Annex B

USS HORNET

APOLLO 11

CRUISE REPORT

CTF130.1:03:JJM:sjd
13800
Ser: 1668
31 July 1969

FIRST ENDORSEMENT on CO USS HORNET (CVS12) ltr ser 1664 dtd 31 July 1969

From: Commander Task Group 130.1
To: Commander Task Force 130

Subj: Apollo 11 Post Mission Report

Ref: (a) Commander, Hawaiian Sea Frontier OPPLAN 306-67

1. As directed by reference (a), the Post Mission Report for the Apollo 11 recovery operation is submitted. USS GOLDSBOROUGH (DDG-20) will submit a separate report. Tape recordings of major communications circuits have been delivered.

2. Although the greatest single item of concern during the early stages of preparation was the late designation of HORNET as the Primary Recovery Ship, the experience and dedication of CTF-130 personnel, representatives of NASA, employees of the Long Beach Naval Shipyard, and NAVAIRPAC staff personnel rapidly eliminated this time gap as a factor. The first Apollo 11 conference aboard HORNET on 11-12 June set the stage, as important organizational and directive decisions were made which established the tone for the entire mission--one of hard work and cooperation on the part of all hands. The result was a highly successful and satisfying recovery operation. Other factors which had a definite and favorable influence on the outcome were:

a. Early liaison with and receipt of practical information and guidance from the Apollo 10 recovery ship, USS PRINCETON (LPH-5).

b. An outstanding effort within a very restricted time frame by Naval Shipyard, Long Beach in connection with electronic repair and installation of the NASA winch. Outstanding support by the Naval Shipyard, Pearl Harbor in making final preparations prior to departure for the recovery area.

c. Positive and intelligent solutions of problems as they arose by responsible officers of the ship's company and the NASA team aboard.

d. Thorough and well paced training for the PRS team in Hawaii and while enroute to the primary end-of-mission landing area.

e. Excellent communications throughout the mission.

3. Effective liaison and planning was evident among representatives of CINCPAC, CINCPACFLT, CTF-130, the Primary Recovery Ship and White House Staff personnel. The spirit of cooperation combined with practical knowledge enabled Recovery and Presidential Visit requirements to be melded together smoothly.

4. Execution of the schedule on Recovery Day was facilitated by determination of all press/photographic requirements and movements during practice sessions. The cooperation of the press during the actual recovery operations was outstanding.

5. Study concerning the problem of stationing the Primary Recovery Ship in relation to the predicted splash-down point will continue. Recommendations will be made prior to planning conferences for the Apollo 12 Mission.

C. J. Seiberlich

C. J. SEIBERLICH

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USS HORNET (CVS-12)
Fleet Post Office
FPO San Francisco 96601

CVS12:03:JJM:dm
13800
Ser 1664
31 July 1969

From: Commanding Officer, USS HORNET (CVS-12)
To: Commander Task Force 130
Via: Commander Task Group 130.1

Subj: Apollo 11 Post Mission Recovery Report

Ref: (a) Commander Hawaiian Sea Frontier OPLAN 305-67

Encl: (1) Daily Summary of Operations
(2) Operations Summary
(3) Public Affairs Summary
(4) Communications Summary
(5) Supply Summary
(6) Weapons Department Summary
(7) Engineering Summary
(8) Navigation Summary
(9) Shiphandling Summary
(10) Air Department Summary
(11) HS-4 Summary
(12) UDT Summary
(13) VAW-111 DET 12 Summary
(14) VC-1 Summary
(15) VR-30 Summary
(16) Medical Summary
(17) Aircraft Intermediate Maintenance Summary

1. In accordance with reference (a), enclosures (1) through (17) are submitted.

C. J. Seiberlich

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DAILY SUMMARY OF OPERATIONS

1. Listed below is a summary of major events as they occurred in support of the Apollo Eleven recovery mission:

DATE	EVENT
1 June	HORNET nominated for Prime Recovery Ship (PRS) for Apollo 11.
5 June	Designated as PRS.
12 June	Held PRS planning conference aboard HORNET.
21-25 June	Onloaded various support equipment from ABC, Western Union, International and General Electric.
26 June	Departed Long Beach enroute San Diego. Onloaded HS-4 and their support equipment in support of recovery operations.
26 June-2 July	Enroute Pearl Harbor.
2 July	Chopped to CTF 130.
3 July	Commenced training program for Apollo 11 recovery. General briefings were conducted by NASA and CTF 130. Communications briefings were held. Public Affairs Officers met for briefings.
4-6 July	On loaded additional support equipment in support of recovery operations.
7 July	Underway for at-sea recovery training. Four day and two night boilerplate (dummy command module) recoveries were made utilizing the B & A crane as pickup vehicle. Astronaut practice recoveries executed during each evolution. Debriefs held on all recoveries.
8 July	Conducted two boilerplate recoveries utilizing B & A crane and tilly (portside). Conducted one night recovery. Debriefs were held on all recoveries. C-130 aircraft made two successful STAR pickups from the flight deck.
9 July	Conducted first full scale SIMEX with the B & A crane boilerplate recovery. Entered Pearl Harbor.
10 July	Loading and resupply Operations.
11 July	Presail briefing conducted. Final loading completed. Remainder of NASA and Press personnel arrived.
12 July	Underway for Mid-Pacific line (MPL) launch aboart station. General briefings held for all hands. Press conferences held 1600.

DATE	EVENT
13 July	Press conferences held twice daily, usually at 0800 and 1600, until return to Pearl Harbor.
14 July	Conducted SIMEX 2, night recovery of module from deep space. B & A crane used. Welcomed Davy Jones and party aboard in anticipation of crossing the line ceremonies tomorrow.
15 July	Crossed into Realm of Neptunus Rex. Over 600 HORNET and civilian personnel became Trusty Shellbacks.
16 July	Conducted boilerplate exercises. Held one daylight pickup by B & A crane utilizing steel cable and 6 foot nylon strap.
17 July	Conducted boilerplate exercise. Held one daytime pickup by B & A crane utilizing steel cable with 8 foot nylon strap.
18 July	SIMEX 3 conducted utilizing B & A crane recovery method.
19 July	SIMEX 4 conducted with simulated arrival of the President. Retrieved boilerplate twice with tilley, first starboard forward and second port aft using 12 foot strap.
21 July	Full scale SIMEX 5 conducted as near to actual recovery situation as possible including arrival of "UNITED STATES". Recovery method was by B & A crane.
22 July	HORNET replenished NSFO and supplies from HASSAYAMPA. RADM DAVIS (CTF 130) welcomed aboard.
23 July	Final preparations for Apollo 11 pick-up. ADM McCAIN (CINCPAC) welcomed aboard. Recovery station moved north to 13-27N/169-16E due to adverse weather.
24 July	On station Apollo recovery position. President Nixon arrived on board. Apollo Eleven Crew recovered by helicopter (See narrative of recovery) Command Module brought aboard by HORNET and UDT 11 recovery teams.
25 July	Enroute Pearl Harbor.
26 July	Arrived Pearl Harbor. Off loaded MQF's, Command Module and associated NASA equipment. Held Post Mission Debrief. Released to COMFIRSTFLT OPCON.

Enclosure (1)

DETAILED SEQUENCE OF EVENTS
24 JULY 1969

2. Listed below is the sequence of events for 24 July 1969 during the recovery of Apollo 11. All times listed are GMT, local time was XRAY (+11):

GMT	SEQUENCE OF EVENTS
1518	LAUNCHED AIRCRAFT: FIVE SH-3D's and three E-1B's.
1600	MARINE ONE 12 miles from HORNET.
1603	1MC Announcement: "United States arriving".
1604	Hawaii Rescue ONE (HC-130) on station.
1605	Hawaii Rescue TWO (HC-130) on station.
1612	President arrived in MARINE ONE.
1613	President greeted by CINCPAC, CTF 130 and Commanding Officer.
1614	President entered Hangar Bay TWO.
1617	President inspected MQF.
1618	President inspected BIG.
1619	President departed Hangar Bay TWO.
1633	All aircraft on station; ship speed 14 kts., steering north by northeast.
1635	Apollo 11 entry.
1636	Begin blackout.
1639	End blackout. Rescue ONE and Rescue TWO reported S band contact. Rescue ONE reported visual fireball.
1640	Rescue TWO reported visual fireball. HORNET radar contact 230 degrees true 130NM. HORNET Lookouts reported visual fireball 210 degrees true.
1642	HORNET radar contact 65NM. Drogues.
1644	Double sonic boom reported by lookouts.
1645	Mains.
1646	RELAY reported Command Module three main chutes and flashing light.

GMT	SEQUENCE OF EVENTS
1646	HORNET established communications with Apollo 11. Crew reported "in good shape".
1648	Swim ONE, Swim TWO, Recovery and HORNET reported recovery beacon contact. CM passing 2500 feet.
1649	Swim ONE reported visual contact with Apollo 11 as it passed through 800 feet. Apollo 11 splash down.
1650	Apollo 11 reported in Stable TWO.
1651	Dye marker deployed; chutes severed. RECOVERY on station.
1654	Three helos on scene; 11.5 miles to CM; heading S.W.
1655	Speed 20 kts; CM 11.4 miles dead ahead.
1656	Apollo 11 in Stable ONE.
1658	First swimmer in water.
1700	Swim team #2 in water.
1701	Astronauts reported their check off list complete. Three swimmers in water; flotation collar in water; speed 22 kts.
1703	Flotation collar installed and inflated.
1704	Raft in water.
1705	Raft inflated and tethered to the CM.
1707	Sea anchor deployed from raft #2. BIG swimmer in water.
1709	Bag of BIGs and decontaminate lowered to raft #2.
1711	Astronauts reported, "All of us excellent. Take your time."
1712	BIG swimmer dons garment.
1713	Range 7 miles.
1715	Range 6.25 miles, report by astronauts to the effect that they are doing fine. Their spacecraft "not as stable as HORNET, but stable enough."

GMT	SEQUENCE OF EVENTS
1717	Raft 10 feet from CM; range 5.5 miles.
1718	BIG swimmer in raft #1, secured it to CM.
1719	BIG swimmer placed bag of BIGs in CM.
1720	BIG swimmer made preparations for CM decontamination.
1725	Range 2.75 miles; course 244; speed 21 kts.
1727	Astronauts open hatch and commence exit; first astronaut in raft.
1728	Second astronaut in raft.
1729	Third astronaut in raft.
1731	BIG swimmer secures hatch. All water wings inflated.
1733	Speed 13 kts; BIG swimmer scrubbing lower portion of CM.
1734	BIG swimmer commenced decontamination of CM. Speed 11 kts; ship is turning; BIG swimmer completed decontamination of CM.
1735	BIG swimmer scrubbing down first astronaut.
1736	Speed 8 kts; course 000; decontamination of first astronaut completed.
1737	Commence decontamination of second astronaut; speed, 7 kts.; ship passing through 025.
1738	Decontamination of second astronaut completed.
1739	Commenced decontamination of third astronaut.
1742	RECOVERY surgeon states all okay; no breaks in the decontamination procedures.
1744	Decontamination process completed; commence decontaminating raft #1.
1745	Course, 075; speed, DIW Command Module 950 yd. to port. Swimmers taking their positions.
1748	RECOVERY making approach for first astronaut.
1749	First astronaut hoisted in sling into RECOVERY.
1750	Commence second approach; second astronaut in sling hoist.
1752	Third astronaut in sling hoist.

GMT	SEQUENCE OF EVENTS
1753	All astronauts in RECOVERY.
1757	RECOVERY landed on flight deck.
1801	RECOVERY lowered to Hangar Bay #2 on #2 elevator.
1802	RECOVERY enters Hangar Bay #2,
1804	RECOVERY guided in front of MQF.
1807	Astronauts leave aircraft and enter MQF, door of MQF closed behind astronauts; walk area decontaminated.
1808	RECOVERY removed.
1839	Mr. Ben James, NASA spokesman, announces doctor has found astronauts fit.
1853	President enters MQF area to sound of "RUFFLES AND FLOURISHES".
1854	Astronauts draw curtain open.
1855	President addresses astronauts.
1903	President leaves MQF area en route to flight deck.
1905	President on flight deck where he greets flight deck crew.
1908	President enters Marine ONE.
1911	President departs; time on board, 3 hours.
1912	CINCPAC addresses crew over 1MC.
1930	CINCPAC departs.
1931	Commenced approach to CM from range of 2500 yards.
1949	CM out of water.
1952	Flotation collar cut from CM on elevator #3.
1955	CM in dolly.

Enclosure (1)

OPERATIONS SUMMARY

PART I: AIR OPERATIONS

1. GENERAL. Air Operations in support of the Apollo 11 recovery were conducted in accordance with the CVA/CVS NATOPS Manual. No special procedures for aircraft scheduling or control were required. However, special emphasis was placed on aircraft control, radio discipline and procedures to be followed for the recovery operation and in the event of a SAR evolution.

2. COD SUPPORT. A two aircraft C-1 detachment from VR-30 provided the initial COD support, augmented by the HORNET C-1. Two US-2C aircraft from VC-1 were assigned just prior to departure from Pearl Harbor, when it became apparent that additional assets might be necessary for the Presidential visit. The US-2C aircraft was found to be of marginal value because of low capacity. However, with 100% C-1 availability, all committments were met on time.

While HORNET was in Hawaii, the C-2 was considered for use during the mission, but rejected, primarily due to the potential disruption to the electronic array on the flight deck which could be caused by the high wind loadings inherent in C-2 operations.

3. OPERATIONAL AND TRAINING FLIGHT SUMMARY. Flights listed below were conducted for training and, on 24 July, for mission accomplishment. Other mission time includes utility, plane guard, and logistic flights. The times of launch and recovery are from takeoff of the first aircraft to recovery of last aircraft, and consequently will vary slightly from individual aircraft flight hours.

OPERATIONAL AND TRAINING FLIGHT SUMMARY

DATE	TIME (LOCAL)	LOCATION	NO. OF A/C	DESCRIPTION
27 JUNE	0906-1030	ENROUTE PEARL HARBOR	8 A/C SH-3D	FLY ABOARD
27 JUNE	0917-1011	"	4 A/C E-1B	FLY ABOARD
27 JUNE	0745-1010	"	2 A/C C-1A	FLY ABOARD
27 JUNE	0930-1015	"	1 A/C C-1A	FLY ABOARD 1 CCA
28 JUNE	1432-1506	"	5 A/C SH-3D	CQ 15 CCA
30 JUNE	1812-2130	"	4 A/C SH-3D	CQ 79 CCA

DATE	TIME (LOCAL)	LOCATION	NO. OF A/C	DESCRIPTION
1 JULY	0750-0857	ENROUTE PEARL HARBOR	2 A/C SH-3D	PLG FOR RECOVERY
1 JULY	1301-1444	"	3 A/C SH-3D	PLG FOR CQ VR-30 LAUNCH TO BBT
1 JULY	1304-1530	"	2 A/C C-1A	VR-30 CQ FLIGHT TO BBT
1 JULY	1304-1440	"	4 A/C E-1B	VAW-111 CQ
2 JULY	0851-0917	INPORT PEARL HARBOR	2 A/C SH-3D	HARBOR PILOT
7 JULY	0811-0834	"	2 A/C SH-3D	HARBOR PILOT
7 JULY	1239-1524	15 NM SOUTH PEARL HARBOR	2 A/C SH-3D	BOILERPLATE PICKUP SWIM TRAINING
7 JULY	1522-1723	"	3 A/C SH-3D	BOILERPLATE PICKUP SWIM TRAINING PLG FOR RECOVERY AND LAUNCH
7 JULY	1847-2031	"	2 A/C SH-3D	BOILERPLATE PICKUP SWIM TRAINING OBSERVER RECOVERY AS REQUIRED
7 JULY	2133-0033	"	3 A/C SH-3D	BOILERPLATE PICKUP SWIM TRAINING OBSERVER RECOVERY AS REQUIRED
7 JULY	1535-1745	"	1 A/C C-1A	HORNET 000 FLIGHT FROM BBT AND RETURN
8 JULY	0706-0834	80 NM SSW PEARL HARBOR	1 A/C SH-3D	VIP CONFIGURATION
8 JULY	0837-1235	"	4 A/C SH-3D	ASTRONAUT RECOVERY (SIMULATED) BOILERPLATE AND COMEX
8 JULY	0900-1234	"	1 A/C SH-3D	BOILERPLATE PICKUP COMEX, PLG
8 JULY	1410-1547	"	2 A/C SH-3D	VIP, PLG FOR LAUNCH

DATE	TIME (LOCAL)	LOCATION	NO. OF A/C	DESCRIPTION
8 JULY	1904-2024	80 NM SSW PEARL HARBOR	2 A/C SH-3D	NIGHT BOILERPLATE PICKUP COMEX 6 CCA'S
8 JULY	1110-1140	"	1 A/C C130	2 CCA'S
8 JULY	0933-1233	"	2 A/C E-1B	COMEX POSITION IN RECOVERY ARRAY
8 JULY	0750-1530	"	2 A/C C-1A	FLIGHT FROM BBT AND RETURN
8 JULY	0805-1530	"	1 A/C C-1A	FLIGHT TO BBT AND RETURN
9 JULY	0442-0824	75 NM SSE PEARL HARBOR	4 A/C SH-3D	SIMULATED ASTRONAUT RECOVERY AND PHOTO PERSONNEL RECOVERY
9 JULY	0814-0900	"	1 A/C SH-3D	PHOTO, PLG FOR LAUNCH
9 JULY	1100-1252	"	2 A/C SH-3D	HARBOR PILOT
9 JULY	0445-0821	"	2 A/C E-1B	SIMULATED ASTRONAUT RECOVERY
9 JULY	0730-0820	"	2 A/C C-1A	FLIGHT FROM BBT
9 JULY	0730-0820	"	1 A/C C-1A	FLIGHT FROM BBT
12 JULY	0902-1044	15 NM S PEARL HARBOR	1 A/C SH-3D	HARBOR PILOT AND PHOTO
12 JULY	1251-1402	"	5 A/C SH-3D	TEST
12 JULY	1804-1820	150 NM SSE PEARL HARBOR	2 A/C SH-3D	PLG FOR RECOVERY 7 CCA
12 JULY	1900-2020	ENROUTE ABORT RECOVERY AREA	1 A/C C-1A	FLIGHT TO BBT

DATE	TIME (LOCAL)	LOCATION	NO. OF A/C	DESCRIPTION
12 JULY	0745-1010	ENROUTE ABORT RECOVERY AREA	2 A/C SH-3D	FLIGHT FROM HICKAM AFB
13 JULY	0754-0845	"	2 A/C SH-3D	PLG FOR RECOVERY
	1300-1513	"		PLG FOR CQ
13 JULY	1854-1920	"	2 A/C SH-3D	PLG FOR RECOVERY
13 JULY	1306-1456	"	2 A/C C-1A	VR-30 CQ
13 JULY	0542-0820	"	2 A/C US-2C	VC-1 FLIGHT FROM BBT
13 JULY	1308-1458	"	2 A/C US-2C	VC-1 CQ 2 CCA'S
13 JULY	0640-0920	"	1 A/C C-1A	HORNET 000 FLIGHT FROM BBT
13 JULY	1307-1446	"	1 A/C C-1A	HORNET 000 CQ'S 3 CCA'S
13 JULY	1302-1910	"	2 A/C E-1B	VAW-111 CQ 9 CCA'S
13 JULY	1259-1514	"	2 A/C CH-3B	FLIGHT TO JOHNSTON ISLAND
14 JULY	0204-0554	395 NM SSE JOHNSTON IS.	4 A/C SH-3D	SIMEX
14 JULY	0207-0552	"	2 A/C E-1B	SIMEX
16 JULY	0957-1237	535 NM WSW CHRISTMAS IS. AT ASSIGNED ABORT RECOVERY POSITION	4 A/C SH-3D	MODIFIED SIMEX
17 JULY	0823-1120	540 NM WSW CHRISTMAS IS.	4 A/C	BOILERPLATE
	1302-1341		3 A/C SH-3D	PRESIDENTIAL SIMEX

DATE	TIME (LOCAL)	LOCATION	NO. OF A/C	DESCRIPTION
18 JULY	0426-0914	575 E CHRISTMAS IS.	6 A/C	HS-4 SIMEX, PLG FOR LAUNCH AND RECOVERY
18 JULY	0429-0911	"	2 A/C	VAW-111 SIMEX
18 JULY	0826-0913	"	2 A/C	VR-30 SIMEX
19 JULY	0716-1214	660 NW OF CHRISTMAS IS.	8 A/C	HS-4 SIMEX AND PLG FOR LAUNCH
19 JULY	0719-1211	"	2 A/C	VAW-111 SIMEX
19 JULY	1115-1209	"	2 A/C	VR-30 SIMEX
19 JULY	1113-1213	"	1 A/C	CVS-12 SIMEX
21 JULY	0419-0847	390 NM SW OF JOHNSTON IS.	5 A/C	HS-4 SIMEX
21 JULY	0529-1155	"	2 A/C	HS-4 LIFEGUARD FOR ARLINGTON UNREP
21 JULY	0804-1149	"	1 A/C	PRES AND PLG FOR LAUNCH
21 JULY	1413-1435	353 NM SW OF JOHNSTON IS.	2 A/C	PLG FOR REC
21 JULY	0421-0926	390 NM SW OF JOHNSTON IS.	2 A/C	VAW-111 SIMEX
21 JULY	0819-1433	"	3 A/C	CVS-12, VR-30 FLIGHT TO JOHNSTON IS.
21 JULY	1044-1147	"	1 A/C	VC-1 FLIGHT FOLLOWING
22 JULY	0550-0737	385 NM SE OF JOHNSTON IS.	2 A/C	PLG FOR LAUNCH
22 JULY	0950-1016	"	1 A/C	SEALEX
22 JULY	1220-1303	"	2 A/C	PLG FOR RECOVERY
22 JULY	0600-1228	"	1 A/C	VR-30 FLIGHT TO JOHNSTON IS.
22 JULY	0601-1227	"	1 A/C	CVS-12 FLIGHT TO JOHNSTON IS.

DATE	TIME (LOCAL)	LOCATION	NO. OF A/C	DESCRIPTION
23 JULY	0754-0852	385 NM SE OF JOHNSTON IS.	5 A/C	HS-4 PLG AND SYSTEMS CHECK
23 JULY	1352-1420	"	2 A/C	HS-4 PLG AND STBY FOR LAUNCH
23 JULY	1757-1858	"	2 A/C	HS-4 PLG AND SEALEX
23 JULY	0757-1824	"	2 A/C	VR-30 FLIGHT TO JOHNSTON IS.
23 JULY	0801-1826	"	2 A/C	VC-1 FLIGHT TO JOHNSTON IS.
23 JULY	0800-1822	"	1 A/C	CVS-12 FLIGHT TO JOHNSTON IS.
23 JULY	1356-1805	"	1 A/C	VAW-111
24 JULY	0416-0846	APOLLO 11 RECOVERY AREA	5 A/C	PICKUP OF APOLLO 11 ASTRONAUTS
24 JULY	0418-1431	"	3 A/C	VAW-111 APOLLO AIR BOSS/ RELAY
24 JULY	0440-0512	"	3 A/C	NIGHTHAWK 2 AND 3 MARINE 1 FLYING WHITE HOUSE PERSONNEL ABOARD.
24 JULY	0812-0942	"	3 A/C	NIGHTHAWK 2 AND 3 MARINE 1 FLYING WHITE HOUSE PERSONNEL TO JOHNSTON IS.
24 JULY	0829-1430	"	3 A/C	VR-30 ADM MCCAIN TO JOHNSTON IS.
24 JULY	0832-1425	"	1 A/C	CVS-12 MAIL COD AND PASSENGER SERV.
24 JULY	1813-2323	"	1 A/C	CVS-12 COD
24 JULY	1815-2324	"	2 A/C	VR-30 LUNAR SAMPLES COD JOHNSTON IS.
25 JULY	0126-1914	APPROX 540 NM WSW HAWAII	1 A/C	CVS-12 RON HICKAM
25 JULY	0143-1916	"	1 A/C	VR-30 RON LUNAR SAMPLES

DATE	TIME (LOCAL)	LOCATION	NO. OF A/C	DESCRIPTION
25 JULY	1310-1917	APPROX 540 NM WSW HAWAII	1 A/C	RADM DAVIS TO HICKAM
25 JULY	1312-1505	APPROX 210 NM W. HAWAII	2 A/C	VC-1 FLYOFF
26 JULY	0556-0724	JUST BEFORE ENTERING PH	1 A/C	HS-4 HARBOR PILOT
26 JULY	0642-0746	JUST BEFORE ENTERING PH	2 A/C	PHOTO HARBOR PILOT
26 JULY	0738-0851	"	1 A/C	CINCPAC LNDG
27 JULY	0946-1005	DEPARTING PEARL	1 A/C	HARBOR PILOT
28 JULY	0850-1013	ENR CONUS	4 A/C SH-3D	SYSTEMS CHECK
28 JULY	0959-1129	"	2 A/C SH-3D	SYSTEMS CHECK
30 JULY	0853-1003	"	4 A/C SH-3D	SYSTEMS CHECK
30 JULY	0952-1111	"	3 A/C SH-3D	SYSTEMS CHECK
31 JULY	0800-1100	"	3 A/C C-1A	FLY OFF
31 JULY	1300-1530	"	8 A/C SH-3D	FLY OFF
31 JULY	1300-1530	"	4 A/C E-1B	FLY OFF

FLIGHT HOUR TABULATION

CATEGORY	HS-4	VAW-111	VR-30	VC-1	CVS-12	TOTAL
A. SIMEX'S	60.6	35.4	0.0	0.0	0.0	96.0
B. Other Training	73.8	21.4	6.5	1.5	2.9	106.1
C. Primary Mission	17.3	20.3	47.2	25.8	47.8	158.4
D. Other Missions	111.3	16.9	6.0	0.0	3.0	137.2
E. Total Flight Hours	263.0	94.0	59.7	27.3	53.7	497.7
F. On Standby (UNREP SAR, COND. I FOR RECOVERY)	191.5	Ø	Ø	Ø	Ø	191.5

PART II: SURFACE OPERATIONS

1. Surface operations were in accordance with the CTF 130 Operation Order 334-69 as modified. Mission Primary Recovery Area was relocated on 24 July to an area of better weather conditions about 230 miles to the northeast. Ample time was available to order and complete the relocation of forces prior to splashdown.

2. Replenishment with HASSAYAMPA was completed on 22 July without incident.

3. Other than Task Force 130 units there was a complete lack of surface contacts after leaving the Hawaiian area on 12 July until return on 26 July.

PART III: CIC PROCEDURES

1. CIC procedures were for the most part normal for CVS operations. The built in capacity to exercise long range air search and control as well as short range control around a DATUM Area blended well with Apollo 11 mission requirements.

2. Certain frequencies were put on tape as directed by CTF 130. This was done using tape recorders in ASCAC which were patched into the designated circuits.

3. The following items were the principal areas of variance with standard CIC procedures.

a. All incoming information from internal and external sources was collected and displayed on the DRT and NC-2. The DRT was to be a long range plot and the NC-2 short range, utilizing target plot attachments (TPA) to track the helicopters. Due to material failure of the NC-2, the NC-2/DRT personnel and plots were switched.

b. The Air Force controller aboard was available to relay pertinent information to HC-130 aircraft.

c. The command and control net was controlled by the evaluator during the initial phases of recovery. After main chutes, command and control net commentary included direct relay of information passed over the astro voice circuit. Commentary was shifted to a pre-positioned talker on the 06 level as the helo carrying the astronauts approached for a landing. The commentary then was shifted to the hangar deck as the helo was lowered and the astronauts exited the helo and proceeded to the Mobile Quarantine Facility (MQF). President Nixon's visit with the astronauts, his departure, CINCPAC's departure, the approach for CM retrieval, and actual retrieval were alternately covered by the 06 level and hangar deck commentators depending on who had the best view.

4. CIC COMMENTS AND RECOMMENDATIONS. In the early SIMEX's the problem of helo stationkeeping and identification became apparent after splashdown when all units converged on the Command Module. This was especially true under night and IFR conditions. It is mandatory that the helicopters remain on station until the initial Sarah bearing is received so that all units can readily and accurately plot the bearings. A requirement for all aircraft to head uprange at re-entry was an additional factor which allowed the plot to become disoriented prior to receipt of solid bearing information. The following action was taken to stabilize helo positioning:

a. Discrete mode III IFF codes were assigned each aircraft.

b. Helicopters were given updated range and bearing to their station at least every three minutes and were taken under positive control if off station.

e. When helicopters head uprange during re-entry of the Command Module, they must remain on assigned stations. In addition, aircraft must ensure adequate vertical separation with the Command Module while homing on SARAH bearings. Separation may be assured by ascertaining that the Command Module is below cruising altitude of the aircraft or by a visual sighting. However, it must be remembered that there are three drogue chutes and an apex cover coming down in the general area of the Command Module.

5. CIC MANNING. The attached chart indicates the position in CIC which were manned for the Apollo 11 mission. As indicated previously, all but the commentary positions are normally manned in CIC during an ASW situation.

APOLLO DIAGRAM KEY

OFFICER

1. EVALUATOR
2. CIC WATCH OFFICER
3. COMMAND AND CONTROL NET
4. APOLLO DATA COORDINATOR
5. SURFACE WATCH OFFICER
6. AIR CONTROLLER (ASTRO)
7. SPLINTERSHIELD CONTROLLER
8. BRIDGE/CIC TALKER (LJS)
9. AIR COORDINATOR

ENLISTED

10. NC-2 (MAIN PLOTTER) 2½ mile scale
11. NC-2 (TPA PLOTTER)
12. SWIM 1 TRACKER (TPA)
13. SWIM 2 TRACKER (TPA)
14. SWIM 1 AND 2 INFO (FLOW BOARD 1)
15. RESCUE 1 AND 2 INFO (FLOW BOARD 1)
16. ASTRO INFO (FLOW BOARD 1)
17. DRT (RECOVERY AREA 15 MILES/IN.) (PICKUP 500 YDS/IN.)
18. SURFACE STATUS BOARD
19. SWIM 1 AND 2 INFO (FLOW BOARD 2)
20. RESCUE 1 AND 2 INFO (FLOW BOARD 2)

Enclosure (2)

21. COMMAND AND CONTROL NET RECORDER

22. ASTRO NET RECORDER

23. SPLINTERSHIELD NET RECORDER

24. CIRCUIT "H" (RESCUE 1 AND 2) RECORDER

25. JL TALKER

26. SPS-43 TRACKER (LONG RANGE)

27. SPS-43 TRACKER (SHORT RANGE)

28. SPS-30 TRACKER

29. SPA-4O (RHI)

30. VP PLOTTER

31. SURFACE SEARCH OPERATOR

32. MANEUVERING BOARD

33. AIR STATUS BOARD (2JG)

34. CIC LOG RECORDER

35. URD-4 OPERATOR

36. ECM OPERATOR

EXTERNAL STATIONS

COMMAND AND CONTROL NET (06/BRIDGE)

COMMAND AND CONTROL NET (HANGAR DECK)

1 LOOKOUT SUPERVISOR

2 LOOKOUTS FORWARD PLUS 1 TALKER (07 LEVEL)

2 LOOKOUTS AFT PLUS 1 TALKER (07 LEVEL)

PORT BOW LOOKOUT PLUS TALKER

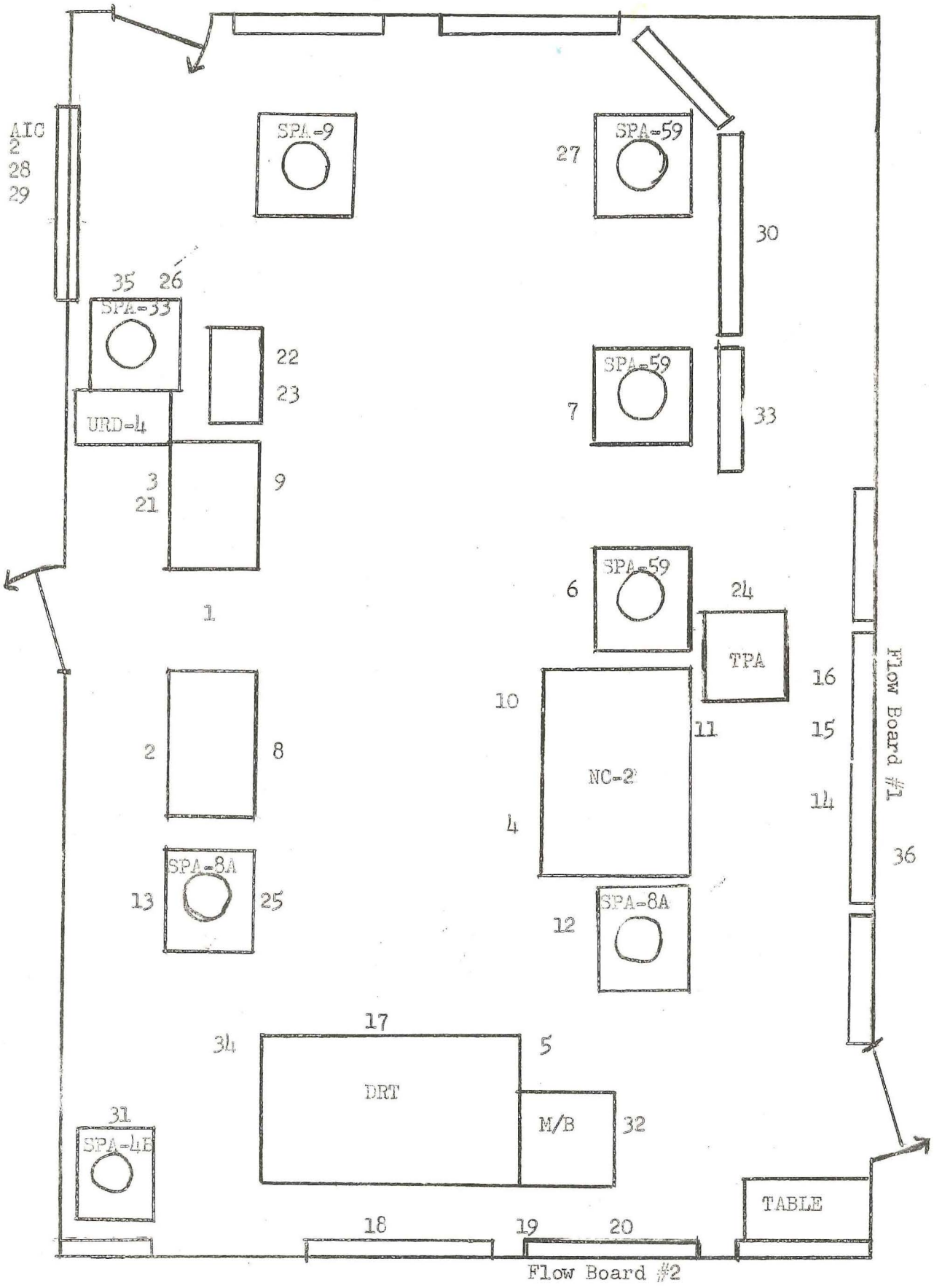
STARBOARD BOW LOOKOUT PLUS TALKER

JL TALKER BRIDGE

21JS TALKER BRIDGE

1JS TALKER (08 LEVEL)

2 JG TALKER (HANGAR DECK)


AIC
2
28
29
SPA-9
27
SPA-59
30
35
26
SPA-33
22
23
URD-4
7
SPA-59
33
3
21
9
1
6
SPA-59
24
TPA
16
15
14
36
Flow Board #1
10
11
NC-2
4
2
8
SPA-8A
13
25
SPA-8A
12
17
34
5
DRT
M/B
32
31
SPA-4B
TABLE
18
19
20
Flow Board #2

PUBLIC AFFAIRS SUMMARY

1. PERSONNEL:

	HORNET	NASA		CTF-130	
Public Affairs Coordinator:	CDR PAUSNER	Head PAO:	BEN JAMES	PAO:	LT NEMER
PA Staff:	LTJG WILSON	Press Pool	LARRY KING	STAFF:	JO2
	ENS WHITMAN	Photo Pool:	LEE JONES		COCHRAN
	6 JOURNALISTS	TV Pool:	BOB WORKMAN		
HS-4 & UDT:	LTJG OSBORN				

1. HORNET, NASA and CTF 130 PAO's worked well together, having made initial contact through pre-mission meetings. After getting underway, two daily meetings were held, one following the 0800 press briefing and one preceding the 1600 press briefing. Information was exchanged at these times and NASA and similar media requirements were passed to the ship's PA Coordinator for action. The CTF 130 PA representatives worked in the Press Room with NASA's Press Pool Coordinator. Through these men HORNET was able to anticipate the majority of the needs of the civilian press.

2. Two CINCPACFLT journalists and one photographer reported aboard to ride the ship to Pearl Harbor two days prior to HORNET's departure from Long Beach. Enroute they interviewed and photographed key personnel involved in the Apollo 11 recovery. In addition they made daily message releases to CTF 130, CHINFO and FHTNC at Great Lakes. Their assistance was invaluable.

3. Working spaces for the press consisted of:

a. Press Center (Flag Operations Office)
b. Press Briefing Room (War Room)
c. Teletype Room (Debriefing Room)

All three spaces were located on the centerline passageway of the 02 level. They were air conditioned, spacious and adjacent to one another. They were also adjacent to Ready Room One from where HS-4 and UDT 11 and 12 were operating. Consequently, coordination was simplified by the mere physical proximity of the spaces to one another as well as to the wardroom, flight deck, bridge, and living quarters.

4. The coordinating of helicopter flights for writers, commentators and photographers was initally handled by the HS-4 PAO who arranged for the ditching briefs and other flight familiarization proceedures. NASA then assigned priorities and scheduled the qualified personnel with Air Operations.

5. Press briefings were conducted twice daily, at 0800 and at 1600. The navigator and meteorologist made routine reports while the Captain made himself available at nearly every briefing, as operations permitted.

Enclosure (3)

Guest speakers included:

HS-4 Commanding Officer
NASA Team Leader
First Lieutenant
MQF Engineer
NASA Medical Group Leader
UDT Officer in Charge
Air Officer
plus other NASA technical personnel

6. Press copy transmission was handled by Western Union International. WUI transmitted on seven teletype channels with the capability of utilizing twelve. These operations either pre-cut or simultaneously cut and transmitted the copy. Transmissions occurred twice daily from 1000-1100X and 1900-2000X. On splashdown day transmission was continuous. Copies were assembled in the Press Center and assigned priorities on a first-come, first-served basis. Then, a cover sheet was attached and the copy was carried to the teletype space. No difficulties were experienced and news was transmitted expeditiously and accurately without involving Navy Communications systems in any way.

7. HORNET provided entertainment through various means. The ship's radio station was on the air from 0600 to 2400 daily. Complementing the radio broadcasts was TV3, HORNET's closed-circuit television network, which aired from 1600 to 2200. TV3 presented nightly a full-length movie, various serials and documentaries, and an interview with key recovery personnel. As a news supplement the ship distributed a daily newspaper. The COMNAVAIRPAC Band also provided two daily concerts immediately following lunch and dinner. Movies were shown twice each night in the wardroom. Bridge, pinochle, and acey-ducey tournaments were arranged for both civilian and Navy personnel. Civilians were also invited to dine with the Captain on various occasions. A talent show was presented two days prior to splashdown. The "talent" was provided by the ship's company with guidance and equipment supplementation of the embarked television network. Since the "Abort Recovery Area" was located south of the Equator, a ceremony took place involving all hands.

8. Problems encountered resulted basically from two new areas. First, the utilization of a Mobile Quarantine Facility (MQF) and its necessary safeguard; and, second, from the required security precautions necessitated by the visit of the President of the United States. Ultimately, these problems were solved to the satisfaction of all concerned. However, it is recommended that NASA establish proceedures and parameters for subsequent quarantine recoveries. Both photographers and writers experience initial confusion as to the extent of their press priviledges. A lesser problem was the lack of a definite NASA representative for the General Electric, Western Union International, Voice of America, and Mutual personnel as well as the two artists. They did not really belong to any specific pool and, therfore, were not provided for as rapidly as they might have been. Office and storage space requirements were underestimated in that photographic equipment must be stored in an immediately accessible, secure, and cool area. TV executives and commentators required additional office space. Finally, all embarking personnel should be briefed concerning the hazards and inconveniences of shipboard life so that they might bring sensible clothing, red-lens flashlights, and any other gear

useful in their trade that might not reasonably be provided by the ship.

9. It is recommended that in future missions, as in this one, an experienced PAO (165X designator) be assigned to the ship for the duration of the mission to act as Media Relations Officer.

10. Philatelic Mail. The estimated Philatelic Mail load for Apollo 11 was 70,000 to 100,000 covers. When Hornet departed Pearl Harbor on 12 July, Terminal Navy Post Office Pearl Harbor delivered approximately 48,000 covers pre-cacheted and ready for cancellation. Hornet also received one cachet from TNPO Pearl. Between 21-23 July, Hornet received approximately 200,000 covers by incoming mail addressed to Postmaster, USS Hornet. The process of opening, affixing the cachet and cancelling this mail was a monumental task that required the services of five officers and 20 men for 52½ hours. The major problem encountered by Hornet regarding this large volume of Philatelic Mail was the fact that only one cachet was available. It is recommended that five cachets be made available for future events.

COMMUNICATIONS SUMMARY

1. Communications throughout the workup and mission were generally outstanding. An early conference between PRS communications representatives and CTF 130, CINCPACFLT, and WMCA personnel at the communications planning level was instrumental in laying groundwork communications planning for the PRS. Continued close coordination was maintained between PRS and CTF 130 subsequent to issue of the OPORDER of 20 July and throughout the mission.

2. Failure of the TACSAT the day before recovery led to the establishment of two UHF/HF relay circuits via ARLINGTON and Honolulu to CTF 130, one for CTF 130 coordination and one for NASA. These two circuits were not of sufficient quality to materially assist in recovery communications. However, the TACSAT became useable when needed at the time of recovery.

3. It is recommended that Communications coordination commence as soon as possible between the PRS and CTF 130 in order to establish standard operating procedures for Apollo 12.

INDIVIDUAL CIRCUIT DESCRIPTIONS AND DIAGRAMS

1. CIRCUITS 1, 2 and 3.

A. Circuit 1. Circuit 1 was designated the CTF 130/PRS Command and Control voice circuit and was utilized for passing of update and status information directly relating to the mission. It was also known as circuit ALFA and was the primary means of communications between CTF 130 and Hornet. Circuit 1 utilized TACSAT circuit 1 path and HF primary and secondary paths as backup. Control was maintained in CIC (RRS-7) with a continuous monitor maintained on HF backup circuits and transmitters ready for use. During recovery ops Circuit 1 was patched to the bridge on RRS-39 for a running commentary of retrieval operations and activities taking place at the MQF vans in hanger bay #2. Circuit 1 was monitored in NASA recovery center (RRS-12) and recorded in ASCAC. Excellent communications were maintained on this circuit during recovery operations although earlier problems with fading and interference had caused concern.

B. Circuit 2. Circuit 2 was designated as a tertiary backup for circuits 1 and 3 utilizing the ATS-1 satellite terminals. It was capable of being patched to any location as were circuits 1 and 3 but it would have deprived NASA of a circuit if it had been patched to the hanger bay. Circuit 2 was dedicated to Presidential support at 241516Z until securing at 242115Z. Earlier problems involving fading, RFI and beam splitting were measurably reduced when the satellite was utilized in the full power mode.

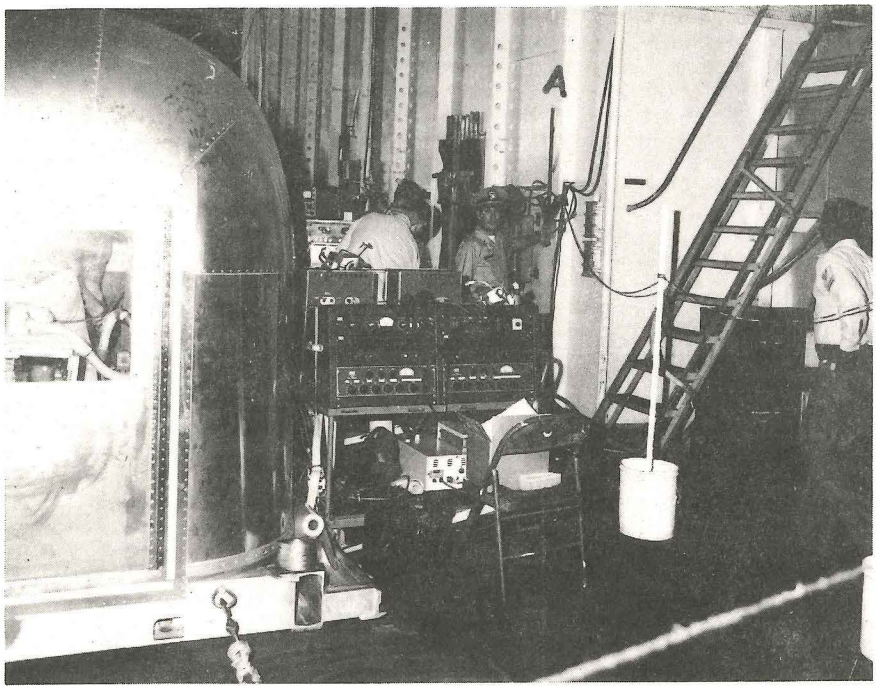
C. Circuit 3. Circuit 3 was designated the NASA PRS Coordination voice circuit utilized for NASA engineering, medical and public affairs coordination with MCC Houston and RCC Pacific. It utilized the TACSAT circuit 3 path with a HF backup. Control was maintained in CIC until after splashdown when shifted to R-1 located at elevator #3. After the module was recovered control was shifted to R-2 located at the MQF van to allow engineers to have communications with MCC Houston while examining the command module and voice communications with the Apollo crew. Excellent communications were maintained on this circuit during recovery operations although earlier problems with fading and interference had caused concern.

2. ARLINGTON HORNET Voice Coordination Circuit. An HF Coordination circuit was established between the ARLINGTON and HORNET for the purpose of maintaining HF circuits concerned with Command and Control and NASA PRS Coordination. This circuit aided in maintaining the status of the HF gear when satellites were used and ensured that a usable circuit was on call for any occasion during the recovery period.

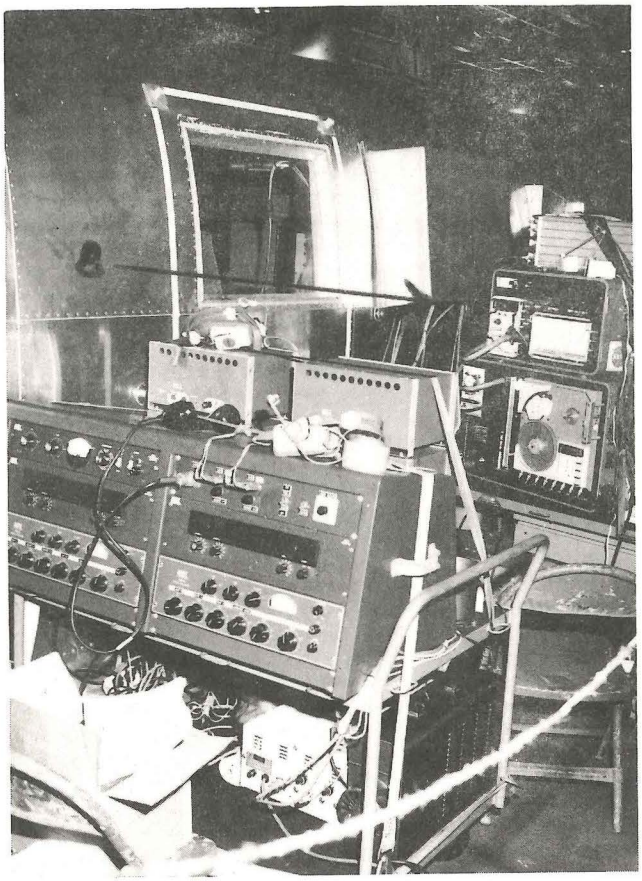
MOBILE QUARANTINE FACILITY

1. The Navy provided a line to the NASA Mobile Quarantine Facility (MQF) terminating in a standard junction box indicated in photo (1) item (a).

NASA extended a line from the junction box to the MQF interface control panel in photos (1) and (2) which then passed into the MQF van at point (b) in photo (2). Three RPUs were located in the MQF van for the astronauts' use and a loudspeaker/intercom system was installed for conversing with the astronauts.



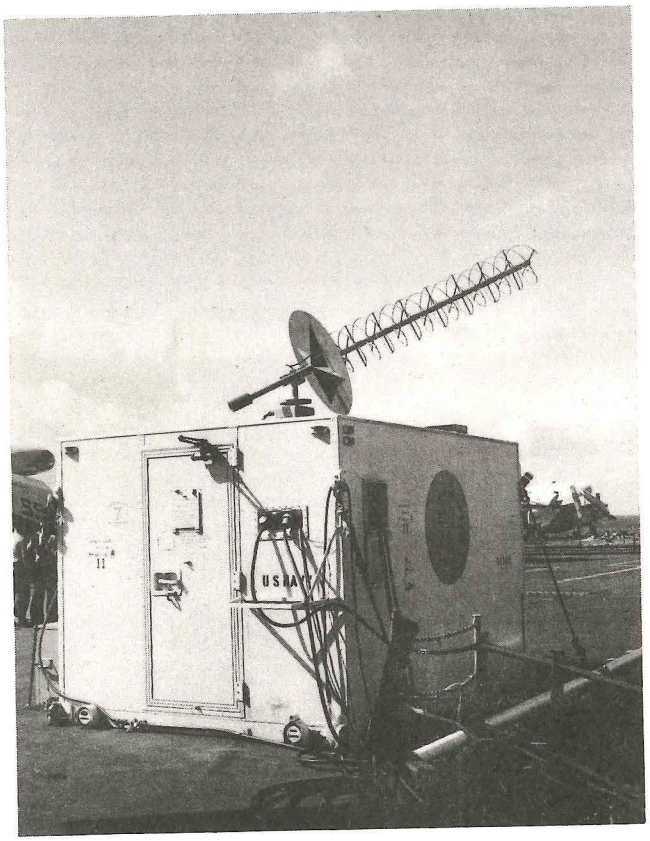
1. MQF VAN INTERFACE CONTROL PANEL



2. MQF VAN AND INTERFACE CONTROL

TACSAT SATELLITE

1. TACSAT operated by NELC was utilized as a backup for Command and Control voice circuit (ckt 1) and backup for NASA PRS Coordination voice circuit (ckt 3) with a provision also for operating a TTY located in Maincomm. The circuit diagrams indicate the remotesutilized although PRS could have patched to almost any remote location. Cables were run from the TACSAT terminal located forward of the island structure on the flight deck to the ship's transmit and receive patchpanels located in Radio I. Photo (3) shows the forward antenna fixed to the TACSAT Hut roof.

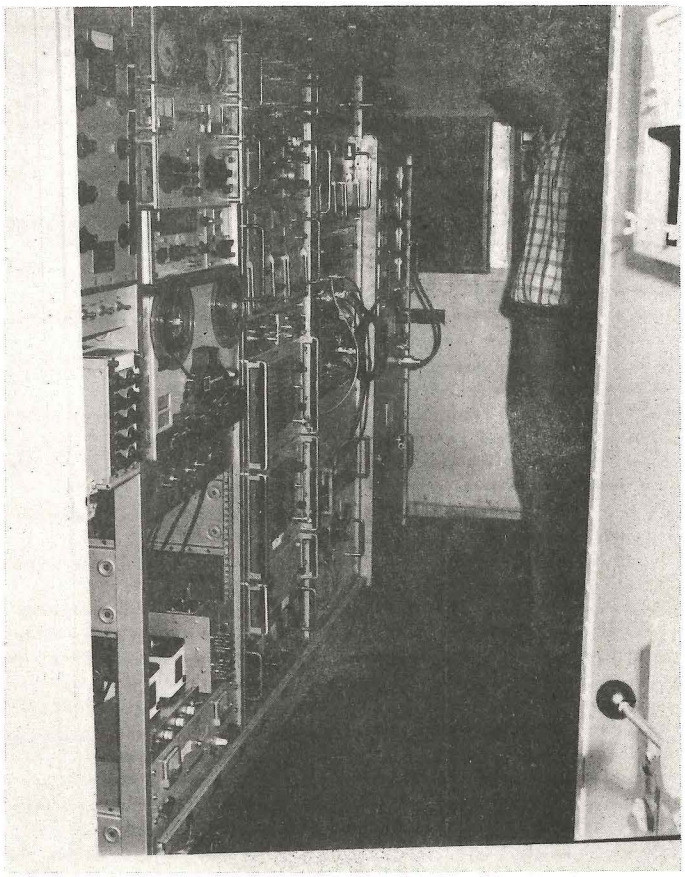


3. NELC TACSAT HUT FORWARD ANTENNA

2. Photo (4) shows the relative position of the NELC TACSAT Hut in relation to the island structure.

4. NELC TACSAT HUT AND FORWARD ANTENNA

3. Photo (5) shows the interior of the NELC TACSAT Hut and the equipment associated with their operations. The after TACSAT antenna is shown in photo (12) as item (b).



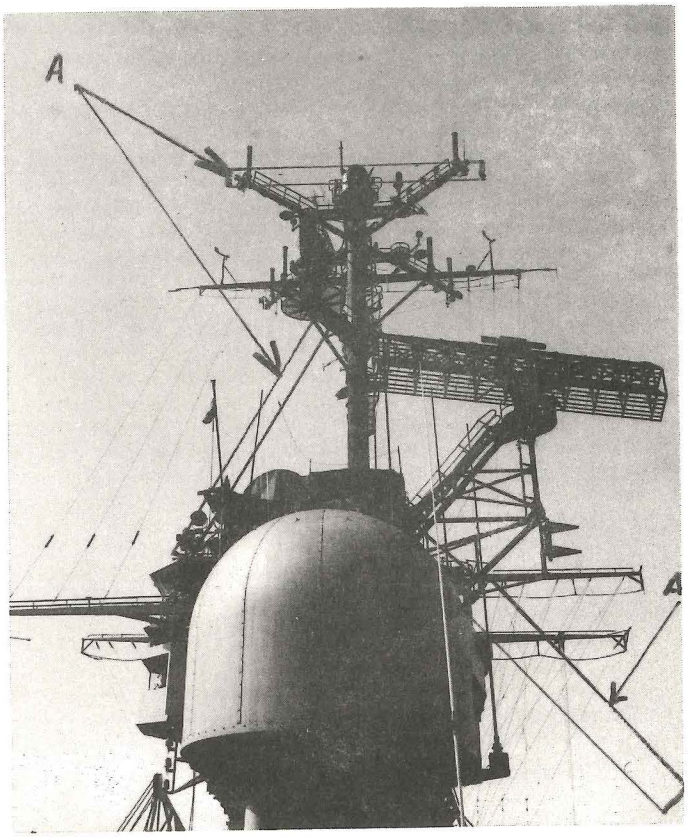
5. NELC TACSAT INTERIOR

MUTUAL BROADCASTING SYSTEM

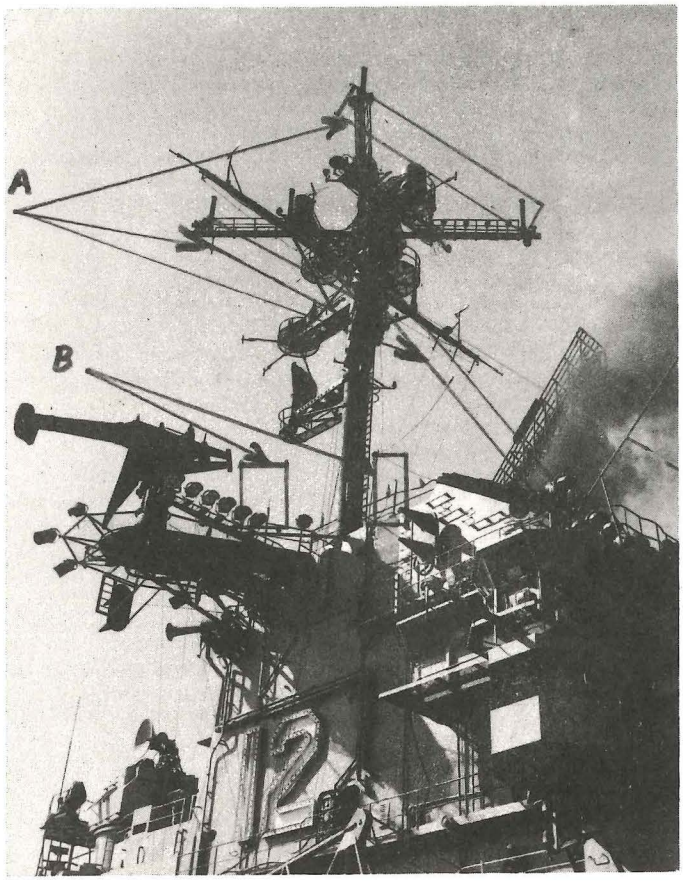
1. The Mutual Broadcasting installation was contained within an Econoline van located midway along the starboard side of the island. Antennas for HF operations were installed on the mast and two dipoles were located on the port side of the ship, one slightly aft of amidships and the other near the LSO platform.

6. MUTUAL VAN

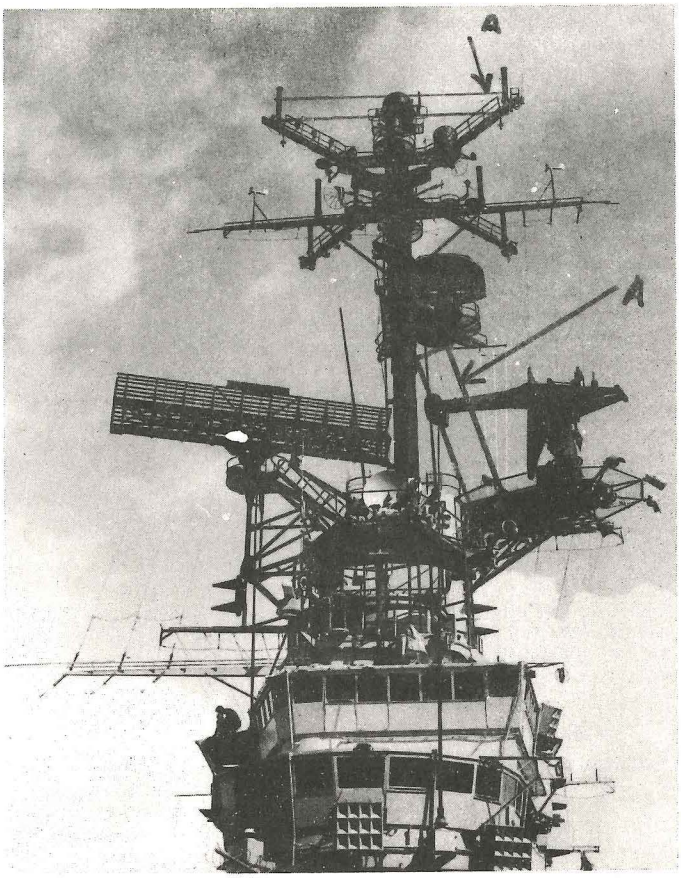
2. All of Mutual Broadcasting's antenna were of the dipole type and are identified in the following photos by enclosing them in boxes and labelling them item (a).



7. MUTUAL ANTENNAS ON MAST



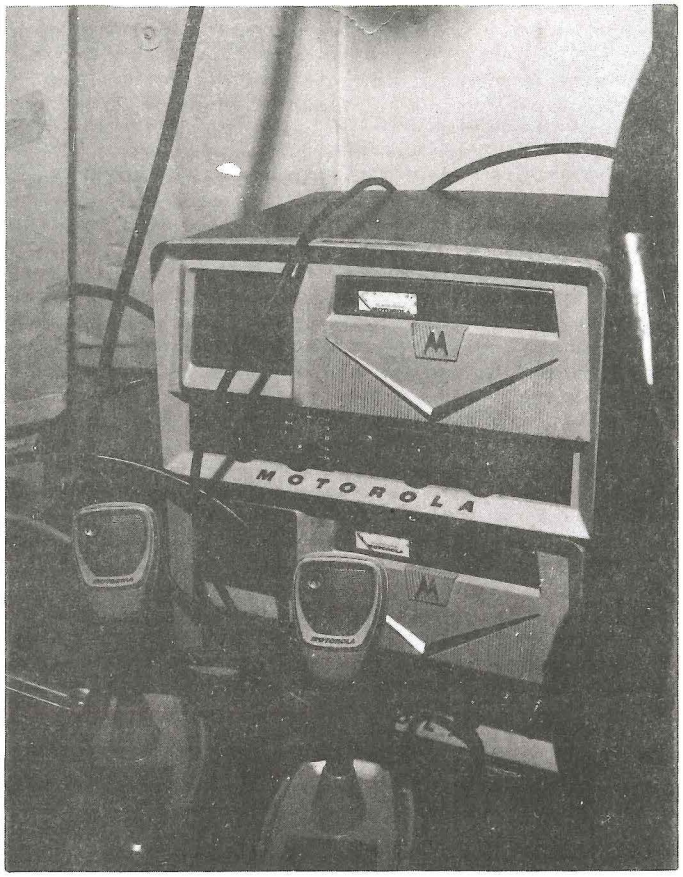
8. MUTUAL ANTENNAS ON MAST (ITEM A ONLY)



9. MUTUAL ANTENNAS ON MAST

WHITE HOUSE COMMUNICATIONS AGENCY

1. The White House Communications Agency utilized two UHF and one VHF transceivers located in Radio 9 on the island. Two walkie-talkies were also used in connection with this gear but not shown. These transceivers fed into dipole antennas located on the O11 level. Two antennas were located on the port side and are identified in photo (8) as item (b) and a third was located on the starboard side (not shown).



10. WHCA UHF TRANSCEIVERS

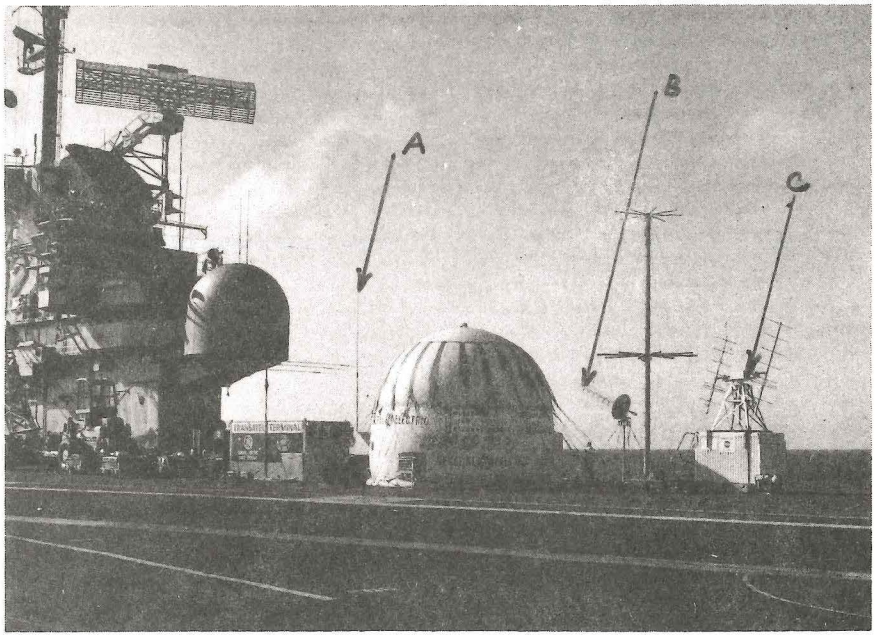
ABC-TV

1. Three ABC-TV vans housing video and audio facilities were located in hanger bay #2 adjacent to the MQF area. Remote cameras were located at strategic positions throughout the ship. ABC patched into the ship's closed circuit TV system on numerous occasions to show events to crew-members who could not observe them directly.

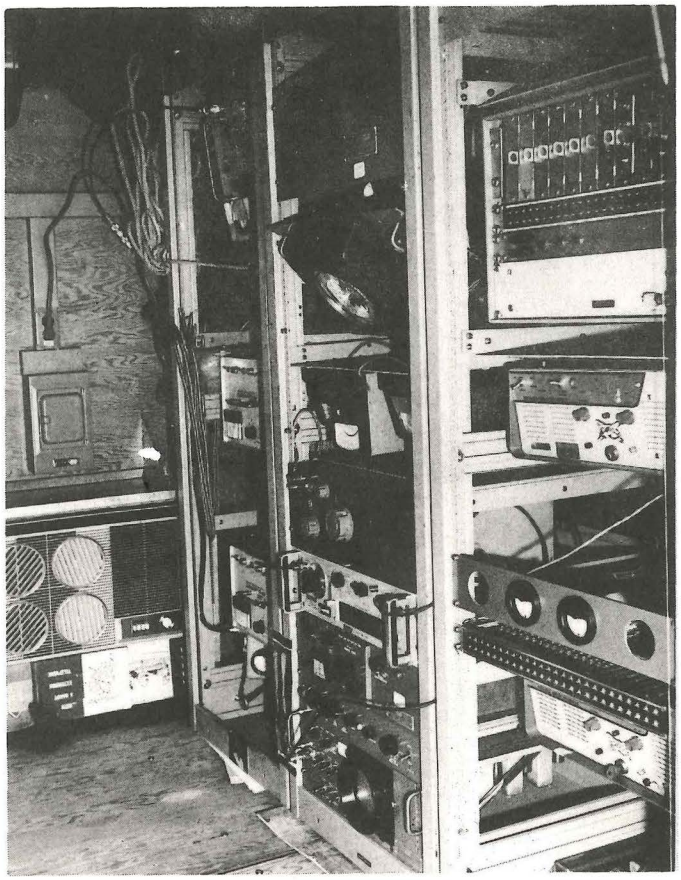
11. ABC-TV VANS

ATS-1 SATELLITE

1. The ATS-1 satellite terminal, controlled by NASA, was located aft of the island starboard side of the flight deck. The ATS-1 Hut had its only antenna mounted directly to its roof as shown in photo (12) item (c). The ATS-1 terminal was utilized as a tertiary backup for NASA PRS Coordination voice circuit (ckt 3) and Command and Control voice circuit (ckt 1). It was planned to use this terminal as the primary circuit for VIP calls to the astronauts once they had entered the MQF van. Cables were run from the ATS-1 terminal to the ship's transmit and receive patchpanels located in Radio I. Remote patching is indicated in the circuit diagrams.



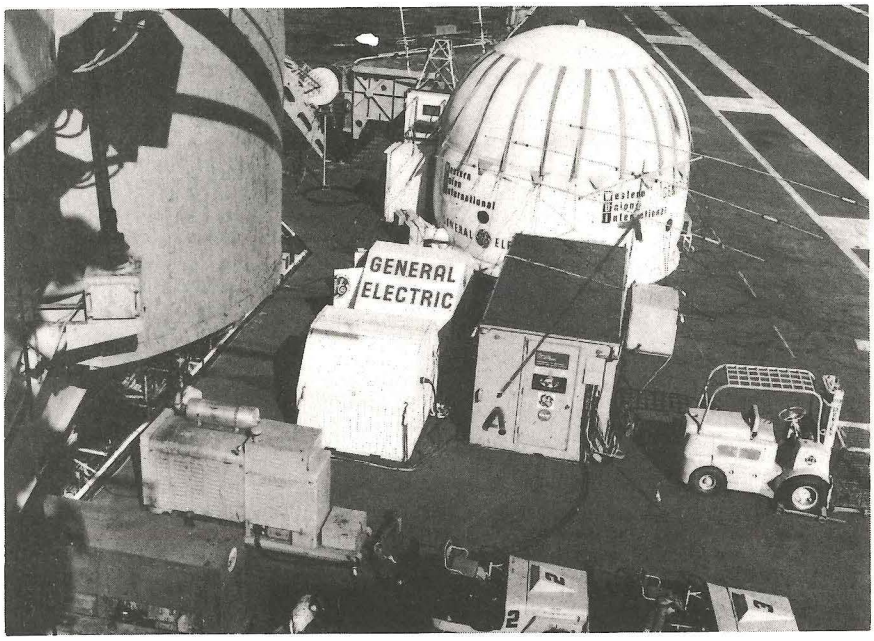
12. ATS-1 HUT (ITEM C) AND GE/WUI EQUIPMENT



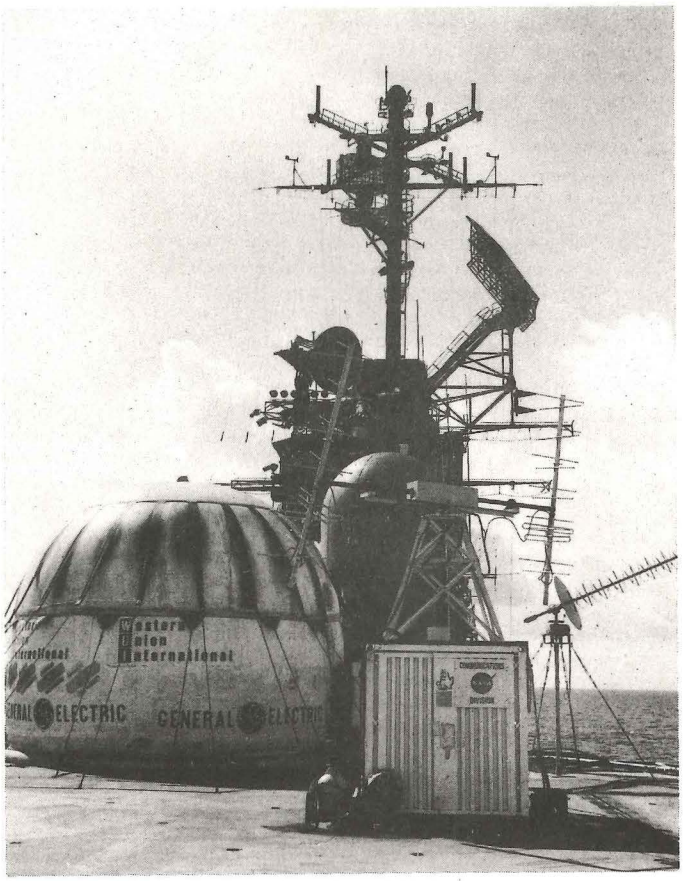
13. ATS-1 HUT INTERIOR

GENERAL ELECTRIC/WESTERN UNION TERMINAL

1. GE/WUI located their gear aft of the island on the flight deck. Their antenna array consisted of a 22 ft. bubble dome, a whip shown in photo (12) item (a) and a rotating dipole shown in photo (14) item (a). General placement of the GE/WUI equipment is shown in photo (14) including their subassemblies and power supplies. Photo (15) shows the relative placements of the GE/WUI, ATS-1, TACSAT, and ship's antennas on the starboard side of the flight deck aft.



14. GE/WUI EQUIPMENT



15. GE/WUI, ATS-1, AND TACSAT ANTENNAS

PARTICIPATION OF USS ARLINGTON

At 192245Z HORNET shifted its termination to USS ARLINGTON, assigned to the Apollo mission to aid in the communications required during the operation.

Termination proved to be the noteworthy contribution of the ARLINGTON to the mission. HORNET operated in an area of poor propagation that seriously affected ship/shore communications with NAVCOMMSTA HONO resulting in a substantial amount of controller time keeping termination up. With the subsequent shift, PRS receive continuity was markedly improved, allowing radio personnel to devote an increased amount of time to the coordination and operation of special Apollo circuits. During termination, communications were established through a low frequency termination over a distance of seven hundred miles, the longest such termination the ARLINGTON had successfully conducted (AGMR send).

At 211200Z a four circuit extention of HF voice circuits was established between the PRS and AGMR to establish best frequencies and check out equipment on NASA, ALFA, WHCA and VOA voice circuits, during the SIMEX of 21 July. Results were generally favorable except for a period prior to splashdown when the ARLINGTON experienced trunkline difficulties with NAVCOMMSTA HONO. However, the extention was operating at the time of the recovery.

One problem noted was a difficulty in bringing up all required circuits and back-ups with the number of transmitters aboard the PRS. Both Raspberry and Alfa tertiary HF circuits were pre-empted at various times in order to activate the PRS/AGMR extention during the exercise of 21 July. In anticipation of this equipment shortage, ARLINGTON took HORNET'S guard on HICOMM in order to establish a voice communications and coordination between the PRS and AGMR.

Equipment available aboard the AGMR resulted in good linkage between her and the PRS in the UHF/HF relays. However, as mentioned previously, trunkline difficulties between the AGMR and NAVCOMMSTA HONO interfered with perfect operation of the system.

PRESIDENTIAL COMMUNICATIONS

UNCLAS voice communications utilizing ATS-1, Goddard Space Flight Center satellite system from HORNET to Rosman, North Carolina for further extension to the White House were required. In addition, because of the unreliability of the ATS-1, two vice one HF voice circuits were employed. Requirement for the second HF circuit was levied on 21 July, three days prior to splashdown. On 21 July WHCA circuit #3 was extended via the ARLINGTON to the Joint Overseas Switchboard (JOSS) Hawaii. While the President was aboard ARLINGTON, HORNET's extension to JOSS was pre-empted and circuit #3 served primarily as a HORNET-ARLINGTON WHCA coordination

circuit. With the exception of occasional propagation problems, circuit #3 was extremely reliable. When the President departed ARLINGTON for HORNET WHCA circuit #3 was again extended to JOSS through the Presidential switchboard on ARLINGTON.

Additional WHCA PRESUS circuit #2 was activated upon departure of the President from ARLINGTON, but ARLINGTON was unable to extend the circuit through the switchboard; therefore, WHCA circuit #2 went direct to JOSS as an HF/HF relay.

ATS-1 circuit was good on 24 July and HF circuits served as back-up.

Teletype communications extended via one channel of the VFCT trunk from ARLINGTON/HONO/SFRAN/WASH/WHCA.

A high frequency secure voice communication circuit was available for the President's use in Flag Plot where he viewed recovery operations.

AMATEUR RADIO

ABC, General Electric, and Mutual Broadcasting System provided phone patching for military and civilian personnel via Hawaii. Negligible interference with other PRS circuits was noted. All frequencies were coordinated with the PRS. Generally, frequencies in the 7 and 14 MHZ bands were used.

A total of 530 phone patches were made. The breakdown is as follows:

ABC	64
Mutual	349
General Electric . . .	117
Total	530

VOICE OF AMERICA (VOA)

The Voice of America (VOA) live Russian broadcast covering the Apollo 11 splashdown was transmitted via the General Electric Satellite system. The PRS provided an HF back-up circuit via low power HF to ARLINGTON thence high power HF from ARLINGTON to RCA San Francisco. To establish an HF path the PRS utilized dual independent side band placing COMM/COORD circuit in A-1 and VOA circuit in B-1. No problems were encountered and the circuit was established through to San Francisco at approximately 241330Z, one hour before the VOA broadcast starting time.

HF back-up was not used even though the General Electric Satellite circuit did fail for a short time.

In addition, two receive frequencies were assigned so VOA could coordinate the actual splashdown broadcast. Frequencies assigned were 11045KHZ, which proved unusable and 18040KHZ which had an FSK singal on it. The latter frequency was actually used by the announcer.

PRESS

Western Union International, using the General Electric satellite system, installed teletypewriter facilities for 6 send channels and provided 6 civilian tapecutters. Originally, the PRS, in the event of satellite failure, had agreed to provide as a back-up one channel in the PRS' VFCT termination with the AGMR/NAVCOMMSTA for press. Such agreement was precluded by WHCA's need for one channel from the 18th until after the President's departure from HORNET.

RADIO FREQUENCY INTERFERENCE TESTS

1. RFI tests commenced upon completion of the T.V. Camera installation on the O-7 level. ABC provided the Apollo 11 Communication Control Area with a video monitor and a direct ABC/COMM intercomm system. The tests showed that there were several sources of RFI which affected T.V. to varying degrees. The prime source of RFI was the SPS-43 airsearch radar which seriously degraded the T.V. video and which was detected in the audio package. Further, the SPS-43 caused marked interference with Communications via TACSAT, ATS-1 and the commercial INTELSAT III. A second source of interference was the low frequency homer which affected the audio noise levels in the G.E. hut. Both the SPS-43 and the low frequency homer were shut down as early in the recovery as was operationally feasible. The ATS-1 transmissions seriously degraded the flight deck radio system, SRC-22, rendering the system virtually unusable. All other interference was controlled by relocating the transmission on another antenna. Monitoring the RF envelope on a continuing basis was accomplished throughout the mission.

HF VOICE CIRCUITS

1. Circuits checked out during 21 July SIMEX tested reliable. Secondary and tertiary backup frequencies on Alfa circuit were maintained at all times except when the tertiary circuit was used with the ARLINGTON. Primary and secondary Hotel circuits were maintained at all times. Problems existed in the remote systems. Proper patching and new handsets rectified trouble areas.

PERSONNEL ASSIGNMENTS

1. Six enlisted personnel were provided the Communications Department to augment ships force in the event the WUI/INTELSAT III press circuit failed. Three from NavCommSta Honolulu and three from the USS RANGER.

2. One officer was provided from the COMNAVAIRPAC Force Communications Department as an observer. He was integrated into the CWO watch bill and assisted materially during preparation of this report.

3. In addition to the above personnel one LCDR and one RMC reported from the USS ARLINGTON from 11 July to 21 July. They provided considerable technical assistance during the work up phase.

4. Two ET's were provided the NELC project representative to augment their watch bill.

5. The HORNET Communications Department personnel were port and starboard from departure conus to end of mission.

27 July 1969

USN Electronics Laboratory Center, Code 3250, San Diego, Calif. 92152

PRELIMINARY REPORT ON THE INSTALLATION AND OPERATION OF THE NELC TACTICAL SATELLITE (TACSAT) COMMUNICATIONS TERMINAL FOR APOLLO 11 RECOVERY MISSION

The TACSAT terminal used on Apollo 9 and 10 Recovery Missions was installed on USS HORNET (CVS12) to furnish TACSAT communications as primary circuit for Command and Control for Chief of Task Force 130 (CTF-130) in Hawaii, and as primary circuit for NASA Recovery in Houston.

SHIPBOARD INSTALLATION

In the interest of expediting the TACSAT installation, the Long Beach Naval Shipyard installed an unshielded armored cable for audio/keying circuits from the TACSAT hut to Main Comm. Efforts were made to use this cable, but because of persistent interference, it was eventually replaced by the cable (shielded pairs) used on Apollo 9 and 10 Recovery.

The TACSAT hut, with the "forward" antenna mounted on top, was placed just forward of the island. The alternate "aft" antenna was mounted just forward on the number 2 elevator, aft the island, and supported by a guyed pipe mast approximately 8 feet tall. Installation of the transmission line (heliax) and control cable was made without difficulty. Unfortunately, the removal of gear along the starboard flight deck catwalk exposed the cables, and damage occurred, since they were not adequately tied clear. NELC reps assume the responsibility for at least a portion of this oversight. Other services included 60 Hz and 400 Hz power, telephone, special phone to main Comm, 1-MC announcing system, and ship's O.S.C. gyro repeater. No problems have been encountered with these services.

INTERFERENCE

As expected, HORNET presented a more hostile noise environment than had been experienced on Apollo 9 (USS GUADALCANAL LPH-7) or Apollo 10 (USS PRINCETON LPH-5). Operation of the NA/SPS-43 Radar caused considerable interference each sweep to both transmit and receive circuits, particularly when the Radar was operated in a high power mode. Frequency components of the SPS-43 signal actually falling within the very narrow receive channels of the TACSAT system caused interference. Other interference each sweep from the SPS-43 was caused by rectification in the audio systems in the hut of the pulsed radar signal which was picked up on the cables. Interference from various HF carriers with tone package or sideband modulation was experienced, probably by induction into exposed audio cables. These interference problems were substantially eliminated by replacement of the audio/keying lines with shielded cable.

Interference from the SPS-43 still persists with the hut door open, since the shielding of equipment within the hut is insufficient to prevent it. While this interference is sometimes bothersome, it does not cause significant disruption of communications.

Considerable disruption to communications, however, is caused by various sources producing impulse noise as well as broadband noise from arcing. In one case a welding operation on the 06 level, not known to Main Communications, caused severe interference for several hours. In another case arcing across an antenna base insulator was identified by the Communications Officer and quickly repaired. Warm-up of certain fixed-wing aircraft, and the operation of flight deck service vehicles caused considerable interference, however, the Air Officer alleviated this problem by operating these vehicles away from the vicinity of the hut as much as feasible.

On one occasion operation of a SARAH Beacon on 242 MHz caused considerable interference. A later test of the four SARAH Beacons on board showed two to be "clean". These were earmarked for future operations. No further interference has been observed.

Occasional interference from other TACSAT-1 users outside the Apollo network occurred, but in no case was it more than temporary.

A compatibility test was made on TACSAT-1 between FM voice and the digital TATS MODEM. Severe interference to FM voice resulted, and operation of the TATS MODEM was discontinued.

Equipment Compatibility

No circuit incompatibilities between the TACSAT terminal and the patching facility in Main Communications Center or the remote stations were found. However, appreciable variation of audio levels from the various remote stations has been observed. Most of these variations are attributable to the wide range of voice levels of the talkers using the system. Occasional low output from a handset was observed, although this appears to be the result of a defective instrument rather than a type incompatibility. The handsets in CIC are operated through consoles and with amplification. On one occasion an abnormally high level from this area was observed, although, in general, appropriate levels were the rule.

To establish reasonably uniform voice levels, it is the obligation of the listener to advise the speaker as to an appropriate level. Some education of the many speakers on the TACSAT circuits was accomplished during the mission. Standardization of voice levels is important because of the relatively narrow band FM system employed with TACSAT. Excessively high voice levels cause over-deviation and distortion, while low levels fail to utilize adequately the system capabilities.

SATELLITE PERFORMANCE

TACSAT-1 output power exhibited moderate to severe fading, particularly during nighttime hours. In this connection on 23 July 69 the satellite was released to SAMSO for observation and possible correction of this problem. During this period operation was shifted to the LES-6 satellite. The same operational configuration of one duplex and two simplex circuits (including ARIA aircraft operation) was maintained and was satisfactory for several hours, but degraded so as to become unusable shortly thereafter. At approximately 1300 to 1400Z 24 July conditions improved on LES-6, although it was just capable of supporting one simplex circuit from HORNET. At about 1500Z TACSAT-1 was returned for Apollo 11 recovery use. Two excellent simplex circuits were established from HORNET to Hawaii and to Houston. These circuits were in use during the recovery operation and concurrent with ARIA aircraft use.

WITHIN-BAND TELETYPE CIRCUIT

Use of the within-band teletype circuit, employing Telegraph Terminal TH-5 with F-98 Filters, was based upon the availability of a full duplex circuit. With the equipment in operation, perfect copy was sent in both directions over the duplex circuit, but the tone level required for teletype operation was such as to cause considerable interference to the companion voice circuit. Conversely, the presence of voice signals on the composite audio circuit resulted in mutilation of the otherwise perfect teletype copy. There is some indication that amplification of the channelized teletype tones feeding the receive side of the TH-5 might improve the operation. Based upon measurements made aboard HORNET, there appears some doubt that the selectivity of the F-98 filter provides sufficient isolation between teletype tone and voice circuits. In any event, more study of the circuit requirements and equipment capabilities is indicated.

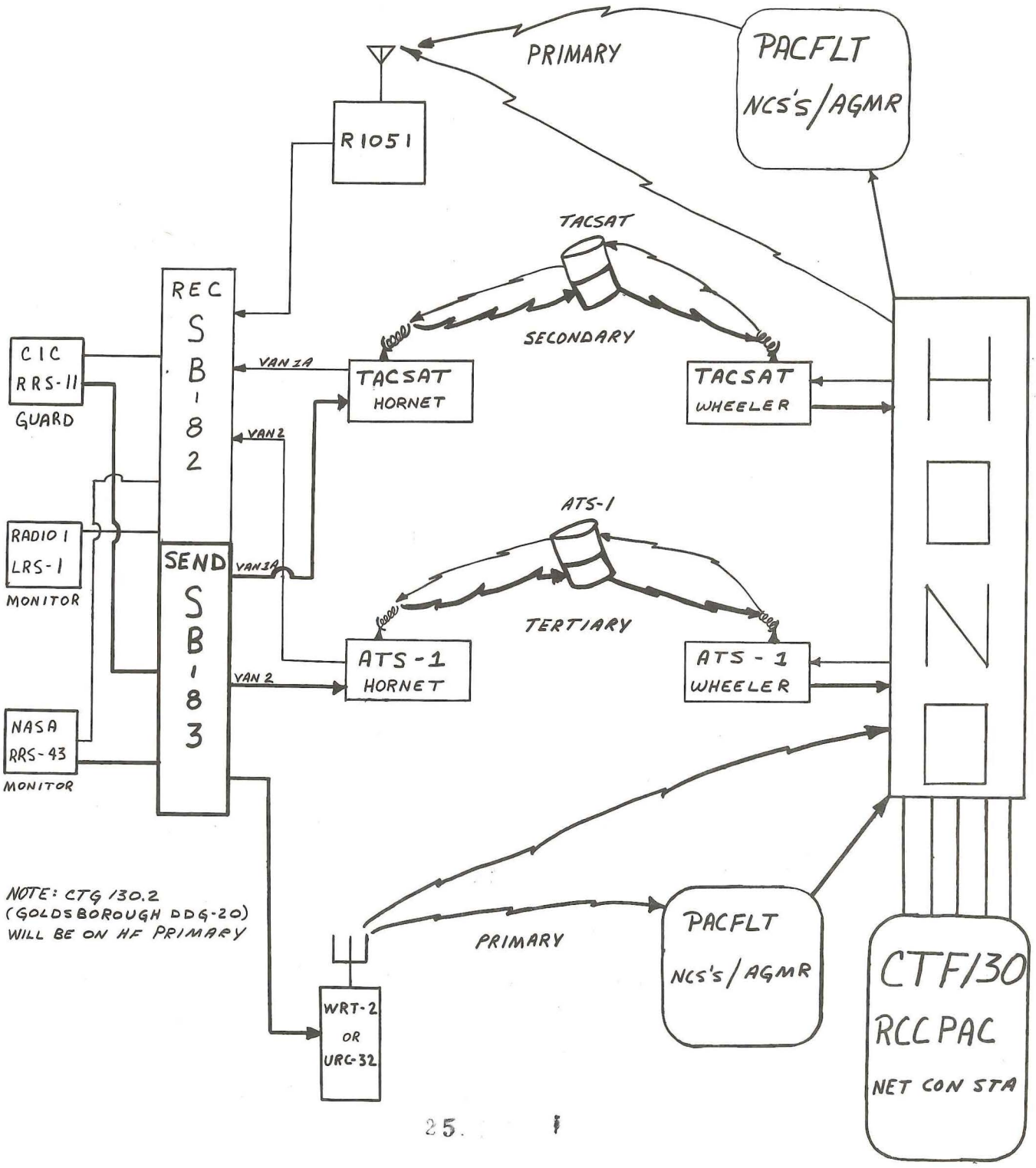
If full duplex voice operation were not otherwise required between satellite terminals, the value of the single shannel teletype circuit should be weighed against the advantages and disadvantages of simplex and duplex voice operation.

H. L. Heibeck, NELC

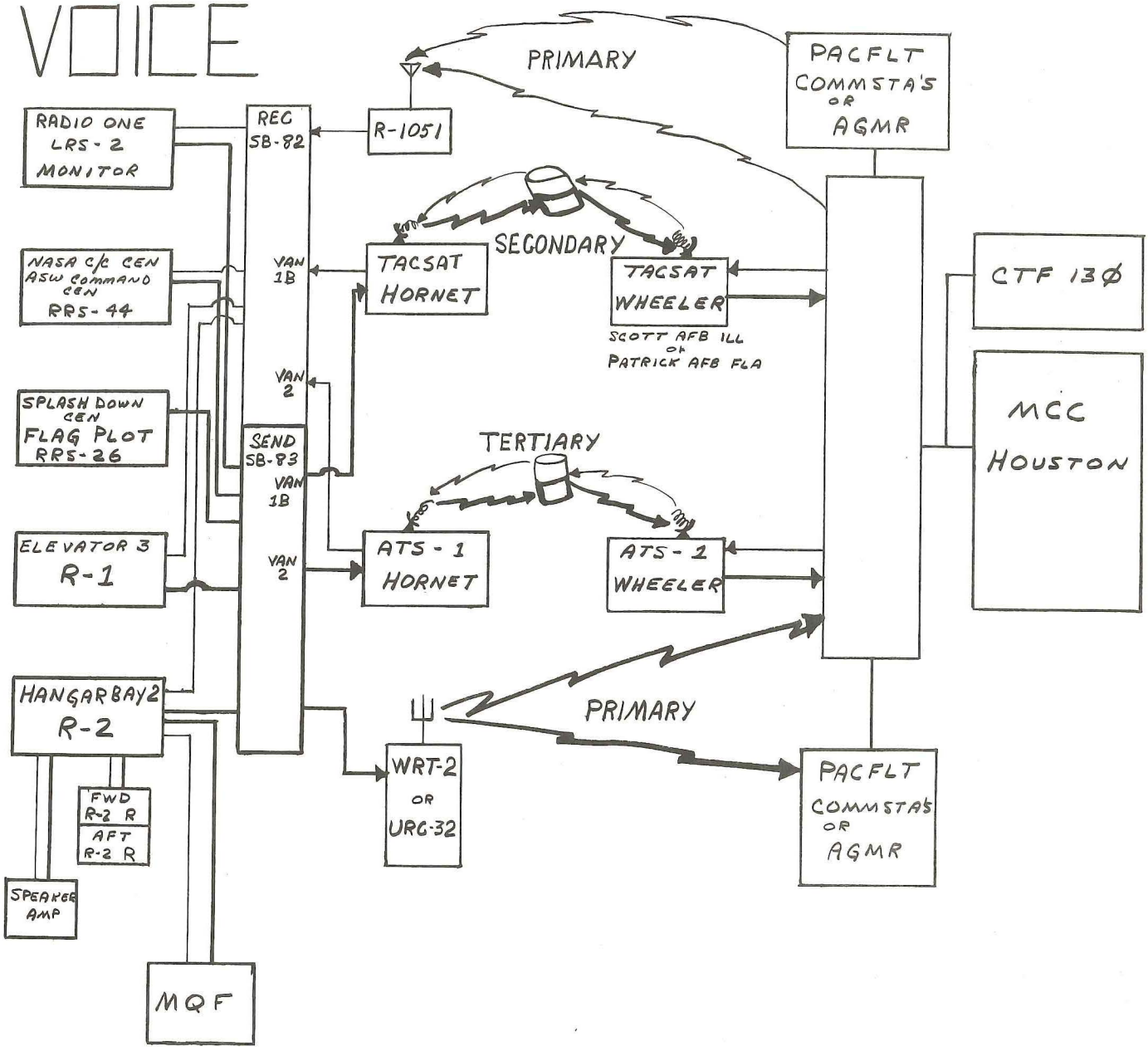
N. L. Tinklepaugh, NELC

CTF 130/PRS COMMAND & CONT

ALFA FREQS FROM "A" POOL

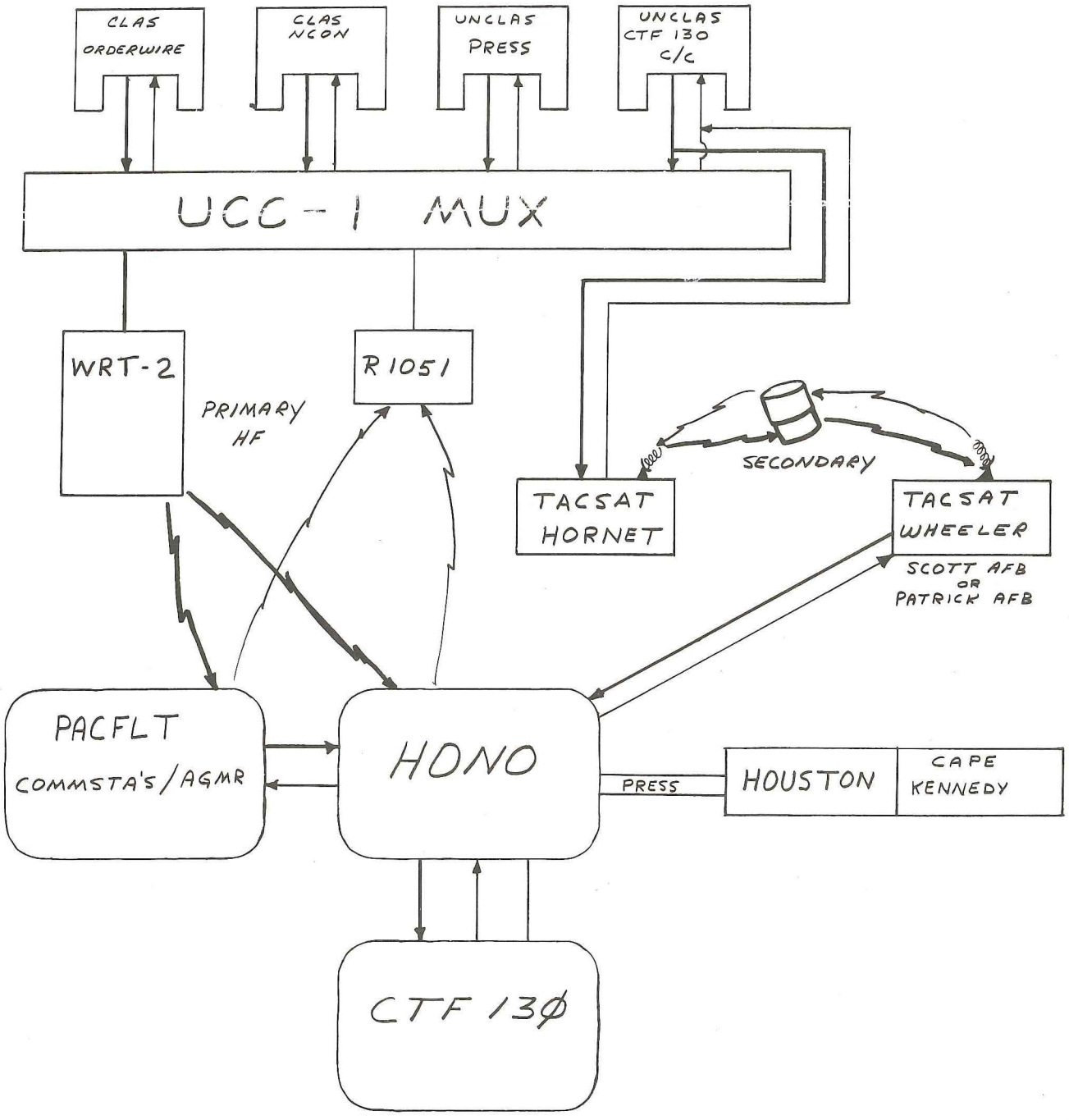


NASA ENG, MED, PAO PRS. BOARD VOICE

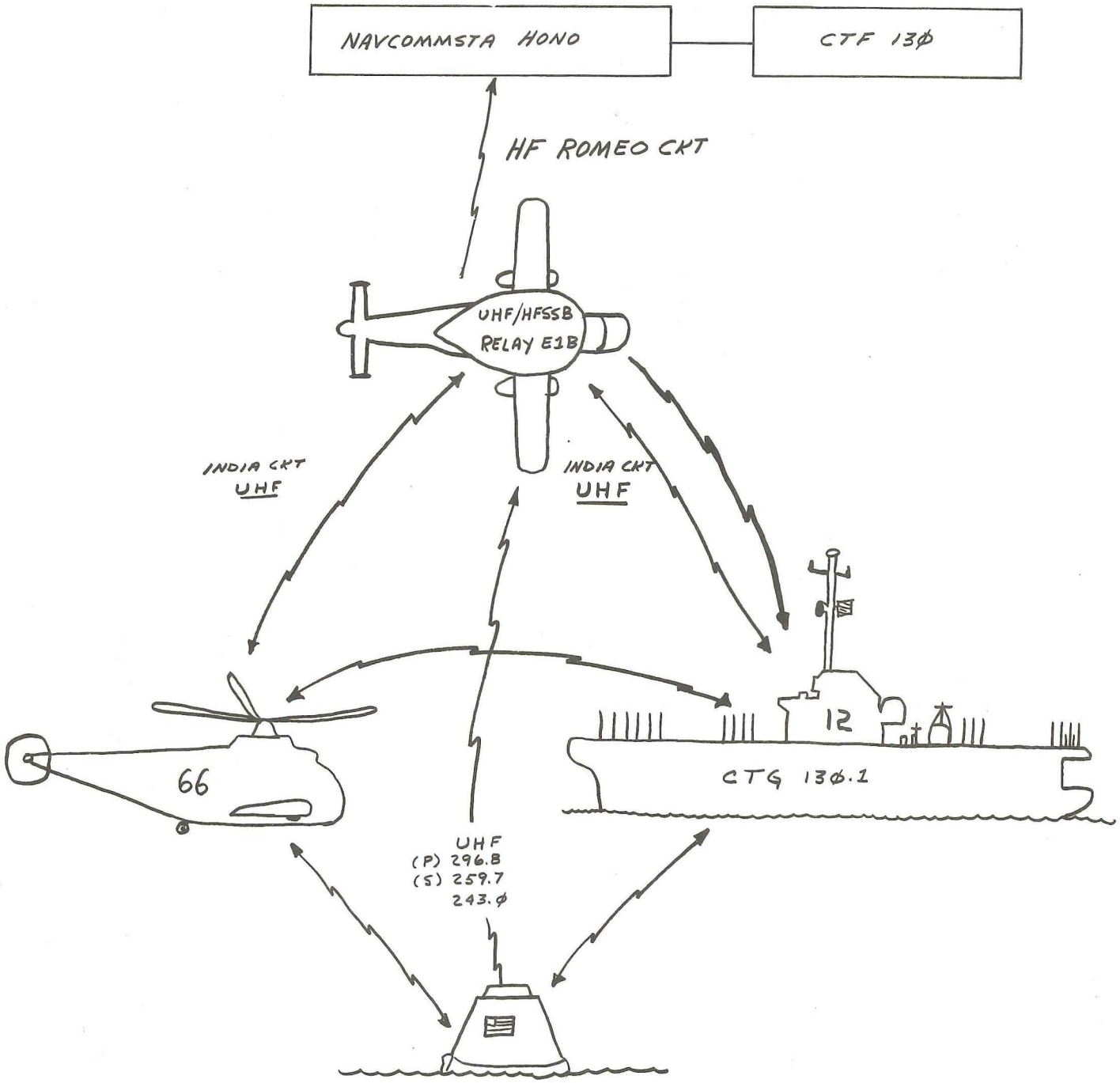


1. FREQS FROM ALFA & HOTEL LISTINGS
2. NASA COMMAND CENTER IN ASW COMCEN ON RRS-44 UNTIL 30 MIN PRIOR SPLASH DOWN THEN SHIFT CONTROL TO FLAG PLOT RRS-26 (LEAVE XMTR & REC ON RRS-44 ALSO). AFTER SPLASH DOWN (DURING RECOVERY OF MODULE PHASE) SHIFT XMTR & REC CONTROL TO R-1. AFTER MODULE IS ON BOARD SHIFT TO R-2 (IN HANGAR BAY #2). THIS ALLOWS ENGINEERS TO HAVE COMMUNICATION WITH MCC HOUSTON WHILE EXAMINING THE COMMAND MODULE. MQF WILL BE TIED INTO R-2 FOR ALL VOICE COMM WITH APOLLO CREW. VIP TELECONS WILL BE VIA ATS-1 (VAN 20 BOARDS).

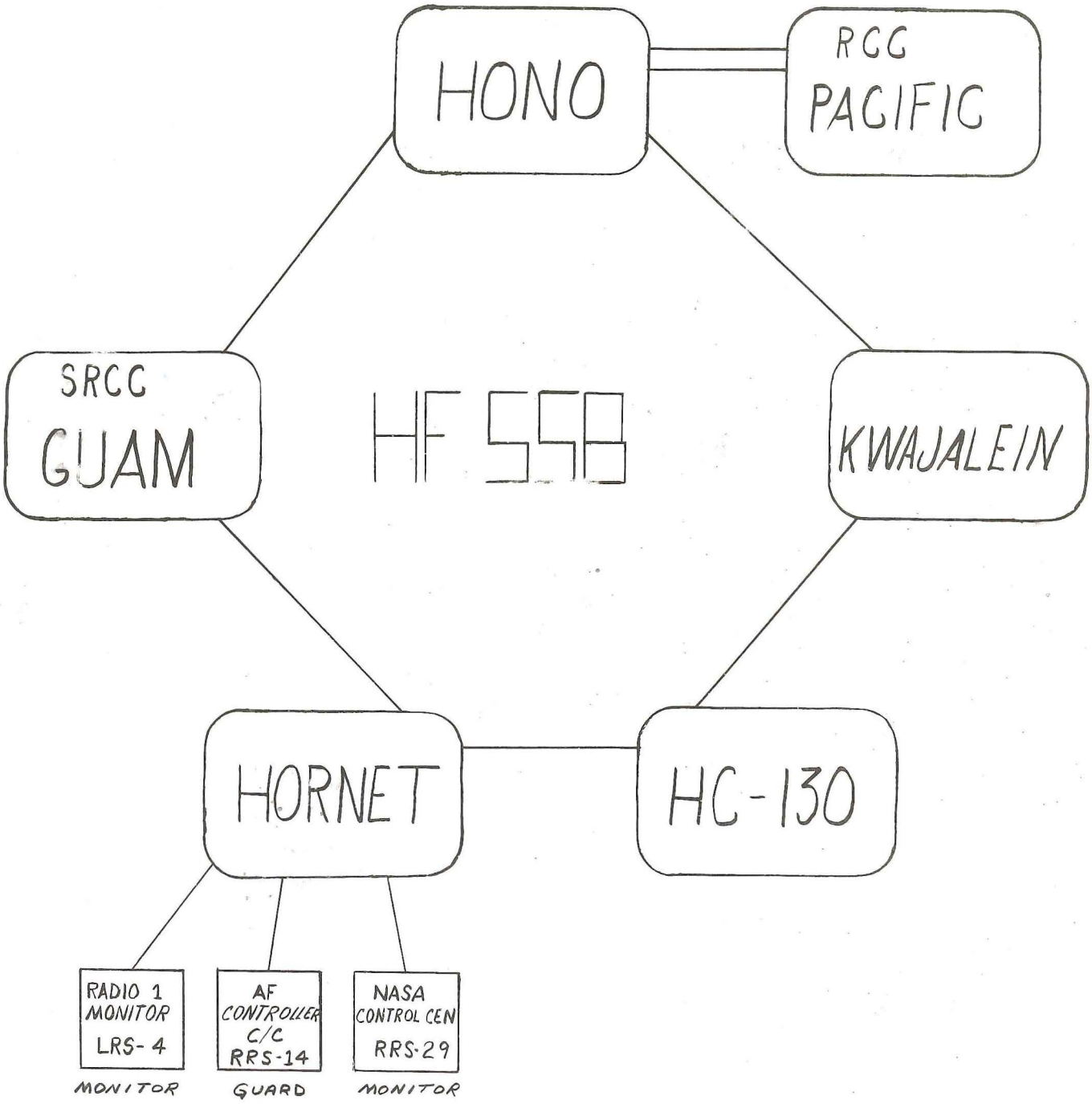
TELETYPE


CLAS ORDERWIRE
CLAS NCON
UNCLAS PRESS
UNCLAS CTF 130 C/C
UCC-1 MUX
WRT-2
PRIMARY HF
R1051
SECONDARY
TACSAT HORNET
TACSAT WHEELER
SCOTT AFB OR PATRICK AFB
PACFLT
COMMSTA's/AGMR
HONO
PRESS
HOUSTON
CAPE KENNEDY
CTF 13Ø

ASTRONAUT VOICE CKT



HOTEL NET


HONO
RCC
PACIFIC
SRCC
GUAM
HF SSB
KWAJALEIN
HORNET
HC-130
RADIO 1
MONITOR
LRS-4
MONITOR
AF
CONTROLLER
C/C
RRS-14
GUARD
NASA
CONTROL CEN
RRS-29
MONITOR

CTG 130.1 COMMUNICATIONS

PLAN

UNITED STATES PACIFIC FLEET
Commander Task Group 130.1
Primary Landing Area Recovery
Group, Pacific and
Commanding Officer USS HORNET (CVS-12)
Pearl Harbor, Hawaii
DTG: 121900Z July 1969
Message Ref: 1213-69

Operation Order
USS HORNET (CVS-12) No. 1-69

ANNEX C

Apollo 11 (Eleven) Communications Plan

1. General. The purpose of this Annex is to provide amplifying data for Apollo 11 recovery operations in the Pacific Command area. Communications is in accordance with COMHAWSEAFRON Operation Order 334-69.

a. Effective. This communications plan is effective upon CHOP to CTF 130 and remains in effect until outchop.

b. Emission Control. A frequency protection criteria message will be promulgated by CTF 130 prior to mission. Embarked units shall clear usage of all frequencies with CTG 130.1 prior to any activation.

c. Authentication: All units engaged in Apollo 11 recovery are exempt from authentication requirements.

d. Fleet Broadcast: All units engaged in recovery shall copy the appropriate required fleet broadcast.

2. SAR (Search and Rescue) Communications: SAR communications shall be in accordance with NWP 37 (A), NWP 16 (B) and appropriate SAR Area Coordinator's instructions. Distress frequencies and guard assignments are contained in the frequency plan.

3. Branding Iron (Emergency Sortie): When required by and in accordance with COMHAWSEAFRON Operations Order 201-69 all units shall guard required frequencies for Emergency Sortie.

4. Call Sign: Call Signs are in accordance with Appendix I to this Communications Plan.

5. Frequencies and Guard Assignments: Frequency and Guard Assignments are in accordance with COMHAWSEAFRON OPORD 334-69.

6. Radio Checks: All units shall be prepared to conduct radio checks in accordance with Appendix II to this Communications Plan as directed by CTG 130.1.

7. Boilerplate Training: Frequency 242.0 MHZ shall be substituted for 243.0 for boilerplate recovery training. During actual recovery all units shall guard 243.0 MHZ (CM homing beacon).

8. Recording Requirements: CTG 130.1 (CO USS HORNET (PRS)) will monitor and record astronaut voice communications (296.8 MHZ) Primary, (259.7 MHZ) Secondary and homing beacon (243.0 MHZ) from CM entry until retrieval. Secondary recovery ships shall monitor and record these same circuits providing equipment is available. All recordings shall be turned over to CTG 130.1 for transmittal to the NASA recovery team leader.

9. Command and Control Circuits: During recovery operations CTF 130 is the net control for all command and control circuits. CTG 130.1 (CO USS HORNET (PRS)) will record this circuit during SIMEXES and recovery operations.

10. Circuit Outages: All circuit outages or communications problems affecting the recovery mission shall be reported to CTF 130 information to CTG 130.1 by the most rapid means possible.

11. Voice Communications Backup: Voice communications backup is provided via two separate satellite systems, (TACSAT and ATS-1).

12. Press Communications: Message format and filing data requirement is in accordance with COMHAWSEAFRON OPORD 334-69. The ship/shore voice circuit for the news media will be provided through portable communications equipment of the agencies involved. These agencies may be required by direction of CTG 130.1 to cease transmissions on any frequency which in the opinion of the PRS Communications Officer, will interfere with operational communications. Frequencies allocated by the FCC to these agencies are contained in Appendix III to the Communications Plan.

C. J. SEIBERLICH
Captain USN
Commanding Officer USS HORNET (CVS-12) and
Commander Task Group 130.1

Authenticated:

J. J. McNALLY
Commander USN
Operations Officer

Operation Order
USS HORNET (CVS-12) No. 1-69

Appendicies:
I Call Signs and Address Groups
II Communications Plan
III Commercial Frequency Assignments
IV Communications Plans "ALFA" and "CHARLIE"

UNITED STATES PACIFIC FLEET
Commander Task Group 130.1
Primary Landing Area Recovery
Group, Pacific and
Commanding Officer USS HORNET (CVS-12)
Pearl Harbor, Hawaii
DTG: 121900Z July 1969
Message Ref: 1213-69

Operation Order
USS HORNET (CVS-12) No. 1-69

Appendix I to Annex G

Call Signs and Address Groups

Activity	Command Call	Collective Call
CTF 130	Pacific Chief	Pacific Tribe
CTG 130.1	Primary Leader	Primary Group
CTG 130.2	MidPac Leader	MidPac Group
CTG 130.4	Pacific Rescue	Rescue Group
CTG 130.5	CHIPOLA	
USS HORNET	HORNET	
USS ARLINGTON	ARLINGTON	
USS GOLDSBOROUGH	GOLDSBOROUGH	
USS HASSAYAMPA	HASSAYAMPA	
USS CARPENTER	CARPENTER	
NCS Honolulu	Hawaii Radio	
NSC Guam	Guam Radio	
Wheeler AFB	Wheeler Radio	
KTS	Kwajalein Relay	
Surface on Scene Commander	Surface Boss	
On Scene Air Commander	Air Boss	
On Scene Collective for Aircraft		Air Gang
CTF 130 Coord.	Pacific Radio	

1. SRCC Voice Calls: Consists of base plus the work leader. Example: "GUAM LEADER".

2. Land Based Aircraft Voice Calls: Consists of geographical location of base, type of mission and number. Example: "HAWAII RESCUE ONE".

3. PRS Based Aircraft Voice Calls: Consists of aircraft, type of mission amd number but omit base. Example: "AIR BOSS" "SWIM ONE" "RECOVERY".

4. Special Voice Calls: Following are voice calls used during circuit checks and for communication coordination between Cape Kennedy, Houston, RCC Pacific and various remote stations aboard the PRS:

	LOCATION/FUNCTION	EXAMPLE OF VOICE CALL
a.	CTF 130 Communication Coordinator	"PACIFIC RADIO"
b.	DID Communication Coordinator at Cape Kennedy	"CAPE OSBORN"
c.	DOD Communication Coordinator at MCC Houston	"HOUSTON OSBORN"
d.	PRS Remote Station in Radio Central	"HORNET RADIO"
e.	PRS Remote Station near Mobile Quarantine Fac	"HORNET MQF"

UNITED STATES PACIFIC FLEET
Commander Task Group 130.1
Primary Landing Area Recovery
Group, Pacific and
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Pearl Harbor, Hawaii
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Operation Order
USS HORNET (CVS-12) No. 1-69

Appendix II to Annex C

Communication Plan

1. As depicted in the following three diagrams.

COMMUNICATION PLAN

CKT TITLE	FREQUENCY	EMISSION	REMOTE/S	NET CONTROL	HORNET	ARLINGTON	GOLDS-BOROUGH	CARPENTER	HASSAYAMPA
FLT BROADCAST	VAR	VAR	VAR	N/A	X	X	X	X	X
S/S TERMINATION VFCT-8	AO2 AO3	3A7J	VAR	N/A	X	X			
TG ORESTES	5385KHZ	1.24F1	VAR	ARLINGTON		G	X	X	X
TG COMMON	7362KHZ	USB	RRS-21	HORNET	G	X	X	X	X
COMM COORD	4430KHZ	USB	LRS-5	ARLINGTON	X	G			
PRITAC	367.4MHZ	6A3	RRS-33	HORNET	G		A	A	A
PRITAC	326.6MHZ	6A3	N/A	ARLINGTON		G	A	A	A
FLEET COMMON	277.8MHZ	6A3	RNS-1 RRS-10	N/A	W	W	W	W	W
LAND LAUNCH	277.3MHZ	6A3	RRS-31	HORNET	G				
AIR FUNCTION I	273.0MHZ	6A3	RNS-1/2/3/4	HORNET	G				
AIR GROUND (P)	264.2MHZ	6A3	RRS-14	HORNET	G				
AIR GROUND (CKT HOTEL)	VAR (2 FREQS)	USB	RRS-11/15	PACIFIC RESCUE	X				
RASPBERRY	6723 DAY 3109 NIGHT	USB USB	RRS-22 CATCC#9	N/A	X				

COMMUNICATION PLAN

CKT TITLE	FREQUENCY	EMISSION	REMOTE/S	NET CONTROL	HORNET	ARLINGTON	GOLDS-BOROUGH	CARPENTER	HASSAYAMPA
CTF 130 COMMAND AND CONTROL	TACSAT CKT I	SATCOMM	RRS-7/12 RRS-39 R-1 ASCAC TL-4 HUT	CTF 130					
CTF 130 COMMAND AND CONTROL PRIMARY HF SECONDARY HF	2820KHZ REC 6745KHZ REC 2656KHZ SEND 4020KHZ SENC	USB USB USB USB	 RRS-5 RRS-13	 CTF 130 CTF 130					
NASA COORD	TACSAT CKT 3	SATCOMM	RRS-43 RRS-27 R-2 HUT RRS-32	CTF 130					
NASA COORD HF BACKUP	2658KHZ SEND 6745KHZ REC	LSB LSB	LRS-4	CTF 130					
ASTRONAUT VOICE	296.8MHZ (P)	6A3	RRS-30 RNS7/RRS33 RRS-8/44 ASCAC TL-1 RRS-28	HORNET/AIRBOSS					
	259.7MHZ (S)	6A3	RRS-9 ASCAC TL-2	HORNET/AIRBOSS					
	243.0MHZ	6A3	RRS-16/19 ASCAC TL-3 CATCC TL-7						
ASTRONAUT VOICE RELAY (ROMEO CKT)	VAR	USB	RRS-6	CTF 130					

COMMUNICATION PLAN

CKT TITLE	FREQUENCY	EMISSION	REMOTE/S	NET CONTROL	HORNET	ARLINGTON	GOLDS-BOROUGH	CARPENTER	HASSAYAMPA
VOICE OF AMERICA	GE SATCOMM	SATCOMM	NA	NA	X				
VOICE OF AMERICA	4020KHZ	LSB	RRS-40 RRS-40	HORNET HORNET	X X	X relay X relay			
WHITE HOUSE (CARNATION)	ATS-1	SATCOMM	RRS-29	WHITE HOUSE HORNET	G				
WHITE HOUSE HF VOICE	2015KHZ SEND 8040KHZ REC	USB USB	RRS-26	WHITE HOUSE HORNET	G	X relay			
HI TROUT	266.6MHZ	MCW	AO KEYER CATCC 8	HORNET (AX)	G				
LO TROUT	408KHZ	MCW	AO KEYER CATCC 9	HORNET (AX)	G				
DISTRESS	500KHZ	CW	RADIO 2	NA	X	X	W	W	W
INT LIFEBOAT	8364KHZ	CW	RADIO 3	NA	X	X	W	W	W
STEAM VALVE full duplex	VAR	3A7J	QHS-4	NAVCOMMSTA HONO extend to White House	G				

Legend:
G = Net Control
X = Guard
W = When Required
L = Loudspeaker
A = As Appropriate

CKT	FREQUENCY (all kHz except as noted)	PURPOSE	CTF 130	CTG 130.1	CTG 130.2	CTG 130 130.4	TG 130.4	NCS GUAM	KWAJ
A	(a) 3089.5 (3088) (b) 4021.5 (4020) **(c) 4705.5 (4704) **(d) 6691.5 (6690) (e) 7363.5 (7362) (f) 7454.5 (7453) (g) 9003.5 (9002) (h) 9121.5 (9120) (i) 13238.5 (13237) (j) 15062.5 (15061) (k) 17986.5 (17985) (l) 20491.5 (20490)	HF SSB Voice	G	X	X		W		
H	(a) 4740.5 (4739) (b) 6698.5 (6697) (c) 6745 (6743) (d) 8977.5 (8976) **(e) 8981.5 (8980) (f) 9040.5 (9039) (h) 11199.5 (11198) (i) 11215.5 (11214) (j) 11600 (11598) **(k) 15088.5 (15087) (l) 15548.5 (15547) (m) 17986.5 (17985) (n) 18408.5 (18407) (o) 22726.5 (22725) (p) 22738 (22736)	SRCC Common HF SSB	X	W	W	G	X		X
I	(a) 142.5 mHz (b) 149.4 mHz **(c) 264.2 mHz (d) 304.2 mHz (e) 2656 kHz (f) 2820 kHz	Air to Ground Voice		W	W				
R	(a) 4556.6 (4555) (b) 6694.5 (6693) **(c) 8225.5 (8224) (d) 11218.5 (11217) (e) 15072.5 (15071)	UHF/HF Voice On-Scene Relay	X						

LEGEND

G - Net Control
X - Guard
W - When required
L - Loudspeaker
A - As appropriate
** - Initial Contact Freq.