

~~H - SECRET~~

NRO APPROVED FOR RELEASE WORKING PAPER, DESTROY  
DECLASSIFIED BY: C/IART OR CONTROL BY 92  
DECLASSIFIED ON: 25 JULY 2012

LBM

OPTICAL TECHNOLOGY DIVISION  
OPTO-MECHANICAL DESIGN ENGINEERING

Memorandum ME 62

TO: Distribution DATE: October 4, 1971  
FROM: L.B. Molaskey ✓  
SUBJECT: Trip Report - Recovery of #3 - Activities of 27 September through  
3 October 1971

Monday, 27 September - The White Sands, being towed by a sea-going tug boat, the "Apache" left the dock at about 3:30 P.M. The ship's activities prior to leaving the dock were all related to preparing for the total operation including the test dive and the actual recovery dive.

There was little activity on the recovery hardware or the Trieste.

A discussion concerning various search, navigation, and homing techniques was held. Mr. Boegemann of MPL, representing the search team, suggested various transducer-receiver set ups as well as a scheme for marking the bottom with a dredge from the search vessel.

In general, the plan is to lay a network of transponders on the ocean floor, survey them using satellite navigation and once the payload is located to reference the payload location to the transponder and mark its location with a pinger. There is no automatic means either in the Trieste or on the surface to actually determine, to any degree of accuracy, the location of the Trieste under the surface. A scheme using hydrophones, transponders, etc., some of which will be supplied by the search ship will be put together so that the surface ships can direct the Trieste to the target. Alternate schemes using air filled glass bottles as a target for the Trieste's doppler system as well as a trench in the bottom laid by the search ship will be used.

Tuesday, 28 September - Activity on the White Sands commenced at 04:30 A.M. The plan for the day was to unload the Trieste from the dock well of the White Sands and to fill its tanks with gasoline and steel shot. This is accomplished by flooding the dock well and towing the Trieste out through the stern gate. I photographed various stages of this sequence.

At 11:00 A.M. the captain, Lt. Cdr. M.G. Bartels, called a meeting to firm up the test sequence and to define the steps required to implement the test. It was decided to carry the test shape to the bottom with the Trieste in order to avoid having to search for it (and possibly spend a long time or even lose it) on the bottom.

~~Hx - SECRET~~

WORKING PAPER, DESTROY  
CONTROL BY 92

NRO APPROVED FOR RELEASE  
DECLASSIFIED BY: C/IART  
DECLASSIFIED ON: 25 JULY 2012

Memorandum ME 62 (Continued)

-2-

October 4, 1971

In summary, the plan is to dive to the bottom (4,200 ft.), cut the shape loose, and maneuver to pick up the shape in the recovery hook. Once the pick-up is successful, drop the shape by activating the opening mechanism and back off 50 - 100 yards and check the sensitivity of the pinger and pinger receiving equipment in the Trieste. If the sensitivity is inadequate they can follow the "trail ball" mark on the bottom and return to the shape. This accomplished, the shape will again be picked up and the Trieste brought to the surface. A complete dry run of the transfer operation is also planned.

In order to rig for the dive the test shape will be lowered to the water from the White Sands with a float attached. It will be tied to the forward port skag of the Trieste and the floats removed. Upon reaching the bottom the rope will be cut by the manipulator and the shape separated from the Trieste.

Reaching the surface after completing the dive the following sequence of events will be performed:

1. Strap the hook closed under water as it is suspended below the Trieste (approximate 30 feet).
2. Attach flotation to recovery hook.
3. Attach safety (back-up) line to recovery hook.
4. Assemble shroud and secure light tight.
5. Reel winch wire off Trieste (wire is not fastened to winch to preclude the possibility of hanging up on the bottom).
6. Hook crane to recovery hook and lift aboard White Sands.
7. Disassemble shroud, open hook, and place payload in nylon net.
8. Place payload, net and all, into the shipping container.
9. Fill shipping container with sea water and seal top.
10. Cover refer box and cool payload.
11. Off to Hawaii.

Discussion with Lt. Cdr. R. Doyle firmed up the contact point for the support required in Hawaii. I should check with Lt. Cdr. Doyle on about the 12th of October to determine the final schedule (presently set for about 19 October in Hawaii). In Hawaii I am to contact:

Memorandum ME 62 (Continued)

-3-

October 4, 1971

Dev. Group Liaison Officer - Trieste  
c/o Sub Base - Pearl Harbor  
Comm. Sub Float 5  
Operations Office.

The following data are the specifications of the pinger used to mark the test shape: "General Purpose Pinger" Model 606 A manufactured by:

Burnett Electronics Lab. Inc.  
P.O. Box 23015, San Diego, Calif. 42123  
Tel. (714) 278-6370

Its specifications are:

Frequency: 37 KHz nominal  
Emission: Pulse  
Duty Cycle: (A) Approx. 20 MS on; 1 sec off  
(A1) 15 ms on; 500 ms off  
Beam Pattern: Omnidirectional  
Acoustic Output: Approx. 1500 dynes/cm<sup>2</sup> at 1 meter  
Operating Pressure: 6,000 ft.  
Activation: Water immersion  
Power Source: Mercury cell (Mallory TR-145)  
Battery Life: 21 days continuous; one year shelf life  
Weight: 215 grams, including battery  
Dimensions: 4-1/4" long x 1-1/2 in diameter.

The last activity of the day was to load the ballast shot and gasoline into the Trieste. It requires over 25 ton of steel shot which is loaded from the White Sands to the floating Trieste via a water slurry pumping system. A fire hose, 200 feet long, is attached to the Trieste and the steel shot is pumped from the White Sands in a slurry of water to the tanks of the Trieste. The shot is supplied in 55 gal. drums containing 25 pound bags which must be unloaded by hand and dumped into a hopper. The hopper is then lifted by crane to the slurry mixing chamber and metered into the pump. The total shot loading operation requires about 10 hours. It was completed about midnight on the 28th. The gasoline is similarly pumped from the White Sands and requires 4 to 6 hours.

Wednesday, 29 September - After completing the loading operation preliminary check out of the electronics instrumentation revealed several problems. They were worked through the night and a more or less formal series of "prediv

NRO APPROVED FOR RELEASE  
DECLASSIFIED BY: C/IART  
DECLASSIFIED ON: 25 JULY 2012

Memorandum ME 62 (Continued)

-4-

October 4, 1971

preparation tests" were started early the next morning. Due to a series of test anomalies, the pre-dive sequence was completed about six hours later than planned.

After releasing the tow and service lines the pilots were transferred to the Trieste and the dive commenced at 15:45. The scaph descended as planned directly to the bottom at about 4,200 feet in approximately 45 minutes.

Several electronics equipment problems occurred almost immediately. I didn't get all the details but there was trouble with the television, sonar, cameras, and navigation systems.

Upon reaching the bottom the pilots attempted to cut the shape loose and experienced much difficulty due to the lack of tension in the "polycrow" line. They solved this by raising off the bottom to establish tension in the line and were successful in cutting the shape loose. The above was somewhat complicated by the fact that the line was wrapped around the television and camera equipment on the front of the scaph. They then moved away from the test shape to test their ability to locate it with the marking device (pinger). Although some of the equipment did not function as expected they were able to return to the shape. They then proceeded to locate the hook over the shape in order to pick it up. This proved to be extremely difficult because of the lack of depth perception out of the view port. Although they were able to come close they did not succeed in lowering the hook over the test shape. During these maneuvers, the winch cable evidently jumped off a pulley and during the next attempt to operate the winch the cable parted, dropping the hook to the bottom. Having lost 900 pounds of weight, the Trieste immediately ascended toward the surface. The fathometer indicated that the scaph went up 400 feet before sufficient gasoline could be released to stop the ascent. When they got back to the bottom the hook and target shape were not in sight. A search pattern was initiated and after approximately 45 minutes the target and hook were located. After consultation with the Westinghouse tech representative on board the White Sands it was decided that they should attempt to pick up the hook in the mechanical manipulator jaw and surface with the hook hanging straight down below the Trieste. This was successfully performed and the hook brought to the surface. It was immediately secured to the bow frame by divers and subsequently attached to floats and transferred to the White Sands. The pilots finally got off of the Trieste and back to the White Sands at about 2:00 A.M. Thursday morning.

Thursday, 30 September - A conference was held early in the morning to decide on a course of action for the remainder of the test. Cdr. Mooney, representing the Submarine Development Group I Commander, very strongly indicated that a recovery technique must be perfected with haste and that all steps possible should be taken to achieve that goal. The following plan was established:

1. The Westinghouse, Straza, and Sperry tech reps should proceed immediately to the scaph to work out the electronics problems at hand.

~~SECRET~~

WORKING PAPER, DESTROY  
OR CONTROL BY 907

Memorandum ME 62 (Continued)

-5-

October 4, 1971

2. The Trieste should be kept in tow and all repairs and rework performed in that mode. This was to avoid a four to five day turn-around time if the Trieste were to be loaded onto the White Sands. The long turn-around time results from having to degas the Trieste prior to bringing it aboard the White Sands. That operation, of course, requires re-gassing once it is launched again.
3. Recharge the Trieste's batteries.
4. Rework the hook to provide more clearance in the open position. (There was an error in the fabrication of the hook which did not allow it to open to its designed position.)
5. Replace the lost "trail ball" - It appears that the trail ball somehow was lost during the dive. The purpose of the trail ball, a 250 pound ball of lead which is suspended on a cable 30 feet below the scaph, is to automatically reduce the ballast when the scaph reaches the bottom. It also allows the Trieste to hover 30 feet above the bottom without active control.
6. Rerig the hook winch line through the forward bow pulley, as opposed to the earlier "side" arrangement.
7. Replenish shot and gasoline used in first dive. (Because of all the maneuvering done on the first dive more shot and gasoline were used than on any previous dive).
8. Perform pre-dive check-out.
9. Repeat dive to recover test shape.

The problem with the opening span of the hook was due to an error in the location of the lower link pivot points on both arms. The problem was solved by disassembling the links and lengthening them from 15-7/8 to 17-3/16 inches. This was done by cutting the links in half and welding a longer tube over them.

An extension for the latch trip mechanism was also designed and fabricated. This will allow more freedom for the actuation of the manipulator. In addition the hook was painted with white stripes (although the drawings had called for white paint the pilots changed the color to black to preclude back scatter which would interfere with their television reception.) Several areas were also painted with "international orange" for test purposes.

After completing the modifications the unit was tested on the crane to verify its new open and closed position and lifting capacity. During the test the latch was noted to dig into the shaft causing the hook to remain partially open. This was remedied by removing the sharp edge on the latch lever.

Memorandum ME 62 (Continued)

-6-

October 4, 1971

Friday, 1 October - I suggested that a wand which could be used to extend the reach of the manipulator be made so as to allow moving the hook over the test shape with the arm rather than maneuvering the entire scaph. I made up a sketch and the part was fabricated.

As an aid to locating the hook over the target it was suggested that a "plumb bob" be added along the center axis of the hook. The plumb bob will be suspended from the hook so as to ride three to four feet above the bottom when the Trieste is sitting on the ocean floor. By locating the plumb bob directly over the test shape (or actual payload) the hook can be accurately located prior to release from its stowed position. It is felt that it will be easier to position a single line over the shape rather than the complex recovery hook. The hook was modified and the plumb bob added.

During the Trieste charging operations it was determined that there were problems with the monitor and power cables (this was the first time these cables had been used - new cables). The connectors on the monitor cable had to be rewired. The time required to diagnose the problem and repair the cable was approximately 20 hours. Charging started about 5:00 P.M. on the 1st. This, of course, delayed the start of the next dive until Sunday morning.

During the course of the activity on Friday morning, it was discovered that there was a leak in the cooling chamber of the fresh water condenser on the White Sands which supplies fresh water to the entire ship's water system including the boilers. As a result all aboard were asked to conserve water. Later in the morning it was announced that the water was not potable and that the boilers had been contaminated with salt water. This requires a complete shut down of the boilers and water evaporators; repair of the leak; flushing of all the fresh water tanks and boilers. Meanwhile, the crew could not use any fresh water. Orders were requested from the Sub Dev. Group. Those orders directed the White Sands back to a location just outside San Diego harbor where a water barge could be safely brought alongside to replenish the ship's water supply and assist in the flushing operation. This was expected to add one to four days to the schedule depending on the time required to locate and repair all the damage.

These orders were subsequently modified and the White Sands ordered back to port. It was planned to attach the tow line back to Apache and towing the Trieste in tandem return to the mouth of the harbor. There the tow line from Apache will be transferred from White Sands to Trieste and the Apache tow the Trieste in to its mooring. It would then return to tow White Sands in to its pier. In this way, regassing and reshotting of the Trieste is avoided cutting down the preparation time for the next dive.

The plan was implemented and we returned to port. Inasmuch as the hook modifications were complete and the consensus of opinion of the pilots was that the new rigging techniques would be successful, I decided, with concurrence

~~TOP SECRET~~

WORKING PAPER, DESTROY  
OR CONTROL BY 90

NRO APPROVED FOR RELEASE  
DECLASSIFIED BY: C/IART  
DECLASSIFIED ON: 25 JULY 2012

Memorandum ME 62 (Continued)

-7-

October 4, 1971

from the Captain, that no further support for the test series was required. I therefore left the ship and returned home.

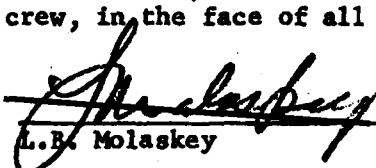
Plans for the remainder of the test series are as follows:

1. Flush the White Sands fresh water system at the pier - 40,000 gallons of fresh water required - complete by Monday night.
2. Replenish shot in the Trieste by hand at the pier. Approximately 10,000 pounds required.
3. Proceed to the test site on Tuesday morning.
4. Locate the test shape from the surface using Satellite navigation and by tracking the pinger from a small boat equipped with a receiver tuned to the proper frequency.
5. Tow Trieste over the target to confirm the signal from the pinger.
6. Locate Trieste over the target and dive.
7. Search the bottom homing in on the pinger and locate the shape.
8. Maneuver the Trieste over the shape and activate the recovery hook.
9. Surface and transfer the hook and test shape to White Sands.
10. Complete recovery operation as previously planned.
11. Drop remaining shot, degas and load Trieste onto White Sands.
12. Proceed to recovery site off Hawaii. Estimated date for completion of test: 7 October '71. - Arrival at recovery site, 27 October '71.

In summary I would like to say that although the operation will be difficult the equipment is capable of meeting the requirements of the job. It is pointed out that this will be the first operational use of the Trieste's capability since it was used to locate the Thresher. The dedication of the officers of the Trieste, especially Lt. R. Taylor, Lt. Cdr. P. Striker, Lt. A. Amara, and Lt. Cdr. M. Bartels is outstanding. The cooperation of the entire crew, in the face of all the problems reported above was commendable.

LBM/cj

cc: M.F. Maguire            P. Petty  
H.W. Robertson        R. Roylance  
R.W. Jones            J. Braddon  
C. Karatzas            [REDACTED] (HQS)

  
L.B. Molaskey

NOTE: Photos of the hardware and many of the above operations will be available in my office.

~~TOP SECRET~~  
WORKING PAPER, DESTROY  
OR CONTROL BY 90