

## Just Another Day In Paradise

Hawaii is beautiful place to visit and live. Yes, there is radio in paradise and there are the unique challenges of a new mountain top transmitter site on the island. Consulting Engineer Don Mussell is the “go-to” man when it comes to good radio in Hawaii. Don piqued my interest when he explained what he had to do to build his new transmitter site.

### An Xtreme Build

According to Don: “The transmitter site is 4,500 feet above sea level, and situated high above Kihei and the south coast of Maui, on the lands of the historic Ulupalakua Ranch. Getting to the site requires four wheel drive, at a minimum, as the “road” (as we like to call it) is more or less a lava rock path on the bottom three miles, and graduates to pasture land on top three miles.

“But the pasture land is also lava, but older and more weather beaten, so it is ground up into small pebbles and new soil. On a good (dry) day, the road can be traveled in about 30 minutes, as long as the rough lower section has been smoothed recently by a road grader.”

### Weather Woes

“During wet weather, the lower section is slippery but mostly passable, but the upper section can become impassible due to mud and “pasture by-products.

“If the clouds move in, it is very easy to get lost quickly if you are not familiar with the twists and turns of the various trails that branch off of the “road.” To get the transmitter up on the mountain was difficult, as one might imagine, but we managed as the weather was favorable. Once we completed the hour long journey (in low gear and at crawl speed), we then had to forklift the transmitter into the upper level of the 40 ft. container.



The “road” across the pasture.

“As one might imagine, this was a sunrise to sundown operation. Installing the Nautel was the easy part of this project. After finding a few loose connections, the transmitter went on the air, on schedule, and has been running since day one with no down time and no real trouble at all. It really is a dream machine.”

I asked Don some specific questions about this very unique installation.

**Callahan:** When and why did the station decide to locate at the Ulupalakua site?

**Mussell:** KIPM is a new station as of 2011. After a long wait, we finally received authorization for constructing

KIPM in 2010. We originally applied for the permit during the 2007 filing window. It was modified to allow operation as a full class C FM.



Backing down to the containers.

**Callahan:** Was there already a station operating from the site?

**Mussell:** Hawaii Public Radio was already operating KKUA from the site, and it was moved there in early 2007 after operating for many years atop Haleakala. We would have preferred to stay at Haleakala, which is 10,000 feet above sea level, but the observatories and Air Force facilities atop the mountain forced all broadcasters (our FM and a number of TV transmitters, and even the Weather Service) to move away.

Ulupalakua was the only place we could go, due to countless restrictions, including cultural and environmental concerns. Ulupalakua was established as an electronic site in the 1990s, and does a good job covering Maui and Hawaii County. It just requires much more power than our previous operation at 10,000 feet (14 kW was a full class C up there).

**Callahan:** What special environmental requirements are there, when building such a site in Hawaii?

**Mussell:** There are migratory bird concerns, and towers need to be hidden as much as possible. A remote site, far away and above main populated areas, and the use of private land, are the easiest way to establish a site.

But it is not easy or quick by any means. It takes years and years, and many many dollars to move through the process. This being Hawaii, we are especially concerned with being a good neighbor, and not be something that tourists notice while sitting on the beach.

**Callahan:** What is the electrical power to the site and how does it get to the peak?

**Mussell:** MECO (Maui Electric Company) supplies the three-phase power. We are a long way from the generating plant down on the south coast, but not too far from the local, up-country communities of Kula and Keokea, so the electrical service was extended about eight miles up to the site, when it was originally built 20 years ago.

Because we are at the end of the line, power regulation and surge protection were essential to dependable operation. But because we are so far away, there are three large

generators at the site: a 60 kW unit for the commercial FMs, an 80 kW for public radio, and a 150 kW unit for the TV broadcasters (at the adjacent site).

**Callahan:** It looks like everything is housed in four containers arranged on top of each other. Is there a limitation on ground space, and what is in each container?

**Mussell:** The lower containers house the commercial FM transmitters, which are mostly 10 kW units; they utilize a large panel array at the top of the tower. Public Radio has the upper container on the south side. The individual containers are 10 feet wide, 10 feet tall, and 40 feet long. They are secured to the ground and also guyed in place for earthquake and hurricane protection.

**Callahan:** Why was Nautel the transmitter you chose?

**Mussell:** Maintenance is difficult at most of our sites, either because of lack of easy access, or lack of spare parts close at hand. We were looking for transmitters with enough power, good efficiency, small footprint, and fewer moving parts - and a price that would not break our budget. Before just a few years ago, we did not have the choices we have now. Nautel has placed their higher power transmitters in the same price range as our tube transmitter choices.

Based upon all of these factors, it made sense, long term, to go with solid state. Another important consideration for us was, way out here in mid-Pacific, was the lack of experienced engineers. There are just a handful of engineers main-

taining nearly 100 transmitters spread across five very separate islands. Maintaining a high power tube transmitter is partly an art, as well as requiring experience and caution. Add in unpredictable tropical weather, and I think you can see it is not typical by any means. A solid state device, kept cool, just provides more dependability in this environment, and allows us to sleep a bit more regularly.

**Callahan:** At such a height, what considerations were there for antenna performance?

**Mussell:** I was not happy with the coverage of the antenna system in use by the commercial stations at the site, so public radio opted for a separate, optimized antenna system. We needed to have enough gain to allow full class C power, but few enough antenna bays to reduce the nulls to the population below. In hindsight, we would have chosen horizontal polarization as well, mostly because the main audience is no further away than 15 or 20 miles, and the lack of vertical power does not appear to make any difference to signal strength close in.

**Callahan:** Has the performance of the station from this site met your expectations?

**Mussell:** Yes, very much so. And our listeners as far away as 130 miles south on the Kailua-Kona coast of the Big Island are very happy to be able to hear our services now.

Don Mussell can be reached at [dmsml@well.com](mailto:dmsml@well.com) and you can see other interesting Nautel installations at [www.nautel.com/resources/customer-stories](http://www.nautel.com/resources/customer-stories). Steve Callahan is the owner of WVBF, 1530AM, Middleboro, Mass. and can be reached at [wvbf530@yahoo.com](mailto:wvbf530@yahoo.com)



The Nautel NV20 gets moved into its new home.