

Assignment in Mississippi.

By Kevin Hoffman, retired from Lockheed Martin and a VIP Club member.

It was a hot and humid day in the spring of 1980 in Pascagoula Mississippi. I was driving to a kickoff meeting for the Supervisor of Shipbuilding test team to be held at a local restaurant. There were deep ditches on each side of the road, all filled to the brim with water from recent heavy rains. There were narrow roadways connecting the road to each business along the way, but the roadways were under water due to the flooding from the rains. As I neared the restaurant I saw the tail end of a rental car sticking out of the water in the ditch. I surmised that the driver had misjudged the location of the roadway which crossed the water filled ditch. I determined not to make the same mistake, and stopped my car, took off my shoes and rolled up my pant legs to walk into the muddy water to determine the location of the roadway. The possibility of water moccasins and alligators never crossed my mind.

I was part of a two-man team from Eagan, who were supporting the final contract trials for the DDG-993 class destroyers. Steve Koltjes was there to support the hardware and I to support the software. The four destroyers had been commissioned to be built for Iran, but when the Iranian hostage crisis erupted a year earlier, President Jimmy Carter had frozen Iranian assets, the contract was cancelled and the ships were completed for the US Navy. Since the software had been written specifically for Iran, the Navy determined that a new US version of the software needed to be developed, but there was no time to do that before the sea trial commenced, so the current software would be used to certify the ship. Since the software was for temporary use, I was given wide latitude to implement patches that made the testing go smoother.



Picture 1. Kevin in his office before retirement.

I functioned as the "Dr. Spock" of these ships, whether at port or at sea, when something didn't work right, or needed to be changed for testing, I wrote and implemented a software patch to keep the testing going. I had to take great care, however, since the patches had to be added while the program was running. Also, in those days, once a program was certified, it was not ever recompiled, so the only way to implement a change was through a patch of the machine code.

One of my proudest moments came after the initial sea trial had been stretched out several days to do the radar alignment tests. These tests required scheduling a jet from the Pensacola Naval Air Station, which would make several passes over and near the ship at various profiles, all the while being tracked by the radars on the ship. Keep in mind, this was 1980, there was no way to record the alignment data, it had to be printed out. Also, there was not enough memory to keep all the results. The whole software had only four 256k banks of memory to reside in. So, the data from each pass had to be printed before another pass could be recorded. The problem is that this printout went to a DEAC (Data Exchange Auxiliary Console,) which was an awfully slow output device. Most people could type faster than a DEAC could print. This took so long that the aircraft would run low on fuel and must return to base between passes, and then another aircraft would have to be scheduled for the next day, weather permitting.

The Supervisor of Shipbuilding noted that there was a line printer on the ship, that was much faster, and wondered if I could patch the program to send the results there instead of to the DEAC. I worked up the patch while in port and wrote it to a paper tape. I triggered the patch when a previously unused variable action key was pressed on the System Maintenance Console. As we were leaving port for the next sea trials, I was busy getting the system booted and ready for the testers. The last thing I tried to do was load the paper tape with the radar alignment patch on it. The paper tape reader diligently mangled the paper tape. The situation looked dire, but I did not give up. I determined the length of the part of the tape which was destroyed then using scotch tape spliced a new length of paper into the patch tape. I then cut holes in the paper, using an exacto knife to match the codes that had been punched in the tape. Meanwhile, one of the hardware engineers adjusted the paper tape reader to correct the problem that caused it to mangle the tape. I then was able to read the patch into the computer. When it came time for the radar alignment tests it worked so well that the testers were able to complete all the alignment tests in one sortie of the aircraft. This saved several days off the sea trials for all the subsequent ships.

Another big success was fixing the satellite navigation software. This was before GPS (Global Positioning System) was invented and used multiple satellites in polar orbits, rather than the stationary satellites the GPS system uses. The system would determine when a satellite passed nearest to the ship from when the doppler shift occurred. If it had at least two satellites visible it could mathematically compute the ships location since the satellite positions were known and predictable. This worked to some extent on land with a satellite antenna on the roof of building C in Eagan. However, even this had problems. The software had not been coded to be re-entrant, but it shared common methods between satellite driven interrupts and operator entries. If an operator typed a command during satellite processing the code would get lost and never finish processing the satellite driven fix.

Another problem was that the software was written to require the ship to remain stationary or travel in a straight line while processing a satellite fix. This worked for submarines but was neither practical nor desirable for a surface ship. We needed some actual satellite data in to solve the problem. Chuck Peterson and I traveled to San Diego for the USS Callaghan Navy Trials. We arrived just as the ship was preparing to leave the dock. They had space for only one of us, so Chuck stayed ashore, and I went on board with my program listing and a suitcase. I was given a bunk, but I never used it in the three days we were at sea. To me it was more important to use the chance to collect live satellite data than to sleep. I was able to collect excellent samples of data and debug several other issues. When we got back to port, I got some sleep then Chuck and I went to the ship and worked out the patch to fix the software, including the reentrancy problem. We wrote the patch to the system tape, and were able to verify it was working in port, but needed to have it tested at sea, so we discussed it with the ship's navigator, and he agreed to give us feedback when they had a chance to do some testing at sea. We then flew home to Eagan. A couple weeks later we received word that the patch had worked and given them accurate fixes all the way from San Diego back to Pascagoula. This fix was later compiled into the US version of the software.

When I moved to Mississippi the only vehicle I had was my motorcycle. I soon learned that real men in Mississippi drove pickup trucks with rifle racks in the rear window. The pickup truck drivers were not fond of motorcycles. There was a draw bridge that had to be crossed to enter or leave the ship yard. When a boat was passing through, the draw bridge was up, and the traffic backed up in all 4 lanes. Some motorcyclists - not me - would use this traffic backup to drive between the lanes and get to the front of the line. This annoyed the pickup truck drivers. In one instance, a pickup truck driver watched a motorcycle approaching in his mirror, and at the last second kicked his right-side door open right when the motorcycle arrived. This resulted in the death of the motorcyclist and the pickup truck driver having his leg amputated. I was once crossing a bridge in stop and go traffic, in the left lane. I noticed a large semi-truck in the lane next to me gradually crowding into my lane. With all the noise my feeble horn could not be heard, and I believe the truck driver never saw me. He kept coming over, and I had to do something quickly, and managed to jump my 650 Yamaha motorcycle up onto a narrow two-foot-high curb just as his wheels came within inches of the curb.

There was one stop light I was warned about, at which the sheriff would watch for someone approaching an intersection and then use a device to change the light to red at the last moment. I was warned about it by other ship yard workers. Sure enough, think "Dukes of Hazard", whenever I approached that intersection the light would turn red at the last second. Being forewarned, I was prepared and always managed to stop. When I looked to my left I could see the disappointed look on the sheriff's face sitting in his squad car.

When winter approached, on some days it was too cold to drive my motorcycle, so I bought a used car. I was driving this car along Hwy 90 in Biloxi in a cold heavy rain one day when I saw a hitchhiker, cold and drenched to the bone. I could not just leave him there, so I picked him up and found out he was from Texas and heading to Florida to work on the shrimp boats. He had no money and had not eaten for a few days. I took him to my apartment and threw his wet clothes in the clothes dryer in the laundry across the road from my apartment. I then shared some hot dish I had made (yeah, Minnesota hot dish) with him and let him sleep on the couch. In the morning I made us breakfast and then took him to the bus station, bought him a bus ticket to where he was going in Florida and gave him \$20. I never thought about it again and did not expect to ever see him, but a few months later I got a call one day to meet him at a restaurant in Ocean Springs. When I met him, he bought me dinner and told me he had gotten a job on a shrimp boat right away and done well. He was on his way back home to Texas. He was very appreciative and believed I was an angel sent by God to help him. He gave me the bus fare and \$20 back, tried to give me more but I would not accept it.

Alligators were everywhere. When one decided to sun himself across a road there was no way around because the ditches were deep, and it would back up traffic for miles. I was told about one particular large alligator that lived in a certain bayou who loved marshmallows. So, I went there with a bag of marshmallows, and threw a couple of them into the middle of the bayou. Pretty soon I saw the grass on the far side move and a large alligator slide into the water. He surfaced just before reaching the first marshmallow, only his eyes were visible above the surface. He then opened his mouth and swallowed each of the marshmallows. When he got near the dock, he gulped down the last one, rolled over and made a big splash as he dove under water, getting me all wet. When you were out at night near a bayou, you could hear the alligators. It sounded like trying to start a motor under water.

Editor's notes: Related information is on-line.

1. <http://vipclubmn.org/peripherals.html#DEAC> - Data Exchange Auxiliary Console - OJ 172 by Dick Kuhns.
2. <http://vipclubmn.org/Articles/TRANSIT.pdf> - a forerunner to GPS by Arlyn Solberg.
3. <http://vipclubmn.org/sysintl.html#Iran> – initial Iranian program by Keith Myhre.
4. From <http://vipclubmn.org/sysnavy.html>; *DDG 993 Combat System - 1977*

Univac utilized the DLGN 38 computer system design and modified the software to be implemented on four guided missile destroyers the U.S. Navy sold to the Iranian Navy. A shipboard combat system and a computer program development center were implemented in Eagan for system development and training. Iranian Navy personnel came to Eagan for training. The four ships had not been delivered to Iran when the Iranian government was overthrown so the U.S. Navy ended up with the very capable ships.

Thanks to Kevin for his story(ies) about working with customers, *L.A. Benson*