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

Tab A to Appendix II to Annex C

ELABORATION OF COMMUNICATION PLAN

1. Ship/Shore VFCT-8 Termination. The primary VFCT termination will be maintained with NAVCOMMSTA HONO until arrival of the AGMR. Anticipate shifting the termation to AGMR approximately 19 July for coordination and testing of optimum frequency utiliztion during rapidly opening and closing situations. Determination of termination location must remain flexible and is tentatively planned as follows:

NAVCOMMSTA HONO until approx 190001Z Jul 69
USS ARLINGTON Low power HF in 2-4 MHZ range
NAVCOMMSTA HONO approx 25 Jul 69

The above termination planning is based on reducing the total number of HF frequencies in use from the recovery area to HAWAII.

Channelization is as follows:

1/9 O/W (to terminated commsta/AGMR)
2/10 NCON ORE
3/11 CTF 130 Netted to CAMS
4/12 Press (on-Call)

Note: White House ORESTES circuit is active for test and shifts from the ARLINGTON to HORNET at NAVCOMMSTA HONO as directed by the White House Communication Agency (WHCA).

There is a possibility CINCPAC will arrive HORNET prior to arrival of the President. When CINCPAC is aboard HORNET his traffic may be handled by a dedicated teletype circuit extended to CINCPAC Headquarters or it may be handled as a torn tape relay on ARLINGTON via the NAVCOMONET. Direction from higher authority will be followed in this matter when received.

Operation Order
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DEDICATED CINCPAC CKT	TORN TAPE ON AGMR
1/9 O/W ORE	1/9 O/W ORE
2/10 NCON ORE	2/10 NCON ORE/CINCPAC
3/11 CTF-130 Netted to CAMS	3/11 CTF-130 Netted to CAMS
4/12 CINCPAC extended	4/12 Press (on-Call)

The President Of the United States is scheduled to arrive on board HORNET from ARLINGTON at 240500X Jul 69. The WHCA ORESTES teletype circuit will be shifted to HORNET as directed by WHCA (APPROX 240445X). WHCA personnel currently on board HORNET will operate this full duplex circuit and make crypto sets using keylist in their custody. This circuit will remain active until a time designated by the WHCA. Channelization will be as follows:

1/9 O/W ORE
2/10 NCON ORE or NCON/CINCPAC or CINCPAC extended
3/11 CTF-130 Netted to CAMS
4/12 PRESIDENTIAL WHCA ORE

2. Task Group Common.

a. Voice. A voice Task Group common will be established approximately 200001Z Jul 69 for coordination of Task Group operations and communication. The Task Group common will operate USB for coordination of Task Group operations including flight following. This circuit will be guarded in CIC (RRS-4) and AIROPS (RRS-21). The LSB of this circuit will be utilized for communication coordination between USS HORNET and ARLINGTON. (LRS-5)

b. Teletype. A Task Group SIMPLEX ORESTES net has been established for GOLDSBOROUGH, CARPENTER and HASSAYAMPA to file ship/shore messages to the AGMR for relay. ARLINGTON is net control. Use standard PACFLT ship/ship keylist.

3. Frequencies. Frequencies listed in the opord have been selected from the CTF-130 ALFA, HOTEL, INDIA and ROMEO lower frequencies which will not be in use from the primary recovery area to HAWAII. Additional frequencies have been selected from COMASWGRU FIVE authorized frequencies in the FIRSTFLT area. AGMR frequencies listed in the A03.01 and A0.3.02 list in JANAP 195 may also be used as the AGMR directs.

4. HORNET to ARLINGTON Relay. Low Power HF relay will be utilized between HORNET and ARLINGTON on designated circuits. Frequencies have been selected which will not interfere with ARLINGTON to NAVCOMMSTA HONO circuits or HORNET to NAVCOMMSTA HONO circuits. Frequency shifts will be as recommended by ARLINGTON and maintain a 10 percent frequency separation if possible.

5. Primary Tactical Maneuvering. HORNET and ARLINGTON have been assigned plane guard Destroyers for night helo operations. A UHF PRITAC circuit has been designated for each ship conducting helo operations. Plan guard destroyers will guard the appropriate PRITAC circuit. HORNET PRITAC will be be guarded on the bridge at RRS-32.

6. Air/Air, Air/Ground. HORNET land launch (HORNET TOWER) frequency 277.3MHZ will be continuously guarded in PRIFLY on RRS-31. The bridge will guard L/L on RNS-7/RRS-33 during aircraft launch and retrieval operations and shift to primary Astronaut voice (296.8MHZ) during APOLLO 11 recovery. Primary Astronaut voice will be guarded on the bridge PRIFLY, CIC, monitored in NASA recovery center, FLAG bridge and recorded in ASCAC. Secondary Astronaut voice will be monitored in CIC and recorded in ASCAC. UHF emergency will be guarded in CIC, CATCC and recorded in ASCAC. Astronaut voice HF relay (ROMEO CIRCUIT) will be monitored in CIC on RRS-6 for quality control and relay of frequency shift information received from CTE-130 to the E1B aircraft on air/ground primary 264.2MHZ (RRS-14). Air Function #1 will be guarded in CIC (RRS-11 and RRS-15) using two HF circuits simultaneously because of the varied geographical location of the various units on the network. RASPBERRY will be guarded for flight following of COD aircraft inbound and outbound from Johnston Island.

7. CTF-130 Command and Control Voice. The CTF-130 Command and Control Voice circuit is the primary means of communications between CTF-130 and HORNET and is designated circuit ALFA. The Command and Control voice circuit will use the TACSAT circuit 1 path and HF primary and secondary paths as a backup. Control of this circuit will be maintained in CIC (RRS-7). A continous monitor will be maintained on the HF backup circuits (RRS-5 and RRS-13) with transmitters connected and ready for use. During recovery operations the Command and Control voice circuit will be patched to the bridge on RRS-39 for a running commentary of operations in progress and to elevator #3 (R-1) for running commentary of retrieval operations and activities taking place in hangar bay #2 at the MQF vans. The Command and Control voice circuit will be monitored in NASA recovery center (RRS-12) and recorded in ASCAC.

8. NASA Coordination Voice. The NASA voice communication circuit is used by NASA engineering, medical and public affairs personnel for coordination with MCC HOUSTON and RCC PACIFIC. This circuit will be operated on a scheduled basis by NASA personnel at 07-0800, 15-1600 and 21-2200 local PRS time. This circuit will use the TACSAT circuit 3 path with a HF backup. The HF backup will be relayed via low power HF to the AGMR for HF relay to CTF-130. The NASA circuit will normall be guarded in the NASA Control Center (RRS-43) and in Radio One (LRS-4) during non-scheduled hours on a 30 minute on call basis. The NASA circuit will shift from the NASA Control Center thirty minutes (R-30 min) prior to splash down to a vantage point on the Flag Bridge (RRS-27) for use by the NASA team leader.

If the Presidential party on the flag bridge precludes the NASA team leader from viewing the splash down in that area the NASA circuit will probably stay in the NASA control center (RRS-43). Information on this will be promulgated later when it becomes available. After splash down and during the unloading of the astronauts from the helo in hangar bay #2 the NASA circuit will be operated from hangar bay 2 using R-2. The long lead handset is of sufficient length to also be used at the retrieval areas on the after outboard corner of elevator 3 and for any inspections of the module in hangar bay 2 or 3. The MQF van is connected to R-2 which will be used for any communication from the interior of the VAN. R-2 is equipped with a 10 watt amplifier and two speakers which may be turned on to allow public listening to both sides of any radio circuit connected to R-2. If public listening is not desired turning off the amplifier will insure privacy.

9. Voice of America. The voice of America (VOA) live Russian language broadcast will be transmitted via the General Electric Satelite system with a HF backup (60 minute on-call). The HF backup system will be via low power HF from HORNET to ARLINGTON then high power HF from ARLINGTON to RCA San Francisco. If HF backup is required the VOA commentator will use RRS-40 from forward air control on the 07 level.

10. Presidential Communications. The President of the United States will be aboard HORNET during the recovery of APOLLO 11. The President will arrive from ARLINGTON via Marine Helo at approx 240500X Jul 69 and depart for Johnston Island via ARLINGTON by Marine Helo at approx 240755X Jul 69 after the APOLLO 11 astronauts are aboard HORNET, but before the module has been retrieved. The President requires immediate access to an UNCLAS voice circuit at all times regardless of his location. UNCLAS voice communications will be furnished utilizing the ATS-1 Goddard Space Flight Center satellite system from HORNET to ROSMAN North Carolina for further extension to the White House. A low power HF USB voice circuit will be established with ARLINGTON for high power HF relay to NAVCOMMSTA HONO extension to the White House via established facilities. The unclas voice circuits will be patched to the Secret Service Command center in Flag Plot. Direction as to where to patch Presidential voice circuits will be received from the Secret Service and/or White House Communication Agency representatives. Steam Valve will be available at all times via the full duplex circuit between HORNET and NAVCOMMSTA HONO extended to the White House. Operations of Steam Valve will be from locations directed in the same manner as for unclas voice. Teletype communications is via a channel of the VFCT trunk extended from ARLINGTON/HONO/SFRAN/WASH/WHCA. White House Communication personnel will operate this circuit and furnish crypto material. Circuits will be established as requested by WHCA and tested for immediate operation while the President is on board HORNET. ATS-1 will be tested at half power hourly for 24 hours prior to the presidents arrival. ATS-1 will be placed in full power operation at 240400X and operate at full power until after the President departs ARLINGTON. The teletype circuit must be shared between HORNET and ARLINGTON at NAVCOMMSTA HONO and will not be available full time for local use until after the President departs ARLINGTON for HORNET.

All Presidential Circuits are Restoration Priority 1B. All circuit outages and problem areas must be refered to the WHCA rep on HORNET (Capt BRUFF) immediately. Decision concerning pre-empting circuits to restore White House communications will be made by Capt Bruff and CTF-130. Remote operating positions for Presidential voice communications are as follows:

Flag Plot/Bridge: ATS-1 primary unclas voice will be patched to RRS-29 and HF unclas voice backup will be patched to RRS-26. Barrel selector switches control each hand set and must be positioned to the desired remote control unit (RRS) for individual handsets. ie; any handset can be used on any remote control unit by positioning the barrel selector switch associated with a given handset. Steam Valve remote control unit QHS-4 will be patched to the full duplex Steam Valve circuit established with NAVCOMMSTA HONO for extention to the White House.

Flight Deck: The Presidential voice curcuit on the flight deck will be by means of a radio telephone located at the top of the escalator with the cable extended up the ladder well to Flag Plot and connected into a barrel selector positioned for the primary path in use (ATS-1 RRS-29).

Hangar Bay 2: The President will go down the escalator to Hangar bay 2 for a MQF demonstration prior to splash down and again after the astronauts have entered the MQF van. While the President is in hangar bay 2 he will possibly want to talk to MCC HOUSTON. If so he will use R-2 located on the starboard bulkhead. If a emergency telephone call is received from the White House which demands his immediate attention the President may pre-empt the NASA voice circuit at R-2. The NASA circuit may be for White House communications by patching at the CTF-130 Kunia operations center, and the alternate means is to connect the ATS-1 satellite terminal to R-2 while the President is in hangar bay 2 but this deprives NASA of a radio circuit in hangar bay 2. A decision on circuity will be made by the White House communication Agency representative when he arrives on HORNET.

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APPENDIX III TO ANNEX C

Commerical Frequency Assignments

1. The following frequencies have been cleared by FCC for use by Mutaul Broadcasting

(a) 6890 KHZ
(b) 10190
(c) 10390
(d) 13645
(e) 15982.5
(f) 18940
(g) 22817.5
(h) 24260
(i) 26955
(j) 29970
(k) 10620
(l) 13780
(m) 18152.5
(n) 24315
(o) 24550

2. The following frequencies have been cleared by FCC for use by General Eleectric.

4091.6
4104.4
8204.4
8217.2
8223.6
8261.9
12354.5
12361.5
12375.5
12382.5
12396.5
16477.5
16491.5
16526.5
22045.5
22066.5

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APPENDIX IV TO ANNEX C

COMM PLAN "ALFA"

CHANNEL	FREQ	USAGE
1		
2	282.8	SAR
3	364.2	GCI/ADIZ
4	277.3	LAND/LAUCNH
5	357.8	AIR SEARCH PRIMARY
6	273.0	AIR FUNCTION NR ONE
7	363.4	AIR FUNCTION NR TWO
8	296.8	ASTRO VOICE PRIMARY
9	259.7	ASTRO VOICE SECONDARY
10	277.8	FLEET COMMON
11		
12		
13		
14	264.2	A/G VOICE PRIMARY (CKT I)
15	304.2	A/G VOICE SECONDARY (CKT I)
16	356.2	DEGAUSSING
17		
18	242.0	BOILER PLATE BEACON (TRAINING)
19	243.0	UHF GUARD

COMM PLAN "CHARLIE

CHANNEL	FREQ	USAGE
01	336.4	BARPT GROUND
02	305.4	JOHNSTON IS. TOWER
03	340.2	NAVY TOWER
04	277.3	LAND/LAUNCH
05	320.2	DEPARTURE
06	357.8	AIR SEARCH (P)
07	296.8	ASTRONAUT VOICE (P)
08	259.7	ASTRONAUT VOICE (S)
09	273.0	AIR FUNCT #1
10	264.2	A/G VOICE (P)
11	304.2	A/G VOICE (S) S
12	373.8	PRI C I
13	277.8	FLEET COMMOM
14	266.6	UHF HOMER
15	354.6	APPROACH
16	339.4	FINAL #1
17	285.8	FINAL #2
18	242.0	BOILERPIATE HOMING (TRAINING)
19	243.0	UHF GUARD

TACAN CHNL 8 ID AX
HI TROUT 266.6 ID A X
LO TROUT 408 ID A X

SUPPLY SUMMARY

1. GENERAL. Preparation for APOLLO 11 Primary Recovery Ship operations was time critical due to the late selection of HORNET as the PRS and the difficulty in identification of requirements. Material required for NASA, the TV/Press Pool equipment, and special operations were identified at an APOLLO 11 Planning Conference held 12-13 June in HORNET. Department Heads identified all essential insurance items desired to ensure a high state of readiness. With departure scheduled for 26 June, special handling of requisitions was mandatory. Liaison was established between COMNAVAIRPAC, COMFAIRSDIEGO, and NSC Long Beach to assist in expediting material. Requisitions were identified by APOLLO Project Code 7Ø8, transportation priority 999, and were ordered priority 2. Special requisition logs were established to ensure current status information availability at all times.

In order to expedite material movement after departure from Hawaii, one storekeeper was ordered TAD to NSC Pearl Harbor and one TAD to Johnston Island. A message was forwarded to major supply points and transportation control points requesting air shipment of priority two requisitions to NSC, Pearl FFT to Johnston Island. COD service from Johnston Island was available the three days prior to splashdown.

Major material deficiencies did not materialize during the cruise. However, COD service recieved maximum utilization and is considered necessary insurance.

2. GENERAL STORES. Despite the very short notice for supply support of APOLLO 11 Recovery operations, most items requested were received prior to leaving Long Beach with additional items received in Hawaii. A special group of serial numbers were used to identify APOLLO items. NSC Long Beach prepared a special card to be attached to APOLLA requirsitions which ensured special handling. Several open purchased items were delivered in less than 24 hours.

No serious deficiencies were encountered in ship's stock during the cruise. Nine CASREPTS were outstanding upon departure CONUS, 1Ø more were added enroute. Seventeen of these CASREPTS were corrected prior to splashdown.

3. SALES DIVISION. Sales during the cruise were excellent. The stock of necessity and souvenier type items was carefully reviewed prior to departure CONUS. However, sales of souveniers exceeded expectations, baseball caps, APOLLO 11 mugs, and HORNET key chains were all at the top of the popularity list. A special splashdown sale with advertising over internal TV and frequent POD notes was very successful. Hawaiian perfumes and luxury items were featured.

Twice a week finished laundry service was provided officers and civilians. The heavy laundry requirements necessitated requesting additional laundrymen from COMNAVAIRPAC. A special group of 1Ø TAD Laundrymen embarked.

4. FOOD SERVICE. General Mess food supplies were topped off in Long Beach with specialty items including flight lunch portioned items, beef tenderloin, and frozen lobster tails. Additional items were loaded in Hawaii including an ample supply of fresh and frozen local fruit.

Fourteen cases of frozen food for the astronauts were stored in General Mess freezers. Very frequent access by NASA personnel in addition to stringent temperature control and security measures were required.

RECOMMENDATION: Provisions for procurement or rental of a portable reefer to be stationed in the vicinity of the MQF during future APOLLO missions would ensure the integrity of astronaut food.

5. WARDROOM BERTHING AND MESSING. The following outline presents the major areas of concern in preparing for and conducting the operations of the Wardroom with respect to the APOLLO 11 recovery:

a. Staterooms - Approximately 15Ø civilians and TAD military personnel had to be accomodated. In berthing these personnel it was not necessary to re-locate ship's company officers.

b. Personnel - To effect an efficient and effective Wardroom operation with the additional civilian and military personnel embarked. Twenty five stewards including rated personnel were embarked TAD.

c. Pre-Deployment Preparation - Provisions-meats, vegetables, soda etc. were purchased in anticipation of feeding 35Ø.

d. FINANCE - A daily rate of $1.5Ø and $2.5Ø was charged to TAD military and civilian personnel respectively.

e. The President and his party were served rolls and coffee in Flag Plot be the Senior Chief Steward and his assistant. Breakfast for six was available in Captain's Plot. Twenty-five additional TV/Press personnel arrived the day prior to splashdown to cover the Presidential visit. Jump bunks were available in sufficient quantity to accommodate all personnel. Special menu items were procured prior to departure Hawaii upon consultation with Presidential advance personnel.

A check-in, check-out desk was set up in the Quarterdeck area for personnel arrival and departure. Adequate stewards were available to assist with luggage and questions. Name tags were issued all embarked civilians. Attachment (1), a "Welcome Aboard" brochure with hours of operation and shipboard living peculuarities, was given to all guests.

After departure from Hawaii, a guest directory was published which included name, actively represented, room and telephone number.

6. SUPPORT OF PUBLIC AFFAIRS PROGRAM. Equipment support for press personnel included utilization of Air Group and pool typewriters and rental of an SCM Copy Machine. A VIP kit was purchased for visiting personnel. The kit included the following items:

APOLLO 11 BASEBALL CAP
APOLLO 11 HORNET BALL POINT PEN
WRITING TABLET/ENVELOPES
HI-DRY WIPING CLOTH
GUEST SOAP BAR
HORNET PICTURE POST CARD
WARDROOM APOLLO 11 WELCOME ABOARD BROCHURE
SPECIAL WELCOME ABOARD CONTAINER FOR ABOVE.

Additional souvenier type items were available in Ship's Store. They included an attractive and popular APOLLO 11 PRS Mug.

Special APOLLO 11 Baseball Caps with gold braid and names were procured for the astronauts and for scheduled VIP's including President Nixon.

7. AVIATION STORES. The Aviation Stores Division began preparation for the support of APOLLO 11 on 7 June 1969. Aircraft embarked included:

8	SH-3D	HS-4
4	E1B	VAW-111
3	C1A	(1) HORNET and (2) VR-30
2	US2C	VC-1

On June 10 the USS PRINCETON transferred the SH3D APOLLO kit to HORNET with the open order file for the kit. The kit was found to be 80% complete in depth. After comparing stock against the pack-up, deficiencies were requisitioned citing APOLLO 11 in the subject line, PRI 02, PROJ 708, and info COMNAVAIRPAC and COMFAIRSDIEGO. After leaving Pearl Harbor for the recovery area, the Pack-up Kit was 92% complete in range (one or more on hand) and 88% complete in depth.

On 5 June a listing of "Critical Items" was requested from each squadron in order to concentrate expediting the "must have" items.

HORNET AVCAL had at that time a range/depth of 87% and 84% respectively. The following is a summary of percent completion of those listing at the time HORNET departed Pearl Harbor for the Recovery Area.

AIRCRAFT TYPE	NBR CRITICAL ITEMS	% COMPLETION
SH3D	450	97%
E1B	23	91%
C1A	51	100%

Problem areas which require additional support effort:

1 EA spare ASE amplifier for stock	FSN 6615-113-3675
1 EA spare C6476/ARC 51A for stock	FSN 5821-738-5992
2 EA spare Torque Trans for stock	FSN 6685-079-9887

The following line item demands were experienced during the cruise:

	DEMANDS	NOT CARRIED
STOCK ISSUES	383	Ø
ROTATABLE POLL ISSUES	98	Ø
SH3D PACK UP ISSUES	29	Ø
NORS(G) OFFSHIP	8	8
NORS(N) OFFSHIP	24	19
WORK STOPPAGE OFFSHIP	75	46
	617	73

Approximately $11,6ØØ was required to fund NSA SH3D pack-up kit deficiencies.

Supply support from COMNAVAIRPAC and COMFAIRSDIEGO was excellent with only 5 NORS(N) requisitions (out of 27 NORS demands) outstanding 3 days prior to splashdown. At the time of splashdown, 1 NORS(G) and 7 NORS(N) requisitions remained outstanding, the oldest of which had been in the system only 5 days.

RECOMMENDATION: The critical material listings received from squadrons prior to embarkation were extremely accurate and of great assistance. It is recommended that the critical listing requirement be continued.

WEAPONS SUMMARY

I. General Summary

- A. Pre-departure home port
- B. Enroute Pearl Harbor
- C. Training in the Pearl Harbor Area
- D. Enroute Recovery Area
- E. Recovery of Apollo 11 Command Module
- F. Enroute Pearl Harbor
- G. Pearl Harbor

II. Significant Lessons Learned

III. Recommendations

IV. Tabs

- A. Rigging, Crane Operations and Swimmer Retrieval
- B. Diagram of Security/Crowd Control Areas Around Retrieval Operations
- C. Security Requirements for Apollo 11
- D. List of NASA equipment furnished for Apollo 11
- E. CTF 130 CVS Kit Inventory
- F. HORNET Retrieval Team
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- I. List of Equipment Purchased by HORNET for Apollo 11
- J. Locations of NS50 Crane during practice retrieval of boilerplace CM from flight deck

I. General Summary.

A. Pre-Departure Home Port. The designation as Primary Recovery Ship came on 5 June. A conference with the USS PRINCETON on 11 June helped to refine plans already made for the retrieval operation. Conferences with NASA Officials provided requirements for special equipment that should be aboard prior to departure from Naval Station Long Beach. Tab I lists that equipment purchased by Hornet Weapons Department for Apollo 11. The most important item of this special equipment was the NASA winch, which was installed on the B and A crane by Long Beach Naval Shipyard. Time became a factor in this installation and at one point threatened to delay the scheduled departure date of 27 June. Primary emphasis was placed in repairing and mounting the NASA winch on the B and A crane as it would be the primary means of retrieval of the Command Module.

Three of the ship's boats were off-loaded at San Diego prior to departure for Pearl Harbor. The additional room gained on the hangar deck was later required for the stowage of NASA and PAO Support equipment.

Information required in Tab G should be obtained during this period.

B. Enroute Pearl Harbor. The five day trip to Pearl Harbor provided an excellent opportunity to consolidate the Retrieval Team Organization; reread publications furnished, such as the Apollo Procedures Manual and Operation Orders; give important lectures concerning safety precautions; and acquaint the entire organization with the general principles of the recovery operation. The Retrieval Organization was coordinated and supervised by the Weapons Officer. Under the Weapons Officer the organization was divided into five individual teams:

(1) The Command Module Retrieval Team - First Lieutenant. A ninety man organization with personnel assigned from all departments. (See Tabs F and H). It should be emphasized that only the best men should be picked to fill key positions on this team; the back-up personnel should be brought up to the same standards. The Petty Officer-in-Charge,

the crane operator, and the shot-line gunner are key positions. Also a highly competent heaving line handler should be positioned in the area of the shot-line gunner in case the Command Module should pass too close for use of the shot-line.

(2) The Tracking and Acquisition Team - Ordnance Officer. This team was composed of the Fire Control Technicians and Ordnance Division Officers. Three Directors were manned: MK56 GFCS forward, MK56 GFCS aft, and the MK37 GFCS.

(3) The Security Team - C. O. MARDET. This team was composed of the Marine detachment and ship's Master-at-Arms force.

(4) The Recording Team - AUW Supervisor. This team was composed of the AUW Supervisor and part time photographers. His function ensured the gathering of appropriate notes, photographs, etc., in anticipation of the preparation of this report.

(5) UDT Team Assistance - GO Division Officer. This Officer set up the storage space and coordinated the material requirements of the UDT Team with the ship.

Dry runs of recovery procedures, exploration of possible paths of travel for the President, peaking the fire control radars, and preparing equipment for use were also tasks that were undertaken.

C. Training in the Pearl Harbor Area. On arrival at Ford Island, Pearl Harbor, on 2 July, the boilerplate was loaded aboard. All necessary support equipment for the Module was also received. A complete inventory of the module support equipment is listed in Tabs D and E.

For the remainder of the first inport period at Pearl Harbor, the motor whale boat crews, tilley, and B and A crane operators were exercised.

Underway recovery training exercises were conducted during the period 7-9 July. Nine (9) practice retrievals were made during this period. Of the nine retrievals 6 were conducted during the day and 3 at night. An additional night retrieval was conducted during the SIMEX of 9 July. Variable weather conditions produced excellent training conditions. While generally low sea states prevailed, winds as high as 24 knots and 6 foot waves accompanied by light rains added sufficient complication to retrieval operations.

Retrieval times, computed from the time the ship was in position to pass a shot line till the boilerplate was aboard in the dolly, ranged from a low of 9 minutes (optimum conditions) to 32 minutes (most extreme conditions encountered). From these exercises it appears that a retrieval time of 13-15 minutes, computed as above, would provide for a safe, smooth and efficient operation.

The motor whaleboat was launched and on station near the Command Module from the time the boilerplate was put into the water until it was retrieved, both day and night, in all exercises. In addition to its safety value, the motor whaleboat provided excellent on-site communications and, during one exercise, was required to deliver the in-haul line to the boilerplate. Invaluable training in open sea operations was acquired by two boat crews.

The MK56 Gunfire Control System, backed up by the MK37 Gunfire Control System provided range and bearing information during the ships approaches to the boilerplate.

Apollo 11 presented security problems not previously encountered in other recovery operations. On receipt of the Mobile Quarantine Facilities (MQF) at Pearl Harbor on 10 July, 2 Marine sentries were required on a 24 hour basis. This requirement was continuous until the MQF's were off-loaded at Pearl Harbor at the end of the recovery operation.

D. Enroute to the Recovery Area. Further practice recoveries were scheduled and nine (9) were made while enroute to the recovery area. Procedures used during the previous three day Underway Training period were refined, but with no major changes. In practice recovery number 12, a second motor whaleboat was placed in the water using the B and A crane. Retrieval of the Command Module was then made with the lifting strap attached to the hook of the B and A Crane traveling block. Due to the relative size of the hook to the eye in lifting strap, difficulties were encountered in getting the hook to pass through the eye. If two boats are required in the water, the B and A Crane should be rerigged as depicted in Tab A Figure (1), the Command Module retrieved, then again rerigged to recover the motor whaleboat.

On 21 June, NASA officials received a message officially designating the Mobile Quarantine Facilities as official Quarantine Facilities and the MQF's were marked accordingly. Violation of the Quarantine boundary lines could have resulted in a $5,000 fine or 1 year imprisonment.

E. Retrieval of Apollo 11 Command Module. As practiced in previous SIMEX, special security precautions necessary for a Presidential visit were instituted at 0400, 24 July 1969. This consisted of locking and placing under guard all ammunition storage areas and small arm lockers, blocking access to the Presidential routes throughout the ship and forming a cordon around the MQF area. The Mastar-At-Arms force, beefed up by personnel from the Weapons Department, aided the Marine Detachment in providing this security.

Splashdown of Apollo 11 occurred at 0550. At 0604, the bridge reported the Command Module bearing 220 degrees true, 13,600 yards. As had been experienced in the previous SIMEX, the forward MK56 fire control radar locked on the helicopters hovering at the splashdown point. Radar lock on the helos was maintained from 0606 until 0627. During this time, range and bearing information was passed every minute to the bridge. After 0627, only range

information was passed as bearings were being taken by Alidades on the bridge. The MK 37 Director and the after MK 56 Fire Control Director were placed in stand-by shortly after the operation commenced due to interference with the TV cameras. At 0651, the lifeboat was placed in the water and proceeded to its assigned position, one o'clock relative to the Module sea anchor, 150 feet from the Command Module.

The security measures taken exclusively for and during the Presidential visit were ended after the Presidential Party departed the ship. At 0832, after the Presidential party and Commander-in-Chief Pacific had departed, the ship commenced its approach for pickup of the Command Module. MK 56 director 51, at the start of the approach, was locked on at 3,000 yards. Contact was maintained until 0842, range 300 yards, when the target was lost as it passed down the starboard side of the ship. At 0844 the shot line was fired to the Command Module and the in-haul line was attached at 0845. The Module was positioned beneath the B and A crane at 0848 and the recovery hook was promptly attached. Lifting of the Command Module from the water went very smoothly and it was placed in its transportation dolly at 0855, an elapsed time of 11 minutes from line passing to on board. This was one of the smoothest retrieval operations experienced and would have equaled the best practice retrieval time of 9 minutes except for the necessary delays required by NASA personnel to inspect, photograph and attach necessary safety devices. The wind was from 075 true/20 knots during the retrieval with wave heights 5 to 6 feet. At 0918, the Command Module was mated to the access tunnel leading to the MQF. Apollo 11 retrieval operations were terminated when the motor whaleboat was lifted from the water at 0905. Neither the apex cover nor the parachutes were retrieved.

It is considered that the most complex part of the retrieval of Apollo 11 was providing and maintaining the security for the Presidential visit. For the President, 22 Marine sentries and 25 Master-At-Arms were required. Of these 22 sentries, 14 were stationed at strategic locations along the route of travel to the MQF, while 8 were stationed in hangar bay #3 for any emergency which might arise. The 25 Masters-At-Arms were stationed outside the Marine area of responsibility to handle the lines depicted in Attachment (B), to keep personnel clear of retrieval operations, to secure the area for the press, and to supervise the movement of personnel. Attachment (C) provides a detailed discussion concerning the Marine Detachments security involvement in the recovery of Apollo 11.

Security of the Command Module, once removed from the MQF area, required an additional 2 Marine sentries.

The fencing material, procured prior to departure from Long Beach, afforded an excellent Quarantine barrier around the MQF and CM area.

F. Enroute Pearl Harbor. While enroute from the recovery area to Pearl Harbor minor assistance was rendered to NASA personnel in accomplishing tasks on an "as required" basis. The support equipment from CTF 130 was inventoried

and packed for off-loading. All shipboard equipment used during the Apollo operation was returned to its original location.

G. Pearl Harbor. On arrival at Pearl Harbor, all CTF 130 and NASA support equipment was off-loaded and returned.

II. SIGNIFICANT LESSONS LEARNED

A. The in-haul line should be so rigged as to have the block at the furthest extremities of the B and A Crane.

B. Early coordination with the Engineering Department is necessary to determine the location of all shut-off valves to discharges/exhausts opening in the area where swimmers are to be retrieved. These discharge/exhausts should be closed when swimmers are in the area.

C. Threats to swimmers from sharks can be considerably reduced by strict garbage disposal control. It is recommended that no garbage be dumped from the ship within four hours prior to the time swimmers are to be placed in the water.

D. In addition to its safety features, the lifeboat was invaluable in retrieving gear adrift near the boilerplate and the Command Module. A grappling hook and tow line for this purpose should be aboard at all times while the life boat is participating in retrieval operations. 5 men (maximum) appeared satisfactory for manning of the lifeboat.

E. The VHF Handy Talkie, due to its wide frequency band (132-173 Mc) is subject to interference from outside sources, and at times was unsatisfactory for retrieval operations. Primary interference to the Bridge Handy Talkie came from the SPS-43 Radar, while the Mutual Broadcasting van affected units located on the Bridge, on elevator 3, and in the lifeboat. The concept of using a Handy Talkie type unit as the Command circuit should be pursued, as the mobility of the units gives on-the-spot control of the various evolutions in the retrieval operations. However, units less subject to outside interference must be used. The 1JV circuit was used as the back-up Command circuit.

F. Swimmers should attach styrofoam to loose equipment so as to preclude fouling of the ship's intakes if it is lost over the side.

G. A minimum of 3000 feet of 1½ inch nylon line should be onboard prior to departure on the recovery mission. Constant demand for this line occurred throughout the mission. Two hundred feet of ½ or ¼ inch nylon line should also be available for use by the swimmers and NASA personnel.

H. A Billy Pugh Retrieval Net significantly aided swimmers in returning their gear to the ship. All gear was loaded in the net and hoisted aboard prior to the swimmers leaving the raft. Once the swimmers were aboard, the

raft was then retrieved by tackle rigged from a davit.

J. The elevator operator should be prepared at all times to raise the elevator if the boilerplate or Command Module should pass close aboard the ship. There is insufficient clearance between the water line and the bottom of the elevator, when the elevator is in the full down position, for safe passage of either the boilerplate or the Command Module.

K. Rubber gloves should be procurred for those men who will actually be required to touch the Command Module during retrieval operations.

L. The three methods available for retrieval of the Command Module in order of preference were:

1. B and A Crane, with NASA hook, with a six foot lifting strap.
2. B and A Crane hook with a twelve foot lifting strap (best shock absorber). The Command Module initially placed in a destroyer dolly and then later transferred to the higher four foot NASA dolly.
3. NS-50 (tilley) flight deck crane with a twelve foot lifting strap.

III. RECOMMENDATIONS

A. The 1500-lb. test nylon line of the sea anchor parted twice. Recommend that a stronger line be used.

B. On several occasions, the attaching bolt which secured the rubber covered wire rope extension to the NASA recovery hook sheared under strong side loads. Recommend that an ample supply (12) be provided for the recovery operation.

C. If use of the B and A crane hook is contemplated in retrieving the boilerplate or Command Module, two sets of lifting straps (6, 8 and 12 foot lengths) should be provided; one set with thimbles and one without, since the B and A crane hook will not pass through the lifting strap eye unless it is thimbled.

D. As discussed in the body of this report, severe twisting of the lifting cables of the NS-50 (tilley) crane occurred on initial practices. This tendency to twist was also noticed on the newly installed cable. Spot welding an eye to the traveling block of the crane corrected the problem. The location of the eye with its attached handling line is shown in figure 12.

E. To ensure proper security, HORNET scheduled events with particular attention to a planned timetable. Appropriate levels of security were established for each event, thus confusion was minimized and planning greatly simplified.

F. The speed of the NASA winch, while satisfactory for operations

during a normal sea (6 to 8 feet), is considered too slow for retrieval operations in a high sea state. It is recommended that an engineering study of the winch mechanism be undertaken with the view of providing a third and higher speed option. One alternative would be to go to a single whip, doubling the hoisting speed. A slow speed option should be retained however in order to safely set the Command Module on the dolly.

TAB A

RIGGING, CRANE OPERATIONS AND SWIMMER RETRIEVAL

B and A Crane Rigging

Figure (1) shows the rigging of the B and A crane for recovery operations. The 6 foot lifting strap (a) is shown attached to the boilerplate practice Command Module. The tripping line (b) is run through a block on the crane to handlers stationed on the B and A crane sponson. The in-haul line (c) is rigged through a block at the furthest extremity of the crane to insure that the Command Module will be pulled clear of the Number three elevator when positioned under the B and A crane.

Rigging of the in-haul line

The in-haul line (c) is shown in figure (2) as it is led to the forward outboard side of Elevator Number three. It is hand held at this position, while the lead is carried forward to men stationed on the starboard mid-ship sponson (Figure 3), thence to the quarterdeck. The shot line was fired to the Command Module from the quarterdeck at an optimum distance between 175 and 200 feet. A man with a heaving line should also be stationed on the quarterdeck in the event that the Module is brought close aboard (Figure 4) where firing of the shot line would not be prudent. Note in Figure (5) how the in-haul line (c), due to the position of its block on the B and A crane, will tend to pull the Command Module from beneath the elevator to a clear position. Every attempt should be made, when rigging the in-haul line, to achieve this feature.

Figure (6) shows the Command Module positioned beneath the B and A crane with the lifting strap yet to be attached.

Swimmer Retrieval

In Figure (7), cargo nets are shown rigged just aft of the B and A crane sponson for use of the swimmers in returning to the ship. In addition, a Jacobs ladder (not shown) was lowered. Once out of the water the swimmers found the Jacobs ladder easier to ascend than the cargo net.

NS-50 (tilley) Crane Operations

The NS-50 (tilley) crane is shown (Figure 8) rigged with the recovery hook in position just forward of Elevator Number two on the port side of the ship. Note that the lifting cables appear to be in satisfactory condition. However, on lifting the practice Command Module from the water, it became apparent that the lifting cables had developed a permanent twist which became very pronounced as the traveling block neared the crane head (Figures 9 and 11). This twist was transferred to the Command Module through the swivel hook (Figure 10) which was frozen. Note how the tripping line and steadying

lines have become entangled (Figure 11). These conditions were considered hazardous and as a result, new lifting cables (6 X 37) were installed on the crane and the swivel hook was freed and amply lubricated. It was found in using the tilley crane that by using its capability to tilt, ample clearance between the Command Module and the side of the ship could be maintained throughout the lifting operation. After acquiring further experience with tilley, the retrieval crew felt that they could use it from almost any position on the flight deck not blocked by sponsons or guntubs. Extreme care should be taken to insure that, when working between antennaes, the antennaes are deactivated. Tab J shows the locations of the NS50 Crane on the flight deck for practice retrieval of the boilerplate.

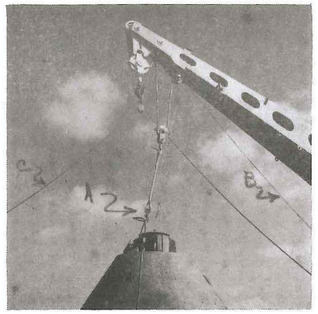


FIGURE 1

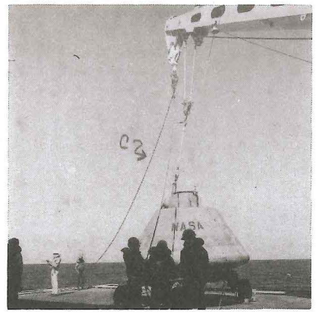


FIGURE 2

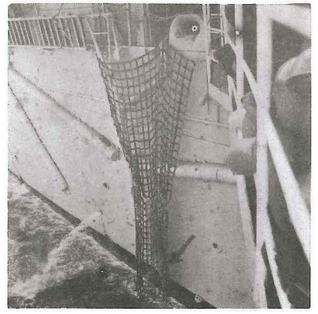


FIGURE 7

FIGURE 8

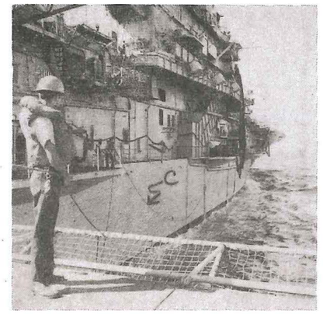


FIGURE 3

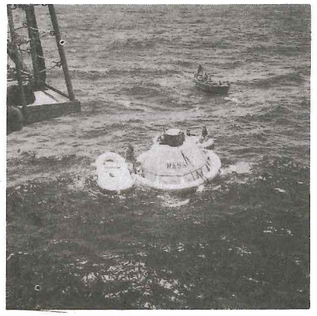


FIGURE 4

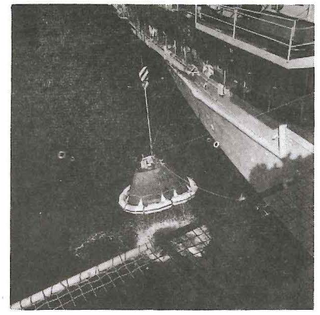


FIGURE 9

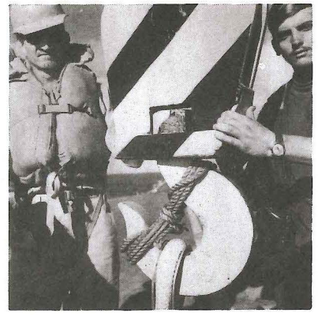


FIGURE 10

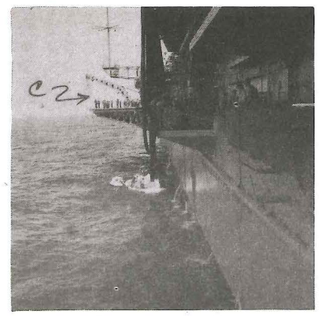


FIGURE 5

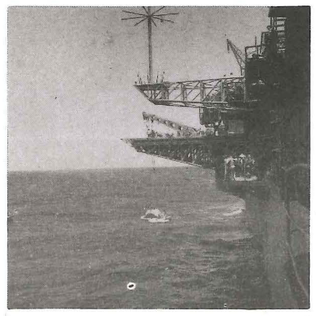


FIGURE 6

Figures 1-12 of
Tab A of
Enclosure (6)

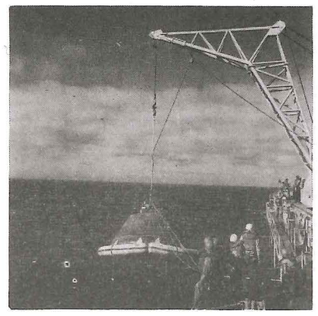


FIGURE 11

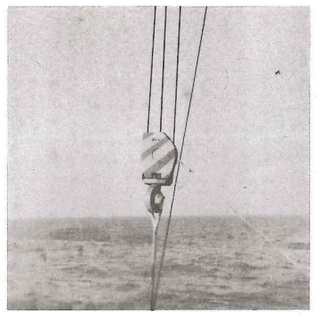


FIGURE 12

TAB B

LOCATION AND FUNCTION OF BARRIER LANES

Line 1 - Located at fire doors between hangar bays two and three. Line 1 was approximately 20 feet from the MQF area and provided a security buffer zone for the President during his visit to the MQF area, prior to the arrival of the astronauts.

Line 2 - Positioned paralled to line 1, but approximately 35 feet away from the MQF. Line 2 provided a quarantine buffer zone between the arriving astronauts, the helicopter, and the observers.

Line 3 - Paralled to lines 1 and 2, but approximately 8 feet away from the MQF. This line provided a security buffer zone during the President's visit with the astronauts. Press and TV were allowed up to this line. Also, line 3 was continued at a right angle to the aft edge of the entrance door of elevator No. 3 at a distance of approximately 10 feet inboard from the bulkhead. This provided controlled access and a buffer between the spectators and the Command Module retrieval area on elevator No. 3.

Line 4 - Positioned diagonally across hangar bay three from the aft edge of the entrance door of elevator No. 3 to the port fire door recess. This provided access and crowd control barriers during the time the Command Module was moved to the MQF.

Line 5 - Placed in the same position as line 1. This provided a security zone while the Command Module was attached to the MQF access tunnel.

Line 6 - Placed between the fire doors in hangar bays one and two. The barrier was maintained until the astronaut's helicopter towing mule had cleared. Thereafter, the barrier was maintained by closing the fire doors. The fire doors were left cracked approximately 2 feet for fire party access if required.

Line 7 - Located in hangar bay two and extended athwart ship from the escalator entrance too the hangar bay to a position between the hangar deck control office and elevator No. 2. This line provided a security barrier for the President as he walked to the MQF area.

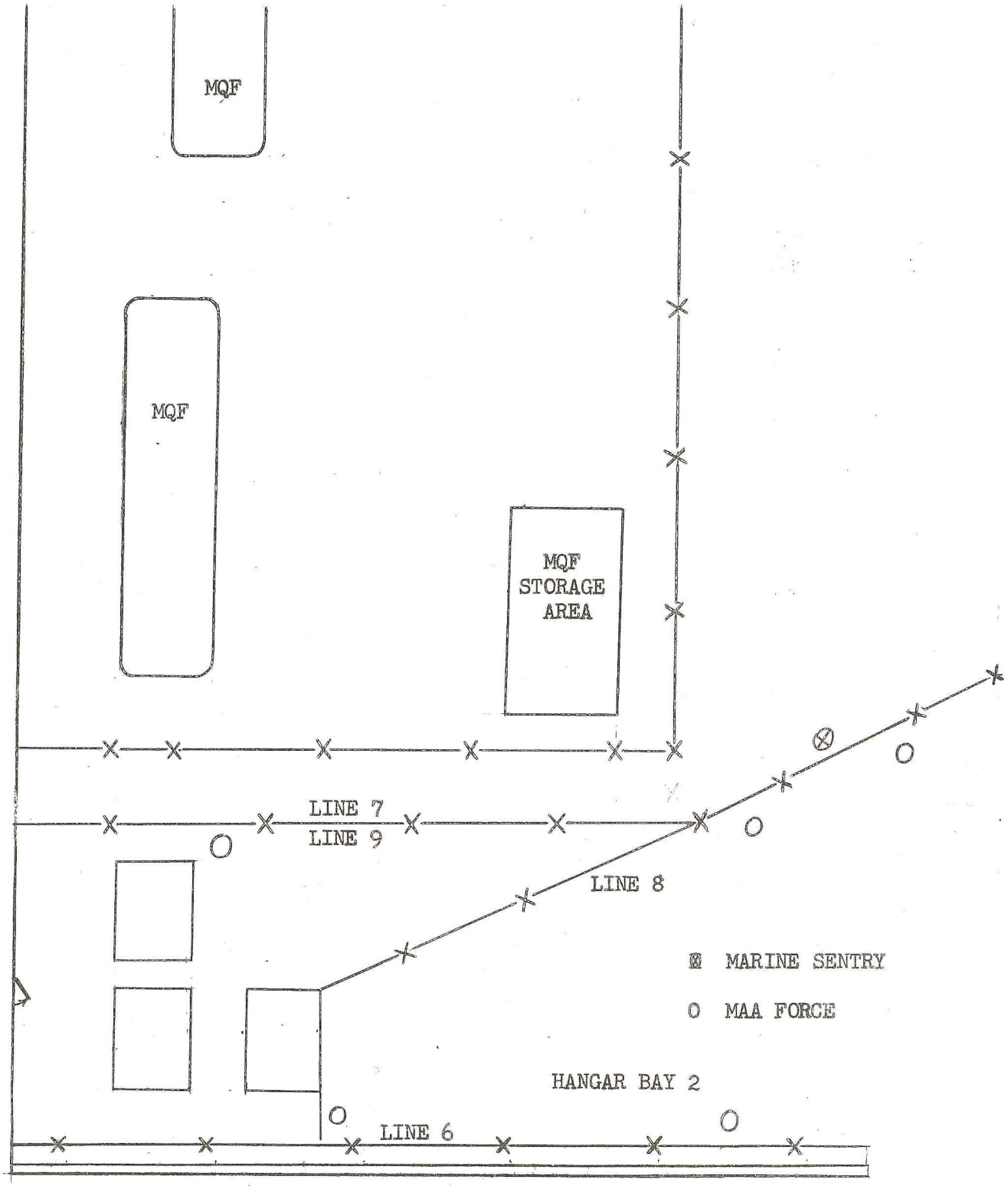
Line 8 - Located in hangar bay two, and run from the tail gate of one TV van to the forward port corner post of the MQF quarantine area. This provided a quarantine zone as the astronaut helicopter was moved about the hangar deck.

Line 9 - Placed in the same position as line 7. The purpose was security for the President.

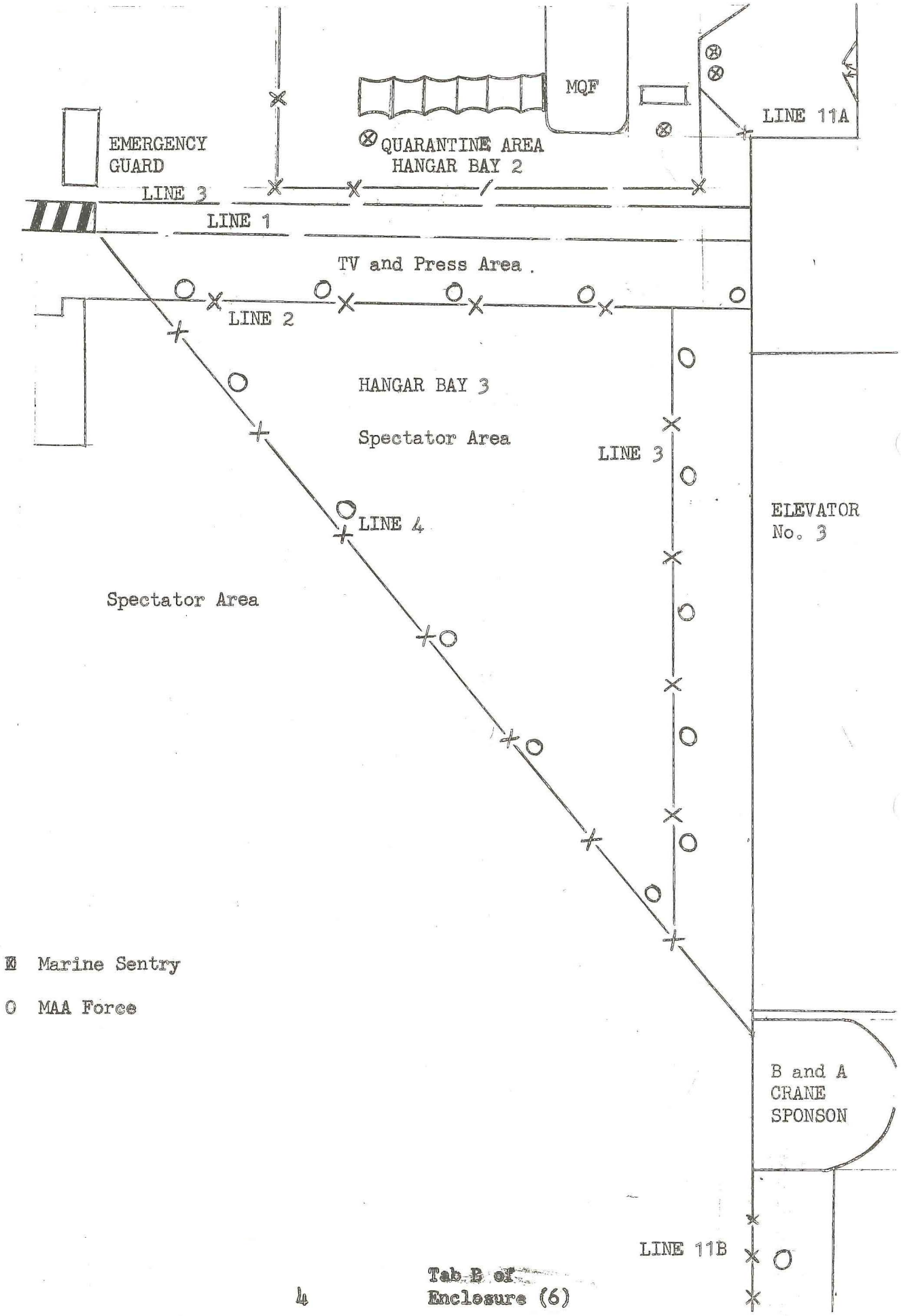
Line 10 - Located in hangar bay two aft of the hangar deck control office, running from the port side of the hangar bay to a post on the MQF quarantine area fence. This provided an extension of the quarantine area while the

CM was attached to the MQF access tunnel.

Line 11 (A and B) - Line 11 (A) was located at the starboard weather deck walkway just forward of elevator number 3. It was to prevent access to the MQF area and the retrieval area on elevator number 3. Line 11 (B), located at the entrance to the starboard weather deck walkway aft of the B and A crane sponson, prevented unauthorized access to the area of crane operations and swimmer retrieval.



Tab B of
Enclosure (6)


MQF
LINE 11A
EMERGENCY GUARD
QUARANTINE AREA HANGAR BAY 2
LINE 3
LINE 1
TV and Press Area
LINE 2
HANGAR BAY 3
Spectator Area
LINE 3
LINE 4
ELEVATOR No. 3
Spectator Area
B and A CRANE SPONSON
LINE 11B
Marine Sentry
MAA Force

TAB C

SECURITY REQUIREMENTS FOR APOLLO 11

After arriving in Pearl Harbor on 9 July, two (2) Mobile Quarantine Facilities (MQF) were onloaded and positioned in Hangar Bay #2 on 10 July. The Marine Detachment ensured the physical security of the immediate area around the quarantine facilities and provided a guard force within the security limits to prevent tampering with equipment. Two sentries were required for security of the MQF on a continuous 24 hour basis. The Marine Guard was organized into a "running" guard force with the sentries standing a four hour watch with twelve hours off.

Prior to departing Pearl Harbor, agents from the White House Secret Service Agency and the MARDET C.O. coordinated the security arrangements for the visit of President Nixon on 24 July. In addition to guards stationed at all strategic points throughout the Presidential route, provision was made for a reaction squard of eight Marines stationed in Hangar Bay #2 in order to be available in any emergency situation. During the Presidential visit and continuing until the MQF and Command Module were off-loaded in Hawaii, one Marine sentry was assigned a post directly above the MQF area along the Port-to-Starboard catwalk to ensure that unauthorized personnel were denied access directly above the secure area.

After the Command Module was brought aboard, eight Marines, previously referred to as the reaction squad, were utilized to provide physical security for the module during transit from Hangar Bay #3 to a position alongside the MQF. Protection for the Command Module was provided without loss of mobility or without delays caused by crowd control procedures. Once the Command Module was in place strict security measures were enforced in order to ensure a complete quarantine area. Problems concerning the exact level of security desired, consistent with photographic coverage of the events, crowd participation and normal Hangar Bay #2 activities were solved by close coordination between shipboard and NASA representatives.

TAB D

NASA EQUIPMENT FURNISHED FOR APOLLO TRAINING/MISSION USS HORNET (CVS-12) Apollo 11

Equipment	Furnished
Spare Parts Box	1
Spare Recovery Hook	3
Spare Recovery Hook Leaders	2
Apollo Boilerplate Command Module	1
Apollo Command Module Cradle	1
Command Module/Boilerplate Tie-down Ring	1
Ratchet Type Tie-down Straps	3
Line Threaders	2
Line Threader Shuttle Pins	4
Mercury Hooks	4
Mercury Poles	4
Jumper II for Mercury Poles	4
Nylon Line, ½ in., 1200 ft. role	1
Nylon Hoisting Strap, 6 ft.	3
Nylon Hoisting Strap, 12 ft.	4
Splicing Tool/Instruction Book	1/1
Shackle 7/8 in.	1
Sea Dye Packets with Tie Line	7
Apollo Boilerplate Dolly	1
Apollo Transport Dolly	1
Apollo Workstand	1
Flower Pot	1
CVS Kit (Consisting of 2 boxes and 2 - 50 Ton shackles)	1
Apollo Transport Dolly Ratchet Type Tie-downs	4
Mockup for Sea Dye and Interphone Connection	1

TAB E

CTF 130 CVS KIT INVENTORY

24 June 1969

Equipment	Furnished
Tool Kit	1
Access Panel Removal Kit	0
Sections of hose for thruster plugs	4
Face shield	1
Sea dye packets with tielines	6
Battery, 1.5 volts	80
CW training beacon, Serial #511J	1
Flex antennas for CW training beacon	2
Rigid antenna for CW training beacon	1
Grappling hook	1
Yellow tape	3
DSE bag	1
FQR bag	1
Repressurization kit	1
Light extension cords, 50 ft.	2
Battery, 12 volts	2
Parachute bags	2
Sea anchors	8
Plastic bags	0
Flashing light bracket	1
Switch plate	1
Wiring harness assembly	1
Vitron, 5 ft. square sheet	1
Photo identification boards	2
CO2 absorber storage bags	0
Apollo RGA containers	0
Apollo helmet containers	0
Window covers	0
Radiological survey meter, Ser. #700,355; #700,348	2
Water sample kit	0
Liferaft, one man, modified	10
Sea anchors (old type)	4
Shackle, screw pin type, 50 ton capacity	2
Covers for food containers	0
Hatch tool, Ser.	0
Engine Thrust Plugs, Ser.	0
Attache case (this item contains line items 1 & 2	1
Recovery Interphones	0
Test Unit for Recovery Interphone, SN 17	1
Batteries for Recovery Interphone, dry cell	4

Water Sample Kit	
Flashing Light (120 RPM)	3
Water Collection Devise	0
Photo Bracket for SH3A	1
Apollo Uprighting Sling Assembly	6

TAB F

APOLLO RETRIEVAL TEAM

1. Officer in Charge - 1ST LT - LCDR KNAPP

2. Assistant Officer in Charge - 1st Div. Off. - LTJG BEAULIEU

3. Rigging and Procedure - Bos'n and BMC - WO HARMER and BMC MANNING

4. Signaling PO in charge - 1st Div. BM1 - PEDRINI BM1

BOAT CREW #1		
Officer:	LTJG HEISER	3rd Div
Coxswain:	VAN BLARGAN BM2	1st Div
Eng:	SCHULTZ EN3	A Div
Signal:	LOTT SM1	CS Div
Bow A:	PEDDERSEN SN	1st Div

BOAT CREW #2		
	LTJG WINEMAN	2nd Div
	KOON BM3	2nd Div
	JONES EN3	A Div
	MARK SM2	CS Div
	CHERRY SN	2nd Div

BOAT LOWERING		
POIC:	HOOTS BM1	2nd Div
	MORRIS BM3	3rd Div
	GAMBLE BM3	3rd Div
Eng:	MCGOWAN EM3	E Div
SN/SA:	STAPP SN, COOK SN	3rd Div
	SMITH SN, ORDAZ SN	3rd Div
	POOLE SA	3rd Div

RETRIEVING LINE		
POIC:	LOYA BM3	3rd Div
SN/SA:	DOCKHORN SN	3rd Div
	HOLLARN SA	3rd Div
	MOSHER SA	3rd Div
	WHITE SA	3rd Div
	HUDGENS SA	3rd Div
	TRAFKANTE SA	3rd Div
	RUSSELL SA	3rd Div
	ROST SA	3rd Div
	GIBSON SA	3rd Div

CRANE OPERATORS	
SKIDMORE BM3, BOWSMAN BM3	3rd Div
STROUD BM3 (B and A)	3rd Div

MESSENGERS	
THILL SN, CHIPMAN SA	1st Div
GASS SN	1st Div

TRIPPING LINE	
JOHNSTON BM3	1st Div
CORLEY SN	1st Div
WILBANKS SA	1st Div
BAUCHAM SN	1st Div

FWD STEADYING LINE	
HUDSON BM2	1st Div
KELLER SN	1st Div
LAWSON SN	1st Div
PURCELL SA	1st Div

AFT STEADYING LINE	
MESCHNARK BM3	1st Div
THOMPSON SN	1st Div
O'CONNOR SA	1st Div
PFLASTER SN	1st Div

HI-SPEED WHIP	
TAYLOR BM2	2nd Div
CEASER SN	2nd Div
FERRELL SN	2nd Div

DOLLY HANDLERS	
LOWE BM2	2nd Div
HARDEN SN	2nd Div

COLLAR HANDLERS	
MARSH SA	2nd Div
MORENO SA	2nd Div

CM HANDLERS	
MUNOZ SN	2nd Div
SPLAWN SA	2nd Div
COPELAND SA	2nd Div
UMBREIT SA	2nd Div
TURNER SA	2nd Div

HOSPITAL CORPMAN	
JOHNSON HM1	H Div

RECOVERY PHASE RECORDER
LCDR HONEA

ILLUMINATION

ERGINO EM1	E Div
WOLFE EM2	E Div
GASHO EM3	E Div

SHOTLINE (2)

TUSING GMG3	G Div
RIDGLEY GMG3	G Div
THOMAS SN	G Div
SANFORD SN	G Div

ELEVATOR OPERATORS

STIEN ABH3	Air Dept
MORFORD AN	Air Dept

TILLEY OPERATOR

RUHE ABH3	Air Dept
MILLER ABH3	Air Dept

TRACTOR OPERATOR

KNAPP AN	Air Dept

FORKLIFT OPERATOR

HELLMUELLER ABH3	Air Dept

FIRE HOSE CREW

MASON DC2	Eng Dept
O'CONNOR DCFN	Eng Dept
MARTINEZ FN	Eng Dept
EISELLE FN	Eng Dept
RIGGS DCFN	Eng Dept
LOUGH FN	Eng Dept
WHITE FA	Eng Dept
CELESTINE FA	Eng Dept

TELEPHONE TALKERS TO BRIDGE

B and A Crane:	MILES BM3		2nd Div
#3 Elevator:	DURDY AN		Air Dept
Jacobs Ladder:	SCHENCK SA		3rd Div
B and A Crane Electricians:		ALLEN EM3	Eng Dept
B and A Crane Electricians:		ECKEL IC3	Eng Dept
Machinist:	CRAWLEY MM2		Eng Dept
IC TEAM:	BENNEHOFF IC2		
	HIGGINS IC3		
	DOUGLAS IC3		
	MAFFEI IC3		

SHARK RIFLE MEN

SIRONEN AO3	GO Div
ARNOLD AO3	GO Div
CULBERTSON AO3	GO Div
YOCUM AO2	GO Div

TAB G

SPACECRAFT RETRIEVAL CAPABILITY

Answers to the questions below should be determined prior to the arrival of NASA officials for the first conference.

1. Number of booms_____TYPE(S)_____.
2. Location_____Life capacity_____tons.
3. Reach overside:

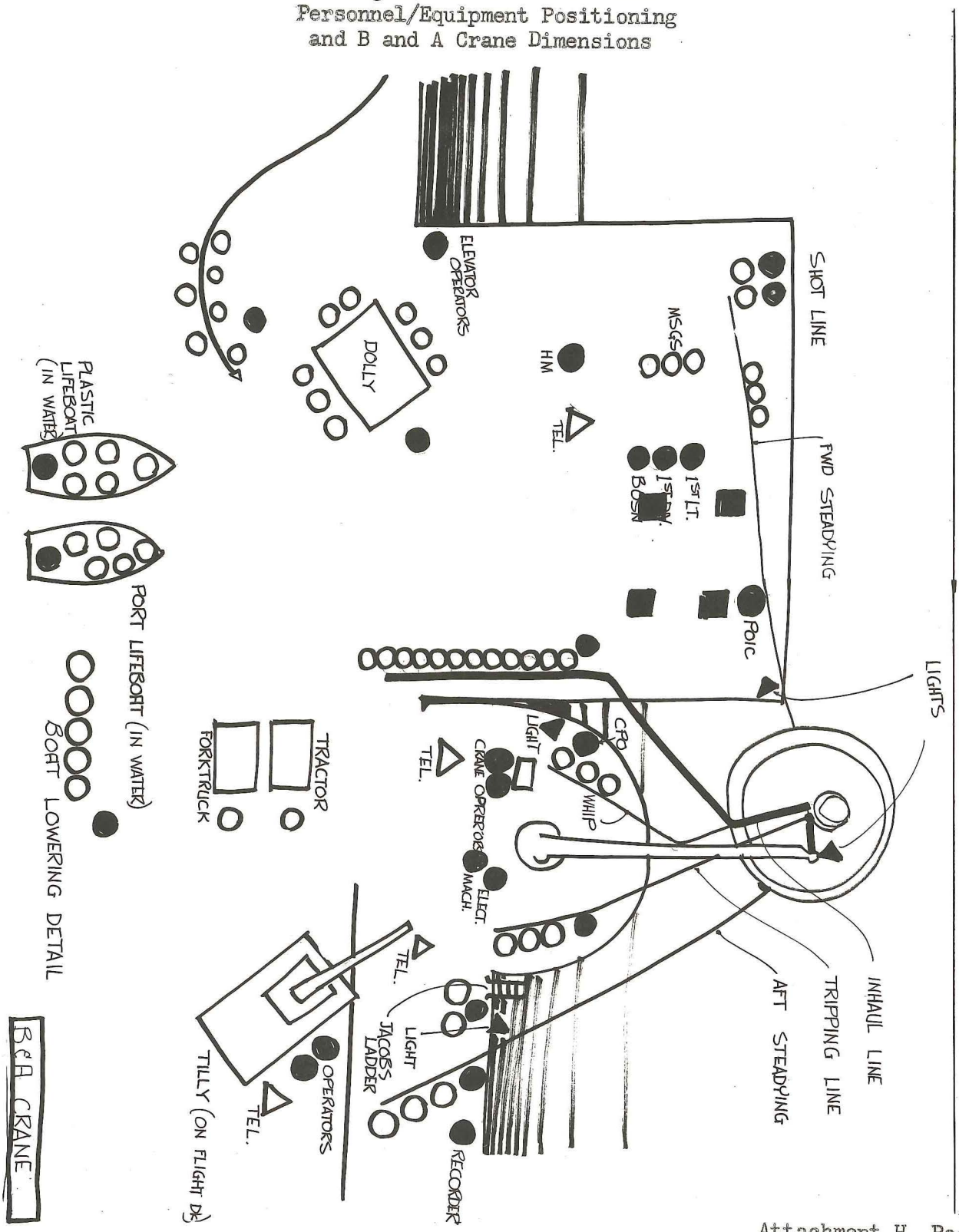
   Freeboard At Boom:
4. Type of winch(es), speed characteristics, control, etc._____.
5. Hull protrusions or hazards to CM.
6. Bridge visibility during approach to CM.
7. Small boat capacity.
8. Deck space.
9. Hangar deck space for MQF.
10. Space for both CM and Boiler Plate.
11. Deactivation capability.
12. Rough seas handling_____.
13. (a) Distance from NASA hook (two blocked) on B and A crane to the elevator (full down position)_____ft.

    (b) Distance from B and A crane hook (two blocked) to the elevator (full down position)_____ft.

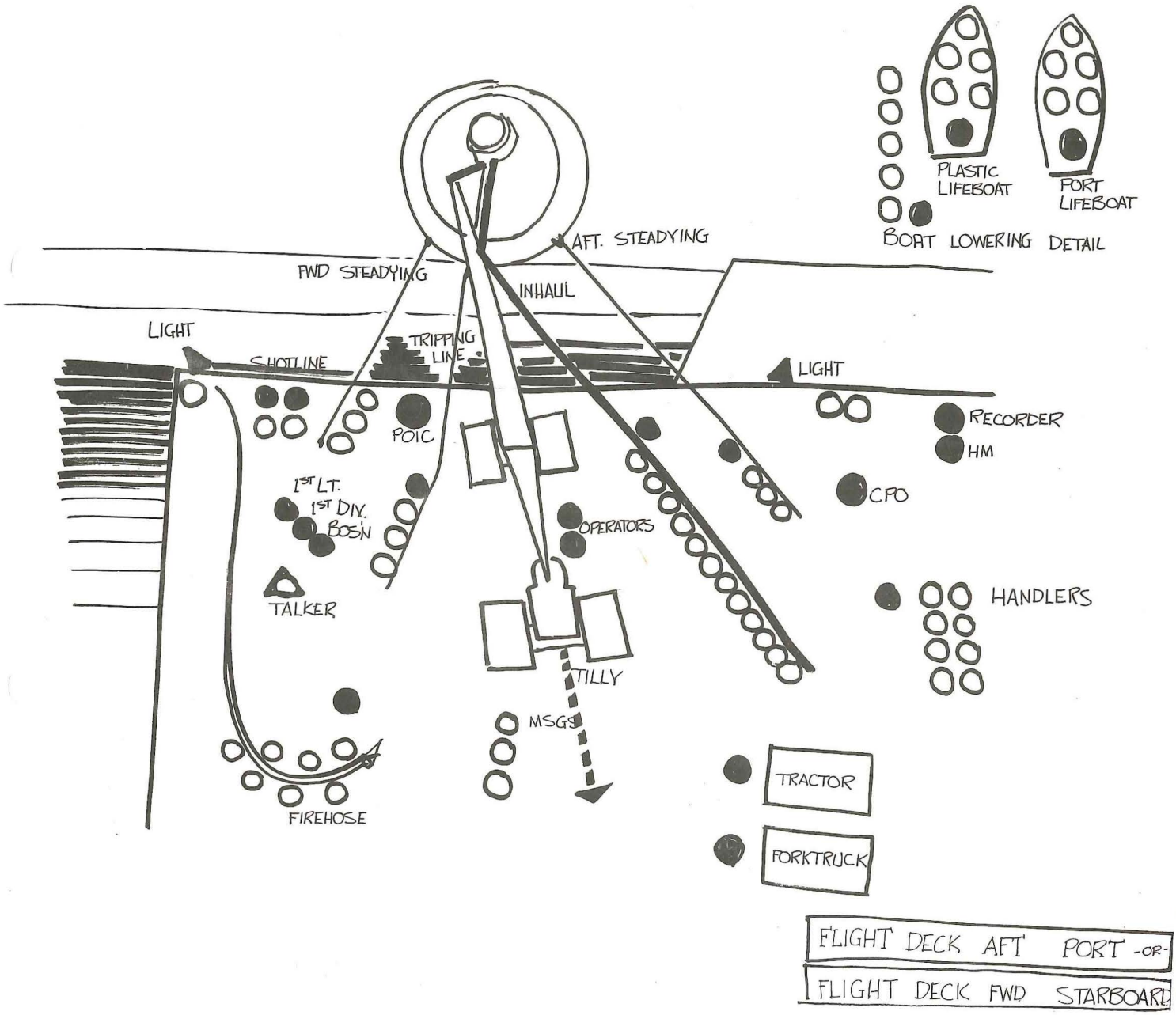
    (c) Distance from Tilley hook (two blocked) to the flight deck _____ft.

Attachment H

Diagrams of Retrieval Team
Personnel/Equipment Positioning
and B and A Crane Dimensions



Attachment H
Diagrams of Retrieval Team
Personnel/Equipment Positioning
and B and A Crane Dimensions



Attachment H

Diagram of Retrieval Team
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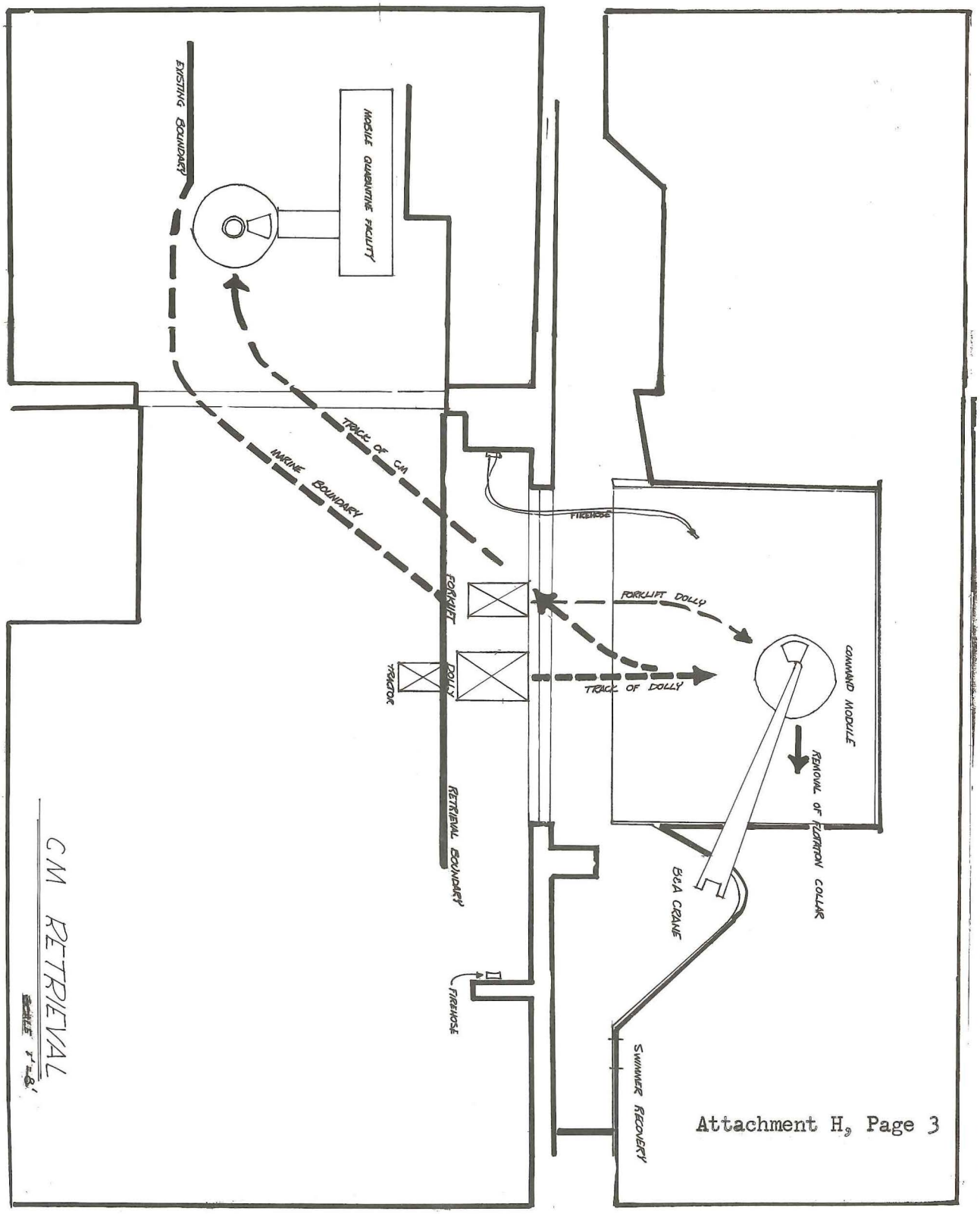

Attachment H

Diagrams of Retrieval Team
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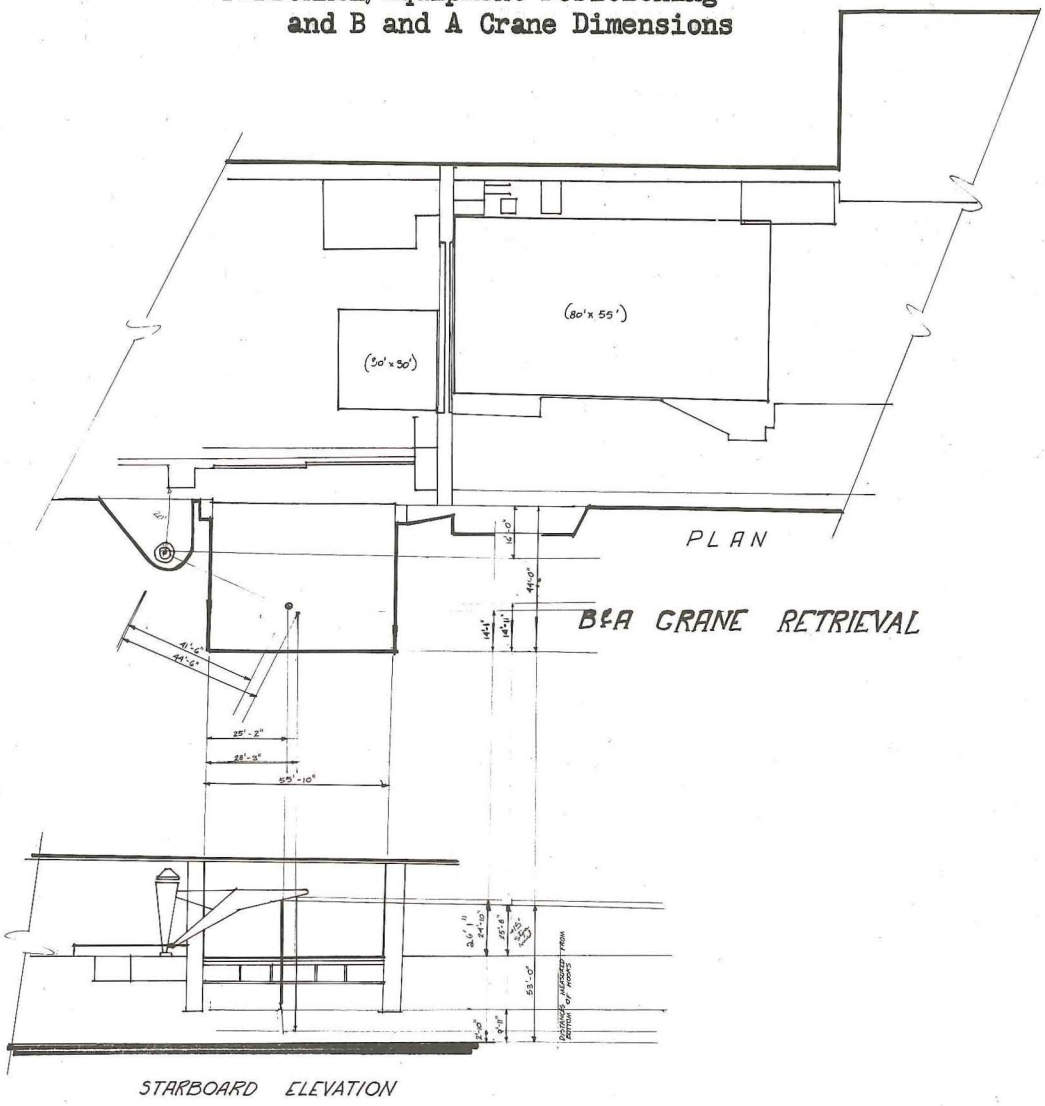


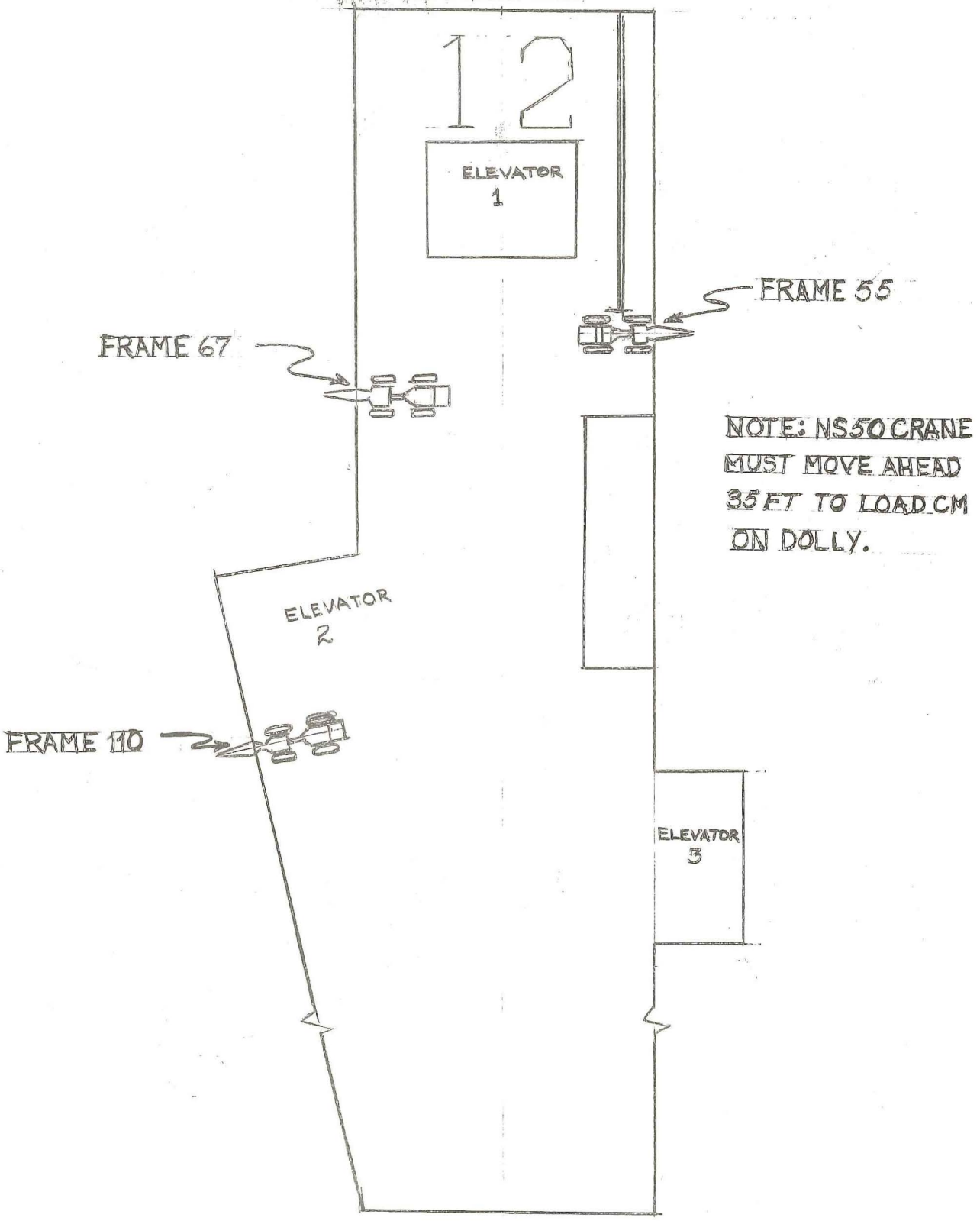
TAB I

LIST OF EQUIPMENT PURCHASED BY HORNET FOR APOLLO 11

ITEM	AMOUNT	COST
Flood Lights	2	$146.00
Garden hose	2 50 ft. length	7.00
Red Devil Blower	1	289.00
Nylon Rope 1½"	1200 ft.	124.00
Wire Fencing	200 ft.	50.00
Steel Poles		28.80
Cement	60 bags	53.40
5 gal. drums	55	
Multimeter	1	75.00
Ice Container	1 2½X1½	2.49
Grappeling Hooks	3	132.00
Rubber Gloves	10 pr.	15.00
Waste Cans	2	11.12
Work Gloves	12 pr.	3.30
Vacuum Cleaner	1	68.83
1½" Nylon line	1200 ft.	124.00
Cargo Nets	6	642.00
21 Thread Manila	600 ft.	59.00
Canvas #8	½ reel	124.00
		$1863.24

TAB J

LOCATIONS OF THE NS50 CRANE
DURING PRACTICE RETRIEVALS OF CM
FROM THE FLIGHT DECK



ENGINEERING SUMMARY

1. A summary of activities by engineering divisions in support of the mission follows:

a. A Division.

1. A Division was not heavily encumbered during the mission. Support services included:

A. Boat engineer and B & A crane for SIMEX and recovery.
B. Minor repair to ABC-TV diesel generator.
C. Machine Shop services to manufacture equipment mountings and to perform engraving services.
D. Air sampling in support of NASA.
E. Fill scuba and decontamination bottles.

Total manhours expended - 257
Total funding required - negligible cost

b. R Division.

1. R Division was tasked to provide a myriad of miscellaneous support services. An itemized list of items constructed and services rendered follows:

A. Manufacture cover for transformer in Flight Deck Control
1/2 sheet 20 ga. sheet metal

B. Manufacture two hoes for mixing comment
1 sq/ft 3/16" plate
10' 1¼ X 1¼ X 3/16" angle iron

C. Manufacture two shelves in B-0201-CEL
3 sq/ft 3/16" plate
2 lbs E-6011 electrodes

D. Manufacture two braces for ABC-TV
2½' 2 X 2 X ¼" angle iron

E. Soldered and welded two junction boxes
1/8 lb solder; 1/8 lb electrodes

F. Welded two junction boxes for MQF
1/8 lb electrodes

G. Manufacture and install two brackets on the bridge for lighting fixtures
47' 1 X 1 X 3/16" angle iron

2 sq/ft ¼" plate
1 lb electrodes

H. Mounted lighting fixtures on port side sponson
½ lb electrodes

I. Modified lights on recovery boat
No materials expended

J. Drilled six switch boxes on MQF
No materials expended

K. Manufactured and installed TV camera platform, 07 level
300' 2 X 1½ X ¼ angle iron
80' 1 X 1 X ¼ angle iron
250' 2" steel pipe
150' 1" steel pipe
50 lbs 5/32" E-6011 electrodes
10 lbs E-7018 electrodes
2 bottles oxygen
2 bottles acetylene

L. Cut two pieces 0.050 aluminum for GE personnel
1 3/4" X 10" 0.050 aluminum

M. Cut two pieces 20 ga. CRES for GE personnel
4½' X 7/8" 20 ga. CRES

N. Manufacture sixteen holddown pads for nitrogen flasks
8' 3/4" round stock
1 sq/ft 3/8" steel plate
½ lb E-6011 electrodes
16 ¼ X 20 X 2 wood screws
20 brass wood screws

O. Welded five connection boxes for ABC-TV
¼ lb E-7018 electrodes

P. Welded three connection boxes for ABC-TV
¼ lb E-6011 electrodes

Q. Installed plywood on TV platform
1 gross ¼ X 20 X 2 nuts and bolts
5 sheets 3/4" plywood

R. Constructed special pallets for NASA containers
8 bd/ft pine
2 sheets 3/4" plywood

S. Milled 6' X 6' X 6' pine
6' yellow pine

T. Milled sixty 3 X 3 blocks for ABC-TV
20 bd/ft pine

U. Manufactured four saw horses and table tops
128 bd/ft fir
2 sheets 3/4" plywood

V. Milled 3' X 4' blocks for NASA
3' X 4' of ½" plywood

W. Manufactured two locking devices for hangar deck hatches
2' steel round stock
1/8 lb E-6011 electrodes

X. Welded mounts for lighting fixtures on stbd. bridge wing
¼ lb electrodes

Y. Manufactured mounting brackets for IC circuits
2 sq/ft 3/16" mild steel plate
½ lb E-6011 electrodes

Z. Manufactured and installed TV platform, 07 level aft
59' 2 X 2 X ¼ angle iron
39" 1 X 1 X ¼ angle iron
30' 1" steel pipe
2' ½" chain
5 lbs E-7018 electrodes

AA. Modified fork-lift forks
No materials expended

BB. Mounted additional shackle on aircraft crash crane
¼ lb E-7018 electrodes

CC. Welded cable studs on Flag Bridge
2 lbs electrodes

DD. Manufactured additional camera platform
10' 2" steel pipe
¼ sq/ft steel plate
2' 3/8" round stock

EE. Miscellaneous welding services for NASA
½ lb E-6011 electrodes

FF. Installed safety rail for TV camera platform
39' 1" steel pipe

GG. Manufactured platform for TV monitor
18' 1¼ X 1¼ X ⅛ angle iron

HH. Manufactured camera mount
4' 1 X 1/8" flat bar

II. Constructed additional TV camera platform
2½ sheets 3/4" plywood

JJ. Manufactured holddowns for MQF plastic tunnel
80 bd/ft pine

Total manhours expended - 713.5
Total funding required - $973.34

c. E Division.

1. The following electrical services were provided to the activities listed:

A. Naval Electronics Laboratory Communication Van

440 VAC, 3 phase, 400 HZ, 5 KW
440 VAC, 3 phase, 60 HZ, 10 KW
60 HZ 1X gyro input
1MC input
Telephone from USMC field telephone switchboard
Ship's service dial telephone

B. ATS Conex

110 VAC, 1 phase, 60 HZ, 3 KW
60 HZ 1X gyro input
Telephone from USMC field telephone switchboard

C. Mutual Broadcasting Econovan

115 VAC, 1 phase, 60 HZ, 50 amperes
Telephone from USMC field telephone switchboard
Ship's service dial telephone

D. ABC-TV television complex

440 VAC, 3 phase, 60 HZ, 300 amperes
Three telephones from USMC field telephone switchboard
115 VAC, 166 amperes for twenty 8.3 ampere lighting

fixtures mounted on the island
115 VAC, 530 amperes for fifty-four 1,000 watt, 8.3 ampere lighting fixtures mounted in hangar bays

E. Western Union International/General Electric complex

440 VAC, 3 phase, 60 HZ, 50 amperes
115 VAC, 1 phase, 60 HZ
Gyro compass repeater
Telephone from USMC field telephone switchboard
Two ship's service dial telephones

F. Mobile Quarantine Facility (MQF)

Three 115 VAC, 60 HZ power sources with six 100 foot extension cords
Three 440 VAC, 3 phase, 60 HZ 30 ampere power sources with two 100 foot extension cords

2. Interior communication sound powered telephone circuits were installed to serve the following locations:

A. TV Commentators - 07 level, flight deck aft of island, hangar bay #2 port side, hangar bay #3 starboard side aft of MQF and the ABC-TV vans in hangar bay #2.
B. Radio Commentator, 07 level
C. Voice of America Commentator, 07 level
D. Press center, 02 level
E. NASA PAO, 02 level

3. A USMC Communications Team was requested of the 5th Marine Division to augment the ship's service telephone installation. This team expended 70 manhours installing equipments and 206 manhours manning the telephone switchboard. The following personnel and equipment was provided USS HORNET by 5th MARDIV:

A. One staff sergeant, one sergeant, four corporals and one PFC
B. Switchboard, Type SB-22 (5 provided, 2 used)
C. Telephone, Type TA-312 (30 provided, 16 used)
D. Wire, field type (5 miles provided, 2 miles used)
E. Power supply, battery BA-30

4. A brief recapitulation of the locations served by USMC field telephones is as follows:

MQF - 2 telephones
War Room - 1 telephone
General Electric control van - 1 telephone
Mutual Broadcasting van - 1 telephone

Press room - 2 telephones
ATS Conex - 1 telephone
General Electric antenna bubble - 1 telephone
Teletype brief/debrief room - 1 telephone
Hot lines (direct point-to-point)
General Electric control van to teletype room
NELC van to Radio Central
Marine Guard Center to MQF

5. The USMC field telephone system was connected into the ship's service telephone system via the ship's shore telephone connection outlet. Intersystem calls were completed using navy and marine switchboard operators.

6. Equipment purchased by E Division to be used in direct support of Apollo XI recovery is as follows:

Item	FSN	Amt Reqd	Unit Cost	Total Cost
Cable, FHOF 4	9Z 6145 260 8806	700 ft	.19 ft	133.00
Cable, THOF 3	9Z 6145 260 8809	2,200 ft	.15 ft	330.00
Cable, THOF 9	9Z 6145 260 8812	500 ft	.43 ft	215.00
Cable, THOF 14	9Z 6145 260 8813	200 ft	.70 ft	140.00
Cable, THOF 23	9Z 6145 260 8814	1,500 ft	.68 ft	1,020.00
Cable, THOF 42	9Z 6145 912 8464	2,000 ft	.95 ft	1,900.00
Cable, DCOP	9Z 6145 184 1113	2,000 ft	.05 ft	100.00
Cable, MCOS 2	9Z 6145 164 6945	1,000 ft	.15 ft	150.00
Cable, FHOF 9	G 6145 260 8807	300 ft	.62 ft	186.00
Jackbox, double	9N 5935 552 6790	16 ea	8.47 ea	135.36
Plug, sound powered	9N 5935 254 9287	50 ea	2.19 ea	109.50
Stuffing tube, #1	9G 5975 296 4092	50 ea	.30 ea	15.00
Stuffing tube, #2	9G 5975 296 4093	60 ea	.22 ea	13.20
Stuffing tube, #4	9G 5975 989 5046	30 ea	.23 ea	6.90
Stuffing tube, #5	9G 5975 296 4096	20 ea	.93 ea	18.60
Stuffing tube, #6	9G 5975 296 4097	15 ea	1.90 ea	28.50
Circuit breaker, 75 amp	1H 5925 876 9218	1 ea	65.00 ea	65.00
Shell, plug 440 volt	9N 5935 243 1285	5 ea	10.10 ea	50.50
Insert, 440 volt	1H 5935 242 0026	5 ea	5.10 ea	25.50
Outlet, 500 volt	1H 5999 025 6388	5 ea	78.00 ea	390.00
Outlet, service	9N 5935 280 2390	30 ea	7.60 ea	228.00
Shell, service	9N 5935 678 8520	50 ea	2.29 ea	114.50
Insert, service	9N 5935 241 2531	50 ea	.75 ea	37.50
Plug, three prong	9N 5935 280 2380	50 ea	.23 ea	11.50
Packing assembly #1	5330 202 2587	50 ea	.11 ea	5.50
Packing assembly #2	5330 202 2588	60 ea	.08 ea	4.80
Packing assembly #4	5330 202 2590	30 ea	.08 ea	2.40
Packing assembly #5	5330 202 2602	20 ea	.26 ea	5.20
Packing assembly #6	5330 202 2609	15 ea	.35 ea	5.25
Insulation, epoxy	Epoxylite Corp.			100.00
Insulation, epoxy	Epoxylite Corp.			100.00
			Total cost	$5,646.71

Enclosure (7)

7. E Division expended a total of 2,813 manhours in support of Apollo XI recovery.

8. Additional electrical support was rendered by Long Beach Naval Shipyard. This support included installation of two 4-circuit breaker power panels, one 300 ampere enclosed circuit breaker, one 25 KVA 400/120 volt transformer, and associated cabling thereto. Total manhours expended by Long Beach Naval Shipyard for electrical support was 158.

2. Pertinent information regarding operation of the main propulsion plant is as follows:

a. At predicted spashdown minus two hours the engineering plant was aligned with four boilers supplying steam to main engines and auxiliaries. The four idle boilers had been boosted to 600 PSIG drum pressure. Four ship's service turbo generators were operated in parallel, and both emergency diesel generators were aligned for automatic starting.

b. Using an experience factor gained over eighteen practive recoveries and the actual Apollo XI recovery, it is firmly established that boiler power from four boilers is adequate to meet all steam demands.

c. Electrical loads during the Apollo XI recovery reached a peak of 2,800 KW, and includes all power supplied to NASA and news media equipment. Though this loading is well below the generating capabilities of four ship's service turbo generators, four SSTG operation is recommended for future recoveries to provide maximum flexibility and to meet all contingencies.

d. Sea injection temperatures in the recovery areas varied between 83° F and 86° F. Environmental ambient temperatures in operating machinery spaces was extremely high.

3. General comments.

a. Information acquired during the Apollo XI Planning Conference indicated a power requirement for approximately 50 amperes of 115 VAC power on the flight deck and perhaps twice that amount on the hangar deck. Actual power requirements were 170 amperes on the flight deck and 530 amperes on the hangar deck.

b. ABC-TV lighting personnel, for the most part, worked a single shift per day, from 0800 through 1600. Management was reluctant to authorize overtime; consequently, the installation of lighting fixtures exceeded the time span programmed by ship's force.

c. USS HORNET supplied power to the flight and hangar deck via the shore power box. This box is normally protected by a 1,200 ampere circuit breaker on a main distribution switchboard. As a means of providing additional

protection to NASA and news media equipments, one 300 ampere circuit breaker, one 100 ampere circuit breaker and two 75 ampere circuit breakers were installed into power circuits leading from the shore power box.

d. During one of the daily informal discussions between NASA and ship's officers the ship became aware that NASA was in possession of fifty-five, one gallon containers of sodium hypochlorite which they intended to use in decontamination procedures. The sodium hypochlorite was stowed in NASA bulk containers on the hangar deck. NASA was informed that this stowage did not meet the criteria of COMNAVAIRPAC INST 9300.2 and NAVSHIPSTECHMAN Chap. 9300 for this particular compound. The ship then took possession of the sodium hypochlorite and stowed it in an unused pyrotechnic magazine off hangar bay #2 immediately adjacent to the NASA working area.

e. All support requirements requested of the Engineering Department were within the ship's force capability to accomplish.

5. Recommendations.

a. Continue to request USMC support for future recoveries as a means to augment the ship's service dial telephone exchange. USMC personnel are cooperative, proficient, and motivated. Their equipment is compatible with that installed in CVA/CVS type ships.

b. Endeavor, in future planning conferences, to more accurately define the power requirements that will be levied on the ship.

c. Civilian corporations should, in their management/labor working agreements, make every effort to coordinate work schedules with those of the ship's force. If such an agreement is not possible, then the corporation managements should establish an end time and date with ship's force to enable the ship to develop more meaningful work schedules in areas of concern to corporate management.

d. Recovery ships should query NASA as to what chemical compounds are being onloaded. Ships should be prepared to provide suitable stowage for any sensitive compounds embarked.

NAVIGATION SUMMARY

1. Preparation. Prior to HORNET's departure from San Diego three major items of equipment were procured in preparation for the recovery:

a. An SPN-40 LORAN with its associated SRA-42 antenna was procured with the assistance of the COMNAVAIRPAC Force Material Officer to extend the LORAN range and to act as a backup for the presently installed UPN-12B. Ship's force personnel additionally made available three antennae for UPN-12 selection via a patch panel installed in the Meteorological Office on the 07 level and rigged the SPN-40 antenna so that it could be rotated for maximum signal strength.

b. A 6X30 monocular sextant was purchased. This sextant while not inherently more accurate than the standard Navy sextant, with its 2 power telescope, was found to be considerably easier to use in the location and identification of stars during limited visibility.

c. Three HT-200 Motorola walkie talkies with an associated charging unit were purchased for direct communication between the bridge, lifeboat, and command module retrieval station. These units were found to be extremely useful. However they were subject to electronic interference from other transmitters which limited reliability (See Enclosure (6)).

d. A three by four magnetic chart board was procured for use in daily briefings for the press and other persons involved in the recovery operation. A rapid brief could be prepared updating the ships position without the tedious process of chart preparation normally available.

e. Small area, large scale (4.0 NM=1") plotting charts were constructed from Table 6 of Bowditch's American Practical Navigator for use in the Simulated Recovery Excercises (SIMEX), Primary and Secondary recovery areas. These charts were then annotated with LORAN lines for the area.

2. NAVIGATION. USS HORNET steamed 4654.8 nautical miles, while under the operational control of CTF-130, in direct support of the Apollo 11 recovery. A summary of these operations follows:

a. 070719W - 091325W July. Pearl Harbor and return. Conducting practice recovery operations in FLETRAGRU OPAREAS G-6, G-8, G-16, G-24 and G-26.

b. 120904W July. Underway for ABORT AREA 3-00S 165-00W. Conducted first SIMEX at 140300X 12-00N 165-00W. Arrived on station in the ABORT AREA at 160830X crossing the Equator at 152236X.

c. 161330X July. Departed ABORT AREA proceeding along Mid Pacific Line (MPL) to position 03-00N 167-00W. Arrived on station at 180330 crossing the Equator at 170633X.

d. 181000X July. Departed area proceeding along MPL to position 05-00N 168-00W while awaiting the accomplishment of Lunar insertion.

Arrived on station at 190400X.

e. 191818X July. Departed area proceeding along MPL to TARGET POINT position 10-56N 172-24W. Arrived on station 210400X. While on station conducted FINAL SIMEX 210550X at position 10-51N 17233W and replenishment from USS HASSAYAMPA 220630X.

f. 230645X July. Departed area proceeding to 12-33N 171-20W to recover aircraft. Arrived on station 231700X. Target point changed enroute to 11-01N 172-02W, later revised to 13-19N 169-10W while proceeding to recover aircraft.

g. 231700X July. Departed area preceeding to revised TARGET POINT position 13-19N 169-10W. Arrived on station at 240130X for SPLASHDOWN.

(1) A four star fix obtained at 241645Z indicated that Apollo 11 splashdown occurred at position 13-19N 169-09.0W. The accuracy of this position is considered to ± .1 nautical miles.

(2) USS HORNET in position 13-25.8N 168-58.6W at 241650Z was bearing 062.5 degrees (T) distance 12.4 nautical miles downrange and upwind from Target Point. Apollo 11 splashdown occurred bearing 068 degrees (T) distance 1.0 nautical miles from TARGET POINT at position 13-19.4N 169-09.0W. Recovery of the command module was later effected at 241950Z in position 13-14.9N 169-10.1W which based on the ship's DR Navigation indicated a set of 245 degrees (T) and a drift of .3 knots.

(3) Splashdown occurred at 2616-49-25Z as indicated by a time check passed from Recovery Center HOUSTON at 2605543Z. It was noted at that time that the check was 44 seconds fast on GMT. At 260543Z HORNET time was adjusted accordingly to conform with this time check.

(4) Radar and Loran fixing were not available during the recovery. Celestial fixing by periscopic bubble type sextant was prevented by the generally broken to overcast layer of thick Cirrostratus and variable to broken Strato Cumulus clouds which had prevailed during the transit.

h. 241015X July. Departed area proceeding to Pearl Harbor. arrived Pier BRAVO at 260832W.

3. COMMENTS AND RECOMMENDATIONS.

Recovery Approach Procedure. In executing an approach to the command module, HORNET utilized a technique which had been developed and perfected during the eighteen practice approaches preceding the Apollo 11 recovery.

a. The approach commenced with a maneuvering board solution for a starboard turn on to the desired recovery course, established by the prevailing sea and wind conditions, at a distance of 2500 yards from the boiler-plate. The recovery ship's lateral offset from the boiler-plate on the established course was then computed using visual bearings.

obtained from a station directly below the conning station on the 05 level starboard side and radar ranges from the Mount 51 Director. The plotter used for computing lateral offset is shown in Tab D.

b. The recovery ship's closure rate approaching the boiler-plate was computed utilizing range information from the Mount 51 Director, stop-watch timing and a tabular comparison of range rate in yards versus time in seconds, shown in Tab E.

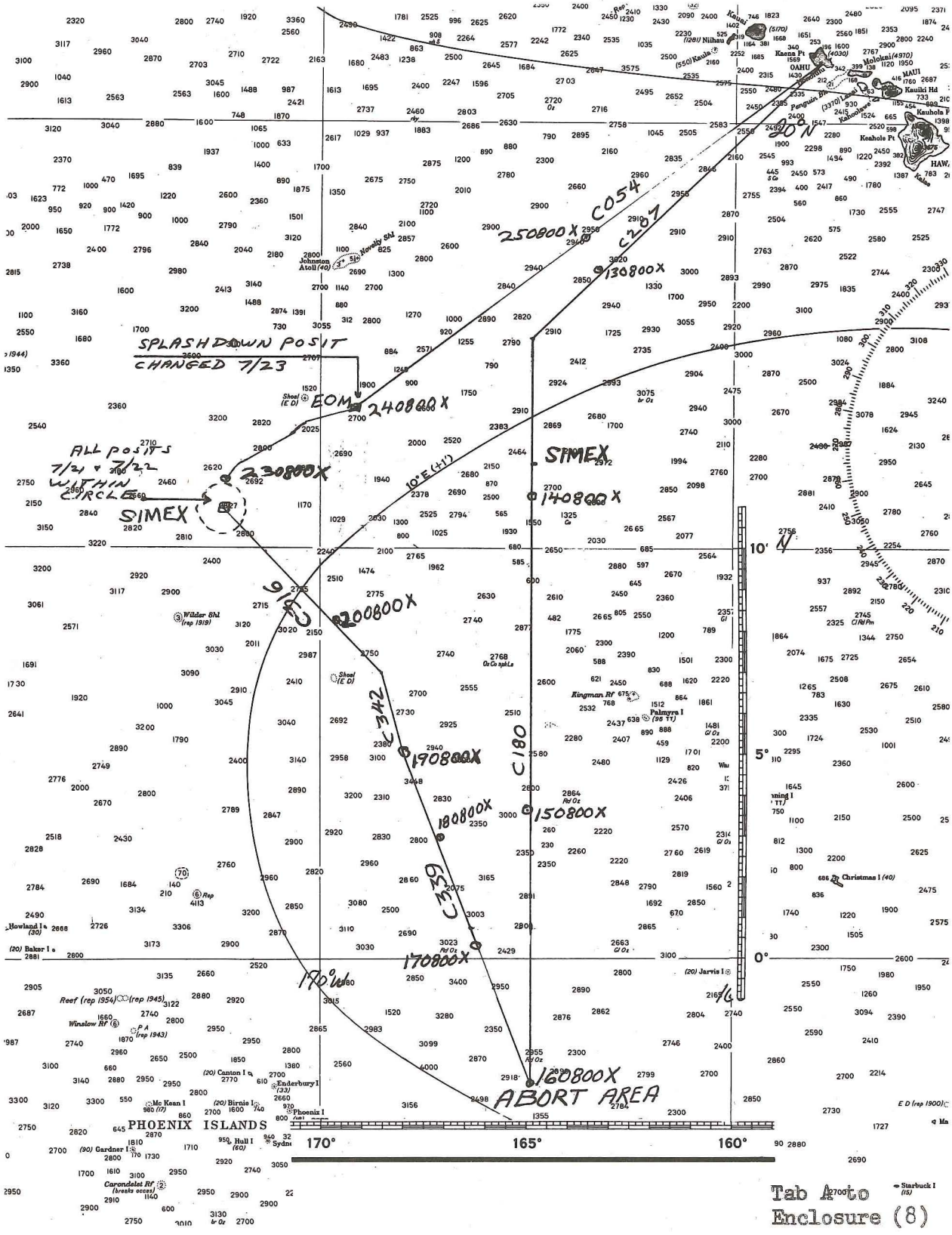
c. The above information, computed at a remote station in Captain's Plot, was relayed via the JW sound powered telephone for display on the status board adjacent to the conning station. This status board is shown in Tab F . The conning officer was thereby presented with a real time presentation of range and bearing information to the boiler-plate, lateral offset in feet, closure rate in knots and the general trend. By utilizing one status board for this purpose the conning officer could devote his full attention to the approach with minimal distraction.

d. A flagman was stationed in the forward starboard catwalk to further indicate the passage of the boiler-plate at the bow.

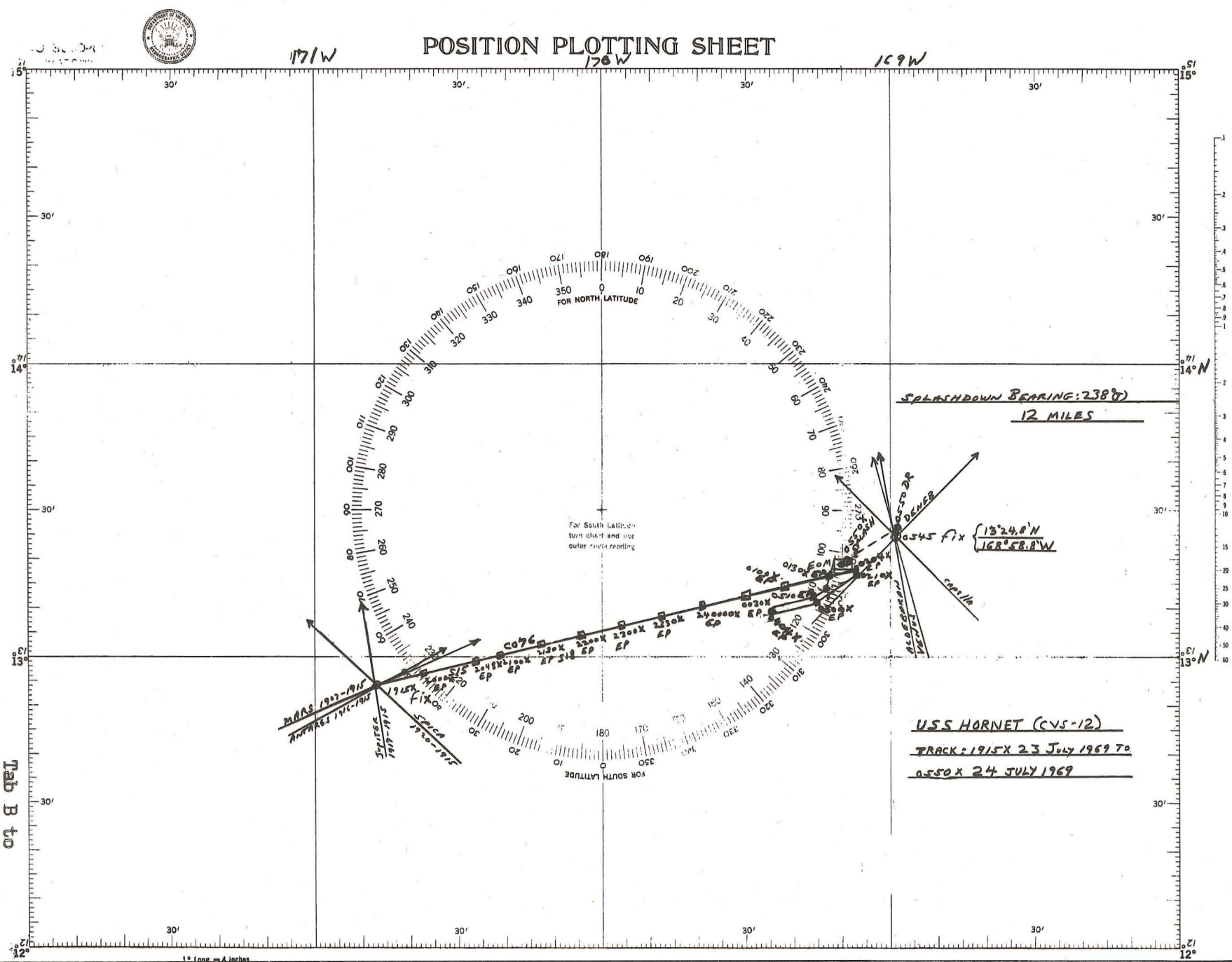
It was found necessary during the practice approaches to lengthen the approach course to 5000 yards if flight operations were to be conducted immediately prior to the recovery of the boiler-plate. The above technique was used during the actual Apollo 11 recovery of the command module on 24 July and is recommended to all units participating in future recovery operations. Equally adaptable to recovery operations of any type and to replenishment at sea, the described procedure may be used for a port as well as starbord approach with only slight modification.

TABS

A FACSIMILE OF OVERALL TRACK CHART
B FACSIMILE OF RECOVERY AREA CHART (SMALL SCALE, LARGE SCALE)
C FACSIMILE OF RECOVERY AREA CHART (SMALL SCALE, LARGE SCALE)
D APPROACH PLOTTER
E CLOSURE RATE TABLE
F APPROACH STATUS BOARD



Tab A to
Enclosure (8)



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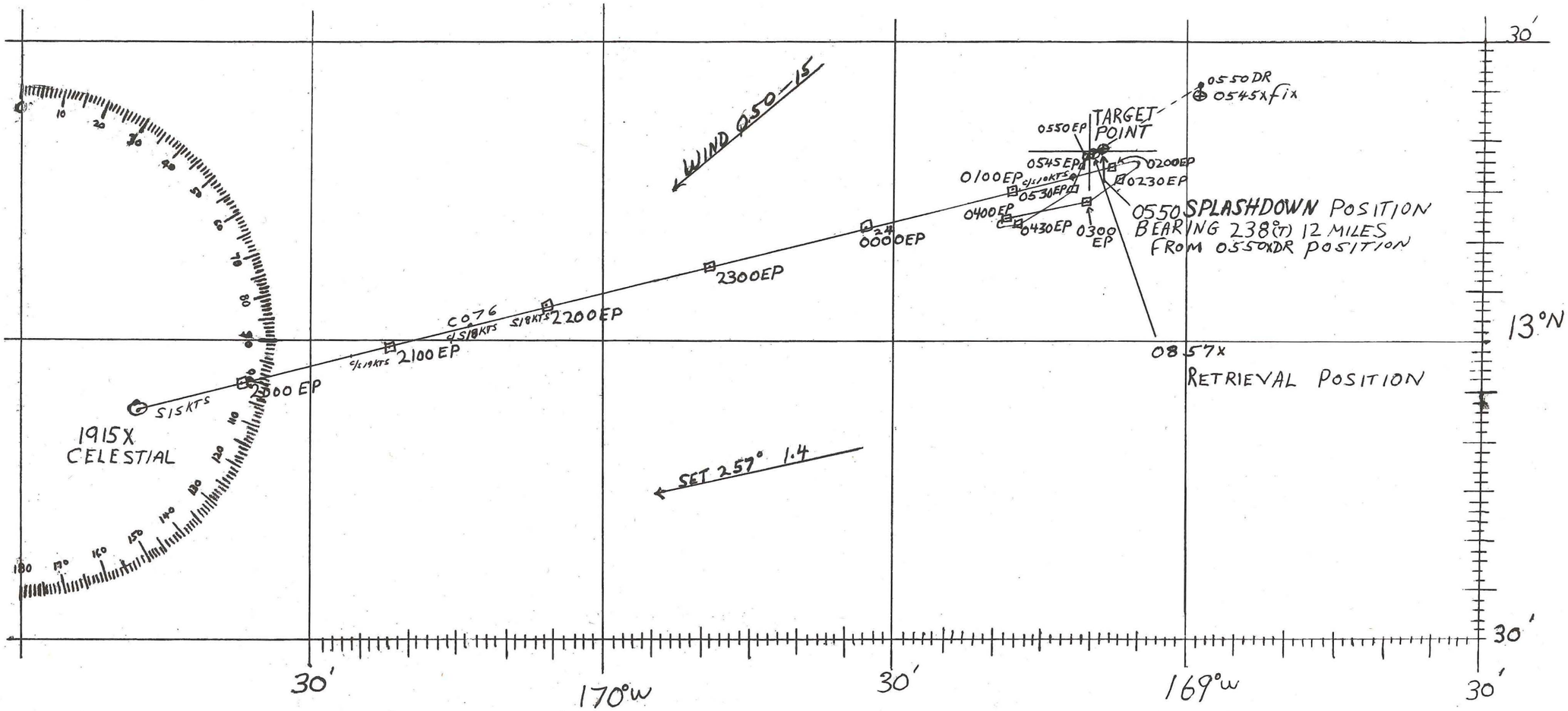
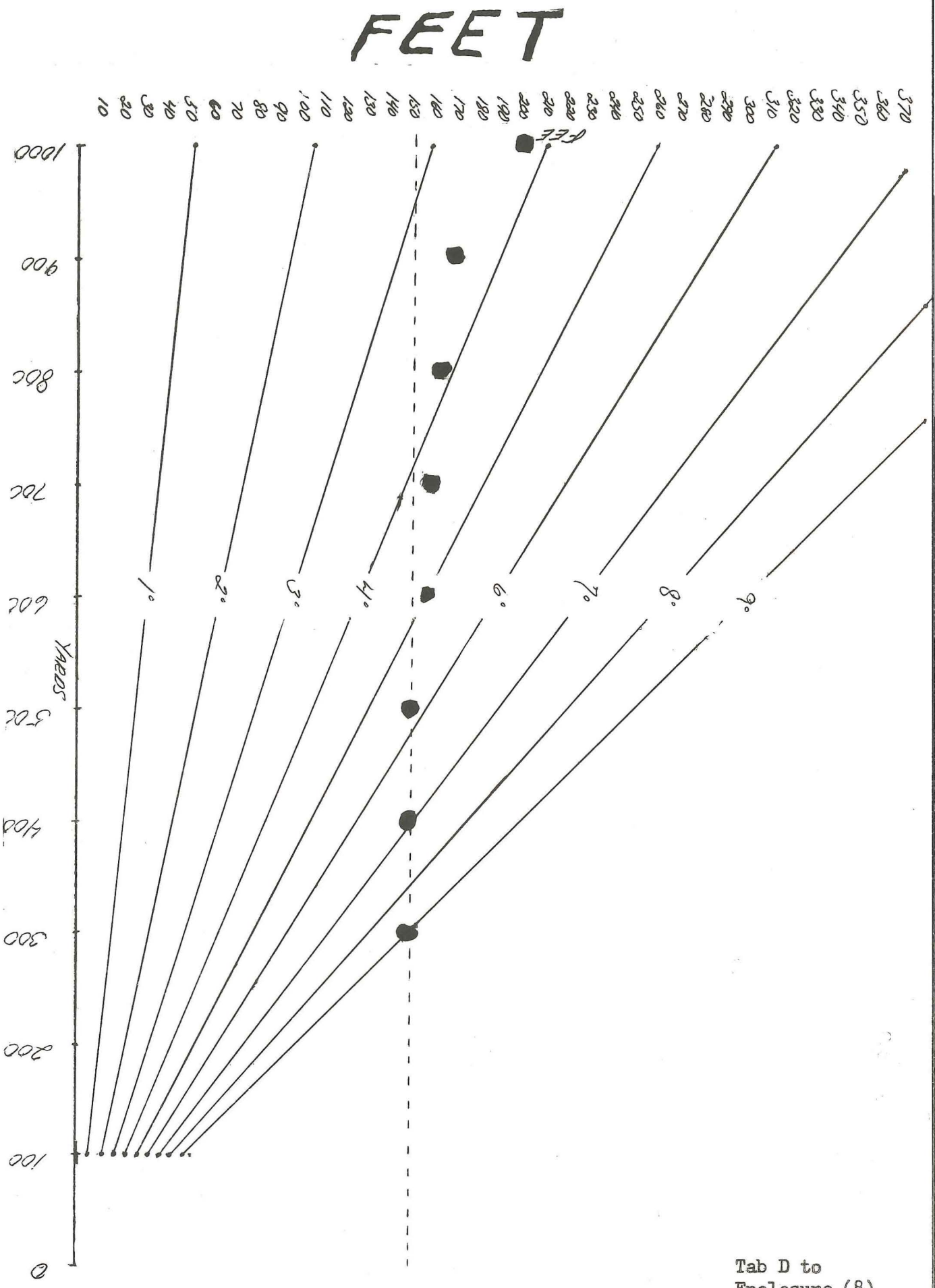

30'
13°N
WIND 050–15
0550 DR
0545x fix
TARGET POINT
0550EP
0545EP
0200EP
0230EP
0100EP
0530EP
0400EP
0430EP
0300 EP
0550 SPLASHDOWN POSITION
BEARING 238°(T) 12 MILES
FROM 0550xDR POSITION
0857x
RETRIEVAL POSITION
0000EP
2300EP
2200EP
2100EP
2000 EP
C076
S/S18KTS
S/C19KTS
S15KTS
1915X
CELESTIAL
SET 257° 1.4
30'
170°W
30'
169°W
30'



Tab D to
Enclosure (8)

CLOSURE RATE

SECONDS	YARDS 0	50	100	150	200	500
	4	22.5	-	-	-	-
	6	15.0	-	-	-	-
	8	11.3	22.5	--	-	-
	10	9.0	18.0	27.0	-	-
	12	7.5	15.0	22.5	30.0	-
	14	6.5	12.9	19.3	25.8	-
	16	5.6	11.4	16.9	22.8	-
	18	5.0	10.0	15.0	20.0	-
	20	4.5	9.0	13.5	18.0	-
	22	4.1	8.2	12.3	16.4	-
	24	3.8	7.5	11.2	15.0	-
	26	3.5	6.9	10.3	13.8	-
	28	3.2	6.4	9.6	12.8	-
	30	3.0	6.0	9.0	12.0	30.0
	32	2.8	5.6	8.4	11.2	29.0
	34	2.7	5.3	7.9	10.6	26.5
	36	2.5	5.0	7.5	10.0	25.0
	38	2.4	4.7	7.1	9.4	23.7
	40	2.3	4.5	6.8	9.0	22.5

BASE RECOVERY COURSE 070

RANGE	BEARING	OFFSET	C/R
1000	073.8	200	7.2
900	073.6	170	6.9
800	073.8	165	6.0
700	074.3	160	5.6
600	075.0	155	5.3
500	075.7	150	5.0
400	077.0	150	4.8
300	079.0	150	4.5
1500	073.5	275	10.0
1400	073.6	265	9.5
1300	073.4	230	9.0
1200	073.7	230	8.2
1100	073.7	210	7.5

Tab F to
Enclosure (8)

SHIPHANDLING

1. INITIAL POSITIONING OF PRS

The Primary Recovery Ship must be stationed in the vicinity of the predicted splashdown point in order to provide proper air coverage of the area. Although the chances are statistically remote that an aircraft or the PRS will be struck by the descending Command Module, this possibility does exist and must be a consideration. In Apollo 11, the possibility of contamination of the PRS, again remote, was considered. Therefore, it was determined to remain upwind of the Command Module in order to eliminate this as a discussion factor after recovery. Initial stationing of the PRS remains an area where more study is required. Factors to be considered are: safety of ships and aircraft; highest probability of contact with Command Module to facilitate recovery, and TV coverage requirements.

2. POSITIONING OF PRS AFTER SPLASHDOWN

After splashdown occurred, the PRS proceeded to a position to place the Command Module forward of the beam to port at 1000 yards. The PRS was headed into the wind; the bow was controlled easily by use of the engines. In making the initial approach the drift of the module was considered, and the module held more toward the bow until drift and maneuvering requirements were established. This close abeam position facilitated return of the astronauts to the PRS, and provided opportunities for excellent photographic coverage.

3. COMMAND MODULE RETRIEVAL

The approach for retrieval of the Command Module was commenced at 2500 yards, downwind at a speed of 10 knots. Because of the drift characteristics of the Command Module, an approach into the wind is best. An approach plate was utilized to determine off-set to the left of the Command Module along the selected approach course. Information provided to the conning officer was: range, bearing, off-set and closure rate in knots. This information was recorded on a board visible to the conning officer. Procedures are contained in the Navigation Summary of this report (Enclosure (8)). These procedures are particularly valuable during night approaches. At a range of 1500 yards speed was reduced to five knots; engines were stopped at 500 yards. At about 100 yards a 2/3 backing bell was ordered. This was reduced to 1/3 as the module came back into position. The ship was brought to dead in the water with the module positioned just forward of the bridge. At this point the shot line was fired and the in-haul line passed. Using this technique, the module is not pushed away from the ship by backing screw wash. During the approach the ship should be held about 140 feet to the left of the approach course. In the final several hundred yards of the approach the bow should be brought to the right slowly to close the off-set range to about 100 feet and bring the wind on the port bow. This will cause the bow to move slowly to the right and provide

a lee for retrieval of the Command Module. The above use of engine, speed and rudder must be modified to meet existing conditions, however, they represent good average figures for use under a majority of the conditions encountered.

Shifting winds can create problems, but prompt action can minimize these. A wind indicator was installed on the starboard wing of the bridge to assist the conning officer in detecting wind shifts. This proved to be an invaluable aid, particularly in the final stages of the approach. If the wind is on the starboard bow at the time of coming dead in the water, it will be impossible to provide a lee for module retrieval since the bow will fall off to port. At this stage engine cannot be used because of the danger to swimmers working with the module. Therefore, close attention must be paid to the wind in the final stages of the approach.

4. LAUNCHING OF PRACTICE MODULE

The ship should be brought to dead in the water with wind about 10° to 15° on the port bow. As the launching procedure continues the bow will fall off to starboard providing a lee for launching. Care must be taken that upon release the module is not swinging toward the ship since with its shallow draft it will continue to close the ship at a rapid rate. After the practice module has been launched, rudder should be brought to right 30° and the port engine ahead 2/3 until the stern has cleared.

5. CONNING FROM PORT SIDE

An alternate retrieval method was developed utilizing the NS-50 (tilley) on the port side of the ship (Enclosure (6)). Use of this method required that the ship be conned from the port side. The Commanding Officer stationed himself on the port side of the flight deck just forward of the number two elevator; the Executive Officer was stationed on the bridge. The approach plotting system described previously was utilized with a correction applied for the breadth of the ship. Range, bearing, off-set and closure rate information was passed on the 1JV sound powered circuit to a talker who recorded the information in a book. Rudder and engine commands were passed to the bridge on a walkie-talkie radio. If interference made the radio link unusable then commands were passed to the bridge on the 2JV sound powered circuit. If communications were lost the Executive Officer would take the conn and break-off the approach to the right. The system worked perfectly during the two port side approaches made.

AIR DEPARTMENT SUMMARY

The Air Department participated in all phases of mission retrieval planning, training and execution of the programmed retrieval activities. Certain areas required special consideration and are addressed herein.

1. Space Allocation - (Hangar Bays). One of the most important and demanding areas of preparation concerned the space allocation in the hangar bays. The primary objective was to assign space with an optimum of compatability consistent with certain priorities. Hangar Bay Two was selected for assignment as the location of the Mobile Quarantine Facility (MQF) and Recovery Quarantine Equipment (RQE) in order to provide the Astronauts with a comfortable ride and in order to be near service facilities. Additional considerations were the proximity of the Number Three Elevator for MQF onload and offload and the convenience of Number Two Elevator for the Recovery Helicopter to deliver the Astronauts to the Hangar Deck.

The Television Vans were located in Hangar Bay Two in order to minimize the wiring requirements consistent with a recommendation made in a USS PRINCETON report of Apollo 10.

The area around Elevator Number Three was designated for retrieval handling equipment stowage and command module stowage because of the ready access to the Boat and Aircraft Crane intended as primary hoisting crane for the operation.

Port side Hangar Bay Three was assigned for supply stowage in view of the large area required and the proximity to the normal supply spaces.

Hangar Bay One was assigned for helicopter/aircraft stowage and maintenance.

Space allocation in each area was sufficient and proved the planning factors considered in making the location choices. For the future it is recommended that an area forward in Hangar Bay Three port side be allocated for heavy aircraft maintenance with Supply stowage beginning aft of the Aircraft maintenance area.

2. Aircraft Handling. Initial positioning of the TV Vans in the forward end of Hangar Bay Two prevented movement of aircraft between Bay One and Two. After the initial transit to Hawaii the Vans were repositioned on the starboard side of Bay Two forward of Frame 120. This adjustment did not affect the working area around the TV Vans but did provide for movement of aircraft spotted aft in Hangar Bay One to the Flight Deck via Elevator Number Two.

3. Equipment located on the Flight Deck. The only equipment located forward on the flight deck was the NELC Hut which was located forward of the Island and aft of the Starboard Catapult. The positioning provided access to the tractor ramp and Number One Bomb Elevator. Use of the Starboard Catapult by C-1/E-1/S-2 aircraft was possible. Deck launches were made

without reducing the wing clearance normal to deck launches.

All other equipment was positioned aft of the Island in areas that would provide the optimum "look angles" for satellite communications. Included in the aft area were: TV van auxiliary power unit; GE auxiliary power unit; three GE huts; the GE "bubble" antenna; the NELC remote antenna; and the ATS hut with mounted antenna. Adequate clearance remained to spot any aircraft carried on the Number Three Elevator. A Mutual "Econovan" was parked on the tractor ramp outboard of the Island.

4. Flight Deck Operations. Flight deck operations were normal except that use of helicopter spot six gave the bubble an excessive buffeting by the wind. Winds in excess of fifty knots tended to push in portions of the bubble and C-2 operations were deemed incompatible with the limitations on the NELC antenna and GE antenna/bubble. Although no experience had been attained to prove the limitation of the installation, it was the best estimate of the GE representative aboard.

5. All equipment came aboard as expected.

G. E. - Long Beach
TV VAN - Long Beach
NELC Hut - Long Beach
NELC Equipment - San Diego
Air Group Equipment - San Diego
NASA Dolly - Long Beach
NASA recovery equipment - Pearl Harbor
MQF - Pearl Harbor
RQE - Pearl Harbor
ATS Hut - Pearl Harbor
Western Union International - Pearl Harbor

6. Comments. (a) Special consideration must be given to the weight of the TV Vans which should only be taken below on the Number One Elevator. (b) No unusual fuel requirements were made. A 55 gallon drum of mobile gas was carried on the fantail for emergency use. (c) No unusual procurement problems were noted except in attaining video heads for the Plat system. With the higher priority assigned the Apollo mission video heads were made available. (d) Ground handling of the MQF was both cumbersome and damaging. The tractor rollers were too small. They caused cracking and gouging of the nonskid and dug into the wooden approach deck to Number Three Elevator. (e) The SRC-22 flight deck radio received heavy interference from ATS communications circuits and was not reliable during the periods of ATS operation.

7. Recommendations. It is recommended that the Hangar Decks be in the best possible condition relative to non-skid, cleanliness and available stowage space prior to commencing onload of equipment.

HELICOPTER ANTISUBMARINE SQUADRON FOUR SUMMARY

1. MISSION. HELANTISUBRON FOUR was assigned the responsibility of providing one recovery helicopter, 2 swim helicopters, one photo helicopter and sufficient support personnel to sustain these aircraft. The primary objective of this mission is the deployment of UDT swimmers and the recovery of the Apollo 11 Astronauts.

2. TRAINING AND CONDUCT OF RECOVERY.

a. Pre-deployment and Enroute Training. Pre-deployment training for the Apollo Eleven mission was conducted by HELANTISUBRON FOUR and the UDT Swim Teams during the period from 17 to 20 June. This training, which took place in the San Diego area, was highly instrumental in modifying and finalizing recovery procedures to date. The following is a statistical summary of this training:

Total flights	9 (4 day, 5 night)
Total flight hours	15.5 (8.2 day, 7.3 night)
No. of UDT deployments	16
No. of Collar Installations	8
No. of pickups from rafts	44 (26 day, 18 night)

HELANTISUBRON FOUR departed San Diego aboard HORNET on 27 June enroute to Pearl Harbor. The squadron deployed with eight SH-3D helicopters. Five of these aircraft were configured with SARAH equipment upon arrival in Pearl Harbor. Enroute, most flights were directed toward aircraft systems check and familiarization of aircrews with shipboard procedures. Pilots were briefed and flew numerous instrument approaches providing excellent training for both HORNET controllers and squadron pilots. A total of 221 (136 day, 85 night) carrier landings were made. 39.2 (27.7 day, 11.5 night) flight hours were accumulated during this transit period.

b. Hawaii Phase. During this phase, 7 to 9 July, training was conducted under the close scrutiny of CTF 130. In this period, all recovery crews became familiar with operations with boilerplate simulation at sea. After exercising recovery procedures and accumulating 58.8 flight hours (39.0 day, 19.8 night), the recovery force was pronounced ready and returned to Pearl Harbor for final Mid-Pacific deployment preparations.

c. Mid-Pacific Phase. From 12 to 23 July, the recovery crews amassed a total of 53.7 flight hours (41.1 day, 12.6 night). Constant attention was devoted to up-dating and revising all procedures, and coordination among all units of the recovery team approached near perfection. Statistics for the period from 17 June to 23 July are as follows:

UDT SWIMMER DEPLOYMENTS (DAY/NIGHT)

Recovery I	4/3
Swim I	15/14
Swim II	13/14
Swim III	8/5
	40/36

NUMBER OF PERSONNEL PICKUPS FROM RAFTS (DAY/NIGHT)

Recovery I	20/14
Swim I	9/10
Swim II	6/10
Swim III	9/7
	44/41

Flotation collars were installed on the boilerplate sixteen times and no major difficulties were encountered by the HELANTISUBRON FOUR recovery crews.

d. Recovery Operations. Precise knowledge of procedures as well as professionalism in use of the same procedures resulted in a flawless recovery. Even though the sea state and visibility were not ideal, the intensive training of all crews paid high dividends. Each crew carried out their responsibilities as briefed and the actual recovery went more rapidly than any of the practices.

The apex cover was not sighted and the main chutes sank quickly upon water entry. One cover for a drogue chute was recovered by Swim I.

The recovery crews logged an additional 20.8 flight hours (13.4 day, 7.4 night) in the recovery operation which brought the total flight hours to 232.0 (166.1 day, 65.9 night). In addition, both Recovery I and Swim II made UDT deployments. Practice on the BIG aspect of the Recovery proved fruitful as it was a new procedure in recovery. All problems were quickly resolved and the actual application of developed procedures progressed smoothly.

e. Comment: The spacecraft contact reported after main chute deployment did not contain sufficient information to allow aircraft to estimate their relative positions from it. This, coupled with less than optimum weather conditions, presented a potential hazard.

Recommendation: It is recommended that the first aircraft to obtain a visual sighting during parachute descent broadcast estimated spacecraft TACAN position from the PRS on ASTRO Primary (296.8). This announcement would then apprise all other aircraft of the position of the spacecraft and would preclude any possibility of a mid-air collision should the spacecraft descent through an overcast.

f. Comment: Helicopter Squadrons deployed for Apollo missions have

aircraft assets sufficient to meet the requirements levied by NASA and CTF 130 plus a spare to be used for utility, VIP or spare parts. Aircraft are designated early for their specific roles (i.e. Recovery, Photo, etc.) so that the miscellaneous equipment used in the mission can most effectively be organized and installed. Considerable extra maintenance effort must be expended to maintain the constancy of these specific mission assigned aircraft.

Recommendation: In view of the above, the necessity of extensive preventive and quality control maintenance required to insure availability of Apollo essential helicopters, maximum effort should be given (as it was on Hornet) to spotting the helicopters in a hangar bay. Lighting is available around the clock and weather, salt spray and stack gasses do not interfere with or add to maintenance.

g. Comment: Several items requested in the special AVCAL were not received to support the mission.

Recommendation: It is recommended that steps be taken to identify the Primary Recovery Ships and aircraft squadrons for the Apollo 12 mission as soon as possible. This should greatly facilitate pre-mission planning and identification of critical supply and support items. Experience indicates that assistance at the highest level is required to procure certain assets without cannibalizing from operational aircraft.

h. Comment: All recovery aircraft have been configured with a second UHF transceiver (ARC-52). Installation by the field team from the Naval Aircraft Rework Facility, NAS North Island took approximately one day per aircraft. Maintenance of this equipment did not present any serious problem. As an aside the operational convenience of dual UHF capability was a luxury the squadron would like to retain.

Recommendation: None.

i. Comment: Biological isolation of the Primary Recovery Helicopter presented some problems. Oxygen bottles of sufficient capacity, masks, regulators and hoses had to be procured. Fitting the masks to the pilots helmets was particularily difficult because of the incompatability of the bayonet release fittings and the pilots helmets. As a final solution, snaps were installed on a separate yoke for the mask which, in turn, were snapped to the inner liner of the helmet. The formaldahyde gas used to biologically decontaminate NT 66 has left a very unpleasant residual odor.

Recommendation: It is recommended that the procedures used in biological decontamination be reviewed by NASA and consideration given to utilizing some other decontaminant. As an alternative, the possible use of a deodorant, subsequent to decontamination should be investigated.

j. Comment: The SARAH equipment arrived on board in Hawaii in several

segments. This caused a delay in installation of the equipment upon arrival in Pearl Harbor. Installation was facilitated because of squadron familiarity with the equipment. Four out of the seven receivers had to be aligned. The NASA Technical Representative is responsible for maintenance and for bench work on the SARAH receivers. Squadron technicians have been utilized for the work when required.

Recommendation: It is recommended that SARAH installation and alignment be performed in CONUS if possible. This should allow a greater lead time for training flights and for resolving any installation problems that may arise.

k. Readiness Data.

BUNO	SKED	UNSK	NORS	NOR	AWM
152701 (62)	0.0	60.9	289.5	350.4	19.1
152711 (66)	0.0	21.3	4.8	26.1	1.0
154107 (55)	0.0	47.6	0.0	47.6	35.0
154108 (53)	0.0	28.7	0.0	28.7	15.0
154109 (56)	0.0	57.8	67.0	124.8	21.0
154110 (60)	0.0	38.4	0.0	38.4	2.3
154112 (64)	0.0	15.5	0.0	15.5	8.5
154114 (70)	0.0	108.5	0.0	108.5	60.0
TOTALS	0.0	378.7	361.3	740.0	161.9

Hours in RRS - 5376.0
Less NOR hrs. - 740.0
Ready hrs. - 4636.0
Percent Ready - 86.2
Percent Abort - 3.6 *
Total Sorties - 140
Total Aborts - 5 *
Aborts/Sorties Ratio - 1:28 *

* No aborts on Apollo training or recovery mission. Aborts indicated occured as a result of squadron training and/or test flights not related to the Apollo mission.

UNDERWATER DEMOLITION TEAM DETACHMENT SUMMARY

1. MISSION. The mission of UDT for Apollo Eleven recovery was (1) The location, collaring and decontamination of the Command Module; (2) The location and recovery of the apex cover and parachutes; (3) The egress, decontamination and delivery of the astronauts; (4) The recovery of the Command Module.

2. TRAINING SUMMARY. To accomplish the mission, the UDT detachment was divided into three recovery swim teams composed of one officer and two enlisted. A primary decontamination swimmer, a back-up decontamination swimmer and one alternate swimmer were also available:

SWIM 1	SWIM 2	SWIM 3
LTJG McLAUGHLIN	LTJG CHESSER	LTJG ROHRBACK
ADJ3 BUCKLEW	QM3 MALLORY	ADJ3 VIA
PH3 MUEHLENBACK	SN WOLFRAM	GMG3 FREE

DECON 1	DECON 2	ALTERNATE
LT HATLEBERG	EN2 BENNETT	HM1 HOLMES

In preparation for Apollo Eleven, UDT DET APOLLO conducted three weeks of pre-Apollo training during the period 9-27 June 1969. The first week consisted of familiarization briefings and boilerplate collaring exercise. The object of this training was to brief UDT personnel on Command Module radiological, chemical and pyrotechnic hazards; the location of important Command Module features and practical work with the flotation collars. The second week consisted of practical work with the boilerplate in San Diego Bay in conjunction with HS-4. During this week UDT and HS-4 accomplished 12 collaring exercises of which six were night evolutions; 24 simulated astronaut recoveries from a raft tethered to the boilerplate and 36 deep water recoveries. The third week consisted of daily swim workouts in the USNAB Coronado Pool.

During the underway period 7-9 July UDT completed six practice recoveries and one partial decontamination evolution. Each swim team completed one day/night recovery.

During the period of 11-21 July, five SIMEX's were completed, each one involving decontamination procedures. Swim One and Three were exercised once. Swim Two was exercised three times. The primary decontamination swimmer completed four evolutions, the back-up swimmer one.

3. RECOVERY OPERATIONS. The recovery of Apollo Eleven on 24 July was accomplished smoothly in accordance with Tab A. Swim Two and the primary decontamination swimmer were used.

4. COMMENTS/RECOMMENDATIONS.

COMMENT The decontamination swimmer was unable to lock the hatch due to improper cycling of the hatch from the inside. Astronaut assistance was required to recycle the hatch before it could be locked.

RECOMMENDATION That the decontamination swimmer be briefed on essential Command Module systems that he might have reason to function.

COMMENT The nozzle on the decontamination sprayers often locked in the open position wasting decontaminant before they could be unlocked.

RECOMMENDATION That the locking device on the nozzle be removed.

COMMENT The masks on the Biological Isolation Garments (BIGs) fogged up.

COMMENT UDT considers the garbage dumping restrictions an effective method of reducing the shark hazard and requests that it be continued.

COMMENT The decontaminant sodium hypochlorite has produced nausea and eye irritation to the swimmers.

RECOMMENDATION That another less noxious solution be used if possible.

COMMENT The NASA supplied rafts are not well suited for recovery work in that (1) the valves work open (2) they are easily punctured.

RECOMMENDATION A more sturdy raft be developed for future Apollo recoveries with a valve protection device.

COMMENT The collars are slippery when wet and more so when covered with decontaminant.

RECOMMENDATION That the upper collar area around the hatch be covered with non-skid and the BIG suit soles covered with felt or non-skid.

COMMENT The raft/collar attachment for decontamination causes a great deal of extra banging motion that can and has caused nausea and hampered movement.

RECOMMENDATION That decontamination in a tethered raft be studied.

COMMENT Due to the complex decontamination requirements, there is the danger of omission of a required action.

RECOMMENDATION That the decontamination swimmers be supplied with a laminated check-list and grease pencil.

COMMENT The standard UDT wet suit ($\frac{1}{4}$" - 3/8") is too thick for 85° water, this causes overheating and swimmer fatigue.

RECOMMENDATION That NASA purchase 1/8" double linked wet suits for swim teams.

TAB A

APOLLO ELEVEN RECOVERY SEQUENCE OF EVENTS

1. Command Module Splashdown....

2. Swim team (3 men) and collar are dropped. Collar installed and inflated.

3. Swim helicopter drops number 1 raft. Swimmers inflate raft and attach it to collar. One swimmer in SCUBA stays with raft to insure raft does not flip during helicopter approach. Swimmer also serves as safety swimmer if astronauts make an emergency egress prior to completion of normal procedure.

4. Swim helicopter drops number 2 raft slightly upwind of Command Module. One swimmer runs tether to Command Module and returns to raft.

5. Recovery helicopter drops Biological Isolation Garment (BIG).

6. Recovery helicopter lowers swimmer/astronauts BIG package, betadine tank, sodium hypochlorite tank, and extra SCUBA bottles into number 2 raft.

7. BIG swimmer now dons BIG assisted by two swimmers.

8. Two swimmers move raft containing BIG swimmer. BIGs and decontamination tanks to Command Module where transfer to number 1 raft is accomplished.

9. The three swimmers then move upwind with number 2 raft.

10. BIG swimmer now signals astronauts to open hatch to receive their BIGs.

11. Astronauts don BIGs in Command Module and signal swimmer they are ready for egress. Checks are made to assure PLV's are closed prior to egress. While astronauts are donning BIGs, BIG swimmer positions decontamination tanks behind bungee on collar, betadine tank nearest hatch.

12. Astronauts open hatch and egress into number 1 raft. LPU's are to be inflated prior to egress from Command Module.

13. BIG swimmer closes and locks hatch. Hatch tool lanyard is secured, hatch tool is placed in raft pocket. The BIG swimmer then scrubs the sprayed area.

14. BIG swimmer enters raft with astronauts, places betadine scrub mitt in BIG bag, puts on clean scrub mitt, saturates mitt with sodium hypochlorite and begins wipe down of astronauts BIGs. After completion of astronaut decontamination one astronaut wipes down BIG swimmer.

16. BIG swimmer then sprays rim of raft and BIG bag with hypochlorite.

RECOMMENDATION That the decontamination swimmer be briefed on essential Command Module systems that he might have reason to function.

COMMENT The nozzle on the decontamination sprayers often locked in the open position wasting decontaminant before they could be unlocked.

RECOMMENDATION That the locking device on the nozzle be removed.

COMMENT The masks on the Biological Isolation Garments (BIGs) fogged up.

COMMENT UDT considers the garbage dumping restrictions an effective method of reducing the shark hazard and requests that it be continued.

COMMENT The decontaminant sodium hypochlorite has produced nausea and eye irritation to the swimmers.

RECOMMENDATION That another less noxious solution be used if possible.

COMMENT The NASA supplied rafts are not well suited for recovery work in that (1) the valves work open (2) they are easily punctured.

RECOMMENDATION A more sturdy raft be developed for future Apollo recoveries with a valve protection device.

COMMENT The collars are slippery when wet and more so when covered with decontaminant.

RECOMMENDATION That the upper collar area around the hatch be covered with non-skid and the BIG suit soles covered with felt or non-skid.

COMMENT The raft/collar attachment for decontamination causes a great deal of extra banging motion that can and has caused nausea and hampered movement.

RECOMMENDATION That decontamination in a tethered raft be studied.

COMMENT Due to the complex decontamination requirements, there is the danger of omission of a required action.

RECOMMENDATION That the decontamination swimmers be supplied with a laminated check-list and grease pencil.

CARRIER AIRBORNE EARLY WARNING SQUADRON 111 DET 12

1. MISSION: VAW-111, Detachment TWELVE, was called upon to provide four E-1B's, with crews and support personnel, to assist in the recovery of Apoll Eleven. The E-1B's were assigned two separate and distinct missions requiring three out of the four aircraft to be airborne simutaneously. One aircraft, "Airboss ONE", was assigned as Air On-Scene Commander until such time as the PRS could assume those duties. In addition, Airboss ONE provided radar air control of the recovery, swim and photo helicopters during night and IFR recovery operations. A second E-1B, "Relay ONE", was assigned to relay UHF/UHF and UHF/HF communications between the PRS, the command module and the recovery aircraft to CTF-130. This was done via 296.8 MHZ (astronaut voice primary), 259.7 (astronaut voice secondary) and circuit Romeo (HF). The third E-1B, "Airboss Two", served as an airborne standby for either of the other two E-1B's, as well as being able to assist in search operations if needed.

2. TRAINING AND OPERATIONS

(a) With the receipt of the "Apollo Communications Package" work was started in earnest in preparation for deployment. The first concern was installation of the "Packages" and qualifying a technician to work on the ARC-94 (HF). Not having sufficient time for formal training, the selected individual received full time OJT at AIMD NORIS, thereby gaining invaluable experience in a minimum amount of time.

(b) During and subsequent to installation of the "Apollo Package", briefings for flight crews were conducted covering equipment functions and its operation. Prior to deployment, 38 hours were flown in checking equipment and aircrew familiarization. By 24 June each individual package had been successfully checked in all modes of operation with Pacific Chief (CTF-130).

(c) Prior to 18 July three "SIMEX's" were conducted using two E-1B's (Airboss ONE and Relay). The standby aircraft was not launched. On one other occasion all four E-1B aircraft were launched and all equipment checked satisfactorily. To insure optimum readiness and reliability all equipment was turned up and checked daily. After 18 July three more full-scale "SIMEX's" were conducted. On these "SIMEX's" and on the actual recovery on 24 July, it was decided to launch the standby E-1B as well as the "Airboss" and "Relay" E-1B's.

(d) As a direct result of the presence of the President and CINCPAC, additional requirements for flight following were placed on the E-1B. These were carried out satisfactorily.

3. STATISTICAL SUMMARY	HOURS	CARRIER LDS
A. TO/FROM DEPLOYMENT SITE	0.0	0
B. ON MISSION	15.1	3
C. ON SIMEX'S	61.0	16
D. PRE DEPLOYMENT EQUIPMENT CHECKS	32.2	0
E. PRE DEPLOYMENT FCLP	5.5	0
F. FLIGHT FOLLOWING	6.2	1
G. CAR QUAL	8.8	35
H. FLY ABOARD	2.9	4
I. SHORE BASED HOURS D/N	34.0/0.0	
J. CARRIER BASED HOURS D/N	65.7/22.0	
K. TOTAL HOURS D/N	99.7/22.0	
L. CARRIER LANDINGS D/N	59/0	

M. TOTAL HOURS BY AIRCRAFT AS OF 26 JULY 1969

147211	34.1
148127	25.1
147209	29.4
148134	33.1

N. STRIP ALERT AT HOME STATION	0.0	0
O. STRIP ALERT (CONDITION AIRCRAFT) AT DEPLOYMENT SITE	0.0	
P. NUMBER OF PERSONNEL COMMITTED TO MISSION (ON PERDIEM/NOT ON PERDIEM)	0/76	
Q. NUMBER OF PERDIEM MAN DAYS	0.0	

Enclosure (13)

VC-1 DETACHMENT A SUMMARY

1. MISSION. Detachment Alpha of Fleet Composite Squadron One was assigned the mission of Carrier on Board Delivery supplement for the Apollo Eleven Recovery. To accomplish this, Detachment Alpha had two US-2C aircraft, three officers and eight enlisted men. The detachment flew 44.2 pilot hours, while attached to the USS HORNET, made 13 arrested landings, four field landings, carried 1500 lbs. mail, parts and various other gear used in the recovery process. In addition, two passengers of the advance Presidential Party were flown off by Det. Alpha when the COD's had no more space for passengers. Aircraft commanders were Hornet ship's company pilots.

2. MAINTENANCE. The maintenance section of Detachment Alpha, for the twelve day period when the aircraft were on board, put in a total of 203 direct man hours on unscheduled maintenance, in addition to plane captain duties.

3. TRAINING. The bulk of Detachment Alpha training was carried out the first two days on board. Six of the eight men had never been on board a carrier before and were thoroughly briefed and trained for carrier flight operations. The men learned their lessons well as demonstrated by their professional attitude on the flight deck and in their duties throughout the ship.

VR-30 DETACHMENT 12 SUMMARY

1. MISSION

VR-30 DET 12 was charged primarily with the safe and efficient air transportation of lunar samples from HORNET to Johnston Atoll and Hickam AFB. Secondarily, the detachment provided routine and VIP COD service upon direction. Because of logistic problems associated with the Presidential visit and the arrival of other high ranking military and civilian personnel, the secondary mission increased sizeably in importance for this recovery operation.

It was determined that C-1A standard loading configuration "Charlie" was best suited to the accomplishment of the primary mission. This provided a cargo cage large enough to meet NASA requirements as well as four additional passenger seats. The first lunar samples departed HORNET on 24 July at 1815X and traveled 180 miles to Johnston Atoll. The departure of the remaining samples was delayed until astronaut medical specimens were ready for transport. The second aircraft departed HORNET at 0145 W, 25 July, enroute to Hickam AFB, a distance of about 520 miles.

VR-30 aircraft logged 39.0 flight hours in 25 sorties carrying 81 passengers and 3600 lbs of mail/cargo a total of 6400 aircraft miles in performance of the secondary COD mission.

2. MAINTENANCE

Aircraft maintenance was not a problem aboard HORNET. With two C-1A QEC units and two US-2C aircraft as a potential parts source in addition to the HORNET inventory, no serious part shortage was encountered. VR-30 personnel covered the major aircraft maintenance ratings with the exception of AT, which was furnished by VAW-111 DET 12 when required.

3. TRAINING

Training aboard HORNET consisted of two refresher landing periods and practice CCA approaches for a total of 21 arrested landings and 5.4 training flight hours. In-port-training included one FCLP period for each VR-30 pilot and a C-1A NATOPS check for the HORNET catapult officer.

MEDICAL DEPARTMENT SUMMARY

1. GENERAL. Apollo 11 medical support differed markedly from the support given in previous Apollo missions. The medical department's have previously given physical examinations and have had the astronauts in the medical department for 2-4 hours. The Apollo 11 mission did not involve the Medical Department except (1) to provide coordination of Apollo 11 medical activities; (2) provide stowage space for NASA and DOD medical gear; (3) to make facilities and personnel available for emergency medical care; (4) to provide for decontamination contingencies that may arise.

2. COORDINATION. The medical department provided centralized activity for 14 NASA and DOD officers and technicians. A bulletin board and the administrative services of the medical department were made available for communications and issuance of notices and contingency plans that involved all hands. All hands meeting were coordinated through the medical department and all personnel were mustered in the sickbay daily.

3. NASA/DOD MEDICAL EQUIPMENT. Emergency back-up surgical equipment and NASA calibration and biological gear was shipped to HORNET from Patrick AFB and Houston MSC and stowed for use by the recovery team. The equipment movement was coordinated through the NAVSTA Pearl Port Medical Liaison Officer. The following is a list of those items received:

a. Set Whiskey bioastronautical gear to consist of 13 medical chests numbered 1 through 13.

b. One x-ray unit 100 MA-100 PKV

c. Two cases of compressed gas (1-O_2 1-N_2O)

d. One set of biologicals

e. One calibration unit respiratory air

f. One bicycle calibration unit

g. 100 liters of liquid nitrogen

h. One emergency exam and treatment kit

Set Whiskey, the calibration and biological gear was placed in a cleared area in the ward. The x-ray unit was stationed near the MQF for x-raying the astronauts; and the biologicals properly stowed in refrigerated spaces. The port medical officer, Pearl Harbor, delivered the above equipment and the medical admin officer signed custody cards on delivery.

4. EMERGENCY CONTINGENCY PLANNING. NASA/DOD and ships medical officer personnel met and devised a method of retrieving and treating the astronauts in the event a major disaster occurred. Ten blood donors were required

in a standby status for each astronaut and three emergency medical teams were organized, each team to consist of the following:

a. 2 medical officers

b. 1 O.R. technician or trained HM

c. 1 circulator for the three teams

d. 4 stretcher bearers (2 HM and 2 DT)

Several drills were conducted. The stretcher bearers picked up and preposioned stretchers and blankets and proceeded to the scene of the recovery on board ship. The DOD surgeon was assigned as triage officer, and determined, at the scene, the requirements for medical care, or treatment room. There the ship's O.R. and back up surgical gear would be utilized for treatment of the injured.

5. DECONTAMINATION PROCEDURES. Quarantine procedures are a considerable part of the Apollo 11 evolution. Contingency places were developed to cope with contamination of other personnel or quarantine of the astronauts in the event major medical care was necessary. The isolation room, consisting of 4 beds and an individual head was selected for quarantine of those contaminated. Regular aseptic technique utilizing gowns and other asepsis i.e., autoclaving, then discarding if required. all disposable materials; the use of benzalkonium chloride solution for instruments, etc. was determined to be adequate protection.

6. SUPPORT MEDICAL CARE TO NASA/DOD PERSONNEL EMBARKED. There were few casualties or illnesses among embarked subject personnel. Treatment was given for upper respiratory infections, sinusitis, and minor abrasions. None were hospitalized or required follow-up treatment.

7. RECOMMENDATIONS.

a. That all equipment be marked clearly, either, NASA Houston or DOD Patrick AFB for identification and that it be plainly marked with a red cross.

AIRCRAFT INTERMEDIATE MAINTENANCE DEPARTMENT SUMMARY

1. Support Equipment. Prior to deployment it was decided to reduce the number of AMSE equipments to a minimum to accomodate the vans and equipment being placed on board by NASA and the news media. After considering the number of aircraft on board, the Air Department and the Aircraft Intermediate Maintenance Department mutually agreed that six MD3 tow tractors with counter-weights and six forklifts would be sufficient for aircraft and news media support. The number of MD3 tow tractors proved to be insufficient, however, since an additional tractor was required for use as a TV platform. The number of forklifts, including two assigned as TV platforms, proved adequate. It is recommended that future operations of this type be supported by either two additional MD3 tractors or by providing two flatbed shop trucks for use as camera platforms. Additionally, it is recommended that one additional pair of fork extensions be provided to safely accomodate the second of two large TV camera platforms. AIMD provided the forklift drivers and moving team for the Mobile Quarantine Facility (MQF). It is recommended that if casters or wheels connot be provided for MQF's, that a 15,000 pound capacity electric forklift be provided for MQF moving operations. Diesel forklifts are unsatis-factory as the exhaust fumes from such equipment tend to be ingested into the MQF, which is maintained under a negative pressurization.

2. Special Support Equipment. Test equipment peculiar to the SH-3D aircraft, such as the ASE test bench and the ARM 40 test bench for the ARC 51, was delivered aboard in San Diego for support of HS-4.

3. Personnel. The skill levels and numbers of TAD personnel assigned to the department were considered adequate for this type operation.

4. Spaces. NASA pre-sail requirements did not anticipate nor include a secure space opening onto the hangar deck for the Todd-AO camera crew (a NASA contractor). Also, NASA recovery equipment engineers required additional space. In both cases, adequate space was provided by AIMD. In the future, it is recommended special needs, such as the afore-mentioned, be anticipated in order that optimum spaces can be allocated prior to embarkation of NASA personnel.

5. Spare engine support. Four reciprocating QECA's, two R1820-82's and two R1820-82A's, were provided. Additionally, two T58-GE-10 QECA's were carried. No engine changes were required.