

# TECHNICAL INFORMATION BULLETIN

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## Radar Tracking Aircraft Assigned for MA-9

Not only will network support aircraft receive and record telemetry and automatically relay voice transmissions, but aircraft (EC-121's) will also search and track the MA-9 spacecraft by radar. Radar aircraft will be stationed near Atlantic landing areas 2-1, 16-1, and 17-1 and near Pacific landing areas 4-1, 7-1, and 22-1, to track during the re-entry and postlanding phases. It is expected that the APS-95 airborne search radar will be able to track during the ionization blackout.

Both PMR and AMR are providing telemetry and voice relay aircraft to support MA-9. The PMR aircraft have the capability to provide both functions. AMR aircraft are designated as either telemetry or voice relay. Voice relay aircraft will not perform communication checks with the spacecraft unless requested by the astronaut or ordered by the air controller. The air controllers will be in direct communication with the Network Status Monitor at MCC.

## TLM Data Processing Being Tried at BDA

An experimental test setup is being assembled at Bermuda for use during MA-9. This experiment will expedite postpass and postmission data processing and will permit fast spot checks of telemetry data for engineering evaluation. A type UYK-1 computer will be used to provide the experimental data after the original information has been processed to a proper format. The 20-bit binary code decimal time from the time standard rack and the EKG heart rate from telemetered information will be processed by a logic buffer, and the telemetered PAM wavetrain will be converted to a parallel, 8-bit per data channel, digital format. All of the data will be stored in the computer until completion of the pass over Bermuda.

The computer output will feed teletype transmitters and can be programmed to transmit to MCC any highlights of the data received at Bermuda.

## Recovery Operations for MA-9 Under Way

Many more direct operation support personnel are involved in the mission recovery effort than all other operational groups combined. Coordination of this complex DOD operation is under the direction of Major General L. I. Davis, USAF, DOD Representative for Project Mercury/Gemini. Rear Admiral H. G. Bowen, USN, commands Task Force 140 of the Atlantic area, and Rear Admiral C. A. Buchanan, USN, commands Task Force 130 of the Pacific area.

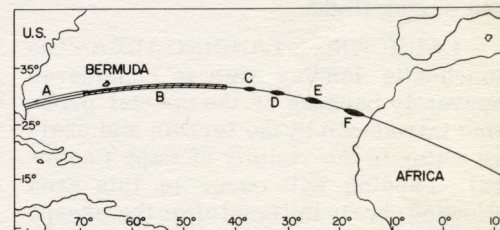
Primary responsibilities of the recovery forces are (1) to rapidly locate the astronaut and spacecraft, (2) to safely retrieve the astronaut, (3) to collect, preserve, and rapidly transmit information pertaining to the recovery operation, test data, and test hardware (this includes retrieving the spacecraft, obtaining photographic coverage of the spacecraft and recovery operation, and delivering the spacecraft and data back to Cape Canaveral), and (4) to make provisions for the collection and transmission of information and photographs by representatives of the press, radio, television, and NASA Public Affairs Office.

Numerous vehicles (e.g., ships, helicopters, airplanes, Lark amphibians) and personnel specialists (paramedics, frogmen, pararescue personnel) are included in the plan to safely and quickly recover the astronaut and spacecraft.



Aerial view of USS Kearsarge retrieving Sigma 7 with Astronaut Walter M. Shirra, Jr. aboard spacecraft. Landing occurred about 4 nautical miles away from the carrier located in the center of the primary recovery area. Recovery was completed about 40 minutes after landing.

There is also a requirement to recover the spacecraft antenna fairing, but this requirement is not to interfere with the normal spacecraft recovery operation. It is highly desirable to retrieve this part of the spacecraft so that



Launch and Pre-insertion Landing Areas the horizon scanners within the antenna fairing and the attached main parachute deployment bag may be examined. The antenna fairing will probably land within 1000 feet of the spacecraft and should be easily located with the aid of the fluorescent sea dye marker contained in it.

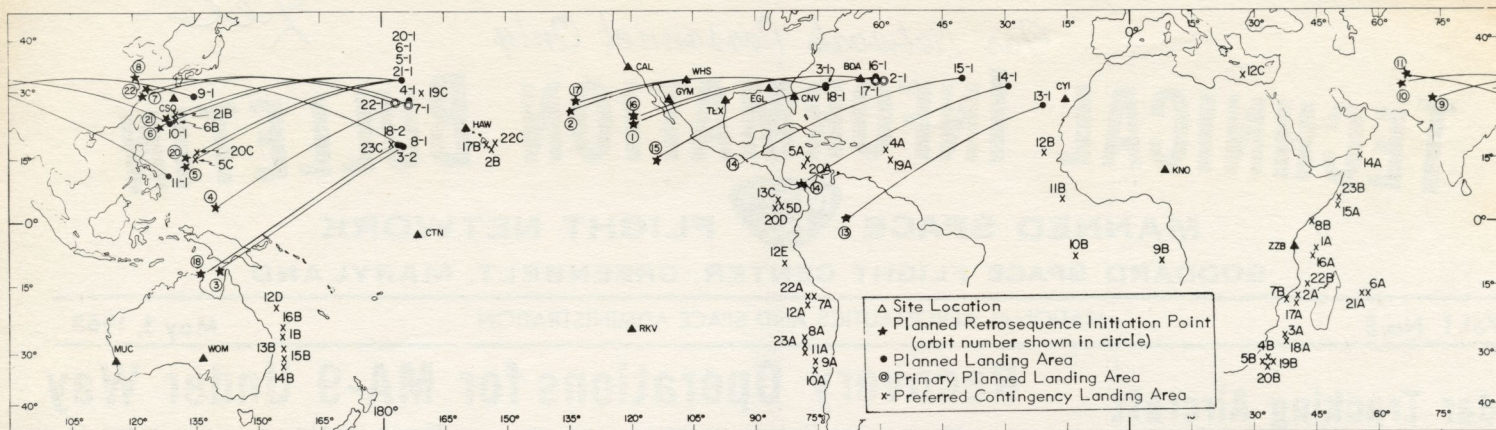
Detailed ship positioning is based on probability considerations within a given area to minimize actual access times in the majority of situations. Landing areas have been selected at spacecraft ground track intersections so that the same ships can provide recovery in more than one landing area.

### LANDING AREAS

Forces are deployed to cover possible aborted flights during all phases of the mission. Two maps are included in this article to show the planned recovery areas and preferred contingency landing areas. Planned landing areas are defined as areas where "short-time" recovery capabilities are provided. Vehicles for locating and retrieving are on station in the planned areas to assure retrieval of the astronaut and spacecraft within a specified period of time.

Contingency landing areas are those areas along the orbital ground track, other than the planned landing areas, where the spacecraft could land following a booster or spacecraft failure. Included in this category are preferred contingency areas, which are established for emergencies where the landing may be deferred long enough to reach a more desirable landing site, but cannot be deferred until one of the planned landing areas can be reached.





Post-insertion Landing Areas

A planned or preferred contingency landing area is available for spacecraft landing approximately every thirty minutes during flight.

**LAUNCH SITE LANDING AREA**—The launch-site landing area is considered separately because of the special problems introduced by the terrain and shallow water in the vicinity of Cape Canaveral. Landing will occur in this area following aborts initiated after the escape system has been armed (approximately one hour prior to launch) and during the first 72 seconds of powered flight.

**AREA A**—Landings will occur in Area A if an abort is initiated after T+72 seconds and prior to about T+175 seconds. This time period includes the time at which booster engine staging occurs.

**AREA B**—Area B extends 15 miles to either side of the ground track and covers landings that occur as a result of aborts initiated after T+175 seconds, but prior to about T+298 seconds.

**AREAS C, D, E, AND F**—Should an abort become necessary during the final portion of powered flight or during the period shortly before insertion of the spacecraft into orbit, an attempt will be made to land in AREAS C, D, E, or F.

**AREAS 2-1 THROUGH 21-1**—Landing areas 2-1 through 21-1 are areas where the spacecraft may be landed in the event of termination of orbital flight earlier than planned.

**AREA 22-1**—This area is the nominal landing point of the spacecraft, following a normal flight of 34 hours and 20 minutes.

Twelve ships will be located in the Atlantic and 10 in the Pacific to effect recovery. Of the 27 landing areas shown on the two maps, 20 areas have an access time of 5 hours, 4 have 6 hours, and 1 area (area B) has an access time of 9 hours. Areas A and B and nearby areas have airborne pararescue personnel available for emergency on-scene assistance.

Landing areas 2-1 and 17-1 in the Atlantic and area 7-1 in the Pacific are defined as GO-NO-GO decision landing areas, and area 22-1 is the planned end-of-mission landing area in the Pacific. Since the probability of landing in these areas is considered to be higher than for other planned areas, aircraft carriers with helicopter retrieval capability are assigned to provide rapid access time and augment medical support.

The contingency recovery force has aircraft, helicopters, and specialized personnel assigned and deployed on a standby basis to locate the spacecraft and render pararescue assistance within 18 hours at any point along the ground track.

#### LOCATION AIDS

Launch-site recovery forces are expected to have visual contact with the spacecraft should an abort occur in their area. Launches are scheduled after daylight in the launch area, and the weather must be satisfactory before launching.

Aboard the spacecraft are the following electronic location aids: (1) a 100-W super SARAH beacon that is activated with main chute deployment; (2) a 7- to 10-W SARAH beacon, also activated with main chute; (3) a 1-W CW SEASAVE beacon that is activated at landing after erection of antenna (at least 105 minutes); (4) a 2-W UHF voice transmitter, (normally transmits unmodulated RF carrier for DF, except when astronaut is transmitting or receiving) activated with main chute; (5) a 4-W HF transceiver; (6) a 7- to 10-W ultra SARAH; and (7) a 60-MW UHF voice transceiver contained in the survival kit.

Items 5, 6, and 7 are activated at discretion of the astronaut. All aids have a 24-hour life except item 7, which has an 8-hour life.

As an acoustic aid, a 1-pound SOFAR bomb that is ejected from the spacecraft at main chute deployment will detonate at a water pressure of 3000 feet. A fluorescein sea marker and a flashing light are provided as visual aids.

## Tricks of the Trade

GYM has come up with a TRICK that other sites might want to use as a manual tracking aid for the MA-9. They cut out two paper circles about 2 inches in diameter, one for AZ and one for EL. These circles were placed over the AZ and EL indicators on the acquisition aid such that the degree marks remained readable. Time marks, which were correlated with the appropriate "degree" data shown in the pointing data, were then made on the paper. To manually track, the operator simply turns the dials in phase with the actual flight time. Paper overlays have been made for each pass.

GYM uses this TRICK for acquisition aid and radar.

## About Documentation

The proposed Revision 5 to Operations Directive 61-1 has been delayed and will not be issued as a formal revision prior to MA-9. Instead, pertinent changes will be made by ISI message. The preliminary copies of the Network Data Reduction plan, dated April 1, 1963, which were mailed to all sites in April will be made a part of the directive by ISI action. Corrections to the data reduction plan in accordance with TWX GSC 16/1945Z April will be made effective by the same means.

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The following manual was shipped to applicable sites during April:

ME-1030 PAM Converter, Engineering Data Manual (Thompson Ramo Wooldridge, Inc.)

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