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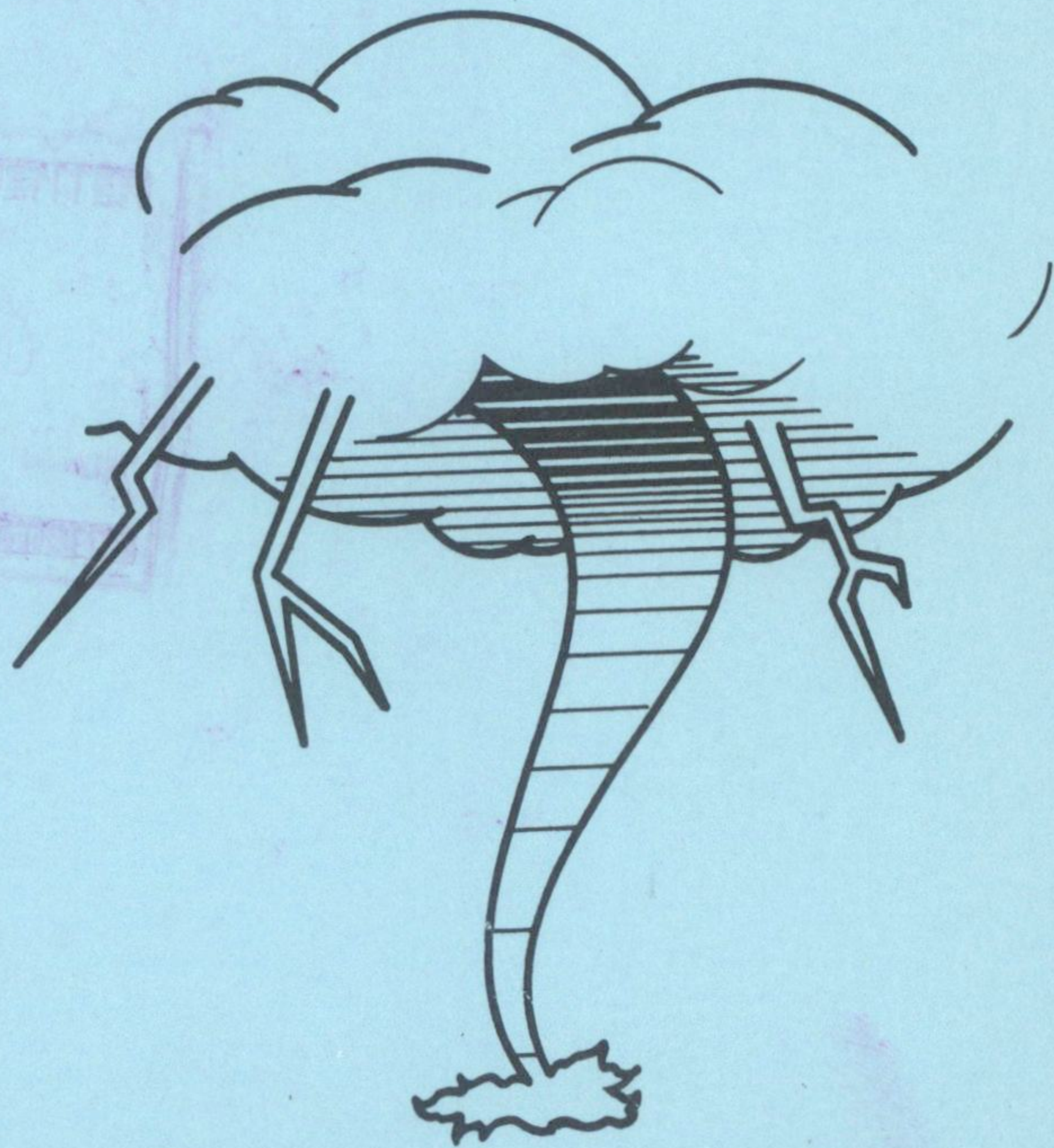
U.S. DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration

# FEDERAL COORDINATOR FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH



## National Severe Local Storms Operations Plan

FCM 80-1



Washington, D.C.  
March 1980



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U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
FEDERAL COORDINATOR FOR METEOROLOGICAL  
SERVICES AND SUPPORTING RESEARCH

NATIONAL SEVERE LOCAL STORMS OPERATIONS PLAN

Washington, D.C.  
February 1980  
FCM 80-1

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## FOREWORD

This is the thirteenth of an annual series of National Severe Local Storms Operations Plans that was developed after a 1967 request by the Federal Coordinator for Meteorological Services and Supporting Research. This plan outlines the responsibilities of the various United States agencies which provide meteorological services in observing and forecasting severe local storms.

Interdepartmental Severe Local Storms Conferences, of which there have been seven, bring together cognizant Federal agencies to resolve problems of mutual concern related to the National Severe Local Storms Warning Service. Such conferences will be held every two years, if items warrant. National Weather Service Severe Local Storms Conferences are held as required.

This plan supersedes the 1979 version and incorporates changes recommended by the concerned agencies through their representatives on the Subcommittee for Basic Services (SC/BS) Working Group on Severe Local Storms.

Additional information describing the warning programs of the participating agencies can be found in Air Weather Service Regulation 105-8, Meteorological Watch Program; National Weather Service Operations Manual, Chapter C-40, Severe Local Storm Warnings; and Operations of the National Weather Service.



T. B. Owen  
Federal Coordinator for Meteorological  
Services and Supporting Research



NATIONAL SEVERE LOCAL STORMS

OPERATIONS PLAN

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## RESPONSIBILITIES OF COOPERATING AGENCIES

1. National Weather Service (NWS). It shall provide:

a. Basic surface, upper air, and radar observations from its network of stations making such observations.

b. Additional observations, when required. These observations will be transmitted to any requesting agency on the appropriate communication circuits.

c. Basic analyses, forecast charts, and radar facsimile charts through the National Meteorological Center (NMC), Camp Springs, Maryland.

d. Severe Weather Watch Bulletins through the National Severe Storms Forecast Center (NSSFC) at Kansas City, Missouri.

e. Severe weather statements and warnings issued by Weather Service Forecast Offices (WSFOs) and Weather Service Offices (WSOs) throughout the United States.

f. Aviation Inflight Weather Advisories through WSFOs with aviation responsibilities for periods up to 6 hours for aircraft (civilian and military) and amendments to appropriate aviation forecasts whenever severe local storm(s) are possible or are in existence.

g. A concerted effort to collect and relay Pilot Reports (PIREPs).

h. Appropriate public educational materials concerning the severe local storms warning service and development of community preparedness plans in accordance with the Federal Emergency Management Agency (FEMA), National Oceanic and Atmospheric Administration (NOAA) Memorandum of Understanding Concerning the Coordination of Emergency Responsibilities.

2. National Environmental Satellite Service (NESS). It shall:

a. Operate satellite systems capable of providing coverage of selected portions of the United States and adjoining coastal areas during the severe storms season.

b. Receive and respond to requirements for coverage of specific areas and times from the NSSFC.

c. Provide appropriate satellite data to authorized research facilities either directly or through the Environmental Data and Information Service (EDIS).

d. Be available for conferences with personnel of NSSFC and WSFOs, primarily through its Satellite Field Service Stations (SFSSs), either in person or by telephone.

e. Coordinate with the National Aeronautics and Space Administration (NASA) on providing data from its Research and Development (R&D) satellites to NOAA operational units for use on an as required basis.



3. U.S. Air Force (USAF). The Air Weather Service (AWS) is responsible for weather warning support to USAF and U.S. Army units throughout the world. It shall provide:

a. Basic surface, upper air, and radar observations from its network of stations making such observations.

b. Additional observations, when required, making all such reports available to civil agencies through existing communications with Federal Aviation Administration (FAA) or, with prior DOD approval, directly.

c. A concerted effort to collect and relay PIREPs.

d. Through the Air Force Global Weather Central (AFGWC), Offutt Air Force Base, Nebraska:

(1) Weather warning support in the conterminous United States and 200 miles offshore to:

(a) U.S. Air Force, U.S. Army, and selected U.S. Navy installations.

(b) Air Force and Army Reserve, and National Guard Units.

(c) Plant sites and facilities operated under Department of Defense (DOD) contracts.

(d) Airborne military aircraft when under military control.

(2) Via the USAF communications system:

(a) Military Weather Advisories for general areas of severe weather potential. Advisories will be issued daily in graphic and teletype format valid for 12-hour periods beginning at 0300Z plus every 6 hours.

(b) Point Warnings in plain language, as required, whenever weather is expected to meet warning criteria. These Point Warnings are issued to about 500 locations in the conterminous United States.

(c) Summaries of severe convective weather occurrences.

(d) Military Weather Advisory Further Outlooks for general areas of severe weather potential. Further Outlooks will be issued twice daily in graphic and teletype format valid for the 12-hour periods beyond the 0900Z and 2100Z Military Weather Advisories.

(e) A continuous meteorological watch on the possibilities of severe weather developments and of other weather phenomena for which AFGWC has warning responsibility.

4. U.S. Navy. The Navy does not operate a centralized Severe Local Storms Warning Service. Requirements for early warnings of hazardous flying conditions



and local destructive phenomena are met by NSSFC/AFGWC products interpreted locally by personnel of the Naval Oceanography Command. Full use is made of information received on the National Facsimile Network (NAFAX), military, and civil weather circuits.

5. Federal Aviation Administration (FAA). It shall provide:

a. Communication services and observations in accordance with the January 24, 1977 MEMORANDUM OF AGREEMENT between the NOAA and FAA to support the Severe Local Storms Operations Plan.

b. Dissemination/Broadcasting of Airmen's Meteorological Information (AIRMETs), Significant Meteorological Information (SIGMETs), and convective SIGMETs by Flight Service Stations (FSSs) during preflight briefings and to aircraft in flight.

6. Exchange of Data Between Agencies.

a. There shall be a mutual exchange of relevant data on the part of all concerned agencies outlined in Chapter 1. Because NSSFC and AFGWC are the units responsible for preparing severe weather forecasts, data concerning such forecasts will be exchanged between these units. Direct telephone communications between AFGWC and NSSFC may be made over the Federal Telecommunications Service (FTS).

b. The coordination channel for exchange of data between NSSFC and AFGWC shall be between the Commander, AFGWC, and the Director, NSSFC. Unresolved differences will be referred to the Public Services Branch, Meteorological Services Division, National Weather Service Headquarters, and to the Headquarters, Air Weather Service.

c. At the present time, the National Weather Service, National Environmental Satellite Service, Environmental Research Laboratories' National Severe Storms Laboratory (NSSL), Air Force Geophysical Laboratory (AFGL), and the Air Weather Service are actively engaged in developing objective severe weather forecasting and analysis techniques. These organizations will engage, whenever possible, in a joint technique development program and will exchange any objective techniques developed.

7. Requests for Special Observations.

Any special rawinsonde (RAWIN) or pilot balloon (PIBAL) observations needed during the continuous weather monitoring underway at NSSFC and at AFGWC are authorized and will be requested when needed.

When special upper air network soundings are required, the requests should normally be made at 0600Z or 1800Z. The Director, NSSFC, will initiate the request to the National Weather Service and National Aeronautics and Space Administration stations, and the Commander, AFGWC, will similarly request soundings from DOD stations. Although WSFOs have the authority to request special upper air observations during periods of potentially severe storms of all types, requests for special soundings during periods of potentially severe local storms should be made by NSSFC. Any cost involved in these special soundings will be borne by the agency making the sounding.



Air Weather Service requests for National Weather Service or NASA soundings should be made to the duty forecaster at NSSFC. National Weather Service requests for USAF soundings should be made to the AFGWC duty officer (402-294-2586 or FTS 866-6019).

NSSFC may also request special limited scan Geophysical Orbiting Environmental Satellite (GOES) data on critical severe storm days.

#### 8. Backup Plan for NSSFC.

In the event that NSSFC is unable to discharge its severe weather forecasting functions, the AFGWC will provide backup. In the event of a power outage or other major disruption of operations, the NSSFC forecaster will make telephone contact with the designated AFGWC focal point and request backup. The NSSFC forecaster will also provide AFGWC with an estimate of the duration of the outage as well as subsequent updated information when available. The number of the last valid watch will also be provided.

Upon notification from NSSFC that the Backup Plan is to be implemented, AFGWC will prepare and transmit watches, outlooks, and other advices regarding severe local storm activity as prescribed in National Weather Service Operations Manual (WSOM) Chapter C-40. The AFGWC will initiate a suitably worded message for Radar Report and Warning Coordination Circuit (RAWARC) and Automation of Field Operations and Services/National Distribution Circuit (AFOS/NDC) indicating that emergency backup procedures are in effect and that subsequent severe weather watches, etc., will be issued by AFGWC as required.

Part A of all AFGWC backup watches will begin as follows: "THE USAF AIR WEATHER SERVICE ACTING IN A BACKUP CAPACITY FOR THE NATIONAL WEATHER SERVICE SAYS THERE IS A POSSIBILITY ....." Prior to issuance or cancellation of a watch, AFGWC will coordinate by telephone with the affected WSFOs if time permits. AFGWC will transmit backup material on RAWARC via the Air Force Automatic Digital Weather Switch (ADWS) and on National Aviation Facsimile Circuit (NAFAX) directly.

When NSSFC resumes normal operation, a message to this effect will be placed on RAWARC and AFOS/NDC by NSSFC.

#### 9. Notification of Military Installations.

Selected military installations, whose AWS detachments are not manned by forecasters or whose radars are inoperative, will be notified by the NWS when severe convective weather is expected to affect them. The notification will be performed by selected NWS offices which have radar and/or other information available. Notification will be via NOAA Weather Radio Warning Alarms for those sites within the receiving area, provided such sites are equipped with receivers. This is the most rapid notification available. Otherwise, notifications will be according to "alerting agreements" between the AWS/NWS offices concerned. (Such written agreements are initiated by the AWS units, but require approval of NWS Headquarters before they can go into effect. See Appendix 2.)



The service to be provided is a wakeup/alerting service to cover severe convective weather occurrences with short lead times, i.e., those developments that the AWS' normal alerting system may miss. No other service will normally be required. As appropriate, radar data may be exchanged. Severe convective weather is defined as Thunderstorms with winds 50 knots or more, Hail 3/4-inch in diameter or larger, and/or Tornadoes.

Notification will be made to only one telephone number. Only one call will be made; however, if the line is busy, one additional call will be made. The notification will be made after the news media and Civil Defense authorities have been notified according to the NWS' present warning dissemination procedures and priorities. The agreement will specify the hours during which the alerting service is to be provided.

a. Military/NWS Locations Involved.

Agreements for providing the alerting service have been signed between the following locations. Changes may be made to this list at any time.

Military Location

NWS Office

Barksdale AFB	WSO Shreveport, LA
Beale AFB	WSO Sacramento, CA
Bergstrom AFB	WSO Austin, TX
Blytheville AFB	WSFO Memphis, TN
Buckley ANGB	WSFO Denver, CO
Cannon AFB	WSO Amarillo, TX
Charleston AFB	WSO Charleston, SC
Columbus AFB	WSFO Jackson, MS
Davis-Monthan AFB	WSO Tucson, AZ
Dobbins AFB	WSFO, Atlanta, GA
Dover AFB	WSO Atlantic City, NJ
Duluth IAP	WSO Duluth, MN
Dyess AFB	WSO Abilene, TX
Edwards AFB	WSO Palmdale, CA
Ellsworth AFB	WSO Rapid City, SD
Fairchild AFB	WSO Spokane, WA
Francis E. Warren AFB	WSFO Cheyenne, WY
Ft. Campbell	WSO Nashville, TN
Ft. Hood	WSO Waco, TX
Ft. Knox	WSFO Louisville, KY
Ft. Riley	WSFO Topeka, KS
George AFB	WSO Palmdale, CA
Grand Forks AFB	WSO Fargo, ND
Grissom AFB	WSFO Indianapolis, IN
Holloman AFB	WSO El Paso, TX
Homestead AFB	NHC Miami, FL
Hunter AAF	WSO Savannah, GA
Kelly AFB	WSFO San Antonio, TX
Keesler AFB	WSO Mobile, AL
Kirtland AFB	WSFO Albuquerque, NM
Laughlin AFB	WSO Del Rio, TX
Little Rock AFB	WSFO Little Rock, AR



Military Location

Maxwell AFB  
 McClellan AFB  
 McConnell AFB  
 McGuire AFB  
 Minot AFB  
 Moody AFB  
 Myrtle Beach AFB  
 Nellis AFB  
 Pease AFB  
 Plattsburgh AFB  
 Randolph AFB  
 Reese AFB  
 Richards-Gebaur AFB  
 Rickenbacker AFB  
 Robins AFB  
 Scott AFB  
 Selfridge ANGB  
 Shaw AFB  
 Sheppard AFB  
 Tinker AFB  
 Travis AFB  
 Tyndall AFB  
 Vance AFB  
 Whiteman AFB  
 Wright-Patterson AFB  
 Wurtsmith AFB

NWS Office

WSO Montgomery, AL  
 WSO Sacramento, CA  
 WSO Wichita, KS  
 WSO Atlantic City, NJ  
 WSFO Bismarck, ND  
 WSO Savannah, GA  
 WSO Charleston, SC  
 WSO Las Vegas, NV  
 WSMO Brunswick, ME  
 WSO Burlington, VT  
 WSFO San Antonio, TX  
 WSFO Lubbock, TX  
 NSSFC Kansas City, MO  
 WSO Port Columbus, OH  
 WSO Macon, GA  
 WSFO St. Louis, MO  
 WSFO Detroit, MI  
 WSO Charleston, SC  
 WSO Wichita Falls, TX  
 WSFO Oklahoma City, OK  
 WSO Sacramento, CA  
 WSO Pensacola, FL  
 WSFO Oklahoma City, OK  
 NSSFC Kansas City, MO  
 WSO Cincinnati, OH  
 WSO Houghton Lake, MI



DEFINITIONS

This chapter defines those common meteorological terms, subject to multiple interpretations, which are used by agencies preparing severe local storms forecasts and warnings.

1. Funnel Cloud. A rotating column of air forming a pendant from a cumulus or cumulonimbus cloud whose circulation does not reach the ground.
2. Severe Local Storms. Dangerous storms that usually cover relatively small geographical areas or move in narrow paths and are of sufficient intensity to threaten life and property. For the purpose of this plan, a severe local storm is a tornado, funnel cloud, waterspout, or a thunderstorm with winds of 50 knots or greater and/or hail 3/4-inch in diameter or greater at the surface. Wind damage may be used to infer the occurrence/existence of a severe local storm.
3. Severe Local Storms Season. Although the center of maximum frequency shifts during the year, tornadoes and severe thunderstorms may occur anywhere in the United States at anytime during the year. The months of greatest total frequency are April, May, and June.
4. Squall Line. A line of active thunderstorms or squalls which may extend over several hundred miles. It is the phenomenon of the mature or active stage of "instability-line" development and may be either a solid or broken line of thunderstorms.
5. Density/Risk of Severe Thunderstorms. The following adjectives describe the possible density/risk of severe thunderstorms in an outlook area:
  - a. Low risk - 2 to 5 percent coverage or 4-10 Manually Digitized Radar (MDR) blocks with severe thunderstorms per 100,000 square miles.
  - b. Moderate risk - 6 to 10 percent coverage or 11-21 MDR blocks with severe thunderstorms per 100,000 square miles.
  - c. High risk - greater than 10 percent coverage or more than 21 MDR blocks with severe thunderstorms per 100,000 square miles.
  - d. MIC (Maximum Instantaneous Coverage) - the percentage of the area that will be covered by cumulonimbus cells at the time of maximum activity. (Military Weather Advisories only.)
  - e. TAA (Total Area Affected) - the percentage of the area that will experience one or more thunderstorms during the applicable valid period. (Military Weather Advisories only.)

Adjectives such as the above will not be used to indicate the possible density of tornadoes in a watch. The Tornado Watch Bulletin will only state that the threat of tornadoes exists in the designated watch area.



6. Thunderstorm Intensity Categories. Only the following thunderstorm intensity classes will be used in the forecasting and warning functions of concerned agencies:

a. Thunderstorm - Wind gusts less than 50 knots and hail, if any, of less than 3/4-inch diameter at the surface.

b. Severe Thunderstorm - Wind gusts of 50 knots or greater or hail of diameter 3/4-inch or greater at the surface. Wind damage may be used to infer the occurrence/existence of a severe thunderstorm.

7. Tornado. A violent, rotating column of air usually forming a pendant from a cumulonimbus cloud, whose circulation reaches the ground. It nearly always starts as a funnel cloud and is accompanied by a loud roaring noise. On a local scale, it is the most destructive of all atmospheric phenomena.

8. Waterspout. A rotating column of air usually pendant from a cumulus or cumulonimbus cloud which forms over a body of water and whose circulation touches the water.



FORECASTS AND WARNINGS

1. General. Although every effort has been made to standardize terminology, adopt common definitions, and adjust criteria to a common base, each agency has differing operational warning criteria that must be met. Although standardization will be used wherever possible in forecasts and warnings, each agency retains the right to specify the forecast and warning criteria that are needed to carry out the mission of its service.

2. Other Warning Criteria. All phenomena (other than those classified as severe storms, Chapter 2, Item 2) described in the various warnings, bulletins, and advisories should be categorized as "other warning criteria" and are not called severe weather phenomena. Such other warning criteria will be listed separately in appropriate National Oceanic and Atmospheric Administration-National Weather Service publications.

3. National Weather Service Watch/Warning Procedures.

a. General. The National Weather Service has statutory responsibility for providing a Severe Local Storms Warning Service for all 50 States. NSSFC does not issue watches for Alaska or Hawaii. Instead the WSFOs at Anchorage and Honolulu have the responsibility for maintaining weather watches and issuing warnings as needed for their respective States. Procedures described in this plan are followed to the extent that they are applicable.

This Warning Service is available to the general public and to aviation and is provided through the National Severe Storms Forecast Center at Kansas City, the National Meteorological Center at Camp Springs, Maryland, Weather Service Forecast Offices, and Weather Service Offices.

b. Watch/Warning Criteria. Events for which aviation and public severe weather watch and warning bulletins may be issued are the same. Any or all of the categories listed below may be mentioned in such bulletins to indicate more fully the severe weather possible/occurring.

(1) Severe Thunderstorm:

(a) Wind - thunderstorm related surface winds (sustained or gusts) of 50 knots or greater;

(b) Hail - surface hail 3/4-inch or larger. The word hail in a watch bulletin implies hail at the surface as well as aloft unless a qualifying phrase such as "hail aloft" is used.

(2) Tornado:

(a) Severe weather watches/warnings that mention tornadoes imply that thunderstorm activity, usually severe, is also expected/occurring. Severe weather watches will not refer to funnel clouds.



c. National Meteorological Center (NMC). NMC is the central data processing center for the NWS. NMC issues prognostic charts, discussions, and other forecast materials.

d. National Severe Storms Forecast Center (NSSFC). NSSFC is responsible for issuing and cancelling severe local storm watches and convective SIGMETS (Significant Meteorological Information) and for preparing other appropriate material essential to the Severe Local Storms Warning Service.

(1) Combined Public and Aviation Watch Bulletins. Although a warning service is provided for public and aviation interests, separate watches are not issued for these interests, but are combined into one bulletin. Each combined watch bulletin (see example below) contains information for the general public (sections A and B) and aviation interests in discrete, alphabetical, sequential sections. When a section is not applicable, it will be omitted. The text will begin with the most serious type of severe weather expected - "Tornado Watch" or "Severe Thunderstorm Watch." The location of the area affected and the valid period of the watch which are common to both public and aviation sections are given in Section A. Combined watches are numbered serially beginning with number 1 for the first issuance of each calendar year. NSSFC will issue an unnumbered watch cancellation message whenever it cancels a watch.

(2) Convective SIGMETs. NSSFC issues hourly at H+35 and as required Special Convective SIGMET bulletins over the conterminous U.S. based on these criteria:

- (a) Tornadoes
- (b) Lines of thunderstorms
- (c) Embedded thunderstorms
- (d) Thunderstorm areas greater than or equal to Video Integrated Processor (VIP) Level 4 (LVL 4) with areal coverage of 4/10 (40 percent) or more
- (e) Hail greater than or equal to 3/4-inch diameter

Negative bulletins are issued if the criteria are not met.

#### Example Of Watch Bulletin

BULLETIN IMMEDIATE BROADCAST REQUESTED  
TORNADO WATCH NUMBER 392  
NATIONAL WEATHER SERVICE KANSAS CITY MO  
620 PM CDT SUN SEP 17 1978

A... THE NATIONAL SEVERE STORMS FORECAST CENTER HAS ISSUED A  
TORNADO WATCH FOR

MUCH OF WESTERN AND CENTRAL OKLAHOMA  
PARTS OF CENTRAL AND SOUTHEASTERN KANSAS

FROM 7 PM CDT UNTIL 12 MIDNIGHT CDT THIS SUNDAY EVENING.

TORNADOES ... LARGE HAIL ... AND DAMAGING THUNDERSTORM WINDS  
ARE POSSIBLE FOR THESE AREAS.



e. Weather Service Offices (WSOs) and Weather Service Forecast Offices (WSFOs).

(1) WSFOs and WSOs release to the public only information contained in sections A and B of watches. However, to help the public visualize which areas are affected by watches, designated offices prepare redefining statements (areal outlines) for those parts of their States within each public severe weather watch. They also may discontinue watches for those portions of their areas no longer threatened.

(2) WSFOs and WSOs with county warning responsibilities are responsible for warning the general public. Severe weather warnings are based on reports of actual or suspected severe weather in or near an Office's area of responsibility. Each warning is identified as either a Tornado Warning or a Severe Thunderstorm Warning. When radar evidence is sufficient in the judgement of the responsible official to identify a dangerous storm, warnings are issued immediately.

(3) Offices issue frequent statements to keep the public informed of weather developments during a severe weather watch.

(4) Designated WSFOs with in-flight weather advisory responsibilities issue nonconvective SIGMETs. Criteria for the issuance of nonconvective SIGMETs: severe or extreme turbulence, severe icing, and widespread dust/sand storms lowering visibilities to below 3 miles.

f. Satellite Field Service Stations (SFSS). The SFSSs receive and analyze satellite pictures in near real time and assist NSSFC, WSFOs, and WSOs in applying these data to their severe storm forecasting and warning programs.

4. U.S. Air Force (USAF) Warning Procedures.

a. General. The Air Force Global Weather Central (AFGWC) provides, by means of USAF communications system, warnings for Military installations for:

- (1) Tornadoes
- (2) Thunderstorms
- (3) Strong surface winds of 35 knots or more that are not associated with thunderstorms
- (4) Heavy rain or snow (2 inches or more in a 12-hour period)
- (5) Freezing precipitation

The criteria for severe thunderstorm warnings are the same as those of the NWS.

b. Military Weather Advisories (MWA). AFGWC issues both graphic (Figure 3-1) and teletypewriter (Figure 3-2) Military Weather Advisories (MWAs) and Military Weather Advisory Further Outlooks (FO). Military Weather Advisories are issued four times daily, valid for 12-hour periods beginning at 0300Z plus every 6 hours. Further Outlooks are issued twice daily valid for 12-hour periods beyond the 0900Z and 2100Z MWAs. Each product gives the area where any of the weather elements listed in Table 3-1 are expected to occur during the valid period.



THE TORNADO WATCH AREA IS ALONG AND 70 STATUTE MILES EITHER SIDE OF A LINE FROM 50 MILES SOUTH SOUTHEAST OF HOBART OKLAHOMA TO 50 MILES EAST OF SALINA KANSAS.

REMEMBER ... A TORNADO WATCH MEANS CONDITIONS ARE FAVORABLE FOR TORNADOES AND SEVERE THUNDERSTORMS IN AND CLOSE TO THE WATCH AREA ... PERSONS IN THESE AREAS SHOULD BE ON THE LOOKOUT FOR THREATENING WEATHER CONDITIONS AND LISTEN FOR LATER STATEMENTS AND POSSIBLE WARNINGS.

B ... THIS TORNADO WATCH REPLACES TORNADO WATCH NUMBER 389. WATCH NUMBER 389 WILL NOT BE IN EFFECT AFTER 7PM CDT.

C ... TORNADOES AND A FEW SVR TSTMS WITH HAIL SFC AND ALF TO 3 IN. EXTRM TURBC AND SFC WND GUSTS TO 80 KT. A FEW CBS WITH MAX TOPS TO 650. MEAN WIND VECTOR 25030.

D ... TSTMS EXPCTD TO INTNSFY IN PVA AREA AHD OF STG VORT CNTR. UNSTBL AMS AND STG LO LVL WINDS ALSO FAVORABLE.

E ... OTR TSTMS .. CONT WW NR 391. UPDATE AC TO INCL FEW SVR TSTMS ERN AR BY MRNG.

..WILSON..

#### Examples of Convective SIGMET Bulletins

MKCC WST 302155  
CONVECTIVE SIGMET 41C  
OK AR TX  
FROM 30N FSM TO 50SW LFK TO 60SE LPD  
LN TSTMS 25 MI WIDE MOVG FROM 2825. MAX TOPS TO 500.

FCST TO 2355Z  
LN WL MOV EWD 25 KT THRU 2355Z. TORNADOES ...HAIL TO 3 IN ...  
WIND GUSTS TO 70 KTS PSBL.

MKCC WST 300655  
CONVECTIVE SIGMET 10C  
KS OK TX  
FROM 50N ICT TO 40E GAG TO 30E AMA TO 30SSW MAF  
LN TSTMS 20 MI WIDE MOVG FROM 2715. MAX TOPS TO 420.  
1-3/4 IN HAIL RPRTD TWO LCTNS IN TX PAST HR.

FSCT TO 0855Z  
LN WL CONT MOVG EWD 15 KT THRU 0855Z. HAIL TO 1-3/4 IN.  
WIND GUSTS TO 65 KT PSBL.



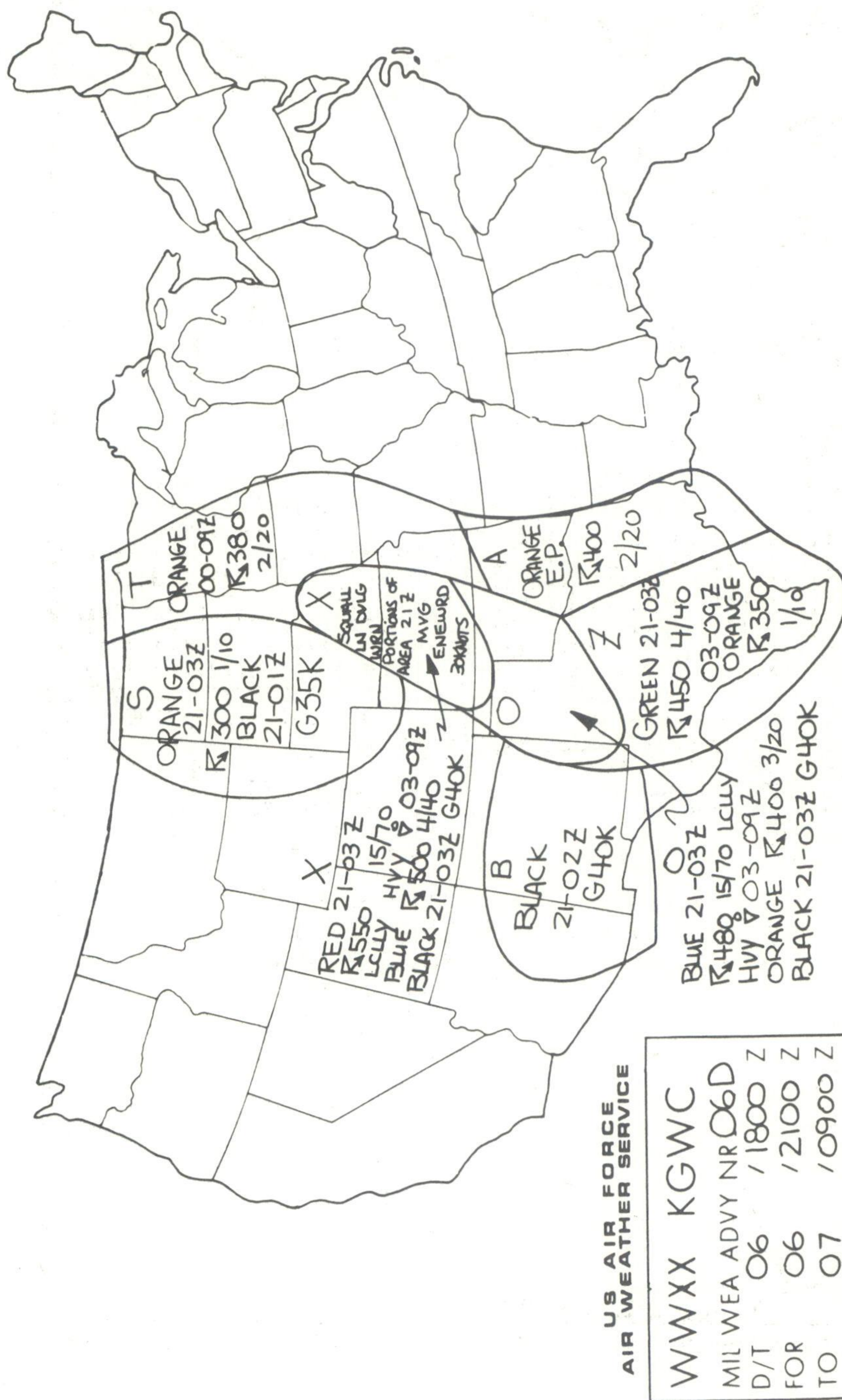


Figure 3-1. Example of Graphic Military Weather Advisory.







Service Pamphlet 105-52; the number of installations is approximately 500. Approximately 50 percent of these locations are U.S. Air Force, 45 percent are U.S. Army, and 5 percent are U.S. Navy. In addition to active military installations, AFGWC Point Warnings are issued for National Guard units, arsenals, ammunition plants, and other civilian activities under contract to the Department of Defense (DOD). AFGWC Point Warnings are issued for specific locations as the situation warrants in contrast to Advisories which are issued at scheduled intervals for fixed valid periods. AFGWC Point Warnings can be amended, extended, or cancelled as necessary.

AFGWC Point Weather Warnings:

- (1) Provide specific warning to an installation where a forecaster is not assigned.
- (2) Alert a responsible individual at locations with a limited forecast service.
- (3) Alert and guide the field forecaster who has final responsibility for warning the agency supported.

EXAMPLE OF MILITARY POINT WARNING

0 032010Z  
 WWXX WWXX WWXX 3 KGWC 032010Z  
 TX 18-19

THUNDERSTORMS WITH 1-1/2 INCH HAIL AND SW GUSTS TO 65 KNOTS  
 VALID 032200Z TO 040200Z TORNADO VALID 032200Z TO 040100Z  
 OK 7-8

THUNDERSTORMS WITH NO HAIL AND SW GUSTS TO LESS THAN 35 KNOTS  
 EXPECTED BETWEEN 031900Z AND 040300Z.

d. Local Air Weather Service AWS Unit Warnings. At those locations where an Air Weather Service forecaster is on duty, the forecaster has final responsibility for warning those agencies being supported. The criteria and lead time for such local warnings are established locally based on customer needs.

5. Distribution of Watches, Warnings, and Severe Weather Reports by Flight Service Stations.

This Plan does not provide for the distribution of severe weather information by FSSs. However, these Stations occasionally receive requests for such information or are given a severe weather report by an observer. Such information or requests will be referred to the WSO having warning responsibility for the county in which the requester or phenomenon is located. National Weather Service Operations Manual C-47 lists the WSOs and their warning responsibility areas. The Federal Aviation Administration's Air Traffic Service (AAT-360) and National Weather Service will develop the communication methods for assuring that these requests and reports reach the appropriate WSO.



<u>COLOR</u>	<u>WEATHER ELEMENT(S)</u>
RED	Tornado
BLUE	Severe Thunderstorm
GREEN	Moderate Thunderstorm <ul style="list-style-type: none"> <li>o Winds between 35 and 49 knots inclusive, or</li> <li>o Hail greater than or equal to 1/2 inch but less than 3/4 inch in diameter</li> </ul>
ORANGE	Thunderstorm with winds less than 35 knots and hail less than 1/2 inch in diameter
BLACK	Surface winds greater than or equal to 35 knots not associated with a thunderstorm
PURPLE	Heavy rains greater than or equal to 2 inches in 12 hours
HATCHED PURPLE	Heavy snow greater than or equal to 2 inches in 12 hours
BROWN	Freezing Precipitation

Table 3-1  
Military Weather Advisory (MWA) Weather Elements

(1) Purpose and Use. The Military Weather Advisories are designed to provide basic guidance to both the field forecaster and to the point warning forecasters at AFGWC. These Advisories are issued at fixed times; preparation time is limited by data availability and presentation format. Advisories may cover fairly large areas as in the case of thunderstorms, snow, and strong gradient winds, but the areas of more severe weather -- such as tornadoes and severe thunderstorms -- are usually more limited in time and space.

(2) Amendment. Advisories are amended only to upgrade areas to severe (red or blue) categories, or to downgrade severe areas when the potential no longer exists. Further outlooks are not amended.

(3) Geographical Interpretation. A clear plastic overlay containing a scaled outline of the conterminous States, placed on the teletypewriter message containing the Military Weather Advisory, will provide geographical orientation.

c. AFGWC Point Warnings. AFGWC Point Warnings are issued in plain language (see example below) for the same phenomena as Advisories. While Advisories provide general guidance to all military forecasters in terms of large and intermediate scale synoptic developments, AFGWC Point Warnings are issued for and to specify locations in the smallest scale of space and time consistent with the availability of data and the state-of-the-art. An effort is made to tailor the size of the points to the requirements of the using agency. The locations for which AFGWC has warning responsibility are listed in Volume III, Air Weather



COMMUNICATIONS1. National Weather Service Systems.

a. Radar Report (RAREP) and Warning Coordination Circuit (RAWARC). The National Weather Service internal teletypewriter system is a landline teletypewriter network consisting of five circuits, which terminate at the National Severe Storms Forecast Center in Kansas City and the Communications Control Section at Suitland, Maryland. The communications center at NSSFC is a systems monitor while the Communications Control Section (Communications Division) performs the computer relay functions for the system. Traffic on RAWARC is basically unscheduled and is handled according to a priority system, with severe weather information having the highest priority. Relays between RAWARC circuits are made by missions other than similar warning messages. The only regularly scheduled material entered on RAWARC is an hourly collection (H+35) of radar reports (SD). Special radar reports and other material authorized in the RAWARC manual can be transmitted at any time the circuits are not in use.

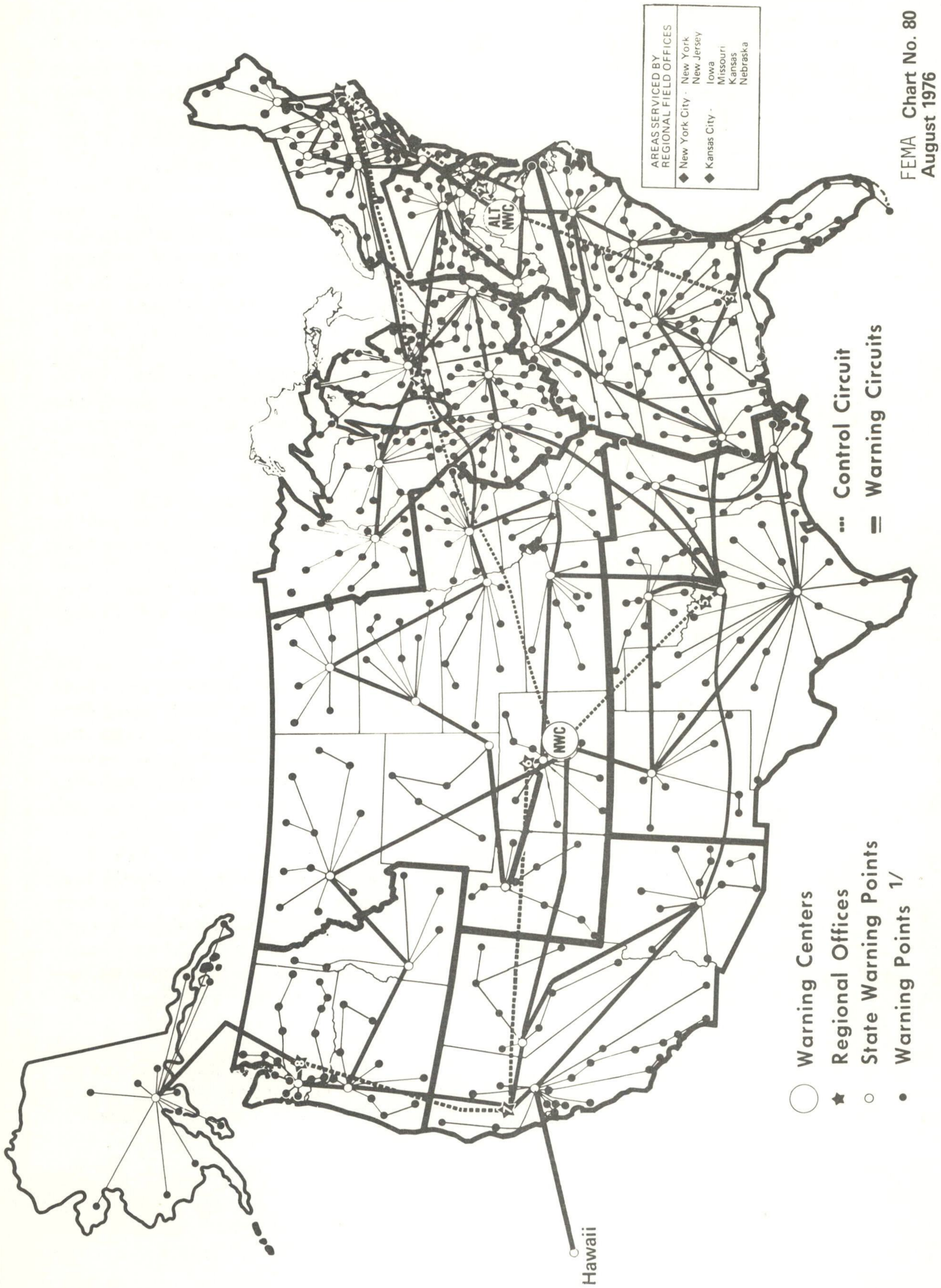
b. NOAA Weather Wire Service (NWWS). The NWWS consists of local loops serving metropolitan areas, Statewide intrastate/interstate circuits, and overlay circuits. The purpose of NWWS is to transmit consumer-oriented forecasts, watches, weather warning, and meteorological data to the mass news media for broadcast to the public. Various specialized users also obtain drops on NWWS to meet their requirements.

Each intrastate/interstate circuit has one Weather Service Forecast Office designated as the State Relay Center (SRC). The SRC is connected to the regional overlay interstate circuit (except in the Western Region) and serves as the State relay point for transmissions over this regional circuit to other States through their SRCs. Washington, DC, is the Overlay Relay Center and is responsible for relaying traffic between regional overlay circuits.

Only WSOs (or certain other authorized offices) have direct entry on these circuits. The Weather Service Forecast Offices furnish broad-scale information, and local WSOs enter local information. Relays between adjacent circuits are established as necessary to meet the requirements of the National Weather Service's Severe Local Storms Warning Service and of subscribers located along State or area borders. When urgent material such as a warning is transmitted, a prearranged bell signal is used to attract the attention of users to the transmission.

c. National Warning System (NAWAS). This is the Federal Emergency Management Agency (FEMA) operated hot line interstate telephone system which connects FEMA Warning Points, WSFOs, and WSOs, and WSMOs (Weather Service Meteorological Observatory) within each State and between States. Figure 4-1 gives the location of FEMA warning points.





FEMA Chart No. 80  
August 1976

<sup>1/</sup> Sample representation of total numbers

Figure 4-1. Federal Emergency Management Agency - NATIONAL WARNING SYSTEM



d. Emergency Broadcast System (EBS). Although all standard AM, FM and television broadcast stations may, at their discretion, use the EBS for short-fused warnings, not all use it. Where its use is acceptable, EBS should be requested for all tornado warnings. Since EBS use is at the discretion of the individual stations, arrangements for its use are made prior to the severe local storm season, unless such use is a continuing agreement. In those areas where EBS use is not an acceptable procedure, all tornado warnings carry the notation "Immediate Broadcast Requested." EBS is not normally requested for severe thunderstorm warnings.

e. NOAA Weather Radio. THE WSOs/WSFOs equipped with NOAA Weather Radio can transmit continuous weather warnings on one of three assigned frequencies; 162.400 MHz, 162.475 MHz, and 162.550 MHz. These radio transmitters provide continuous weather information to an area of about 40-mile radius. Local radio and TV stations can record and rebroadcast the material even though land lines in the area may be disrupted. These transmitters have a tone signal capability which can be used to activate specially designed receivers.

f. Miscellaneous. Other types of distribution methods are used, as appropriate, to make warnings available to other WSOs/WSFOs and to the public as rapidly as possible.

g. Distribution of Severe Weather Watch and Warning Bulletins. The distribution of Public Severe Weather Watch and Warning Bulletins is shown in Figure 4-2. The distribution of Aviation Severe Weather Watch Bulletins and In-Flight Weather Advisories is outlined in Figure 4-3.

## 2. U.S. Air Force Systems (USAF).

a. Within the conterminous United States, USAF radar weather observations are collected by means of the Continental U.S. (CONUS) Meteorological Data System (COMEDS). Collected reports are transmitted from the Carswell Automatic Digital Weather Switch (ADWS) to the Air Force Global Weather Central, the FAA Weather Message Switching Center (WMSC), and to the National Meteorological Center through computer-to-computer links. Severe radar reports are available to NSSFC/Radar Analysis and Development Unit in the bulletin that has the heading WOUSI KAWN. Routine radar reports are transmitted from WMSC to NSSFC.

b. The COMEDS is divided into 20 geographic areas, with a single collecting and disseminating circuit covering each area (Figure 4-4). Area 19 covers Hawaii.

c. The COMEDS is used to disseminate all Military Weather Advisories and Point Warnings issued by AFGWC.



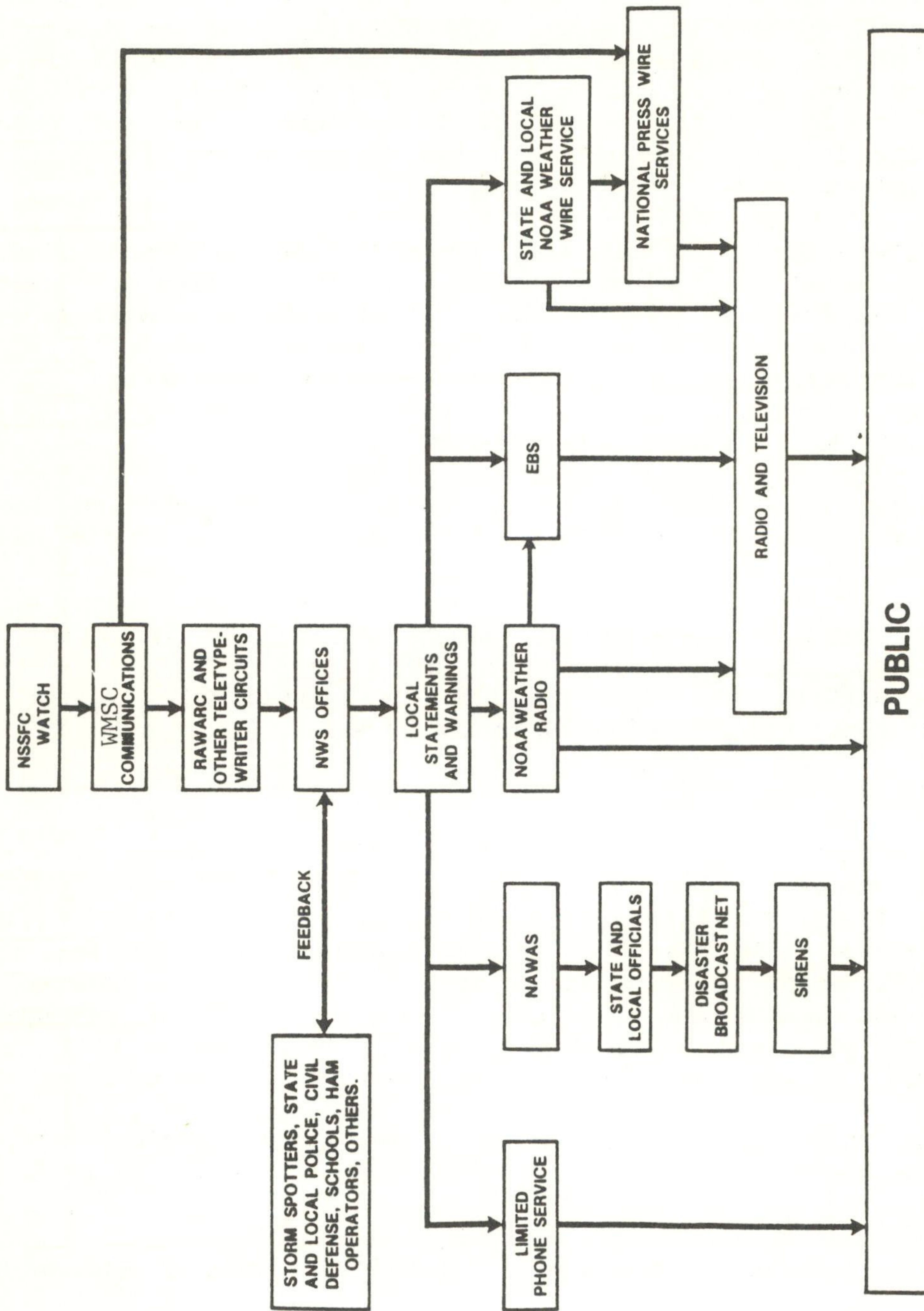


Figure 4-2. Distribution of Combined Severe Weather Watch and Warning Bulletins.



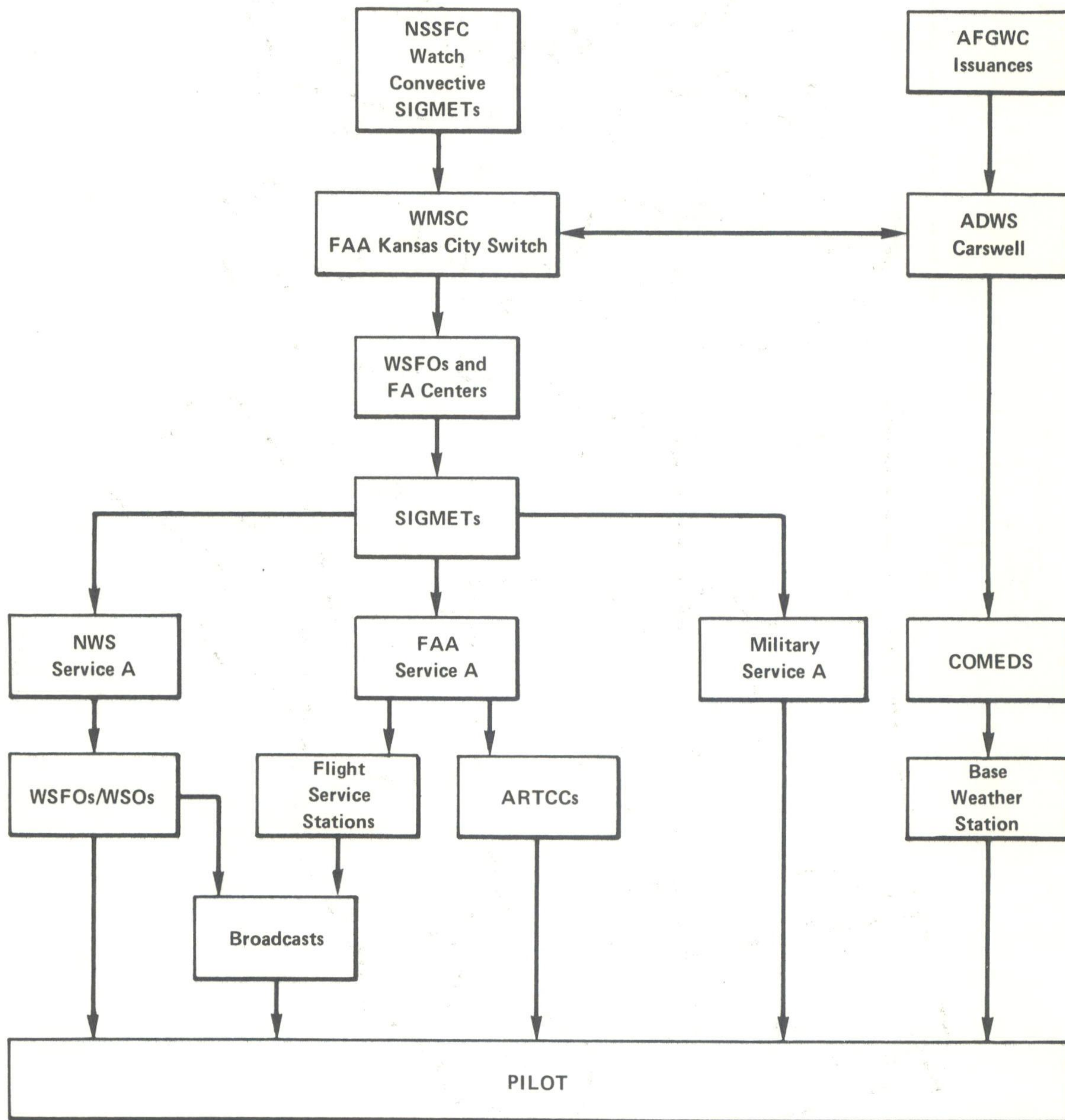


Figure 4-3

DISTRIBUTION OF AVIATION SEVERE WEATHER FORECASTS



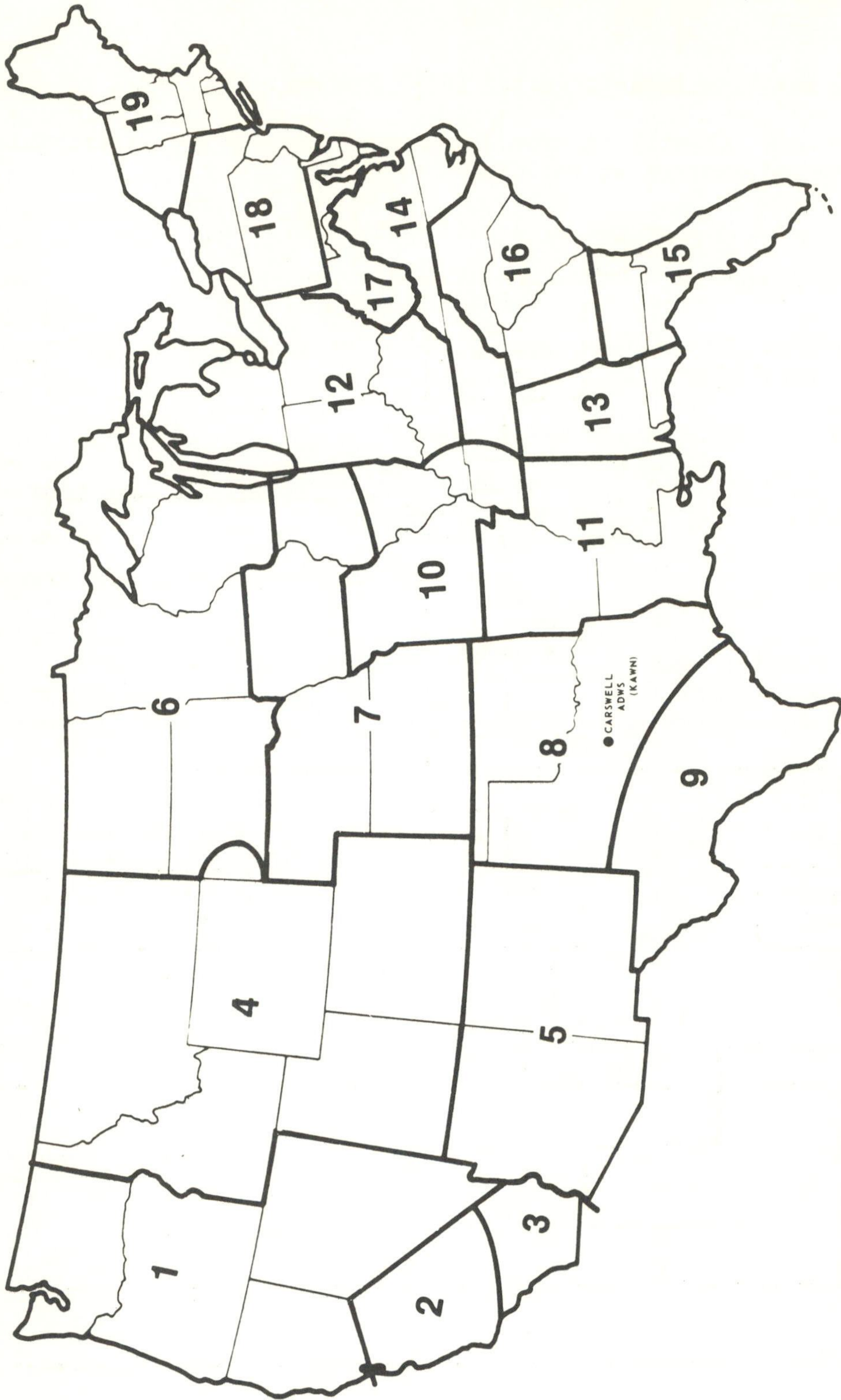


Figure 4-4  
Geographical Areas of USAF CONUS Meteorological Data System



### 3. Federal Aviation Administration (FAA) Systems.

a. Service "A" will be used for the collection and distribution of severe local storms information as follows:

- (1) Hourly and Special Aviation Observations
- (2) PIREPS

b. Service "A" will be used for the distribution of severe local storms information as follows:

- (1) Aviation Severe Weather Watch
- (2) Airmen's Meteorological Information, Significant Meteorological Information (SIGMETS), and Convective SIGMETS.

c. RAREP and Warning Coordination (RAWARC) teletypewriter system

RAWARC will be used for the collection and distribution of severe local storms information and hourly radar reports. Secondly, and as circuit time permits, RAWARC serves as a bypass to Service A, C. and O for more routine information when these circuits are busy.

### 4. U.S. Navy.

COMEDS is used to collect and disseminate U.S. Navy weather reports.



OBSERVATIONS1. Radar Observing and Reporting Plans.

a. Radar data, which are routinely used in the support of this Plan and in the preparation of National Severe Storms Forecast Center and Air Force Global Weather Central products, are available from radars of the U.S. Basic Weather Radar Network. This Network is composed of NWS radars, U.S. Air Force weather radars, and in the Western United States, air route traffic control radars. The air route traffic control radars are remoted into the Air Route Traffic Control Centers (ARTCC) at Salt Lake City, Utah; Palmdale, Calif.; Albuquerque, N. Mex.; and Auburn, Wash. NWS local warning radars supplement the network radars. National Weather Service personnel at Palmdale, Albuquerque, and Auburn develop a composite of the radar data from radars remoted into these sites and transmit the data on an interagency (Nuclear Regulatory Commission (NRC) and National Weather Service) facsimile circuit to the National Weather Service Radar Unit at the Salt Lake City ARTCC. These data are then collated with the Salt Lake City radar data, and, by means of a data-telephone link, the observations are sent to NMC for use in the Radar Summary Chart, and to AFGWC for use in meeting AWS requirements.

(1) National Weather Service coded radar observations, other than those from these four ARTCCs, are transmitted hourly on the Radar Report (RAREP) and Warning Coordination Circuits (RAWARC) at H+35. More frequent observations are taken and transmitted on RAWARC in severe weather situations. Hourly composites from ARTCCs are transmitted to a number of offices in the western intermountain region on the interagency facsimile circuit. Each ARTCC Radar Unit prepares a narrative summary of its composite and transmits the summary on RAWARC. These summaries and selected hourly radar observations are transmitted hourly on selected Service A circuits by the Modernized Weather Teletypewriter Communications System in Kansas City.

(2) At H+35, coded radar reports from the Air Weather Service (AWS) radar stations assigned to the U.S. Basic Weather Radar Network are forwarded to AFGWC from the Automated Digital Weather Switch (ADWS) at Carswell AFB by means of the data link. The NSSFC receives routine military radar weather observations from the ADWS through the FAA Weather Message Switching Center. Severe military RAREPs (those describing tornadoes, severe thunderstorms, or hail observations and carrying the bulletin heading WOUS) are obtained by dual means; {1} a drop on the COMEDS; and {2} through the FAA WMSC.

(3) The National Weather Service, Air Force, and Navy operate a number of non-network radar facilities. Used primarily for local forecasting and warning and for immediate service to local agencies, these radars also provide selected information on severe storms. For example, all USAF radar facilities in the conterminous United States, whether or not they are assigned Network responsibilities, report radar-detected hailstorms, severe thunderstorms, and tornadoes, both on COMEDS communications and by telephone to the nearest WSFO or WSO, when so requested. Furthermore, all U.S. Air Force storm detection radar facilities, whether on the network or not, transmit hourly radar reports and necessary specials whenever their station is covered by a Military Weather Advisory area or point warning calling for tornadoes or severe thunderstorms, unless they are within 30 nm of a network reporting station.



b. A number of USAF Aerospace Defense Command (ADC) radar sites are capable of limited detection and interpretation of weather echoes. Appendix 1 lists the six AWS units supporting the six ADC air divisions (ADs) with a map of radar site locations. Operational commitments permitting, these sites can provide limited supplementary data upon request. Contact should be made by calling the appropriate AD weather station. In general, either AFGWC or the supervising forecaster of the NSSFC should attempt to contact a particular site through its associated AD weather station.

c. If a WSO needs radar data from a nearby military radar (Network, ADC, or local use), such data can be obtained by local arrangements between the National Weather Service Meteorologist-in-Charge/Official-in-Charge and the AWS Detachment Commander or the Naval Oceanography Command Commanding Officer/Officer-in-Charge of the activity operating the radar facility. Authorizations for such arrangements have been completed between the National Weather Service and the military agencies in prior agreements. These data will be supplied on a non-interference basis and should usually be limited to severe weather situations.

## 2. Rawinsonde-Observing Stations.

a. Rawinsonde observations are scheduled twice daily, 0000Z and 1200Z, at the 71 stations in the National Weather Service and Military Upper Air Network. These stations also take special observations whenever required and requested by the agency concerned.

Transponder capability is available at 33 stations to permit more accurate measurement of upper winds under strong wind conditions. Evaluated data from the routine soundings are transmitted over the Service C and COMEDS teletypewriter systems in the radiosonde code. Data from special soundings requested for potential or existing severe weather situations are transmitted by means of RAWARC and other appropriate communications circuits to NSSFC and AFGWC. Special soundings transmitted on RAWARC will use the standard upper air message heading to assure their relay to AFGWC.

b. Low-level soundings in support of Air Pollution Meteorological Services are taken on an as-needed basis at seven stations. When requested, these stations take observations to 700 millibars about sunrise, and, if needed, again around noon. Data for the soundings taken about sunrise in the eastern half of the United States are transmitted on the Service C circuit at 1424Z and relayed, as necessary, to NSSFC and AFGWC. Data for the other soundings are transmitted on an unscheduled basis.

The DOD takes unscheduled observations at a number of schools, at mobile locations, and at research, development, test, and evaluation facilities. However, because of the irregular scheduling of these observations, the military agencies concerned do not deem it advisable to include all of the observations in this Plan. Non-network upper air stations which might be sources of data are given in Table 5-1.

During the months of April, May, and June when the National Severe Storms Laboratory at Norman, Oklahoma, and other agencies are usually engaged in an intensive severe local storms data collection program in central Oklahoma, upper air soundings are taken at a number of locations in support of this program. However, these data are processed by computer and are not available for real-time use.



STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
Edwards AFB, CA	USAF	Unscheduled	COMEDS	Commander, Det. 21, 2nd Wea. Sq.; AUTOVON 350-4318	No
Fort Benning, GA	USA	Unscheduled	COMEDS	Commander, Det. 10, 5th Wea. Sq.; AUTOVON 835-7313, ask for Wx Facility	No
Fort Bragg, NC	USA	Unscheduled	COMEDS	Commander, Det. 3, 5th Wea. Sq.; AUTOVON 236-3914, ask for Wx Facility	No
Fort Carson, CO	USA	Unscheduled	COMEDS	Commander, Det. 58, 5th Wea. Sq.; AUTOVON 691-3651, ask for Wx Facility	No
Fort Hood, TX	USA	Unscheduled	COMEDS	Commander, Det. 14, 5th Wea. Sq.; AUTOVON 737-9819, ask for Wx Facility	No
Fort Sill, OK	USA	Unscheduled	COMEDS	Commander, Det. 11, 5th Wea. Sq.; AUTOVON 639-3200, ask for Wx Facility	No
Fort Polk, LA	USA	Unscheduled	COMEDS	Commander, Det. 31, 5th Wea. Sq.; AUTOVON 863-2015, ask for Wx Facility	No

Table 5-1.

Non-Network Upper Air Stations Which Might Be Sources of Data



STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIALS
Eglin AFB, FL	USAF	Daily 0300Z and 1500Z	COMEDS	Commander, Det. 10, 2nd Wea. Sq; AUTOVON 872-5710	Yes
Marshall Space Flight Center, Huntsville, AL	NASA	Unscheduled, dependent upon operations	Local loop to WSO Huntsville, Ala. then to RAWARC.	Bob Turner, FTS 453-3109	Yes
Navy Pacific Missile Test Center, Point Mugu, CA	USN	Monday-Friday, 1300Z, 1800Z, and 2300Z	COMEDS	Mr. Hickson or Mr. Lee, commercial 805-982-8948, AUTOVON 351-8748	Yes
Navy Pacific Missile Test Center, San Nicolas Island, CA	USN	Monday-Friday, 2300Z and 1800Z	COMEDS	Mr. Hickson or Mr. Lee, commercial 805-982-8948, AUTOVON 351-8748	No
White Sands Missile Range, NM	USA	Unscheduled	COMEDS	CO, Met. Team, USA Electronics Command; AUTOVON 258-2537, ask for Met. Team	No

Table 5-1 (continued)

Non-Network Upper Air Stations Which Might Be Sources of Data



3. Surface Weather Observational Network. To provide the basic weather data needed for the analyses performed by the National Meteorological Center, NSSFC, and AFGWC, all available surface data are used. The following stations provide data:

- a. WSFOs/WSOs/WSMOs and Automatic Meteorological Observing Stations.
- b. Federal Aviation Administration weather reporting stations-- Flight Service Stations and Towers.
- c. Supplementary Aviation Weather Reporting Stations, including part-time paid, cooperative aviation and synoptic weather-reporting stations, and U.S. Coast Guard facilities.
- d. The DOD weather reporting stations.

These stations take observations and transmit coded observational data at regularly scheduled intervals. Transmissions are made hourly and even more frequently for aviation purposes, every 3 and 6 hours for synoptic map preparation, and daily for climatological purposes.

4. Pilot Reports (PIREPs).

a. The present FAA Instrument Flight Rules regulation (91.125, radio communications, section b) requires pilots to report, "(b) Any unforecast weather conditions encountered; and ....."

b. Pilots should report any weather condition they encounter which is hazardous to aviation.

c. The ARTCCs are requested to pass PIREPs to FSSs which are required to place them on the Service A teletypewriter circuit for distribution.

5. Severe Storm Surveillance by Meteorological Satellites. Several types of data are available from the various operating meteorological satellites during the severe local storms season. (Table 5-2 summarizes the operational satellites and data available.)

a. NOAA Polar Orbiting Satellites. These satellites cross the U.S. twice daily at about 9:00 a.m. and 9:00 p.m. Twice-daily soundings taken from Vertical Temperature Profile Radiometer (VTPR) observations are used in NMC analyses and forecasts and are distributed also via teletype on an orbit-by-orbit basis. High-resolution (1 km) pictures in the visible and infrared from the Very High Resolution Radiometer (VHRR) covering the U.S. are available via direct readout. VHRR sectors for the U.S. can be made available to Satellite Field Service Stations (SFSSs) and WSFOs within 30 to 60 minutes after observation if the need exists.

b. Geostationary Operational Environmental Satellite (GOES). The current GOES system consists of GOES-2 at 75 W, SMS-2 (Synchronous Meteorological Satellite) at 135 W, and SMS-1 and GOES-1 in standby at 105 W. The main products are pictures taken at frequent intervals, day and night. During



routine operations a picture is taken and disseminated every 30 minutes. On storm days, pictures are taken at 15-minute intervals.

(NOTE: Under routine circumstances, each satellite is taken out of service for a 2.5 hour period every other night while preventive maintenance is performed on the ground equipment. This maintenance is scheduled on GOES-1 from 0450-0720 GMT and on SMS-2 from 0505-0735 GMT. If the severity of the weather situation warrants, preventive maintenance can be deferred or rescheduled to assure continuous satellite coverage until the activity has subsided.)

During daylight hours, standard visible picture sectors of 1-, 2- and 4-km resolution are produced routinely. During nighttime, equivalent 2- and 4-km resolution standard sectors are produced from the infrared (IR) data. Also, sectors of enhanced IR can be produced day or night to emphasize certain weather features, such as highest tops in a convective cloud system. Heights of cloud tops are computed by the NESS Analysis and Evaluation Branch (AEB). This information is available four times daily at 0015 GMT plus every 6 hours, and can be accessed and displayed on the keyboard cathode ray tube (KCRT) system at Kansas City and elsewhere. All standard sectors are gridded automatically before they are disseminated. These standard products are delivered in real time to the NESS AEB and to WSFOs through the SFSSs. In addition to the standard sectors, each SFSS has two floating sectors which it may center over the area(s) of significant weather and keep these areas under surveillance as they move and develop. AFGWC has a port at the Kansas City (MKC) SFSS by which AFGWC receives GOES imagery (common to MKC/SFSS).

(1) Satellite Field Services Stations (SFSSs). As seen in Figure 5-1, GOES picture sectors are distributed from the NESS Central Data Distribution Facility at the World Weather Building in Camp Springs, Md., to SFSSs at Kansas City, Miami, San Francisco, Washington, and Honolulu. The SFSS in Kansas City is collocated with the NSSFC; the SFSS in Miami is collated with both the NHC and the Miami WSFO. All other SFSSs are collocated with WSFOs. The SFSSs help WSFOs interpret and use the satellite pictures. In addition to GOES picture sectors, selected VHRR pictures can be distributed through the GOES system in near real time when the need exists.

The SFSS in Kansas City supports NSSFC plus all WSFOs in the central U.S. from Canada to the Gulf of Mexico. This SFSS continuously produces, analyzes, monitors, and disseminates GOES products to the stations it supports. It also advises NSSFC and affected WSFOs of areas where the satellite pictures show severe weather in progress or indicate the possibility of severe developments. This SFSS operates 7 days a week, 24 hours a day -- telephone (FTS) 758-2102.

c. DOD Defense Meteorological Satellite Program (DMSP). This is a DOD-managed system to collect and process meteorological data from spaceborne sensors. These data are processed by the AFGWC and are available for timely application to severe weather forecasting. DMSP data are currently archived by NOAA/NESS at the University of Wisconsin and is available for use in severe weather research and development.

6. Severe Local Storm Actions of Nonmeteorological Agencies and Individuals. The National Weather Service uses observations of severe local storms, particularly tornadoes, from many nonmeteorological agencies and personnel such as: utility companies, State Highway Patrols, local police departments, road



<u>SATELLITE</u>	<u>TYPE OF DATA</u>	<u>LOCAL TIME</u>	<u>NESS PRODUCTS</u>	<u>METHODS OF DISTRIBUTION</u>
ITOS (NOAA Series)	SR(stored)	0900, 2100	1. Cloud cover imagery	. Limited facsimile, teletypewriter
	VTPR		2. Sea-surface temp. analysis	. Direct GOES picture lines from the CDDF to SFSSS
	VHRR		3. Moisture analyses	and WSFOs
			4. Temperature soundings	
GOES-2 (East)	VISSR	Every 30 min. (Limited scan for short interval viewing available)	1. 8-km resolution IR (full disk) 2. 4-km resolution VIS sectors 3. 2-km resolution VIS sectors 4. 1-km resolution VIS sectors	
SMS-2 (West)			5. Equivalent IR sectors (8-km resolution, with equivalent 2-km sector geographical coverage). 6. Enhanced IR data 7. Cloud-top heights	
<u>AFGWC PRODUCTS</u>				
DMSP	LS LF TS TF	Early morning and evening Late morning and evening	1. 3-hourly 3-dimensional nephanalysis 2. Mapped HR and IR displays 3. Real-time LF and TF displays	. by telephone conference with Severe Weather Specialist in AFGWC . Special photos available from University of Wisconsin Archive.
CDDF - Central Data Distribution Facility			VHRR - Very High Resolution Radiometer	
DMSP - Defense Meteorological Satellite Program			VISSR - Visible Infrared Spin-Scan Radiometer	
GOES - Geostationary Operational Environmental Satellite			VTPR - Vertical Temperature Profile Radiometer	
ITOS - Improved TIROS Operational Satellite			LF - Light Fine Video Data (1/3 nm)	
SMS - Synchronous Meteorological Satellite			LS - Light Smooth Video Data (1.5-2.0 nm)	
			TF - Thermal Fine Data (1/3 nm)	
			TS - Thermal Smooth Data (1.5 - 2.0 n.m.)	

Table 5-2. Satellite and Satellite Data Availability for Severe Local Storms Season

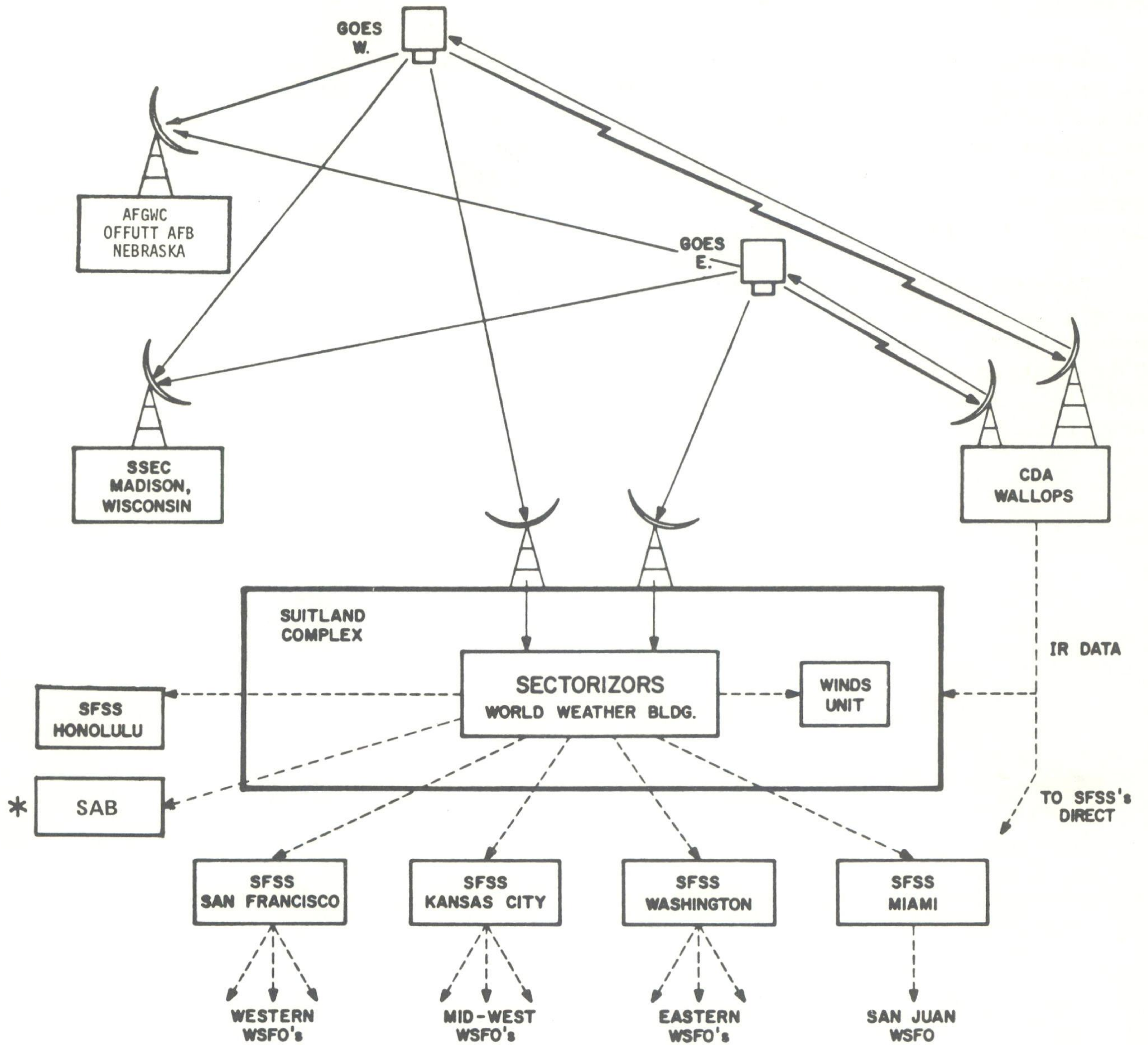


maintenance patrols, citizen spotters (network), cooperative National Weather Service climatological observers, Citizen Band radio groups, local Civil Defense Organizations, radio and television station mobile units, city employees (for example, the Chicago Sanitary District), the FAA, and individual citizens.

Reports are received by various means -- which are not uniform at each WSO -- including Citizen Band or Civil Defense radio facilities (with a transceiver often located in the WSO and manned by local cooperators), police radio, direct telephone lines involving unlisted numbers, the National Warning System (NAWAS), State Highway Patrols, teletypewriter circuits by means of telephone or a sending "drop" on statewide NOAA Weather Wire Service (NWWS) circuits, and Service A teletypewriter circuits.

Reports are disseminated to mass news disseminators, to other WSOs, and to safety agencies by NWWS circuits (first priority, except for a more expedient means in some local areas), RAWARC, NAWAS, telephones (hotlines and commercial), NOAA Weather Radio, direct commercial radio broadcasts, telephone recordings, and Civil Defense radio facilities. The "fan-out" principle is used wherever practical.





NOTE: Anchorage SFSS is in the GOES Operational Data Flow, but primarily uses the NOAA Polar-Orbiting Satellite data.

Figure 5-1. GOES Operational Data Flow.



PUBLICITY

The Military Weather Advisories and Point Warnings of the Air Force Global Weather Central (AFGWC) are designed for specialized military users and shall not be released to the public. News media releases that concern the cooperative efforts in severe storms activities of the Department of Defense and NOAA weather services and of other agencies should reflect the joint nature of these efforts by giving due credit to participating agencies. Copies of these releases should be forwarded to:

Deputy Director for Operations  
(Environmental Services)  
OJCS  
Washington, D.C. 20301

Director of Operations and Readiness  
Airspace and Air Traffic Service Division  
USAF/XOOTF  
Washington, D.C. 20330

Assistant Chief of Staff for Intelligence  
Department of the Army  
Attention: DAMI-DOT-C  
Washington, D.C. 20310

Commander, Naval Oceanography Command  
NSTL Station  
Bay St. Louis, Mississippi 39520

Headquarters, Air Weather Service (AWS/CS)  
Scott Air Force Base, Illinois 62225

NOAA Public Affairs Office  
6010 Executive Boulevard  
Rockville, Maryland 20852

Commandant, United States Marine Corps  
Headquarters, United States Marine Corps  
Washington, D.C. 20380



## AEROSPACE DEFENSE COMMAND (ADC)

## WEATHER STATIONS AND AREAS OF RESPONSIBILITY

The following AWS units supporting ADC air divisions can obtain appropriate operational permission and contact radar sites within the division area of responsibility. (See attached map for division areas and location of radar sites.)

<u>Air Division (General Area of Responsibility)</u>	<u>AWS Unit</u>	<u>Autovon Number</u>	<u>FTS Number</u>
20 AD (Southeast)	Det 41, 12 WS Ft Lee AFS VA	687-4008 Ext 765	732-7256 Ext 765
21 AD (Northeast)	Det 27, 23 WS Hancock Field NY	587-9535	458-5500 Ext 535
23 AD (N Central)	Det 8, 12 WS Duluth IAP MN	825-8765	727-8211 Ext 765
24 AD (N Plains)	Det 3, 12 WS Malmstrom AFB MT	632-3154	731-3154
25 AD (Northwest)	Det 11, 7 WW McChord AFB WA	976-6766	984-6766
26 AD (Southwest)	Det 15, 25 WS Luke AFB AZ	853-2805 Ext 765	935-2611 Ext 765



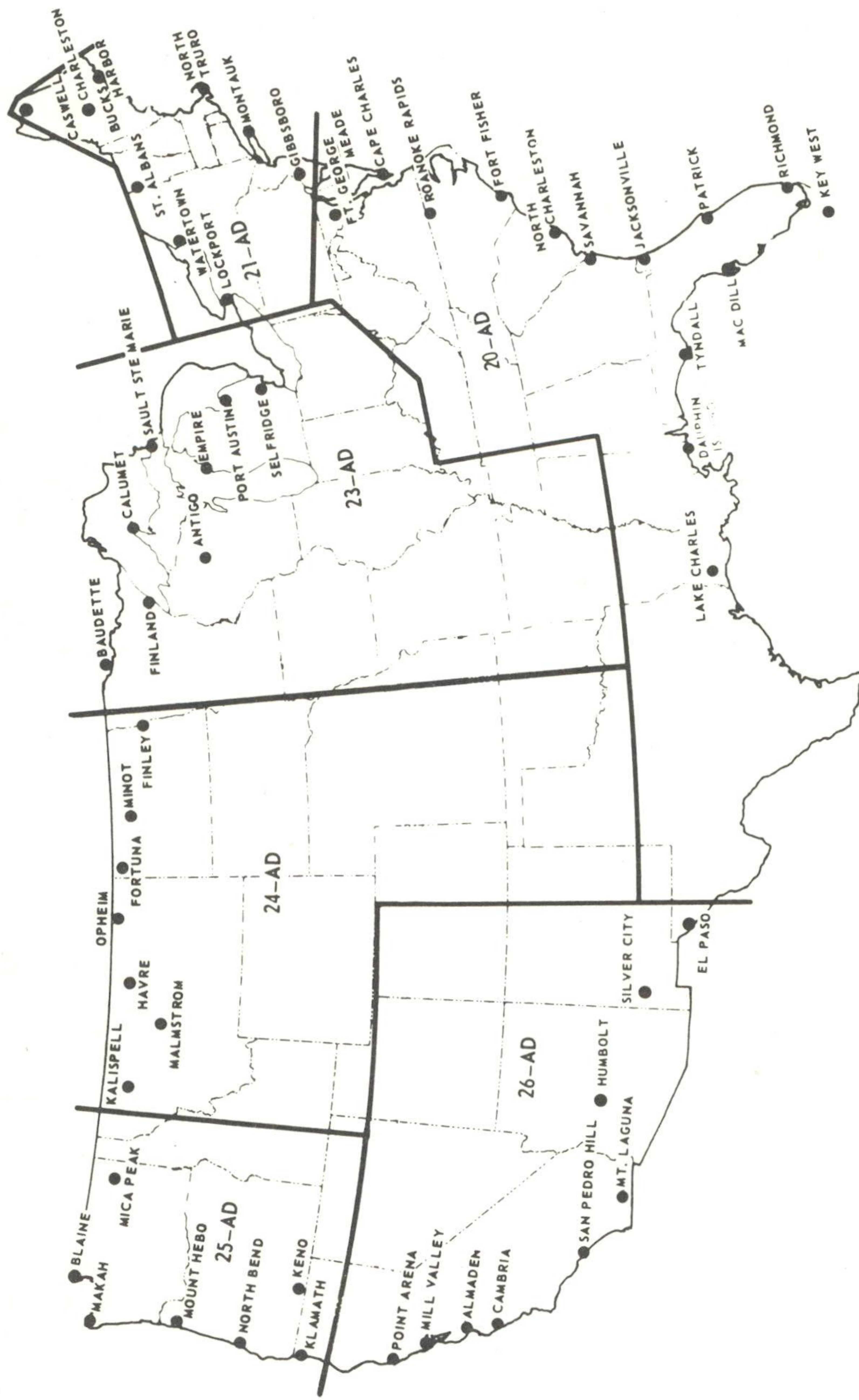


Figure A1-1. Aerospace Defense Command Air Divisions (AD) and Radar Locations



RECOMMENDED LETTER OF AGREEMENT  
BETWEEN LOCAL UNITS OF NWS AND USAF

FROM: DET X, X WW, \_\_\_\_\_, AFB

SUBJECT: Letter of Agreement (LOA) - Notification of Severe Convective  
Weather

TO: (Appropriate NWS Office)

1. Introduction.

a. Purpose. To establish responsibilities and procedures for (Appropriate NWS office) to notify (Det X, X WW or military installation) when severe convective weather is expected to affect (military installation or site) and the supporting AWS detachment, Det X, X WW, is not manned by a forecaster or the detachment's radar is inoperative.

b. Severe convective weather is defined as thunderstorms with winds of 50 knots or more, hail 3/4 inch in diameter or larger, or tornadoes.

c. This LOA supersedes LOA dated \_\_\_\_\_ which should be destroyed.

2. Specific Terms of the Agreement.

a. Det X, X WW, will:

(1) Notify (appropriate NWS office) when Det X is not manned by a forecaster. Normal forecaster duty hours are as follows:

(Describe normal forecaster duty hours)

(2) Notify (appropriate NWS office) when Det X's radar is inoperative except for normal preventive maintenance.

(3) Provide (appropriate NWS office) a single point of contact for notification. Telephone number for this point of contact is XXX-XXXX. Det X will inform (appropriate NWS office) of changes in this point of contact of telephone number.

b. The (appropriate NWS office) will:

(1) Notify (appropriate military installation) by calling (single point of contact/telephone number) whenever a severe local storm warning is issued for the area including (military installation or site), when Det X, X WW is not manned by a forecaster or Det X's radar is inoperative.



(2) Provide notification by telephone. This notification will be made only after dissemination commitments are completed and only when doing so will not impact public warning operations.

(3) Make only one telephone call; however, if line is busy one additional call will be made.

(4) Notify Det X, X WW when their radar is inoperative except for normal preventive maintenance.

c. Detachment X and (appropriate NWS office) will, as workload permits, pass to each other by phone, local severe weather information of mutual benefit to both agencies. Such informatin would include, but not be limited to, reported hail, damaging winds, tornadoes, or radar observations indicating severe thunderstorms or tornadoes.

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Signature  
Meteorologist in Charge,  
or Official in Charge

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Signature  
Detachment Commander

Date \_\_\_\_\_

Date \_\_\_\_\_



ABBREVIATIONS AND ACRONYMS

AAT	Air Traffic Service (FAA)
AD	Air Division
ADC	Aerospace Defense Command
ADWS	Automatic Digital Weather Switch
AEB	Analysis and Evaluation Branch (NESS)
AFB	Air Force Base
AFGL	Air Force Geophysical Laboratory
AFGWC	Air force Global Weather Central
AFOS/NDC	Automation of Field Operations and Services/National Distribution Circuit
AFS	Air Force Station
AIRMET	Airmen's Meteorological Information
AM	Amplitude Modulation
ANGB	Air National Guard Base
ARTCC	Air Route Traffic Control Center
AWS	Air Weather Service
AW	Aviation Tornado Watch
CDDF	Central Data Distribution Facility
CONUS	Continental United States
COMEDS	CONUS Meteorological Data System
DMSP	Defense Meteorological Satellite Program
DOD	Department of Defense
EBS	Emergency Broadcast System
EDIS	Environmental Data and Information Service
FAA	Federal Aviation Administration
FCMSSR (FCM)	Federal Coordinator for Meteorological Services and Supporting Research
FEMA	Federal Emergency Management Agency
FM	Frequency Modulation
FO	Military Weather Advisory Future Outlooks
FSS	Flight Service Station
FTS	Federal Telecommunications Service
GMT	Greenwich Mean Time
GOES	Geophysical Orbiting Environmental Satellite
IAP	International Airport
IR	Infrared
ITOS	Improved Tiros Operational Satellite
KCRT	Keyboard Cathode Ray Tube



LF	Light Fine Video Data (1/3 nm)
LOA	Letter of Agreement
LS	Light Smooth Video Data (1.5 - 2.0 nm)
LVL	Level
MDR	Manually Digitized Radar
MIC	Maximum Instantaneous Coverage
MKC	Kansas City
MWA	Military Weather Advisory
NAFAX	National Facsimile Network
NAMFAX	National Aviation Meteorological Facsimile Circuit
NASA	National Aeronautics and Space Administration
NAWAS	National Warning System
NESS	National Environmental Satellite Service
NHC	National Hurricane Center
NMC	National Meteorological Center
NOAA	National Oceanic and Atmospheric Administration
NRC	Nuclear Regulatory Commission
NSSFC	National Severe Storms Forecast Center
NSSL	National Severe Storms Laboratory
NWS	National Weather Service
NWWS	NOAA Weather Wire Service
OJCS	Office Joint Chiefs of Staff
PATWAS	Pilots Automatic Telephone Weather Advisory Service
PIBAL	Pilot Balloon
PIREP	Pilot Report
R&D	Research and Development
RAREP	Radar Report
RAWARC	Radar Report and Warning Coordination Circuit
RAWIN	Rawinsonde
SC/BS	Subcommittee for Basic Services
SD	Circuit Heading for Radar Reports
SFSS	Satellite Field Service Station
SIGRAD	Significant Radar Message
SIGMET	Significant Meteorological Information
SMS	Synchronous Meteorological Satellite
SR	Stored Data
SRC	State Relay Center
TAA	Total Area Affected
TF	Thermal Fine Data (1/3 nm)
TIROS	Television Infrared Observation Satellite
TS	Thermal Smooth Data (1.5 - 2.0 nm)
TWEB	Transcribed Weather Broadcast



USA	United States Army
USAF	United States Air Force
USN	United States Navy
VHRR	Very High Resolution Radiometer
VIP	Video Integrated Processor
VISSR	Visible Infrared Spin Scan Radiometer
VTPR	Vertical Temperature Profile Radiometer
VOR	Visual Omni Range
WIBIS	Severe Weather Watch Will Be Issued
WMSC	Weather Message Switching Center
WSFO	Weather Service Forecast Office
WSMO	Weather Service Meteorological Observatory
WSO	Weather Service Office
WSOM	Weather Service Operations Manual