if the winds are measured at 58 MPH or greater, it contains  $\frac{3}{4}$  inch hail or larger, funnel clouds, or tornados develop.

**SHELF CLOUD** A low-level horizontal accessory cloud that frequently appears to be wedge-shaped. The leading edge is usually smooth and is attached to the thunderstorm base and forms along the gust front. It is most often seen along the leading edge of the thunderstorm. Tornadoes rarely occur with a shelf cloud.

**TORNADO** A violently rotating narrow column of air in contact with the ground and extending from a thunderstorm base. A tornado is most often found on the southwest quadrant of the storm, near the trailing edge of the cumulonimbus cloud. Tornadoes and funnel clouds are from (1) wall clouds, or (2) directly from the thunderstorm base. Wind speeds can be as high as 300 MPH.

It may be difficult to spot a tornado at night. Look for flashes of light just above the ground. These occur when a tornado has hit a power line or transformer. You might also look for tornadoes that would be silhouetted against lightening behind them.

Another difficult tornado to spot is one that is imbedded in rain. If you are in unusually heavy rain and there is large hail, expect a tornado nearby. Be AWARE!

Tornadoes may not be visible until debris are sucked up into them. Often the tattle-tale sign of a tornado may be debris being scattered around on the ground, but no funnel is visible.

If a tornado does not seem to be moving either to the left or right and appears to be getting bigger, it is approaching your location. If possible, move at right angles to an approaching tornado.

**UPDRAFT** Warm moist air which rises and condenses into a visible cumulus or cumulonimbus cloud.

**WALL CLOUD** A local and often abrupt lowering of a rain-free base into a low hanging accessory cloud from 1 to 4 miles in diameter. The wall cloud is usually situated on the southwest portion of the storm below an intense updraft, marked by the main cumulonimbus cloud and associated with a very strong or severe thunderstorm. Many of the clouds will exhibit rapid upward motion and rotation in the same sense as a tornado, except with considerably slower speed. A ROTATING WALL CLOUD USUALLY DEVELOPS BEFORE A TORNADO OR FUNNEL CLOUD.

**WARNING** Issued for tornadoes, severe thunderstorms, flash floods. A warning is issued when severe weather has already developed. Warnings are statements of imminent danger, and are usually issued for a small area.

**WATCH** Issued for tornadoes, severe thunderstorms or flash floods. A watch identifies a large area in which these things might occur. Watches are usually issued before severe weather has developed.

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