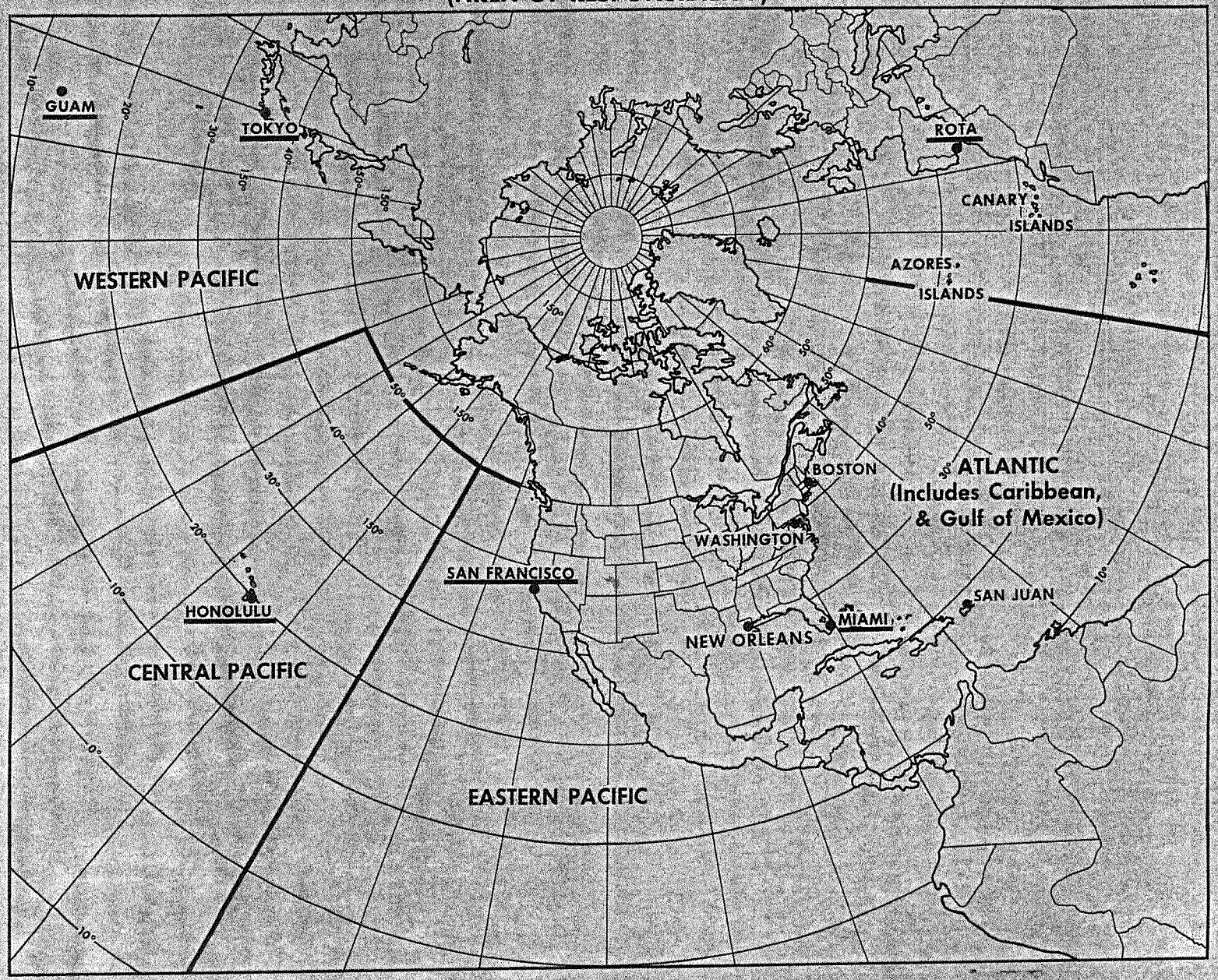
INTERDEPARTMENTAL COMMITTEE FOR METEOROLOGICAL SERVICES

NATIONAL HURRICANE OPERATIONS PLAN

SUBCOMMITTEE ON BASIC METEOROLOGICAL SERVICES
WASHINGTON
APRIL 1969

NATIONAL HURRICANE OPERATIONS PLAN

(AREA OF RESPONSIBILITY)



SEE CHANGES PREPARED BY SUBCOMMITTEE ON BASIC MET. SERVICES CHANGE #1 OCTOBER 1969

INTERDEPARTMENTAL COMMITTEE FOR METEOROLOGICAL SERVICES

NATIONAL HURRICANE OPERATIONS PLAN

Prepared By

Subcommittee on Basic Meteorological Services

Supersedes National Hurricane
Operations Plan - 1968

Washington, D. C.
April 1969

CHANGE LOG

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NATIONAL HURRICANE OPERATIONS PLAN

(ATLANTIC - EASTERN PACIFIC & CENTRAL PACIFIC)

TABLE OF CONTENTS

PREAMBLE

This plan presents the procedures and agreements reached at the annual Interdepartmental Hurricane Warning Conference (combined Atlantic and Pacific). These conferences are sponsored annually by the Sub-committee on Basic Meteorological Services (SC/BMS), Interdepartmental Committee for Meteorological Services (ICMS), to bring together cognizant Federal agencies to resolve problems of mutual concern related to the Atlantic and Pacific Hurricane Warning Services.

The following Environmental Science Services Administration (ESSA) Weather Bureau (WB) officials shall provide Air Weather Service (AWS) and Naval Weather Service (NWS) designated representatives with the basic meteorological decisions and associated prognostic reasoning concerning location, intensity and forecast positions of tropical cyclones:

1. The Director, National Hurricane Center (NHC) ESSA, Weather Bureau, Miami, Florida is responsible for the North Atlantic Ocean west of 30 degrees west longitude, the Caribbean Sea, the Gulf of Mexico, and the States and Territories of the United States adjacent to these maritime areas.

2. The Meteorologist in Charge (MIC), Hurricane Warning Office (HWO), ESSA Weather Bureau, San Francisco California is responsible for the Eastern Pacific Ocean east of 140 degrees west longitude and north of the equator.

3. The MIC, Hurricane Warning Office, ESSA Weather Bureau, Honolulu, Hawaii is responsible for the Central Pacific Ocean from 140 degrees west to the 180th meridian and north of the equator.

The ESSA Weather Bureau shall:

1. Make the necessary analyses and prepare basic forecasts of tropical cyclones for the use of all Department of Defense interests.

2. Supply tropical cyclone forecasts to Department of Defense weather services in accordance with published interdepartmental agreements.

The U. S. Air Force and the U. S. Navy shall furnish to the Weather Bureau aircraft reconnaissance observations and other special observations which are required to support the provisions of Chapter 3 of this Plan.

1. The U. S. Navy and U. S. Air Force shall assign a single Chief, Aerial Reconnaissance Coordination, Atlantic Hurricanes (CARCAH) to the NHC. The CARCAH will be responsible for the coordination and final preparation of the Plan of the Day and for the scheduling of aircraft required to meet the provisions of Chapter 3 of this Plan. An alternate CARCAH will be designated for the Alternate Hurricane Office in support of Chapter 8 of this Plan.

2. The Commanding Officer, Fleet Weather Central (FWC) Alameda and Chief 9 Weather Reconnaissance Wing Recon Command Post, McClellan Air Force Base (AFB) will be responsible for effecting necessary coordination and liaison with the MIC, HWO San Francisco with respect to arrangements of aircraft reconnaissance and/or other special observations which are required to support the provisions of this Plan.

3. The Commanding Officer, Fleet Weather Central (FLEWEACEN), Pearl Harbor, Hawaii and the Tropical Cyclone Reconnaissance Coordinator (Central North Pacific) Commander 57 Weather Reconnaissance Squadron, Hickam AFB, Hawaii will be responsible for effecting necessary coordination and liaison with the MIC, HWO Honolulu, Hawaii with respect to arrangements of aircraft reconnaissance and/or other special observations which are required to support the provisions of this Plan.

The Federal Aviation Administration (FAA) shall provide air traffic control, communications, and flight assistance services as appropriate in support of the Hurricane Warning Services.

The chapters specify in further detail the responsibilities and functions of the several agencies cooperating in support of the tropical cyclone warning service.

RESPONSIBILITIES OF COOPERATING AGENCIES

1. The ESSA Weather Bureau, through the Director of the National Hurricane Center, Miami, Fla.; MIC, Hurricane Warning Office, San Francisco, Calif. (HWO-SFO); MIC, Hurricane Warning Office, Honolulu, Hawaii (HWO-HNL) shall:

a. Provide basic tropical cyclone forecasts and attendant advice to the U. S. Navy and the U. S. Air Force in accordance with the detailed instructions in Chapter 3.

b. Provide the Air Force and Navy timely access to all significant tropical cyclone reports.

c. Consult as necessary with the U. S. Air Force and U. S. Navy regarding day-to-day requirements for tropical cyclone advice and arrange to meet these requirements within the capabilities of the hurricane warning offices.

d. Advise the CARCAH (Atlantic), Tropical Cyclone Reconnaissance Coordinator (TCRC) (Eastern North Pacific), Tropical Cyclone Reconnaissance Coordinator (Central North Pacific), of aircraft reconnaissance and other observational requirements of the respective Hurricane Warning Offices.

e. HWO-HNL will coordinate with FLEWEACEN, Pearl Harbor and Central Pacific Forecast Center (CENPAC FC) Hickam AFB prior to issuing tropical cyclone advisories.

2. The ESSA National Environmental Satellite Center shall:

a. Operate satellite systems capable of providing local and global tropical coverage during the tropical cyclone season.

b. Receive requirements from the National Hurricane Center for specific coverage.

c. Process and transmit available data to meet the requirements of the National Hurricane Center.

d. Monitor all tropical regions via the satellite data and communicate interpretations therefrom of disturbed areas as specified in Chapter 10 of this Plan.

3. The U. S. Navy and the U. S. Air Force through their respective hurricane liaison officers shall:

a. Provide up-to-date information to the NHC, Miami; HWO-SFO; HWO-HNL concerning requirements for tropical cyclone advice and pertinent information.

b. Meet the requirements for aircraft reconnaissance and other observations noted in paragraph 1.d. within the limits of service capabilities.

4. The U. S. Navy and the U. S. Air Force will meet from their own resources any military requirements that are in excess to the common tropical cyclone requirements as stated in Appendix D, Chapter 4 of this Plan.

a. The Navy has a special requirement for low level (at or below 1500 feet) oceanographic and meteorological data in support of their operating forces, particularly wind speed and direction and sea surface conditions.

5. The Federal Aviation Administration will:

a. Provide air traffic control, communication and flight assistance services as appropriate in support of this Plan.

b. In the Atlantic area the FAA will make the necessary arrangements for accommodations and access to appropriate communication facilities to allow the transmission of hurricane radar data from Air Route Traffic Control Centers (ARTCCs).

6. ESSA Weather Bureau and Department of Defense (DOD), Office of Special Assistant for Environmental Sciences (SAES) will cooperate in arranging an annual trip to the Caribbean and Gulf of Mexico area to carry out a continuing and effective liaison with the Director of Meteorological Services and disaster prevention agencies on the warning service.

DEFINITIONS

The following definitions will apply for the purposes of this Plan and its appendices:

CYCLONE: An atmospheric closed circulation rotating counterclockwise in the Northern Hemisphere.

TROPICAL CYCLONE: A non-frontal cyclone of synoptic scale, developing over tropical or sub-tropical waters and having a definite organized circulation.

TROPICAL DISTURBANCE: A discrete system of apparently organized convection, generally 100 to 300 miles in diameter originating in the tropics or subtropics, having a non-frontal migratory character and having maintained its identity for 24 hours or more. It may or may not be associated with a detectable perturbation on the wind field. As such, it is the basic generic designation which, in successive stages of intensification, may be subsequently classified as a tropical wave, depression, storm, or hurricane.

TROPICAL WAVE: A trough or cyclonic curvature maximum in the trade wind easterlies. The wave may reach maximum amplitude in the lower middle troposphere, or may be the reflection of an upper troposphere cold low or equatorward extension of a middle latitude trough.

TROPICAL DEPRESSION: The weak stage of a tropical cyclone with a definite closed surface circulation, one or more closed surface isobars, and highest sustained wind speeds up to 34 knots.

TROPICAL STORM: A tropical cyclone with closed isobars and highest sustained wind speeds of 34 to 63 knots inclusive.

HURRICANE: A tropical cyclone with highest sustained winds 64 knots or more.

HURRICANE SEASON: The portion of the year having a relatively high incidence of hurricanes. In the North Atlantic it is usually regarded as the period June through November and in the East and Central Pacific it is usually regarded as the period June through October.

PRESENT MOVEMENT: The best estimate of movement of the center of the tropical cyclone at the time of position indicated in the advisory. (In advisories, remarks will be used to amplify significant changes between present movement and forecast movement.)

QUADRANT: A quadrant is defined as the 90 degree sector of the storm centered on a designated cardinal point of the compass.

Example: North east quadrant refers to the sector of the storm from 360 degrees through 090 degrees.

Note: Sustained wind-1 minute mean.

CHAPTER 3

TROPICAL CYCLONE FORECASTS AND INFORMATION TO BE FURNISHED BY THE WEATHER BUREAU TO THE AIR FORCE AND NAVY

1. Reports. The National Hurricane Center (NHC) Miami; HWO-SFO; HWO-HNL (in their respective areas of responsibility) will make available to the Air Force and Navy all significant tropical cyclone reports which they receive.

2. Advisories. The NHC; HWO-SFO; HWO-HNL will issue and provide to the Navy and Air Force basic tropical cyclone forecasts and related information for tropical cyclones of storm or hurricane intensity. Basic tropical cyclone forecasts will include advice as to location, movement, intensity and dimensions of tropical cyclones. These forecasts and related information will be provided in the form of military advisories, (WB Form 656-6).

NHC will provide this information through the CARCAH. Such material provided to the CARCAH will be in tape form for further relay to Air Force and Navy offices. The release time of such material by the CARCAH will not be earlier than 30 minutes prior to the scheduled warning time of the material.

a. Time and Circumstances of Issue of Advisories for Air Force and Navy.

(1) Initial Advisory. The first advisory will normally be issued when wind speeds in a closed tropical cyclone system reach sustained values of 34 knots*. Consideration will be given to issuing the first advisory before winds reach these values if the wind system is closed and speeds are expected to increase to 34 knots within 24 hours.

(2) Scheduled Advisories. Atlantic - After the initial advisory is issued, advisories will be issued for the hours 04, 10, 16, and 22Z (GMT). 12, 24, 48 and 72 hour forecasts will be based on the latest 6 hourly synoptic time 00, 06, 12 and 18Z. Advisories will continue to be issued as long as the tropical cyclone exists west of 30°W.

Pacific - After the initial advisory is issued, advisories will be issued at 03, 09, 15 and 21Z, for synoptic positions at 00, 06, 12 and 18Z.

(3) Special Advisories. Scheduled advisories will be supplemented by special advisories issued at intervening hours as required by receipt of new information showing important changes in the cyclone.

Eastern Pacific - Special Advisories will carry the word "amended," "corrected," or "relocated," as appropriate, immediately following the advisory number. (This will not change the advisory number.)

Central Pacific - The "amended," "corrected," or "relocated" will appear immediately following the cyclone name. (See Form 1 Chapter 3)

(4) Amended Military Advisory. Last minute changes of hurricane position, direction of motion and intensity included in a public advisory require an issuance of an amended Military Advisory. The number used for the amended advisory will be the same as the advisory being amended.

* Note: Refers to surface observations.

b. Content of Advisories. Advisories provided the Air Force and Navy will contain the following information:

(1) Time of Issue.

(2) Heading, Advisory number, kind and name, hour and day.

(3) Warnings in effect.

(4) Position, in degrees and tenths.

(5) Time of position in GMT.

(6) Accuracy and basis for position.

(7) Present movement. (Not used in Central Pacific.)

(8) Present Winds

(a) Maximum sustained winds.

(b) Maximum sustained winds over inland areas* (Atlantic only).

(c) Radius of 65, 50 and 30-knot sustained winds (Atlantic only).

(d) Radius of 100, 50, and 30-knot sustained winds (Pacific only).

(9) Repeat Center Location and Time.

(10) Forecasts.

(a) Twelve-hour forecast position.

1) Maximum sustained winds in 12 hours.

2) Maximum sustained winds over inland areas (Atlantic only).

3) Radius of 50-knot sustained winds in 12 hours.

(b) Twenty-four hour forecast position.

1) Maximum sustained winds in 24 hours.

2) Maximum sustained winds over inland areas. (Atlantic only)

3) Radius of 50-knot sustained winds in 24 hours.

(11) Storm Surge Forecast. (Not used in Central Pacific)

(12) Heavy Precipitation Forecast. (Not used in Central Pacific)

* Inland Areas - more than 10 miles from coast.

(13) Extended Outlooks.

(a) Forty-eight hour outlook position.

1) Maximum sustained winds in 48 hours.

2) Maximum sustained winds over inland areas (Atlantic only)

3) Radius of 50-knot sustained winds in 48 hours.

(b) Seventy-two hour outlook position.

1) Maximum sustained winds.

2) Maximum sustained winds over inland areas.(Atlantic only)

3) Radius of 50-knot sustained winds in 72 hours.

(14) Reconnaissaince Plans including Scheduled Fixes. (Central Pacific only).

(15) Time of Issuance for next Military Advisory.

c. Format. The format of advisories furnished the Air Force and Navy will be as shown in Chapter 3, Form 1.

3. Tropical Cyclone Issuances - Pacific. The HWO-SFO and HWO-HNL will issue and provide to the Navy and Air Force basic tropical cyclone forecasts and related information. Basic tropical cyclone forecasts will include advice as to location, movement, intensity and dimensions of tropical cyclones. These forecasts and related information will be provided as shown on Form 1 (WB 656-6).

a. Time and Circumstances of Issue of Bulletin for Air Force and Navy.

Initial Bulletins, Scheduled Bulletins and Special Bulletins will be issued for existing tropical depressions in the same manner as advisories.

b. Contents of Bulletins. Bulletins provided the Air Force and Navy will contain the following information from Form WB 656-6.

(1) Time of Issue.

(2) Heading, Bulletin, Tropical Depression, Tropical Depression Number (spelled out), hour and day.

(a) Numbers to be furnished HWO-SFO by the Navy at Alameda and HWO-HNL by the Navy at Guam.

(b) Bulletin issuances will not be numbered sequentially by NHC-MIA and HWO-SFO.

(c) In the Central Pacific both bulletins and advisories will be numbered sequentially, i.e., Bulletin number 1 Tropical Depression ONE; Bulletin Number 2 Tropical Depression ONE; Advisory Number 3 Tropical Storm Anita; Advisory Number 4 Hurricane Anita; Bulletin Number 5 Tropical Depression ONE; etc. WHPN1 PHNL (Tropical Depression Bulletins on WB Form 656-6) and WHPN3 PHNL (Tropical Storm or Hurricane Advisories on WB Form 656-6) will be numbered sequentially as indicated, but the first issuance of WHPN2 PHNL (issuance in public format) will be Advisory Number 1, regardless of the number assigned to concurrently issued WHPN3 PHNL or WHPN1 PHNL.

(3) Position, in degrees and tenths.

(4) Time of Position in GMT.

(5) Accuracy and basis for position.

(6) Present Movement. (Not used in Central Pacific.)

(7) Present Winds.

(a) Maximum sustained winds.

(8) Forecast.

(a) Twelve and twenty-four hour forecast position.

1) Maximum sustained winds in 12 and 24 hours.

(9) Reconnaissance Plans including Scheduled Fixes. (Central Pacific)

(10) Time of Issuance for next Military Bulletin.

4. Tropical Cyclone Discussions - Atlantic. The NHC will issue tropical cyclone discussions at 03, 09, 15 and 21Z daily whenever advisories are being issued. These discussions, with preliminary prognostic positions up to 72 hours, will be for intragovernment use only and dissemination will be in the same manner as the military advisory.

The discussion will cover 24 hour forecasts, 24-48 hour forecasts and 48-72 hour outlook as related to synoptic features, objective technique, climatology, etc. They will give reasons for intensity or track changes and include plans for warnings display.

The Marine/Aviation/Military Advisory will give the final forecast positions and will serve as the amendment to the preliminary forecast position in the Tropical Cyclone Discussion.

5. Tropical Weather Outlook. The National Hurricane Center will issue a Tropical Weather Outlook three times a day during the period June 1- November 30. These will be issued at 0930, 1530 and 2130 GMT and distributed on circuits 23421 and 7072. The Outlook will provide the general public and

other user groups (1) assurance to areas in the main hurricane belt when conditions are stable and (2) an additional day or two notice in areas where conditions are becoming unstable and favorable to tropical inception.

6. Hourly Tropical Cyclone Position Estimates - Atlantic. The Weather Bureau Hurricane Warning Office that issues the public advisory will also issue hourly tropical cyclone position estimates when the tropical cyclone is under effective surveillance by land based radar and within 200 miles of the continental United States. These estimates will be distributed on Circuits 23421 and 7072 a short time before each hour except for hours when advisories and bulletins are issued. The position estimates will be available to the public and to other agencies for relay to their own communications systems.

7. Marine Bulletins Broadcast by Radio Station.

a. NSS, Washington, D. C. - Formal tropical storm and hurricane advisories issued at 04, 10, 16 and 22Z will be edited by WBFO, Washington, D.C. and included in Marine Bulletins broadcast by radio station NSS.

b. San Francisco, Los Angeles and San Pedro, Calif. - Formal tropical storm and hurricane advisories issued at 03, 09, 15, and 21Z will be edited by WBFO, San Francisco and included in Marine Bulletins broadcast by Radio Stations KPH, KMI, KFS, KOK, NMQ, KOU, WWD.

c. KHK, Kahuku, Hawaii - Formal tropical storm and hurricane advisories issued at 03, 09, 15 and 21Z will be edited by WBFO Honolulu and included in Marine Bulletins broadcast by radio station KHK. Broadcasts will be made every two hours on the even half hour during hours of station operation.

8. Bulletins. The NHC, Miami, HWOs SFO and HNL will make available to the Navy and Air Force any public bulletins issued by the Weather Bureau regarding suspicious areas, tropical disturbances, tropical depressions, tropical storms or hurricanes.

9. Distribution of Forecasts and Information. The Weather Bureau will distribute tropical cyclone advice to the public. In the public advisory, wind speed and speed of translation will be given in miles an hour and distances in statute miles. Each other agency will arrange for its own internal distribution and will take appropriate action to insure that tropical cyclone advice issued for its internal use is not disseminated to the public.

10. Bulletins on Tropical Cyclones After Discontinuance of Advisories. The storm name will be retained until all bulletins have been discontinued on a tropical cyclone.

11. Definition of Position Reliability (Form 656-6).

Excellent - Accurate to within 10* miles.
Good - Accurate to within 20* miles.
Fair - Accurate to within 40* miles.

When the position accuracy is greater than 40* miles it will be expressed as:

Position accurate within _____ miles.

* Military advisory use nautical miles as the measure of distance.

WB FORM 656-6
4/69

ESSA WEATHER BUREAU MARINE/AVIATION/MILITARY
(National Hurricane Center)

*BULLETIN ADVISORY NUMBER_____ AMENDED CORRECTED RELOCATED

TROPICAL DEPRESSION
TROPICAL STORM
HURRICANE

_____ _____Z _____
(NAME/NUMBER*) (MONTH) (DAY) (YEAR)

(WARNINGS)

The Eastern and Central Pacific have made minor changes to the heading of this form for their use. The following indicates the second line of their heading:

_____ upgraded to tropical depression
(Name/Number) downgraded from tropical storm
hurricane

_____ corrected
(Name/Number) amended
relocated

DEPRESSION/STORM/HURRICANE CENTER LOCATED NEAR LATITUDE _____ NORTH LONGITUDE_____WEST AT ____/_____Z.

POSITION EXCELLENT/GOOD/FAIR/ACCURATE WITHIN_____MILES BASED ON AIR FORCE/NAVY/ESSA RECONNAISSANCE/ LAND BASED RADAR/ACFT RADAR/SATELLITE/SHIPS/SYNOPTIC REPORTS/EXTRAPOLATION FIX.

PRESENT MOVEMENT TOWARD THE _____ OR _____ DEGREES AT _____KT.

MAX SUSTAINED WINDS OF ___KT NEAR CENTER AND WITHIN RADIUS OF___NM NE__NM SE___NM SW___NM NW QUAD.

MAX WINDS OVER INLAND AREAS _____ KT.

* RAD OF 100 KT WINDS _____ NE _____ SE _____ SW _____ NW QUAD.

\# RAD OF 65 KT WINDS _____ NE _____ SE _____ SW _____ NW QUAD.

RAD OF 50 KT WINDS _____ NE _____ SE _____ SW _____ NW QUAD.

RAD OF 30 KT WINDS _____ NE _____ SE _____ SW _____ NW QUAD.

REPEAT CENTER LOCATED _____ N _____W AT ____/_____Z.

12 HOUR FORECAST VALID ____/_____Z LATITUDE _____N LONGITUDE _____W.

MAX WINDS OF ____KT NEAR CENTER AND WITHIN RADIUS OF _____NE _____ SE _____ SW _____ NW QUAD.

MAX WINDS OVER INLAND AREAS _____KT.

RADIUS OF 50 KT WINDS _____NE _____SE _____SW _____NW QUAD.

24 HOUR FORECAST VALID ____/_____Z LATITUDE _____N LONGITUDE _____W.

MAX WINDS OF ____KT NEAR CENTER AND WITHIN RADIUS OF _____NE _____ SE _____ SW _____NW QUAD.

MAX WINDS OVER INLAND AREAS _____KT.

RADIUS OF 50 KT WINDS _____NE _____SE _____SW _____NW QUAD.

(AVIATION ADVISORY ENDS HERE)

STORM SURGE OF (Not used in Central Pacific)

HEAVY PRECIPITATION (Not used in Central Pacific)

(MARINE ADVISORY ENDS HERE)

48 HOUR OUTLOOK VALID ____/_____Z LATITUDE _____N LONGITUDE _____W.

MAX WINDS OF ____KT NEAR CENTER AND WITHIN RADIUS OF _____NE _____SE _____SW _____NW QUAD.

MAX WINDS OVER INLAND AREAS _____KT.

RADIUS OF 50 KT WINDS _____NE _____SE _____SW _____NW QUAD.

72 HOUR OUTLOOK VALID ____/_____Z LATITUDE _____N LONGITUDE _____W.

MAX WINDS OF ____KT NEAR CENTER AND WITHIN RADIUS OF _____NE _____SE _____SW _____NW QUAD.

MAX WINDS OVER INLAND AREAS _____KT.

RADIUS OF 50 KT WINDS _____NE _____SE _____SW _____NW QUAD.

\+ RECONNAISSANCE PLANS INCLUDING SCHEDULED FIXES _____

NEXT ADVISORY AT ____/_____Z. (FORECASTER _____)

(* FOR USE IN PACIFIC ONLY) (# FOR USE IN ATLANTIC ONLY) (+ CENTRAL PACIFIC ONLY)
(INLAND AREAS - MORE THAN 10 MILES FROM COAST)
Note: Use of quadrants is optional in the Pacific.

FORM 2

DIGITAL TROPICAL WEATHER WARNING

(WORKSHEET)

INSTRUCTIONS

Group	
1	Tropical weather warning indicator.
2	Up to six letters of name/number.
3	t_p – storm type. 1 – hurricane 2 – typhoon 3 – tropical storm 4 – tropical depression. NN – advisory number F – fix quality. 1 – excellent 2 – good 3 – fair 4 – greater than 40 n.m. t_f – fix type 1 – reconnaissance 2 – land-based radar 3 – aircraft radar 4 – satellite 5 – ships 6 – synoptic reports 7 – extrapolation
4	Date-time (GMT) of initial position reported.
5 and similar groups	99 – WMO indicator. $L_aL_aL_a$ – Latitude *(tenth of degree).*
6 33, 45, 57, 69	Q_c – WMO quadrant. 1 – 0–180° E } North 7 – 0–180° W } 3 – 0–180° E } South 5 – 0–180° W } $L_oL_oL_oL_o$ – Longitude *(tenth of degree)*
7 34, 46, 58, 70	O – initial position report. 1 – 12-hour prognosis 2 – 24-hour prognosis 4 – 48-hour prognosis 7 – 72-hour prognosis WWW – max wind (kts) RR – min radius of max wind *(tens of n.m.)* *(00 = near center)*
8 and similar groups	O – same as 7. Q1 – NE quadrant Q2 – SE quadrant Q3 – SW quadrant Q4 – NW quadrant RR – radius if reported wind *(tens of n.m.)*
12 17, 22, 27, 39, 51, 63, 75	O – same as 7. WWW– Wind speed required by local directive (100, 65, 50, 30 kt) RR – same as 7.
80	Clarifying remarks deemed necessary by issuing agency.

FORMAT NOTES

1. *( ) Enclosed group number. Use group as required by regional directive.*
2. *◯ Encircled group number. Use group if appropriate.*
3. *Line out unneeded groups.*

Bulletin ID	1. HH	2. AAAAAA	(3) t_p NNF t_f	4. ddtttt			
	HH						
ANALYSIS	5. 99LaLaLa	6. Q_c LoLoLoLo	7. OWWWRR	(8) OQ1RR	(9) OQ2RR	(10) OQ3RR	(11) OQ4RR
	99		0	ONE	OSE	OSW	ONW
	(12) OWWWRR	(13) OQ1RR	(14) OQ2RR	(15) OQ3RR	(16) OQ4RR		
	0100	ONE	OSE	OSW	ONW		
	(17) OWWWRR	(18) OQ1RR	(19) OQ2RR	(20) OQ3RR	(21) OQ4RR		
	0065	ONE	OSE	OSW	ONW		
	(22) OWWWRR	(23) OQ1RR	(24) OQ2RR	(25) OQ3RR	(26) OQ4RR		
	0050	ONE	OSE	OSW	ONW		
	(27) OWWWRR	(28) OQ1RR	(29) OQ2RR	(30) OQ3RR	(31) OQ4RR		
	0030	ONE	OSE	OSW	ONW		
12-hr Prog	32. 99LaLaLa	33. Q_c LoLoLoLo	34. 1WWWRR	(35) 1Q1RR	(36) 1Q2RR	(37) 1Q3RR	(38) 1Q4RR
	99		1	1NE	1SE	1SW	1NW
	(39) 1WWWRR	(40) 1Q1RR	(41) 1Q2RR	(42) 1Q3RR	(43) 1Q4RR		
	1050	1NE	1SE	1SW	1NW		
24-hr Prog	44. 99LaLaLa	45. Q_c LoLoLoLo	46. 2WWWRR	(47) 2Q1RR	(48) 2Q2RR	(49) 2Q3RR	(50) 2Q4RR
	99		2	2NE	2SE	2SW	2NW
	(51) 2WWWRR	(52) 2Q1RR	(53) 2Q2RR	(54) 2Q3RR	(55) 2Q4RR		
	2050	2NE	2SE	2SW	2NW		
48-hr Prog	56. 99LaLaLa	57. Q_c LoLoLoLo	58. 4WWWRR	(59) 4Q1RR	(60) 4Q2RR	(61) 4Q3RR	(62) 4Q4RR
	99		4	4NE	4SE	4SW	4NW
	(63) 4WWWRR	64. 4Q1RR	(65) 4Q2RR	(66) 4Q3RR	(67) 4Q4RR		
	4050	4NE	4SE	4SW	4NW		
72-hr Prog	68. 99LaLaLa	69. Q_c LoLoLoLo	70. 7WWWRR	(71) 7Q1RR	(72) 7Q2RR	(73) 7Q3RR	(74) 7Q4RR
	99		7	7NE	7SE	7SW	7NW
	(75) 7WWWRR	(76) 7Q1RR	(77) 7Q2RR	(78) 7Q3RR	(79) 7Q4RR		
	7050	7NE	7SE	7SW	7NW		
REMARKS	(80) REMARKS						

This form is included for informational purposes. It may be used by Air Weather Service in the development of a system for converting Military Advisories (from WB Form 656-6) to digital format for computer consumption. Should digital advisories be transmitted, receipt by non-users will be minimal.

Air Weather Service Proposed Form

CHAPTER 4

AIRCRAFT RECONNAISSANCE

1. Responsibility.

a. Atlantic - The Air Force and Navy will share the reconnaissance responsibility on an equal basis for providing fixes, and investigative flights on tropical cyclones and hurricanes in the Atlantic, Caribbean and Gulf of Mexico areas in accordance with the following:

(1) Air Force to normally conduct reconnaissance at 700 mb. and above;

(2) Navy will normally conduct reconnaissance at 700 mb. or below;

(3) Fixes will be on a shared basis at an altitude coordinated and specified in the Plan of the Day;

(4) The resolution of conflicts will be made by the CARCAH.

(5) The Air Force Gull Hotel will have higher priority than the Gull India Track during the period from June 1 through November 30. The outward leg of the Gull Hotel Track should be flown at 700 mbs.

(6) Special flights may be scheduled through CARCAH to fill specific NHC requirements. Priority for these special tracks will be higher than standard tracks and lower than Investigative/Tropical Cyclone missions. The weather mission identifier will be Gull/Navy Special.

b. Pacific - The Air Force will be responsible for providing tropical cyclone aircraft reconnaissance in the HWO-HNL area of responsibility subject to the capabilities of available aircraft. The Navy will be responsible for providing tropical cyclone aircraft reconnaissance in the HWO-SFO area of responsibility.

2. Operational Control of Aircraft. Operational control of aircraft engaged in tropical cyclone reconnaissance will be exercised by the respective services which operate them.

3. Observational Data to be Obtained by Reconnaissance.

a. Center Fixes. Within the limits of operational safety, tropical cyclone reconnaissance flights will make all possible efforts to obtain an observed fix on the center by whatever means are available as soon as possible after entering the cyclonic circulation so as to keep navigational errors at a minimum. All observed center fixes obtained, or other information that might in any way indicate or more accurately fix the "eye" of a tropical cyclone, including the size, shape, and orientation of the eye, as well as the method by which the information was obtained, that cannot be included in the encoded portion of the report will be added as plain language remarks. A plain text message will be sent on the initial fix of the eye of each flight. This message will be transmitted separately and as soon as possible in the interest of reducing time delay for delivery to the NHC, Miami or HWO-SFO and HWO-HNL. All radar fix reports will be made in plain text. The method of obtaining the location of the center should always be included in eye position reports from reconnaissance aircraft.

The center should be located according to the following priority in the Atlantic and Eastern Pacific Areas:

(1) Cloud eye - as obtained within the eye by visual and/or radar observations.

(2) Wind eye - if practical to obtain accurate observations of spot winds.

(3) Pressure eye - this is to be obtained by proper flight pattern to locate the position of the lowest surface pressure. (Atlantic requirement)

(4) Radar eye - obtained by coverage of the storm from outside the eye.

All aircraft eye fixes will be reported in degrees and minutes. Forms for reporting eye information are given in Chapter 4 , Forms 1 and 2.

b. Central Pressure - Atlantic. When reconnaissance aircraft have entered the eye, central pressure should be obtained by drop-sonde observations at the center and/or sufficient wind and height observations should be obtained at and in close proximity of the center at 500 mbs. or lower so that the central pressure at the surface may be accurately calculated. These data should be obtained at least at 6-hour intervals when a storm (tropical cyclone) is within 30 hours of landfall.

c. Wind Profile - Atlantic. The horizontal wind speed profile obtained from about 100 miles radius to the center at the 700 mb. or lowest safe level.

d. Cumulonimbus "Blow-offs." Direction of blow-offs from the tops of cumulonimbus clouds should be reported by flights operating below 25,000 feet. In the Atlantic there is an additional requirement for this information east of 60°W as an aid in determining upper-tropospheric winds.

4. Reconnaissance Requirements.

a. Center Fixes - Atlantic. Hurricane reconnaissance flights assigned operational responsibility for obtaining forecast data have highest NHC priority and will provide requisite operational weather information, including fixes on the center, to facilitate determination of present and future position of all tropical cyclones. The flights should be planned so that center fixes are obtained at the specified times indicated below or as near those times as operational conditions permit, except when the eye is under effective surveillance by land based radar. Under these conditions, the reconnaissance aircraft may be requested by the NHC to obtain peripheral data or specific fixes and center data as the situation may require. The frequency of these fixes may be augmented as required.

1200Z - 0700 EST - forenoon reconnaissance
1800Z - 1300 EST - afternoon reconnaissance
0000Z - 1900 EST - evening reconnaissance
0600Z - 0100 EST - night reconnaissance

Flexibility for fix requirements is necessary. Whenever possible, flights should be planned to provide first and last light fixes in addition to synoptic time fixes. Three hourly fixes should be scheduled only when a storm is in close proximity to land mass or operating forces and additional data are required to accurately fix and forecast the storm movement.

b. Center Fixes - Eastern Pacific. Hurricane reconnaissance flights should be so planned that center fixes are obtained as near 18Z or 00Z as operational conditions permit. Two fixes six hours apart will be provided when tropical cyclones are within 600 miles of the United States otherwise only one fix per day will be provided depending upon the capabilities of available aircraft.

5. Peripheral Data.

a. Atlantic. Peripheral data, preferably at 500 mbs., should be obtained to the maximum extent practicable consistent with requirements for data listed in the preceding sub-paragraph 4(a). Reconnaissance flights requested solely for peripheral data at 500 mbs. will be flown at acceptable flight altitudes at or slightly above this level and will provide winds, temperatures and heights of pressure surfaces outwards to a radius of 500 miles from the center or as requested.

b. Eastern Pacific. Peripheral data will be provided to a radius of 500 miles of the storm in two locations only when a tropical cyclone is within 600 miles of the United States.

6. Post Flight Report. All investigative/tropical cyclone flights will file a post flight report. This report will contain all significant additional information not previously transmitted and will be transmitted as soon as feasible.

7. Reconnaissance Planning and Flight Notification.

a. Reconnaissance Plan of the Day (POD) - Atlantic.

(1) Preparation. Plans for aircraft reconnaissance to meet requests for data shall be prepared by the CARCAH in consultation with the Director of NHC . When flights by the ESSA Research Flight Facility (RFF) are to be made, the Chief of the RFF shall participate. Plans for reconnaissance flights will reflect the coordinated requirements as determined by the Director NHC with respect to flights into tropical cyclones or suspicious areas. NHC daily reconnaissance requirements will be provided to the CARCAH as early as possible each day, and in no case later than 1630Z for use in preparation of the POD. The format of the Plan of the Day is given in Form 4 of this Chapter. In preparation of the Reconnaissance Plan of the Day, full consideration will be given to the following:

(a) The data gathering efforts of the available reconnaissance aircraft will be coordinated so as to effect procurement of the maximum amount of reconnaissance data.

(b) Although requirements for operational data are primary, every possible effort should be made to meet requirements for research data.

(c) Aircraft of more than one agency may operate in the storm simultaneously provided that

1) Vertical separation of 5000 feet is maintained.

2) Common UHF or VHF frequencies exist between aircraft and

3) The aircraft having responsibility for gaining the eye fix will have priority for air traffic clearance.

(d) Amendments to the Plan of the Day will be prepared and disseminated in accordance with the foregoing procedures.

(e) The Plan of the Day will be prepared and disseminated daily during the period 1 June - 30 November.

Flight plans of reconnaissance aircraft flying in support of NHC into or through Warning Areas W-151, W-470, and W-497, controlled by missile test ranges at Patrick AFB, Fla. (Air Force Eastern Test Range), and Eglin AFB, Fla. (Eglin Gulf Test Range), will be coordinated by CARCAH. When these areas are designated by NOTAMS as being closed, CARCAH will contact the controlling agency and attempt to obtain PERMISSION for reconnaissance aircraft to enter the closed areas; however, final CLEARANCE responsibility rests with the aircraft commander and/or the agency or unit operating the aircraft. Such coordination effected by CARCAH for an aircraft to enter a closed area constitutes PERMISSION only, and does not provide for a positive CLEARANCE. Therefore, risk due to missile or rocket flight in the area is assumed by the aircraft and/or the agency operating the aircraft.

After coordination has been effected, and there is NO potential conflict, the POD will contain the statement "Flight Plan coordinated with missile test range." This statement will serve to notify the appropriate FAA, Air Route Traffic Control Center that the flight has permission to enter the closed warning area. This statement should also be contained in the remarks section of the aircraft FLIGHT PLAN to further confirm that the flight has PERMISSION to enter the closed warning area.

In the event there is a potential conflict, coordination will be effected between CARCAH and NHC to adjust the requirements by either altering fix times, routes, or alternates whereby the required margin of safety is provided.

In the event a Warning Area is closed after coordination of the POD, and/or an Area is closed without a NOTAM, then the respective aircraft commanders, upon being denied entry to one of these Warning Areas, should contact the CARCAH by autovon phone patch immediately and request assistance. Every attempt will be made by CARCAH to resolve the conflict with the appropriate controlling agency and FAA. When an aircraft enters a closed Warning Area with PERMISSION, ARTCC will provide separation from KNOWN IFR traffic.

(f) The Federal Aviation Administration has directed that reconnaissance flights operating in support of the National Hurricane Center into an area where a NAMED storm exists shall be provided Altitude Reservation (ALTRV) in accordance with FAA Handbook AT P 7520.2B.

Each reconnaissance flight qualifying for Order of Precedence will be so designated by the POD by the inclusion of the statement "REQ ALTRV PRECEDENCE CLASS THREE." The remarks section of the aircraft FLIGHT PLAN should contain this same statement.

(g) Weather Reconnaissance Squadron (WEARECONRON)-FOUR USN, 53rd WRS USAF, and RFF-ESSA will be responsible for notifying CARCAH of any weather reconnaissance aircraft under their control that are anticipating flights into or near storm areas in order that these flights may be coordinated in the Reconnaissance POD.

(2) Dissemination of the Reconnaissance Plan of the Day. The "Reconnaissance Plan of the Day" (POD) will be made available to all appropriate agencies that provide support to and/or exercise control of the missions. CARCAH will be responsible for disseminating the POD by 1800Z on the day preceding the planned missions to the USAF, USN, NHC and FAA. CARCAH will be advised immediately by the appropriate agency of any changes in the status of the missions scheduled in the POD, for example: delayed take off, aborts, etc.

The FAA Air Traffic Control Center representative at Miami will assume responsibility for notifying appropriate Air Traffic Control Centers of the "Reconnaissance Plan of the Day" immediately upon receipt. The Plan of the Day received by the Air Traffic Control Center will be considered the same as the "Gateway" plan and it will cause these Air Traffic Control Centers to consider space for these hurricane flights on the following day.

b. Eastern Pacific-Request for Reconnaissance. The MIC, HWO, San Francisco will telephone requirements for hurricane aircraft reconnaissance flights to the Tropical Cyclone Reconnaissance Coordinator (TCRC-McClellan) and confirm requirements by message to the Air Force Hurricane Liaison Officer (AFHLO), via the hurricane teletype circuit. Such requests should include projected position and time for which an eye fix is desired. All requests for reconnaissance should be coordinated as much in advance as possible preferably by 22Z of the preceding day. The AFHLO-McClellan will confirm to HWO-SFO by message TCRC-McClellan actions via the hurricane circuit.

b. Central Pacific-Request for Reconnaissance. The HWO-HNL will coordinate, through a conference call with responsible authorities of the Air Force, reconnaissance requirements for tropical cyclones north of the equator between 140 degrees west and the 180th meridian. The Tropical Cyclone Reconnaissance Coordinator (TCRC-Hickam) will levy tropical cyclone reconnaissance requirements on appropriate military units. Requests for aerial reconnaissance will be by message, but pre-coordination by telephone is encouraged.

d. Flight Plans. The flight plans for hurricane reconnaissance flights will be filed with FAA as soon as practicable (at least one hour is desirable) prior to departure time. In the interest of standardization and clarification Navy Reconnaissance aircraft (Plan of the Day assigned flights) when filing flight plans with FAA facilities will use NAVH followed by the last three digits of the bureau number of the aircraft. In no case will more than seven (7) digits appear in the call sign. Example: "NAVH789." In the Atlantic, the National Hurricane Center will be included as an information addressee (HGXP-Miami). Flight plans for flights which qualify will include the statement in remarks: "REQ ALTRV PRECEDENCE CLASS THREE."

e. Gull Flights -

(1) Gull Flight Tracks - The Air Force will advise FAA of changes in routine Gull flight tracks by forwarding planned changes to the following air traffic control centers; Miami, Houston, Jacksonville, New York, San Juan, allowing 30 days notice prior to implementation of the changes.

(2) Gull Flight Level Changes - Gull flights will accept flight level changes when requested by the FAA.

8. Aircraft Reconnaissance Communications.

Atlantic

a. Meteorological reports from reconnaissance flights will be coded and transmitted in RECCO code (WB Form 611-6) to include all mandatory groups plus optional groups 4ddff and/or $5DFSD_k$. Plain language will be appended to include a brief description of significant or unusual features observed since the last observation including radar patterns indicative of organization. Any evidence of tornadoes, water spouts or funnel clouds within 200 miles of land should also be reported in this manner. When feasible from an observing and communications standpoint, supplementary hurricane reconnaissance data taken at 15 minute intervals will be appended to the routine reports. The sea surface temperature (Navy reports only) will be included in degrees and tenths Celsius as the first group in remarks in the following format: ST followed by three digits. Following the last group of the RECCO report, the coded latitude and longitude groups and flight level and/or surface wind groups will be repeated. These groups will be repeated in numbers for the purpose of confirmation of these important elements. Each participating agency will effect distribution of pertinent portions of its intra-service operating instructions and procedures to all other participating agencies.

b. All activities should use procedures as outlined in ACP 125B with respect to message headings, date-time groups and numbering systems which are external to the message text in formatting messages for transmission to ground stations. Appropriate Joint Army, Navy, Air Force Procedures (JANAP) Allied Communication Procedures (ACP) will be used when contacting A/G stations.

c. Air Force flights will use communications procedures as shown in Appendix A, Navy communications procedures are shown in Appendix B.

d. Air-Ground communications arrangements for ESSA/RFF aircraft will be the same as Navy aircraft, as shown in Appendix B. ESSA/RFF aircraft may utilize USAF Aeronautical Station facilities as shown in Appendix A when contact cannot be established with the Navy.

e. To preclude interference in simultaneous dropsonde operation, the Reconnaissance Plan of the Day should include the desired times and locations (relative to the storm) of the drops. Additionally, it is necessary that operators monitor the dropsonde frequency prior to drop and plane-to-plane coordination be utilized to avoid interference.

f. When two or more reconnaissance aircraft are operating in the storm area, voice communications between the aircraft will be established and conducted on UHF frequency 304.8 MHz. If initial contact fails on 304.8 MHz UHF Guard frequency 243.0 MHz will be used to establish communications.

Prefix GULL will be used for contacting Air Force aircraft, NAVY for Navy, and ESSA for RFF. As the aircraft approaches the storm area, calls will be made on the hour and every fifteen minutes thereafter until contact is established.

When Navy and RFF aircraft are in the storm area, frequencies in the HF band as promulgated in the published Navy frequency plan will be guarded by the aircraft.

g. A uniform system of identification and continuity of weather/hurricane reconnaissance reports will be followed. The identifiers will be a part and constitute the opening text of each message. Regular weather/hurricane reconnaissance missions will include the unit indicator (GULL for Air Force), (NAVY for Navy), (ESSA for ESSA), followed by the numerical mission number for a particular storm (ONE), the storm/track/investigative name (BETSY) (INDIA) etc., the numerical sequence of the report during the flights (ONE, TWO,...). See Appendices A and B for examples.

Eastern Pacific

a. Meteorological reports from reconnaissance flights will be coded and transmitted in RECCO code. Plain language will be appended to include a brief description of significant or unusual features observed since the last observation including radar patterns indicative of organization. Any evidence of tornadoes, water spouts or funnel clouds within 200 miles of land should also be reported in this manner. A system of numbering will be used to identify individual reports.

b. All activities should use procedures as outlined in ACP 125B with respect to message headings, date-time groups and numbering systems which are external to the message text in formating messages for transmission to ground stations. Appropriate JANAP (ACP) procedures will be used when contacting Air/Ground (A/G) stations.

c. Air Force flights will use communications procedures established for normal Pacific Weather Reconnaissance operations (Appendix C). Should it be necessary to use other A/G communications, appropriate relay instructions will be included in the message.

d. All hurricane aircraft reconnaissance reports received by the AFHLO, McClellan will be expeditiously transmitted to HWO San Francisco via the hurricane circuit.

e. Air Traffic Control Communications. Normal Air Traffic Control (ATC) procedures will be followed.

9. Navy Air Traffic Control Communications - Atlantic. ATC A/G communications, by Navy aircraft operating within the San Juan and Miami FIR areas of responsibility will be conducted in accordance with the following priorities.

a. USN SSB 6723 kHz (primary) 4711 KHz (secondary)

b. 6567kHz (FAA)

c. ARINC

d. USAF Airways Stations

10. USAF Air Traffic Control Communications - Atlantic. USAF Aircraft operating within the San Juan and Miami FIR Areas will conduct ATC A/G communications with the following facilities in priority as listed:

a. USAF Aeronautical Stations (MacDill, Andrews, Albrook)

b. FAA Stations - 6567 kHz (Miami, San Juan, New York)

c. USN SSB Stations - 6723 kHz (Primary, 4711 kHz (Secondary) (Navy JAX)

d. ARINC Stations as contained in current DOD Flight Information Publications Enroute-Supplement.

11. Air-Ground Communications With FAA Stations - Atlantic. If the primary air-ground communications outlined in Appendices A and B fail, reconnaissance aircraft may transmit their hurricane data in plain language by voice to WBR (Miami), WSY (New York), or WRW (San Juan) in that order of priority. Such messages should be addressed to HGXP. The appropriate FAA station will relay the data to the NHC.

Attachments to this Chapter:

Form 1	- Initial Tropical Cyclone Eye/Center Report
Form 2	- Detailed EYE/CENTER DATA MESSAGE
Form 3	- Format to be Used When Reporting Radar Eye from Outside Eye Appended to Areal Meteorological Reconnaissance Reporting Code (RECCO)
Form 4	- Plan of the Day Format - Atlantic
Appendix A	- Air Force Communications Procedures - Atlantic
Attachment 1	- USAF Atlantic Hurricane Communications System Dia ram
Appendix B	- Navy Communications Procedures - Atlantic
Attachment 1	- FLEWEAFAC Jacksonville Communications Diagram(Primary)
Appendix C	- USAF Communications Support Plan for USAF East Pacific Hurricane Reconnaissance
Attachment 1	- USAF Eastern Pacific Hurricane Communications System Diagram
Appendix D	- Joint Requirements for Aircraft Reconnaissance Data

FORM 1

INITIAL TROPICAL CYCLONE EYE/CENTER REPORT

UH NAVY GULL *ESSA _____ _____ _____ EYE/CENTER LOCATED BY _____

AT _____ DEGREES _____ MINUTES NORTH _____ DEGREES _____

MINUTES WEST AT _____ _____ _____ _____ ZULU

---

*ESSA participate only in Atlantic area.

1. The first center fix obtained on each flight will be dispatched as rapidly as possible using Form 1.

2. This form is used in the Atlantic and Eastern Pacific areas.

CHAPTER 4
Form 2

DETAILED EYE/CENTER DATA MESSAGE			ADDRESSEE:
MISSION NUMBER:	DATE:	SCHEDULE FIX TIME Z	
AIRCRAFT COMMANDER:	AIRCRAFT NUMBER:	WEATHER OBSERVER:	
SIMULTANEOUS FIX WITH OTHER AIRCRAFT: ☐ YES ☐ NO	TRANSMISSION TIME: Z	GROUND STATION RECEIPT TIME Z	PRECEDENCE: ☐ IMMEDIATE ☐ PRIORITY
MESSAGE HEADING:			

A. SQUADRON CALL SIGN / MISSION NUMBER / CYCLONE/STORM NAME / OBS NUMBER		
B.		EYE OR CENTER FIXED BY: (Note 1)
C. / N S		LATITUDE CENTER FIX. (DEG./MIN.)
D. / E W		LONGITUDE CENTER FIX. (DEG./MIN.)
E. ZULU		DATE AND TIME OF FIX.
F.		CENTER DETERMINATION: 1.POSITIVE, 2.FAIR, 3.POOR. (Note 2)
G.		NAVIGATION FIX ACCURACY IN NAUTICAL MILES.
H.		MINIMUM COMPUTED SEA LEVEL PRESSURE OR COMPUTED DROPSONDE. (MILLIBARS)
I. / N W/E ZULU		CONFIRMATION OF FIX. POSITION (DEG./MIN.) DATE, TIME.
J.		ESTIMATE OF MAXIMUM SURFACE WIND OBSERVED. (KNOTS)
K. /		BEARING AND RANGE FROM CENTER OF MAXIMUM SURFACE WINDS. (DEG. AND NM)
L. /		EYE SHAPE AND DIAMETER (CIRCULAR, OVAL, CONCENTRIC). ORIENTATION OF MAJOR AND MINOR AXIS (TENS OF DEGREES/ NM). (Note 3)
M. /		MINIMUM HEIGHT AT STANDARD LEVEL. (MBS./METERS)
N. /		FLIGHT LEVEL/MAXIMUM TEMPERATURE INSIDE THE EYE. (METERS) (DEGREES CENTIGRADE)
O. /		FLIGHT LEVEL/MAXIMUM TEMPERATURE INSIDE THE EYE. (METERS) (DEGREES CENTIGRADE)
P. / /		ABSOLUTE ALTITUDE OF AIRCRAFT (METERS) MAXIMUM FLIGHT LEVEL WINDS NEAR CENTER (DEG AND KNOTS)
Q.		BEARING AND RANGE OF MAXIMUM OBSERVED FLIGHT LEVEL WINDS FROM CENTER. (DEG. AND NM)
R.		PRIMARY MEANS OF NAVIGATION: (Note 4)
S.		EYE CHARACTER: CLOSED WALL, POORLY DEFINED, OPEN SW, ETC.
T.		COMM ON CENTER DETER: COMBINE POSITIVE, FAIR, OR POOR WITH WIND TEMPERATURE PRESSURE. (Note 5)
U. / / / E W		AIRCRAFT POSITION IF RADAR FIX. (DEG./MIN.)
V.		REMARKS: RAIN FEEDER BANDS, CLOUDS IN EYE, ETC. (All After Item S are Optional.)
W.		
X.		
Y.		
Z.		

ITEMS K - V MAY BE DELAYED IF TIME IS CRITICAL.

NOTES - FORM 2

Note 1. Transmit Number in accordance with the following code:

1. Wind
2. Pressure
3. Radar
4. Penetration
5. Temperature
6. Cloud
7. Spiral Overlay
8. Triangulation
9. Radar Hole in Sea Return

Note 2. Center Determination:

1. Positive (0-9 NM)
2. Fair (10-19 NM)
3. Poor (20 NM or greater)

The aircraft may send this information in code figures 1, 2 or 3 or may indicate the accuracy of the center fix in nautical miles. Example: Figure 1 would indicate Positive Center Determination with accuracy of 0 to 9 nautical miles. Figure 5 would indicate center determination within 5 nautical miles.

Note 3. Eye Shape will be transmitted: C = Circular, CO = Concentric, E = Elliptical. Orientation of Major Axis in tens of degrees, i.e., 01-010 to 190; 17-170 to 350; etc. Diameter in NM.

EXAMPLES: C8 - Circular eye 8 miles in diameter.
E09/15/5 = Elliptical eye, major axis 090-270, length of major axis 15 NM, length of minor axis 5 nm.
CO8/14 = Concentric eye, diameter inner eye 8 NM, outer eye 14 NM.

Note 4. Transmit Number in accordance with the following code:

1. LORAN
2. Radar
3. Doppler
4. Celestial
5. Dead Reckoning
6. TACAN

Note 5. Transmit in code as follows: W=Wind, T=Temperature, P=Pressure, R=Radar, 1=Positive, 2=Fair, 3=Poor. Example: W2P1T1 = Wind Fair, Pressure Possitive, Temperature Positive.

Items W-Z will be as determined by the specific agency with Storm Warning Responsibility, i. e., JTWC in Western Pacific, NHC in Atlantic, HWO San Francisco in Eastern North Pacific, and HWO Honolulu in Central North Pacific.

CHAPTER 4

AMPLIFYING NOTES - FORM 2

1. Every effort will be made to eliminate ambiguous or misleading statements.

2. Authorized contractions should be used.

3. Only that portion of Form 2 beginning with MESSAGE HEADING will be transmitted in flight.

4. Significant clouds observed in the eye/center should be reported either in the remarks section of this format, or summarized in the written post-flight report.

5. Items not available (N/A) should be so stated.

6. Terms "degrees, minutes, nautical miles, knots, meters, millibars, centigrade" will not be transmitted in messages. If more than one item is denoted on a line, they will be separated in the message by a diagonal (/).

FORMAT TO BE USED WHEN REPORTING RADAR EYE
FROM OUTSIDE EYE-APPENDED TO RECCO CODE

UH (GULL) (NAVY) (ESSA)* _____ 96669 11304 10189 68466 ----etc. ----X

(RADAR EYE)
(RADAR EYE BY HOLE IN SEA RETURN) (Note 1) CNTRD (AT) (NEAR) (Note 2) _____

DEGREES_____ MINUTES NORTH_____DEGREES_____ MINUTES WEST X

CNTR SELECTION (POSITIVE) (GOOD) (FAIR) (Note 3) X LOCATION (POSITIVE) (GOOD) (FAIR) (Note 4) X

NAV (Note 5) ACCURATE WITHIN _____ MI BY (LORAN)

(CELESTIAL) (RADAR) (TACAN#) (DOPPLER) (DEAD RECKONING) _____

(RADAR WEATHER REMARKS) (Note 6)

*ESSA participate only in Atlantic.
#Tactical Air Navigation (Radio)

1. This form is used in the Atlantic and Eastern Pacific areas.

CHAPTER 4
Form 3

AMPLIFYING NOTES

1. a. "RADAR EYE" - obtained by coverage of the storm from outside the eye.

   b. "HOLE IN SEA RETURN" - is used only when the eye is detected in this manner. Experience has shown that a well organized tropical storm or hurricane traveling at slow or moderate speeds in the open ocean presents a field of intense and widespread surface clutter or sea return. The sea return is primarily wave face reflection but may include hydrometeor reflection from airborne spray in the higher velocity wind areas. Depending on the aircraft altitude, range to the center, and antenna tilt, the eye of the storm can usually be revealed as a circular area of comparatively light or no sea return. This is interpreted as a function of the circulation and may vary slightly in position with the apparent center of the precipitation pattern.

2. The word "AT" or "NEAR" will be used to indicate the overall reliability of the present solution of the center report problem. That is, it represents a summation of the individual accuracies applicable to identification and location solutions which may or may not include the aircraft navigation. When all considerations indicate the center target to be significant and conservative and its reported position to be accurate within ten miles, "AT" will be used, otherwise "NEAR".

   "AT" will be used with "SELECTION POSITIVE", "LOCATION POSITIVE"
   "AT" may be used with "SELECTION POSITIVE", "LOCATION GOOD"
   "AT" may be used with "SELECTION GOOD", "LOCATION POSITIVE"
   "AT" could possibly be used with "SELECTION GOOD", "LOCATION GOOD"

3. The reliability of the selection of a center target will be indicated in three categories. In every case, interpretation of a storm center will be based on continuous scope observation during which the aircraft altitude, antenna tilt and other principal factors have been duly considered.

   a. Selection "POSITIVE" will be used:

      (1) For all cases where a hole in the sea return is reported.

      (2) For persistent characteristic precipitation patterns detected with an inner periphery comprising at least half a complete circle and the radius of curvature is ten miles or less.

b. Selection "GOOD" will be used for persistent characteristic precipitation patterns composed of arcs, crescents, curved bands or spirals whose inner periphery comprises less than half a complete circle and/or the radius of curvature is greater than ten miles.

c. Selection "FAIR" will be used:

(1) For those cases where by aircraft probing or by other means the observer is confident that a given area involves a storm center but the precipitation patterns on radar are weak, poorly organized, or define such a large eye area that center selection with ten mile accuracy cannot be accomplished with confidence.

(2) When the characteristic precipitation target lacks reasonable persistence, or loses continuity by evolution of its defining elements.

(3) When continuous observation of the eye target is seriously hampered by severe ground clutter interference, partial electronic failure or unusually adverse maneuvering requirements.

4. An evaluation of the accuracy of the center target location computation will be indicated in one of three categories. When the radar scope presentation includes two or more usable terrain targets as well as the storm center target, location of the latter can be accomplished accurately and independent of the aircraft navigation.

a. Location "POSITIVE" will be used:

(1) When a combination of three or more ranges and/or bearings from terrain targets fall within a mutual tolerance of four miles.

(2) When center target range and bearing from the aircraft is plotted from a simultaneous ground wave loran fix and this position agrees with a radar line of position plotted from a terrain target.

b. Location "GOOD" will be used:

(1) When center target range and bearing from the aircraft are plotted from a simultaneous ground wave loran or 3-star celestial fix.

(2) When center target location is determined by radar range and bearing data from a single terrain target.

c. Location "FAIR" will be used:

(1) When center target lines of position by radar from terrain features fail to fall within a mutual tolerance of ten miles.

(2) When center target location is relative to the aircraft position determined by dead reckoning, sub-standard loran or radio direction finding.

5. Navigation accuracy will be reported only when it enters directly into the center target location problem.

6. Description of radar precipitation targets: character (stratiform or cumuliform), shape, intensity, location, extent; height of major cells in various regions, etc.

7. Air space reservation, operational information, etc.

8. Plain language remarks should be used to the maximum when appropriate. However, observers must pay particular attention to the avoidance of any statement which might be construed to be of a forecast nature.

PLAN OF THE DAY FORMAT - ATLANTIC

FM: OL-8 HQ AWS (RUCLEFA/CARCAH) MIAMI FLA.

TO: 1. HOMESTEAD AFB FLA DIAL TWX #305-248-0151 (AIG #8227)
(GT22117) (30GT2352) (7072)

UNCLAS CARCAH SENDS _____

AMENDMENT NO. _____ TO

RECON PLAN OF THE DAY FOR _____ _____ 69 FOLLOWS

---

1. USAF...FLT _____...GULL_____
2. USN....FLT _____...NAVY_____ _____(or) INVEST...._____
3. ESSA...FLT _____...ESSA_____ SPECIAL... (acft)

CYCLONE...

DEPART _____ APPROX._____Z. ENROUTE ALT. _____FT.

TO _____N _____W. RETURN ALT. _____FT.

RECON AT _____FT. OR BELOW AT PILOTS DISCRETION HURRICANE
TROPICAL STORM
SUSPICIOUS LOW
PRESSURE AREA

_____ EXPECTED TO BE VICINITY OF _____N _____W AT ___/_____Z.

OBTAIN ___/_____Z ___/_____Z AND ___/_____Z FIX(ES) AT_____FT.

IF OPERATIONALLY FEASIBLE PROCEED AT _____FT. TO _____N _____W AND

MAKE DROP AND RETURN TO STORM/HURRICANE FOR _____Z FIX.

DESTINATION _____.

FLIGHT PLAN COORDINATED /NOT COORDINATED THROUGH W- _____

WITH MISSILE TEST RANGE.

4. REQ ALTRV PRECEDENCE CLASS THREE.

SGN CARCAH ___/_____Z _____ KMIA.

CHAPTER 4
Appendix A

ATLANTIC

USAF COMMUNICATIONS SUPPORT PLAN FOR USAF HURRICANE RECONNAISSANCE

1. General. WC-130B type aircraft of the 53 Weather Reconnaissance Sq. (AWS) will operate from Ramey AFB, Puerto Rico during the hurricane season. Reconnaissance observations initiated by these aircraft will be transmitted by voice via high frequency single side band (HF/SSB) radio through the USAF aeronautical station complex to a weather monitor at Charleston AFB, S. C. The weather monitor will evaluate and edit the reports to insure meteorological and technical accuracy. The monitor will relay the edited reports via land line teletype facilities to the Chief Aerial Reconniassance Coordination, Atlantic Hurricanes (CARCAH) located with the National Hurricane Center (NHC) at the University of Miami, Coral Gables, Fla. The monitor will also relay these reports to Tinker Weather Relay Facility (KWRF) via the USAF COMET II circuit for further distribution over military weather communication systems as required. The CARCAH will provide these reconnaissance reports to NHC for use in developing advisories and warnings. NHC will provide the CARCAH with teletype tape and page copies of hurricane advisories. The CARCAH will relay these advisories via the USAF COMET II circuit to KWRF for introduction and distribution over the military weather communications system. Teletype facilities will also be provided for coordinating the Plan of the Day (POD) and other aspects of the reconnaissance activities. The latter facilities will link CARCAH; the 53 Weather Reconnaissance Sq. Command Post (53WRSCP) at Ramey AFB, Puerto Rico; the alternate CARCAH at Suitland, Md.; Charleston Weather Monitor; MacDill and Andrews Aero Stations. A diagram of the USAF hurricane communications network is included as attachment 1 to this Appendix.

2. Air/Ground Communications.

a. Whenever possible, USAF hurricane reconnaissance aircraft will relay reconnaissance reports through the USAF Aeronautical Station at MacDill, Andrews or Albrook AFBs. Specific station contacted will depend upon aircraft location and radio propagation conditions. HF/SSB frequencies to be used for intial contact with each USAF Aeronautical Station are listed in the appropriate DOD Flight Information Publication Enroute - Supplement. Subsequent to initial contact, the Aeronautical Station will assign a primary and secondary frequency for use by hurricane reconnaissance aircraft during each mission. Frequencies assigned may or may not be the same as frequencies published in the Enroute Supplement for the contacted stations. Whenever possible, frequencies will be assigned to reduce interference and congestion from other HF A/G traffic. When specifically requested by the aircrew and circuit conditions will permit, a direct voice phone patch between the aircraft and the weather monitor at Charleston AFB will be provided by the Aeronautical Station. USAF has authorized the use of "Immediate"precedence for transmission of hurricane reconnaissance reports. To further facilitate such voice patching direct AUTOVON access lines have been provided. Specific methods of handling hurricane reconnaissance messages are listed below for each station:

PRIMARY METHOD	FIRST ALTERNATE	SECOND ALTERNATE
	MACDILL AERONAUTICAL STATION	
Direct phone patch between recon acft. and Charleston Weather Monitor via AUTOVON	Air/Ground (A/G) operator copy transmission from acft.; relay by voice to Charleston via AUTOVON	A/G oper. copy from acft.; relay to Charleston using com'l long distance phone or direct teletype circuit (GT 22117) whichever is fastest.
	ANDREWS AERONAUTICAL STATION	
Direct phone patch between recon acft. and Charleston via AUTOVON	Air/Ground operator copy transmission from acft.; relay by voice to Charleston via AUTOVON	A/G oper. copy from acft.; relay to Charleston using direct teletype circuit (GT 22117).
	ALBROOK AERONAUTICAL STATION	
Direct phone patch between recon acft and Charleston via AUTOVON	A/G oper. copy from acft.; relay to Charleston via AUTOVON or other available voice circuits	A/G oper. copy from acft.; voice relay to MacDill over shared A/G frequencies for further relay to Charleston via AUTOVON

b. The following is a typical sequence of actions required for passing an observation message from the aircraft, through the MacDill Aeronautical Station, to the receiving facility at Charleston AFB:

(1) MACDILL - THIS IS GULL ONE - ON FOUR SEVEN - OVER.

(2) GULL ONE - MACDILL - GO AHEAD.

(3) MACDILL - GULL ONE - REQUEST OPERATIONAL IMMEDIATE PHONE PATCH TO CHARLESTON WEATHER MONITOR - OVER.

(4) GULL ONE - MACDILL - STAND BY.

(5) The A/G Operator then conditions his console for a ground subscriber call, selects the line associated with the station's AUTOVON line, and calls the Charleston addressee using the direct AUTOVON number. When the Charleston party answers, the operator advises:

(6) THIS IS MACDILL - STAND BY FOR PHONE PATCH FROM GULL ONE - OVER.

(7) ROGER - STANDING BY.

(8) The A/G operator then conditions his console for phone patch and advises the aircraft:

(9) GULL ONE - THIS IS MACDILL - YOUR PATCH TO CHARLESTON IS READY - GO AHEAD.

(10) CHARLESTON - THIS IS GULL ONE - MESSAGE FOLLOWS - BREAK BREAK - GULL ONE BETSY FOUR TEXT TEXT TEXT - OVER.

(11) GULL ONE - CHARLESTON - ROGER - OUT

(12) GULL ONE - OUT.

(13) The MacDill A/G operator then breaks the patch.

c. If at Item 11, Charleston has any question or comment on the observation message, it will be resolved prior to discontinuation of the patch. If, at Item 3 above, phone patch cannot be provided, following sequence of actions would be typical:

(1), (2) and (3) See paragraph 2b above.

(4) GULL ONE - MACDILL - UNABLE TO PROVIDE PATCH AT THIS TIME - YOUR SIGNAL IS NOT PATCH QUALITY - I CAN PROVIDE RELAY TO ADDRESSEE - OVER.

(5) MACDILL - GULL ONE - PASS TO CHARLESTON MONITOR - BREAK BREAK - GULL ONE BETSY FOUR TEXT TEXT TEXT - OVER

(6) MACDILL

(7) The air/ground operator then passes the copied message to the Coordinator for relay to Charleston monitor via AUTOVON or teletype (GT 22117) as appropriate.

d. Regular hurricane mission messages will include the unit indicator (GULL), followed by the numerical mission number (ONE), the name of the tropical cyclone (ANN), and the numerical sequence of the reports during the flight (ONE - end of flight).

Examples:

First tropical cyclone, first mission, first report
GULL ONE ANN ONE

First tropical cyclone, second mission, tenth report
GULL TWO ANN TEN

Second tropical cyclone, first mission, fifth report
GULL ONE BABS FIVE

e. Diverted hurricane search missions will append a plain language explanatory message to the last scheduled position message; for example:

GULL NECTAR DIVERTED NEXT MSG GULL ONE CYCLONE

or

GULL NECTAR DIVERTED NEXT MSG GULL ONE ANN

f. Reconnaissance messages from suspicious areas will read:

GULL ONE CYCLONE, etc.

Reconnaissance missions messages into suspicious areas will be numbered consecutively without regard to the tropical cyclone itself; i.e., first reconnaissance of a suspicious area during the season will be GULL ONE CYCLONE etc., with the next suspicious area investigated identified as GULL TWO CYCLONE, etc.

3. Point-to-Point Teletype Communications Capability.

a. Circuit GT 22117 (JQGCU 304) will be configured with send/receive terminals at CARCAH, Alternate CARCAH, 53WRSCP, Ramey AFB, Puerto Rico; Latin American Forecast Center, Charleston AFB, S.C.; Andrews and MacDill Aero Stations. NHC will have a receive only reperforator on this circuit to provide it with the hurricane reconnaissance reports for further relay over FAA weather networks. The Charleston Monitor will act as net control station and maintain circuit discipline. Authorized uses of this circuit are:

(1) Aircraft hurricane traffic received at Charleston via AUTOVON will be relayed to CARCAH over this circuit for further passing to NHC.

(2) Coordination of Plan of the Day and other related matters between CARCAH and 53WRSCP will be handled over this circuit.

(3) MacDill and Andrews Aero Stations to pass reports received from recon aircraft to Charleston when they cannot be handled by primary or first alternate means. (See second alternate air/ground procedures for MacDill and Andrews.)

(4) Essential coordination between CARCAH and Alternate CARCAH concerning transfer of responsibility and similar matters will be handled over this circuit.

(5) In the event responsibility is transferred from NHC to Alternate National Hurricane Center, USWB, Washington HWO (ALT. NHC), traffic received at Charleston via AUTOVON will be relayed to the Alternate CARCAH over this circuit for further relay to ALT NHC via USWB circuit 7072.

(6) Dissemination of Air Force Storm Reconnaissance Aircraft "Departure" and "Arrival" messages from the 53rd WRS Command Post in the following format:

10 LTRS
AA CR 4LF
00 URXX RRCP DTG
TEXT CR 4LF
NNNN
10 LTRS

(7) Command/Control traffic between the 9th Weather Reconnaissance Wing Command Post (9WRWCP) and 53WRSCP.

b. A COMET II drop is installed at CARCAH and will be used to transmit hurricane advisories to Tinker Weather Relay for further distribution to military customers, as required.

4. Miscellaneous Communications Services and Support.

a. Routine communications between weather reconnaissance aircraft and USAF Aeronautical Stations for normal air traffic control services will be handled in accordance with standard procedures. Where contact cannot be made with USAF Aeronautical Stations, air traffic control communications may be conducted in accordance with paragraph 10, Chapter 4 .

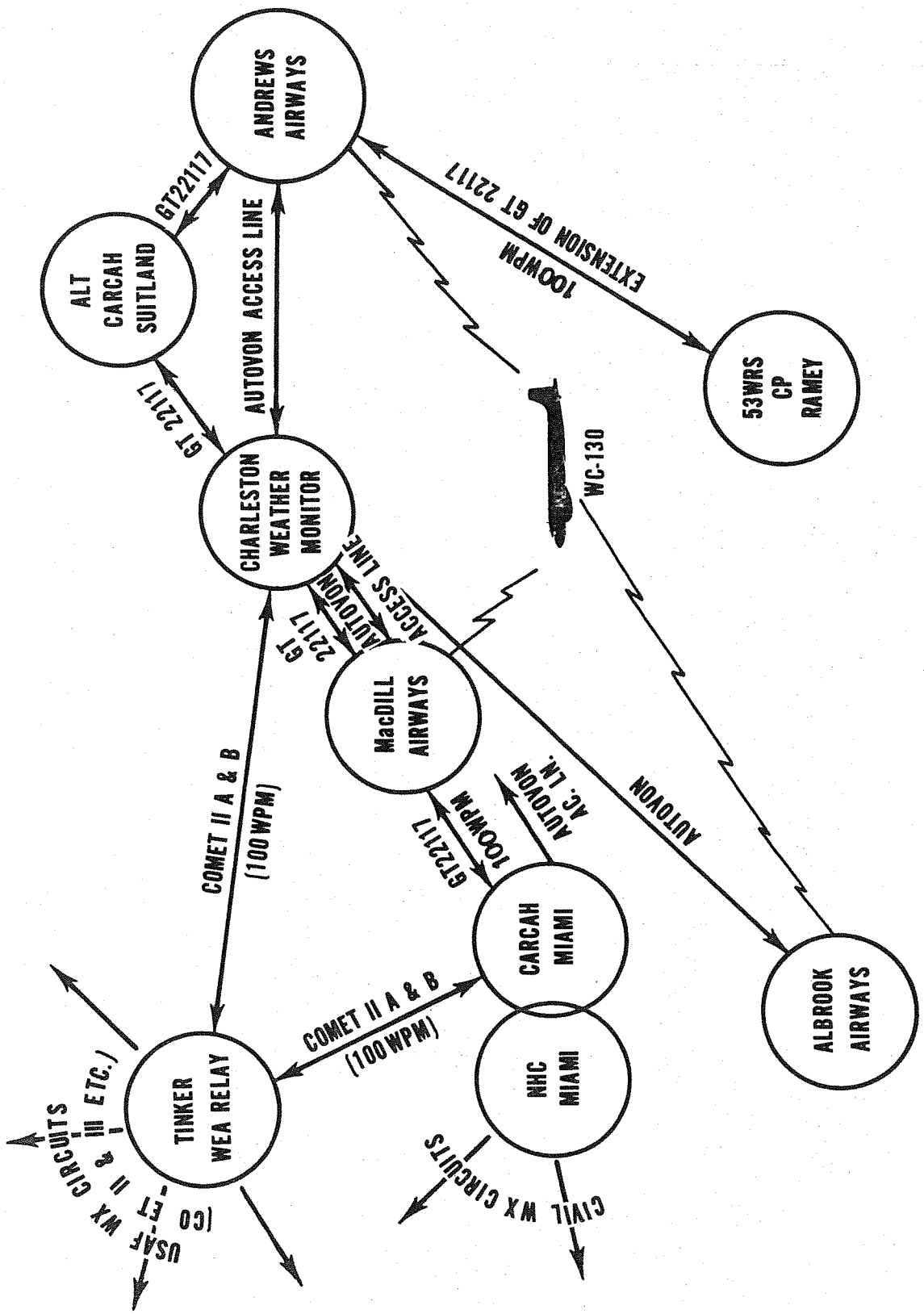
b. When USAF hurricane reconnaissance are unable to communicate through USAF Aeronautical Stations, contact will be made with the Fleet Weather Facility (FWF) SSB radio facilities at Jacksonville Naval Air Station (NAS) or Roosevelt Roads, P. R. Frequencies are listed in paragraph 2, Appendix B, Chapter 4 . When passing traffic through these stations, ACP 125(B)-1 procedures and message headings will be utilized. USAF reconnaissance reports relayed in this manner will be forwarded by the Navy to CARCAH/NHC via USN hot line teletype circuit or other Navy circuits as appropriate. FLEWEAFAC SSB radio facility at Jacksonville NAS has direct phone patch capability. USAF aircraft contacting this facility will request a phone patch to Charleston Monitor, AUTOVON number 431-3947.

c. USN and RFF hurricane aircraft are authorized to utilize the facilities of the USAF Aeronautical Stations for relay of hurricane reconnaissance reports. A direct voice patch can be provided from these aircraft to FLEWEAFAC at Jacksonville by requesting the MacDill or Andrews A/G stations to contact AUTOVON number 434-3740. In the event that signal is not of patch quality, ground operator will copy message and relay to FLEWEAFAC, Jacksonville .

d. TWX messages for the CARCAH Coral Gables, Florida, should be addressed in the heading of the message as follows: RUCLEFA/CARCAH HOMESTEAD AFB FLA.

ATTACHMENT 1

USAF ATLANTIC HURRICANE COMM SYSTEM



CHAPTER 4
Appendix B

ATLANTIC NAVY COMMUNICATIONS PLAN

1. Fleet Weather Facility, Jacksonville, Communications.

a. FLEWEAFAC JACKSONVILLE (JAX) will use the following means of distributing hurricane traffic:

(1) Automatic Digital Network (AUTODIN). This on-line encrypted duplex teletype circuit will be utilized to distribute warnings, intermediate position estimates and Tropical Weather Summaries to military addressees and to NAVCOMSTAS for transmission on the Atlantic Fleet broadcasts.

(2) 30GT2352, Direct line teletype. This circuit consists of International Flight Service Station (IFSS) MIAMI, NHC MIAMI, WEARECONRON FOUR and FWF JACKSONVILLE. Reconnaissance aircraft Plans of the Day will be transmitted on this circuit by the CARCAH at NHC MIAMI. All reconnaissance reports received at FWF JACKSONVILLE via SSB will be placed on this circuit as soon as received and monitored. NHC MIAMI will be responsible for entering these reports on the Hurricane Circuit 23421. FWF JACKSONVILLE will act as back-up for this responsibility in the event of casualty to NHC MIAMI.

(3) 30GP2901, Direct line telephone. This circuit connects FWF JACKSONVILLE and NHC MIAMI. This telephone is utilized to coordinate the Plan of the Day with CARCAH at NHC Miami and for discussing hurricane data with NHC MIAMI.

(4) COMET II. All reconnaissance reports received at FWF JAX via SSB are entered on this circuit by FWF JAX as soon as they are received and monitored.

(5) FWF JACKSONVILLE-ROOSEVELT ROADS-FWF SUITLAND RECONNAISSANCE CIRCUIT (SSB). This circuit is utilized for operational messages from and to WEARECONRON ROUR at ROOSEVELT ROADS and for communications with the hurricane reconnaissance aircraft. FWF JACKSONVILLE will use the voice call sign "JACKSONVILLE HURRECO CONTROL" for communications on this circuit. Navy reconnaissance aircraft will use "NAVY HURRECO" followed by the last three digits of the bureau number. Voice procedures and circuit logs will be as outlined in ACP 125. Hard copies will be made of all operational and administrative messages.

b. Hurricane message:

(1) The following precedences will be used:

MESSAGE	PRECEDENCE
Warning	IMMEDIATE (O)
Position Estimates	IMMEDIATE (O)
Tropical Weather Summary	PRIORITY (P)

2. Aircraft Reconnaissance Communications.

a. FWF JACKSONVILLE-ROOSEVELT ROADS-FWF SUITLAND RECONNAISSANCE CIRCUIT (SSB).

(1) This circuit will operate as a FREE NET unless otherwise directed by NET CONTROL (FLEWEAFAC JACKSONVILLE) and will be the primary circuit for passing reconnaissance data.

(2) Except in case of emergency, the aircraft will notify net control prior to leaving the circuit.

(3) Utilization of frequencies - Circuit E11.1 as assigned in accordance with JANAP 195( ) will be utilized as follows:

(a) FWF JACKSONVILLE will guard circuits as follows:

1 Primary: Circuit CHARLIE (13221 kHz)

2 Secondary: Circuit DELTA (15081 kHz)

(b) ROOSEVELT ROADS will guard backup circuits as follows:

1 Primary: Circuit CHARLIE. (13221 kHz)

2 Secondary: Circuit DELTA. (15081 kHz)

(c) FWF Suitland will guard back-up circuit "CHARLIE" (13221 kHz)

(d) Circuits ALFA (4700 kHz) and BRAVO (9010 kHz) may be utilized if required.

(4) Hourly radio checks between ROOSEVELT ROADS, FLEWEAFAC SUITLAND and FLEWEAFAC JACKSONVILLE will be initiated by ROOSEVELT ROADS and FLEWEAFAC SUITLAND at 10 minutes past the hour or as soon thereafter as circuit time permits.

(5) If, after a frequency shift is made and no contact is made within 15 minutes, return to the last frequency on which contact was made.

b. The circuit used for communications between FLEWEAFAC JACKSONVILLE and reconnaissance aircraft will be utilized as follows:

(1) Radio checks will be initiated by the aircraft prior to takeoff and at 30 minute intervals while airborne. Check times will be on the hour and half hour.

(2) The aircraft will check in with FLEWEAFAC JACKSONVILLE prior to takeoff as stated in (1) above on primary frequency. At that time, NET CONTROL will notify them as to the primary and secondary frequencies to be used for that flight.

(3) To facilitate High Frequency Direction Finding (HFDF) identification, the aircraft will give its call sign at the beginning of each transmission. In addition each radio check will contain one full long count if no other traffic is to be passed at that time.

(4) If contact can not be established within 15 minutes of the designated time, an attempt will be made on the next lower frequency. If a 15 minute attempt on the lower frequency is not successful, another attempt will be made on the next higher frequency. If at this point contact is not made, the aircraft shall return to the primary circuit.

(5) In order to determine if another circuit will provide better communications, FLEWEAFAC JACKSONVILLE will request a "Test Transmission" on another frequency. For example, upon the command "Test circuit ALFA" from Net Control, the aircraft will shift to Circuit ALFA, give three long counts and return to the circuit upon which the command was given.

(6) To facilitate frequency changes in flight,"WEARECONRON" FOUR will prepare and disseminate FREQUENCY PROPAGATION GRAPHS each month for the forthcoming month.

c. Relay of Air Traffic Information to appropriate Air Route Traffic Control Center (ARTCC) can be effected via SSB under the following circumstances:

(1) On routine point to point flights or flights enroute to or from storm/suspicious areas, position reports and/or requests for clearances will be relayed by FWF JACKSONVILLE only when other means of direct contact with the center cannot be established.

(2) Within storm/suspicious areas, FWF JACKSONVILLE will effect relay of all essential traffic (position reports, requests for clearances, etc.) but only when requested to do so by the aircraft.

d. AIR-GROUND VOICE AIR FORCE CIRCUIT (SSB).

(1) If communications cannot be established and maintained on the primary circuit (SSB JACKSONVILLE-ROOSEVELT ROADS-FWF SUITLAND) the Air-Ground Voice Air Force circuit as outlined in the U. S. Air Force Communications Plan, Appendix A to Chapter 4, of the current "National Hurricane Operations Plan" will be used. If communications is established with the Air Force SSB station at MacDill AFB, ask for AUTOVON number 434-3740.

e. NAVY UNIVERSAL AIR-GROUND (CW) CIRCUIT.

(1) If communications cannot be established and maintained on circuits as outlined in a. and d. above, the Navy Universal Air-Ground (CW) Circuit will be utilized. "Tango" instructions will be included on messages passed on this circuit.

f. The following frequencies have been assigned for emergency and distress:

FREQUENCY	EMISSION	USE
500.0 kHz	CW	International Distress and Calling Frequency
2182.0 kHz	V	International Distress and Calling Frequency
2678.0 kHz	V	Coast Guard Calling and Working Frequency
5680.0 kHz	V	Search and Rescue Control (Coast Guard)
5695.5 kHz	V/CW	Search and Rescue Control (Navy)
8364.0 kHz	CW	International Lifeboat, Liferaft and Survival: Craft Frequency
121.5 MHz	V	Emergency and Distress for Aircraft and Ships SAR and VHF/DF Primary
243.0 MHz	V	Military Common Emergency Frequency, UHF

g. When communications cannot be established through any of the above circuits, naval reconnaissance aircraft may contact any Navy Air-Ground stations, or Air Force Ground stations at MACDILL and ANDREWS or ALBROOK AFBs in accordance with procedures outlined in Appendix A. When alternate ground stations must be contacted, weather messages must be addressed with proper "Tango" instructions so that ground stations will be responsible for immediate relaying of such messages to FLEWEAFAC JACKSONVILLE.

h. Reports via SSB or CW channels from Navy aircraft and reconnaissance flights, addressed to FLEWEAFAC JACKSONVILLE or its alternate FLEWEAFAC SUITLAND will be preceded by "UH" or "UR", unit identification (i.e. "NAVY"), mission number (for missions other than synoptic tracks), type of mission (CYCLONE NAME", "INVESTIGATIVE" or "TRACK NAME") and message number (ONE, TWO, etc.,) with "ONE" assigned to the departure report. The sequence will be continuous for all messages on each particular flight, regardless of whether messages are transmitted in RECCO code, plain language text or a combination of the two. The arrival report shall be the final one of the series.

i. Weather reports, except for those authorized in plain text will be encoded and transmitted in the currently effective RECCO code in accordance with the current National Hurricane Operations Plan. Precedence shall be immediate for all weather reports. The following may be transmitted in plain text:

(1) The initial eye fix on each flight. This message may be transmitted separately in the interest of reducing the time delay to the National Hurricane Center at Miami.

(2) All radar fix reports.

(3) Direction of the outflow cloud.

(4) Post Flight Report.

j. At the end of each RECCO message, the coded longitude and latitude groups and the flight level and surface wind groups will be repeated for the purpose of confirmation.

k. The letters UR indicating routine surveillance will be used as the first group of the text. All other reconnaissance reports will be indicated by the letters UH as the first text group.

Example of a hurricane RECCO message:

0 181902Z
FM Navy Hurrecco 896
TO NHC Miami
FWF Jacksonville
INFO WEARECONRON FOUR
GR30
BT
UNCLAS
UH NAVY ONE BETSY TWO 97779 ..... etc.
(Second message from first Navy mission on named storm "BETSY")

UR NAVY ONE INVESTIGATIVE TWO 97779 ..... etc.
(Second message from Navy mission to investigate a suspicious area.)

UR NAVY KILO TWO 97779..... etc.
(Second message from a Navy aircraft on a standard named track.)

NOTE: In the event a reconnaissance aircraft is diverted from a standard named track to investigate a suspicious area, a mission number will be assigned and message numbers will continue sequentially. For instance, the first message from a KILO flight, diverted after message number four to investigate a suspicious area would read:

UR NAVY ONE INVESTIGATIVE FIVE 97779 .....etc.

3. Miscellaneous Communications Services and Support:

TWX messages for the CARCAH Coral Gables, Florida, should be addressed in the heading of the message as follows:

RUCLEFA/CARCAH HOMESTEAD AFB, FLA.

4. Direct Communications to FWC ROTA:

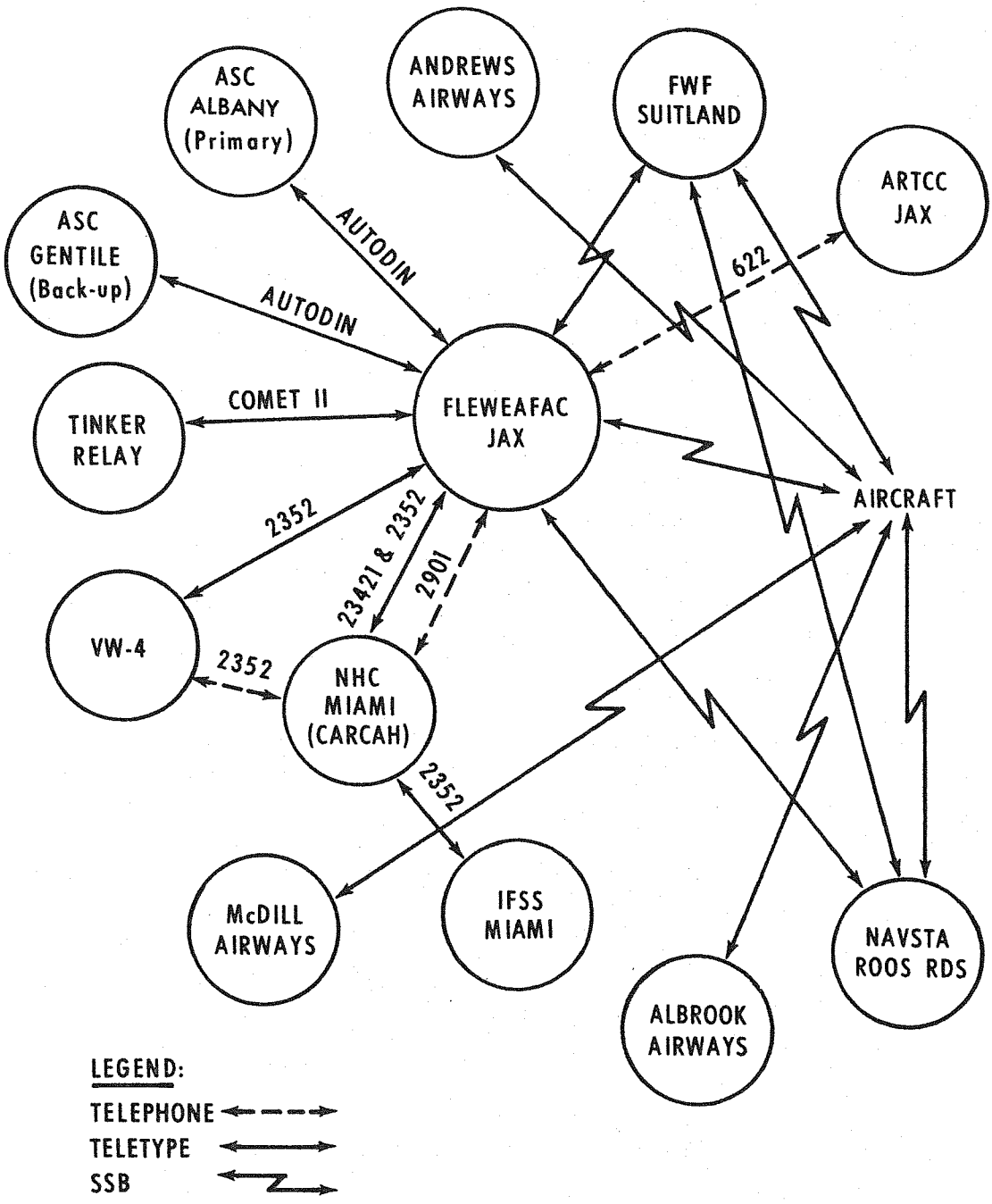
Contact NORAD Operator Naval Communications Station (NAVCOMSTA Norfolk) AUTOVON 244-7861. A phone patch may be completed at any time, however, the following hours are recommended.

0000Z - 0315Z
1200Z - 1515Z

5. Attachment 1 illustrates the normal communications channels used by FLEWEAFAC JACKSONVILLE.

ATTACHMENT 1

FLEWEAFAC JACKSONVILLE COMMUNICATIONS DIAGRAM (PRIMARY)



NOTE: AUTOVON available between all activities except IFSS MIAMI

USAF COMMUNICATIONS SUPPORT PLAN FOR USAF EAST PACIFIC HURRICANE RECONNAISSANCE

1. General. WB-47 type aircraft of the 55 Weather Reconnaissance Squadron (AWS) will operate from McClellan AFB, California, during the hurricane season. Reconnaissance observations initiated by these aircraft will be transmitted by voice via high frequency single sideband (HF SSB) radio through the USAF aeronautical station complex to a weather monitor at McClellan AFB, California. The weather monitor will evaluate and edit the reports to ensure meteorological and technical accuracy. The monitor will then relay these monitored reconnaissance reports via the West Coast Hurricane Circuit and COMET II to all customers requiring this information. The HWO-SFO will provide the Air Force Hurricane Liaison Officer, McClellan (AFHLO, MCC) with hurricane advisories. These advisories will be sent to Tinker Weather Relay Facility (KWRF) on COMET II for further distribution over the military weather communications system. A diagram of the USAF hurricane communication network is included as Attachment 1 to this Appendix.

2. Air/Ground Communications.

a. Whenever possible, USAF hurricane reconnaissance aircraft will relay reports through the USAF aeronautical stations at McClellan or Albrook, in that order. HF SSB frequencies to be used are listed in the appropriate USAF/USN Flight Information Publications, Enroute Supplement. When specifically requested by the aircrew and circuit conditions will permit, a direct voice phone patch between the aircraft and the weather monitor at McClellan AFB will be provided by the aeronautical station. To facilitate such voice patching, a hot line has been provided between the McClellan Airways Station and the McClellan Weather Monitor. An "Immediate" precedence is authorized for the voice transmission of these reports. Specific methods of handling Pacific hurricane reconnaissance messages are listed below for each station:

PRIMARY METHOD	FIRST ALTERNATE
McClellan Airways:	
Direct phone patch between reconnaissance aircraft and McClellan monitor via hot line.	Air/Ground operator copy transmission from aircraft; relay to McClellan monitor via hot line.
Albrook Airways:	
Air/Ground operator copy transmission from aircraft; voice relay to McClellan weather monitor using shared base AUTOVON facilities 633-6810 or 633-6755.	Air/Ground copy from aircraft; teletype relay to Det 19, Wea Sq, McClellan AFB, via Air Operations Network (AIROPNET) immediate precedence message.

b. The following is a typical sequence of actions required for passing an observation message from the aircraft through the McClellan Aeronautical Station to the receiving facility at McClellan weather monitor:

(1) MCCLELLAN - THIS IS LARK ONE - ON FOUR SEVEN - OVER.

(2) LARK ONE - MCCLELLAN - GO AHEAD.

(3) MCCLELLAN - LARK ONE - REQUEST IMMEDIATE PHONE PATCH TO MCCLELLAN WEATHER MONITOR - OVER.

(4) LARK ONE - MCCLELLAN - STAND BY.

(5) The A/G operator then conditions his console for a ground subscriber call and calls the McClellan addressee using the direct hot line. When the McClellan party answers, the operator advises:

(6) THIS IS MCCLELLAN - STAND BY FOR PHONE PATCH FROM LARK ONE - OVER.

(7) ROGER - STANDING BY.

(8) The A/G operator then conditions his console for phone patch and advises the aircraft:

(9) LARK ONE - THIS IS MCCLELLAN - YOUR PATCH TO MCCLELLAN MONITOR IS READY - GO AHEAD.

(10) MCCLELLAN MONITOR - THIS IS LARK ONE - MESSAGE FOLLOWS - BREAK BREAK - LARK ONE AGATHA FOUR TEXT TEXT TEXT - OVER.

(11) LARK ONE - MCCLELLAN MONITOR - ROGER - OUT.

(12) LARK ONE - OUT.

(13) The McClellan Air/Ground operator then breaks the patch.

c. If at Item 10 McClellan monitor has any question or comment on the observation message, it will be resolved prior to discontinuation of the patch. If at Item 3 above the phone patch cannot be provided, the following sequence of actions would be typical:

(1), (2) and (3). See paragraph 2b above.

(4) LARK ONE - MCCLELLAN - UNABLE TO PROVIDE PATCH AT THIS TIME - YOUR SIGNAL IS NOT PATCH QUALITY - I CAN PROVIDE RELAY TO ADDRESSEE - OVER.

(5) MCCLELLAN - LARK ONE - PASS TO MCCLELLAN WEATHER MONITOR - BREAK BREAK - LARK ONE AGATHA FOUR TEXT TEXT TEXT - OVER.

(6) MCCLELLAN

(7) The Air/Ground operator then passes the copied message to the Coordinator for relay to McClellan monitor via hot line.

d. Regular hurricane mission messages will include the unit indicator (LARK), followed by the numerical mission number (ONE), the name of the tropical cyclone (AGATHA), and the numerical sequence of reports during a flight (ONE, etc.).

Examples:

First tropical cyclone, first mission, first report
LARK ONE AGATHA ONE

First tropical cyclone, second mission, tenth report
LARK TWO AGATHA TEN

Second tropical cyclone, first mission, fifth report
LARK ONE BRIDGET FIVE

e. Diverted hurricane search missions will append a plain language explanatory message to the last scheduled position message; for example:

LARK BRAVO DIVERTED NEXT MSG LARK ONE CYCLONE, or
LARK BRAVO DIVERTED NEXT MSG LARK ONE AGATHA

f. Reconnaissance messages from suspicious areas will read:

LARK ONE CYCLONE, etc.

Reconnaissance mission messages into suspicious areas will be numbered consecutively without regard to the tropical cyclone itself; i.e., first reconnaissance of a suspicious area during the season will be LARK ONE CYCLONE etc., with the next suspicious area investigated identified as LARK TWO CYCLONE, etc.

3. Point-to-Point Teletype Communications Capability. USAF teletype facilities provided in support of the hurricane reconnaissance effort will be configured as follows:

a. A leased half-duplex send/receive 100 wpm circuit will be installed with terminations at AFHLO McClellan, HWO-SFO and Alameda Fleet Weather Central. This circuit is designated as the West Coast Hurricane Circuit. AFHLO McClellan is designated as the net control station and maintains circuit discipline. Authorized uses of this circuit are:

(1) Aircraft hurricane traffic received at McClellan via hot line will be relayed to SFO and Alameda over this circuit.

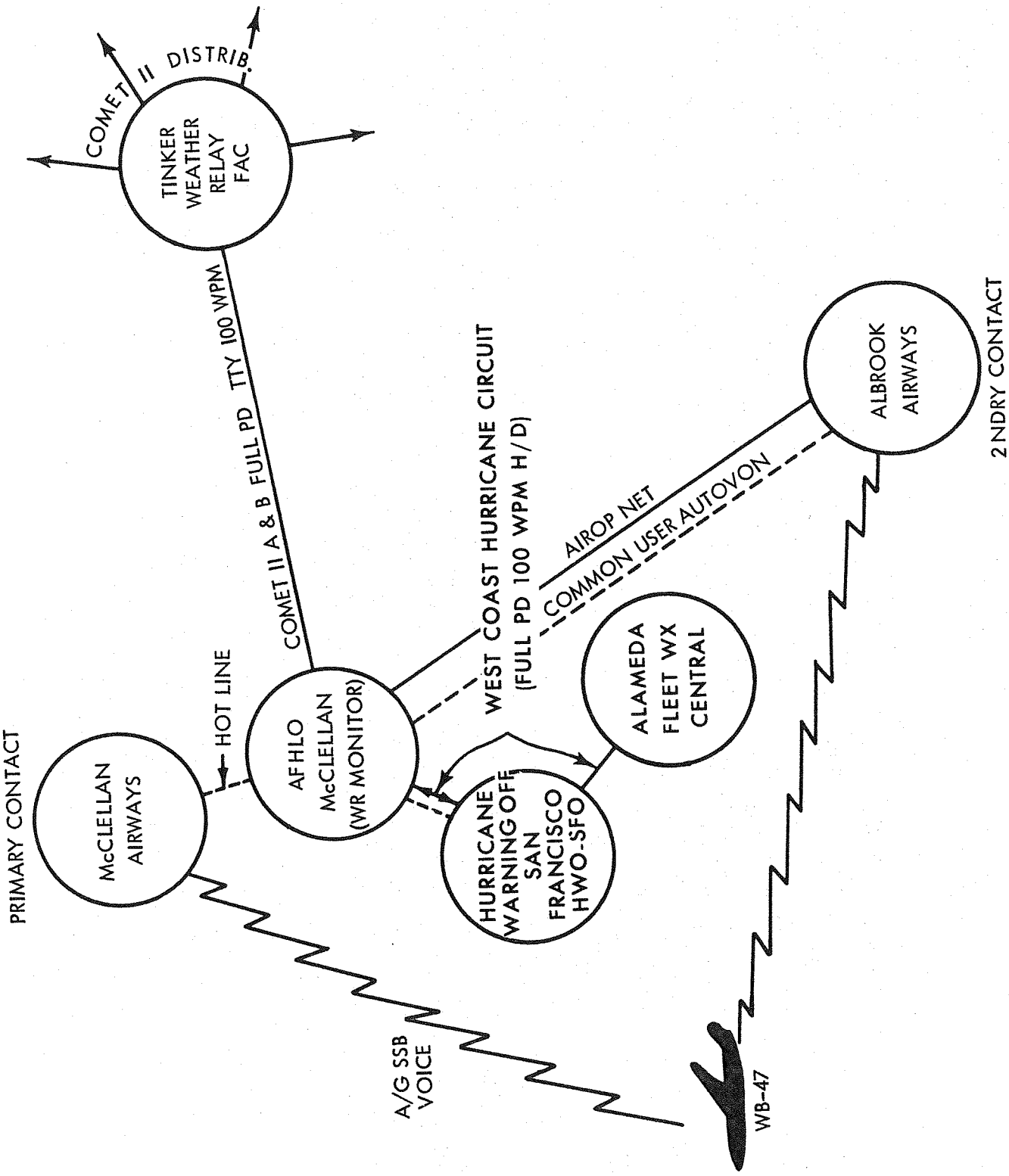
(2) Coordination of requests for reconnaissance and other related matters between TCRC - McClellan, FWC-Alameda and HWO-SFO will be handled over this circuit.

b. A COMET IIA drop is installed at McClellan AFB and will be used to introduce hurricane reconnaissance reports and hurricane advisories into the dedicated military weather communications system for further distribution as required.

4. Miscellaneous Communications Services and Support. Routing communications between weather reconnaissance aircraft and USAF Aeronautical Stations for normal air traffic control services will be handled in accordance with standard procedures.

USAF EAST PACIFIC HURRICANE COMMUNICATION SYSTEM

Attachment 1



ATLANTIC AND EASTERN PACIFIC
JOINT REQUIREMENTS FOR AIRCRAFT RECCO DATA

Data required	Altitudes at which data are required	Areal portion of cyclone in which data are needed	Time or frequency of observation	Accuracy required
Location of eye or center	At 700 mb or any lower level except at or below 1500 feet for tropical cyclones with max winds less than 50 knots.* Flights may be made at 500 mb. in tropical cyclones with winds of 100 knots or higher, if dropsonde capability available.	At center or within radar range	Every 6 hours at 00Z, 06Z, 12Z and 18Z except additional 3-hourly fixes at 03Z, 09Z, 15Z, and 21Z for tropical cyclones within 500 miles or 48 hours of any land areas and not within range of land based radar. Eastern Pacific - Two fixes 6 hrs. apart when tropical cyclone is within 600 miles of U.S. coast otherwise one fix per day.	± 10 mi.
Dimensions and configuration of eye	At 700 mb. or any lower level	"	"	Indeterminate
Central pressure	Surface	At center	"	± 2 mb.
Radius of maximum winds**	Surface or by doppler radar at a level in the middle or lower troposphere from which surface winds can be derived.	Wherever maximum winds are found, but usually within 50 miles of center	"	± 5 mi.
Strength of maximum winds**	"	"	"	± 5 kt.

Atlantic only. Radius of winds of 65 kts, 50 kts, and 30 kts**	"	Throughout storm out to radius of 30 knot winds	"	± 10 mi.
Vertical structure of tropical atmosphere	Flight level to surface	Enroute to cyclone and return	Dropsondes every 400 miles for flights at 700 mb, every 450 miles for 500 mb flights, every 500 miles for 300 mb. flights	± 2 mb. at surface and to 0.5°C and 10 meters at upper levels
Peripheral data for forecasting tropical cyclone movement	500 mb. supplemented with 700 mb. and surface data by dropsonde	As requested in POD, depending upon availability of other data.	Twice per day geared to 00Z and 12Z upper air data when storm is within 500 miles of any land area for which U.S. has forecast responsibilities.	± 5 kt. 0.5°C 10 meters
Temperature gradient across eye	Level of penetration	At center	Whenever center fix is made	0.5°C
Winds, pressure heights and weather in suspicious areas	Daily tracks as per interservice agreements. At 700 mb. or as low as 1500 ft. for investigative flights as required	Variable radius 100-300 mi.	Daily tracks as per interservice agreements. Special investigative flights as required.	± 5 kt. 10 meters
Radar echoes and direction of Cb blowoffs	"	Radar Echoes-Areas outside the principal rain shield. Blowoffs - where encountered.	Irregular	Indeterminate
True temperature	300 mb.	110 degree sector to right of storm heading (right front quadrant)	Either approach or departure from eye center. Observation at 10 mile intervals within 60 miles of the center.	1°C

*Low level reconnaissance to be terminated whenever in the judgment of the aircraft commander the safety of the aircraft and crew would be jeopardized by continuing.

**Navy requirement for these data is at an altitude of 1500 feet or below.

CHAPTER 5

ATLANTIC

JOINT RADAR HURRICANE OBSERVING AND REPORTING PLAN

1. General. Radar observations of hurricanes will be taken and reported at radar stations of the Air Force, Navy and Weather Bureau in accordance with the plan and procedures described in the paragraphs which follow. Radar stations of other cooperators will provide radar observations of hurricanes on a voluntary basis in accordance with arrangements which are in effect between them and the Weather Bureau.

2. Procedures for taking radar observations of hurricanes will be those given in the Weather Radar Manual (WBAN).

3. Participants. Participating radar stations are listed below. If radar observations are needed from participating Air Defense Command (ADC) Radar Squadron and/or Aircraft Control and Warning (AC&W) sites and Federal Aviation Administration ARTCC, the Weather Bureau will furnish the necessary weather radar operators for the purpose of making and transmitting these observations. (See Sections 6 and 7 below.)

When a tropical cyclone situation exists and special radar observations from specific Air Force Eastern Test Range (AFETR) stations are desired, the NHC (through CARCAH) will request such observations from Detachment 11, 6th Weather Wing, Patrick AFB, Florida, via AUTOVON telephone 485-5322.

The AFETR stations normally report routinely three times per day, but will be requested to take hourly or half-hourly observations when needed. These observations will be taken as requested on a non-interference basis with live missile test support. The radar reports will be sent to the Patrick AFB weather station via the down range circuit 1L61 (commercial #1052). The Patrick AFB weather station will immediately transmit these reports to the NHC via circuit 1L20 (Internal WB Rarep and Warning Coordination System - RAWARC #23421). When a hurricane is approaching, each AFETR station is capable of taking radar observations until the surface winds reach a sustained speed of 45 knots.

a. U. S. Weather Bureau

Apalachicola, Fla.	WSR-57	29° 44' N,	84° 59' W
Atlantic City, N. J.	WSR-57	39° 27' N,	74° 34' W
Brownsville, Texas	WSR-57	25° 55' N,	97° 26' W
Charleston, S. C.	WSR-57	32° 54' N,	80° 02' W
Daytona Beach, Fla.	WSR-57	29° 11' N,	81° 03' W
Galveston, Texas	WSR-57	29° 18' N,	94° 48' W
Hatteras, N. C.	WSR-57M	35° 16' N,	75° 33' W
Jackson, Miss.	WSR-57M	32° 20' N,	90° 13' W
Key West	WSR-57	24° 33' N,	81° 45' W
Lake Charles, La.	WSR-57M	30° 07' N,	93° 13' W
Miami, Fla.	WSR-57	25° 43' N,	80° 17' W
New Orleans, La.	WSR-57	29° 57' N,	90° 05' W
New York, N. Y.	WSR-57	40° 46' N,	73° 59' W
San Juan, P. R.	FPS-67*	18° 16' N,	65° 46' W
Tampa, Fla.	WSR-57	27° 58' N,	82° 31' W
Washington, D. C.	WSR-57	38° 51' N,	77° 03' W
Waycross, Georgia#	WSR-57M	31° 15' N,	82° 24' W
Wilmington, N. C.	WSR-57	34° 17' N,	77° 55' W

* FAA-Navy joint-use radar

\# To be commissioned July 1969

b. U. S. Navy

Beaufort MCAS, S. C.	FPS-41	32° 29' N,	80° 44' W
Brunswick NAS, Me. (WB after 7/69)	FPS-41	43° 53' N,	69° 56' W
Corpus Christi NAS, Texas	FPS-81	27° 42' N,	97° 16' W
Cherry Point MCAS, N. C.	FPS-81	34° 54' N,	76° 53' W
Jacksonville NAS, Fla.	FPS-68	30° 14' N,	81° 41' W
Lakehurst NAS, N. J.	FPS-81	40° 02' N,	74° 20' W
New Orleans NAS, La.	FPS-81	29° 50' N,	90° 01' W
Norfolk FWF, Va.	FPS-81	36° 56' N,	76° 18' W
Patuxent NAS, Md.	FPS-41	38° 17' N,	76° 25' W
Pensacola NAS, Fla.	FPS-41	30° 21' N,	87° 19' W
Quonset Point FWF, R. I.	FPS-41	41° 35' N,	71° 25' W

c. Air Weather Service

Andrews AFB, Md.	FPS-77	38° 49' N,	76° 51' W
Barksdale AFB, La.	*CPS-9	32° 30' N,	93° 41' W
Cape Kennedy AFS, Fla.	FPS-77	28° 28' N,	80° 33' W
Eglin AFB, Fla.	CPS-9	30° 29' N,	86° 31' W
Homestead AFB, Fla.	FPS-77	25° 25' N,	80° 24' W
Keesler AFB, Miss.	*CPS-9	30° 24' N,	88° 55' W
Kindley AFB, Bermuda	CPS-9	32° 22' N,	64° 41' W
MacDill AFB, Fla.	CPS-9	27° 51' N,	82° 30' W
Maxwell AFB, Ala.	CPS-9	32° 23' N,	86° 21' W
McGuire AFB, N. J.	*CPS-9	40° 01' N,	74° 35' W
Patrick AFB, Fla.	CPS-9	28° 14' N,	80° 36' W
Pope AFB, N. C.	CPS-9	35° 11' N,	79° 01' W
Otis AFB, Mass.	FPS-77	41° 39' N,	70° 31' W
Ramey AFB, P. R.	FPS-77	18° 30' N,	67° 08' W
Randolph AFB, Texas	FPS-77	28° 32' N,	98° 17' W
Robins AFB, Ga.	* CPS-9	32° 38' N,	83° 36' W
Seymour - Johnson AFB, N. C.	FPS-77	35° 20' N,	77° 58' W

Westover AFB, Mass.	FPS-77	42° 12' N,	83° 36' W
*FPS-77 programmed			
d. Cooperating Sites			
Bay St. Louis, Miss (NASA)	CPS-9	30° 42' N	89° 07' W
Cambridge, Massachusetts (Massachusetts Institute of Technology)	CPS-9 and M-33	42° 42' N,	71° 06' W
College Station, Texas (Agricultural & Mechanical College of Texas)	CPS-9	30° 37' N,	96° 21' W
Coral Gables, Florida (University of Miami)	SP-1M and CPS-6B	25° 43' N,	80° 17' W
Sudbury, Massachusetts (Air Force Cambridge Research Laboratory)	CPS-9 and FPS-68	42° 25' N,	71° 29' W
Victoria, Texas (Copano Research Foundation)	APS-20B	28° 47' N,	97° 05' W
#Wallops Station, Virginia	MPS-19	37° 50' N,	75° 29' W
(National Aeronautics & Space Administration)	SPS-12	37° 56' N,	75° 28' W
	FPS-16	37° 50' N,	75° 29' W
e. ADC Sites	FPQ-6	37° 52' N,	75° 31' W
(1) 31 Air Division			
741 AC&W Sq, Lackland AFB, Texas		29° 24' N,	98° 38' W
*747 AC&W Sq, Ellington AFB, Texas		29° 37' N,	95° 10' W
(2) 32 Air Division			
*645 Radar Sq, Patrick AFB, Fla.		28° 13' N,	80° 36' W
657 Radar Sq, Houma AFS, La.		29° 34' N,	90° 41' W
*660 Radar Sq, MacDill AFB, Fla.		27° 50' N,	82° 28' W
*678 Radar Sq, Tyndall AFB, Fla.		30° 05' N,	85° 37' W
*679 Radar Sq, Jacksonville AFS, Fla.		30° 13' N,	81° 41' W
691 Radar Sq, Cross City AFS, Fla.		29° 38' N,	83° 06' W
693 Radar Sq, Dauphin Island AFS, Ala.		30° 15' N,	88° 05' W
702 Radar Sq, Hunter AFB, Ga.		32° 01' N,	81° 10' W
861 Radar Sq, Aiken AFS, S. C.		33° 39' N,	81° 41' W
(3) 33 Air Division			
632 Radar Sq, Roanoke Rapids AFS, N.C.		36° 27' N,	77° 44' W
701 Radar Sq, Ft Fischer AFS, N. C.		33° 59' N,	77° 55' W
770 Radar Sq, Ft George G. Meade RSI, Md.		39° 07' N,	76° 44' W
*771 Radar Sq, Cape Charles AFS, Va.		37° 08' N,	75° 57' W
*792 Radar Sq, N. Charleston AFS, S. C.		32° 54' N,	80° 01' W
(4) 35 Air Division			
*648 Radar Sq, Benton AFS, Pa.		41° 21' N,	76° 18' W
*656 Radar Sq, Saratoga Springs AFS, N.Y.		43° 01' N,	73° 41' W
*680 Radar Sq, Palermo, AFS, N. J.		39° 13' N,	74° 41' W
762 Radar Sq, N. Truro AFS, Mass.		42° 02' N,	70° 03' W

*Remoted in FAA ARTC Center: See Paragraph 7.
#Radar used depends upon the location of the hurricane and the one in use will be properly identified.

(5) 36 Air Division

*907 Radar Sq, Buck's Harbor AFS, Maine	44° 38' N,	67° 24' W

f. Air Force Eastern Test Range Stations

Cape Kennedy, Fla.	Mod II SCR 584 S Band	28° 30' N,	80° 35' W
Grand Turk	Mod II SCR 584 S Band	21° 30' N,	71° 09' W

4. Procedures to be Used When Radar Units are Co-located (Within 25 Miles).

a. When WB, AWS, NWS or ADC Radar Squadron and AC&W radar stations are co-located (within 25 miles) the WB WSR-57 radars will be the primary source of reports of storm and storm eye characteristics. AWS, NWS, or ADC radar units will provide backup service in case the WSR-57 radar fails.

b. When radar units (less powerful than the WSR-57) are co-located with an ADC radar unit or other more powerful unit, the ADC unit will be the primary source of reports of storm and storm eye characteristics providing it is manned by a competent weather radar operator. The less powerful units will provide backup or coordination service.

c. Normally only the hurricane radar reports from the primary source as defined above will be transmitted. However, when significant phenomena are detected by any of the other co-located radars but not by the primary source, such phenomena should be reported.

d. Consultation between all radar sites will be by telephone.

5. Communications. Hurricane observations must be transmitted in a manner to assure receipt at the NHC with the least possible delay. In essence, communications procedures are directed towards getting hurricane radar data onto RAWARC circuit 23421 or T/T circuit 7072 with a minimum number of relays, as quickly as possible. Air Force and Navy stations not having transmission capability on circuits 23421 or 7072 may use COMET II as an alternate means. When commercial telephone is used to pass hurricane observations to a Weather Bureau office, the Weather Bureau will accept "reverse charges" calls for this purpose. The following procedures will be used in communicating hurricane radar observations:

a. From ADC Sites:

(1) Commercial telephone to the nearest WB office for entry on weather teletypewriter circuits, or

(2) Hot line to the supporting base weather station for entry on weather teletypewriter circuits.

b. From AWS Weather Stations: Radar Reports (RAREPS) and other hurricane observation information received or observed will be transmitted every half hour at H+15 and H+45 on RAWARC circuits 23420 or 23421 if they have send-receive capability on either of these circuits. If not, hurricane observation information from those stations listed in para. 3(c) above will be transmitted via COMET II as an alternate.

c. From Weather Bureau Offices: RAREPS and other hurricane observation information received or observed will be transmitted over either RAWARC circuit 23420 or 23421 every half hour at H+15 and H+45.

d. From NWS Weather Stations:

(1) NWS stations having send-receive drops on either RAWARC circuits 23420, 23421 or T/T circuit 7072 shall transmit reports on one of these circuits every half hour at H+15 and H+45. If not, those stations having transmit capability on COMET II will transmit hurricane observations by that circuit as an alternate means.

e. From Federal Aviation Administration ARTC Centers: Hurricane information will be telephoned to the nearest Weather Bureau station having a drop on either teletypewriter circuits 23420, 23421 or 7072.

6. Procedures for Detailing Weather Bureau Weather Radar Operators to ADC Sites to Make Hurricane Radar Observations.

a. The Director of the WB has been authorized to send WB radar meteorologists to ADC radar sites on the Atlantic and Gulf Coasts during periods when hurricanes threaten these regions for the purpose of making and reporting hurricane radar observations. In order to expedite the granting of access to a site and to maintain proper security measures, the following procedures will be used:

(1) The WB must notify the appropriate coordinator by wire or telephone of the intent to visit a site. Notification will normally be done by the responsible regional headquarters, but in case this function can not be so handled, the Emergency Warning Section, Silver Spring, Md. will make the necessary arrangements. The coordinator will notify the site commander(s) concerned of the impending visit. This notification will include name, security clearance, and date(s) of the visit.

(2) Staff weather offices at the Air Defense Command Air Divisions indicated in paragraph 3e will act as coordinators for these visits. Addresses and commercial telephone numbers for these staff weather officers are:

(a) 31 AD - Commander, Det 6, 29 Wea Sq, Oklahoma City AFS, Oklahoma. Telephone area code 405, 737-1481 Ext. 721.

(b) 32 AD - Commander, Det 23, 12 Wea Sq, Gunter AFB, Alabama. Telephone area code 205, 272-7490 Ext. 7765.

(c) 33 AD - Commander, Det 41, 12 Wea Sq, Ft. Lee AFS, Virginia. Telephone area code 703, 731-2893 Ext. 765.

(d) 35 AD - Commander, Det 27, 12 Wea Sq, Hancock Field, Syracuse, N. Y. Telephone area code 315, 458-5500 Ext. 765.

(e) 36 AD - Commander, Det 42, 12 Wea Sq, Topsham AFS, Maine. Telephone Area Code 207, 729-3381 Ext. 765.

b. The WB personnel are authorized to use government quarters and messing facilities. They are authorized to visit site operations to view and transmit radar weather observations from the PPI and RHI scopes. Normal commercial telephone facilities will be used to transmit hurricane information to the nearest WB location.

c. Due to the limited facilities at some sites, the WB agrees that not more than two persons will visit a site at any given time. Each visit will normally be short, one or two days, but will depend upon the progress of the hurricane under observation.

d. The persmission to visit and security status of the WB personnel listed in paragraph 6e below must be on file at the ADC radar sites listed in paragraph 3e above. It will be the responsibility of the Emergency Warning Section, WXAP,WBH,Silver Spring, Md. to coordinate additions, changes, and/or deletions in this list with Headquarters ADC at least two weeks in advance of the effective date of the change. The coordinating correspondence from the WBH to ADC should refer to this document and paragraph and will include the security clearance, effective date, and authority for the clearance. Correspondence should be addressed as follows:

Hq ADC (ADOWX)
Ent AFB, Colorado 80912

After authorization, Hq ADC (ADOWX) will notify the Air Division Staff Weather officers and ADC radar sites of additions (or deletions) from the list of authorized WB personnel.

e. The following ESSA/Weather Bureau personnel have the indicated security clearances and are authorized by ADC USAF to visit ADC radar sites listed in Section 3e. above, when paragraphs 6a(1) and (2) above have been complied with. Positive identification must be presented to the ADC radar site entry post before entry to the site will be granted. The purpose of these visits is the making and transmitting radar hurricane observations. These personnel have also been authorized by the FAA to visit the ARTC centers listed in Section 7 for the same purpose:

CHAPTER 5

NAME	SECURITY CLEARANCE	AUTHORITY			
Baskerville, Robert W., Jr.	Secret	Investigation by		OIS*	4-11-69
Benton, Davis	"	"	"	"	8-04-60
Bigler, Stuart G.	"	"	"	CSC*	11-24-59
Black, Dale A.	"	"	"	"	7-05-56
Bowser, Carl O., Jr.	"	"	"	OIS	4-14-69
Capo-Dominguez, Rafhel A.	"	"	"	CSC	3-14-67
Carlson, Arthur C.	"	"	"	"	9-06-66
Clay, Dale A.	"	"	"	"	5-15-63
Dooley, J. T.	"	"	"	"	5-03-57
Drybala, Francis J.	"	"	"	"	4-05-68
Fisher, Robert E.	"	"	"	"	1-07-66
Flanders, Allen F.	"	"	"	"	8-09-57
Foster, Harrie E., Jr.	"	"	"	OIS	10-26-56
Fuertsch, Francis E.	"	"	"	CSC	12-10-68
Hagood, Leroy B.	"	"	"	"	6-29-60
Hamilton, Robert E.	"	"	"	"	1-05-66
Harris, Gordon W.	"	"	"	OIS	1-16-63
Hexter, Paul L., Jr.	"	"	"	CSC	4-11-58
Hull, Albert J.	"	"	"	"	3-02-56
Hurlbut, Sam R.	"	"	"	"	6-29-62
Johnson, Clyde C.	"	"	"	"	8-02-60
Keener, Robert W.	"	"	"	"	4-11-68
Lee, John P.	"	"	"	OIS	3-01-63
Logan, Wendell B.	"	"	"	"	12-19-68
Marier, Donald W.	"	"	"	CSC	11-05-62
Monroe, Harold J., Jr.	"	"	"	"	6-12-61
Oldmixon, Donald H.	"	"	"	"	7-07-59
Parrish, Samuel K.	"	"	"	"	10-27-60
Pentecost, Joseph B.	"	"	"	"	6-05-59
Phipps, Carl L.	"	"	"	"	9-16-57
Prosser, Arthur E., Jr.	"	"	"	"	4-10-68
Pruett, Jeter A.	"	"	"	"	9-24-64
Robinson, John M.	"	"	"	"	4-10-68
Sadowski, Alexander F.	"	"	"	"	7-24-59
Samet, Alvin M.	"	"	"	"	4-09-68
Sarnowski, Edward	"	"	"	"	8-24-65
Schonberger, Abram	"	"	"	OIS	11-15-60
Schulz, Walter A., Jr.	"	"	"	CSC	7-05-66
Sheffield, Richard K.	"	"	"	"	12-20-55
Smith, Robert L.	"	"	"	OIS	4-15-54
Teague, Jack L.	"	"	"	CSC	5-05-65
Thomas, Billy D.	"	"	"	"	7-29-60
Warden, John D.	"	"	"	"	5-24-60
Wells, Fred E.	"	"	"	"	10-16-59
Williams, Milton L.	"	"	"	"	7-18-60
Wilk, Kenneth E.	"	"	"	"	12-06-62
Whitehead, Robert E.	"	"	"	OIS	7-21-60

* OIS - Office of Investigation and Security
  CSC - Civil Service Commission

NOTE: Additional names may be added to this list following coordination and approval by Headquarters ADC, Ent AFB, Colorado and the FAA regional offices concerned.

7. Procedures for Detailing Weather Bureau Radar Meteorologists to Federal Aviation Administration ARTC Centers to Make Hurricane Radar Observations.

a. Since radar data from some of the ADC radar sites are now remoted to FAA ARTC Centers, the Weather Bureau has been authorized by the Federal Aviation Administration to send WB and/or ESSA radar meteorologist to these centers during hurricanes for the purpose of making, recording and transmitting hurricane radar observations. It should be noted that the FAA have their own radars remoted into these centers, but they will not be listed in this Chapter. Regional Headquarters are to keep themselves advised where these radars are located and be prepared to detail personnel to the centers if conditions warrant. In order to expedite the granting of access to a site and to maintain proper security measures, the following procedures will be used:

(1) The Chief of the Air Traffic Control Center concerned will act as a coordinator for these visits.

(2) When a detail is planned, the Weather Bureau will notify the center chief(s) by telephone of the impending visit. Normally the responsible regional headquarters will notify the center chief, but if necessary it can be done by the Emergency Warning Section, Silver Spring, Maryland. This notification will include names and security clearance of the personnel being detailed, along with the date(s) of the visit.

b. Due to the limited facilities at these sites, the Weather Bureau agrees that no more than two persons will visit a center at any given time. Each visit will normally be short, one to two days, but will depend upon the progress of the hurricane under observation.

c. Only Weather Bureau and/or ESSA personnel listed in Paragraph 6(e) are authorized to visit these sites. The permission to visit and security status of the personnel listed in Paragraph 6(e) will be on file at the ARTC centers listed in Paragraph 7(d). Should there be a need for other cleared Weather Bureau and/or ESSA personnel to be added to the list, it will be the responsibility of the Weather Bureau regional headquarters to coordinate names of new radar meteorologists with the ARTC center chiefs at least two weeks in advance of the anticipated utilization of such personnel. A copy of these additions (or deletions) will also be sent to the FAA regional offices.

d. Participating ARTC centers are listed below:

Center	Source of Radar Data
New York (Islip, N. Y.)	648 Radar Sq. Benton AFS, Pa. 680 Radar Sq. Palermo AFS, N.J.
Boston, Mass.	656 Radar Sq. Saratoga Springs AFS, N. Y. 907 Radar Sq. Buck's Harbor AFS, Me.
Washington, D.C. (Leesburg, Va.)	771 Radar Sq. Cape Charles AFS, Va.

Center (continued)	Source of Radar Data (continued)
Jacksonville, Fla.	678 Radar Sq. Tyndall AFB, Fla. 679 Radar Sq. Jacksonville AFS, Fla. 792 Radar Sq. North Charleston AFS, S. C.
Miami, Fla.	645 Radar Sq. Patrick AFB, Fla. 660 Radar Sq. MacDill AFB, Fla.
Houston, Texas	747 AC&W Sq. Ellington AFB, Texas

EASTERN PACIFIC
JOINT RADAR HURRICANE OBSERVING AND REPORTING PLAN

1. General. Radar observations of hurricanes will be taken and reported in accordance with the plan and procedures described in the Weather Radar Manual (WBAN).

2. Participants. Normally, the FAA radar stations at Mt. Laguna , Paso Robles and San Pedro, California which are remoted into the Los Angeles ARTCC will be the only source of radar information for the lower part of California The Weather Bureau has a limited staff of radar meteorologists presently located at this center. However, if a hurricane is threatening this area continuous surveillance will be maintained.

3. Communications. Los Angeles ARTCC radar overlays are transmitted bi-hourly when Weather Bureau personnel are on duty via facsimile to WBFO, Los Angeles. Radar reports are sent by RAWARC in SD-1 format to the Radar Analysis and Development Unit (RADU) Kansas City, where they are entered on Service A circuits 30 through 35. Special radar overlays are prepared hourly, when requested, and transmitted to the LAX WBFO via the radar facsimile circuit. San Francisco WBFO must rely on RAWARC or special telephone calls.

CHAPTER 5

CENTRAL NORTH PACIFIC
JOINT TROPICAL CYCLONE RADAR OBSERVING AND REPORTING PLAN

1. There is currently no weather-dedicated radar within the HWO-HNL area of responsibility. The Hawaiian Air Defense Division has agreed to have the following radar units participate in supplying radar data:

326 Air Division:

150 AC&W Squadron, Kokee, Hawaii	22° 09' N	159° 39' W
169 AC&W Squadron, Mt. Kaala, Hawaii	21° 31' N	158° 09' W

2. These units will provide RAREPS once each hour whenever weather echoes appear on their radar and each half hour whenever eye or center positions are observed in the area of surveillance.

3. Radar reports will be provided to CENPAC-FC, Hickam AFB by telephone. CENPAC-FC will code reports in accordance with Weather Radar Manual (WBANWR) using Honolulu VOR-TAC, coordinates 21° 20' N 158° 02' W as a reference point. Reports will be transmitted via teletype to ESSA WB, Honolulu and FLEWEACEN Pearl Harbor.

4. During a critical situation, Weather Bureau radar meteorologists with SECRET clearance will be detailed to the ADC radar sites to take the radar observations.

COLLECTION AND DISTRIBUTION OF TROPICAL CYCLONE REPORTS

ATLANTIC

1. Transmission of Reports to the National Hurricane Center. All reports and information regarding tropical cyclones received by the Weather Bureau, Air Force, Navy or Federal Aviation Administration will be transmitted immediately to the National Hurricane Center at Miami. When reports and information of operational significance are available from research aircraft, they will be transmitted immediately to the National Hurricane Center at Miami in the same manner as meteorological reports from hurricane reconnaissance aircraft.

The address group HGXP, assigned to the National Hurricane Center (Miami) will be utilized as an action addressee following the date-time group. The Washington Alternate Hurricane Center (HECU) and Fleet Weather Central, Suitland, Maryland (YGLP) will also be included in the distribution if transfer of responsibility to the Alternate Center appears imminent. When FAA is unable to effect delivery of messages to HGXP, they will immediately transmit them to HECU.

When, in emergencies, responsibility has been transferred from the National Hurricane Center at Miami to the Alternate Hurricane Center at Washington, the addressee Indicating Group HECU will be used in place of HGXP. (See Chapter 8.)

The respective services will assign an appropriate high precedence to messages to the National Hurricane Center or reports containing initial indication of the genesis or existence of a tropical cyclone.

2. Transmissions on Weather Bureau Hurricane Circuit. The Weather Bureau Circuit (23421) will be in operation during the hurricane season and drops will be installed in Air Force and Navy offices as required. Relays from 7072 to 23421 will be handled on a semi-automatic basis at Suitland WBC. Manual backup relay capability will be retained at Miami NHC. In addition, such local circuits will be installed as necessary to provide channels for local coordination in Miami.

3. Transmissions on Service "O". Reconnaissance reports and advisories will be afforded priority handling on the Service "O" system.

4. Transmissions from Air Force Ground Stations. Hurricane reconnaissance messages will be handled in accordance with USAF Hurricane Communications Support Plan. (See Appendix A, Chapter 4.)

CHAPTER 7

DESIGNATION OF TROPICAL DEPRESSIONS

Numbering of Tropical Depressions

1. Atlantic.

a. Tropical depressions will be numbered (lettered) as soon as their identity can be established the first one of the year to be numbered "one." The number (letter) thus assigned to a tropical depression would be used for the depression for reference on warnings by the military.

b. The NHC assign numbers to tropical depressions.

2. Pacific. Each tropical depression will be assigned a number that will be retained throughout the life cycle of the cyclone.

a. For the area east of 140° west, a list of tropical depression numbers will be maintained by the FWC Alameda, Calif. Numbering will start at the beginning of each calendar year.

b. For the area west of 140° west, a list of tropical depression numbers from 01 through 99 will be maintained by the Joint Typhoon Warning Center (JTWC), Guam. Renumbering will be at the end of sequence, or, in all cases, at the beginning of each calendar year.

c. When a tropical depression generates in the Pacific the HWO-SFO and the HWO-HNL will respectively request a number from the FWC Alameda or JTWC, Guam. When forecast responsibility is passed from one warning office to another, the number assigned will be retained.

TROPICAL CYCLONE NAMES*

Atlantic - Eastern Pacific

1. A separate set of names will be used each year, beginning with the first name in the set. After four years, when the four sets will have been used, the sets would be used over again in the same manner.

2. If a major hurricane seriously affects the United States, the name assigned to it will be "retired" for 10 years and another name substituted in the list. (This will facilitate identification in historical references, legal actions, insurance claim activities, etc. and avoid public confusion which might result from associating a disastrous hurricane which has occurred in the recent past with another of the same name which may be threatening a coastal area.)

3. The list of names in Appendix A of this Chapter will be used for identifying tropical cyclones in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico. The list of names in Appendix B of this Chapter will be used for identifying tropical cyclones in the Eastern Pacific east of 140°W. The list consists of four sets of names in alphabetical order. Names beginning with the letters Q, U, X, Y, and Z are not included because of the scarcity of suitable names beginning with these letters.

Pacific

4. When a tropical depression intensifies into a tropical storm or hurricane between 140°W and the 180th meridian, the HWO-HNL will request a name (See Appendix C) from JTWC, Guam. The depression number will be discontinued and replaced by the appropriate name.

5. For tropical cyclones originating east of 140°W, names will be assigned by the MIC, HWO-SFO. Tropical cyclones that cross 140° west from either west or east will retain their original assigned name.

*There will be no duplication of names in the three lists.

CHAPTER 7
Appendix A

LIST OF ATLANTIC TROPICAL CYCLONE NAMES

1969	1970	1971	1972
Anna	Alma	Arlene	Abby
Blanche	Becky	Beth	Brenda
Camille	Celia	Chloe	Candy
Debbie	Dorothy	Doria	Dolly
Eve	Ella	Edith	Evelyn
Francelia	Felice	Fern	Frances
Gerda	Greta	Ginger	Gladys
Holly	Hallie	Heidi	Hannah
Inga	Isabel	Irene	Ingrid
Jenny	Judith	Janice	Janet
Kara	Kendra	Kristy	Katy
Laurie	Lois	Laura	Lila
Martha	Marsha	Margo	Molly
Netty	Noreen	Nona	Nita
Orva	Orpha	Orchid	Odette
Peggy	Patty	Portia	Paula
Rhoda	Rena	Rachel	Roxie
Sadie	Sherry	Sandra	Stella
Tanya	Thora	Terese	Trudy
Virgy	Vicky	Verna	Vesta
Wenda	Wilna	Wallis	Wesley

LIST OF EASTERN PACIFIC TROPICAL CYCLONE NAMES

1969	1970	1971	1972
Ava	Adele	Agatha	Annette
Bernice	Blanca	Bridget	Bonny
Claudia	Connie	Carlotta	Celeste
Doreen	Dolores	Denise	Diana
Emily	Eileen	Eleanor	Estelle
Florence	Francesca	Francene	Fernanda
Glenda	Gretchen	Georgette	Gwen
Heather	Helga	Hilary	Hyacinth
Irah	Ione	Ilsa	Iva
Jennifer	Joyce	Jewel	Joanne
Katherine	Kristen	Katrina	Kathleen
Lillian	Lorraine	Lily	Liza
Mona	Maggie	Monica	Madeline
Natalie	Norma	Nanette	Naomi
Odessa	Orlene	Olivia	Orla
Prudence	Patricia	Priscilla	Pauline
Roslyn	Rosalie	Ramona	Rebecca
Sylvia	Selma	Sharon	Simone
Tillie	Toni	Terry	Tara
Victoria	Vivian	Veronica	Valerie
Wallie	Winona	Winifred	Willa

CHAPTER 7
Appendix C

LIST OF CENTRAL NORTH PACIFIC TROPICAL CYCLONE NAMES

List will be repeated (ALICE) when last name in Column 4 (WINNIE) has been used.

Column 1	Column 2	Column 3	Column 4
Alice	Anita	Amy	Agnes
Betty	Billie	Babe	Bess
Cora	Clara	Carla	Carmen
Doris	Dot	Dinah	Della
Elsie	Ellen	Emma	Elaine
Flossie	Fran	Freda	Faye
Grace	Georgia	Gilda	Gloria
Helen	Hope	Harriet	Hester
Ida	Iris	Ivy	Irma
June	Joan	Jean	Judy
Kathy	Kate	Kim	Kit
Lorna	Louise	Lucy	Lola
Marie	Marge	Mary	Mamie
Nancy	Nora	Nadine	Nina
Olga	Opal	Olive	Ora
Pamela	Patsy	Polly	Phyllis
Ruby	Ruth	Rose	Rita
Sally	Sarah	Shirley	Susan
Therese	Thelma	Trix	Tess
Violet	Vera	Virginia	Viola
Wilda	Wanda	Wendy	Winnie

ALTERNATE HURRICANE WARNING OFFICES
ATLANTIC-TRANSFER CONTROL MASTER PLAN
WEATHER BUREAU TRANSFER PLAN

1. If it appears probable that NHC may be disabled, the duty forecaster will notify the Chief, Aerial Reconnaissance Coordination, Atlantic Hurricanes (CARCAH); Fleet Weather Facility, Jacksonville (FWF); and appropriate Weather Bureau offices. The alternate for NHC will be the Hurricane Warning Office (Washington) Suitland, Md. In the absence of any earlier alert, hoisting of hurricane warnings for the Miami area will be considered standby notification of a possible later requirement for transfer of responsibility. At the time of hoisting of warnings or other alert to a possible transfer, pertinent information necessary for an effective transfer will be exchanged. In order to provide "hard copy," telephone or radio messages will be supplemented by teletype when possible.

2. If incapacitation of NHC appears imminent, NHC will maintain constant contact with HWO, Washington and FWF via teletype, hot line telephone, or radio. Transfer may be accomplished at the discretion of the Director, NHC, or may be delayed until contact between HWO, Washington and NHC is lost. If such contact is lost, HWO, Washington will automatically assume responsibility for NHC. Contact will be assumed lost if attempts at communication have failed for a period of fifteen (15) minutes.

3. Immediately upon assuming forecast responsibility for NHC, HWO-Washington will notify Alternate CARCAH and FWF Jacksonville. It is expected that Altnernate CARCAH will report to HWO-Washington. Communication with FWF Jacksonville will be via telephone and via teletype circuits. (7072 with relay to 23421).

4. If NHC becomes incapacitated without prior notification to HWO-Washington the procedures of paragraphs 2 and 3 above will apply.

5. After communications to NHC have been restored or the threat to effectiveness has passed, NHC will notify CARCAH, HWO-Washington, and FWF and duty responsibilities will be restored.

6. Geographical areas of responsibility of Weather Bureau Hurricane Warning Offices are delineated in attachment (1), along with assignment of alternate responsibilities in case of disability of a center.

7. Essentially the same transfer procedures will apply when loss of communications is possible or imminent at other hurricane warning offices. Transfer will be to the alternate hurricane office listed in the last paragraph Attachment (1).

8. At the discretion of the Director, NHC , a combined Air Force - Weather Bureau drill in the above procedures will be held during the early part of June. Explicit instructions will be distributed in advance to all concerned in case a drill is planned.

CHAPTER 8

ATTACHMENT 1 -- WEATHER BUREAU TRANSFER PLAN

Geographical Areas of Responsibility of Hurricane Warning Offices. Areas of responsibility for tropical cyclone forecasting and warning are assigned to warning offices as follows:

Caribbean, Gulf and Atlantic:

San Juan	:	Caribbean Sea, Islands and ocean areas south of 20°N and 75°W to 55° W (warning responsibility only);
New Orleans	:	Gulf of Mexico and its coasts west of 85°W (warning responsibility only);
Washington	:	Coastal and ocean areas from 35°N to 41°N and eastward to 65°W (warning responsibility only);
Boston	:	Coastal and ocean areas north of 41°N and west of 65°W (warning responsibility only);
Miami	:	Forecast responsibility for all coastal and ocean areas west of 30 °W. Warning responsibility for all areas in the Gulf and Caribbean Sea not assigned to New Orleans or San Juan, and those areas in the Atlantic Ocean west of 30 °W not assigned to Boston or Washington.

Alternate Responsibilities in Event of Disability of a Center Due to Communications Failure or Other Cause are assigned as follows:

Warning Center With Primary Responsibility	First Alternate	Second Alternate
NHC, Miami	HWO, Washington	HWO, New Orleans
HWO, New Orleans	NHC, Miami	HWO, Washington
HWO, San Juan	NHC, Miami	HWO, Washington
HWO, Washington	NHC, Miami	HWO, Boston
HWO, Boston	HWO, Washington	NHC, Miami

CHIEF, AERIAL RECONNAISSANCE COORDINATION, ATLANTIC HURRICANES-TRANSFER PLAN

Transfer of responsibility for coordination of the Reconnaissance Plan of the Day, and the dissemination of the Military Hurricane Warning Advisory from the CARCAH O/L8, Hq. AWS, Coral Gables, Fla. to the ALTERNATE CARCAH (Det. 44, 7th Weather Wing, Suitland).

1. Procedures.

a. Whenever "hurricane warnings" are hoisted for the Greater Miami area and the National Hurricane Center is thereby threatened with becomming inoperative, due to inclement weather, and/or loss of communications, the CARCAH will advise the ALTERNATE CARCAH, and the Fleet Weather Facility, Jacksonville, Florida, of the following:

(1) Current and planned reconnaissance missions of USAF, USN, and ESSA/RFF aircraft.

(2) Capability and location of USAF, USN, and ESSA/RFF aircraft.

(3) Status of coordination of reconnaissance aircraft into or thru the Air Force Missle Test Range warning areas.

(4) The latest Military Hurricane Warning Advisory.

(5) Status of the requirements for any special surface and radar weather observations.

(6) Notification to maintain continuous contact between CARCAH and ALTERNATE CARCAH on the USAF hurricane teletype circuit (GT 22117/JQGCU 304), or any other communication facilities available.

b. In the event it later becomes necessary to effect actual transfer the NHC will advise the CARCAH of the planned transfer time. The CARCAH will immediately notify the ALTERNATE CARCAH, and FWF JAX, of any later developments since the initial alert, and the following additional information:

(1) Specific time of transfer of responsibility.

(2) Latest position of any storms.

(3) Last numbered Military Advisory and time issued.

(4) The current Reconnaissance Plan of the Day.

c. In the event that communications are unexpectedly disrupted between the initial alert and the orderly transfer as outlined, the ALTERNATE CARCAH after unsuccessful contact with the CARCAH for any fifteen (15) minute period will coordinate with the alternate NHC sub-center (HWO-Washington) and automatically assume CARCAH responsibility. Under these conditions, however, the primary responsibility for notification of transfer to the ALTERNATE CARCAH rests with the Alternate NHC sub-center (HWO-Washington).

2. CARCAH Reassumption of Responsibility. NHC will advise CARCAH when they are again operational, and if all required communications are restored, CARCAH will resume normal responsbility in the same manner as they were relinquished, and at the same time that NHC Miami resumes normal operation. CARCAH will notify alternate CARCAH.

3. Transfer Drill. At the discretion of the Director, NHC a complete transfer of CARCAH responsibility drill will be conducted in conjunction with any NHC transfer drill early in June. During this drill the ALTERNATE CARCAH will coordinate a Reconnaissance Plan of the Day with the USAF, USN, and ESSA RFF, and disseminate a Military Hurricane Warning Advisory to the USAF and the FWF Jacksonville. If feasible, this drill will also include a flight by USAF aircraft to test alternate routing of weather reconnaissance observations. Detailed instructions for this transfer drill will be disseminated to all concerned sufficiently in advance of the drill.

U. S. NAVY TRANSFER PLAN

1. In the event of impending or actual operational failure of the FLEWEAFAC Jacksonville, its responsibilities will be transferred to the FLEWEAFAC Suitland in accordance with current directives. When FLEWEAFAC Jacksonville can resume its responsibilities, FLEWEAFAC Suitland will be notified. Procedures for transfer of responsibilities will be as follows:

a. FLEWEAFAC Jacksonville shall request the Commanding Officer, FLEWEAFAC Suitland by appropriate available communications channels to assume the responsibilities at a specified time if foreseeable.

b. Notify Chief of Naval Operations (CNO), Commander in Chief Atlantic Fleet (CINCLANTFLT), Commanding Officer (CO) WEARECONRON FOUR, Officer in Charge (OIC) QUONSET PT., Commander Naval Weather Service (COMNAVWEASERV), FWC, Norfolk, NHC, MIAMI, CARCAH MIAMI and FWC ROTA that control will be shifted as above.

c. In the event of an operational failure occurring prior to the above action being taken, it is requested that the FLEWEAFAC Suitland assume the responsibilities as soon as cognizant of the failure.

d. Time permitting, FWF Suitland will be advised by classified message of the status and location of all WEARECONRON FOUR aircraft, and briefed by telephone of any special forecasting responsibilities of which FWF Suitland would not be cognizant.

e. When possible, actions of a. and b. shall be carried out by one message. Format of the request for transfer follows:

FM FLEWEAFAC JACKSONVILLE
TO FLEWEAFAC SUITLAND
WEARECONRON FOUR
INFO CNO
CINCLANTFLT
COMNAVWEASERV
NHC MIAMI
CARCAH MIAMI
FWC NORFOLK
FLEWEAFAC QUONSET PT.
FLEWEACEN ROTA

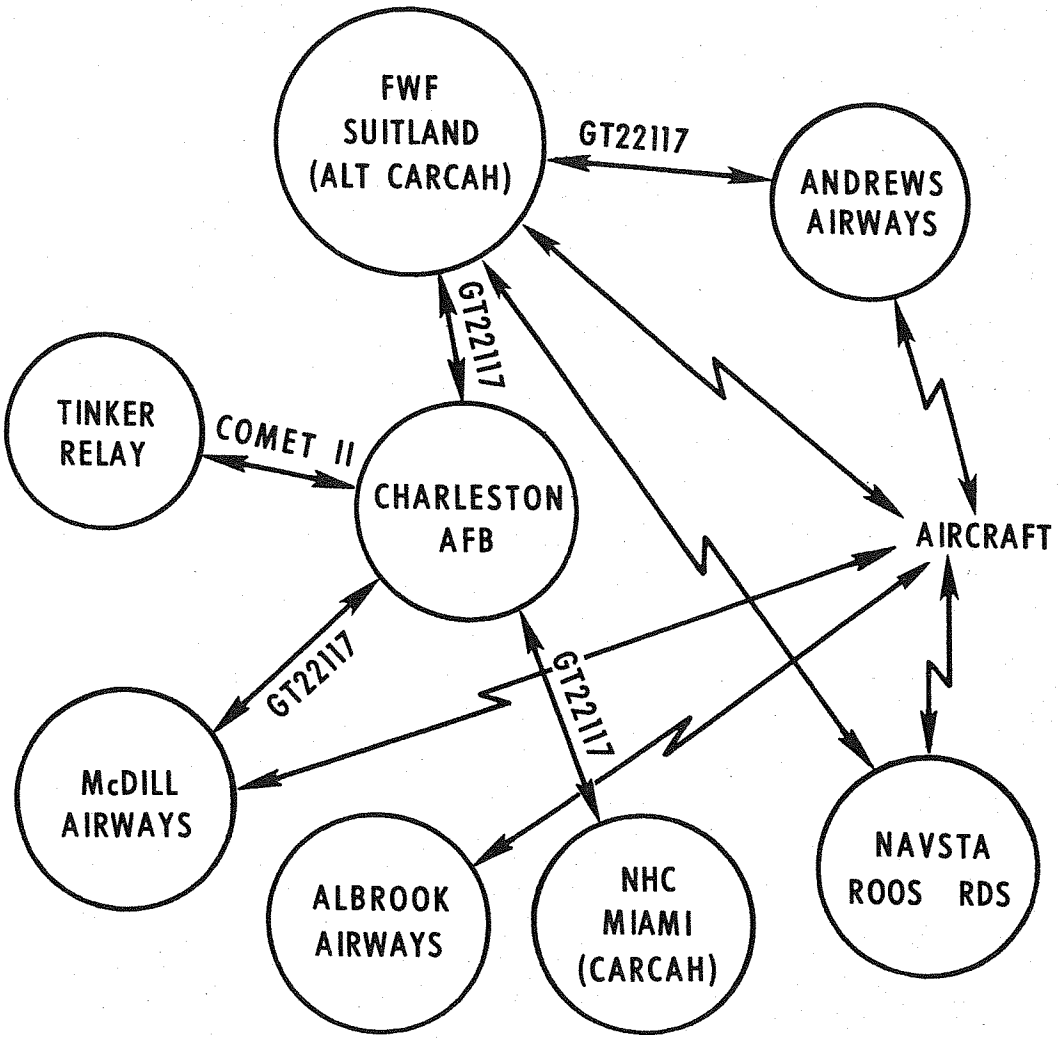
UNCLAS
EMERGENCY TRANSFER OF RESPONSIBILITY
1. FLEWEAFAC JACKSONVILLE CASUALTY IMMINENT.
2. REQUEST FLEWEAFAC SUITLAND ASSUME HURRICANE WARNING AND FORECAST RESPONSIBILITIES AND SCHEDULING CONTROL WEARECONRON FOUR AT ____Z.
3. RECON FLIGHT SCHEDULE IAW POD _____Z.
4. WEARECONRON FOUR CHOP TO FLEWEAFAC SUITLAND.

2. After assumption of responsibilities, FLEWEAFAC Suitland will coordinate the POD with the CARCAH at Miami through the Alternate CARCAH and warnings with the NHC Miami via AF TTY circuit GT22117 or via Autovon number 899-1650 patch to 666-3912, 666-4612 or by commercial telephone. Attachment 1 is a schematic illustrating the various communications channels available to FLEWEAFAC Suitland.

3. FLEWEAFAC Suitland can communicate with airborne reconnaissance aircraft through the various modes as shown in Attachment 1.

ATTACHMENT 1

FLEWEAFAC JACKSONVILLE COMMUNICATIONS DIAGRAM (SECONDARY)



LEGEND:

TELETYPE ←→

SSB ←Z→

NOTE: AUTOVON available between all activities.

CHAPTER 8

EASTERN PACIFIC
ALTERNATE HURRICANE WARNING OFFICE

Actions of the U. S. Weather Bureau Alternate Hurricane Warning Office, Los Angeles, California, in case of failure of normal operations at the Hurricane Warning Office (HWO), San Francisco:

1. Pacific ship reports normally received at HWO-SFO will be rerouted by communication agencies concerned to METEO, Los Angeles where they will be received on Western Union tieline, TWX, or local Coast Guard Teletype circuit. FWC Alameda will telephone selected ships in area of concern to HWO-LAX.

2. Pacific ship reports received at Alternate HWO-LAX will be given to FAA Flight Service Station (FSS) Los Angeles (LAX) for transmission on Service C Circuit 35 and Service O Circuit 8274. Military stations not on either of these circuits will receive them as relayed on COMET III.

3. AFHLO MCC will telephone hurricane reconnaissance reports to HWO-LAX.

4. Coordination and liaison with Commanding Officer, FWC Alameda and the Air Force Hurricane Liaison Officer, McClellan Air Force Base will be by conference telephone calls.

5. Requests for hurricane reconnaissance flights will be made by telephone to the TCRC, McClellan AFB.

6. After telephone coordination with FWC Alameda and AFHLO McClellan, final military tropical cyclone forecasts using WB Form 656-6 will be read to FWC Alameda for entry on military communication circuits. If it is impossible to confer with the above offices, the telephone coordination will be conducted with FWF San Diego, the alternate for FWC Alameda, and the forecast entered on COMET II by FWF San Diego.

7. Public bulletins, advisories and warnings from Alternate HWO-LAX will be transmitted on Services C and O and will be available to military bases with drops on these circuits.

CENTRAL PACIFIC
TRANSFER OF WARNING RESPONSIBILITY

1. When a tropical cyclone approaches 140° West, the transfer of responsibility will be accomplished through the Weather Bureau offices at San Francisco and Honolulu. HWO-HNL will advise other agencies concerned regarding transfer of warning responsibility.

2. When a tropical cyclone crosses 180° from west to east, the JTWC, Guam, will append to the last warning issued on its area, the statement "Next warning by HWO-HNL." Fleet Weather Central, Pearl Harbor, will acknowledge and notify all interested local agencies of assumption of tropical cyclone warning responsibility by HWO-HNL. In similar fashion, HWO-HNL, through FWC, Pearl Harbor, will pass responsibility to JTWC, Guam, for a tropical cyclone crossing 180° from east to west. All local agencies will be notified when acknowledgment is received.

3. Transfer of responsibility will not affect name or numbering sequence used to identify the tropical cyclone.

4. The HWO-SFO will assume all HWO-HNL functions when failure of normal operations at HWO-HNL is imminent.

5. If failure of normal operations at the Joint Typhoon Warning Center (JTWC) Guam is imminent, the Alternate Joint Typhoon Warning Center (AJTWC), Japan, will assume warning responsibility west of 180 degrees to the Malay Peninsula and north of the equator. In this event, all references to JTWC, Guam, in this Plan will be replaced by AJTWC, Japan.

CHAPTER 9

PROCEDURES FOR COORDINATING AND ISSUING TROPICAL CYCLONE ADVISORIES AND WARNINGS EAST OF 30° W LONGITUDE

1. When named tropical cyclones cross 30°W longitude from west to east, the Weather Bureau ceases to issue formal public advisories. However, the Weather Bureau continues to issue marine bulletins on tropical storms and hurricanes after they pass eastward of longitude 30°W as long as they are of importance to merchant shipping in the eastern North Atlantic. These bulletins are included in Weather Bureau Marine Bulletins broadcast to ships 4 times daily via Radio Station NSS, Washington, D. C. Similarly, the Weather Bureau issues bulletins on tropical cyclones in progress when they are east of longitude 30°W in the North Atlantic but moving westward. These bulletins are included in the Weather Bureau shipping bulletins broadcast to merchant ships via Radio Station NSS.

2. The responsibilities for issuing warnings for interests in the Eastern North Atlantic rests with the Fleet Weather Central Rota for the Navy, and with Det. 11, 21 Weather Squadron, Torrejon Air Base, for the Air Force and Army. However, warnings issued by the Fleet Weather Central Rota will satisfy Air Force and Army requirements in the Azores, European and North African areas. When tropical cyclones exist east of 30°W, the Fleet Weather Central, using pertinent portions of the National Hurricane Plan, will pass warnings directly to Torrejon Weather Relay Center, for further relay to other Air Force and Army installations in the Azores, Europe and North Africa.

3. Storms and/or hurricanes which occur east of 30°W longitude or which move from west to east across this meridian will be assigned an appropriate identifier by Fleet Weather Central Rota. When these storms pass westward across the 30th meridian, the responsibility for advices will be transferred to the NHC which will assign a name to the tropical cyclone.

4. NHC, Miami, Fla., HWO, Washington, D. C., and HWO, San Juan, P. R., will be included among the addressees of warnings issued by FWC, Rota, for tropical cyclones in the Atlantic east of 30°W.

5. Letters of the alphabet will be used in lieu of numbers to identify the sequence of un-named tropical cyclones in warnings issued by FWC, Rota, i. e., the first un-named tropical cyclone will be Alpha, the second Bravo, etc. Numbers will be used to identify the sequence of named tropical cyclone warnings issued by FWC, Rota. The first advisory following the transfer of responsibility from one center to another across latitude 30°W shall contain a brief paragraph reflecting past history of the storm.

6. A statement will be included in the last warning of a tropical cyclone in the eastern North Atlantic issued by FWC, Rota, indicating the status of the cyclone, e. g., that it is dissipating or that it is about to cross the 30th meridian. Any future warnings and/or bulletins will then be issued by FWF, Jacksonville, and NHC, Miami.

TROPICAL STORM SURVEILLANCE BY SATELLITES

1. The ESSA environmental satellites will provide global coverage at least once daily for local direct reception via the Automatic Picture Transmission (APT) System and for centralized reception and processing via the Advanced Vidicon Camera System (AVCS). The National Aeronautics and Space Administration (NASA) research and development satellites with meteorological applications will be employed in the surveillance of tropical storms as part of the evaluation of the various experimental subsystems. Attachment 1 shows the expected satellite operations and data availability for the current season.

2. Satellite picture data (nephanalyses, strip pictures, digitized mosaics, etc.) for the Pacific, Atlantic, and Indian Ocean areas of tropical cyclone activity during their storm seasons will be provided as expeditiously as possible to the forecast centers whose forecast responsibility includes these areas.

3. Tropical disturbances observed by the satellites will be described in messages prepared by the Analysis Branch of the National Environmental Satellite Center (NESC). These messages, called "Satellite Weather Bulletins," will be entered on Weather Bureau, U. S. Navy, and U. S. Air Force teletype circuits for distribution to the responsible forecast centers. The bulletins will be numbered serially beginning January 1 for each of the five geographical subdivisions: Atlantic Ocean (including the Gulf of Mexico and Caribbean Sea); Eastern North Pacific Ocean; Western North Pacific Ocean; South Pacific Ocean; and Indian Ocean.

The Satellite Weather Bulletin is a semi coded message based upon a satellite observation of a disturbed area which can be described by the NESC system for TROPICAL AND SUBTROPICAL DISTURBANCE CLASSIFICATION FROM SATELLITE DATA. Attachment 2 is a graphical description of the Classification System The chart in Attachment 3 may be used to estimate the maximum surface wind speed from the banding category and the diameter of the overcast.

The message format for the Satellite Weather Bulletin is shown in Attachment 4.

4. The NESC will distribute two daily messages entitled "Satellite Tropical Disturbance Summary." One message will be available daily at 0600 GMT and will summarize the tropical disturbances observed between 20E longitude westward to 160W longitude. The other message available at 1800 GMT daily will summarize all tropical disturbances observed from 160W longitude westward to 20E longitude.

These messages will:

a. List day's Satellite Weather Bulletins,

b. Give information on disturbances for which continuity was not maintained,

c. Give locations of vortices with tropical history observed in extra-tropical waters,

d. Describe all significant disturbed areas for which no bulletins were sent.

A copy of the format for these messages is contained in Attachment 5.

5. The NESC will examine on a continuing basis the current classification system for relating banding and storm diameter to surface winds, particularly to weakening or dissipating storms, and will inform all forecast agencies of new developments.

6. The NESC will inform the responsible forecast centers, by the most expeditious communications available, in the event of:

a. Discovery of a new storm,

b. Sudden change in size or apparent intensity of a storm,

c. Observed storm position in disagreement with advisory,

d. Apparent storm intensity in disagreement with advisory if in data sparse or non-reconnaissance area.

This communication is normally accomplished through the Satellite Weather Bulletin procedure or by telephone call.

7. Forecasting centers will advise the NESC Analysis Branch (telephone 301-440-7146) whenever storm characteristics as measured by reconnaissance data differ significantly from characteristics indicated by the appropriate NESC Satellite Weather Bulletin. The reconnaissance flight meteorologist should evaluate the accuracy of the satellite bulletin in the post-flight report, whenever feasible.

8. Guidelines for classifying tropical cyclones as named tropical storms or hurricanes/typhoons based solely on information from satellites are as follows:

a. Classification will be based on the standard NESC Banding Category/ Overcast Circle Diameter/Wind Speed (BC/OCD/WS) graph; and only Stage X, Category 2, 3, or 4 cyclones may be classified as storms or hurricanes/ typhoons.

b. Stage A, B, or C may be classified as tropical disturbances, waves, or depressions.

9. Characteristics of tropical cyclone areas observed by APT receivers at Guam, Wake, and Oahu will be described in messages prepared by appropriate authorities and transmitted to responsible forecast centers. The responsible forecast centers will in turn notify all stations affected.

SATELLITES AND SATELLITE DATA AVAILABILITY - 1969

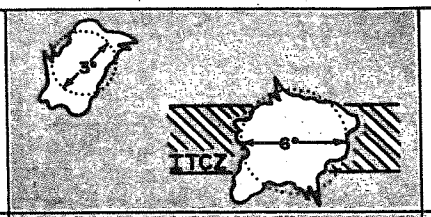
SATELLITE	TYPE OF DATA	TIME OF OBSERVATION	NESC PRODUCTS	PRODUCT DISTRIBUTION
ESSA 9 (Feb. 26) ESSA 7 ESSA 5	AVCS (Stored)	1500 ↖ 1500 ↖ 1800 ↖ or 0600 ↙ (not both)	1. Gridded Analog Pictures 2. Mapped digitized video 3. Manually annotated mosaics or nephs 4. Tropical Wind Analyses 5. Moisture Analyses 6. Satellite Weather Bulletins	1. Facsimile 2. Telephone 3. Teletype 4. WEFAX
ESSA 8 ESSA 6(tilted) ESSA 2	APT (Direct)	0900 ↙ 1100 ↙ 0600 ↙ or 1800 ↖ (not both)	1. Satellite Weather Bulletins 2. APT Video Signal	1. Teletype 2. Telephone 3. FOFAX
TIROS - M (mid-summer)	AVCS (Stored) APT (Direct) IR (Stored) DRIR (Direct)	1500 ↖ 1500 ↖ 0300 ↙ 0300 ↙	1. Same as above plus similar products from IR (Infrared) data and the DRIR (Direct Read-our Infrared) Signal	1. Facsimile 2. Telephone 3. Teletype 4. WEAFAX 5. FOFAX
Nimbus III (spring)	APT (DRID) HRIR*(Stored) DRIR (Direct)	1200 ↖ 0000 ↙ 0000 ↙	1. Satellite Weather Bulletins	1. Teletype 2. Telephone 3. FOFAX
Applications Technology Satellite I (ATS I) 151W	ESSA (NESC) will cooperate with NASA in experiment to obtain Spin Scan Cloud Camera picture data and schedule WEFAX transmissions		1. Mapped digitized video (one picture daily) 2. Wind analyses from movies 3. Synoptic time neph 4. Satellite Weather Bulletins	1. Facsimile 2. Teletype 3. WEFAX
ATS III 75W	ESSA (NESC) is preparing the capability for acquiring picture data from ATS III and expanding its cooperation with NASA beyond ATS I. Some data receipt and limited processing similar to that of ATS I is expected.			

* High Resolution Infrared Radiometer

TROPICAL AND SUBTROPICAL DISTURBANCE CLASSIFICATION FROM SATELLITE DATA

A

NO CURVED CLOUD LINES OR BANDS



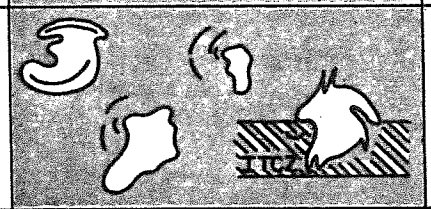
Stage A is a dense amorphous cloud mass composed of cumuliform, cirriform, and layered middle cloud in any combination. Some cirrus outflow is usually present.

The cloud mass must have an average diameter of 3° latitude or more.
Exceptions: (1) If the cloud mass is contiguous to or within the ITCZ in the Atlantic, Pacific, or south Indian Ocean, it must have an average diameter of 6° latitude or more and be partially isolated by breaks from the general cloudiness.
(2) In the Arabian Sea and the Bay of Bengal, the cloud mass must be 8° latitude or more in diameter.

B

POORLY ORGANIZED CURVED CLOUD LINES AND BANDS

ILL-DEFINED CENTER



Stage B is a dense cloud mass with adjacent curved cumulus cloud lines and/or curved bands of middle cloud which are either detached from, or form part of, the major overcast area. The curved cloud lines and bands are often poorly organized.

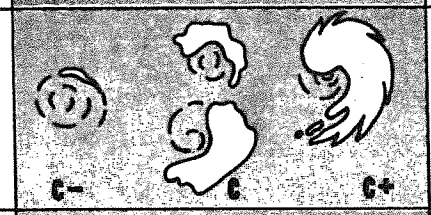
The pattern produced by the curved lines and bands is poorly defined--it does not appear to have one definite center.

Along the ITCZ, the cloud mass and associated curved cumulus cloud lines and/or bands must be separated from the ITCZ cloudiness on at least one side and cirrus outflow must be evident.

C

WELL ORGANIZED CURVED CLOUD LINES AND BANDS

WELL DEFINED CENTER OUTSIDE DENSE CLOUD MASS



Stage C has well organized, curved cumulus cloud lines and/or broad curved bands of middle and high cloud.

The pattern produced by the various curved lines and bands has a well defined single center.

The center of the pattern generally lies outside but adjacent to an associated dense cloud mass, but it can be on the edge or as much as one-half degree latitude within the cloud mass.

A C- has no associated dense cloud mass.

A C+ appears very well organized with a large amount of curved cirrus outflow.

X CAT. 1

POORLY ORGANIZED SPIRAL BANDS

ILL-DEFINED CENTER OF ORGANIZATION WITHIN CENTRAL CLOUD MASS

Category 1 has a bright generally circular central overcast which is cirriform in appearance. Curved cirrus outflow is often restricted to one quadrant.

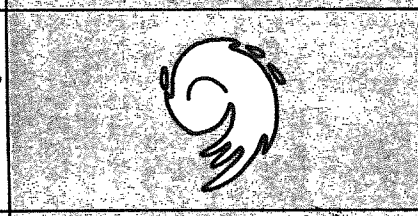
Poorly organized, slightly curved cumuliform cloud bands appear near the periphery of the central overcast and cross into it at a large angle. This banding remains close to the overcast edge; away from the overcast, organized curved bands are usually absent.

An eye is not visible. The center of the spiral pattern can be located approximately by extrapolating inward along the curved peripheral bands. This estimated center must be more than one-half degree latitude within the central cloud mass.

X CAT. 2

WELL ORGANIZED BANDS

SPIRAL BANDS DEFINE CENTER WITHIN CENTRAL CLOUD MASS



Category 2 has a bright, often asymmetrical central overcast. Cirrus outflow is curved and more extensive.

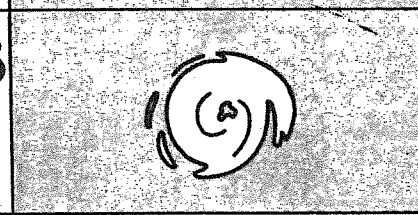
At least one long, major, well organized band spirals at a large angle into the central cloud mass. A linear curved break accompanies this band. Within the central cloud mass, the break is covered by thin cirrus but is readily detectable. Minor peripheral bands outside the overcast are poorly organized.

An eye is not visible. The central tip of the major spiral band defines the center. This center must be more than one-half degree latitude within the central cloud mass.

X CAT. 3

MODERATE DEGREE OF CONCENTRICITY TO CLOUD BANDS

IRREGULARLY SHAPED EYE WITHIN CENTRAL CLOUD MASS



Category 3 has a bright central overcast that is compact and tends to be circular. There is considerable curved cirrus outflow visible at the edge of the central overcast.

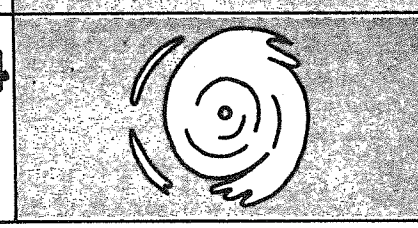
Curved striations within the central cloud mass define spiral cloud bands which are moderately concentric about a visible eye. Well organized peripheral bands, some with well developed cirrus, are present.

A ragged and irregularly shaped eye is normally visible. This defines the storm center.

X CAT. 4

HIGH DEGREE OF CONCENTRICITY TO CLOUD BANDS

ROUND EYE NEAR CENTER OF CENTRAL CLOUD MASS



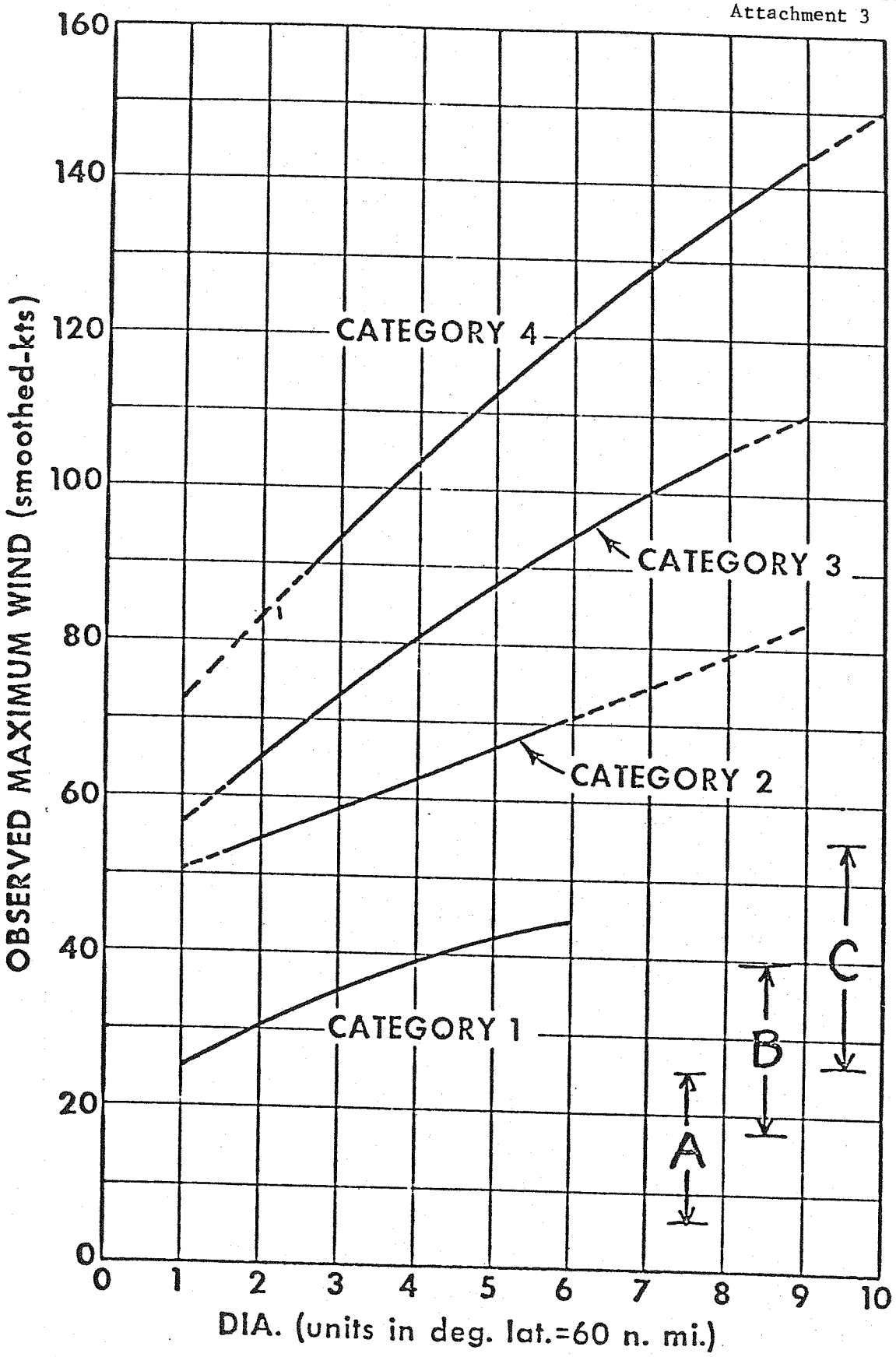
Category 4 has a very circular bright central overcast. The edge is often sharp and smooth over one or two quadrants, otherwise, it is striated cirrus.

Highly concentric striations appear within the central overcast. Banding outside the central overcast is very well organized and circular. The entire cloud system is very symmetrical in appearance.

A well defined eye appears as a small dark circular area surrounded by a bright ring. This defines the storm center.

NESC JUNE 1968

Note: Stage X Category 1 will not be used during the 1969 season. Disturbances which meet this criteria will be called a Stage B with a parenthetical remark to indicate the location of the cloud curvature more than half a degree within the associated cloud mass.


160
140
120
100
80
60
40
20
0
OBSERVED MAXIMUM WIND (smoothed-kts)
CATEGORY 4
CATEGORY 3
CATEGORY 2
CATEGORY 1
A
B
C
0 1 2 3 4 5 6 7 8 9 10
DIA. (units in deg. lat.=60 n. mi.)

ABXX-1
ABXX-2 KWBC

SATELLITE WEATHER BULLETIN

(Satellite) (Area) (Bulletin #)

(Day) (Month) (Year) (Hour Min) Z

(Lat Location Long) STAGE DIA CAT

(Remarks about eye) (Storm name) *(Trend in development)

*Past _____ Hour Movement

APPROX TIME NEXT OBS (Month/Day/Hour)

(Remarks)

*Not to be used in the Caribbean, Gulf of Mexico and Atlantic west of 30°W longitude. However, in these areas pertinent information, especially regarding trends as indicated by the appearance of the disturbance, will be placed in the remarks section.

Note: A comment on the accuracy of the location of observed features will be entered in Remarks when unusual circumstances prevent determination of the accuracy to a normal accuracy of 60 nautical miles.

ABXX-3 KWBC
SATELLITE TROPICAL DISTURBANCE SUMMARY

_____
(Date)

ATLANTIC

	(#)	(Location)	(Time)	(STAGE)	(DIA)	(CAT)	(Name or FIRST SIGHTED or leave blank)
BLTN	___	_____	_____	_____	_____	_____	_____
BLTN	___	_____	_____	_____	_____	_____	_____
BLTN	___	_____	_____	_____	_____	_____	_____
BLTN	___	_____	_____	_____	_____	_____	_____
BLTN	___	_____	_____	_____	_____	_____	_____

_____
(If any bltns were sent yesterday on storms not reported today, state why.)
_____

_____
(Give location of any vortex with tropical history observed in extrop waters.)

_____
_____
_____

_____
(Remarks: Describe all significant disturbed areas for which no bltn was sent.)

EASTERN PACIFIC

	(#)	(Location)	(Time)	(STAGE)	(DIA)	(CAT)	(Name of FIRST SIGNTED or leave blank)
BLTN	___	_____	_____	_____	_____	_____	_____
BLTN	___	_____	_____	_____	_____	_____	_____
BLTN	___	_____	_____	_____	_____	_____	_____

_____
_____
_____
_____
_____
_____
_____
_____

ABXX-4 KWBC - Satellite Tropical Disturbance Summary will include the same type of information as ABXX-3 for the Western Pacific, South Pacific and Indian Ocean areas.

CHAPTER 11

PUBLICITY

News media releases, other than warnings and/or advisories for the purpose of informing the public of the operational and research activities of the U. S. Navy, U. S. Air Force, and U. S. Weather Bureau, should reflect the joint effort of these agencies by giving due credit to the participation of other agencies. Copies of these releases should be forwarded to:

Commander, Naval Weather Service Command

Hq, Air Weather Service (AWFOI)

ESSA, PIO

INTERDEPARTMENTAL COMMITTEE FOR METEOROLOGICAL SERVICES

NATIONAL HURRICANE OPERATIONS PLAN

(ATLANTIC-EASTERN PACIFIC-CENTRAL PACIFIC)

Prepared By

Subcommittee on Basic Meteorological Services

CHANGE NUMBER 1

OCTOBER 1969

1. Most of the changes have been made due to the Navy taking over the responsibility for providing tropical cyclone aircraft reconnaissance in the Eastern Pacific.

2. Several changes have been made to Chapter 5 due to the deactivation of the 36th Air Division, USAF

Replace pages v, vi, 1, 2, 3, 4, 13, 14, 17, 18, 19, 20, 21 22, 43, 44, 45, 46, 47, 48, 49, 50, 53, 54, 55, 56, 73, 74.

Add pages 42a, 42b

* Indicates change in content of the Plan

Each page that has been changed will carry the date of the change at the bottom of the page, (10/69).

Chairman, Ad Hoc Committee
For Preparing The Hurricane Plan, SC/BMS

Samuel O. Grimm, Jr.

PREAMBLE

This plan presents the procedures and agreements reached at the annual Interdepartmental Hurricane Warning Conference (combined Atlantic and Pacific). These conferences are sponsored annually by the Sub-committee on Basic Meteorological Services (SC/BMS), Interdepartmental Committee for Meteorological Services (ICMS), to bring together cognizant Federal agencies to resolve problems of mutual concern related to the Atlantic and Pacific Hurricane Warning Services.

The following Environmental Science Services Administration (ESSA) Weather Bureau (WB) officials shall provide Air Weather Service (AWS) and Naval Weather Service (NWS) designated representatives with the basic meteorological decisions and associated prognostic reasoning concerning location, intensity and forecast positions of tropical cyclones:

1. The Director, National Hurricane Center (NHC) ESSA, Weather Bureau, Miami, Florida is responsible for the North Atlantic Ocean west of 30 degrees west longitude, the Caribbean Sea, the Gulf of Mexico, and the States and Territories of the United States adjacent to these maritime areas.

2. The Meteorologist in Charge (MIC), Hurricane Warning Office (HWO), ESSA Weather Bureau, San Francisco California is responsible for the Eastern Pacific Ocean east of 140 degrees west longitude and north of the equator.

3. The MIC, Hurricane Warning Office, ESSA Weather Bureau, Honolulu, Hawaii is responsible for the Central Pacific Ocean from 140 degrees west to the 180th meridian and north of the equator.

The ESSA Weather Bureau shall:

1. Make the necessary analyses and prepare basic forecasts of tropical cyclones for the use of all Department of Defense interests.

2. Supply tropical cyclone forecasts to Department of Defense weather services in accordance with published interdepartmental agreements.

The U. S. Air Force and the U. S. Navy shall furnish to the Weather Bureau aircraft reconnaissance observations and other special observations which are required to support the provisions of Chapter 3 of this Plan.

1. The U. S. Navy and U. S. Air Force shall assign a single Chief, Aerial Reconnaissance Coordination, Atlantic Hurricanes (CARCAH) to the NHC. The CARCAH will be responsible for the coordination and final preparation of the Plan of the Day and for the scheduling of aircraft required to meet the provisions of Chapter 3 of this Plan. An alternate CARCAH will be designated for the Alternate Hurricane Office in support of Chapter 8 of this Plan.

*2. The Commanding Officer, Fleet Weather Central (FWC) Alameda will be responsible for effecting necessary coordination and liaison with the MIC, HWO San Francisco with respect to arrangements of aircraft reconnaissance and/or other special observations which are required to support the provisions of this Plan.

3. The Commanding Officer, Fleet Weather Central (FLEWEACEN), Pearl Harbor, Hawaii and the Tropical Cyclone Reconnaissance Coordinator (Central North Pacific) Commander 57 Weather Reconnaissance Squadron, Hickam AFB, Hawaii will be responsible for effecting necessary coordination and liaison with the MIC, HWO Honolulu, Hawaii with respect to arrangements of aircraft reconnaissance and/or other special observations which are required to support the provisions of this Plan.

The Federal Aviation Administration (FAA) shall provide air traffic control, communications, and flight assistance services as appropriate in support of the Hurricane Warning Services.

The chapters specify in further detail the responsibilities and functions of the several agencies cooperating in support of the tropical cyclone warning service.

CHAPTER 1

RESPONSIBILITIES OF COOPERATING AGENCIES

1. The ESSA Weather Bureau, through the Director of the National Hurricane Center, Miami, Fla.; MIC, Hurricane Warning Office, San Francisco, Calif. (HWO-SFO); MIC, Hurricane Warning Office, Honolulu, Hawaii (HWO-HNL) shall:

a. Provide basic tropical cyclone forecasts and attendant advice to the U. S. Navy and the U. S. Air Force in accordance with the detailed instructions in Chapter 3.

b. Provide the Air Force and Navy timely access to all significant tropical cyclone reports.

c. Consult as necessary with the U. S. Air Force and U. S. Navy regarding day-to-day requirements for tropical cyclone advice and arrange to meet these requirements within the capabilities of the hurricane warning offices.

*d. Advise the CARCAH (Atlantic), Hurricane Liaison Officer Fleet Weather Central Alameda (HLO FLEWEACEN Alameda), Tropical Cyclone Reconnaissance Coordinator (Central North Pacific), of aircraft reconnaissance and other observational requirements of the respective Hurricane Warning Offices.

e. HWO-HNL will coordinate with FLEWEACEN, Pearl Harbor and Central Pacific Forecast Center (CENPAC FC) Hickam AFB prior to issuing tropical cyclone advisories.

2. The ESSA National Environmental Satellite Center shall:

a. Operate satellite systems capable of providing local and global tropical coverage during the tropical cyclone season.

b. Receive requirements from the National Hurricane Center for specific coverage.

c. Process and transmit available data to meet the requirements of the National Hurricane Center.

d. Monitor all tropical regions via the satellite data and communicate interpretations therefrom of disturbed areas as specified in Chapter 10 of this Plan.

3. The U. S. Navy and the U. S. Air Force through their respective hurricane liaison officers shall:

a. Provide up-to-date information to the NHC, Miami; HWO-SFO; HWO-HNL concerning requirements for tropical cyclone advice and pertinent information.

b. Meet the requirements for aircraft reconnaissance and other observations noted in paragraph 1.d. within the limits of service capabilities.

4. The U. S. Navy and the U. S. Air Force will meet from their own resources any military requirements that are in excess to the common tropical cyclone requirements as stated in Appendix D, Chapter 4 of this Plan.

a. The Navy has a special requirement for low level (at or below 1500 feet) oceanographic and meteorological data in support of their operating forces, particularly wind speed and direction and sea surface conditions.

5. The Federal Aviation Administration will:

a. Provide air traffic control, communication and flight assistance services as appropriate in support of this Plan.

b. In the Atlantic area the FAA will make the necessary arrangements for accommodations and access to appropriate communication facilities to allow the transmission of hurricane radar data from Air Route Traffic Control Centers (ARTCCs).

6. ESSA Weather Bureau and Department of Defense (DOD), Office of Special Assistant for Environmental Sciences (SAES) will cooperate in arranging an annual trip to the Caribbean and Gulf of Mexico area to carry out a continuing and effective liaison with the Director of Meteorological Services and disaster prevention agencies on the warning service.

CHAPTER 4

AIRCRAFT RECONNAISSANCE

1. Responsibility.

a. Atlantic - The Air Force and Navy will share the reconnaissance responsibility on an equal basis for providing fixes, and investigative flights on tropical cyclones and hurricanes in the Atlantic, Caribbean and Gulf of Mexico areas in accordance with the following:

(1) Air Force to normally conduct reconnaissance at 700 mb. and above;

(2) Navy will normally conduct reconnaissance at 700 mb. or below;

(3) Fixes will be on a shared basis at an altitude coordinated and specified in the Plan of the Day;

(4) The resolution of conflicts will be made by the CARCAH.

(5) The Air Force Gull Hotel will have higher priority than the Gull India Track during the period from June 1 through November 30. The outward leg of the Gull Hotel Track should be flown at 700 mbs.

(6) Special flights may be scheduled through CARCAH to fill specific NHC requirements. Priority for these special tracks will be higher than standard tracks and lower than Investigative/Tropical Cyclone missions. The weather mission identifier will be Gull/Navy Special.

*b. Pacific - The Air Force will be responsible for providing tropical cyclone aircraft reconnaissance in the HWO-HNL area of responsibility subject to the capabilities of available aircraft. The Navy will be responsible for providing tropical cyclone aircraft reconnaissance in the HWO-SFO area of responsibility subject to the capabilities of available aircraft.

2. Operational Control of Aircraft. Operational control of aircraft engaged in tropical cyclone reconnaissance will be exercised by the respective services which operate them.

3. Observational Data to be Obtained by Reconnaissance.

a. Center Fixes. Within the limits of operational safety, tropical cyclone reconnaissance flights will make all possible efforts to obtain an observed fix on the center by whatever means are available as soon as possible after entering the cyclonic circulation so as to keep navigational errors at a minimum. All observed center fixes obtained, or other information that might in any way indicate or more accurately fix the "eye" of a tropical cyclone, including the size, shape, and orientation of the eye, as well as the method by which the information was obtained, that cannot be included in the encoded portion of the report will be added as plain language remarks. A plain text message will be sent on the initial fix of the eye of each flight. This message will be transmitted separately and as soon as possible in the interest of reducing time delay for delivery to the NHC, Miami or HWO-SFO and HWO-HNL. All radar fix reports will be made in plain text. The method of obtaining the location of the center should always be included in eye position reports from reconnaissance aircraft.

The center should be located according to the following priority in the Atlantic and Eastern Pacific Areas:

(1) Cloud eye - as obtained within the eye by visual and/or radar observations.

(2) Wind eye - if practical to obtain accurate observations of spot winds.

(3) Pressure eye - this is to be obtained by proper flight pattern to locate the position of the lowest surface pressure. (Atlantic requirement)

(4) Radar eye - obtained by coverage of the storm from outside the eye.

All aircraft eye fixes will be reported in degrees and minutes. Forms for reporting eye information are given in Chapter 4 , Forms 1 and 2.

b. Central Pressure - Atlantic. When reconnaissance aircraft have entered the eye, central pressure should be obtained by drop-sonde observations at the center and/or sufficient wind and height observations should be obtained at and in close proximity of the center at 500 mbs. or lower so that the central pressure at the surface may be accurately calculated. These data should be obtained at least at 6-hour intervals when a storm (tropical cyclone) is within 30 hours of landfall.

c. Wind Profile - Atlantic. The horizontal wind speed profile obtained from about 100 miles radius to the center at the 700 mb. or lowest safe level.

d. Cumulonimbus "Blow-offs." Direction of blow-offs from the tops of cumulonimbus clouds should be reported by flights operating below 25,000 feet. In the Atlantic there is an additional requirement for this information east of 60°W as an aid in determining upper-tropospheric winds.

4. Reconnaissance Requirements.

a. Center Fixes - Atlantic. Hurricane reconnaissance flights assigned operational responsibility for obtaining forecast data have highest NHC priority and will provide requisite operational weather information, including fixes on the center, to facilitate determination of present and future position of all tropical cyclones. The flights should be planned so that center fixes are obtained at the specified times indicated below or as near those times as operational conditions permit, except when the eye is under effective surveillance by land based radar. Under these conditions, the reconnaissance aircraft may be requested by the NHC to obtain peripheral data or specific fixes and center data as the situation may require. The frequency of these fixes may be augmented as required.

1200Z - 0700 EST - forenoon reconnaissance
1800Z - 1300 EST - afternoon reconnaissance
0000Z - 1900 EST - evening reconnaissance
0600Z - 0100 EST - night reconnaissance

Each reconnaissance flight qualifying for Order of Precedence will be so designated by the POD by the inclusion of the statement "REQ ALTRV PRECEDENCE CLASS THREE." The remarks section of the aircraft FLIGHT PLAN should contain this same statement.

(g) Weather Reconnaissance Squadron (WEARECONRON)-FOUR USN, 53rd WRS USAF, and RFF-ESSA will be responsible for notifying CARCAH of any weather reconnaissance aircraft under their control that are anticipating flights into or near storm areas in order that these flights may be coordinated in the Reconnaissance POD.

(2) Dissemination of the Reconnaissance Plan of the Day. The "Reconnaissance Plan of the Day" (POD) will be made available to all appropriate agencies that provide support to and/or exercise control of the missions. CARCAH will be responsible for disseminating the POD by 1800Z on the day preceding the planned missions to the USAF, USN, NHC and FAA. CARCAH will be advised immediately by the appropriate agency of any changes in the status of the missions scheduled in the POD, for example: delayed take off, aborts, etc.

The FAA Air Traffic Control Center representative at Miami will assume responsibility for notifying appropriate Air Traffic Control Centers of the "Reconnaissance Plan of the Day" immediately upon receipt. The Plan of the Day received by the Air Traffic Control Center will be considered the same as the "Gateway" plan and it will cause these Air Traffic Control Centers to consider space for these hurricane flights on the following day.

*b. Eastern Pacific - Request for Reconnaissance. The MIC, HWO, San Francisco will telephone requirements for hurricane aircraft reconnaissance flights to the HLO FLEWEACEN Alameda and confirm requirements by message to the HLO FLEWEACEN Alameda, via the hurricane teletype circuit. Such requests should include projected position and time for which an eye fix is desired. All requests for reconnaissance should be coordinated as much in advance as possible, preferably by 22Z of the preceding day. The HLO FLEWEACEN Alameda will confirm to HWO-SFO by message Navy reconnaissance actions via the hurricane circuit.

c. Central Pacific-Request for Reconnaissance. The HWO-HNL will coordinate, through a conference call with responsible authorities of the Air Force, reconnaissance requirements for tropical cyclones north of the equator between 140 degrees west and the 180th meridian. The Tropical Cyclone Reconnaissance Coordinator (TCRC-Hickam) will levy tropical cyclone reconnaissance requirements on appropriate military units. Requests for aerial reconnaissance will be by message, but pre-coordination by telephone is encouraged.

d. Flight Plans. The flight plans for hurricane reconnaissance flights will be filed with FAA as soon as practicable (at least one hour is desirable) prior to departure time. In the interest of standardization and clarification Navy Reconnaissance aircraft (Plan of the Day assigned flights) when filing flight plans with FAA facilities will use NAVH followed by the last three digits of the bureau number of the aircraft. In no case will more than seven (7) digits appear in the call sign. Example: "NAVH789." In the Atlantic, the National Hurricane Center will be included as an information addressee (HGXP-Miami). Flight plans for flights which qualify will include the statement in remarks: "REQ ALTRV PRECEDENCE CLASS THREE."

e. Gull Flights -

(1) Gull Flight Tracks - The Air Force will advise FAA of changes in routine Gull flight tracks by forwarding planned changes to the following air traffic control centers; Miami, Houston, Jacksonville, New York, San Juan, allowing 30 days notice prior to implementation of the changes.

(2) Gull Flight Level Changes - Gull flights will accept flight level changes when requested by the FAA.

8. Aircraft Reconnaissance Communications.

Atlantic

a. Meteorological reports from reconnaissance flights will be coded and transmitted in RECCO code (WB Form 611-6) to include all mandatory groups plus optional groups 4ddff and/or $5DFSD_k$. Plain language will be appended to include a brief description of significant or unusual features observed since the last observation including radar patterns indicative of organization. Any evidence of tornadoes, water spouts or funnel clouds within 200 miles of land should also be reported in this manner. When feasible from an observing and communications standpoint, supplementary hurricane reconnaissance data taken at 15 minute intervals will be appended to the routine reports. The sea surface temperature (Navy reports only) will be included in degrees and tenths Celsius as the first group in remarks in the following format: ST followed by three digits. Following the last group of the RECCO report, the coded latitude and longitude groups and flight level and/or surface wind groups will be repeated. These groups will be repeated in numbers for the purpose of confirmation of these important elements. Each participating agency will effect distribution of pertinent portions of its intra-service operating instructions and procedures to all other participating agencies.

b. All activities should use procedures as outlined in ACP 125B with respect to message headings, date-time groups and numbering systems which are external to the message text in formatting messages for transmission to ground stations. Appropriate Joint Army, Navy, Air Force Procedures (JANAP) Allied Communication Procedures (ACP) will be used when contacting A/G stations.

c. Air Force flights will use communications procedures as shown in Appendix A, Navy communications procedures are shown in Appendix B.

d. Air-Ground communications arrangements for ESSA/RFF aircraft will be the same as Navy aircraft, as shown in Appendix B. ESSA/RFF aircraft may utilize USAF Aeronautical Station facilities as shown in Appendix A when contact cannot be established with the Navy.

e. To preclude interference in simultaneous dropsonde operation, the Reconnaissance Plan of the Day should include the desired times and locations (relative to the storm) of the drops. Additionally, it is necessary that operators monitor the dropsonde frequency prior to drop and plane-to-plane coordination be utilized to avoid interference.

f. When two or more reconnaissance aircraft are operating in the storm area, voice communications between the aircraft will be established and conducted on UHF frequency 304.8 MHz. If initial contact fails on 304.8 MHz UHF Guard frequency 243.0 MHz will be used to establish communications.

Prefix GULL will be used for contacting Air Force aircraft, NAVY for Navy, and ESSA for RFF. As the aircraft approaches the storm area, calls will be made on the hour and every fifteen minutes thereafter until contact is established.

When Navy and RFF aircraft are in the storm area, frequencies in the HF band as promulgated in the published Navy frequency plan will be guarded by the aircraft.

g. A uniform system of identification and continuity of weather/hurricane reconnaissance reports will be followed. The identifiers will be a part and constitute the opening text of each message. Regular weather/hurricane reconnaissance missions will include the unit indicator (GULL for Air Force), (NAVY for Navy), (ESSA for ESSA), followed by the numerical mission number for a particular storm (ONE), the storm/track/investigative name (BETSY) (INDIA) etc., the numerical sequence of the report during the flights (ONE, TWO,...). See Appendices A and B for examples.

Eastern Pacific

a. Meteorological reports from reconnaissance flights will be coded and transmitted in RECCO code. Plain language will be appended to include a brief description of significant or unusual features observed since the last observation including radar patterns indicative of organization. Any evidence of tornadoes, water spouts or funnel clouds within 200 miles of land should also be reported in this manner. A system of numbering will be used to identify individual reports.

b. All activities should use procedures as outlined in ACP 125B with respect to message headings, date-time groups and numbering systems which are external to the message text in formating messages for transmission to ground stations. Appropriate JANAP (ACP) procedures will be used when contacting Air/Ground (A/G) stations.

*c. Navy flights will use communications procedures established for normal Pacific Weather Reconnaissance operations (Appendix C). Should it be necessary to use other A/G communications, appropriate relay instructions will be included in the message.

*d. All hurricane aircraft reconnaissance reports received by the HLO Alameda will be expeditiously transmitted to HWO San Francisco via the hurricane circuit.

e. Air Traffic Control Communications. Normal Air Traffic Control (ATC) procedures will be followed.

CHAPTER 4

9. Navy Air Traffic Control Communications - Atlantic. ATC/AG communications, by Navy aircraft operating within the San Juan and Miami FIR areas of responsibility will be conducted in accordance with the following priorities.

a. USN SSB 6723 kHz (primary) 4711 kHz (secondary)
b. 6567 kHz (FAA)
c. ARINC
d. USAF Airways Station

10. USAF Air Traffic Control Communications - Atlantic. USAF Aircraft operating within the San Juan and Miami FIR areas will conduct ATC A/G communications with the following facilities in priority as listed:

a. USAF Aeronautical Stations (MacDill, Andrews, Albrook)
b. FAA Stations - 6567 kHz (Miami, San Juan, New York)
c. USN SSB Stations - 6723 kHz (Primary) 4711 kHz (Secondary) (Navy JAX)
d. ARINC Stations as contained in current DOD Flight Information Publications Enroute-Supplement.

11. Air-Ground Communications with FAA Stations - Atlantic. If the primary air-ground communications outlined in Appendices A and B fail, reconnaissance aircraft may transmit their hurricane data in plain language by voice to WBR (Miami), WSY (New York), or WRW (San Juan) in that order of priority. Such messages should be addressed to HGXP. The appropriate FAA station will relay the data to the NHC.

Attachments to this Chapter:

Form 1	- Initial Tropical Cyclone Eye/Center Report
Form 2	- Detailed EYE/CENTER DATA MESSAGE
Form 3	- Format to be Used When Reporting Radar Eye from Outside Eye Appended to Areal Meteorological Reconnaissance Reporting Code (RECCO)
Form 4	- Plan of the Day Format - Atlantic
Appendix A	- Air Force Communications Procedures - Atlantic
Attachment 1	- USAF Atlantic Hurricane Communications System Diagram
Appendix B	- Navy Communications Procedures - Atlantic
Attachment 1	- FLEWEAFAC Jacksonville Communications Diagram (Primary)
* Appendix C	- Navy Communications Support Plan for East Pacific Hurricane Reconnaissance
Attachment 1	- USN East Pacific Hurricane Communications Diagram
Appendix D	- USAF Communications Support Plan for USAF East Pacific Hurricane Reconnaissance
Attachment 1	- USAF Eastern Pacific Hurricane Communications System Diagram
Appendix E	- Joint Requirements for Aircraft Reconnaissance Data

FORM 1

INITIAL TROPICAL CYCLONE EYE/CENTER REPORT

UH NAVY / GULL / *ESSA _____ _____ _____ EYE/CENTER LOCATED BY _____

AT _____ DEGREES _____ MINUTES NORTH _____ DEGREES _____

MINUTES WEST AT _____ _____ _____ _____ ZULU

---

*ESSA participate only in Atlantic area.

1. The first center fix obtained on each flight will be dispatched as rapidly as possible using Form 1.

2. This form is used in the Atlantic and Eastern Pacific areas.

DETAILED EYE/CENTER DATA MESSAGE			ADDRESSEE:
MISSION NUMBER:	DATE:	SCHEDULE FIX TIME Z	
AIRCRAFT COMMANDER:	AIRCRAFT NUMBER:	WEATHER OBSERVER:	
SIMULTANEOUS FIX WITH OTHER AIRCRAFT: ☐ YES ☐ NO	TRANSMISSION TIME: Z	GROUND STATION RECEIPT TIME Z	PRECEDENCE: ☐ IMMEDIATE ☐ PRIORITY
MESSAGE HEADING:			

A. SQUADRON CALL SIGN / MISSION NUMBER / CYCLONE/STORM NAME / OBS NUMBER		
B.		EYE OR CENTER FIXED BY: (Note 1)
C. / N S		LATITUDE CENTER FIX. (DEG./MIN.)
D. / E W		LONGITUDE CENTER FIX. (DEG./MIN.)
E.	ZULU	DATE AND TIME OF FIX.
F.		CENTER DETERMINATION: 1.POSITIVE, 2.FAIR, 3.POOR. (Note 2)
G.		NAVIGATION FIX ACCURACY IN NAUTICAL MILES.
H.		MINIMUM COMPUTED SEA LEVEL PRESSURE OR COMPUTED DROPSONDE. (MILLIBARS)
I. / N W/E	ZULU	CONFIRMATION OF FIX. POSITION (DEG./MIN.) DATE, TIME.
J.		ESTIMATE OF MAXIMUM SURFACE WIND OBSERVED. (KNOTS)
K. /		BEARING AND RANGE FROM CENTER OF MAXIMUM SURFACE WINDS. (DEG. AND NM)
L. /		EYE SHAPE AND DIAMETER (CIRCULAR, OVAL, CONCENTRIC). ORIENTATION OF MAJOR AND MINOR AXIS (TENS OF DEGREES/ NM). (Note 3)
M. /		MINIMUM HEIGHT AT STANDARD LEVEL. (MBS./METERS)
N. /		FLIGHT LEVEL/MAXIMUM TEMPERATURE OUTSIDE THE EYE* (METERS) (DEGREES CENTIGRADE)
O. /		FLIGHT LEVEL/MAXIMUM TEMPERATURE INSIDE THE EYE. (METERS) (DEGREES CENTIGRADE)
P. / /		ABSOLUTE ALTITUDE OF AIRCRAFT (METERS) MAXIMUM FLIGHT LEVEL WINDS NEAR CENTER (DEG AND KNOTS)
Q.		BEARING AND RANGE OF MAXIMUM OBSERVED FLIGHT LEVEL WINDS FROM CENTER. (DEG. AND NM)
R.		PRIMARY MEANS OF NAVIGATION: (Note 4)
S:		EYE CHARACTER: CLOSED WALL, POORLY DEFINED, OPEN SW, ETC.
T.		COMM ON CENTER DETER: COMBINE POSITIVE, FAIR, OR POOR WITH WIND TEMPERATURE PRESSURE. (Note 5)
U. / / / E W		AIRCRAFT POSITION IF RADAR FIX. (DEG./MIN.)
V.		REMARKS: RAIN FEEDER BANDS, CLOUDS IN EYE, ETC. (All After Item S are Optional.)
W.		
X.		
Y.		
Z.		

ITEMS K - V MAY BE DELAYED IF TIME IS CRITICAL.

*NAVY COMMUNICATIONS SUPPORT PLAN FOR EAST PACIFIC HURRICANE RECONNAISSANCE

1. General. C-121 type aircraft of Pacific Missile Range (PMR) will operate from Pt. Mugu California during the hurricane season. Reconnaissance observations initiated by the aircraft will be transmitted by voice/teletype via high frequency single side band (HF-SSB) to Fleet Weather Central Alameda (Fleet Weather Facility San Diego; back-up) for evaluation, editing and relay to HWO-SFO via the Hurricane Circuit. The HWO-SFO after coordination with HLO FLEWEACEN Alameda will provide hurricane advisories via the West Coast Hurricane Circuit to users requiring the information. These advisories will then receive further dissemination via the military communications system. A diagram of the Navy hurricane communications network is included as Attachment 1 to this Appendix.

2. Air/Ground Communications. Whenever possible USN Hurricane Reconnaissance aircraft will relay reports through the USN communications at FLEWEACEN Alameda, FLEWEAFAC San Diego or PMR PT Mugu. HF SSB Frequencies as assigned will be used. An immediate precedence is authorized for the voice transmission of these reports. Specific methods of handling Eastern Pacific hurricane reconnaissance messages are listed below for each station:

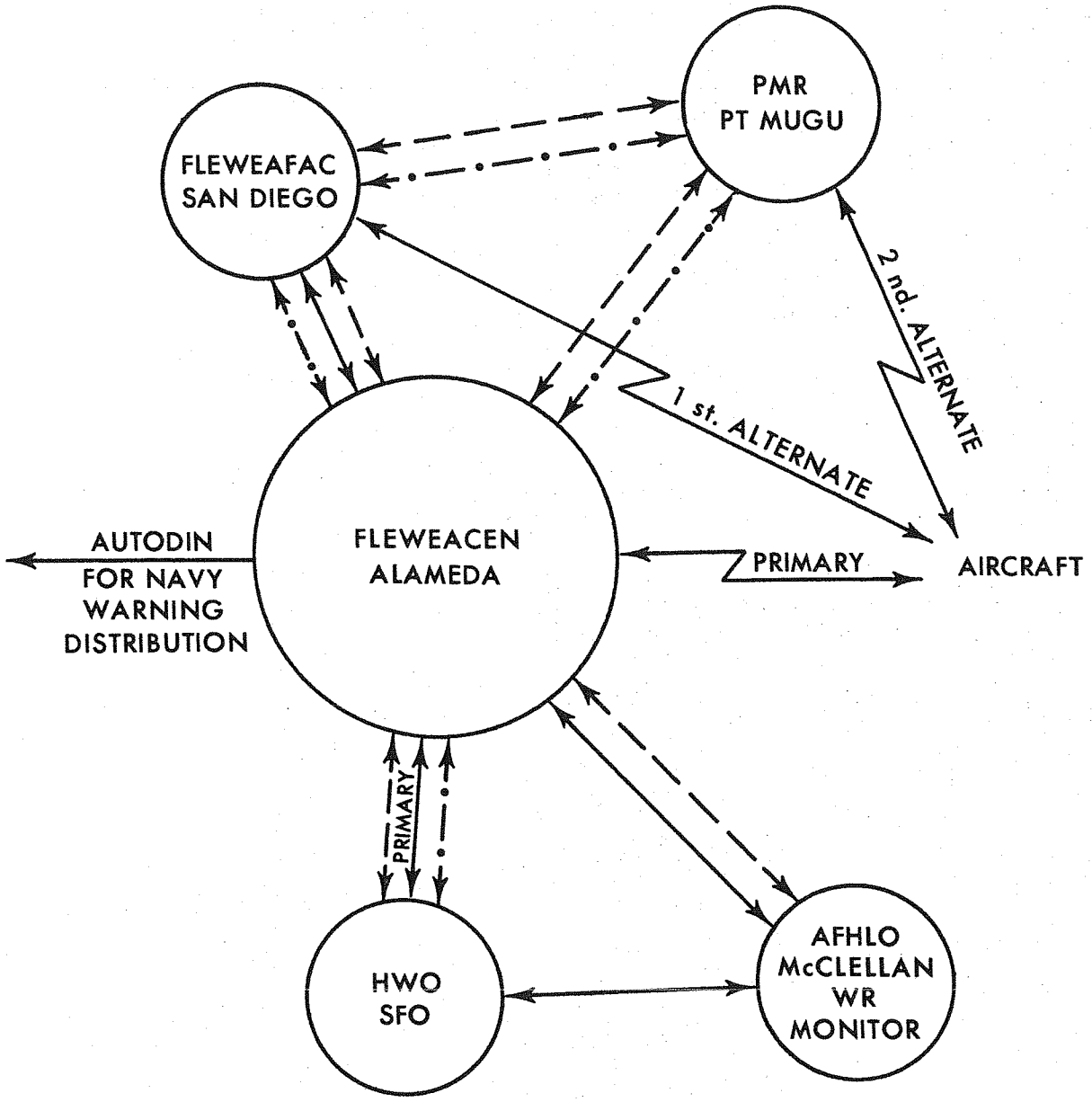
Primary Method
Direct (HF-SSB) between aircraft and FLEWEACEN Alameda.
Relay to HLO-SFO via NEDN/phone.

First Alternate
Direct (HF-SSB) between aircraft and FLEWEACEN San Diego.
Relay to HLO-SFO FLEWEACEN Alameda via NEDN/phone.

Second Alternate
Direct (HF-SSB) between aircraft and PMR PT Mugu
Relay to HLO-SFO via FLEWEACEN Alameda via NEDN/phone.

Note: Air/Ground comm facilities are also available at NavComSta San Francisco, NavComSta San Diego and McClellan or Albrook Airways.

*USN EAST PACIFIC HURRICANE COMMUNICATIONS DIAGRAM
ATTACHMENT 1



Legend:
Telephone ◄— —►
Navy Environmental Data Network (NEDN) ◄— • — • —►
Teletype ◄——► West Coast Hurricane Circuit unless noted
Single Side Band (HF-SSB) ◄~~►

Note: For emergency Air/Ground comm procedures, SSB.CW Comm Facilities are available at NavComSta San Francisco and NavComSta San Diego.

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USAF COMMUNICATIONS SUPPORT PLAN FOR USAF EAST PACIFIC HURRICANE RECONNAISSANCE

*1. General. If the Air Force is called upon by the Navy to perform hurricane reconnaissance in the Eastern Pacific, this communications support plan will apply. Reconnaissance observations initiated by these aircraft will be transmitted by voice via high frequency single sideband (HF SSB) radio through the USAF aeronautical station complex to a weather monitor at McClellan AFB, California. The weather monitor will evaluate and edit the reports to ensure meteorological and technical accuracy. The monitor will then relay these monitored reconnaissance reports via the West Coast Hurricane Circuit and COMET II to all customers requiring this information. The HWO-SFO will provide the Air Force Hurricane Liaison Officer, McClellan (AFHLO, MCC) with hurricane advisories. These advisories will be sent to Tinker Weather Relay Facility (KWRF) on COMET II for further distribution over the military weather communications system. A diagram of the USAF hurricane communication network is included as Attachment 1 to this Appendix.

2. Air/Ground Communications.

a. Whenever possible, USAF hurricane reconnaissance aircraft will relay reports through the USAF aeronautical stations at McClellan or Albrook, in that order. HF SSB frequencies to be used are listed in the appropriate USAF/USN Flight Information Publications, Enroute Supplement. When specifically requested by the aircrew and circuit conditions will permit, a direct voice phone patch between the aircraft and the weather monitor at McClellan AFB will be provided by the aeronautical station. To facilitate such voice patching, a hot line has been provided between the McClellan Airways Station and the McClellan Weather Monitor. An "Immediate" precedence is authorized for the voice transmission of these reports. Specific methods of handling Pacific hurricane reconnaissance messages are listed below for each station:

PRIMARY METHOD	FIRST ALTERNATE
McClellan Airways:	
Direct phone patch between reconnaissance aircraft and McClellan monitor via hot line.	Air/Ground operator copy transmission from aircraft; relay to McClellan monitor via hot line.
Albrook Airways:	
Air/Ground operator copy transmission from aircraft; voice relay to McClellan weather monitor using shared base AUTOVON facilities 633-6810 or 633-6755.	Air/Ground copy from aircraft; teletype relay to Det 19, Wea Sq, McClellan AFB, via Air Operations Network (AIROPNET) immediate precedence message.

b. The following is a typical sequence of actions required for passing an observation message from the aircraft through the McClellan Aeronautical Station to the receiving facility at McClellan weather monitor:

(1) MCCLELLAN - THIS IS LARK ONE - ON FOUR SEVEN - OVER.

(2) LARK ONE - MCCLELLAN - GO AHEAD.

(3) MCCLELLAN - LARK ONE - REQUEST IMMEDIATE PHONE PATCH TO MCCLELLAN WEATHER MONITOR - OVER.

(4) LARK ONE - MCCLELLAN - STAND BY.

(5) The A/G operator then conditions his console for a ground subscriber call and calls the McClellan addressee using the direct hot line. When the McClellan party answers, the operator advises:

(6) THIS IS MCCLELLAN - STAND BY FOR PHONE PATCH FROM LARK ONE - OVER.

(7) ROGER - STANDING BY.

(8) The A/G operator then conditions his console for phone patch and advises the aircraft:

(9) LARK ONE - THIS IS MCCLELLAN - YOUR PATCH TO MCCLELLAN MONITOR IS READY - GO AHEAD.

(10) MCCLELLAN MONITOR - THIS IS LARK ONE - MESSAGE FOLLOWS - BREAK BREAK - LARK ONE AGATHA FOUR TEXT TEXT TEXT - OVER.

(11) LARK ONE - MCCLELLAN MONITOR - ROGER - OUT.

(12) LARK ONE - OUT.

(13) The McClellan Air/Ground operator then breaks the patch.

c. If at Item 10 McClellan monitor has any question or comment on the observation message, it will be resolved prior to discontinuation of the patch. If at Item 3 above the phone patch cannot be provided, the following sequence of actions would be typical:

(1), (2) and (3). See paragraph 2b above.

(4) LARK ONE - MCCLELLAN - UNABLE TO PROVIDE PATCH AT THIS TIME - YOUR SIGNAL IS NOT PATCH QUALITY - I CAN PROVIDE RELAY TO ADDRESSEE - OVER.

(5) MCCLELLAN - LARK ONE - PASS TO MCCLELLAN WEATHER MONITOR - BREAK BREAK - LARK ONE AGATHA FOUR TEXT TEXT TEXT - OVER.

(6) MCCLELLAN

(7) The Air/Ground operator then passes the copied message to the Coordinator for relay to McClellan monitor via hot line.

d. Regular hurricane mission messages will include the unit indicator (LARK), followed by the numerical mission number (ONE), the name of the tropical cyclone (AGATHA), and the numerical sequence of reports during a flight (ONE, etc.).

Examples:

First tropical cyclone, first mission, first report
LARK ONE AGATHA ONE

First tropical cyclone, second mission, tenth report
LARK TWO AGATHA TEN

Second tropical cyclone, first mission, fifth report
LARK ONE BRIDGET FIVE

e. Diverted hurricane search missions will append a plain language explanatory message to the last scheduled position message; for example:

LARK BRAVO DIVERTED NEXT MSG LARK ONE CYCLONE, or
LARK BRAVO DIVERTED NEXT MSG LARK ONE AGATHA

f. Reconnaissance messages from suspicious areas will read:

LARK ONE CYCLONE, etc.

Reconnaissance mission messages into suspicious areas will be numbered consecutively without regard to the tropical cyclone itself; i.e., first reconnaissance of a suspicious area during the season will be LARK ONE CYCLONE etc., with the next suspicious area investigated identified as LARK TWO CYCLONE, etc.

3. Point-to-Point Teletype Communications Capability. USAF teletype facilities provided in support of the hurricane reconnaissance effort will be configured as follows:

a. A leased half-duplex send/receive 100 wpm circuit will be installed with terminations at AFHLO McClellan, HWO-SFO and Alameda Fleet Weather Central. This circuit is designated as the West Coast Hurricane Circuit. AFHLO McClellan is designated as the net control station and maintains circuit discipline. Authorized uses of this circuit are:

(1) Aircraft hurricane traffic received at McClellan via hot line will be relayed to SFO and Alameda over this circuit.

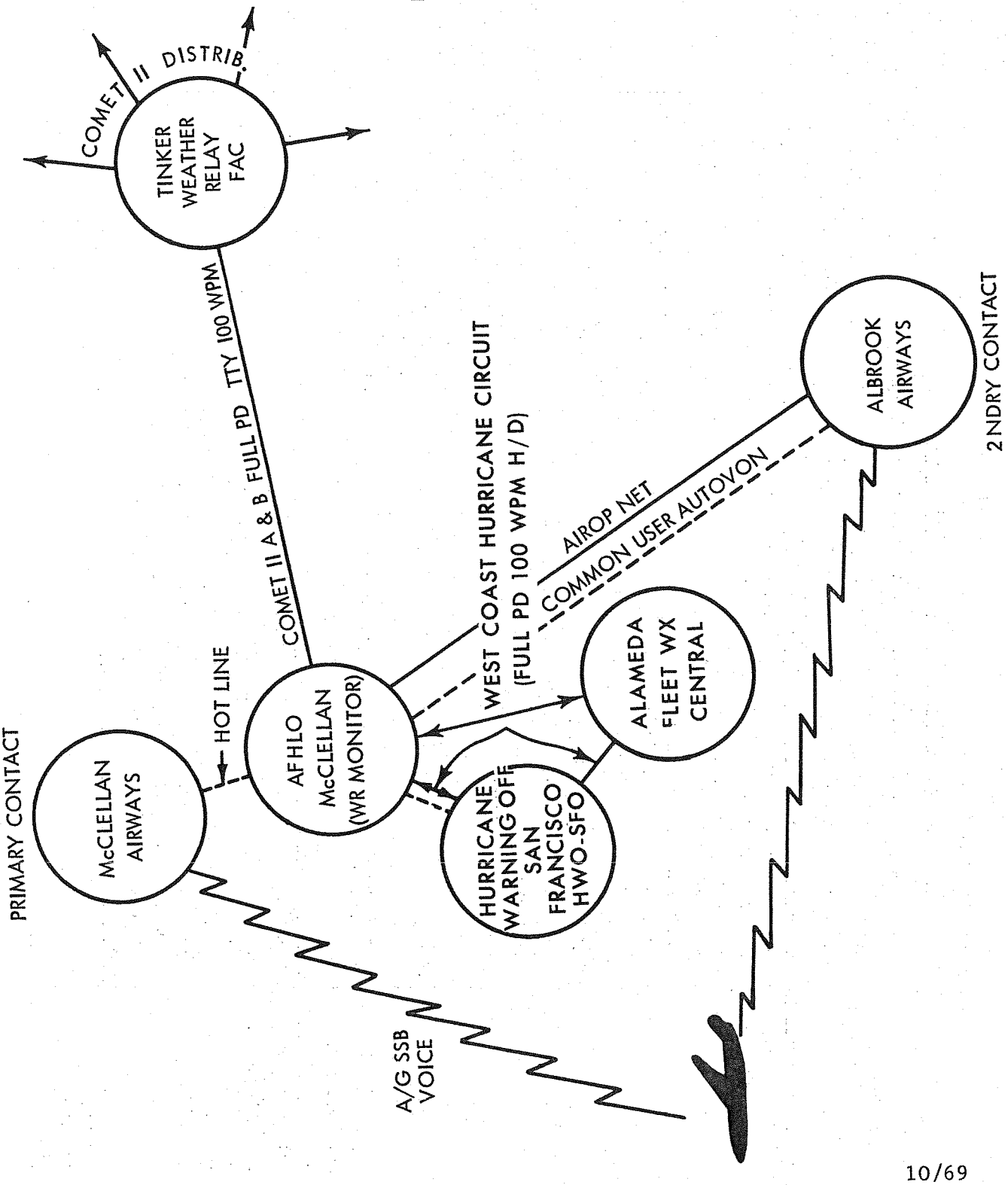
(2) Coordination of requests for reconnaissance and other related matters between TCRC - McClellan, FWC-Alameda and HWO-SFO will be handled over this circuit.

b. A COMET IIA drop is installed at McClellan AFB and will be used to introduce hurricane reconnaissance reports and hurricane advisories into the dedicated military weather communications system for further distribution as required.

4. Miscellaneous Communications Services and Support. Routing communications between weather reconnaissance aircraft and USAF Aeronautical Stations for normal air traffic control services will be handled in accordance with standard procedures.

USAF EAST PACIFIC HURRICANE COMMUNICATION SYSTEM

Attachment 1



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ATLANTIC AND EASTERN PACIFIC

JOINT REQUIREMENTS FOR AIRCRAFT RECCO DATA

Data required	Altitudes at which data are required	Areal portion of cyclone in which data are needed	Time or frequency of observation	Accuracy required
Location of eye or center	At 700 mb or any lower level except at or below 1500 feet for tropical cyclones with max winds less than 50 knots.* Flights may be made at 500 mb. in tropical cyclones with winds of 100 knots or higher, if dropsonde capability available.	At center or within radar range	Every 6 hours at 00Z, 06Z, 12Z and 18Z except additional 3-hourly fixes at 03Z, 09Z, 15Z, and 21Z for tropical cyclones within 500 miles or 48 hours of any land areas and not within range of land based radar. Eastern Pacific - Two fixes 6 hrs. apart when tropical cyclone is within 600 miles of U.S. coast otherwise one fix per day.	± 10 mi.
Dimensions and configuration of eye	At 700 mb. or any lower level	"	"	Indeterminate
Central pressure	Surface	At center	"	± 2 mb.
Radius of maximum winds**	Surface or by doppler radar at a level in the middle or lower troposphere from which surface winds can be derived.	Wherever maximum winds are found, but usually within 50 miles of center	"	± 5 mi.
Strength of maximum winds**	"	"	"	± 5 kt.

Atlantic only. Radius of winds of 65 kts, 50 kts, and 30 kts**	"	Throughout storm out to radius of 30 knot winds	"	± 10 mi.
Vertical structure of tropical atmosphere	Flight level to surface	Enroute to cyclone and return	Dropsondes every 400 miles for flights at 700 mb, every 450 miles for 500 mb flights, every 500 miles for 300 mb. flights	± 2 mb. at surface and to 0.5°C and 10 meters at upper levels
Peripheral data for forecasting tropical cyclone movement	500 mb. supplemented with 700 mb. and surface data by dropsonde	As requested in POD, depending upon availability of other data.	Twice per day geared to 00Z and 12Z upper air data when storm is within 500 miles of any land area for which U.S. has forecast responsibilities.	± 5 kt. 0.5°C 10 meters
Temperature gradient across eye	Level of penetration	At center	Whenever center fix is made	0.5°C
Winds, pressure heights and weather in suspicious areas	Daily tracks as per interservice agreements. At 700 mb. or as low as 1500 ft. for investigative flights as required	Variable radius 100-300 mi.	Daily tracks as per interservice agreements. Special investigative flights as required.	± 5 kt. 10 meters
Radar echoes and direction of Cb blowoffs	"	Radar Echoes-Areas outside the principal rain shield. Blowoffs - where encountered.	Irregular	Indeterminate
True temperature	300 mb.	110 degree sector to right of storm heading (right front quadrant)	Either approach or departure from eye center. Observation at 10 mile intervals within 60 miles of the center.	1°C

*Low level reconnaissance to be terminated whenever in the judgment of the aircraft commander the safety of the aircraft and crew would be jeopardized by continuing.

**Navy requirement for these data is at an altitude of 1500 feet or below.

CHAPTER 5

ATLANTIC

JOINT RADAR HURRICANE OBSERVING AND REPORTING PLAN

1. General. Radar observations of hurricanes will be taken and reported at radar stations of the Air Force, Navy and Weather Bureau in accordance with the plan and procedures described in the paragraphs which follow. Radar stations of other cooperators will provide radar observations of hurricanes on a voluntary basis in accordance with arrangements which are in effect between them and the Weather Bureau.

2. Procedures for taking radar observations of hurricanes will be those given in the Weather Radar Manual (WBAN).

3. Participants. Participating radar stations are listed below. If radar observations are needed from participating Air Defense Command (ADC) Radar Squadron and/or Aircraft Control and Warning (AC&W) sites and Federal Aviation Administration ARTCC, the Weather Bureau will furnish the necessary weather radar operators for the purpose of making and transmitting these observations. (See Sections 6 and 7 below.)

When a tropical cyclone situation exists and special radar observations from specific Air Force Eastern Test Range (AFETR) stations are desired, the NHC (through CARCAH) will request such observations from Detachment 11, 6th Weather Wing, Patrick AFB, Florida, via AUTOVON telephone 485-5322.

The AFETR stations normally report routinely three times per day, but will be requested to take hourly or half-hourly observations when needed. These observations will be taken as requested on a non-interference basis with live missile test support. The radar reports will be sent to the Patrick AFB weather station via the down range circuit 1L61 (commercial #1052). The Patrick AFB weather station will immediately transmit these reports to the NHC via circuit 1L20 (Internal WB Rarep and Warning Coordination System - RAWARC #23421). When a hurricane is approaching, each AFETR station is capable of taking radar observations until the surface winds reach a sustained speed of 45 knots.

*(5) 35 Air Division (continued)

*907 Radar Sq, Buck's Harbor AFS, Maine	44° 38' N,	67° 24' W

f. Air Force Eastern Test Range Stations

Cape Kennedy, Fla.	Mod II SCR 584 S Band	28° 30' N,	80° 35' W
Grand Turk	Mod II SCR 584 S Band	21° 30' N,	71° 09' W

4. Procedures to be Used When Radar Units are Co-located (Within 25 Miles).

a. When WB, AWS, NWS or ADC Radar Squadron and AC&W radar stations are co-located (within 25 miles) the WB WSR-57 radars will be the primary source of reports of storm and storm eye characteristics. AWS, NWS, or ADC radar units will provide backup service in case the WSR-57 radar fails.

b. When radar units (less powerful than the WSR-57) are co-located with an ADC radar unit or other more powerful unit, the ADC unit will be the primary source of reports of storm and storm eye characteristics providing it is manned by a competent weather radar operator. The less powerful units will provide backup or coordination service.

c. Normally only the hurricane radar reports from the primary source as defined above will be transmitted. However, when significant phenomena are detected by any of the other co-located radars but not by the primary source, such phenomena should be reported.

d. Consultation between all radar sites will be by telephone.

5. Communications. Hurricane observations must be transmitted in a manner to assure receipt at the NHC with the least possible delay. In essence, communications procedures are directed towards getting hurricane radar data onto RAWARC circuit 23421 or T/T circuit 7072 with a minimum number of relays, as quickly as possible. Air Force and Navy stations not having transmission capability on circuits 23421 or 7072 may use COMET II as an alternate means. When commercial telephone is used to pass hurricane observations to a Weather Bureau office, the Weather Bureau will accept "reverse charges" calls for this purpose. The following procedures will be used in communicating hurricane radar observations:

a. From ADC Sites:

(1) Commercial telephone to the nearest WB office for entry on weather teletypewriter circuits, or

(2) Hot line to the supporting base weather station for entry on weather teletypewriter circuits.

b. From AWS Weather Stations: Radar Reports (RAREPS) and other hurricane observation information received or observed will be transmitted every half hour at H+15 and H+45 on RAWARC circuits 23420 or 23421 if they have send-receive capability on either of these circuits. If not, hurricane observation information from those stations listed in para. 3(c) above will be transmitted via COMET II as an alternate.

c. From Weather Bureau Offices: RAREPS and other hurricane observation information received or observed will be transmitted over either RAWARC circuit 23420 or 23421 every half hour at H+15 and H+45.

d. From NWS Weather Stations:

(1) NWS stations having send-receive drops on either RAWARC circuits 23420, 23421 or T/T circuit 7072 shall transmit reports on one of these circuits every half hour at H+15 and H+45. If not, those stations having transmit capability on COMET II will transmit hurricane observations by that circuit as an alternate means.

e. From Federal Aviation Administration ARTC Centers: Hurricane information will be telephoned to the nearest Weather Bureau station having a drop on either teletypewriter circuits 23420, 23421 or 7072.

6. Procedures for Detailing Weather Bureau Weather Radar Operators to ADC Sites to Make Hurricane Radar Observations.

a. The Director of the WB has been authorized to send WB radar meteorologists to ADC radar sites on the Atlantic and Gulf Coasts during periods when hurricanes threaten these regions for the purpose of making and reporting hurricane radar observations. In order to expedite the granting of access to a site and to maintain proper security measures, the following procedures will be used:

(1) The WB must notify the appropriate coordinator by wire or telephone of the intent to visit a site. Notification will normally be done by the responsible regional headquarters, but in case this function can not be so handled, the Emergency Warning Section, Silver Spring, Md. will make the necessary arrangements. The coordinator will notify the site commander(s) concerned of the impending visit. This notification will include name, security clearance, and date(s) of the visit.

(2) Staff weather offices at the Air Defense Command Air Divisions indicated in paragraph 3e will act as coordinators for these visits. Addresses and commercial telephone numbers for these staff weather officers are:

(a) 31 AD - Commander, Det 6, 29 Wea Sq, Oklahoma City AFS, Oklahoma. Telephone area code 405, 737-1481 Ext. 721.

(b) 32 AD - Commander, Det 23, 12 Wea Sq, Gunter AFB, Alabama. Telephone area code 205, 272-7490 Ext. 7765.

(c) 33 AD - Commander, Det 41, 12 Wea Sq, Ft. Lee AFS, Virginia. Telephone area code 703, 731-2893 Ext. 765.

(d) 35 AD - Commander, Det 27, 12 Wea Sq, Hancock Field, Syracuse, N. Y. Telephone area code 315, 458-5500 Ext. 765.

*

b. The WB personnel are authorized to use government quarters and messing facilities. They are authorized to visit site operations to view and transmit radar weather observations from the PPI and RHI scopes. Normal commercial telephone facilities will be used to transmit hurricane information to the nearest WB location.

c. Due to the limited facilities at some sites, the WB agrees that not more than two persons will visit a site at any given time. Each visit will normally be short, one or two days, but will depend upon the progress of the hurricane under observation.

d. The persmission to visit and security status of the WB personnel listed in paragraph 6e below must be on file at the ADC radar sites listed in paragraph 3e above. It will be the responsibility of the Emergency Warning Section, WXAP, WBH, Silver Spring, Md. to coordinate additions, changes, and/or deletions in this list with Headquarters ADC at least two weeks in advance of the effective date of the change. The coordinating correspondence from the WBH to ADC should refer to this document and paragraph and will include the security clearance, effective date, and authority for the clearance. Correspondence should be addressed as follows:

Hq ADC (ADOWX)
Ent AFB, Colorado 80912

After authorization, Hq ADC (ADOWX) will notify the Air Division Staff Weather officers and ADC radar sites of additions (or deletions) from the list of authorized WB personnel.

e. The following ESSA/Weather Bureau personnel have the indicated security clearances and are authorized by ADC USAF to visit ADC radar sites listed in Section 3e. above, when paragraphs 6a(1) and (2) above have been complied with. Positive identification must be presented to the ADC radar site entry post before entry to the site will be granted. The purpose of these visits is the making and transmitting radar hurricane observations. These personnel have also been authorized by the FAA to visit the ARTC centers listed in Section 7 for the same purpose:

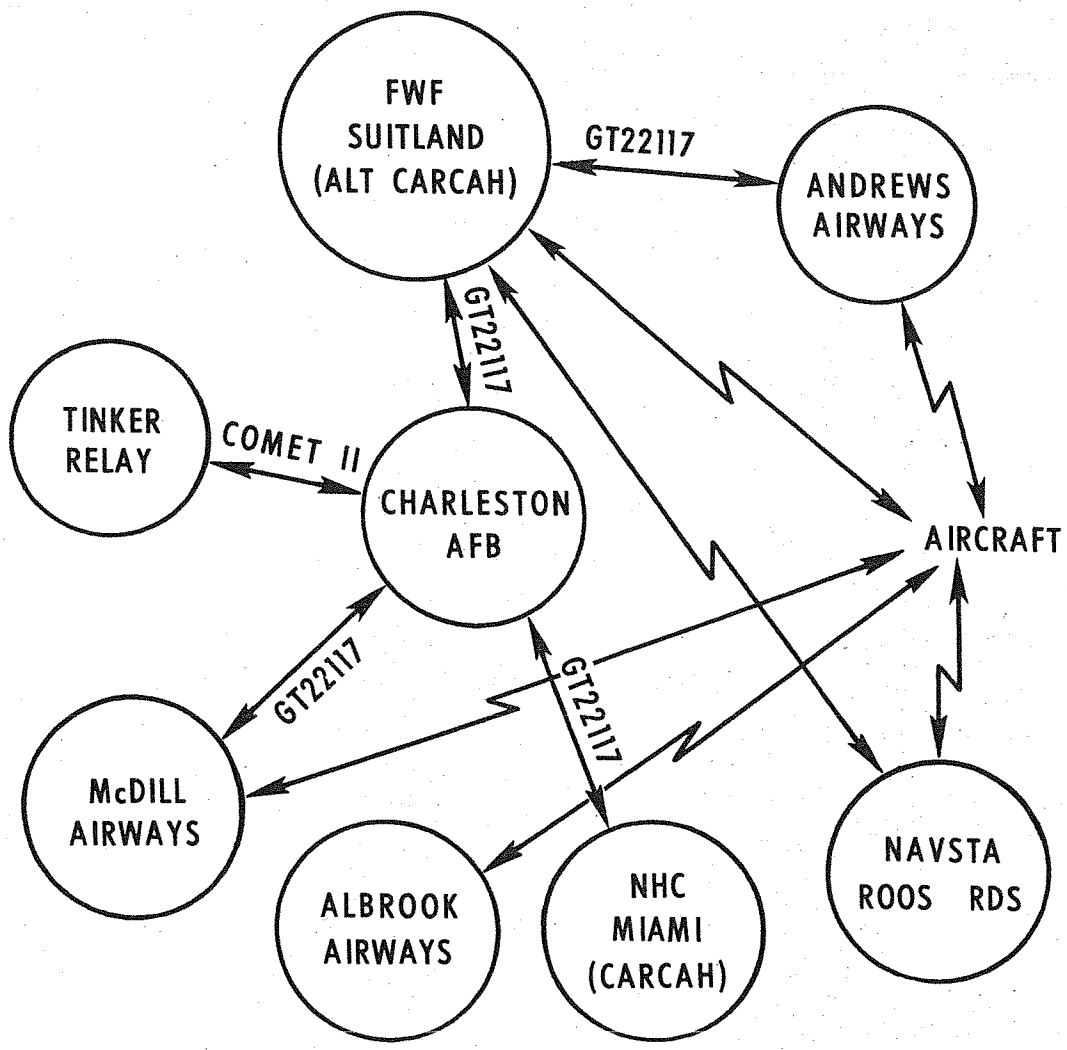
CHAPTER 5

NAME	SECURITY CLEARANCE	AUTHORITY			
Baskerville, Robert W., Jr.	Secret	Investigation	by	OIS*	4-11-69
Benton, Davis	"	"	"	"	8-04-60
Bigler, Stuart G.	"	"	"	CSC*	11-24-59
Black, Dale A.	"	"	"	"	7-05-56
Bowser, Carl O., Jr.	"	"	"	OIS	4-14-69
Capo-Dominguez, Rafhel A.	"	"	"	CSC	3-14-67
Carlson, Arthur C.	"	"	"	"	9-06-66
Clay, Dale A.	"	"	"	"	5-15-63
Dooley, J. T.	"	"	"	"	5-03-57
Drybala, Francis J.	"	"	"	"	4-05-68
Fisher, Robert E.	"	"	"	"	1-07-66
Flanders, Allen F.	"	"	"	"	8-09-57
Foster, Harrie E., Jr.	"	"	"	OIS	10-26-56
Fuertsch, Francis E.	"	"	"	CSC	12-10-68
Hagood, Leroy B.	"	"	"	"	6-29-60
Hamilton, Robert E.	"	"	"	"	1-05-66
Harris, Gordon W.	"	"	"	OIS	1-16-63
Hexter, Paul L., Jr.	"	"	"	CSC	4-11-58
Hull, Albert J.	"	"	"	"	3-02-56
Hurlbut, Sam R.	"	"	"	"	6-29-62
Johnson, Clyde C.	"	"	"	"	8-02-60
Keener, Robert W.	"	"	"	"	4-11-68
Lee, John P.	"	"	"	OIS	3-01-63
Logan, Wendell B.	"	"	"	"	12-19-68
Marier, Donald W.	"	"	"	CSC	11-05-62
Monroe, Harold J., Jr.	"	"	"	"	6-12-61
Oldmixon, Donald H.	"	"	"	"	7-07-59
Parrish, Samuel K.	"	"	"	"	10-27-60
Pentecost, Joseph B.	"	"	"	"	6-05-59
Phipps, Carl L.	"	"	"	"	9-16-57
Prosser, Arthur E., Jr.	"	"	"	"	4-10-68
Pruett, Jeter A.	"	"	"	"	9-24-64
Robinson, John M.	"	"	"	"	4-10-68
Sadowski, Alexander F.	"	"	"	"	7-24-59
Samet, Alvin M.	"	"	"	"	4-09-68
Sarnowski, Edward	"	"	"	"	8-24-65
Schonberger, Abram	"	"	"	OIS	11-15-60
Schulz, Walter A., Jr.	"	"	"	CSC	7-05-66
Sheffield, Richard K.	"	"	"	"	12-20-55
Smith, Robert L.	"	"	"	OIS	4-15-54
Teague, Jack L.	"	"	"	CSC	5-05-65
Thomas, Billy D.	"	"	"	"	7-29-60
Warden, John D.	"	"	"	"	5-24-60
Wells, Fred E.	"	"	"	"	10-16-59
Williams, Milton L.	"	"	"	"	7-18-60
Wilk, Kenneth E.	"	"	"	"	12-06-62
Whitehead, Robert E.	"	"	"	OIS	7-21-60

* OIS - Office of Investigation and Security
  CSC - Civil Service Commission

ATTACHMENT 1

FLEWEAFAC JACKSONVILLE COMMUNICATIONS DIAGRAM (SECONDARY)



LEGEND:

TELETYPE ⟷

SSB ⟷

NOTE: AUTOVON available between all activities.

CHAPTER 8

EASTERN PACIFIC
ALTERNATE HURRICANE WARNING OFFICE

*Actions of the U. S. Weather Bureau Alternate Hurricane Warning Office, Los Angeles, California, in case of failure of normal operations at the Hurricane Warning Office (HWO), San Francisco and the HLO FLEWEACEN Alameda:

1. Pacific ship reports normally received at HWO-SFO will be rerouted by communication agencies concerned to METEO, Los Angeles where they will be received on Western Union tieline, TWX, or local Coast Guard Teletype circuit. FWC Alameda will telephone selected ships in area of concern to HWO-LAX.

2. Pacific ship reports received at Alternate HWO-LAX will be given to FAA Flight Service Station (FSS) Los Angeles (LAX) for transmission on Service C Circuit 35 and Service O Circuit 8274. Military stations not on either of these circuits will receive them as relayed on COMET III.

*3. ALT HLO FLEWEAFAC San Diego will telephone hurricane reconnaissance reports to HWO-LAX.

4. Coordination and liaison with ALT HLO FLEWEAFAC San Diego and the Air Force Hurricane Liaison Officer, McClellan Air Force Base will be by conference telephone calls.

*5. Requests for hurricane reconnaissance flights will be made by telephone to the ALT HLO FLEWEAFAC San Diego.

*6. After telephone coordination with FLEWEAFAC San Diego and AFHLO McClellan, final military tropical cyclone forecasts using WB Form 656-6 will be read to FLEWEAFAC San Diego for entry on military communication circuits. FLEWEAFAC San Diego will enter the forecast on COMET II and insure distribution to Navy users via AutoDin.

7. Public bulletins, advisories and warnings from Alternate HWO-LAX will be transmitted on Services C and O and will be available to military bases with drops on these circuits.

*8. The above procedures apply when failure of normal operations occur simultaneously at HWO San Francisco and FLEWEACEN Alameda. In cases where FLEWEACEN Alameda remains operational substitute HLO FLEWEACEN Alameda for ALT HLO FLEWEAFAC San Diego.