

A good pick-me-up

Robert Fulton's Skyhook and Operation Coldfeet

William M. Leary

The infiltration of agents behind enemy lines during World War II could be accomplished without undue technical difficulty, thanks to the use of parachutes. Thousands of individuals descended upon occupied Europe through "Joe holes" in Royal Air Force Halifaxes and Army Air Force B-24s, or out the side doors of C-47s. Extraction of personnel, however, proved a far more challenging task. Usually, individuals had to exfiltrate enemy territory by hazardous land routes. Sometimes they could be flown out by light aircraft, like the British Lysander, that landed at night on makeshift airstrips.

All American System

An innovative extraction method, reportedly used by the British toward the end of the war, involved the use of a modified version of a mail pickup system that had been invented by Lytle S. Brown during the 1920s and perfected before Pearl Harbor by All American Aviation. The All American system used two steel poles, set 54 feet apart, with a transfer line strung between them. An aircraft approached the ground station in a gentle glide of 90 mph, while a flight mechanic paid out a 50-foot steel cable. As the aircraft pulled up, a four-finger grapple at the end of the cable engaged the transfer rope, shock absorbers cushioned the impact, and then the flight mechanic winched the mail pouch on board.¹

In July 1943, the need to rescue airmen from difficult terrain led to tests of this system by the Army Air Forces. Initial results, using instrumented containers, were not promising. The instruments recorded accelerations in excess of 17 g's following the pickup, a force far in excess of what the human body could tolerate. Changes in the transfer line and modifications in the

parachute harness, however, brought this down to a more acceptable 7 g's. The first live test, with a sheep, failed when the harness twisted and strangled the animal. On subsequent tests other sheep fared better.

Lt. Alex Doster, a paratrooper, volunteered for the first human pickup, made on 5 September 1943. After a Stinson engaged the transfer rope at 125 mph, Doster was first yanked vertically off the ground, then soared off behind the aircraft. It took less than three minutes to retrieve him.

The Air Force continued to improve the system, even developing a package containing telescoping poles, transfer line, and harness that could be dropped by air. The first operational use of the system came in February 1944, when a C-47 snagged a glider in a remote location in Burma and returned it to India. Although the Air Force never used it to pick up individuals, the British apparently did use it to retrieve agents.

CIA Involvement

During the Korean war, CIA became interested in the All American system. In the spring and summer of 1952, CIA tried to establish a resistance network in Manchuria. Civil Air Transport (CAT), its air proprietary, dropped agents and supplies into Kirin Province as part of a project known to the pilots as Operation Tropic. The All American system seemed to answer the problem of how to bring people out of Manchuria.

In the fall of 1952, CAT pilots in Japan made a number of static pickups, then successfully retrieved mechanic Ronald E. Lewis. On the evening of 29 November

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Robert E. Fulton, inventor of Skyhook. (Credit: Robert E. Fulton)

1952, a CAT C-47 with CIA officers John T. Downey and Richard G. Fecteau departed Seoul for Kirin Province, intending to pick up members of a team that had been inserted the previous July.

But a double agent had betrayed the team, and the Chinese shot down the C-47 as it came in for the pickup, killing the pilots and capturing the CIA officers. Fecteau was not released until December 1971; Downey was freed in March 1973.²

A Remarkable Inventor

Robert Edison Fulton, Jr., a talented inventor, had observed a demonstration of the All American system in

London after World War II. He believed that he could do better, although at the time he was busy formulating plans for a flying automobile.

Fulton may have been a collateral descendant of the steamboat inventor, but he never bothered to check the genealogical connection. Moreover, Edison had been a family name long before it became associated with the famous inventor. Nonetheless, with Fulton and Edison as part of his name, he seemed destined for a career as an inventor.

Born in 1909, Fulton grew up in affluent circumstances in the New York area, where his father was president of the Mack Truck Company. He attended Choate and

Harvard, then studied architecture in Vienna. In 1932, he embarked on a 17-month motorcycle adventure, visiting 32 countries and traveling 40,000 miles. Interested in photography, he worked for Pan American Airways in the mid-1930s, taking pictures of the development of the trans-Pacific air route.³

Following the outbreak of World War II in Europe in 1939, Fulton began work on an aerial gunnery trainer. He developed a static device that used films to simulate aerial combat.

Fulton demonstrated his trainer in May 1942 to Cdr. Luis de Florez, who was in the process of establishing a Special Devices Division for the Navy. De Florez endorsed Fulton's trainer and provided developmental funds. Eventually, the Navy ordered 500 trainers at a cost of \$6 million. Together with a gunnery manual written by Fulton, the trainer became the Navy's primary simulator for teaching air-to-air marksmanship.⁴

The Airphibian

After the war, Fulton bought 15 acres of land adjoining the airport at Danbury, Connecticut, where he built a house and workshop. He devoted most of his time and remaining funds to the development of a flying automobile.

Fulton built and tested eight versions of the "airphibian" and was about 90-percent finished when he ran out of money. He sold control of his company in order to raise funds to complete the lengthy government certification process, but the new owners decided not to continue the project.⁵

A New Challenge

While flight-testing the airphibian, Fulton often had wondered what might happen if he had been forced down in inaccessible terrain. A helicopter had only limited range. The All American system, he believed, was not the answer. Following the disappointment of the airphibian venture, he decided to try to create a more viable pickup system.⁶

Experiments began in 1950. Using a weather balloon, nylon line, and 10- to 15-pound weights, Fulton made numerous pickup attempts as he sought to develop a reliable procedure. Successful at last, he had his son photograph the operation. Fulton then took the film to Admiral de Florez, who had become the first director of technical research at the CIA.⁷ Believing that the program could best be handled by the military, de Florez put Fulton in touch with the Office of Naval Research (ONR). Thanks to de Florez's interest, Fulton received a development contract from ONR's Air Programs Division.

Over the next few years, Fulton refined the air and ground equipment for the pickup system. Based at El Centro, California, he conducted numerous flights over the desert, using a Navy P2V for the pickups. He gradually increased the weight of the pickup until the line began to break. A braided nylon line with a test strength of 4,000 pounds solved the problem. More vexing were the difficulties that were experienced with the locking device, or sky anchor, that secured the line to the aircraft. Fulton eventually resolved this problem, which he considered the most demanding part of the entire developmental process.⁸

The Skyhook System

By 1958, the Fulton aerial retrieval system, or Skyhook, had taken its final shape. A package that easily could be dropped from an aircraft contained the necessary ground equipment for a pickup. It featured a harness, for cargo or person, that was attached to a 500-foot, high-strength, braided nylon line. A portable helium bottle inflated a dirigible-shaped balloon, raising the line to its full height.

The pickup aircraft sported two tubular steel "horns" protruding from its nose, 30 feet long and spread at a 70-degree angle. The aircraft would fly into the line, aiming at a bright mylar marker placed at the 425-foot level. As the line was caught between the forks on the nose of the aircraft, the balloon was released at the same time the spring-loaded trigger mechanism (sky anchor)

secured the line to the aircraft. As the line streamlined under the fuselage, it was snared by the pickup crew, using a J-hook. It was then attached to a powered winch and pulled on board.

Fulton first used instrumented dummies as he prepared for a live pickup. He next used a pig, as pigs have nervous systems close to humans. Lifted off the ground, the pig began to spin as it flew through the air at 125 mph. It arrived on board undamaged but in a disoriented state. Once it recovered, it attacked the crew.

Human Pickups

The first human pickup took place on 12 August 1958, when S. Sgt. Levi W. Woods, USMC, was winched on board the P2V. Because of the geometry involved, the person being picked up experienced less of a shock than during a parachute opening. After the initial contact, which was described by one individual as similar to “a kick in the pants,” the person rose vertically at a slow rate to about 100 feet, then began to streamline behind the aircraft. Extension of arms and legs prevented the oscillation that plagued the pig, as the individual was winched on board. The process took about six minutes.⁹

In August 1960, Capt. Edward A. Rodgers, commander of the Naval Air Development Unit, flew a Skyhook-equipped P2V to Point Barrow, Alaska, to conduct pickup tests under the direction of Dr. Max Brewer, head of the Navy’s Arctic Research Laboratory. With Fulton on board to monitor the equipment, the P2V picked up mail from Floating Ice Island T-3, retrieved artifacts, including mastodon tusks, from an archeological party on the tundra, and secured geological samples from Peters Lake Camp. The high point of the trials came when the P2V dropped a rescue package near the icebreaker USS Burton Island. Retrieved by a ship’s boat, the package was brought on deck, the balloon inflated, and the pickup accomplished.¹⁰

Operation Coldfeet

The stage was now set for the first operational use of Skyhook. What became known as Operation Coldfeet began in May 1961, when a naval aircraft flying an

aeromagnetic survey over the Arctic Ocean reported sighting an abandoned Soviet drift station. A few days later, the Soviets announced that had been forced to leave Station NP 9 when the ice runway used to supply it had cracked.

The prospect of examining an abandoned Soviet ice station attracted ONR’s interest. The previous year, ONR had set an acoustical surveillance network on a US drift station used to monitor Soviet submarines. ONR assumed that the Soviets would have a similar system to keep track of American submarines as they transited the polar ice pack, but there was no direct evidence to support this. Also, ONR wanted to compare Soviet efforts on drift stations with US operations.

The problem was how to get to NP 9. It was far too deep into the ice pack to be reached by an icebreaker, and it was out of helicopter range. Fulton’s Skyhook seemed to provide the answer. To Capt. John Cadwalader, who would command Operation Coldfeet, it looked like “a wonderful opportunity” to make use of the pickup system.¹¹

Following a recommendation by Dr. Max Britton, head of the Arctic program in the Geography Branch of ONR, RAdm. L. D. Coates, Chief of Naval Research, authorized preliminary planning for the mission while he sought final approval from the Chief of Naval Operations. The mission was scheduled for September, a time of good weather and ample daylight. NP 9 would be within 600 miles of the US Air Force base at Thule, Greenland, the planned launching point for the operation.

ONR selected two highly qualified investigators for the ground assignment. Maj. James Smith, USAF, was an experienced paratrooper and Russian linguist who had served on US Drift Stations Alpha and Charlie. Lt. Leonard A. LeSchack, USNR, a former Antarctic geophysicist, had set up the surveillance system on T-3 in 1960. Although not jump qualified, he quickly went through the course at Lakehurst Naval Air Station. During the summer, the two men trained on the Fulton retrieval system, working in Maryland with an experienced P2V crew at the Naval Air Test Center, Patuxent River.

Some Problems

Meanwhile, ONR's scheme was running into difficulty at the Navy's highest level, as skeptics argued that the plan would never work and likely would cost the lives of the investigators. Thanks largely to Dr. Britton's efforts, approval eventually came through, but not until late September.¹² This meant that the operation could not be launched until the return of well-below-freezing temperatures. When equipment was sent to Eglin Air Force Base for testing in the cold chamber, problems with the gear developed that took several weeks to correct. Also, promises for a support aircraft fell through. All the while, NP 9 kept moving farther away from Thule. "The winter dragged without solution," Captain Cadwalader lamented.

New Target

In March 1962, the mission planners received the unexpected news that the Soviets had abandoned ice station NP 8 in haste after a pressure ridge destroyed its ice runway. A more up-to-date facility than NP 9, it also was in a more accessible position at 83°N 135°W. "With the operation finally about ready to take off," Cadwalader reported, "the target was shifted to this new and tempting target." After the Canadian Government readily agreed to the use of the Royal Canadian Air Force base at Resolute Bay, 600 miles from NP 8, Project Coldfeet got under way.

In mid-April, the P2V and a C-130 support aircraft from Squadron VX-6 departed Patuxent River for Resolute Bay via Fort Churchill. Captain Cadwalader, the project's commander, had hoped that the Hydrographic Office's monthly ice reconnaissance flight that flew between Thule and Point Barrow would provide an up-to-date position on NP 8; bad weather and a navigational error, however, prevented a sighting. Still, with the last known position only a month old and given the general dependability of the Hydrographic Office's drift predictions, he expected no difficulty in finding the target. The C-130 carrying the drop party would locate NP 8, while the P2V would be standing by in case an immediate extraction was necessary.

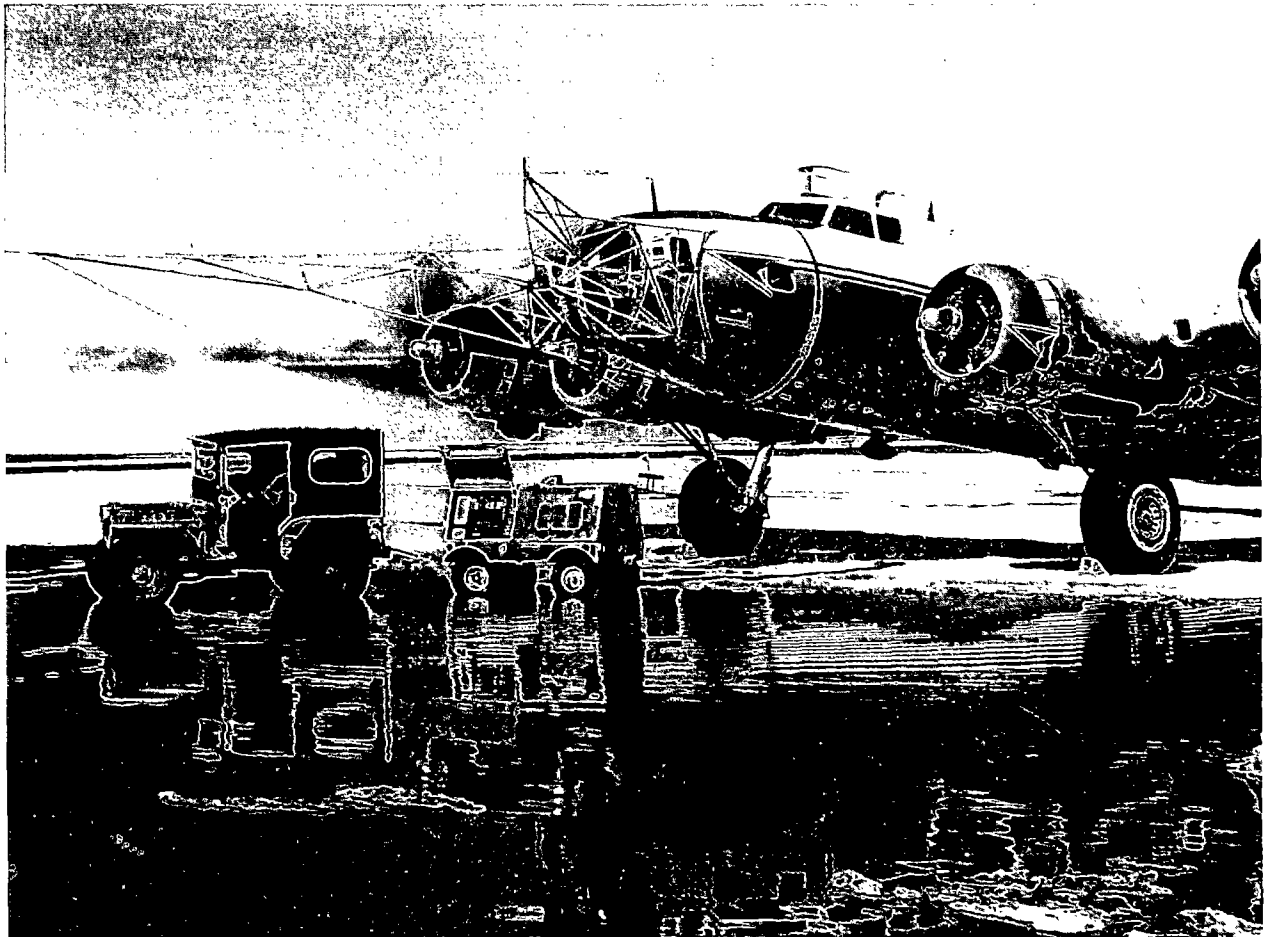
The hunt for NP 8 began in perfect weather. The C-130 flew to the station's last known position, then began a box search at 10-mile intervals. Hours went by, but nothing could be seen except ice. The next day, the C-130 started searching at five-mile intervals. It spotted the abandoned US Ice Station Charlie but not NP 8. Four more searches failed to reveal the elusive Soviet drift station. With the flight time available for the C-130 running out and the weather deteriorating, Cadwalader called off the operation.

Back in Business

The expedition had no sooner returned to the US when the monthly ice reconnaissance flight on 4 May spotted NP 8 well to the east of its predicted position. ONR remained convinced that Coldfeet could work, but its funding for the project had run out. Perhaps the Intelligence Community, which had displayed interest in the scheme, might be persuaded to support the operation.

As it happened, Fulton had been working with CIA on the development of Skyhook since the fall of 1961. Intermountain Aviation, an Agency proprietary at Marana, Arizona, that specialized in aerial delivery techniques, had equipped a B-17 with the Fulton gear in October. Over the next six months, Intermountain's veteran CIA-contract pilots Connie W. Seigrist and Douglas Price flew numerous practice missions to perfect the equipment needed to infiltrate and extract agents. (They later conducted demonstrations for the Forest Service and Air Force while training for a covert operation to extract fellow CIA-contract pilot Allen L. Pope from an Indonesian prison.)¹³

Fulton then approached Intermountain about participating in Coldfeet. Garfield M. Thorsrud, head of the proprietary, liked the idea. After \$30,000 was made available by the Defense Intelligence Agency, Coldfeet was ready to resume, with Intermountain furnishing the Skyhook-equipped B-17 and a C-46 support aircraft for the project.¹⁴



Intermountain Aviation's B-17 at Point Barrow, May 1962. (Credit: Robert E. Fulton)

The Search for NP 8

On 26 May, the B-17 and C-46 reached Point Barrow, which was selected to replace Resolute Bay in order to avoid the delay in obtaining the necessary diplomatic clearance from the Canadian Government. Carrying William Jordan, an experienced Pan American Airways polar navigator who had been hired by Intermountain, the B-17 began the search for NP 8 the next day.

Seigrist and Price flew a northerly heading at 8,000 feet for almost four hours until they reached the ice station's predicted position. They then descended to 1,500 feet and initiated a square search pattern. The visibility was poor—"a forbidding dusky grey," Siegrist recalled. "It

was the most desolate, inhospitable looking and uninviting place I had ever seen." NP 8 never appeared, and the B-17 returned to Point Barrow after more than 13 hours in the air.¹⁵

On 28 May, assisted by a P2V from Patrol Squadron One at Kodiak, the B-17 located NP 8. Seigrist circled the station while Major Smith and pickup coordinator John D. Wall selected a drop point. Drift streamers determined the wind, then Smith left the aircraft through a "Joe hole," followed by LeSchack. After dropping supplies to the men and receiving a favorable report from Smith over his UHF hand-held radio, the B-17 departed.

The plan called for Smith and LeSchack to have 72 hours to explore the Soviet base. While they conducted their explorations, Intermountain mechanics Leo Turk and Carson Gerken installed the pickup booms on the nose of the B-17. Seigrist and Price tested the equipment on 30 May by making a practice pickup in front of the Arctic Research Laboratory at Point Barrow.

The next day the mission to retrieve Smith and LeSchack got under way. In addition to pilots Seigrist and Price, the B-17 carried navigator Jordan, coordinator Wall, jumpmaster Miles L. Johnson, winch operator Jerrold B. Daniels, nose-trigger operator Randolph Scott, and tail-position operator Robert H. Nicol. Cadwalader, Fulton, and Thorsrud also climbed aboard to observe the operation.

The weather, Seigrist and Price soon learned, had deteriorated since their last trip over the frozen sea. Warmer temperatures had heated the ice mass, causing dense fog to form. The target eluded the B-17, and it returned to Point Barrow.

After a second fruitless search on 1 June, Thorsrud asked Cadwalader to call out the P2V. The next morning, the P2V took off from Point Barrow two hours and 30 minutes before the B-17. Using its more sophisticated navigational equipment, it quickly located NP 8, then guided the trailing aircraft by UHF/DF steers to the location.

Up, Up, and Away

Conditions for the pickup were marginal at best. The ice had a grey hue, and it was difficult to make out an horizon. The surface wind was blowing at 30 knots, nearing the limits of Skyhook's capability. After inflating the balloon attached to 150 pounds of exposed film, documents, and equipment samples, Smith and LeSchack had to keep a tight hold on the canvas bag containing the cargo lest it be blown away.

As Seigrist lined up for the pickup, the horizon disappeared. "I was instantly in a situation," he recalled, "what could be imagined as flying in a void." The

pickup line and its bright orange mylar marker, however, provided sufficient visual clues to enable Seigrist to keep his wings level. He flew into the line, made a good contact, then immediately went over to instrument flying to avoid vertigo. Winch-operator Daniels brought the cargo on board without difficulty.

As prearranged, Price, a former Navy pilot, now took over the left seat to make the pickup of LeSchack. The wind was blowing stronger, and Smith had to struggle to hold LeSchack from being blown away. As the rising balloon caught the wind, LeSchack tore away from Smith's grasp, pitched forward on his stomach, and began to drag across the ice. After 300 feet, his progress was stopped by an ice block. As he lay on the ice and tried to catch his breath, Price hooked into the line.

Smith watched as LeSchack rose slowly into the air, then disappeared throughout the overcast. Although LeSchack rode through the air facing forward, he managed to turn around and assume the correct position before being hauled on board the B-17.

Price and Seigrist again changed seats so that Seigrist could make the final pickup. Smith held tightly to a tractor as he inflated his balloon. Still, he started to drag across the ice until he managed to catch a crack with his heels. He lay on his back as Seigrist approached the line. "The line made contact on the outer portion of the left horn," Seigrist remembers. "It just hung there for what to me was an eternity."

Slowly, the line slid down the horn and into the catching mechanism. As the line streamed along the bottom of fuselage, assistant jumpmaster Johnson reached down through the "Joe hole" and placed a clamp on it. He then signaled nose-trigger operator Scott to release the line. Next, tail-position operator Nicol secured the line, Johnson released his clamp, and winch-operator Daniels quickly brought Smith on board. He received a warm welcome from Fulton, Cadwalader, and Thorsrud—and a drink of "medicinal" Scotch.



Major Smith samples "medicinal" Scotch after being winched on board Intermountain's B-17, 2 June 1962. Lieutenant LeShack is in the lower right corner. (Credit: Robert E. Fulton)

Valuable Intelligence

Operation Coldfeet, Cadwalader reported, produced intelligence "of very great value." ONR learned that the Soviet station was configured to permit extended periods of silent operation, confirming the importance that the Soviets attached to acoustical work. In addition, equipment and documents obtained from NP 8 showed that Soviet research in polar meteorology and oceanography was superior to US efforts. "In general," Cadwalader summarized, "the remarkable Soviet accomplishments in their drift stations reflect their long experience in this field and the great importance that their government attaches to it."¹⁶

Operational Success

Beyond the intelligence obtained, Cadwalader wrote, perhaps the greatest accomplishment of Coldfeet "was to prove the practicality of paradrop and aerotriever recovery to conduct investigations in otherwise inaccessible areas." Certainly, Coldfeet had been an outstanding operational success. The recovery of Smith and LeSchack had been especially challenging. As Admiral Coates wrote to Thorsrud, the pickup had been conducted "under stronger winds and lower visibility than had previously been attempted; nonetheless, through

the exceptional skill of pilots and the coordination and efficiency of the crew, all pickups were made without a hitch, and in the best time (6 1/2 minutes) yet achieved.”¹⁷

While the Skyhook system provided an important asset for all manner of intelligence operations, its utility as a long-range pickup system was somewhat undermined during the 1960s by the development of an aerial refueling capability for helicopters. Still, it appears likely that Fulton’s Skyhook did find employment in a number of specialized clandestine operations following Coldfeet, although its subsequent use by CIA and the military services remains shrouded in secrecy.

NOTES

1. The All American system is best described in W. David Lewis and William F. Trimble, *The Airway to Everywhere: A History of All American Aviation, 1937-1953* (Pittsburgh: University of Pittsburgh Press, 1988).
2. On Operation Tropic, see William M. Leary, *Perilous Missions: Civil Air Transport and CIA Covert Operations in Asia* (University, AL: University of Alabama Press, 1984), pp. 138-42.
3. Fulton’s background is detailed in Wesley Price, “The Automobile Gets Wings,” *Saturday Evening Post* 219 (17 May 1947): pp. 51-52, 54, 56. He describes his motorcycle trip in *One-Man Caravan* (New York: Harcourt, Brace and Company, 1937).
4. Interview with Fulton, 9 November 1988; Robert Lewis Taylor, “Captain Among the Synthetics,” *New Yorker* 11 (11 November, 1944): pp. 34-43, and (18 November 1944): pp. 32-43.
5. Price, “The Automobile Gets Wings”; James R. Chiles, “Flying Cars Were a Dream That Never Got Off the Ground,” *Smithsonian* 19 (February 1989): pp. 144-46, 148, 150, 152, 154, 156, 158-60, 162; interview with Fulton, 9 November 1988.
6. Interview with Fulton, 28 September 1988.
7. Harvey M. Sapolsky, *Science and the Navy: The History of the Office of Naval Research* (Princeton: Princeton University Press, 1990), p. 51.
8. Interview with Fulton, 9 November 1988.
9. “Skyhook-Aerotriever System: Operations Conducted by NADU,” *Naval Research Reviews* (October 1960): pp. 18-21; Leonard A. LeSchack, “Skyhook Retrieval,” *United States Naval Institute Proceedings* 92 (March 1966): pp. 138-42.
10. “Skyhook,” *Naval Research Reviews* (October 1960); pp. 18-21.
11. John Cadwalader, “Operation Coldfeet: An Investigation of the Abandoned Soviet Arctic Drift Station NP 8,” *ONI Review* 17 (August 1962): pp. 344-55. I am indebted to Dr. Edward J. Marolda, head, Contemporary History Branch, Naval Historical Center, for a copy of this declassified report.
12. Cadwalader to the author, 30 October, 1989.
13. Connie W. Seigrist, “Coldfeet,” n.d. The author is grateful to Captain Seigrist for a copy of this narrative account of his participation in the operation. Pope had been shot down on 18 May 1958, while flying a B-26 for the CIA-supported rebel group that was trying to topple the Sukarno government. The planned rescue attempt proved unnecessary after Attorney General Robert Kennedy obtained Pope’s release in July 1962.
14. The operation finally cost nearly twice the project figure of \$30,000 because bad weather led to increased flying time.
15. Seigrist, “Coldfeet.” My account of events in May and June 1962 is also based on a telephone interview with Garfield M. Thorsrud, 7 February 1994; Cadwalader, “Project Coldfeet,” and the Robert Fulton

Company, "Pictorial Report of Operation 'Coldfeet,' " 23 June 1962. I am indebted to Mr. Fulton for a copy of this report. The accounts vary somewhat in detail, and I have had to reconstruct events on the basis of what seemed to me most logical.

16. Cadwalader, "Project Coldfeet."
17. Coates to Thorsrud, n.d.; copy courtesy of Mr. Thorsrud.