RESCUE BY A SATELLITE!

Crossing the Atlantic, the trimaran *Gonzo* capsized. But a Soviet satellite was listening for the cry of any troubled ships.

BY JACK SOMER

When Walter Greene and his two crewmen set out on a dangerous Atlantic voyage by trimaran, they were ready for almost anything. But they never dreamed their lives would depend on the power of a Russian satellite.

At about 0830, Sunday, Oct. 10, 1982, during a violent North Atlantic storm, the 50-foot trimaran *Gonzo* capsized in 30-foot seas some 300 miles east southeast of Cape Cod. Walter Greene, 38, a renowned sailor and *Gonzo's* designer/builder, was at the helm. When *Gonzo* flipped, Greene was thrown into the churning sea, under the massive but graceful hulls. He swam underwater and, after several attempts, reached one of the outer hulls, or amas as they're called, and surfaced. It took less than a minute, as Greene recalls, by which time his crew, Robert Goodman, 28, and Aneirin Williams, 22, who had been asleep inside the main hull, regained their balance.

The three companions were sailing from Portland, Me., to Dartmouth, England, then delivering *Gonzo* to St. Malo, France, where Greene was to start the quadrennial *Route du Rhum*, a 4,000-mile race to Guadeloupe for solo sailors. The storm had risen unexpectedly; ocean weather forecasts from the

PM photo: Dale Holmes
PM art (overleaf): Ed Valigursky

Crew of capsized trimaran, after cutting escape hatch in center hull, hangs on while awaiting rescue by U.S. Coast Guard cutter Vigorous (foreground). Tanker California Getty, which also came to the rescue, stands by.

Signal from Gonzo's Emergency Position Indicating Radio Beacon was picked up by COSPAS satellite, which relayed position to Scott Air Force Base in Illinois. A Canadian rescue plane also received the position. Scott AFB radioed Coast Guard, and cutter Vigorous responded. Coast Guard broadcast also was picked up by California Getty, first ship on the scene.

Coast Guard at Portsmouth, Va., and weather warnings from WWV, the Bureau of Standards time-tick station in Colorado, indicated no worse than 30-knot winds. But by Saturday evening, three days out, *Gonzo* was plunging into heavy seas and battling winds gusting to 50 knots.

Before dark, Greene elected to strip *Gonzo* of all sail, alter course to run before the easterly gale, and tow warps and sail bags to slow the boat and stabilize her steering. Still, she was unmanageable and nearly broached 10 times during the night. And during Greene's morning watch she surfed off a large wave at high speed and her starboard hull dug deep into the trough. The inertia instantly flipped her on her back. Unlike ballasted monohulls, which can right themselves when capsized, an upside down trimaran, though it floats, is a helpless creature at the mercy of wind and wave.

Fortunately, Greene and his crew were not helpless creatures. Williams had, in fact, survived an earlier trimaran capsize, and Greene had sailed trimarans more than 40,000 miles. In less than half an hour the three donned survival suits to avoid hypothermia. Then Greene was passed a keyhole saw with which he cut away the wood around a porthole to make a hatch. Williams found and activated the yacht's EPIRB (Emergency Position Indicating Radio Beacon). Thus began one of the most remarkable rescues in marine history—the first ever in which a satellite played an instrumental role.

The EPIRB is a small radio that transmits a distress signal over 121.5 and 243.0 MHz (commercial and military

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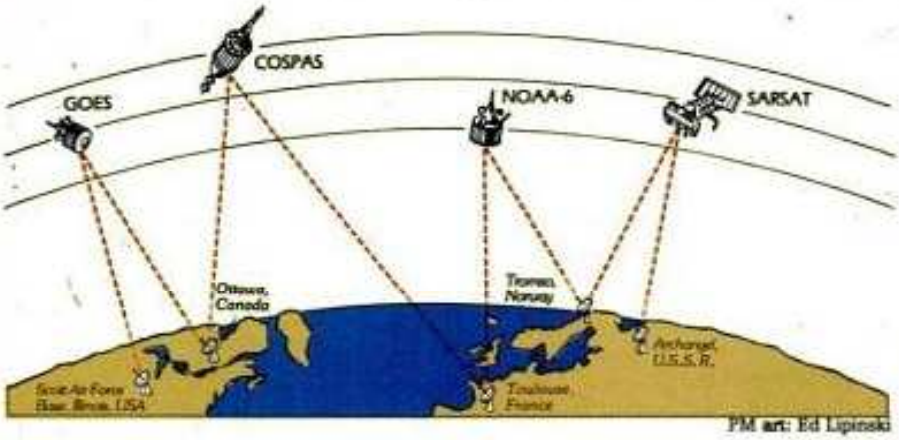
Rescue By Satellite—How It Works



PM art: Ed Lipinski

Within a 30-day period late last year—after the rescue of the *Gonzo* crew—two downed planes and a yacht whose engines had died in a storm were located with "guidance from above." Twelve lives were saved. The agency was not supernatural, but man-made—a satellite rescue system.

A worldwide system, part of which is shown above, will, when complete, be made up of specialized satellites which pick up distress signals and transmit positions to ground bases. The first of these heavenly rescuers—Russia's COSPAS, launched early last year—did all the rescuing during 1982. But the French ARGOS transponder, which is aboard the GOES satellite, helped searchers find some troubled ships by giving generalized positions, placing them within 300 miles of an SOS. America's newly launched SARSAT (Search and Rescue Satellite, Aided Tracking) will be on line this year. SARSAT carries a Canadian-built transponder and French-built computer electronics and weighs only 65 pounds. It also serves as a weather satellite. The total cost to the United States has been estimated at $29 million, with an approximately equal cost split by Canada and France. Another U.S. satellite, NOAA-6, also will go up this year.

Ground stations are being installed in Alaska and California to cover most of North America. One is already in operation at Scott Air Force Base in Illinois. A Canadian station is located in Ottawa. The Soviets have a station in Archangel, while European stations are being set up in Toulouse, France, and Tromso, Norway.

The satellites in the system are designed to pick up distress signals from beacons which automatically transmit an SOS if subjected to great shock (such as in an airplane crash). They also pick up signals from handheld transmitters called Emergency Position Indicating Radio Beacons (EPRIB).

The distress beacons are battery powered and generally transmit with a power of less than one watt so they will be effective for at least 48 hours. Rescue aircraft can also pick up the distress signals, but must be within 200 miles to detect the signal. Sometimes, when the beacon is snuggled amid rough terrain, it can be heard only from directly overhead.

The conversion of the received radio distress signal into an actual location when picked up by one of the rescue satellites is done through Doppler-effect shifting of the radio frequency. As the satellite nears the beacon, the signal is received at a slightly higher frequency than it was actually transmitted; as the satellite flies away, the signal sounds as if it were at a slightly lower frequency than it really is. In its rescue of *Gonzo*, COSPAS provided five separate possible locations within less than 50 miles of one another based on signals received on different passes.

The satellites circle the earth in a relatively low orbit about every hour and a half, at speeds of 300 miles per minute. If a satellite's orbit were properly designed, a single vehicle could provide worldwide coverage—although any one location would be serviced for only several brief periods during each day. COSPAS did that job admirably. Now, since there is coverage from more than one satellite, the same area is monitored several dozen times a day.

Computers aboard satellites in the system record, store and play back to ground stations every two hours. But more advanced signal systems scheduled to be deployed during the next five years will decode telemetry signals which specify the type of vehicle, the craft's registration and ownership, and even the time and nature of the accident.

The system has worked in the most out-of-the way places. When the yacht *Blue Jeans* lost engine power during a South Atlantic storm last year, her crew of seven waited for calm winds, then hoisted her sail and made for what appeared to be an anchored tanker in the little traveled spot. But the tanker turned out to be a long-abandoned and grounded vessel. At that time, COSPAS picked up the *Blue Jeans'* EPIRB beacon, and all aboard her were rescued within three days.

—*James Oberg*