A Seven Seas Shack

A freighter captain shares some practical advice for hamming on the high seas.

The *Capt Steven L. Bennett* discharging cargo in Cape Canaveral, Florida. She is using two of her three 40-ton cranes to unload vehicles.

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The sun set in crimson glory on the starboard bow, bathing the bridge in red light. The gulls called their farewells as we passed beyond the breakwater jetties of Galveston, Texas. It would be the last time I would see the US for nearly 4 months, and while we would not see land for a few weeks, Amateur Radio would provide a welcome connection back to terra firma.

I have been going to sea in the United States Merchant Marine for 19 years and have been bringing my radio along since I earned my Amateur Extra class license in 2001. While I have had some radio adventures over the years, the summer and autumn months of 2013 were particularly enjoyable.

I am the Master (captain) of the MV (Motor Vessel) *Capt Steven L. Bennett*, call sign KAXO. She is a 209 meters (685 feet) long and 31 meters (101 feet) wide container and bulk carrier that can carry 40,000 metric tons of cargo. During my 2013 trip, we were carrying bulk wheat for US food aid from Galveston, Texas, to Bangladesh in South Asia and Mozambique in East Africa. On our return trip, we made additional stops in Colombo, Sri Lanka; Mombasa, Kenya; Djibouti; Gibraltar, UK; and Rota, Spain to pick up some vehicles and containers. During this trip we travelled approximately 28,600 nautical miles over 131 days and passed through the Suez Canal twice.

The Station

Most mariners join ships in ports that are some distance from their homes, and I am no different. Having to take an airplane to join a ship limits the amount of radio gear that I can bring along. Most trips last at least 4 months, so there needs to be a balance between personal gear and radio equipment.

I limit my Amateur Radio station to what I can reasonably fit in a single carry-on bag. (The ship has its own station for business use.) My radio is an Icom IC-706MkIIG transceiver, which covers 160 – 10 meters

This is the end-fed sloper antenna located on the bridge deck, approximately 85 feet over the water. The remote tuner, located behind the fire station hose box, is mounted and grounded to the handrail.

on HF, as well as 6 meters, 2 meters, and 70 centimeters. While I have used this rig for some weak signal work on VHF, the workhorse bands from the ship are 40 – 10 meters.

The *Capt Steven L. Bennett* was constructed in Korea for an English client, so the standard voltage is 220 in the staterooms. In my office, I have a 1000 VA transformer that supplies the station's power needs through a Tripp Lite line conditioner. Because the 706 requires a 13.8 V dc supply, I use a small SEC 1223 switching power supply, which is slightly smaller than the radio.

Over the years I have tried a number of wire antenna and tuner configurations with varying degrees of success. My current antenna is effective, as it takes advantage of the ship's steel structure. The antenna is approximately 30 feet of copper-clad steel antenna wire that leads from the Icom AH-4 automatic remote tuner up a short mast on the bridge deck and then cants off at a slight angle to its termination at an insulator on the underside of our INMARSAT FBB (satellite communications) antenna mast. The antenna is mostly vertical in configuration and is blocked in only a small sector by the ship's smoke stack. The base of the antenna is approximately 85 feet above sea level and the tip is just over 110 feet above sea level.

Automatic tuners need a good ground or counterpoise to be effective. Fortunately for me, a steel ship immersed in billions of gallons of seawater forms an incred-

ibly effective ground plane. I use about 4 inches of 1-inch-wide ground braid from the ground post of the tuner to the handrail on which the tuner is mounted. In addition to the antenna ground, the rig is grounded by approximately 1 foot of braid to the steel bulkhead of my office. The antenna configuration easily tunes from 40 – 6 meters.

The station is equipped to run a variety of modes while at sea. I have a straight key for the rare times I use CW and a hand microphone for when I operate SSB. During this trip I regularly checked into the Pacific Maritime Mobile net on 21.415 MHz at 2100Z, when the ship was in range. While we were primarily in the Atlantic and Indian Oceans, the net relay stations were able to receive me as far east as the Azores.

While I am equipped for CW and SSB, my primary interest is in digital modes. As part of my radio kit, I carry two modems and a sound card interface. The West Mountain Radio Nomic interface is a small box that fits nicely into my kit and allows me to use a variety of sound card modes. I am primarily on PSK31, although I have also used MFSK16 and RTTY. The interface also allows me to use *WINMOR* to access the Winlink 2000 system, although I prefer to use my other modems for moving traffic.

My primary PACTOR modem is the SCS DR-7800 Dragon. This modem offers phenomenal performance with PACTOR. I have traveled nearly around the world with this modem and it is rare indeed that I have not been able to link with a shore station to exchange mail. In addition to moving e-mail traffic, I am a regular on the PACTOR keyboard 14.109 MHz meeting frequency. I have worked stations on three continents in keyboard contacts, including exchanging photos as well as text. I have also interfaced with PACTOR Bulletin Board Station (BBS) stations in the US and Europe to keep up on the Amateur Radio news while away from the Internet when at sea.

My newest modem is the SCS DSP Tracker Terminal Node Controller. This packet modem offers both AFSK and Robust Packet Radio (RPR; **robust-packet.net**). It is especially useful when interfaced with my computer and Global Navigation Satellite System (GNSS) receiver to transmit Automatic Packet Reporting System (APRS) beacons on 30 meters as we travel across the oceans. RPR has proven effective out to 6100 miles between two Maritime

N1ZZZ/MM running *APRSIS32* as we approach Galveston, Texas. The station TNC is running Robust Packet APRS on 30 meters.

Mobile stations, as well as various Internet gateway stations (IGates) in North America, Europe, and Africa. I have also used RPR to exchange mail within the Winlink system and RPR BBS stations.

APRS at Sea
The majority of my radio time was spent sending and receiving positions on the 30 meter APRS frequency. The radio is set on 10.1473 MHz USB to beacon out my position, course, and speed at regular intervals. This frequency is monitored by a number of IGates on at least three continents, which then pass the positions to tracking databases and the APRS network. The ship's position, course, and speed are gathered from the satellite positioning receiver at regular intervals and the ship's progress is displayed by the *APRSIS32* software I use to run the system. The software also displays directly received stations as well as those set to digipeat.

The most enjoyable part of APRS is the messaging system, which works well using both direct RF messages and messages originating from smartphones and stations on the Internet. These messages are then broadcast by the IGates. Fairly often through the trip, I was exchanging text messages with several stations simultaneously on two continents via the APRS messaging system. In addition to live chats, I was able to text my wife's mobile phone with SMS messages and received notification of pending e-mail on the Winlink system.

It was rare during the trip that I did not have coverage into at least one IGate. From the

US Gulf of Mexico to about the middle of the Atlantic Ocean, I had 24/7 access to IGates from southern California to upstate New York. From this same area I was also able to hear the IGates and mobile trackers in Europe during the night. From the middle of the Atlantic and through the Red Sea, I was able to hear the European gateways and had nighttime coverage into the US. In the Indian Ocean, I was able to get the European gateways at night and had 24/7 access to ZS6SS in South Africa, which I heard as far away as the middle of the Atlantic Ocean.

To decrease the potential of attack while transiting the high-risk piracy area off the east coast of Africa and the Red Sea, I switched my tracker to RX-only to avoid transmitting my position. I also ceased sending position reports via the Winlink system. These were the same waters Captain Phillips, of recent movie fame, was traveling on the *Maersk Alabama*.

The APRS system was an excellent experiment in both tracking and propagation. I have never operated 30 meters so extensively at sea before. It was fascinating to see how the band reacted at various distances and between day and night, as well as how the band changed as we moved from the summer months to autumn.

HF Bulletin Board Station and Winlink
Lack of an Internet connection hampered my ability to receive current propagation updates and other Amateur Radio information. To obtain this news I accessed several
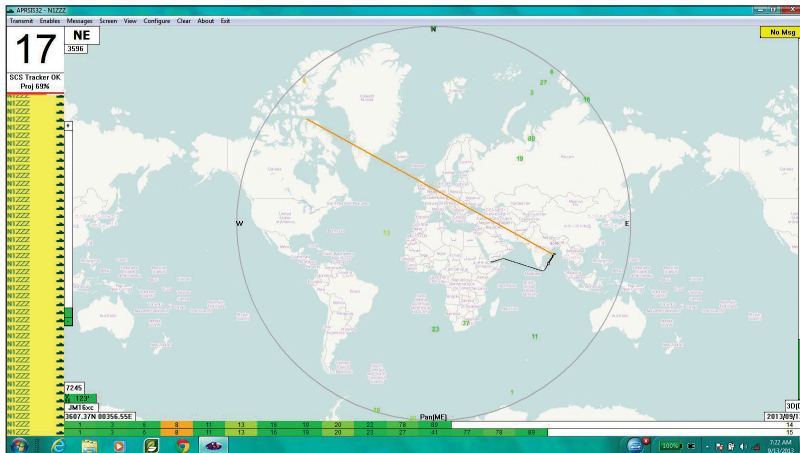
One of the most exciting APRS paths during the voyage was seeing VP8DEU/MM in the arctic from the *Bennett* in the Bay of Bengal. This was a 6168-mile direct path via 30 meter RPR. This packet was received at 2211Z, which was about 1711 local time for him and 0411 local for me.

of the remaining active HF BBS systems. While the traditional BBS used AFSK 300 baud packet, several stations use PACTOR or Robust Packet to enhance the connections. I was able to access three BBSes in the US and two in Europe during my travels. While I was in the eastern Atlantic and Mediterranean Sea, I was accessing GB7CIP in England via PACTOR 2 or PACTOR 3. This BBS is full service and I was able to download various bulletins, as well as utilize the BBS chat function to have live contacts with the board's sysop Paul, G4APL.

Once I was out of range of Paul's station, I switched to three BBSes utilizing RPR. My mainstay BBS was Jeff's, WA4ZKO, in Kentucky, which monitors both 10 and 30 meters. It was fun to experiment with 10 meters and see the changes as I moved westward across the Atlantic between single- and double-hop F2 layer propagation zones. When the band was good, it was an excellent connection. I was able to leave both private messages and N1ZZZ/MM update bulletins on this BBS. The farthest link was on 10 meters on October 8. I was able to access Jeff's Kentucky BBS from off of the coast of Mozambique. This was a distance of 8659 miles, which was not too bad for a couple of wires and 100 W!

Also on 30 meters are BBSes run by Andy, N9VT, and Chuck, W4CPG, which proved to be good secondary BBS locations to read bulletins and leave messages. While the modern amateur BBS stations are not quite the same as accessing Internet discussion boards, I was able to keep up with the propagation bulletins as well as various ARRL® notices while at sea.

Winlink 2000 is the most extensive HF e-mail system available today. It uses a variety of modes through an incredible network of land stations worldwide. I have been using the system from ships since 2002 and it has proven a reliable link to friends and loved ones over the years.

While the ship has a commercial satellite e-mail system for ship's business, I prefer to use Winlink for my personal e-mail. I primarily write to my family and friends but also put out twice daily position reports. You can check on any station filing position reports at the Winlink website (**www.winlink.org**), which includes a display of "pushpins" for each station's position. I can also send weather data on Winlink, but prefer the ship's commercial systems that connect directly to National Oceanic and Atmospheric Administration (NOAA).

Mail Modes

I have used the three primary modes that Winlink uses for HF e-mail traffic: PACTOR, *WINMOR*, and Robust packet, using both the *RMS* and *Airmail* software. In addition to the RF links, when I am lucky enough to be in port with an Internet dongle to use, I telnet into the system. In my experience, the most effective RF mode to use is PACTOR, especially PACTOR 2 and 3. This mode offers the most robust connection in poor conditions and the fastest throughput in good conditions. I have experimented with Robust Packet, and while there are far fewer RMSes that offer this

mode, it has proven to be effective, if slower than PACTOR 3. I have tried *WINMOR* a few times from sea. With a good signal path it is effective, but when conditions deteriorate, it often times out.

I find that with my station, there is excellent coverage over the entire North Atlantic and most of the North Pacific Oceans. There is also good coverage in the Western Indian Oceans. In the South Atlantic, coverage is less reliable, primarily due to a dearth of RMS stations in Africa and South America. Despite the relative proximity of stations in the South China Sea, I have found that there is often very poor coverage in this area. I have not travelled the South Pacific Ocean with Winlink, so I cannot report on that area of the world.

Amateur Radio aboard the ship offers me a connection to my family and companionship through the Amateur Radio community. Such companionship has varied from a CW or SSB contact with someone halfway around the world, to APRS text messages of encouragement and concern as I skirted a storm. These messages came from stations worldwide that keep track of me via my position beacons. I have been blessed by all of the stations who tirelessly run IGates and RMS stations in support of the traveling ham, and especially operators like Demetre, SV1UY; Peter, HB9JAQ; Glenn, WB2LMV; Jim, AG6IF, and Jeff, WA4ZKO, who have taken the time to support my activities directly and pass along information to the greater radio community. It is a comfort to know that even when you are hundreds or thousands of miles from civilization, the phenomenon of radio makes you feel close to home.

All photos by Jeremy Allen, N1ZZZ.

Captain Jeremy Allen is an ARRL Life Member and an Amateur Extra class licensee. He earned his Technician class license in 1997 to become N1ZZZ. Captain Allen also holds both the Global Maritime Distress and Safety System (GMDSS-b) and General Radiotelephone Operator License (GROL) with Radar endorsement commercial radio licenses. He is a graduate of the Massachusetts Maritime Academy where he earned a BS in Marine Engineering and one in Marine Transportation. He currently holds his Master Unlimited Oceans and 1st Assistant Unlimited steam, motor, and gas turbine licenses from the US Coast Guard. He may be reached via e-mail at **n1zzz@arrl.net**.