

A Really Xtreme Build

This month I have a transmitter site that really puts the X in Xtreme. Many of us will never have the opportunity to do a big installation project in a foreign country. I would personally welcome the opportunity, because of the logistical challenge and the ability to work in a different environment under unique conditions. Read on to find out how I learned about this most Xtreme site.

Shively's Dubai Build

I was coming back from a long weekend in western Maine, so I thought I'd stop by the Shively Labs in Bridgton. Angela Gillespie and Bob Surette welcomed me, and we had a chance to chat about some of Shively's recent challenging projects. They suggested that I should talk with Martyn Gregory about an antenna they installed last year in Dubai, in the United Arab Emirates.

Martyn was happy to share some of the particulars of this most interesting project. Shively had been working on this installation from August of 2009, to October of 2010, and Martyn and Matt Smith were the two Shively engineers who spent nine days on site. As with many international projects, there were many delays and finally all parties were ready for the actual construction and installation. This was Matt's first out of the country project and what a project it was.



A road less traveled – looking down from the site.

The Plan

The initial project called for a major upgrading of the existing site. Previously, there were a half dozen individual FM radio stations variously branch-combined into three separate systems. The existing antennas were two vertically polarized dipole panels. The coverage into Dubai and Abu Dhabi was both unreliable and inadequate.

So one goal was to get a circularly polarized FM signal into Abu Dhabi, which is 130 miles from the tower site. Fujairah Mountain in Fujairah, UAE is a very rough 3,000 feet above sea level. The project called for a Shively 2540-16-6, station balanced combining system, capable of handling six 20 kilowatt Nautel NV20 trans-

mitters. The 16 element broadband panel antenna would be fed from a single, five-inch high power semiflex feed line. The antenna peak gain would be 15.8 dB and the maximum ERP generated would be 750 kW. Those are some pretty big numbers.

A Huge Problem

The first problem needing to be overcome was a lack of "line of sight." Remember, Abu Dhabi is around 130 miles to the southeast of the tower site, and even with a transmit antenna elevation of almost 3,000 feet, the direct path is completely obstructed by the curvature of the earth. However, in this part of the world there is intense tropospheric induction most of the year which can extend the radio horizon considerably.



Normal FM antenna practice in the Middle East is to use vertically polarized elements, so Shively's proposal to use circular polarization on the new antenna was a departure from the norm. However, Shively's success with circular polarized antennas in other counties in the Middle East made a very compelling argument.

The owner of the station was ready to try anything, after having to promise local officials good stereo coverage into the city, as a condition to receive the license to operate. The advantages outweighed the negatives, and the project was signed and work proceeded. Of course, there were changes and delays with a project of this complexity and magnitude, and the actual installation started almost exactly one year after the contractual documents were signed.

Welcome to The Site

After a 16 hours flight to the Middle East, Martyn was shocked to see the washed out state of the road leading almost 2,500 feet up the mountain. It was a logistical miracle for the local contractor to get 70 tons of air conditioning up the road and installed into what would later become a showplace facility. This wasn't the only problem with the project.

Work on the mountain was hampered by the constant fine dust and summertime desert temperatures reaching as high as 120 degrees.

Existing Tower

Fortunately, the tower was an existing structure and there already was power to the site. The power came to the site as 11 kV but was then stepped down to 415 VAC. However, the access road to the mountain was a nightmare. The pickup trucks rented by the local contractor needed a new set of tires every two weeks, and when the project was finished, the trucks were practically worthless.

Crew Untrained

The local installation personnel were not specifically trained in contemporary broadcast installation procedures so they did what they were familiar with to get the job done. All of the transmission equipment was shipped from the U.S. to the UAE. Then the rough ride up the mountain guaranteed that all the filters in the combiner had to be checked and retuned.

This build was about as Xtreme as it can get. The environmental conditions were deplorable, with the heat and the dust. The "road" (for lack of a better description) to the transmitter site seemed as treacherous as traversing Mt. Everest. The crew wasn't trained on new broadcast construction and, to top it all off – by normal methods of RF planning – the signal had virtually no chance of reaching one of the intended destinations, Abu Dhabi. Oh, but the story gets even better – way better.

An Unlikely Cable Pull

It seems that the local installation crew used some techniques that we wouldn't even consider in this country. Instead of a ground-mounted winch, the installation crew used a Toyota pickup to pull the transmission line up the tower. The intrepid guys from Shively had to check everything done by the local crew, after they found some directional couplers full of brass filings. Extreme locations call for extreme measures.

Martyn is happy to report that the facility did sign on with one of the FM signals, and that the reception in Abu Dhabi was much better than anticipated. Shively is certainly in the forefront of antenna design and implementation when it comes to extreme sites both in the US and in foreign locations. Ultimately, after a complete inspection of every aspect of the RF systems, the new antenna system performed as designed, and coverage reports confirmed the validity of the polarity change, the tropospheric induction, and the general system design.

Success

In Dubai, there is now coverage in underground parking structures and in Abu Dhabi there is now good coverage where there previously was none. The good folks at Shively are looking forward to their next project in the Middle East which will surpass the Fujairah system in every aspect. As Martyn says, "If it was easy, anyone could do it!"

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For more information on Shively antennas and their project capability visit www.shively.com, call them at 888-744-8359 or email sales@shively.com



The Antenna on the Tower