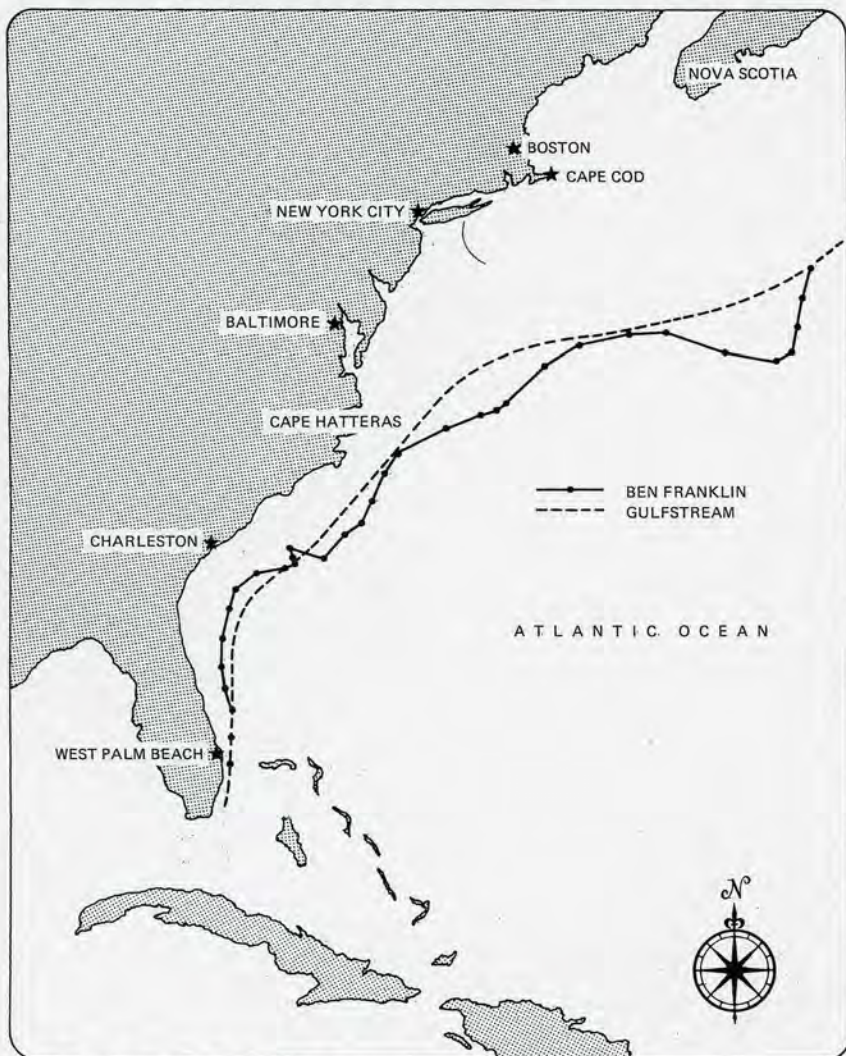


plane GRUMMAN news

Six complete 1444-mile Gulf Stream underwater voyage



A white and yellow Ben Franklin carrying six exuberant crew members surfaced in the Atlantic Ocean the morning of August 14, completing a journey like no other in the history of oceanography. The 145-ton Grumman/Piccard submersible was at the end of its drift from Florida in the Gulf Stream at a point in the Atlantic 300 miles south of Halifax, Nova Scotia, a distance of 1444 nautical miles.

One of the surprises of the quiet journey was that the Gulf Stream is not a favorite habitat for fish. There were a few encounters, like the swordfish that attacked the Ben Franklin five days out, an unusually long colony of salp (transparent jelly-like creatures joined in a chain of perhaps 30 feet x 4 inches), a few squid, some crabs, a sea anemone, tiny shrimp, schools of tuna, several sharks—that was about the extent of the marine life encountered. If the long-discussed "deep scattering layer" of plankton exists in the Gulf Stream, it eluded the vessel.

Biggest surprises

Perhaps the biggest surprises were the speed of the Gulf Stream north and east of Cape Hatteras, and a sharp turn northward "just as we were about to go off our chart," on August 11. In Dr. Jacques Piccard's words, "The Gulf Stream is not merely one flood of water, but several swirling, colliding, meandering torrents tumbling northward." The submarine drifted at two knots or less while south of Cape Hatteras, then picked up speed until it was moving at a little over four knots near the end of the mission.

There was a definite jog north-northwest out of Charleston; the submersible had been moving closer and closer to the north wall of the Gulf Stream each day, until she broke through. She then surfaced (the hatch remained closed), and M/V Privateer towed her back into the Gulf Stream.

"We seemed to be in some kind of eddy there," Don Kazimir, the Grumman skipper, said.

The "northern kick" occurring south of Nova Scotia seems to suggest that part of the warm current heads toward Iceland to moderate the climate of that northerly island.

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Running silent. Without the aid of its motors, Grumman/Piccard submersible joined the warm Gulf Stream current off Palm Beach and drifted along with it for 30 days, covering 1444 nm. Dotted line represents average path of Gulf Stream; crew found some surprises in speed of the current, and its changes of direction. Oceanographic and psychological data are still being evaluated.

... and prepares Ben Franklin for future underseas missions

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having been down 30 days, it was just great to have the wind in my face and the sky above."

Ken Haigh, British Royal Navy acoustician, exchange scientist in Naval Oceanographic Office: "I was amazed by how strong the light was; it was good to feel the wind and the movement of the boat—quite a difference from the very quiet trip we had just completed, and it reminded me of the fact that we still have a lot to learn about the ocean."

Frank Busby, U.S. Naval Oceanographic scientist: "Ben Franklin exceeded all my expectations. The fact that everything worked as well as it did, that we stayed with the current, that we went as far as we did, will all add to our knowledge of the Gulf Stream."

'Tremendous support'

The crew could not say enough for the "tremendous amount of support" they received from the escort ship PRIVATEER and from the mission's Technical Alert facilities at Palm Beach and Bethpage. "They were really on the ball; from my standpoint and that of the submarine, we couldn't have asked for anything more," Kazimir, who is an ex-Navy submarine officer, asserted.

On board PRIVATEER were Bill Rand, mission director; Bob Quick, back-up mission director; and Harold Dorr, back-up pilot. They were in charge of the tracking. The men who operated the tracking equipment and handled the maneuvering to keep PRIVATEER close to FRANKLIN at all times were Ray Gregory, Bruce Sorensen, and Paul Campbell.

Grumman Medical Director Dr. Bob

Jessup was aboard to monitor the health of both submarine and escort ship crews.

Manning a support van that, on land, paralleled the ocean drift, were Al Ferguson and Fred Martin. They carried tools and spare parts, mooring lines, and other supplies that might have been needed if the mission had not run its full course.

The Ben Franklin, designed by Dr. Piccard and Grumman, and built by Grumman in Switzerland, is now on static display at the South Street Seaport

Museum in Manhattan through Labor Day.

While on its way to static display in Washington, D. C., FRANKLIN will perform a one-day submerged mission for the Franklin Institute of Philadelphia, according to tentative plans at press time. From Washington, it will be towed to its berth at West Palm Beach for cleaning, testing, and tune-up, and for further experiments.

A series of demonstration research and development dives to 1800 feet will be

conducted off the Port of Palm Beach for the Naval Oceanographic Office, Deep Ocean Technology, and the Office of Naval Research; for NASA; for Woods Hole Oceanographic Institute; for the Bureau of Commercial Fisheries; and others.

These groups, reports Walt Muench, have projects that will keep the Ben Franklin busy for some months. "We are seeking other scientific and commercial missions for FRANKLIN," he emphasizes.



High flyers. From 1946 through 1948, the Navy's Blue Angels flew Grumman planes in their precision flight demonstrations. The Blue Angels were at Bethpage recently to present a plaque saluting Grumman for its long service to the team. Shown during presentation ceremony are (L to R): Grant Hedrick, Lt. Ernie Christensen, Lew Evans, Blue Angels leader, Cdr. Bill Wheat, Clint Towl, Capt. Vince Donlie, Bill Schwendler, and Lt. Rick Millson. Plaque contains signatures of all the living Blue Angels and a memorial to the former Blues.

Name Hall, Bussolini to new posts in Company

Al Hall, formerly deputy director of Machining Operations, has been named director of Machining Operations by C. H. (Corky) Meyer, Vice President - Product Manufacturing.

Hall joined Grumman in December 1963 as a member of Systems Analysts: Engineering, working on the F-111 Program. He then moved to Business Development on the A-6A Program, and subsequently became staff assistant to the director of Product Manufacturing. During 24 years in the Navy, he flew Grumman F4Fs and F6Fs in World War

II, and later on, F9Fs, F11Fs, and A-6As.

In his new slot, Hall will be in charge of Machining Operations for Grumman Aerospace Corporation at Plant 56, Glen Arm, Md.; Plant 58, Sterling, Va.; Plant 32, Sag Harbor; and Plants 3 and 5 Machine Shops, Bethpage. "Grumman has one of the best equipped machining facilities in the country, thanks to a predominance of machine tools less than two years old," he points out. "And while many of the machines are numerically controlled these days, we can't overlook the fact that our skilled ma-

chinites are the very backbone of Grumman machining capability."

Jake Bussolini has been named as manager of Engineering Operations in the Product Engineering Dept., headed by Vice President Grant Hedrick.

Bussolini's primary task is to tap the reservoir of engineering talent and ideas to assure more efficient operations and improved communications among members of the department.

According to Hedrick, "Jake's job is to put his finger on the pulse of engineering ideas; evaluate them; try them out on management, if necessary; and get the good ones implemented. Also, he is to help prevent any communications gap—at all levels—by talking to the men, their supervisors, and their managers."

Immediately prior to taking this new post, Bussolini had been chief of Reliability and Maintainability for about three years, having been assistant chief for a year.

Bussolini received a Bachelor's degree in Electrical Engineering from Norwich University in 1958 and he has done graduate study at the University of Connecticut and at Yale University. He served as an instructor of military science at Yale as a 1st Lt. in the U.S. Army Signal Corps.

F-14 openings

With the F-14 starting into the initial stages of the tool design effort, Manufacturing Engineering has openings for a number of tool designers on the project.

If you have previous experience in any phase of tool design, or if you know a friend or neighbor who has such experience, now is the time to join the Manufacturing Engineering F-14 team.

Depending upon your experience and interest, assignments are available in such fields as: welding design, including electron beam and laser weld systems; assembly jigs; form tooling; plastics and bonding fixtures; optical alignment tooling; handling equipment; detail parts; and jigs and fixtures, among others.

If you are interested, an interview can be arranged by calling Art Boalick, Ext. 1509, or Wally Brown, Ext. 1429.



Al Hall



Jake Bussolini



Good morning, world! After more than 30 days underwater, Ben Franklin surfaces 300 miles south of Nova Scotia August 14, mission accomplished. Ben Franklin and her six-man crew left West Palm Beach July 14, drifted silently within the Gulf Stream nearly 1500 miles. Escort ship Privateer stands by at left.

Gulf Stream drift helps unlock secrets of 'inner space'...

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"The line on the map indicates only the average path of the Gulf Stream; it changes often and meanders all around that line," Kazimir said.

"The Navy's Oceanographic Office people are very pleased and quite excited about the data derived from the Gulf Stream mission," Kazimir continued. "Part of this, of course, was collected by the Oceanographic vessel LYNCH. It will be interesting to correlate the data, but that will take several weeks."

Data collected that are expected to be very useful to the Oceanographic Office include stereo photos taken of the ocean bottom; measurement of sound velocity, temperature, and salinity; reflectivity of the ocean floor, gravity readings, magnetic anomalies in the earth's magnetic field. The activity also included visual observations, photos of marine life, ambient light measurements, and side scan sonar "pictures" of the ocean floor. Be-

tween Florida and Cape Hatteras investigations were made of the Blake Plateau at depths of 1800 feet; after that the water was too deep (12,000 feet) for bottom investigation.

The National Aeronautics and Space Administration was interested in what Program Manager Walt Muench calls "man-machine interface": how man operates in a "closed ecological environment." NASA researcher Chet May, at a press conference held in Washington, D. C., on August 20, said he was very pleased with the results of the mission as they might apply to the manning of future space stations. He noted that the crew's high morale and ability to perform maintenance and scientific tasks, together with the maintenance of a habitable environment during the long voyage, provided much useful information to be applied to the space program.

A wine and steak dinner aboard COOK INLET, the Coast Guard cutter that

picked them up—and the satisfaction of just breathing great gulps of fresh air—made the crew aware of the restrictions they had been living under for 30 days. Their freeze-dried meals, balanced for vitamins and protein and calories, had been reconstituted from hot water stored in insulated tanks. Cabin moisture had been removed with silica gel, and oxygen for breathing had been provided by the slow evaporation of super-cold liquid oxygen. Panels of lithium hydroxide had taken care of the carbon dioxide, and charcoal filters had removed odors in the atmosphere.

The sub returned with power to spare—a tribute to the success of this passive kind of drifting. Lead acid batteries—378 of them provide 750 kw hours of energy—were there to furnish power for four 25 hp AC propulsion motors and to run the lights and scientific instruments. This was indeed a small amount of power for a journey of such duration.

The reactions of the crew as they emerged from their strangely silent drift mission suggest some of the noteworthy aspects of their journey:

Don Kazimir, Grumman skipper: "Mission just great. Boat worked beautifully. Instrumentation worked fine. Very enjoyable experience."

Jacques Piccard, designer of Ben Franklin and mission leader: "Cooperation between the crews of Franklin, Privateer and Lynch (surface escort vessels) contributed to the success. Not only did we collect much useful information under the sea, but considerable data was also collected from the surface by Lynch. True impact of this mission on oceanography is still to be determined."

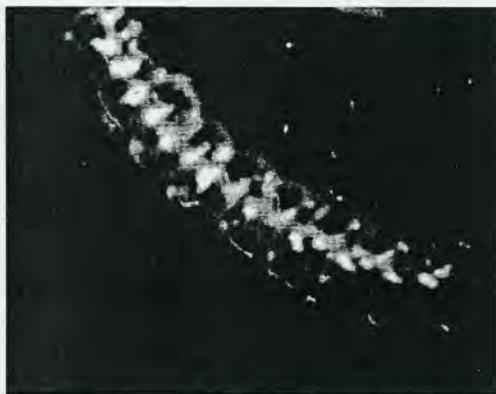
Erwin Aebersold, Swiss pilot: "What impressed me most was the atmosphere in the boat; we started with just six men and ended with six friends."

Chet May, NASA researcher: "After

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Homeward bound. Coast Guard cutter Cook Inlet ferried crew to Portland, Maine, and a Grumman Gulfstream flew them from there to Bethpage. Enjoying the sunlight August 14 were (L to R): Jacques Piccard, Frank Busby, Ken Haigh, Don Kazimir, Chet May, Erwin Aebersold.



Marine life. Although the Ben Franklin encountered fewer fish than anticipated, there were plankton and tiny shrimp, crabs, sharks—and various sizes of salp, like the colony above. One such string of the jelly-like creatures measured 30 feet and was four inches thick.