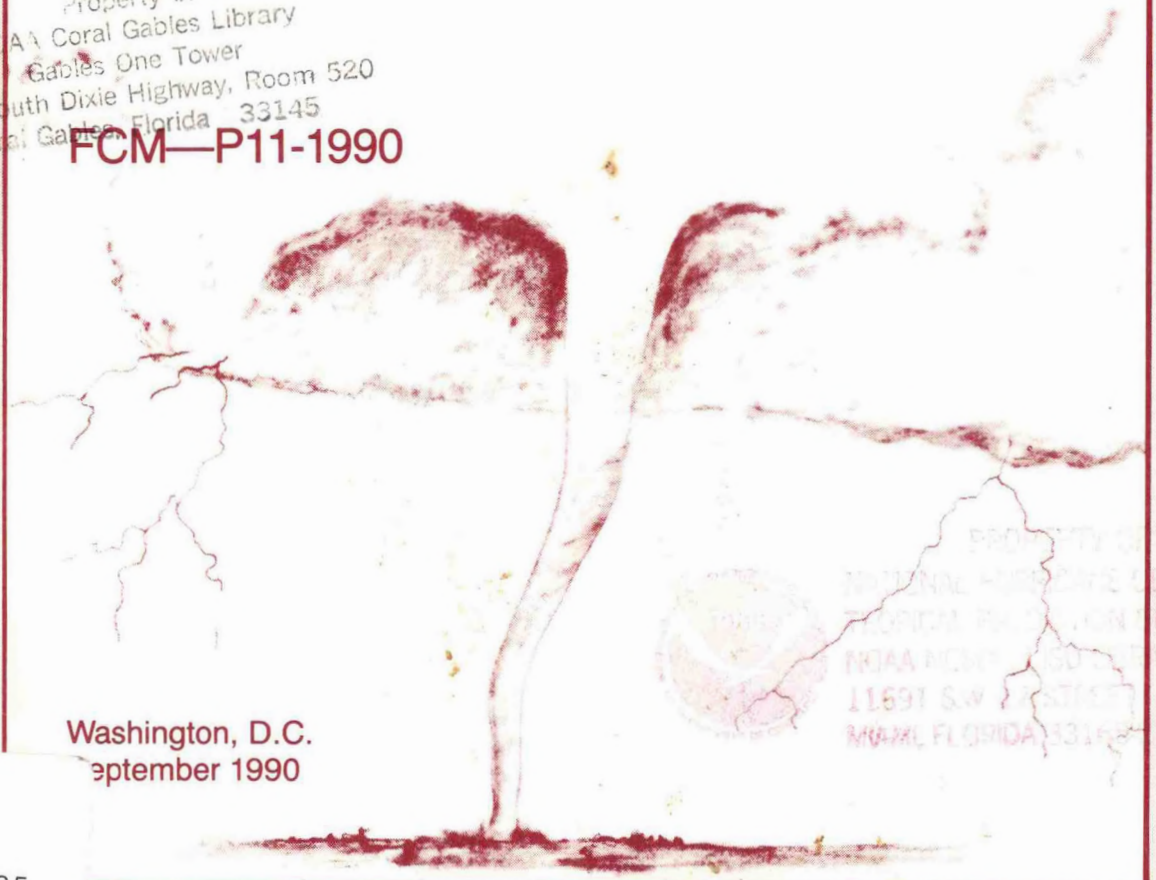
U.S. DEPARTMENT OF COMMERCE / National Oceanic and Atmospheric Administration

OFCM

OFFICE OF THE FEDERAL COORDINATOR FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

National Severe Local Storms Operations Plan

FCM—P11-1990



Washington, D.C.
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FOR
METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH

6010 EXECUTIVE BOULEVARD, SUITE 900
Rockville, Maryland 20852

NATIONAL SEVERE LOCAL STORMS OPERATIONS PLAN

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CHANGE AND REVIEW LOG

Use this page to record changes and notices and reviews.

Change Number	Page Numbers	Date Posted	Initial
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Review Date	Comments	Initials

FOREWORD

This is the twenty-first of a 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 is one of several operations plans produced under the auspices of the Federal Coordinator. It outlines the responsibilities of the various United States agencies which provide meteorological services in observing and forecasting severe local storms. It also defines meteorological terms used by agencies preparing severe local storms forecasts and warnings, identifies differing operational warning criteria, and discusses communications, observations, and some public release aspects of severe storms warnings.

This plan supersedes the 1988 version and incorporates changes recommended by the concerned agencies through their representatives on the Committee for Basic Services (CBS) Working Group for Severe Local Storms Operations.

The National Weather Service (NWS) is now initiating a major modernization and associated restructuring effort. As a result, a wide variety of warning and forecasting operations including severe local storms will be significantly affected. The transition to this new Weather Service is expected to extend well into the decade. In view of this, the present plan can be expected to require frequent and possibly major revision over the next several years.

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.

Robert L. Carnahan
Federal Coordinator for
Meteorological Services and
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CHAPTER 1

1. RESPONSIBILITIES OF COOPERATING AGENCIES

The cooperation among agencies which provide the necessary meteorological data, information, and dissemination services is the essential basis for ensuring that users receive the best possible warnings and forecasts of severe local storms. This cooperation is achieved through the activities of the Committee for Basic Services (CBS) and the Working Group for Severe Local Storm Operations in the Office of the Federal Coordinator for Meteorological Services and Supporting Research (OFCM). Each of the agencies represented in this Plan, the National Weather Service, the National Environmental Satellite, Data, and Information Service, U.S. Air Force, U.S. Army, U.S. Navy, and the Federal Aviation Administration have agreed to arrangements which promote the most effective use of their weather-related assets with respect to severe local storm operations.

1.1 National Weather Service (NWS).

The NWS 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. Dissemination of 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 the National Severe Storms Forecast Center (NSSFC) 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.

1.2 National Environmental Satellite, Data, and Information Service (NESDIS). The NESDIS 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.

d. 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.

1.3 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 and make all such reports available to civil agencies through existing communications with Federal Aviation Administration (FAA) or, with prior Department of Defense (DOD) approval, directly.

c. A concerted effort to collect and relay PIREPs.

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

(1) Weather warning support in the conterminous United States and 200 miles (322 km) 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 alphanumeric format at 0800Z valid until 2400Z; 1600Z valid until 0600Z; 2100Z valid until 1200Z.

(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 (METWATCH) of meteorological parameters for possible severe weather developments and of other weather phenomena for which AFGWC has warning responsibility.

(f) Critical backup to NSSFC and NMC.

1.4 U. S. Army (USA).

The Army operates a regional weather warning dissemination program with Weather Warning Regions and Centers. Weather warnings are prepared at the Air Force Global Weather Central and disseminated to the Army Weather Warning Centers via the U. S. Air Force CONUS Meteorological Data System/ Automated Weather Distribution (COMEDS/AWDS) or AUTODIN.

The centers disseminate the weather warnings to Army installations and activities within the warning region when the Army installation or activity is not on the COMEDS/AWDS net or receiving the warning via AUTODIN, or it is not feasible during non-duty hours for the installation or activity to staff the weather facility containing the COMEDS/AWDS net.

Army Weather Warning Centers have established local procedures to ensure that the weather warnings are disseminated to the applicable installation or activity within 10 minutes of receipt of the warning.

1.5 U. S. Navy (USN) and U. S. Marine Corps (USMC).

Neither the Navy nor the Marine Corps operates a centralized Severe Local Storms Warning Service. Within the conterminous United States and offshore waters, requirements for early warnings of hazardous flying conditions and local destructive phenomena are primarily met by NSSFC/AFGWC products interpreted locally by personnel of the Naval Oceanography Command and the Marine Corps Aviation Weather Service units. Full use is made of information received on the Digital Facsimile System (DIFAX) and the National Facsimile Network (NAFAX), as well as other military and civil weather circuits.

Basic surface weather observations are taken worldwide, including at sea, by assigned military personnel. A concerted effort is made by both services to collect and relay Pilot Reports (PIREPS).

1.6 Federal Aviation Administration (FAA).

The FAA shall provide:

a. Communication services and observations in accordance with the January 24, 1977, MEMORANDUM OF AGREEMENT between 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.

1.7 Exchange of Data Between Agencies.

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

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 Severe Weather Branch, Operations Division, National Weather Service Headquarters, and to the Headquarters, Air Weather Service.

The National Weather Service, National Environmental Satellite, Data, and Information Service (NESDIS), National Severe Storms Laboratory (NSSL), Air Force Geophysical Laboratory (AFGL), and 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.

1.8 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 for 0600Z or 1800Z. The lead forecaster, 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. The agency taking the special sounding is responsible for funding.

Air Weather Service requests for National Weather Service or NASA soundings should be made to the lead forecaster at NSSFC (816-426-3646). National Weather Service requests for USAF soundings should be made to the AFGWC duty officer (402-294-2586 or FTS 866-2586).

NSSFC may also request special limited scan Geostationary Operational Environmental Satellite (GOES) data on critical severe storm days. Requirements for special products are coordinated through NESDIS, Satellite Services Division, and described in the VAS Operations Plans (provided by the Satellite Services Division, by calling FTS 763-8051).

1.9 Backup Plan for NSSFC.

In the event that NSSFC is unable to discharge its severe weather forecasting functions, AFGWC will provide backup. Backup procedures are documented in FCM-P14-1985, Federal Plans for Mutual Support and Cooperative Backup Among Operational Processing Centers. The AFGWC severe storms forecaster can be reached at FTS 864-3613.

1.10 Notification of Military Installations.

Selected military installations whose AWS detachments are not staffed 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 or other information available. Notification will be via NOAA Weather Radio Warning Alarms for those sites within the receiving area. 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 the Meteorologist-in-Charge or Hydrologist-in-Charge and the Detachment Commander before they can go into effect. See Appendix B.]

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 (25 m/s) or more, or hail 3/4-inch (20 mm) in diameter or larger, or tornadoes.

If NWR services are not available, telephone notification is authorized. 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.

1.10.1 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
Buckley ANGB	WSFO Denver, CO
Cannon AFB	WSO Amarillo, TX
Castle AFB	WSO Sacramento, CA
Charleston AFB	WSO Charleston, SC
Columbus AFB	WSO Tupelo, MS
Davis-Monthan AFB	WSO Tucson, AZ
Dobbins AF B	WSFO Atlanta, GA
Dover AFB	WSO Atlantic City, NJ

Dyess AFB	WSO Abilene, TX
Edwards AFB	WSO Palmdale, CA
Ellsworth AFB	WSO Rapid City, SD
Eaker AFB	WSFO Memphis, TN
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
Luke AFB	WSO Phoenix, AZ
Maxwell AFB	WSO Montgomery, AL
McClellan AFB	WSO Sacramento, CA
McConnel AFB	WSO Wichita, KA
McGuire AFB	WSO Atlantic City, NJ
Minot AFB	WSFO Bismarck, ND
Moody AFB	WSO Savannah, GA
Myrtle Beach AFB	WSO Charleston, SC
Nellis AFB	WSO Las Vegas, NV
Offutt AFB	WSO Omaha, NE
Pease AFB	WSMO Brunswick, ME
Plattsburgh AFB	WSO Burlington, VT
Randolph AFB	WSFO San Antonio, TX
Reese AFB	WSFO Lubbock, TX
Richards-Gebaur AFB	WSO Kansas City, MO
Rickenbacker AFB	WSO Port Columbus, OH
Robins AFB	WSO Macon, GA
Scott AFB	WSFO St. Louis, MO
Selfridge ANGB	WSFO Detroit, MI
Shaw AFB	WSO Charleston, SC
Sheppard AFB	WSO Wichita Falls, TX
Tinker AFB	WSFO Oklahoma City, OK
Travis AFB	WSO Sacramento, CA
Whiteman AFB	WSO Kansas City, MO
Wurtsmith AFB	WSO Houghton Lake, MI

CHAPTER 2

2. DEFINITIONS

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

2.1 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, waterspout, or a thunderstorm with winds of 50 knots (25 m/) or greater or hail 3/4-inch (20 mm) in diameter or greater at the surface. Wind damage may be used to infer the occurrence/existence of a severe local storm.

2.2 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.

2.3 Squall Line.

A line of active thunderstorms or squalls which may extend over several hundred miles. It is often the manifestation of the mature or active stage of "instability-line" development and may be either a solid or broken line of thunderstorms.

2.4 Density/Risk of Severe Thunderstorms.

The following adjectives describe the possible density/risk of severe thunderstorms in an outlook area:

a. Slight risk - 2 to 5 percent coverage or 4-10 Manually Digitized Radar (MDR) blocks with severe thunderstorms per 100,000 square miles (259,000 km2).

b. Moderate risk - 6 to 10 percent coverage or 11-21 MDR blocks with severe thunderstorms per 100,000 square miles (259,000 km2).

c. High risk - greater than 10 percent coverage or more than 21 MDR blocks with severe thunderstorms per 100,000 square miles (259,000 km2).

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 and close to the designated watch area.

2.5 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 (25 m/s) and hail, if any, of less than 3/4-inch diameter (20 mm) at the surface.

b. Severe Thunderstorm - Wind gusts of 50 knots (25 m/s) or greater or hail of diameter 3/4-inch (20 mm) or greater at the surface. Wind damage may be used to infer the occurrence/existence of a severe thunderstorm.

2.6 Funnel Cloud.

A rotating column of air forming a pendant from a cumulus or cumulonimbus cloud whose circulation does not reach the ground or water.

2.7 Tornado.

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

2.8 Waterspout.

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

CHAPTER 3

3. FORECASTS AND WARNINGS

3.1 General.

Every effort has been made to standardize terminology, adopt common definitions, and adjust criteria to a common base, however, each agency has different 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.

3.2 Other Warning Criteria.

All phenomena (other than those classified as severe storms, paragraph 2.2) 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 the appropriate National Oceanic and Atmospheric Administration National Weather Service publications.

3.3 National Weather Service Watch/Warning Procedures.

3.3.1 General. The National Weather Service has statutory responsibility for providing a Severe Local Storms Watch and 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 Watch and Warning Service is available to the general public and to aviation interests and is provided through the National Severe Storms Forecast Center at Kansas City, Weather Service Forecast Offices, and Weather Service Offices.

3.3.2 Watch/Warning Criteria. Any or all of the categories listed below may be mentioned in severe weather watches/warnings to indicate more fully the severe weather that is expected.

3.3.2.1 Severe Thunderstorm.

a. Wind: Thunderstorm related surface winds (sustained or gusts) of 50 knots (25 m/s) or greater;

b. Hail: Surface hail 3/4-inch (20 mm) 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.

(Heavy rainfall, when a significant threat of flash floods exists, and lightning, when expected to have a significant impact on the general public, may also be mentioned in severe weather watches/warnings.)

3.3.2.2 Tornado. 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.

3.3.3 NMC. NMC is the central data processing center for the NWS. NMC issues prognostic charts, discussions, and other forecast materials.

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

3.3.4.1 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.

Example of Watch Bulletin

BULLETIN - IMMEDIATE BROADCAST REQUESTED
TORNADO WATCH NUMBER 392
NATIONAL WEATHER SERVICE KANSAS CITY MO
620 PM CDT SAT MAY 12 1990
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

THIS SATURDAY EVENING UNTIL 12 MIDNIGHT CDT .

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

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..

3.3.4.2 Convective SIGMETs. NSSFC issues hourly, at H+55, and as required Special Convective SIGMET bulletins over the conterminous United States and adjacent coastal waters. These bulletins contain descriptions and trends of current significant thunderstorms and an outlook for periods of up to 6 hours 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; and

e. Hail greater than or equal to 3/4-inch (20 mm) diameter.

Negative bulletins are issued if none of the criteria are met.

Example of Convective SIGMET Bulletin

MKCC WST 231855
CONVECTIVE SIGMET 20C
VALID UNTIL 2055Z
ND SD
FROM 90W MOT-GFK-ABR-90W MOT

INTSFYG AREA SVR TSTMS MOVG FROM 2445. TOPS ABV 450.
WIND GUSTS TO 60 KT RPRTD.
TORNADOES...HAIL TO 2 IN...WIND GUSTS TO 65 KT PSBL ND
PTN.

CONVECTIVE SIGMET 21C
VALID UNTIL 2055Z
TX
50SE CDS
ISOLD SVR TSTM D30 MOVG FROM 2420. TOP ABV 450.
HAIL TO 1 1/2 IN...WIND GUSTS TO 60 KT RPRTD.
HAIL TO 2 IN...WIND GUSTS TO 65 KT PSBL.

OUTLOOK VALID 232055-230055
AREA 1...FROM INL-MSP-ABR-MOT-INL
SVR TSTMS CONT TO DVLP IN AREA OVR ND. AREA IS EXPCD TO
RMN SVR AND SPREAD INTO MN AS STG PVA MOVES OVR VERY
UNSTBL AMS CHARACTERIZED BY -12 LIFTED INDEX.

AREA 2...FROM CDS-DFW-LRD-ELP-CDS
ISOLD STG TSTMS WILL DVLP OVR SWRN AND WRN TX THRUT FCST
PD AS UPR LVL TROF MOVES NEWD OVR VERY UNSTBL AMS.
LIFTED INDEX RMNS IN THE -8 TO -10 RANGE. DRY LINE WILL
BE THE FOCUS OF TSTM DVLPMT.

3.3.4.3 Nonconvective SIGMETS. NSSFC issues nonconvective SIGMETS in the conterminous United States and adjacent coastal waters for severe or extreme turbulence, severe icing, and widespread dust/sand storms/volcanic ash lowering visibilities to below 3 miles (5 km).

3.3.4.4 AIRMETS. NSSFC issues AIRMETS in the conterminous United States and adjacent coastal waters for moderate turbulence, moderate icing, extensive cloud ceilings below 1,000 feet or visibilities below 3 miles (5km), extensive mountain obscuration, and sustained surface winds of 30 knots or more.

3.3.5 WSFOs and WSOs.

3.3.5.1 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.

3.3.5.2 WSFOs and WSOs with County warning responsibilities are responsible for warning the general public. Severe weather warnings are based on reports of actual, suspected, or imminent 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.

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

3.3.6 Satellite Field Distribution Facilities (SFDF). The SFDFs receive and analyze satellite imagery in near real time and assist collocated units, WSFOs, and WSOs in applying these data to their weather forecasting and warning programs.

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

3.4.1 General. AFGWC provides, by means of the USAF communications system, warnings for Military installations for:

a. Tornadoes;

b. Thunderstorms;

c. Strong surface winds of 35 knots (65 km/h) or more that are not associated with thunderstorms;

d. Heavy rain or snow (2 inches (50 mm) or more in a 12-hour period); and

e. Freezing precipitation.

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

3.4.2 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.

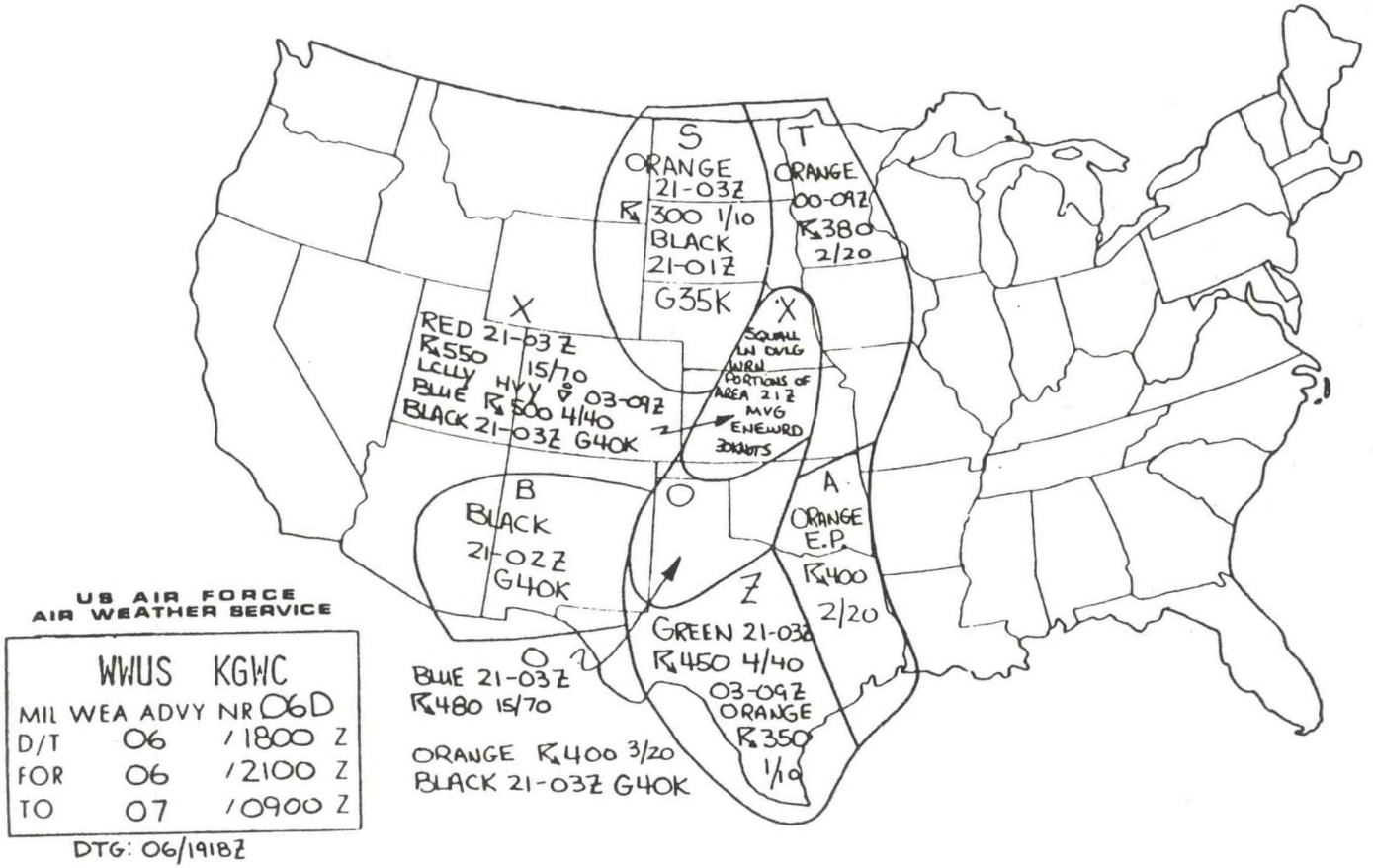

FIGURE 3-1. Example of Graphic Military Weather Advisory

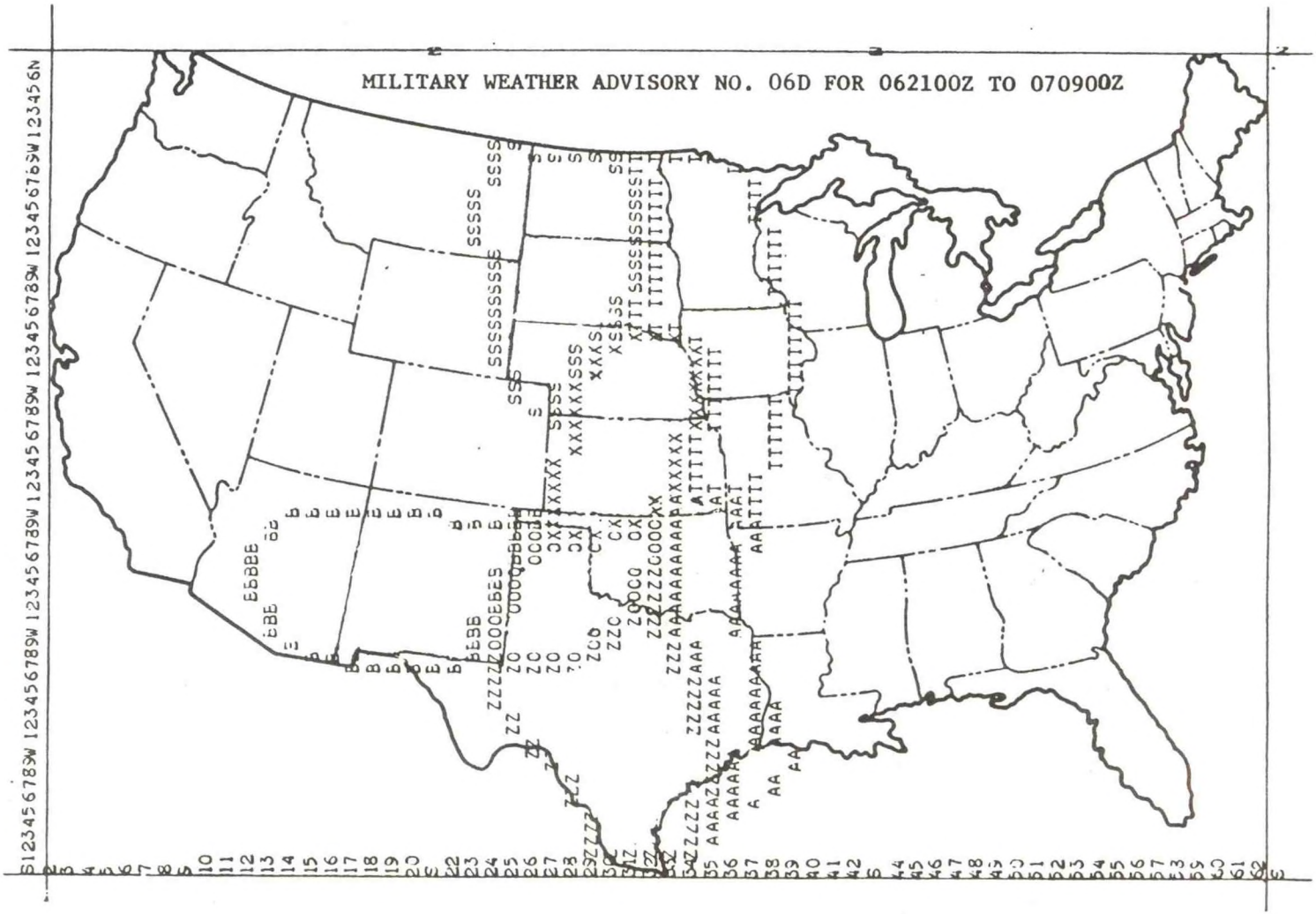

FIGURE 3-2. Example of Graphic Teletype Portion of a Military Weather Advisory

Table 3-1

Military Weather Advisory (MWA) Weather Elements

COLOR*	WEATHER ELEMENT(S)
A. RED	Tornado
B. BLUE	Severe Thunderstorm
C. GREEN	Moderate Thunderstorm o Winds between 35 and 49 knots (18-25 m/s) inclusive or o Hail greater than or equal to 1/2 inch (13 mm) but less than 3/4 inch (20 mm) in diameter
D. ORANGE	Thunderstorm with winds less than 35 knots (18 m/s) and hail less than 1/2 inch (13 mm) in diameter
E. BLACK	Surface winds greater than or equal to 35 knots (18 m/s) not associated with a thunderstorm
F. BROWN	Freezing Precipitation
G. PURPLE	Heavy rains greater than or equal to 2 inches (50 mm) in 12 hours
H. HATCHED PURPLE	Heavy snow greater than or equal to 2 inches (50 mm) in 12 hours

*Colors entered manually on graphic military weather advisories

3.4.2.1 Purpose and Use. The Military Weather Advisories are designed to provide basic guidance to both the field forecaster and to the weather 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.

3.4.2.2 Amendment. Advisories are amended when an unforecast event is observed and expected to continue or when an advisory no longer adequately describes the severity or valid times of a forecast event.

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

3.4.3 AFGWC Weather Warnings. AFGWC weather 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 weather warnings are issued for and to specific areas 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 areas to the requirements of the using agency. The locations for which AFGWC has warning responsibility are listed in Volume III, Air Weather 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 weather warnings are issued for National Guard units, arsenals, ammunition plants, and other civilian activities under contract to the DOD. AFGWC weather warnings are issued for specific areas as the situation warrants in contrast to Advisories which are issued at scheduled intervals for fixed valid periods. AFGWC weather warnings can be amended, extended, or cancelled as necessary.

AFGWC Weather Warnings:

a. Provide specific warning to an installation where a forecaster is not assigned.

b. Alert a responsible individual at locations with a limited forecast service.

c. Alert and guide the field forecaster who has final responsibility for warning the agency supported.

EXAMPLE OF AFGWC WEATHER WARNING

.KOFF 17 12/0658Z
PWFL8 KGWC 1206554
C. MODERATE THUNDERSTORMS WITH 1/2 INCH HAIL AND SE GUSTS TO 45 KTS
VALID 120900Z TO 121100Z

D. THUNDERSTORMS WITH 1/4 INCH HAIL AND SE GUSTS TO LESS THAN 35 KTS
VALID 121100Z RO 121400Z
13

.KOFF 17 12/1453Z
PWND2 KGWC 121455
E. SURFACE WINDS SW AT 25 KNOTS WITH GUSTS TO 40 KNOTS
VALID 121700Z TO 130000Z
13

.KOFF 17 12/2335Z
PWNE3 KGWC 122332
A. TORNADO WARNING...TORNADOES AND SEVERE THUNDERSTORMS WITH 1 3/4 INCH HAIL AND SSW GUSTS TO 55 KNOTS
VALID 130000Z TO 130130Z

G. HEAVY RAINS ACCUMULATING TO 2 INCHES
VALID CURRENT TO 130400Z
13

3.4.4 Local Air Weather Service (AWS) Unit Warning. 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.

3.5 Distribution of Watches, Warnings, and Severe Weather Reports by Flight Service Stations (FSS).

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 associated with the FSS receiving the information. That WSO will issue the warning or pass the information to the WSO which has the warning

responsibility for the county in which the requestor or phenomenon is located. The Federal Aviation Administration, Air Traffic Service, FSS Procedures Branch (ATT-360), and the National Weather Service will include, with their agency directives, the communication methods for assuring that these requests and reports reach the appropriate WSO.

CHAPTER 4

4. COMMUNICATIONS

4.1 National Weather Service Systems.

4.1.1 Automation of Field Operations and Services (AFOS). AFOS is an automated communications system that permits data, forecasts, warnings, and other meteorological products to be distributed faster than conventional teletypewriter or facsimile. The communications system for the contiguous United States consists of two types of circuits: Regional Distribution Circuits (RDCs) and State Distribution Circuits (SDCs). Minicomputers transmit data between most offices on dedicated telephone circuits. Each message transmitted is automatically assigned a transmission priority ranging from one (highest) to five (lowest). Warning messages and watches have the highest priorities.

4.1.2 NOAA Weather Wire Service (NWWS)

The NWWS is the primary NWS medium for disseminating warning and forecasts to the media, emergency management agencies, and other users in the public and private sectors. It is a leased satellite communications system operated for the NWS by a private sector contractor. The NWWS will accept messages simultaneously entered from all NWS data entry nodes, primarily WSFOs and the National Centers. WSOs relay warnings and forecasts to the parent WSFO via AFOS for automatic transmission on the NWWS. The system delivers the information to subscribers through satellite broadcast at 1200 bits per second in ASCII format.

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

4.1.4 Emergency Broadcast System (EBS). EBS activation is requested only for tornado and flash flood warnings. Since EBS use is voluntary for individual radio and television stations, arrangements for its use are made prior to the severe local storm season, unless such use is a continuing agreement. EBS activation is usually not requested for severe thunderstorm warnings.

4.1.5 NOAA Weather Radio. WSOs/WSFOs equipped with NOAA Weather Radio can transmit continuous weather information on one of following frequencies: 162.400, 162.425, 162.450, 162.475, 162.500, 162.525, and 162.550 MHz. These radio transmitters provide continuous weather information to an area of about 40-mile (65 km) radius. Local radio and TV stations can record and rebroadcast the material

even when land lines in the area have been disrupted. These transmitters have a tone signal alert capability which can be used to activate specially designed receivers. Figure 4-2 shows locations of NOAA Weather Radio transmitters, and Appendix C lists the stations and their frequencies.

4.1.6 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.

4.1.7 Distribution of Severe Weather Watch and Warning Bulletins. The distribution of combined Severe Weather Watch and Warning bulletins is shown in Figures 4-3 and 4-4. The distribution of aviation severe weather forecasts are outlined in Figure 4-4.

4.2 U. S. Air Force (USAF) Systems.

4.2.1 Within the conterminous United States, USAF radar weather observations are collected by means of the continental United States (CONUS) Meteorological Data System (COMEDS/AWDS). Collected reports are transmitted from the Carswell Automatic Digital Weather Switch (ADWS) to 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 WOUS1 KAWN. Routine radar reports are transmitted from WMSC to NSSFC.

4.2.2 The COMEDS/AWDS is divided into 10 geographic areas (Figure 4-5).

4.2.3 The COMEDS/AWDS is used to disseminate all Miliary Weather Advisories and weather warnings issued by AFGWC.

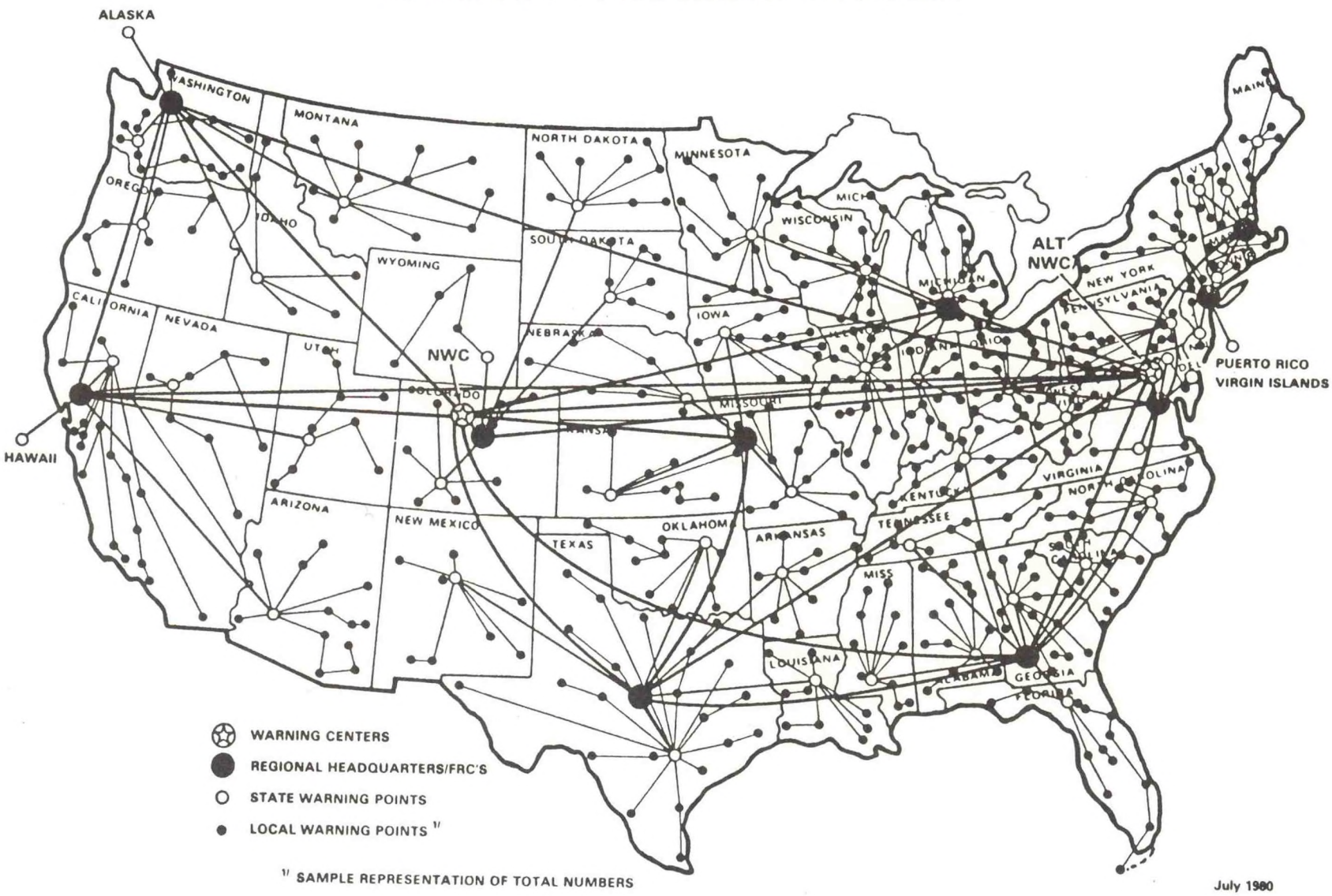

FIGURE 4-1. Federal Emergency Management Agency - NATIONAL WARNING SYSTEM.

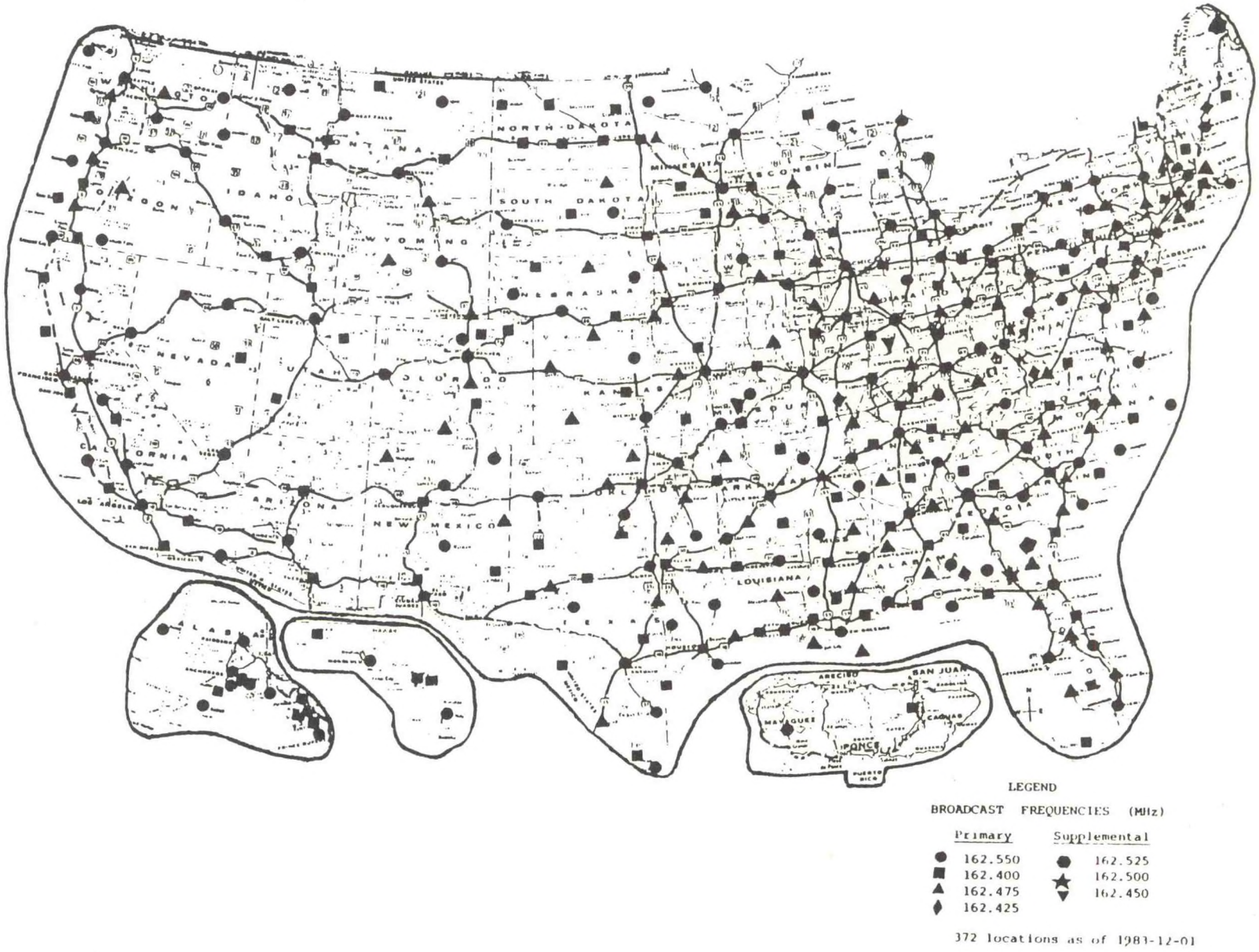

Figure 4-2. NOAA Weather Radio Network.

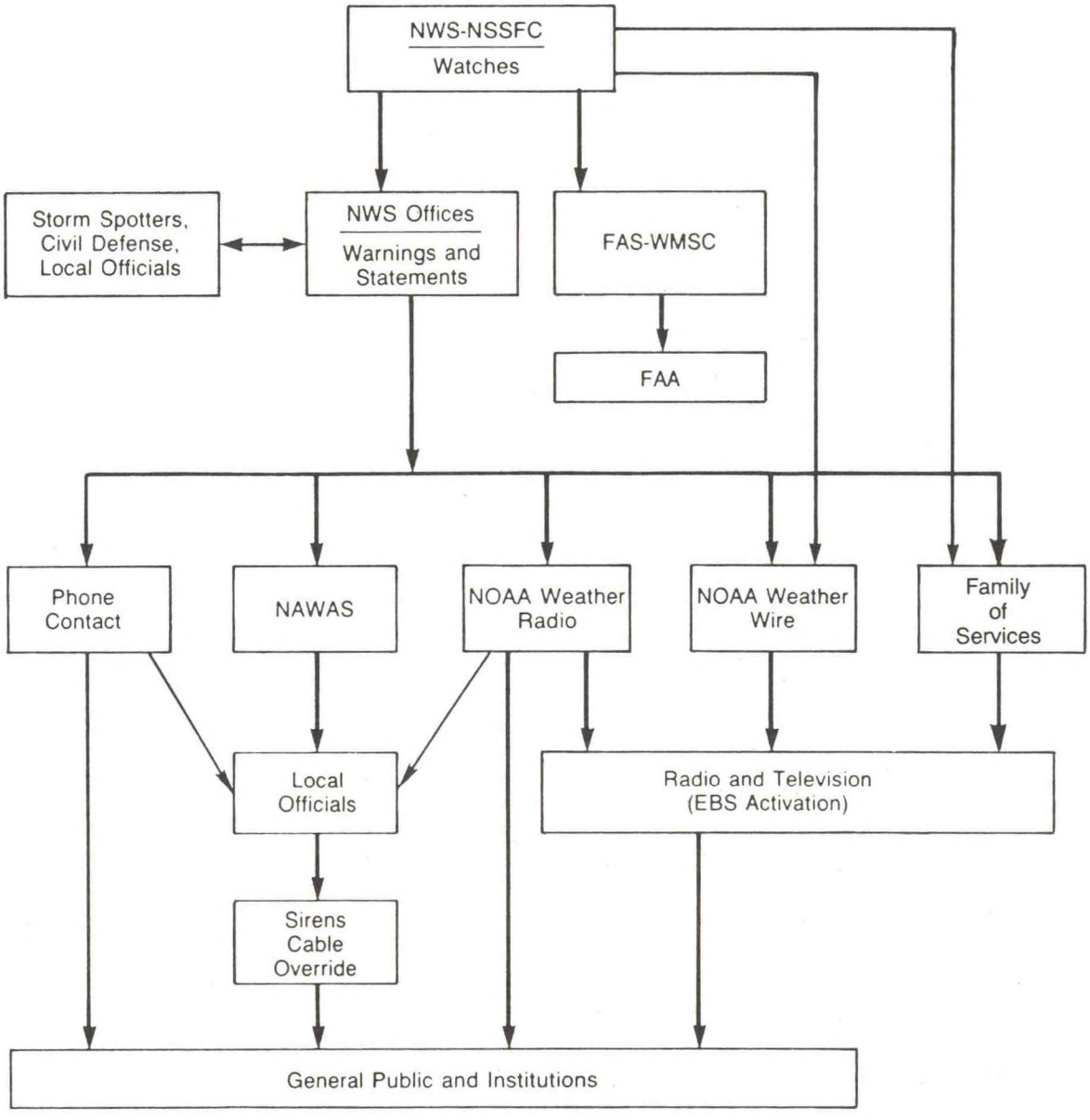

Figure 4-3. Distribution of Combined Severe Weather Watch and Warning Bulletins.

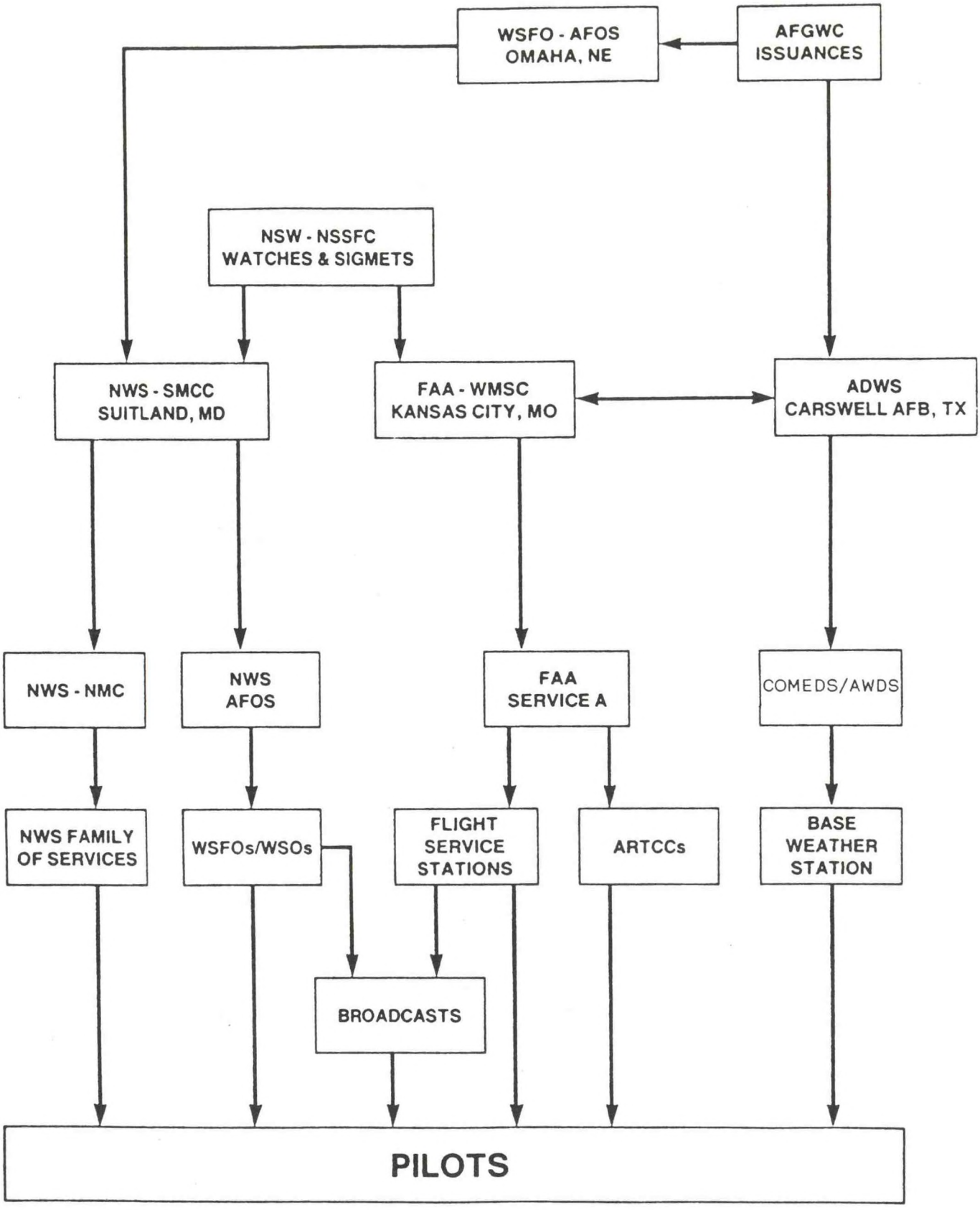

Figure 4-4. Distribution of Aviation Severe Weather Forecasts

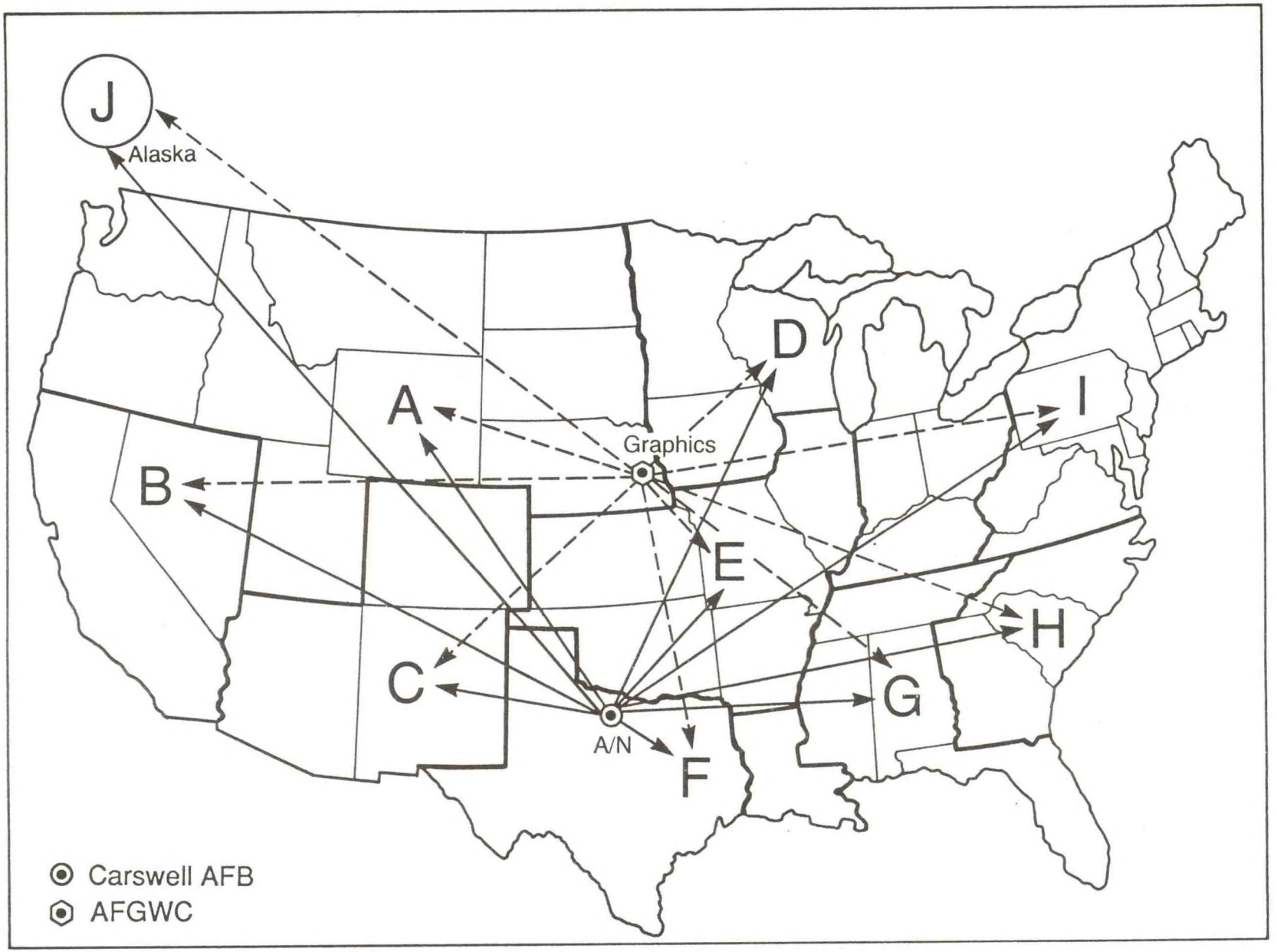

Figure 4-5. AWDS COMMUNICATIONS CIRCUITS.
Solid lines for alphanumeric (A/N) product communications;
dashed lines for graphic product communications.

4.3 Federal Aviation Administration (FAA) Systems.

4.3.1 Collection. Leased Service A/B (LABS) will be used for the collection and distribution of severe local storms information as follows:

a. Hourly and Special Aviation Observations;

b. Special Aviation Observations; and

c. Pilot reports.

4.3.2 Distribution. Leased Service A/B (LABS)will be used for the distribution of severe local storms information as follows:

a. Preliminary notification of a forthcoming watch;

b. Severe Weather Watch; and

c. AIRMETs, SIGMETs, and Convective SIGMETS.

4.4 U. S. Navy.

COMEDS/AWDS is used to collect and disseminate U.S. NAVY weather reports.

CHAPTER 5

5. OBSERVATIONS

5.1 Radar Observing and Reporting Plans.

5.1.1 General Description. The Basic Weather Radar Network is the first line of defense against severe local storms. It consists of 56 S-band radars from the NWS, 2 C-band from the USAF and 24 L-band FAA Air Route Traffic Control radars in the western U.S. Information from the FAA radars is collected, analyzed and distributed by the NWS Forecast Offices at Salt Lake City, Albuquerque, Los Angeles and Seattle. The NWS also operates 73 local warning radars throughout the continental U.S. to supplement the network system.

The Department of Defense, the Department of Commerce and the Department of Transportation have joined forces to develop and procure a Next Generation Doppler Weather Radar system. This system will replace the present, aging radars in the network during the 1990s and provide a major upgrade in severe storm surveillance capabilities.

5.1.1.1 Observing and Reporting. Coded observations are taken and transmitted hourly on AFOS at H+35 at all Network sites. Special observations are taken more frequently as required during severe weather. A narrative radar summary is also issued each hour from NWS Network radars. The FAA collection and local warning radar offices write narrative summaries only during severe weather events as required.

5.1.1.2 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/AWDS and (2) through the FAA WMSC.

5.1.1.3 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 weather radar facilities in the conterminous United States, whether or not they are assigned Network responsibilities, report radar-detected hailstorms, severe thunderstorms, and tornadoes on COMEDS/AWDS

and, when so requested, by telephone to the nearest WSFO or WSO (in accordance with Federal Meteorological Handbook No. 7).

5.1.2 The USAF air defense radar sites are capable of limited detection and interpretation of weather echoes. Appendix A lists the radar sites supporting each NORAD Region (NR). Operational commitments permitting, the radar sites within each region can provide limited supplementary weather data upon request. Contact by either AFGWC or NSSFC should be made by calling the appropriate AWS unit (see Appendix A).

5.1.3 If a WSO needs radar data from a nearby military radar (network, air defense, 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.

5.2 Rawinsonde-Observing Stations.

5.2.1 Network Stations. 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 or requested by the agency concerned.

Transponder capability is available at most 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/AWDS teletypewriter systems in the radiosonde code. Data from special soundings requested for potential or existing severe weather situations are transmitted by means of AFOS and other appropriate communications circuits to NSSFC and AFGWC. Special soundings transmitted on AFOS will use the standard upper air message heading to assure their relay to AFGWC.

5.2.2 Non-network Stations. 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.

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
Edwards AFB, CA	USAF	Unscheduled	COMEDS/(AWDS)	Commander, Det. 21, 2nd Wea. Sq. DSN 350-4318 COM 805-277-4318	Yes
Fort Benning, GA	USA	Unscheduled	COMEDS/(AWDS)	Cdr. Det. 10, 5th Wea. Sq. DSN 835-7313 COM 404-545-7313	No
Fort Bragg, NC	USA	Unscheduled	COMEDS/(AWDS)	Commander, Det. 3, 5th Wea. Sq. DSN 236-3914 COM 919-396-3914	No
Fort Carson, CO	USA	Unscheduled	COMEDS/(AWDS)	Commander, Det. 58, 5th Wea. Sq. DSN 691-3651 COM 303-579-3620	No
Fort Hood, TX	USA	Unscheduled	COMEDS/(AWDS)	Commander, Det. 14, 5th Wea. Sq. DSN 737-9819 COM 817-532-9327	No
Fort Sill, OK	USA	Unscheduled	COMEDS/(AWDS)	Commander, Det. 11, 5th Wea. Sq. DSN 639-3200 COM 405-351-3200	No
Fort Polk, LA	USA	Unscheduled	COMEDS/(AWDS)	Commander, Det. 31, 5th Wea. Sq. DSN 863-2015 COM 318-537-2015	No
Fort Stewart, GA	USA	Unscheduled	COMEDS/(ADWS)	Commander, Det. 21, 5th Wea. Sq. DSN 971-5432 COM 912-352-5207	No

Table 5-1 (continued)
Non-Network Upper Air Stations Which Might be Sources of Data

STATION	OPERATED BY	TIME OF OBSERVATIONS	DISTRIBUTION	AGENCY CONTACT	WILL TAKE REQUESTED SPECIAL
Fort Riley, KS	USA	Unscheduled	COMEDS/(AWDS)	Commander, Det 8, 5th Wea. Sq. DSN 856-3327 COM 913-239-3327	No
Fort Campbell,	USA	Unscheduled	COMEDS/(AWDS)	Commander, Det 1, 5th Wea. Sq. DSN 635-2519 COM 502-798-2519	No
Fort Lewis, WA	USA	Unscheduled	COMEDS/(AWDS)	Commander, Det 6, 5th Wea. Sq. DSN 357-5967 COM 206-967-5967	No
Elgin AFB, FL	USAF	Unscheduled	COMEDS/(AWDS)	Commander, Det 10, 2nd Wea. Sq. DSN 872-5710 COM 904-882-5452	Yes
Marshall Space Flight Center, Huntsville, AL	NASA	Unscheduled, dependent upon operations	Local loop to WSO Huntsville, AL 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/(AWDS)	Mr. Hickson or Mr. Lee DSN 351-8748 COM 805-982-8748	Yes
Navy Pacific Missile Test Center, San Nicolas Isl., CA	USN	Monday-Friday, 1800Z and 2300Z	COMEDS/(AWDS)	Mr. Hickson or Mr. Lee DSN 351-8748 COM 805-982-8748	Yes
White Sands Missile Range, NM	USA	Unscheduled	COMEDS/(AWDS)	Chief, Forecast Section White Sands Met Team DSN 258-2605/1032 COM 505-678-2605/1932	Yes

5.3 Surface Weather Observational Network.

To provide the basic weather data needed for the analyses performed by the NMC, 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, towers, and contract observer aviation weather reporting stations;

c. DOD weather reporting stations.

d. Automated Surface Observation System (ASOS) and Automated Weather Observation Station (AWOS)

During the 1990s the NWS, and FAA will replace many manual observations with automated observations and add many additional observations at airports that presently do not report weather observations through deployment of ASOS and AWOS. The DOD (USN/USMC) will use ASOS to replace antiquated equipment and augment observing personnel. These observations will greatly increase the temporal and spatial resolution of the U.S. surface observation network.

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

5.4 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. FSSs, ARTCCs, and ATCTs accept, solicit and broadcast PIREPs. Additionally, ARTCCs and ATCTs pass PIREPs to FSSs for dissemination on the Leased Service A/B (LABS) circuit.

5.5 Severe Storm Surveillance by Meteorological Satellites.

5.5.1 Geostationary Operational Environmental Satellite (GOES). The GOES system currently consists of one operational spacecraft: GOES-7 at 98 to 108 degrees west longitude. The principal GOES products are half-hourly pictures with implanted grids automatically applied to all sectors. During daylight hours, approximately 1, 2, and 4 km resolution fixed standard sectors are produced. During the night (also available in daylight), the same geographical coverage standard sectors are produced with 7 km resolution infrared (IR). The IR data may be enhanced to emphasize various features. Floating sectors which are scheduled by the NWS Satellite Field Distribution Facilities (SFDFs) are produced to augment the standard sector coverage support. Special products from GOES in support of NSSFC are described in the VAS Operation Plan developed by NESDIS Satellite Services Division. All products are delivered in near real time to the NESDIS Synoptic Analysis Branch (SAB), the NWS (SFDFs) and WSFOs. (See GOES Operational Data Flow, Figure 5-1, and Satellite Data Availability, Table 5-2).

5.5.2 NOAA Polar-Orbiting Satellites. These satellites cross the U.S. twice daily near the equatorial crossing times as indicated in Table 5-2. Data are available via direct read-out (HRPT and APT) or central processing. AVHRR data are available on a limited basis through the GOES distribution system.

5.5.3 National Weather Service Satellite Field Distribution Facilities (SFDF).

5.5.3.1 Support Concept. Under the NESDIS support concept, GOES imagery in support of the severe weather warning services is distributed by the Central Data Distribution Facility (CDDF) at Camp Springs, Maryland, to the SF DFs in Miami, San Francisco, Kansas City, Washington, Anchorage, and Honolulu. The Kansas City SF DF is an operational unit of the National Severe Storms Forecast Center (NSSFC) and is responsible for satellite data interpretation support to collocated NSSFC units and field offices in the conterminous United States except Florida . Each SF DF, except Anchorage, has floating sectors which can be centered over significant weather areas at 1, 2, and 4 km resolutions for visible data and the same geographical coverage in 7 km IR data. In addition, the VAS Data Utilization Center (VDUC) system at the three National Centers (NMC, NSSFC, and NHC) ingest the GOES digital data. This provides access to all GOES information in real-time including the NESDIS Rapid Interval Scan Operation Plan (RISOP) which provides data over the severe storm area every 5 to 15 minutes.

5.5.3.2 Station Contact. NWS satellite meteorologists can be contacted as follows:

Miami	Between 0630-1630 EDST and 2000-0400 EDST at 305-665-4704 and 4460	(FTS 350-4460)

San Francisco	24 h/day at 415-876-9122/23	(FTS 470-9122/23)
Washington /NESDIS/SAB	24 h/day at 301-763-84 44	(FTS 763-84 44)
Kansas City	24 h/day at 816-426-5395	(FTS 867-5395)
Honolulu	24 h/day at 808-836-2776 San Francisco FTS 556-0220, HNL 836-2776	(FTS-551-1698)
Anchorage	24 h/day at 907-271-3473 Seattle FTS 399-0150,	(907-271-3801) ANC 271-3173

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

SATELLITE	TYPE OF DATA	LOCAL TIME	REMARKS
GOES- 7- 98° -108°W'	VISSR/VAS	Every 30 min (24/day) (limited scan for short-interval viewing	1. 1, 2 and 4 km resolution visible 2. 7 km resolution equivalent IR geographic standard sectors (night). 3. Equivalent IR-enhanced imagery. 4. Floating sectors at 1, 2 and 4 km resolution (visible) (equivalent IR 7 km). 5. Full disc IR (day and night).
NOAA- 10	AVHRR GAC and LAC (recorded) HRPT and APT (direct) TOVS	1526/0326	1.Composite non-real-time imagery. 2.Sea-surface temperatures. 3.Moisture analysis. 4.Soundings.
NOAA- 11	AVHRR GAC and LAC (recorded) HRPT and APT (direct) TOVS	1936/0736	Same as NOAA- 10

VISSR - Visible Infrared Spin Scan Radiometer
VAS - VISSR Atmospheric Sounder
GAC - Global Area Coverage (recorded reduced resolution for central processing)
LAC - Local Area Coverage (recorded high-resolution data, limited amount)
TOVS - TIROS Operational Vertical Sounder
HRPT - High Resolution Picture Transmission
APT - Automated Picture Transmission (4 km)
AVHRR - Advanced Very High Resolution Radiometer

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[1] GOES-7 stationed at 108°W from November through May. GOES-7 stationed at 98°W from June through October for tropical storm monitoring.

5.5.4 DOD Defense Meteorological Satellite Program (DMSP) Polar- Orbiting System. These satellites cross the equator at local sunrise and near noon. Data are processed by AFGWC and are available to NESDIS through the shared METSAT program for further distribution to civilian agencies. DMSP data are currently archived by NESDIS at the University of Colorado and are available for use in severe weather research.

5.6 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 maintenance patrols, citizen spotters (network), cooperative National Weather Service climatological observers, amateur radio groups, local Civil Defense organizations, radio and television station mobile units, city employees and individual citizens.

Reports are received by various means and are not uniform at each office. The means include amateur radio or Civil Defense radio facilities with a transceiver often located in the WSO/WSFO and operated by local cooperators, police radio, direct telephone lines involving unlisted numbers, the National Warning System (NAWAS), State Highway Patrols, teletypewriter circuits.

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

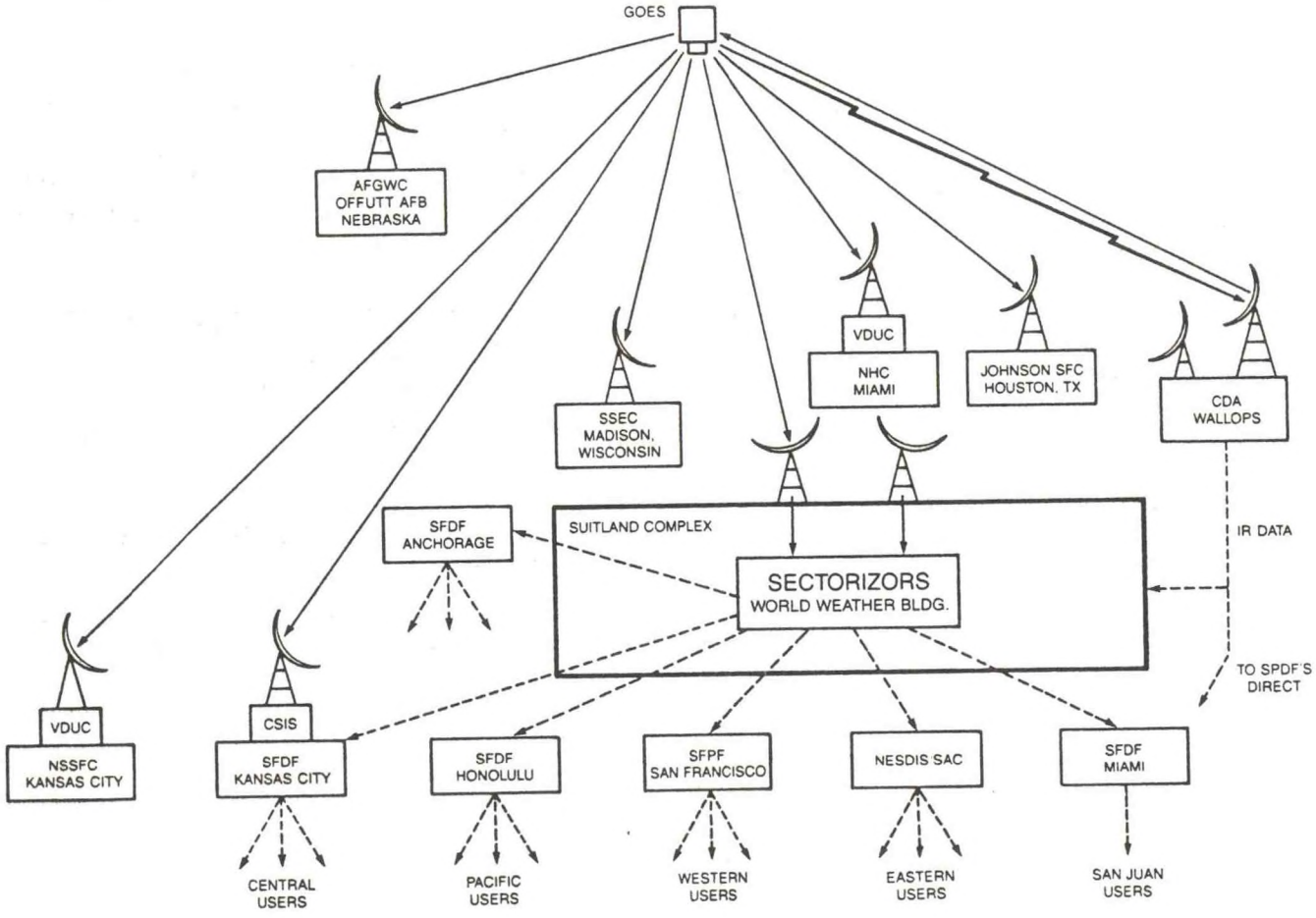

Figure 5-1. GOES Operational Data Flow

CHAPTER 6

6. NEWS RELEASES

The Military Weather Advisories and weather warnings of the 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, NOAA weather services, and 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:

Environmental Services Division
OJCS
Washington, D.C. 20301

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

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

Commander, Naval Oceanography Command
Stennis Space Center, Mississippi 39529-5000

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

NOAA Public Affairs Office
Herbert C. Hoover Building
14th & Constitution Avenue, N.W.
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Commandant, United States Marine Corps
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APPENDIX A

REGION (NR) JOINT USE AND MILITARY ONLY RADAR SITES

The supporting AWS units of each of the listed NORAD Regions (NR) can obtain appropriate operational permission, contact military/civilian controllers at the NR radar sites within each region's area of responsibility, and obtain limited radar weather data.

NR	SECTOR	AWS UNIT	TELEPHONE NUMBERS	RADAR SITE
24	NE US	Det 8, 26 WS Griffis AFB, NY	DSN 587-3444 COM 315-330-3444	N. Truro AFS, MA Bucks Harbor, ME Empire, MI Calumet AFS, MI Port Austin AFS, MI Nashwauk, MN Gibbsboro AFS, NY Dansville, NY Remsen (Utica), NY Riverhead (Suffolk), NY Washington, DC
	SE US	Det 9, 3 WS Tyndall AFB, FL	DSN 970-2856 COM 904-283-2856	Grand Bay, AL Cape Canaveral, FL Cross City, FL Cudjoe Key, FL Ft. Lonesome, FL Key West, FL Patrick AFB, FL Richmond, FL Tyndall AFB, FL Whitehouse, FL Lake Charles, LA Slidell, LA Ft. Fisher, NC Jedburg, SC Ellington AFB, TX Oilton, TX Oceana, VA

25	NW US	Det 11, 17 WS McChord, WA	DSN 976-3434 COM 206-984-3434	Crescent City, CA Kalispell, MT Malmstron AFB, MT Finley AFS, ND Watford City, ND Keno, OR Salem, OR Makah AFS, WA Mica Peak, WA
	SW US	Det 7, 9 WS March AFB, CA	DSN 947-2463 COM 714-655-2463	Phoenix, AZ Mill Valley AFS, CA Mt Laguna AFS, CA Paso Robles, CA Point Arena AFS, CA San Pedro, CA Silver City, NM El Paso, TX Odessa, TX Sonora, TX

APPENDIX B

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 detactment, Det X, X WW, is not staffed by a forecaster or the detachment's radar is inoperative.

b. Severe convective weather is defined as thunderstorms with winds of 50 knots (25 m/s) or more, hail 3/4 inch (20 mm) 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 staffed 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. Additionally, Det X will notify (appropriate NWS office) when their radar becomes operational again.

(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 or 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 staffed 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. Only one telephone call will be made; however, if line is busy, one additional call will be made.

(3) Notify Det X, X WW when its radar is inoperative except for normal maintenance.

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

_____ _____

Signature
Meteorologist in Charge
or Official in Charge

Signature
Detachment Commander

Date_____ Date _____

APPENDIX C

NOAA WEATHER RADIO NETWORK

Legend-Frequencies are identified as follows:

(1)-162.550 **MHz**
(2)-162.400 **MHz**
(3)-162.475 **MHz**
(4)-162.425 **MHz**
(5)-162.450 **MHz**
(6)-162.500 **MHz**
(7)-162.525 **MHz**

Location	Frequency
Alabama	
Anniston	3
Birmingham	1
Demopolis	3
Dozier	1
Florence	3
Huntsville	2
Louisville	3
Mobile	1
Montgomery	2
Tuscaloosa	2
Alaska	
Anchorage	1
Cordova	1
Fairbanks	1
Homer	2
Juneau	1
Ketchikan	1
Kodiak	1
Nome	1
Petersburg	1
Seward	1
Sitka	1
Valdez	1
Wrangell	2
Yakutat	2

Location	Frequency
Arizona	
Flagstaff	2
Lake Powell	1
Phoenix	1
Tucson	2
Yuma	1
Arkansas	
Fayetteville	3
Fort Smith	2
Gurdon	3
Jonesboro	1
Little Rock	1
Mountain View	2
Star-City	2
Texarkana	1

Location	Frequency
California	
Bakersfield	1
Coachella	2
Eureka	2
Fresno	2
Los Angeles	1
Lindsay	6
Monterey	2
Point Arena	2
Redding	1
Sacramento	1
San Diego	2
San Francisco	2
San Luis Obispo	1
Santa Barbara	2
Colorado	
Alamosa	3
Colorado Springs	3
Denver	1
Grand Junction	1
Greeley	2
Longmont	1
Pueblo	2
Sterling	2
Connecticut	
Hartford	3
Meriden	2
New London	1
Delaware	
Lewes	1
District of Columbia	
Washington, D.C.	1

Location	Frequency
Florida	
Clewiston	2
Daytona Beach	2
Fort Myers	3
Gainesville	3
Jacksonville	1
Key West	2
Melbourne	1
Miami	1
Orlando	3
Panama City	1
Pensacola	2
Tallahassee	2
Tampa	1
West Palm Beach	3
Georgia	
Athens	2
Atlanta	1
Augusta	1
Baxley	7
Chatsworth	2
Columbus	2
Macon	3
Pelham	1
Savannah	2
Valdosta	6
Waycross	3
Waynesboro	4
Hawaii	
Hilo	1
Honolulu	1
Kokee	2
Mt. Haleakala	2
Waimanalo	2

Location	Frequency
Idaho	
Boise	1
Lewiston	1
Pocatello	1
Twin Falls	2
Illinois	
Champaign	1
Chicago	1
Marion	4
Moline	1
Peoria	3
Rockford	3
Springfield	2
Indiana	
Bloomington	5
Evansville	1
Fort Wayne	1
Indianapolis	1
Lafayette	3
South Bend	2
Terre Haute	2
Iowa	
Cedar Rapids	3
Des Moines	1
Dubuque	2
Sioux City	3
Waterloo	1
Kansas	
Chanute	2
Colby	3
Concordia	1
Dodge City	3
Ellsworth	2
Topeka	3
Witchita	1

Location	Frequency
Kentucky	
Ashland	1
Bowling Green	2
Covington	1
Elizabethtown	2
Hazard	3
Lexington	2
Louisville	3
Mayfield	3
Pikeville	2
Somerset	1
Louisiana	
Alexandria	3
Baton Rouge	2
Buras	3
Lafayette	1
Lake Charles	2
Monroe	1
Morgan City	3
New Orleans	1
Shreveport	2
Maine	
Caribou	7
Dresden	3
Ellsworth	2
Portland	1
Maryland	
Baltimore	2
Hagerstown	3
Salisbury	3
Massachusetts	
Boston	3
Hyannis	1
Worcester	1

Location	Frequency
Michigan	
Alpena	1
Detroit	1
Flint	2
Grand Rapids	1
Houghton	2
Marquette	1
Onondaga	2
Sault Sante Marie	1
Traverse City	2
Minnesota	
Detroit Lakes	3
Duluth	1
International Falls	1
Mankato	2
Minneapolis	1
Rochester	3
Saint Cloud	3
Thief River Falls	1
Willmar	2
Mississippi	
Ackerman	3
Booneville	1
Bude	1
Columbia	2
Gulfport	2
Hattiesburg	3
Iversness	1
Jackson	2
Meridian	1
Oxford	2

Location	Frequency
Missouri	
Columbia	2
Camdenton	1
Hannibal	3
Hermitage	5
Joplin/Carthage	1
Kansas City	1
St. Joseph	2
St. Louis	1
Sikeston	2
Springfield	2
Montana	
Billings	1
Butte	1
Glasgow	1
Great Falls	1
Havre	2
Helena	2
Kalispell	1
Miles City	2
Missoula	2
Nebraska	
Bassett	3
Grand Island	2
Holdrege	3
Lincoln	3
Merriman	2
Norfolk	1
North Platte	1
Omaha	2
Scottsbluff	1

Location	Frequency
Nevada	
Elko	1
Ely	2
Las Vegas	1
Reno	1
Winnemucca	2
New Hampshire	
Concord	2
New Jersey	
Atlantic City	2
New Mexico	
Albuquerque	2
Clovis	3
Des Moines	1
Farmington	3
Hobbs	2
Las Cruces	2
Ruidoso	1
Santa Fe	1
New York	
Albany	1
Binghamton	3
Buffalo	1
Elmira	2
Kingston	3
New York City	1
Riverhead	3
Rochester	2
Syracuse	1

Location	Frequency
North Carolina	
Asheville	2
Cape Hatteras	3
Charlotte	3
Fayetteville	3
New Bern	2
Raleigh/Durham	1
Rocky Mount	3
Wilmington	1
Winston-Salem	2
North Dakota	
Bismarck	2
Dickinson	2
Fargo	2
Jamestown	2
Minot	2
Petersburg	2
Williston	2
Ohio	
Akron	2
Cambridge	3
Cleveland	1
Columbus	1
Dyton	3
Lima	2
Sandusky	2
Toledo	1
Oklahoma	
Clinton	3
Enid	3
Lawton	1
McAlester	3
Oklahoma City	2
Tulsa	1

Location	Frequency
Oregon	
Astoria	2
Brookings	1
Coos Bay	2
Eugene	2
Klamath Falls	1
Medford	2
Newport	1
Pendleton	2
Portland	1
Roseburg	3
Salem	3
Pennsylvania	
Allentown	2
Clearfield	1
Erie	2
Harrisburg	1
Johnstown	2
Philadelphia	3
Pittsburgh	1
State College	3
Towanda	3
Wellsboro	1
Wilkes-Barre	1
Williamsport	2
Puerto Rico	
Maricao	1
San Juan	2
Rhode Island	
Providence	2

Location	Frequency
South Carolina	
Beaufort	3
Charleston	1
Columbia	2
Cross	3
Florence	1
Greenville	1
Myrtle Beach	2
Sumter	3
South Dakota	
Aberdeen	3
Huron	1
Pierre	2
Rapid City	1
Sioux Falls	2
Tennessee	
Bristol	1
Chattanooga	1
Cookeville	2
Jackson	1
Knoxville	3
Memphis	3
Nashville	1
Shelbyville	3
Waverly	2

Location	Frequency
Texas	
Abilene	2
Amarillo	1
Austin	2
Beaumont	3
Big Spring	3
Brownsville	1
Bryan	1
Corpus Christi	1
Dallas	2
Del Rio	2
El Paso	3
Fort Worth	1
Galveston	1
Houston	2
Laredo	3
Lubbock	2
Lufkin	1
Midland	2
Paris	1
Pharr	2
San Angelo	1
San Antonio	1
Sherman	3
Tyler	3
Victoria	2
Waco	3
Wichita Falls	3
Utah	
Logan	2
Cedar City	2
Vernal	2
Salt Lake City	1
Vermont	
Burlington	3
Marlboro	4
Windsor	3

Location	Frequency
Virginia	
Heathsville	2
Lynchburg	1
Norfolk	1
Richmond	3
Roanoke	3
Washington	
Neah Bay	1
Olympia	3
Seattle	1
Spokane	2
Wenatchee	3
Yakima	1
West Virginia	
Beckley	6
Charleston	2
Clarksburg	1
Gilbert	7
Hinton	4
Romney	7
spencer	6
Sutton	5
Wisconsin	
La Crosse	1
Green Bay	1
Madison	1
Menomonie	2
Milwaukee	2
Park Falls	6
Wausau	3

Location	Frequency
Wyoming	
Casper	1
Cheyenne	3
Lander	3
Sheridan	3

Location	Frequency
U.S. Virgin Islands	
St. Thomas	3

APPENDIX D

ABBREVIATIONS AND ACRONYMS

AAT	Air Traffic Service (FAA)
AD	Air Division
ADWS	Automatic Digital Weather Switch
AFB	Air Force Base
AFGL	Air Force Geophysical Laboratory
AFGWC	Air Force Global Weather Central
AFOS	Automation of Field Operations and Services
AFS	Air Force Station
AIRMET	Airmen's Meteorological Information
AM	Amplitude Modulation
ANGB	Air National Guard Base
APT	Automatic Picture Transmission
ARTCC	Air Route Traffic Control Center
AWDS	Automated Weather Distribution System
ATCT	Air Traffic Control Tower
ASOS	Automated Surface Observing System
AWS	Air Weather Service
AWOS	Automated Weather Observing System
AVHRR	Advanced Very High Resolution Radiometer
CDDF	Central Data Distribution Facility
CONUS	Continental United States
COMEDS/AWDS	CONUS Meteorological Data System/Automated Weather Distribution System
DMSP	Defense Meteorological Satellite Program
DOD	Department of Defense
EBS	Emergency Broadcast System
FAA	Federal Aviation Administration
FCMSSR	Federal Committee for Meteorological Services and Supporting Research
FCM	Federal Coordinator for Meteorology
FEMA	Federal Emergency Management Agency
FM	Frequency Modulation

FO	Military Weather Advisory Future Outlooks
FSS	Flight Service Station
FTS	Federal Telecommunications Service
GAC	Global Area Coverage 4 km Resolution
GOES	Geostationary Operational Environmental Satellite
HRPT	High Resolution Picture Transmission
IAP	International Airport
ICMSSR	Interdepartmental Committee for Meteorological Services and Supporting Research
IR	Infrared
LAC	Local Area Coverage 1.1 km resolution
LF	Light Fine Video Data (1/3 nm (0.6 km))
LOA	Letter of Agreement
LS	Light Smooth Video Data (1.5 - 2.0 nm (2.8 - 3.7 km))
LVL	Level
MDR	Manually Digitized Radar
METWATCH	Meteorological Watch
MIC	Maximum Instantaneous Coverage
MKC	Kansas City
MSU	Microwave Sounding Unit
MWA	Military Weather Advisory
NAFAX	National Facsimile Network
NASA	National Aeronautics and Space Administration
NAWAS	National Warning System
NESDIS	National Environmental Satellite, Data, and Information Service
NEXRAD	Next Generation Radar (WSR.88D)
NHC	National Hurricane Center
NMC	National Meteorological Center
NOAA	National Oceanic and Atmospheric Administration
NR	NORAD Region
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	Organization of the 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
RAWIN	Rawinsonde
SAB	Synoptic Analysis Branch
SD	Circuit Heading for Radar Reports
SFDF	Satellite Field Distribution Facility
SIGRAD	Significant Radar Message
SIGMET	Significant Meteorological Information
SR	Stored Data
SRC	State Relay Center
SSU	Stratospheric Sounding Unit
TAA	Total Area Affected
TF	Thermal Fine Data (1/3 nmi (0.6 km))
TIROS	Television Infrared Observation Satellite
TOVS	TIROS Operational Vertical Sounders
TS	Thermal Smooth Data (1.5 - 2.0 nm (2.8 - 3.7 km))
TWEB	Transcribed Weather Broadcast
USA	United States Army
USAF	United States Air Force
USMC	United States Marine Corps
USN	United States Navy
UTC	Universal Coordinate Time
VAS	VISSR Atmospheric Sounder
VHRR	Very High Resolution Radiometer
VIP	Video Integrated Processor
VISSR	Visible Infrared Spin Scan Radiometer
VOR	VHF Omni-Directional Radio 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

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