# Leave No Man Behind

**George Galdorisi & Thomas Phillips**


**Part IV-9**
**Indian Summer**
**Navy Late '66**

Two…Air Force pilots from an F-4C of the 497th TFS were beneficiaries of … courteous pickups when they ejected feet wet the night of August 27, 1966. Hit in the late afternoon, they nursed their dying fighter out to sea east of Dong Hoi before they were forced to eject. With the loss occurring after the day's Navy strikes, the Navy CSAR helicopters had returned to *Kearsarge*, and two unarmored helicopters on a night ASW mission responded.

If there was a good reason to use Navy ASW helicopters for rescue, it was their unique, for the time, ability to fly a stable hover at night over the ocean and perform a rescue. At night, with no visible horizon, and dark enough to be unable to even see the water over which they would be hovering, this amazing skill was the product of their ASW mission. The SH-3A was a revolutionary aircraft, far ahead of the world in its ability to hover using its sophisticated avionics system without any visual reference. Hovering for most helicopters is simply holding a position relative to some reference point – a visual reference.

Once the pilot develops the hand-feet-eye coordination unique to helicopters, hovering with a visual reference is relatively routine. Without a visual reference, it is impossible, save for sophisticated electronic sensors, centered around a Doppler radar in the belly of the helicopter looking down. Doppler radars measure motion over a surface by bouncing radar signals from the transmitting antenna off the surface and back to the receiving antenna. The SH-3A used that signal as input to automatic flight control systems to pretty much hover automatically. However, it was still in its infancy, and even today, no helicopter pilot is very far from an intense attention to the system and a little educated help to make it work to the pilots standards. After all, the whole thing is being done within 30 to 150 feet of the water, their enemy, on a dark night; darker over the ocean than anywhere on God's green earth. (This amazing ASW helicopter also had automatic flight control systems to let it hover over the dipping sonar dome when the sonar dome was submerged, but this mode of the AFCS is not germane to rescue hovers at night over the ocean.) This challenge to hover at night basically drove the early Air Force rescue business to be a daylight thing, with hardly a rescue made at night, except for the Navy. Tonight, that night hovering skill would come into play.

Arriving at the reported location of the downed aircraft off Dong Hoi, the helicopters, commanded by Commander Bob Vermilya and Lieutenant Commander David Humphreys, found no sign of the two downed men. They closed to the shore line along the bearing they had been given initially, and turned to work back out to sea, knowing that the F-4 had gotten feet wet before the pilots punched out. Another search

aircraft located the two men and marked their vicinity with a smoke light. Good news for the helicopters; they had a datum. Closing in, each found a downed airman, dropped their own series of three closely thrown smoke lights to more accurately mark the survivor, and set themselves up for the avionics miracle that was the automatic approach to a hover.

Here is where the crew becomes a factor. The automatic approach function does not aim for a particular spot over the ground; it performs a descent from one altitude to another, and a deceleration from one speed to another, with the hovering altitude selected by the copilot and the zero ground speed (more or less) realized at roughly the same time. So its arrival in a hover over a precise spot, like over the downed aviator, is not likely to happen without assistance by the pilot. How close it gets automatically is a function of the moment the copilot selects the function, estimating how far the target spot is located from the helicopter, and estimating how far the helicopter will fly while doing its automatic thing (which is based on sea state, wind speed, wind direction, and how those natural things may be varying this night). This estimation, no matter how much experience the crew has, will be only a SWAG at night with no horizon and no depth perception cues. When a precise spot must be achieved, like for a rescue, the pilot, copilot, and crewman in the cabin door aft, all must coordinate in a synergistic way to achieve the desired hover. Pilot reads some cues from the instruments, hears other necessary cues from his copilot, who is also backing him up on the flight instruments and acting as his eyes, and hears still other cues from his crewman who is looking out at the survivor without the burden of flying or scanning flight instruments.

The pilot intently monitors the flight instruments, including airspeed indicator, ground speed indicator, radar altimeter, barometric altimeter, rate of climb/descent, compass, and drift meter, which tell him the flight condition, attitude, and orientation of the helicopter. He dares not look away from them for fear of inducing vertigo. The threat of vertigo is enhanced by the smoke lights ahead of them right where they need to be, but right in the worst place for compromising night vision and spatial orientation. The lights are necessary to mark the survivor, but they are an impediment to the vision of the pilots, the intense flame degrading night vision, and the spot of light floating in the black void, with sea and sky both stygian black and indistinguishable one from the other. That light suspended in the window is certain to cause autokinesis and other forms of vertigo. Many pilots will scrunch down and lower their head to try to put the bulk of the instrument panel between them and the smoke lights to let their eyes have a better chance to see the instruments; the direct blinding source closes the pupils more than indirect light.

The copilot just as intently monitors the engine, transmission, and hydraulic gauges, the caution and warning indicators, which tell him the health of the aircraft's vital components, and keeps his eyes on the smoke markers for the pilot, accepting the night blindness the lights bring on behalf of the pilot, judging distance, and lineup. He chants a litany of altitude and ground speed supporting the pilot, between the calls of the crewman.

The crewman is leaning out the cabin door from a kneeling position to keep an eye on the smokes and then the survivor once he can acquire the actual man in the darkness. He reports distance and direction to the light, at first only occasionally, but increasing in frequency as they close in, especially when he sights the survivor, then he

silently shifts to reporting the distance and direction to the survivor, telling the pilot this third set of cues he needs to complete his situational awareness. Usually at night the pilot may never see the rescuee, the copilot may see him as they close, but then the rescuee will pass beneath the limited forward view of both pilots, even looking through the chin bubble, the window at their feet. For the last few dozen yards, and during the final maneuvering to position precisely over the man in the water, and the actual rescue, only the crewman will see the survivor, and will be the eyes of the pilots through his voice communications.

The copilot and crewman intersperse their litanies in a carefully cadenced, and frequently practiced ballet of words, all to provide the pilot on the controls with the supporting and primary sensory inputs he dares not try to garner for himself. He uses these inputs to modify the automatic approach so the "system," men and machine will bring the helicopter to a hover over the man in the water. This procedure is the likely source of the beginning of Naval Aviation sea stories: "It was a dark and moonless night…" (as opposed to the mystery writer's "It was a dark and stormy night.").

The pilot flies to the "gate" position, where the automatic approach is initiated with the command:

Pilot: *"Engage Approach"*
Copilot: *"Roger, engaged, 150 feet, 60 knots"*
Copilot: *"Passing 100 feet, 50 knots, gauges are good"*
Crewman: *"Smoke in sight, easy forward 300 yards"*
Copilot: *"70 feet, 30 knots"*
Crewman: *"I have the man in sight, one o'clock 100 yards"*
Pilot: *"Roger, you have verbal control"*
Crewman: *"Roger, I have verbal control, forward, easy right, 75 yards"*
Copilot: *"60 feet, 25 knots, gauges are good"*
Crewman: *"Easy forward, steady right, 50 yards"*
Copilot: *"50 feet, 20 knots"*
Crewman: *"Easy forward, 30 yards, hoist going down"*
Pilot: *"Roger"*
Copilot" *"40 feet, 10 knots"*
Crewman: *"Stop forward, easy left, 5 yards"*
Copilot: *"Gauges good"*
Crewman: *"Steady, steady, steady, sling is in the water"*
Copilot: *"Hover torque 80, committed to the water"* (the copilot is reminding the pilot that the torque required to hover, 160%, 80 from each engine, is more than the torque available on one engine (perhaps 120%) if an engine fails, so they are committed to land in the water rather than attempting to fly away should an engine fail in this hover. In fact, they have no choice: fly away power is not there. As the helicopter gets lighter with fuel burned down, flying away may be possible. This is a reminder to the pilot of the results of their preflight performance charts calculations.)

Crewman: *"Drifting left, steady, steady, man approaching the sling"*
Crewman: *"Man is in the sling, weight coming on the aircraft, steady, steady"*

Copilot: *"T-five is good"* (turbine gas temperature, T5 is an indicator of whether the engine is salting up. Sea water spray being kicked up by the rotor downwash, is being ingested, and is covering the windscreen as well on many occasions. Too much salt accumulating in the engine air intake disturbs the critical smooth airflow, and the engine will begin to lose power and, if excessive, can stall).

Crewman: *"Man is halfway up… man is at the door… man is in the aircraft… pilot, ready for forward flight"*

Pilot: *"Roger, departing"*

The departure is also semi-automatic, the helicopter programming a climb schedule, while the pilot pushes the nose over gently to begin and control acceleration, airspeed and altitude when properly coordinated by man with machine meeting at 60 knots and leveled off at 150 feet.

When this is done right it is no fluke; it is the product of repeated practice on dark nights when all would prefer to be safely at altitude taking no risks and not flirting with death a few feet below in the dark.

Both Air Force Phantom pilots were rescued without incident, if you can characterize this extremely challenging procedure as without incident. Such a rescue is a significant and perilous accomplishment whenever done. This night capability would become a hallmark of Navy combat rescue in the months to follow, and was already a welcome capability of plane guard rescue around the carriers.