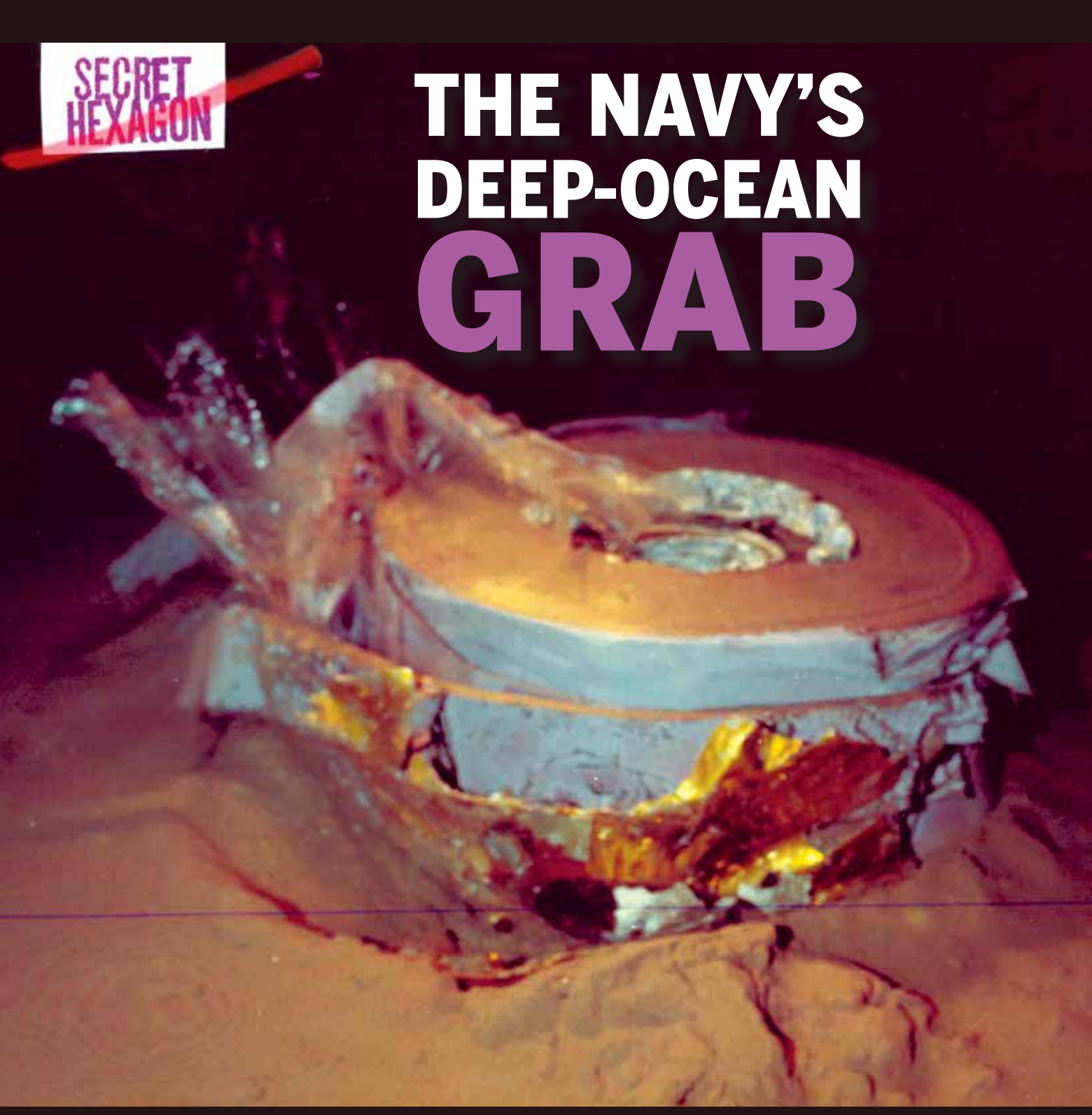
SECRET HEXAGON

THE NAVY'S DEEP-OCEAN GRAB



By Lee J. Mathers and Lieutenant Commander Beauford E. Myers, U.S. Navy (Retired)

In a mission that was classified top secret for decades, the U.S. Navy partnered with U.S. intelligence agencies and oceanographers to recover spy-satellite film from the bottom of the Pacific.

← THE TARGET

On 25 April 1972, more than 16,000 feet below the surface of the Pacific, a *Trieste II* (DSV-1) camera snapped this photo of the film-and-reel assembly from a U.S. reconnaissance satellite's re-entry vehicle.

↑ THE GRAB

A short time later, a "kludge," or claw, attached to the *Trieste* holds the film stack as the bathyscaph and her prize slowly ascend to the surface.

CIA

On 15 June 1971, the first of the third generation of U.S. spy satellites, Hexagon Mission 1201, was launched from Vandenberg Air Force Base, California, into a sun-synchronous orbit. Soon nicknamed "Big Bird," Hexagon was the most complex unmanned electromechanical device ever put into orbit. With four film re-entry vehicles (RVs), each capable of independently returning to Earth with more than 50,000 feet of 6.6-inch-wide film, the satellite provided stereoscopic photography that could reveal objects on the ground as small as two to three feet in diameter. The 19 successful Hexagon missions from 1971 to 1984 would provide such extensive coverage of classified areas that the U.S. government, confident that treaty compliance could be monitored visually, was comfortable in negotiating Strategic Arms Limitations Talk agreements with the Soviet Union in May 1972 and thereafter.

Big Bird went up with more than 33 *miles* of film, and all four RVs separately returned with exposures taken over the Soviet Union and other

communist-bloc countries. RV-1 deorbited on 20 June 1971 with 40,502 feet of film. Parachute failure resulted in an in-water recovery, and the next day the film was in the hands of Eastman Kodak for processing. A representative of the National Photographic Interpretation Center subsequently exclaimed: "My God, we never dreamed there would be this much, this good! We'll have to revamp our entire operation."

The appetite for more instantly became insatiable. RV-2, with 53,194 feet of film, re-entered on 26 June. It also experienced parachute problems, but an Air Force JC-130 Hercules successfully snagged the vehicle in midair. RV-3 deorbited on 10 July with 54,083 feet of film. This capsule suffered a catastrophic parachute failure and hit the water at high velocity, immediately sinking. RV-4's 15 July reentry with 25,797 feet of film ended with a normal aerial recovery.

This first KH-9 Hexagon mission was an overwhelming success. Still, more than 30 percent of the film exposed during Big Bird's flight lay on the ocean bottom 305 nautical miles northwest of Pearl Harbor. Could RV-3's film be retrieved?

To Reach the Oceans' Depths

The Navy operated three deep-submersible bathyscaphs—each named the *Trieste*—sequentially, from 1958 to 1984. The world's first bathyscaphs were the creation of Swiss physicist Auguste Piccard, who proved the concept and sold the first *Trieste* to the U.S. Navy in 1958. Designed by and constructed at the Mare Island Naval Shipyard, the *Trieste II* employed new equipment and concepts to explore and work as deep as 20,000 feet.

While the second *Trieste* operated from February 1964 (shortly after her completion) to April 1967, in 1965 construction began at Mare Island on the third and last *Trieste*. To support this covert submersible, the Navy created the Integral Operating Unit (IOU), consisting of an extensively modified floating drydock, the *White Sands* (ARD-20), and the fleet tug *Apache* (ATF-67).

This *Trieste*, which conducted her first dive in April 1968, was so highly classified the Navy initially did not attach a name to the craft. She originally was designed for only one mission: Project Winter Wind, conceived after nose cones from early Soviet intercontinental ballistic missile (ICBM) tests landed in the North Pacific in 1960. Development of methods to conduct precision deep-ocean search and recovery in support of Winter Wind would cost hundreds of millions of dollars from 1963 to 1971, far in excess of initial estimates but with unexpected benefits for the Navy, the United States, and oceanography.

The *Trieste*'s participation in Winter Wind effectively ended on 21 May 1968 when the nuclear-powered submarine USS *Scorpion* (SSN-589) was lost in the North Atlantic. The covert bathyscaph was the only operational manned deep-submersible available to the Navy that was capable of diving on the *Scorpion* wreck. (The older *Trieste II* was no longer operational.) The third bathyscaph would have to come out of hiding.

During the IOU's eastbound transit of the Panama Canal in late February 1969, the officer-in-charge of the *White Sands* was directed to remove the tarp covering her docking well, openly displaying the third *Trieste* for the first time. Subsequent to this debut, the older streamlined *Trieste II* was withdrawn from public view and later unceremoniously disassembled for scrap at Mare Island.

COURTESY OF LORENZO HAGERTY

The third U.S. bathyscaph—all named Trieste*—DSV-1 was covertly designed and constructed to recover Soviet ballistic missile nose cones on the bottom of the Pacific. When this photograph was taken, she had come out of hiding to search the wreckage of the nuclear submarine USS* Scorpion*. In the background is the modified floating drydock* White Sands*, which along with the fleet tug* Apache *and* Trieste *formed the Integral Operating Unit (IOU).*

After investigating the *Scorpion* debris field in 1969, the IOU returned to San Diego. The bathyscaph emerged from overhaul in September 1970, and the Navy finally officially named her *Trieste II*, with the hull number DSV-1, designating her Deep Submergence Vehicle No. 1.

Deep-Sea Recovery of an RV?

Within days of RV-3's 1971 loss, Robert Naka, deputy director of the National Reconnaissance Office (NRO), voiced the idea of recovering the film capsule during conversations with Carl E. Duckett, deputy director of the CIA for Science and Technology. Duckett authorized the agency's Office of Special Projects to informally query the director of the Deep Submergence Program (OP-23)

in the Office of the Chief of Naval Operations as to the possibility of a Navy deep-ocean recovery attempt. He quickly received an encouraging reply, and activities immediately accelerated.

At the time, former officers-in-charge of the *Trieste* were strategically positioned within the Navy establishment. Commander Don Walsh was in the Office of the Assistant Secretary of the Navy (Research and Development), Commander J. Bradford Mooney was chief of staff of Submarine Development Group 1 in San Diego, and Commander E. E. Henifin was in the CNO's Deep Submergence Systems Division office. Henifin was designated the Navy point of contact for the RV-3 recovery effort.

Meetings with all concerned were held in Washington, D.C., on 27 July. Henifin informed the NRO that the *Trieste II* was available and suggested a "hook and cable" retrieval of the RV. The job of locating it would need to be conducted by the Scripps Institution of Oceanography. The Navy would provide the *Trieste* and other assets at no cost.

Subsequent study revealed that a high-velocity ocean impact could have damaged the RV, mitigating against a hook-and-cable lift. On 4 August, the CIA tasked the technology firm Perkin-Elmer with designing a salvage device that would be carried by the *Trieste* and enclose the RV. The Navy later agreed to construct the apparatus, a claw that resembled a four-armed hay hook, by 16 September.

With preliminary meetings concluded, lines of communications established, and agreements reached between agencies, NRO Director John L. McLucas formally requested a Navy deep-ocean recovery effort from Assistant Secretary of the Navy (R&D) Robert A. Frosch on 10 August 1971. Eight days later, Frosch responded that the Navy would "be pleased to assist" and identified the most critical task facing the operation: precisely locating the target.

Ironically, the *Trieste* IOU was being assigned a mission almost identical to Project Winter Wind, although this re-entry vehicle was from a U.S. photoreconnaissance satellite rather than from a Soviet ICBM.

CIA

Designed by the technology firm Perkin-Elmer and built by the Navy, the kludge was lowered from the Trieste *by a winch and cable. A triggerlike mechanism closed its jaws.*

Preparations on Shore, Training at Sea

Sixteen days prior to the Navy's official agreement to assist the NRO, Commander Mooney had received a phone call from Submarine Flotilla 1, directing that the *Trieste* be prepared for a classified deep-sea recovery operation. Mooney immediately sent the IOU to an area off San Clemente Island, California, for a week's training—primarily sharpening precision bottom-navigational skills. The *Trieste*'s logs show two dives to 4,800 feet, both with Lieutenant Dick Taylor piloting, Lieutenant Commander Malcolm Bartels (officer-in-charge of the *Trieste*) navigating, and Lieutenant Commander Phil Stryker operating the craft's sonar.

Perkin-Elmer's hay hook reached the Navy Submarine Support Facility at Ballast Point, San Diego, on 17 September, and three days later its designer, Len Molaskey,

arrived as technical representative. Christened a "kludge" by the *Trieste* crew, the device was designed so the bathyscaph's mechanical arm could manually close it. On 23 September, an Air Force 1,100-pound Mark-VIII training re-entry vehicle was trucked to Ballast Point on a flatbed trailer. On-shore tests soon commenced to marry Molaskey's kludge to the training RV.

kludge: (rhymes with stooge) a makeshift, jury-rigged solution; sometimes used as an acronym for "Klumsy, Lame, Ugly, Dumb, but Good Enough."

The IOU sailed for the Coronado Islands operating areas for training on 27 September. NAVNET (navigation network) computer and other equipment failures frustrated the *Trieste*'s three training dives. The mission nearly was scuttled on 29 September when the bathyscaph's bow winch malfunctioned 4,200 feet below the surface and cut its cable. The kludge dropped to the ocean floor. After a 45-minute search, the *Trieste* used her mechanical arm to recapture the device and return it to the surface.

Two weeks behind schedule and with the impending onset of winter weather in the target area, the IOU was forced to deploy without completely proving the kludge. The red-and-white training RV is still on the bottom off the Coronado Islands.

Reconnaissance

Under the direction of Fred Spiess since 1958, Scripps Marine Physical Laboratory (MPL) had received classified contracts and grants from the Office of Naval Research for decades and from the Navy's Deep Submergence Program since 1966. These partnerships enabled the laboratory to be at the forefront in developing methods and tools to search the deep-ocean bottom, most significantly with the Deep-Tow sonar survey, and long-baseline (LBL) acoustic navigation systems.

Deep-Tow equipment, including 25,000 feet of deep-sea cable and the system's towed "fish," had been loaded aboard the USNS *De Steiguer* (T-AGOR-12) in Seattle the week of 16 September. After a short period in port at Honolulu and Pearl Harbor, the oceanographic research ship sailed for the search area the evening of 6 October. Spiess, his Deep-Tow team, a photo-developer, and two CIA representatives were on board.

From 8 to 20 October, the Deep-Tow team scoured the bottom, logging more than 120 sonar contacts and photographically identifying ten possible targets. It spotted RV-3's circular parachute base on the 18th. Its orientation on the bottom reinforced the CIA's estimate that the vehicle survived impact and buried itself vertically in the muddy ocean floor. The team spent the next two days taking additional photographs and precisely determining the latitude and longitude of the target. If the *De Steiguer* had been a U.S. Navy warship, she would have hoisted a broom up her mast, signifying a clean sweep, when she sailed into Pearl Harbor on 22 October.

Because of the compartmentalized nature of the recovery effort, there was no formal way to transmit RV-3's location other than at a face-to-face meeting. So four days later in San Diego, Spiess gave Brad Mooney the target's precise coordinates, along with the frequencies and codes of the two deep-ocean transponders (DOTs) his team had left behind—handwritten on a cocktail napkin. Spiess reported: "This is the best I've got."

The First Attempts

Brad Mooney flew into Honolulu on 29 October, and on 31 October boarded the civilian support ship *Maxine D*, joining Molaskey. On 1 November, the vessel rendezvoused with the IOU north of Oahu, whereupon Mooney assumed duties as officer in tactical command of the group and transferred to the *White Sands*. As the *Maxine D* departed the IOU en route to San Diego, she hoisted flags signaling "Think Deep," a reference to the *Trieste*'s Latin motto: *Pensate Profunde*. At 2000 on 2 November, the *Apache* disconnected the *White Sands* from tow. The IOU had arrived at the Marine Physical Lab's recovery site.

The first order of business was to gain contact with the *De Steiguer*'s DOTs. Using a portable satellite navigation system temporarily installed on board the *White Sands*, Mooney directed the drydock to the coordinates provided by Fred Spiess on that cocktail napkin. When she was in position, he ordered, "Give me a ping." The portable transducer in the *White Sands* rang out, and the two transponders responded immediately.

On 4 November, the *Apache* launched two BQN-8 Navy DOTs, deployed operationally for the first time at extreme depths, and the *Trieste* prepared for a 16,400-foot dive. Loaded with 67,000 gallons of aviation gasoline for buoyancy and 32 tons of soft iron shot for ballast, the *Trieste*

The Hunt for RV-3

By Lee J. Mathers and Lieutenant Commander Beauford E. Myers, U.S. Navy (Retired)

After Commander "Buzz" Henifin was contacted by the CIA about RV-3's loss, one of the first calls he made was to Fred Spiess, director of the Scripps Marine Physical Laboratory (MPL). Spiess was then at sea, on board the Military Sealift Command's oceanographic research ship the USNS *De Steiguer* (T-AGOR-12) off the Oregon coast. Information relayed from MPL by message was guarded, and Spiess' responses were qualified.

submerged at about 1815 with Stryker piloting, Taylor navigating, and Bartels on sonar. They searched the bottom for six hours without success before returning to the surface. The NAVNET computer was providing confused data, and sonar contacts could not be visually acquired.

There are two types of luck at sea: bad—and worse. The quick onset of stormy weather left no time to dock the *Trieste*, and by 1630 the next day, the *Apache* had taken the *White Sands* under tow, with the bathyscaph in tandem tow 500 yards astern of the drydock. The gale forced the IOU to retire to Pearl Harbor to await better weather.

On 16 November, Rear Admiral Paul Lacy, commander Submarine Forces, Pacific, met with Mooney, Bartels, and Stryker to evaluate whether to try again or immediately stand down until spring. Subsequently, Lacy determined to remain at the ready to exploit any break in the weather. Amid a sense of urgency, Submarine Development Group 1's commander, Captain Samuel H. Packer, joined the IOU as officer in tactical command when a brief weather window opened on 21 November.

Analysis of the NAVNET data from the 4 November dive indicated that the plot developed from Spiess' cocktail napkin coordinates was in error. Back on-site on 24 November, Packer had the *Apache* resurvey the deep-ocean transponders left earlier. In addition to disclosing that the locations of two DOTs had been transposed, the results revealed that those two transponders were not 330 feet apart, as calculated from the original plot, but rather 2,330 feet apart. On her earlier dive, the *Trieste* had searched 2,000 feet east of the target. With a corrected plot and any luck, her second attempt would be the recovery dive.

Interference from many large sharks and a killer whale delayed a 30 November attempt until late in the afternoon. Once the *Trieste* was at depth, an electrical surge wiped out part of the NAVNET computer's memory and Doppler sonar capability was lost. But the crew continued the search using dead reckoning, assisted by vectoring from the surface via underwater telephone.

On 1 December, after nearly eight hours submerged, the *Trieste* slowed as she approached a sonar contact and crew members sighted the target two feet to starboard. Momentum carried them beyond it and, as Bartels maneuvered to return, they received a low-battery alarm, indicating imminent loss of power and requiring immediate action. Bartels had no option but to terminate the dive without a capture attempt. A malfunctioning mechanical arm frustrated efforts to mark the target with a transponder carried on board the *Trieste*. Bad weather again closed in, ending recovery efforts in 1971.

The dive revealed two new problems. The *Trieste*'s 16,400-foot unpowered descent caused her to drift so far

COURTESY OF TONY BOEGEMAN

For the daunting task of locating the spy satellite's re-entry vehicle, the Navy and CIA turned to Scripps Marine Physical Laboratory and its advanced Deep-Tow sonar survey system. Above: MPL director Fred Spiess stands at the plotting board in the oceanographic research ship De Steiguer *during the search.*

Henifin informed MPL that the Navy had lost a Volkswagen-sized device in deep water northwest of Oahu. Charts showed the area only sketchily surveyed, but consisting largely of a flat mud-bottomed plain at about 14,400-foot depth. Based on this rudimentary information, and relaying the need for a designated search area of a reasonable size—i.e. 10 to 20 square miles—Spiess agreed to personally direct an effort to locate the device, quoted an estimate of $100,000 for (an optimistic) 10 days of searching and 4 days of travel, and recommended using the *De Steiguer* for the "hunt."

The ship was equipped with a satellite navigation system and a bow-thruster, and MPL would be using their advanced Deep-Tow seafloor imaging and mapping system. As the name implies, the system entailed the *De Steiguer* towing an unmanned sonar- and camera-laden "fish" far below the ocean's surface. The ship's bow-thruster was critical in maintaining the fish on a predictable track at very slow search speeds. The task would be nearly impossible without the aid of satellite navigation.

On 4 October, Speiss learned that the target, if it was intact, was only one-quarter the size of a VW and perhaps one-eighth that size if it had broken up on impact. The

from the target that transiting to the search area took two hours. Correcting for drift would save battery life for search and recovery. The second problem, the mechanical arm malfunctioning at depth, required a redesign to the kludge's operating mechanism.

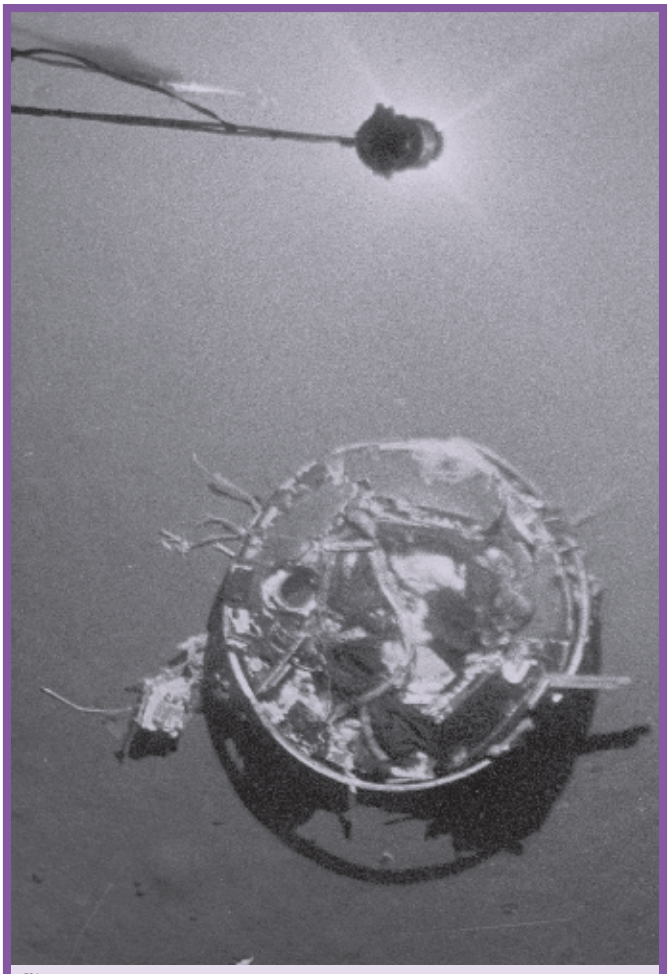
After another brief period in port, the IOU made a third sortie to the site in January 1972. But unrelenting foul weather drove it back into Pearl Harbor for the season in early February without a dive attempt having been made.

Re-Evaluation

The previous summer, Eastman Kodak had estimated that the possibility of the film from RV-3 being usable—even after immersion in saltwater for more than three months—was good. But the recovery delays and the missed attempts in November meant the film by now had been immersed for more than six months. Was it time to call the game?

On 3 February, Captain Howard Larcombe of the Deep Submergence Systems Division, Admiral Lacy, and "higher authorities" at the Pentagon ruled out any unilateral cancellation of the operation by the Navy. But did the National Reconnaissance Office want to continue the effort?

Debate within the NRO was animated, and the decision was kicked up to Director McLucas. Concerns centered on security issues rather than the value of the film. Colonel F. S. Buzard, outgoing Hexagon Program director, argued that the Soviets had been monitoring the recovery efforts northwest of Honolulu. If the United States gave up, he added, the Soviets could legally attempt a recovery of their own—potentially compromising one of the most highly classified intelligence programs then in existence. This argument carried the day, and McLucas decided to continue the effort in the spring of 1972.



CIA

On 18 October 1971, the Deep-Tow team identified the reentry vehicle's parachute base. Its orientation seemed to reinforce the CIA's estimate that the vehicle had survived impact with the ocean surface and buried most of itself, nose first, in the bottom. This later proved to be inaccurate.

Bittersweet Success

On 8 April 1972, the IOU, with Mooney back as officer in tactical command, departed Pearl Harbor. It first headed to an area off Kauai for refresher training, and then it was on to the target site. Because the Westinghouse mechanical arm had proved to be unreliable at 16,000 feet, *Trieste* engineering officer Lieutenant Richard L. Abbott devised a workaround that used a "cocked trigger" mechanism to release the hay hook. The *Trieste* would get only one release per dive.

On 25 April, weather finally eased enough for a dive on the target. None of Spiess' transponders remained active, but the area was well charted and DOTs

MPL's Deep-Tow team had been able to locate a target smaller than a ship on the open-ocean bottom only once before.

Operating as MPL expedition Slow Tow, the *De Steiguer* arrived in the search area prior to midnight 7–8 October and the team established a five-transponder acoustic long-baseline (LBL) navigation grid. Two days later, with 18 satellite fixes, Spiess had a navigation plot with an accuracy of 30 to 50 feet.

"Flying" the Deep-Tow fish at 120 feet above the bottom for side-scanning sonar survey, and 42 feet for photography, the *De Steiguer* tracked long runs through the CIA-defined search area from 10 to 15 October, logging more than 120 sonar contacts. Spiess personally evaluated each contact, qualifying ten for photographic identification.

To take a photo of each contact required maneuvering the fish (towed three miles below and one hour astern of the ship) directly over the contact. A miss of 20 feet either side would place the contact outside of the camera's field of view. After several days of long approaches and frustrating misses, Spiess' lead engineer, Tony Boegeman, suggested modifying camera runs into a tight, half-nautical-mile, 360-degree circle, which could be completed within 45 minutes to an hour and would double the photo opportunities per watch. Spiess approved the plan, which thereafter

emplaced in November and January were still live. With Mal Bartels piloting, Stryker on sonar, and Taylor navigating, the *Trieste* submerged at 1619. Two hours later, with her crew using improved NAVNET data, the bathyscaph neared the bottom. After more than three hours of searching, the *Trieste* discovered a tangled mass of metal and wire. RV-3's debris field had been found!

As the submersible approached a large sonar contact, a round shape became discernible. With the words "Tally-ho, the fox!" Bartels alerted Mooney of the sighting via underwater telephone. The object was an internal subassembly of the RV, its periphery festooned with thermal insulation pads, long filaments of film swaying in the deep-ocean current. Hitting the ocean at about 305 mph, RV-3 had broken apart. Photographs taken with the bathyscaph's external camera revealed that this subassembly was not the component Spiess and the Deep-Tow team had located and photographed in October, but rather—by an unusual piece of good fortune—the all-important film-and-reel assembly.

With the *Trieste* sitting on the bottom, Taylor activated the winch to lower the kludge and envelop the target—but the claw failed to close. After five unsuccessful attempts, Mooney advised the *Trieste* crew to drop the kludge onto the target and pay out additional cable. As the hay hook enclosed the subassembly for the sixth time and the cable slackened, the Abbott trigger finally was tripped, and Molaskey's kludge captured the film stack.

Within 20 minutes of lifting the target from the bottom, short segments of film were seen falling through gaps in the subassembly's thermal insulation pads and disappearing into a brown mist of film emulsion. Later, Kodak analysis of short strands of the film revealed that the RV's severe ocean impact had shattered the brittle film into thousands of pieces. During the two-hour ascent, Dick Taylor alerted Mooney that divers should be "ready to recover the kludge and target as soon as possible because it was breaking up."

In the early morning hours of the 26th, divers attached flotation devices to the kludge about 100 feet underwater, placed a black tarp over the assemblage, and began floating the claw up to the *White Sands*. With the kludge hanging about 35 feet below the surface and bobbing in the seaway, the weakened film stack suddenly began shedding major internal components and almost all of the film was lost. Taylor recalled "a diver collecting a long (8-10 feet) section of film." The expedition's CIA representative reported, "Everyone went from an emotional high to an emotional low in about one microsecond."

The drydock's crane lifted the remaining assembly into the dock well. Crewmen quickly transferred it into a deck-mounted freezer designed to prevent fungus or bacterial damage to any recovered film. An armed guard was posted near the locked freezer until it was off-loaded in Pearl Harbor on 29 April. The residual film from Hexagon #1201 RV-3 remained in Hawaii until the next Hexagon bucket re-entered, at which time both were forwarded to Eastman Kodak. In addition to its long immersion in saltwater, the 30.6 feet of recovered RV-3 film had been exposed to divers' lights. It retained no intelligence value.

After a slow plod homeward, the IOU arrived in San Diego on 23 May. In a Navy press release printed in the *San Diego Union* the next day, Bartels was quoted as saying that the *Trieste* had recovered "a half-ton robot laboratory . . . from 16,400-feet . . . 400-miles north of Hawaii."

Retrospective

Success comes from preparation, practice, perseverance, and an occasional epiphany. The mid-Pacific film-recovery operation displayed all of these attributes, but it is still difficult to characterize it as successful. For all of the Navy's efforts, everything that seemingly could go wrong did go wrong, and the NRO ended up with less than three dozen yards of damaged film. Yet when operating at the cutting edge of technology, the effort, not the results, can make a mission worthwhile. And the *Trieste* had demonstrated the Navy's capability to locate and recover small objects from extreme depths.

Surprisingly, the "customer" was well satisfied with the outcome. The partial recovery added to the National Reconnaissance Office's understanding of re-entry vehicle survivability given a catastrophic parachute failure. It also left nothing of significance remaining on the ocean floor, thereby protecting the security of the Hexagon program. John McLucas praised the recovery, stating that the Navy had established

became standard operating procedure for small-object hunts.

On 17 October, during Boegeman's first watch under the new plan, he nailed a sonar contact, but it was not until the fish was retrieved the next day that his "catch" was identified. Spiess was so pleased that he woke Tony from a deep sleep and hauled him into the darkroom to reveal the object of their collective efforts.

From 18 to 20 October, Spiess' team redeployed the fish to verify the location of the photographed re-entry vehicle's parachute base and obtain additional photos of it and to scout for associated debris in the area. The final camera run was completed at 0350 on 20 October. The Deep-Tow team then launched two MPL deep-ocean transponders and a "pinger" to await the arrival of the *Trieste*.

The target had been located within a mile of the center of the CIA-provided search area, on the deep abyssal plain less than ten nautical miles south of the Mendelssohn Seamount, the remains of an underwater volcano whose ravines, gullies, and crags could have swallowed the RV forever. By far, the RV was the smallest object ever located at extreme mid-ocean depths up to that time.

COURTESY OF DICK TAYLOR AND JACK MYERS

The Trieste*'s crew for the difficult film recovery mission consisted of (from left) officer-in-charge Lieutenant Commander Malcolm Bartels, Lieutenant Dick Taylor, and Lieutenant Commander Phil Stryker. While the IOU received the Navy's Meritorious Unit Citation for its efforts during the operation, Bartels received the Navy Commendation Medal and Taylor and Stryker Navy Achievement Medals.*

Recovering RV-3's damaged film stack required overcoming the limitations of several immature deep-sea technologies. The crews of the *Trieste*, *White Sands*, *Apache*, and *De Steiguer* and the MPL's Deep-Tow personnel could take great pride in using teamwork, dogged persistence, and a little imagination to glean the maximum benefit from those early technologies while overcoming their concomitant problems. The result was a successful conclusion to what had been "the deepest navigation, search and recovery operation" ever conducted.[1]

The *Trieste II* (DSV-1) continued deep-ocean operations, some public, some classified, until she was deactivated on 18 May 1984.[2] The *Trieste* is now on permanent display at the Naval Undersea Museum in Keyport, Washington.[3]

1. Secretary of the Navy's Meritorious Unit Citation for the IOU's mid-Pacific operations (undated). The recovery of RV-3's film stack preceded the CIA's Project Azorian mission by more than two years.
2. The IOU was disbanded in 1974, replaced by the one-of-a-kind USNS *Point Barrow* (T-AKD-1) converted and redesignated the USS *Point Loma* (AGDS-2). The *Point Loma* could transport the *Trieste* at 15 knots. The Navy struck the *White Sands* from the active list on 1 April 1974; the *Apache* was decommissioned on 27 February 1974.
3. The authors received valuable assistance from Mary Liz (Spiess) DeJong, Richard Molaskey, former *Trieste* technical representatives Al Hodgdon and Bob Fishback, and U.S. military space historian Dwayne Day. Special appreciation and thanks go to CIA historian David Waltrop for his comprehensive research and cooperation, and to Norman Polmar for his advice, assistance, and guidance.

and demonstrated "a unique capability vital to the security of the United States."

For sure, there were deep-recovery lessons to be learned. A CIA memo dated 24 May 1972 recommended:

- Reconnaissance assets and the recovery craft should be integrated into a single organization to eliminate delays and reduce errors communicating reconnaissance information.
- Methods should be developed to avoid weather-related delays in readying the recovery craft.
- The "relatively poor" equipment reliability on board *Trieste* should be addressed.
- A faster method of deploying the recovery craft should be developed.

Implementing these suggestions would ensure that subsequent deep-ocean salvage systems would profit from the *Trieste*'s pioneering effort.

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