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DEPARTMENT OF THE NAVY
Headquarters of the Commander
Manned Spacecraft Recovery Force, Atlantic
Task Force ONE FOUR ZERO
Naval Air Station
Norfolk, Virginia 23511

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Ser 105
4 April 1969

From: Commander Manned Spacecraft Recovery Force, Atlantic
To: Department of Defense Manager for Manned Space Flight Support Operations, Patrick AFB, Florida

Subj: Apollo 9 Final Summary Report

Ref: (a) Overall Plan, Department of Defense Support for Project Apollo Operations of 29 DEC 1966
(b) DOD Manager for Manned Space Flight Support Operations OPORD 1-69 of 7 FEB 1969
(c) CTF 140 OPORD 1-69 of 31 JAN 1969

Encl: (1) TF 140 Task Organization
(2) Chronology of Significant Events, Apollo 9 Mission
(3) Narrative of TF 140 Participation in Apollo 9 Mission
(4) USS GUADALCANAL Post-Mission Report
(5) USS ALGOL Summary Report
(6) Comments and Recommendations
(7) Force Participation Report

1. The Final Summary Report for Task Force 140 support of Apollo 9 mission is submitted herein in accordance with references (a) through (c).

2. Task Force 140 was activated for operations at 2300Z on 16 February 1969, for the Apollo 9 recovery support mission, and the Task Organization outlined in enclosure (1) supported this mission. Prior to staging or departure from ports of embarkation, as appropriate, all units had been briefed on the details of the recovery support mission and had undergone training in Apollo recovery operations procedures. Arrangements were made to provide live down range radio and television (TV) coverage as well as press coverage from the Primary Recovery Ship. Prior to launch day units conducted refresher training in recovery skills by local drills, with key units participating in worldwide Simulation Exercises. Recovery support during the launch and earth orbital phases was provided generally as planned without undue difficulties. Heavy weather in the WESTLANT area curtailed some planned training during the earth orbital phase. The command module (CM) egress/mobile quarantine facility (MQF) procedural trials were performed on 6 March 1969. The space flight mission was extended one revolution and the end-of-mission target point was shifted 410 miles to the south to avoid predicted adverse weather in the pre-mission planned end-of-mission landing area. The WESTLANT recovery forces were relocated to recovery positions about this point. The on-scene forces first sighted the CM at 1658Z while it was descending on main parachutes.

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The CM landed at 1701Z, 4.5 miles distant, bearing 151° True from the helicopter landing platform ship USS GUADALCANAL (LPH 7). Seas were calm (5 ft swells) with a slight wind and an overcast sky. The astronauts were retreived by a Sikorsky (SH-3D) anti-submarine helicopter from the Helicopter Anti-Submarine Squadron THREE (HS-3) detachment, designated "Recovery THREE," at 1745Z. The main parachutes and apex cover were sighted and the latter retrieved after the 1800Z retrieval of the Apollo 9 CM. The astronauts were flown to Eleuthera, Bahama Islands on 14 March 1969. The CM was off-loaded from USS GUADALCANAL on 16 March 1969, at Norfolk, Virginia for deactivation and was airlifted from Norfolk on 20 March 1969. Upon return of the amphibious cargo ship USS ALGOL (LKA 54) to Norfolk, Virginia on 22 March 1969, the operational phase of the Apollo 9 recovery operations was concluded.

3. A chronology of significant events related to the Apollo 9 mission is forwarded in enclosure (2). A narrative of TF-140 participation in the mission is forwarded in enclosure (3). Details of the recovery operations are contained in GUADALCANAL's Post-Mission Report which is forwarded in enclosure (4). ALGOL's summary of support operations is forwarded in enclosure (5). Comments and recommendations related to the historic Apollo 9 recovery mission are summarized in enclosure (6). Task Force Participation Report for the mission is forwarded as enclosure (7).

P. S. McMANUS

Copy to:
CINCLANTFLT
CTF 130
CO, USS GUADALCANAL
CO, USS ALGOL
CO, USS PAIUTE
CO, HS-3
CO, UDT-22
NASA MSC LRD, Houston
HQ ARRS, Scott AFB, ILL

TF-140 TASK ORGANIZATION

TF 140		Manned Spacecraft Recovery Force, Atlantic	Commander Task Force 140
a.	TG 140.0	Launch Site Area Sea Salvage	Commanding Officer USS PAIUTE (ATF 159) LT J. C. HARDY 064657-00
b.	TG 140.1	Station 1 Recovery Group (1 LPH, 7 SH-3D and UDT Det)	Commanding Officer USS GUADALCANAL (LPH 7) CAPT R. M. SUDDUTH 000805-00
		1 Lockheed Transport HC -130H Aerospace Rescue and Recovery Service (ARRS) Rescue Aircraft with pararescue team for launch abort and 2 HC-130H with pararescue team for end-of-mission (upon reporting on station).	Rescue Crew Commander
		1 EC-121E aircraft at end-of-mission (upon reporting on station).	Aircraft Commander
c.	TG 140.2	Station 2 Recovery Group (1 AIS) (if requested)	Master USNS VANGUARD (T-AGM-19) CAPT D. BAKER
		1 HC-130H ARRS Rescue Aircraft with pararescue team for launch abort (upon reporting on station).	Rescue Crew Commander
d.	TG 140.3	Station 3 Recovery Group (1 LKA)	Commanding Officer USS ALGOL (LKA 54) CAPT J. D. REILLY, JR. 001011-90
		1 HC-130H ARRS Rescue Aircraft with pararescue team for launch abort (upon reporting on station)	Rescue Crew Commander
e.	TG 140.9	Aerospace Rescue and Recovery Group	Commander Aerospace Rescue and Recovery Group representative at CTF 140 Recovery Control Center, Atlantic (RCCA)

TU 140.9.1	Aerospace Rescue and Recovery Control Center Unit, Kindley (2 HC-130H with pararescue teams).	55th ARRS Squadron Commander, Kindley AFB, Bermuda
TU 140.9.2	Aerospace Rescue and Recovery Control Center Unit, Ramstein	Recovery Control Center Commander, Ramstein, Germnay
TE 140.9.2.1	Aerospace Rescue and Recovery Sub-Control Center Element, Lajes (1 HC-130H with pararescue team).	Sub-Control Center Commander, Lajes Field, Azores
TE 140.9.2.2	Aerospace Rescue and Recovery Sub-Control Center Element, Ascension (2 HC-130H with pararescue teams)	Sub-Control Center Commander, Ascension Island
TE 140.9.2.3	Aerospace Rescue and Recovery Sub-Control Center Element, Mauritius (2 HC-130H with pararescue teams)	Sub-Control Center Commander, Mauritius Island
TE 140.9.2.4	Aerospace Rescue and Recovery Sub-Control Center Element, Moron (1 HC-130H with para-rescue team)	Sub-Control Center Commander, Moron AB, Spain
TU 140.9.9	Apollo Range Instrumentation Aircraft Unit (2 EC-135 at end-of-mission for CM location and astronauts voice relay if requested)	Commander Air Force Eastern Test Range representative at CTF 140 Recovery Control Center, Atlantic

CHRONOLOGY OF SIGNIFICANT EVENTS
APOLLO 9 MISSION

DATE (1969)	EVENT
6 Jan	CTF 140 briefed Underwater Demolition Team Twenty Two (UDT-22) and HS-3 in RCCA on Apollo retrieval procedures.
7 Jan	UDT-22 conducted flotation collar repacking demonstration at Little Creek, Virginia and collar installation in Desert Cove.
9 Jan	UDT-22 and HS-3 conducted two training retrievals in Chesapeake Bay.
13-14 Jan	USS ALGOL conducted two training retrievals with UDT-22 personnel deployed from boat.
16-17 Jan	USS GUADALCANAL conducted day and night helicopter operations with HS-3, two training retrievals with UDT-22 and HS-3, and one Surface-to-Air Retrieval (STAR) with ARRS HC-130 Aircraft.
20 Jan	USS CHILTON briefed on retrieval procedures and conducted one pierside boat assist training retrieval. Weather unsuitable for at-sea training.
20 Jan	National Aeronautics and Space Administration (NASA) representative briefed USS GUADALCANAL for MQF evaluation.
22 Jan	MQF loaded aboard USS GUADALCANAL for pierside evaluation. MQF off-loaded from USS GUADALCANAL on 24 Jan and loaded aboard USNS M. C. FOX for continuation of these trials.
29 Jan	USS CHILTON conducted two training retrievals with UDT-22.
3-4 Feb	United States Naval Ship (USNS) VANGUARD conducted three training retrievals with Aerospace Rescue and Recovery Service (ARRS), at Cape Canaveral. Two Aircraft Delivered Drift Reduction System (ADDRS) were deployed.
5 Feb	NC-50 Aircraft Mobile Crash Crane loaded aboard USS GUADALCANAL as backup for ship's Aviation and Boat (A&B) Crane.
14 Feb	Pre-sail briefing aboard USS ALGOL. Completed loading of Apollo retrieval equipment.
16 Feb	CTF 140 OPORD 1-69 executed at 2300Z; all units acknowledged.
17 Feb	USS ALGOL underway for launch abort station 3 at 2300Z and chopped to CTF-140.

22-23 Feb — USS GUADALCANAL completed loading Apollo retrieval equipment.

23 Feb — 67th Aerospace Rescue and Recovery Squadron ARRSQ (Moron) deployed two aircraft (A/C) to Mauritius.

24 Feb — Pre-sail briefing aboard USS GAUDALCANAL for GUADALCANAL and support units.

25 Feb — USS GUADALCANAL underway for launch abort station at 0900Z and changed (CHOPPED) operational control to CTF 140.

25 Feb — 57th ARRSQ (Lajes) deployed two A/C to Ascension.

26 Feb — USS ALGOL conducted Recovery Simulation Exercise (SIMEX) III with RCCA and ARRS A/C at 1300Z.

26 Feb — 54th ARRSQ (Pease) scheduled to deploy two A/C to Howard. Deployment was delayed one day due to weather.

27 Feb — USS GAUDALCANAL and support units conducted SIMEX I with RCCA at 1300Z. Apollo 9 launch was slipped three days until 3 March.

29 Feb — USS ALGOL conducted in-house SIMEX.

2 Mar — CTF 140 with TF 140 CHOPPED to Department of Defense (DOD) Manager for Space Flight Support Operations.
USS GUADALCANAL surgeon conducted surgery (appendectomy) on crew member of HS-3. Surgery was successful and patient prognosis good.

3 Mar — 1133Z - TF 140 surface units on station and ready to support Apollo 9 launch.

1453Z - ALGOL reported no surface contacts within 50 miles.

1551Z - GUADALCANAL reported three surface contacts. Closest point of approach thirteen miles.

1552Z - TF 140 A/C reported on station and ready.

1600Z - Apollo 9 lift-off.

1604Z - USS PAIUTE released to normal OPCON.

1606Z - GUADALCANAL released from launch abort station to cover TP 2-1A.

1612Z - ALGOL released from launch abort station to cover TP 13-2A.

1614Z - ARRS Apollo Recovery A/C (Kindley Rescue I and Lajes Rescue I) released.

6 Mar — USS GUADALCANAL diverted to proceed to within 150 NM of Bermuda for COD flight of emergency leave case to Bermuda.
USS GUADALCANAL conducted MQF/Egress trainer SIMEX.

8 Mar — USS GUADALCANAL and support units conducted in-house boiler plate (B/P) SIMEX.

9 Mar — USS GUADALCANAL and support units conducted in-house B/P SIMEX.

12 Mar — USS ALGOL released from ship station 3.
1400Z - Apollo 9 flight extended for one additional revolution.

13 Mar — 1323Z - TF 140 surface units on station and ready for Apollo 9 Recovery Operations.

1621Z - GUADALCANAL reported no surface contacts within 30 miles of ship.

Task Force 140 aircraft on station and ready to support Apollo 9 Recovery Operations.

1651Z - EC-121E radar aircraft (McCoy Radar) reported radar contact with Apollo 9.

1657Z - Navy On-Scene Commander (Air Boss) reported first voice co tact with Apollo 9.

1659Z - GUADALCANAL sighted Apollo 9 visual on main parachutes.

1701Z - Apollo 9 landed at 23-12.5N, 67-56.5W.

1958Z - Surface-to-Air retrieval of film completed.

2130Z - Commenced Surface-to-Air retrieval of Bio-Medical samples.

2200Z - USNS VANGUARD departed station enroute Bermuda.

2250Z - Secured from Surface-to-Air retrieval operations after two unsuccessful attempts.

14 Mar — 1507Z - Launched seven helos from GUADALCANAL for Eleuthera with astronauts aboard.

1647Z - Astronauts landed at Eleuthera where they embarked in a NASA Grumman turbo propeller "Gulf Stream" passenger aircraft.

16 Mar — USS GUADALCANAL arrived Norfolk. Off-loaded Apollo support equipment and chopped to COMPHIBLANT. CTF 140 reverted to Operational Control (OPCON) CINCLANTFLT.

NARRATIVE, TF-140 PARTICIPATION IN APOLLO 9 MISSION

1. General

a. TF-140 participation in Apollo 9 mission consisted of staff planning for operations, of training and deploying forces for mission support in the Atlantic Command Area, of locating and retrieving the Command Module and of recovering the astronauts. This force was ready in all respects to perform the assigned mission.

b. Although the Apollo 9 launch date was slipped three days subsequent to the deployment of recovery ships, no changes in ship assignments was required, and all ships were able to complete the mission without having to refuel. The successful launch of Apollo 9 occurred at 031600Z March 1969. The astronauts were retrieved by helicopter at 131745Z March 1969 and were landed safely aboard USS GUADALCANAL at 131750Z. Retrieval of the Apollo 9 Command Module was completed at 131913Z by GUADALCANAL. A grappling hook was used to snag one or more of the main parachutes and a seven-man life raft was attached to the grappling hook line to provide flotation. The hook became disengaged, and the parachute sank before retrieval could be accomplished. Two seven-man and one one-man rafts were attached to the apex cover which subsequently was towed by a motor whaleboat to GUADALCANAL for retrieval.

2. Force Training, Deployment and Readiness. Force training and deployment was accomplished as outlined in enclosure (2). All units were ready for recovery operations when they arrived at their launch abort stations.

3. Mission Support Operations

a. At lift-off of Apollo 9 at 1600Z on 3 March 1969, all Task Force 140 recovery units were deployed to designated launch abort stations as set forth in reference (c). USS PAIUTE (ATF 159) was standing by at Mayport, Florida to provide Launch Site salvage support if required.

b. Upon completion of the successful Apollo 9 launch, PAIUTE was released to her normal operational commander. USNS VANGUARD, station two ship, was not required for launch abort support and was therefore never under the operational control of CTF 140.

c. Subsequent to the successful launch of Apollo 9 GUADALCANAL and ALGOL proceeded as required to cover the assigned orbital target points. Exclusive of initial and final transits the coverage of these target points required GUADALCANAL to steam 3060 miles to provide recovery support at 13 separate target points and ALGOL to steam 1650 miles in covering 22 target points. Most of the target points were covered without undue difficulty, but on one occassion GUADALCANAL was unable to be at a distant assigned target point on time due to high seas and winds.

4. Recovery Operations. Recovery operations are described in detailed report submitted by CTG 140.1 (See enclosure (4)).

5. Weather. Poor weather conditions existed in the planned Atlantic end-of-mission area during the entire Apollo 9 mission. All recovery units experienced periods of high winds and seas, i.e., up to 20 ft seas and winds of 40-45 kts. These conditions were the result of a chain of low pressure cells and frontal passages moving slowly across the mid-Atlantic. As a result of the weather conditions, the primary landing area was shifted some 410 nautical miles to the SSW where conditions were more favorable for recovery.

6. Public Affairs

a. CTF 140 public affairs functions in support of the Apollo 9 manned space-flight mission were effective and trouble free.

b. Ship support of the Primary Recovery Ship (PRS) news pool was extensive and effective.

c. Press release transmissions were both rapid and accurate. The "press release only" restraint imposed on the news pool teletype circuit for this mission eliminated past problems experienced in traffic sequence and release number identification.

d. Support of DOD, NASA and news media operations at Cape Kennedy and Houston was efficient and highly responsive.

7. Communications

a. Apollo 9 communications in the Atlantic Command Area were a text book example of an efficient error free operation. Success was attained by the outstanding efforts of operating and supporting maintenance personnel of the USS GUADALCANAL, USS ALGOL, Naval Communications Station, NORVA, Eastern Test Range, and Naval Communications Station, Puerto Rico. In addition to accomplishing all normal PRS communication requirements, GUADALCANAL effectively conducted experiments using two separate satellite systems, proving they could be effectively integrated into ships communication system for use in future recovery operations.

8. Facilities for Command Module Deactivation and MQF Support

a. Crane services for off-loading the Command Module, MQF and egress trainer were provided at U. S. Naval Station, Norfolk. Additional services included tow tractors, police escort and fire equipment. Apollo 9 was moved to Hangar No. LP-2 at NAS, Norfolk for deactivation. The MQF and egress trainers were also moved to NAS Norfolk for airlift to Houston.

b. NAS Norfolk provided one quarter of Hanger LP-2 for exclusive use by NASA for deactivation purposes. Aircraft Maintenance Department personnel provided assistance in various ways to facilitate deactivation procedures.

c. Marine Barracks, Naval Station provided a continuous guard for the command module until it departed via Military Airlift Command (MAC) aircraft for Long Beach.

COMMENTS AND RECOMMENDATIO.

1. The following comments and recommendations concerning the Apollo NINE mission are applicable for improvement of future operations:

a. GUADALCANAL Comment. Significant advance planning was required in advance of pre-mission loading of news media and recovery equipment. Heavy items of communication and TV equipment required for Apollo 9 recovery coverage had to be placed so as to provide for helicopter normal flight and emergency operation as well as to provide minimum clearance distances between antennas and communication gear. (See Enclosure (5) to GUADALCANAL's Apollo 9 Recovery Post-Mission Report.)

GUADALCANAL Recommendation. Prior to future missions LPH-2 Class ships should be provided information concerning the loading plan employed successfully by GUADALCANAL in the Apollo 9 missions.

CTF-140 Planned Action. Concur. Documentation concerning the loading plan employed by GUADALCANAL will be provided to LPH-2 Class ships participating in Atlantic Recovery operations.

b. GUADALCANAL Comment. Two of the three practice recoveries were conducted during adverse wind and sea condition. This provided the ship with a basis for establishing maximum safe conditions for recovery operations.

CTF-140 Comment. The results of GUADALCANAL's exercises indicates that a wind in excess of 28-30 knots combined with sea swells of 11 feet result in an unsuitable condition for recovery operations. The sea anchor is inadequate for stresses placed upon it under these extreme conditions. It is also considered that these conditions are the limits under which trained personnel are able to complete collaring operations safely. In addition, the expected roll of the ship can be expected to make Command Module lifting hazardous.

CTF-140 Recommendation. The end-of-mission recovery point should be shifted to a more suitable area whenever the forecast weather conditions are expected to approach the limits specified above.

c. CTF-140 Comment. The egress trainer exercise conducted during the Apollo 9 mission disclosed that the proposed procedures to be used in preventing one or more members of the swim team from becoming contaminated while assisting the astronauts are inadequate. The swimmers cannot continuously employ their SCUBA equipment to prevent contamination exposure since the air tank life is insufficient and face mask fogging limits the swimmer's efficiency.

CTF-140 Recommendation. It is urged that back contamination control procedures be revised in the light of the findings of these trials.

d. GUADALCANAL Comment. McCoy Radar detected the Apollo 9 spacecraft at a range of 236 miles. Several minutes later the range was 108 miles and apparently on predicted trajectory. The command module was never held on GUADALCANAL'S SPS 12 air search radar. However, the command module was tracked on the SPS 10 surface radar after it was in the water.

CTF-140 Comment. The outstanding detection performance demonstrated by McCoy Radar proves conclusively the utility of providing this acquisition/tracking capability to provide location assistance should the command module land at a distance from the recovery forces. This radar capability would expedite recovery in the event the landing results in the command module staying in Stable II Condition or in the event of failure of the installed electronic location aids.

CTF-140 Recommendation. It is recommended that a suitable radar aircraft be on station in the end-of-mission area for each recovery.

e. HS-3 Comment. Helicopter astronaut retrieval was not practiced prior to deployment. The problems encountered could have been alleviated had proper emphasis been placed on this phase of the evolution during pre-deployment simulated exercises and in other training sessions.

HS-3 Recommendation. It is recommended that every scheduled exercise in the future include helicopter astronaut retrieval simulations prior to deployment in order to build proficiency in pickups from the spacecraft.

CTF-140 Planned Action. Concur. CTF-140 is currently developing a helicopter training syllabus suited for qualifying helicopter crews for participation in recovery operations. This syllabus will include requirements and performance standards for helicopter pickup of astronauts.

f. CTF-140 Comment. The employment of two lightweight standard air droppage survival 7-man life rafts in close proximity to the Apollo 9 command module resulted in one of the rafts being overturned by helicopter rotorwash. This situation is unacceptable. It is considered that the use of two rafts creates an unnecessary encumbrance. The life rafts used for recovery purposes should be modified to include self filling water ballast bags to increase its stability and to reduce its tendency to become airborne in rotor down-wash. It would also be highly beneficial to provide a hand pump in the life raft bag for use in pumping up the raft's center cross member in order to give the raft greater rigidity.

CTF-140 Recommendation. It is recommended that NASA re-validate the acceptability of the use of a single 7-man raft for recovery purposes and that a suitable number of appropriately modified rafts be obtained as required for support of both training operations and recovery missions.

g. CTF-140 Comment. Some difficulties were encountered in positioning the "Billy Pugh" net for pick-up of the astronauts. As the result, there were delays in getting the astronauts into the net. Also, swinging of the net resulted in the astronauts getting wet. It is concluded that both of these problems can be minimized through adequate pre-mission training.

CTF-140 Intended Action. Recovery helicopter crews will be trained in the specialized astronaut pickup procedures and will be required to demonstrate qualifications.

h. GUADALCANAL Comment. All went well with retrieval operations up to the point where the spacecraft had been raised about three feet out of the water. At that time, the Aviation and Boat Crane failed and the spacecraft was dropped back into the water, still held attached by the attaching block and crane cables.

A. receding swell [ ] caused the full weight of the spacecraft to jerk against the A and B crane block. The Miller type swivel at the end of the crane cable rotated under this force causing the cable to disconnect.

CTF-140 Comment. This casualty to the A and B crane emphasizes the necessity for meticulous inspection of retrieval equipment immediately prior to each mission. It also points up the necessity for having alternate procedures for each recovery step. In this connection, it is essential that a Crash Crane of suitable size be embarked in the PRS for each mission.

i. GUADALCANAL Comment. The Tilley block hook was too large for the eye of the spacecraft lifting pendant.

GUADALCANAL Recommendation. A larger lift pendant eye should be available when NC50 pickup is utilized.

CTF 140 Recommendation. It is recommended that NASA provide Apollo lifting pendants fitted with metal thimbles of 6" inside diameter in addition to the 4" inside diameter thimble presently in use. This would accommodate the crane hook by the NC50 as well as the largest hooks employed by other ships for recovery operations.

j. GUADALCANAL Comment. The NC50 Aircraft Mobile Crash Crane (Tilley) was used to retrieve the spacecraft. Initially, with crane boom fully extended and sea swells receding, the weight of the spacecraft momentarily jerked the afterwheels of Tilley off the deck approximately 1 to 2 inches.

CTF-140 Comment. In view of the possibility of aircraft mobile crash crane being upset during heavy sea conditions, CTF-140 will require that the crane to be tied down prior to future lifting operations. The resultant hoisting delays will have to be accepted in the interest of safety.

k. GUADALCANAL Comment. The shortest lifting pendant available should be used with Tilley to provide maximum flight deck clearance when retrieving without retracting boom. Retraction of boom causes spacecraft to collide with side of ship.

GUADALCANAL Recommendation. A shorter lifting pendant, about 8 feet, should be available to ensure maximum flight deck clearance without retracting the boom.

CTF-140 Comment. Concur. The availability of an 8-foot nylon strap vice the 12-foot strap used during Apollo 9 would have permitted more flight deck clearance with the Tilley boom extended. It would have also provided more clearance between the ship's side and the command module while the latter was being hoisted aboard. To minimize production lengths and to maximize clearances it is essential that the shortest practicable lifting pendant be employed. Differences in rigging and appurtenances among the ships employed in PRS and SRS roles indicate that lifting pendants of various lengths from six to 12 feet should be stocked.

l. GUADALCANAL Comment. The secondary method for lifting the command module in case of a casualty to the A and B crane was rehearsed during recovery training.

CTF-140 Comment. The A and B crane casualty encountered by GUADALCANAL reemphasizes the necessity for adequate advance training in the use of all potential recovery procedures.

CTF-140 Planned Action. Recovery training exercises using the alternate hoisting means will be included in future PRS pre-mission training exercises.

m. GUADALCANAL Comment. On this mission the ship obtained the services of a communication specialist from NAVCOMMSTA Norfolk. His assistance in coordinatin between ship and the NAVCOMMSTA proved to be invaluable and contributed greatly to communication reliability.

GUADALCANAL Recommendation. It is recommended that on future missions of this type, a person be assigned to the PRS who is familiar with the assets and capabilities of the terminating station. It is further recommended that the NAVCOMMSTA be directed to orient their antenna to beam at the PRS.

CTF 140 Comment. Concur.

n. GUADALCANAL Comment. After departing Norfolk, ships force was able to install another four channel receiver section of a UCC-1. This increased the ship's receiver reliability and provided a full duplex operation.

GUADALCANAL Recommendation. It is recommended that it be mandatory for the PRS to have an 8 channel P-system (MULTIPLEX).

CTF 140 Comment. Equipping the PRS with 4 channel multiplex equipment is a standard procedure for TF-140 operations. A late schedule change prevented shipyard installation of the receive side of the UCC-1 equipment prior to GUADALCANAL's departure for Apollo 9 operations. GUADALCANAL showed exceptional resourcefulness in completing this installation after sailing.

o. GUADALCANAL Comment. During this mission communications experienced two solar disturbances which caused an average of 30 minutes interruption in HF communications. During the second disturbance the ship maintained a broadcast by utilizing a low frequency.

GUADALCANAL Recommendation. It is recommended that a low frequency receiver capability be made available to the PRS and that a LF broadcast frequency be guarded in order to reduce the possibility of losing all communications during ionospheric disturbances.

CTF 140 Comment. Concur in the employment of low frequency communication under the conditions encountered. The occurrence of two SID's (Sudden Ionospheric Disturbances) points up the vulnerability of HF communications. The SID's occurred on the day before launch and on the day before recovery. Communications would have been awkward had the SID occurred during recovery. Comments concerning the applicability of satellite communications are submitted below.

p. CTF 140 Comment. Based upon experience gained in Apollo 8 it was agreed among the various interested agencies that experimentation with TACSAT could take place during the Apollo 9 mission to determine equipment availability compatibility, operational feasibility and to establish procedures. Although the location of the PRS during Apollo 9 did not indicate the need for HF

augmentation, use of the SATCOM system did afford an excellent opportunity to test its compatibility "on Board" a PRS in an actual operational environment, as well as determining the type of procedures needed to provide an acceptable communication system for recovery support. The results of the Apollo 9 tests indicate:

(1) Use of the NELC terminal, LES-6. or TACSAT One, and AFETR stations Antigua/Ascension and/or NELC station, San Diego could produce reliable and quality voice and teletype communications.

(2) Initial operational and technical alignment procedures required considerable refinement.

(3) Some minor technical adjustments and modifications will have to be made to participating terminals to assure needed flexibility and peak performance in future mission support.

(4) NELC LES-6 terminal performance was outstanding.

(5) NASA ATS terminal configuration for 12 volt keying and an antenna remote azimuth train capability to facilitate maintaining alignment with the satellite is required.

(6) All satellite circuits must terminate at ship's main radio patch panel for coordination and to permit utilization of ship's inherent capability to patch circuits to any ship remote position/positions.

CTF 140 Recommendation. Recommend satellite circuits be provided to furnish alternate transmission paths within their capabilities. It is considered mandatory that fully qualified personnel for R&D ground terminal satellite equipment be provided in order to assure equipment reliability.

q. GUADALCANAL Comment. Initially operational traffic was sent via the fleet broadcast. It was later sent via the NCON circuit. This increased the speed of delivery and the reliability.

GUADALCANAL recommendation. It is recommended that in future operations all operational traffic be routed via the NCON circuit.

CTF 140 Comment. Concur. Final determination on circuit selection depends upon the reliability of the ship-shore termination and upon atmosphere interference which may be encountered.

r. GUADALCANAL Comment. It was noted that there was a misuse of high precedence, especially immediate traffic. It became so common that a constant monitor had to be maintained in order to insure that it was not handled routinely.

GUADALCANAL Recommendation. It is recommended that all traffic be closely screened and only traffic which is critical to the recovery operation have a precedence higher than priority.

CTF-140 Comment. Concur.

s. GUADALCANAL Comment. The ship was capable of separating the press circuit from ordinary naval and other operational communications. This eliminated a possible mixup in traffic. The press circuit was easily accessible to the press people, which also provided the added advantage of allowing the press to see how their traffic was being handled.

GUADALCANAL Recommendation. It is recommended that the press circuit be separate from normal ship's communications and if possible to be located in the press room itself.

CTF 140 Comment. Concur. The providing of maximum service and information to the Press Pool fosters confidence. understanding and mutual respect.

t. ALGOL Comment. Ship-shore Orestes was supported by NAVCOMSTA, Puerto Rico in an outstanding manner. A major problem proved to be receiving the Orestes frequency with numerous lengthy outages experienced.

ALGOL Recommendation. Although not required during Apollo 9, during periods of heavy loading of voice circuits, a separate orderwire with the supporting communications station would be beneficial.

CTF-140 Comment. Although the availability of an orderwire would be desirable, the specific installations of the extra equipments required to establish an orderwire circuit on each SRS is not considered warranted. If the SRS becomes involved in a contingency recovery operation, all necessary assets and available circuits will be committed to recovery communications with the ship. Under other circumstances the procedure for utilizing the Task Force Voice nets on a not-to-interfere basis with operational uses has proven satisfactory.

u. GUADALCANAL Comment. The SRC-22 flight deck communications system (Mickey Mouse) operates on frequencies 138.66MHZ and 149.00MHZ. During peak periods of activity on the flight deck and live broadcasting by some of the commercial broadcasting companies at the time of astronaut and command module retrieval, interference was experienced from portable radio transmitter/receivers and completely blocked out all transmissions from LSE personnel and the Flight Deck Officer.

GUADALCANAL Recommendation. Recommend check of all portable broadcasting equipment prior to day of retrieval to ascertain whether a problem will exist during this period. The 5MC and hand signals will suffice if personnel are aware that this problem may arise. An alternative would be to obtain a second set of crystals for the SRC-22 to switch frequencies of this system.

CTF-140 Comment. Concur.

v. CTF-140 Comment. USS GUADALCANAL'S hosting of news media representatives during the Apollo 9 mission was accomplished with credit. The needs of TV, radio and the press were met in a way which resulted in a smoothly coordinated mission. This result came about in part because of the pre-sail detailed coordination where a concerted effort was made to insure that there was a full and mutual understanding of problems likely to be encountered and the actions which could be undertaken to resolve any conflicting requirements.

CTF-140 Recommendation. It is recommended that the Recovery Force Commander establish liaison with the news pool at the earliest possible date, that the requirements of the mission be covered in detail, that every identifiable support requirement be established, and that there is a meeting of the minds as to what is expected by all parties. Early liaison between the Primary Recovery Ship and the news pool is essential to a smooth operation. In this way many problems can be prevented rather than having to be solved after they arise following sailing of the PRS.

w. GUADALCANAL Comment. Close liaison between commercial radio and television personnel resulted in a good relationship and minimal mutual interference.

GUADALCANAL Recommendation. It is recommended that all non-military communications keep Main Communications informed of the frequencies they are using and when they are using them. This will insure against intermodulation and is a means of easily detecting possible sources of interference.

CTF 140 Comment. Concur. The PRS must establish a centralized monitor and control procedure as necessary to insure that mutual RFI situations are identified early in the mission and that steps are taken to minimize the problems encountered. It is essential that RFI monitoring and control be a continuous process throughout the mission. Otherwise, required frequency shifts may result in unanticipated and unacceptable interference during the critical recovery period.

x. GUADALCANAL Comment. CTF 140 should be kept informed of news releases which might contain non-factual information. It is not a good policy to censor or even check a news story prior to release, but if there has been an error made in news releases, CTF 140 should be advised of the error so that possible queries can be answered.

CTF 140 Comment. Concur. It is essential that the Force Commander be kept informed of all situations of significance. This includes information about factual events as well as any non-factual information which may be transmitted. To accomplish this end, Change 2 to CTF 140 Operation Plan 2-68 will amplify the requirement for timely reporting of these events to CTF 140.

y. GUADALCANAL Comment. During the initial planning phase for Apollo 9 recovery, the requirements for men, material and services appeared to be minimal; however, after loading out, approximately 435 man/hours were required by "R" Division personnel for construction of camera platforms, stairs, stages and tables for various uses. The anticipated electrical power requirements almost tripled once the equipment was on board. NASA medical personnel did not make their power requirements known until approximately half-way through the mission.

GUADALCANAL Recommendations.

a. Supporting platforms, tables, etc. for media personnel, be provided by their respective companies. This equipment should be compatible with material handling equipment on board.

b. A standard requirements guide be established, including need for drop cords, at least one month prior to sailing. This procedure would allow time for systematic planning of primary and alternate sources of power.

CTF 140 Comment. It is recognized that requirements as outlined above will inevitably arise in varying degrees for each Apollo recovery mission. The burden on ship's personnel can be minimized by insuring that all aspects of mission support requirements are identified in the preliminary liaison meeting with both NASA and news pool representatives as has been discussed earlier.

z. GUADALCANAL Comment. After an unsuccessful attempt at a "STAR" pickup, a long delay was experienced in deploying subsequent rigs resulting in a cancellation due to darkness. Only one person was TAD to the ship for this purpose which necessitated the use of unqualifiedship's company personnel to help inflate the balloon and hook up the cannister harness.

GUADALCANAL Recommendation. Two well-qualified men, as a minimum, should be aboard for simultaneous inflation and hookup in order to expedite the "STAR" deployment.

CTF 140 Comment. Concur. The availability of two well-qualified men for this function will decrease the time required and facilitate the necessary rigging for pickup.

aa. GUADALCANAL Comment. The AN/UPN-12B Loran proved unreliable for fix information. Fixes were continually 3-5 miles behind track.

GUADALCANAL Recommendation. Recommend that the primary recovery ship be provided with AN/WPN-3 Loran Charlie equipment with spare parts and qualified maintenance personnel. This would greatly improve the fix information during night time reception of skywave signals.

CTF 140 Comment. While the greatest possible accuracy in navigation is most desirable, it is considered that the expense involved in outfitting a ship with Loran Charlie specifically for supporting a particular Apollo mission is not justified.

bb. GUADALCANAL Comment. There was a last minute requirement for oxygen, tubing, and a oxygen regulator more sensative than the regulators used by the Medical Department. This was to be used for water purging of the space-craft.

GUADALCANAL Recommendation. If this continues to be a responsibility of the Medical Department, the requirement should be included in the NASA medical requirements list.

CTF 140 Recommendation. Recommend that requirements of this nature not be levied against the ship's Medical Department. It is considered appropriate that the Recovey Team provide all specialized equipment required for command module deactivation.

2. Various other comments and recommendations of less significance than those discussed in paragraph 1 above will be treated at the Force level by CTF 140.