Les Veenstra

And in the beginning, Acton MA, received Amateur and Commercial radio licensees from the FCC, so while in school would work at Boston AM/FM Broadcast stations. By 1967 there was a cool breeze blowing down my back, so went on active duty with the USN. Cannot say much but you can read all about it the book, Red November, by Reed (https://www.amazon.com/Red-November-Inside-U-S-Soviet-Submarine/dp/0061806773/ref=sr_1_2?crid=27CYLS4LR5SW9&dchild=1&keywords=red+november+book&qid=1597690250&sprefix=red+november%2Caps%2C234&sr=8-2)

At the end of six years I was on instructor duty (E6) in Pensacola FL, when as an incentive to reenlist, they offered me orders to Adak, Al. I took that offer as an intelligence test, and, instead finished my last two years of under grad work at the University of West Fl (BS, Physics and BS, Systems). From there, back to Boston and Grad School at Northeastern. That was a co-op program, which landed me a position in the Physics Department, Comsat Labs MD. I noticed some hams were doing some neat work with small portable antennas, both at C-Band and on the first KU-band satellite, so at lunch, asked the Lab director (of course another ham) if I could move my Physics to the Small Terminal Project. From there to Comsat General, at L'Enfant Plaza, directly opposite the Intelsat offices. That was designing and implementing small terminals, primarily for the USG. One interesting project was to bring a transportable terminal up to the new Intelsat site for the ground breaking. We ran a SCPC duplex audio circuit out to Etam at K-Band. Etam patched it via C-Band to Goonhilly, Hong Kong, and Jamesburg. Jamesburg looped it back on the same route. We gave the VIP, I assume the DG, a touch tone phone on the podium, with instructions to sends two digits. After many satellite delays, the signaling returned to Van Ness, was decoded, and was used to set of a charge to “break the ground”.

Another Comsat Labs and then General project involved updating an old system of Two Way Satellite Time Transfer. This originally involved sending a one pulse per second waveform, via symmetrical video channels. This was used to compare frequency and time scales of various national labs, typically ensembles of Cesium clocks and Hydrogen masers. This evolved a low power spread spectrum system that had measurement uncertainties of under 1 nanosecond. Now the task was to allow Intelsat to let these Spread Spectrum carrier to operate at a charge based not on their 6 MHz bandwidth but rather on the transponder power required, less that a 64 kbit/s IDR carrier between A Stations.

While at Comsat General, I was working with Intelsat on getting our terminals on the air with Intelsat. Apparently, I complained to much that the SSOG’s for the new small terminals were not “fit for purpose”. The response was, “stop complaining, and come over to Intelsat” and work the problem from their side of the fence. So after nine years of Comsat General, I moved up town to Van Ness.

Intelsat work started on SSOGs involved with earth station verification, with techniques for the traditional A, B,and C classes, as well as the newer E and F class. Lots of test methods and practices that were friendly to the limited resources the smaller terminals had as well as protecting Intelsat and their Signatories interests. The small terminal work of course was primarily digital modes, IBS and then IDR. These services were new to the Intelsat environment.

It soon became clear that digital carrier did not co-exist well with FDM carrier with their energy dispersal sweeps. Frequency reuse, co frequency, both cross pol and adjacent satellite, were killing the digital modems, even though both the FDM transmit stations, the satellites, and digital receivers, meet the IESS requirements for both cross pol isolation and side lobe levels. The increasing use of IDR digital carrier, driven by the Digital Speech Interpolation systems that allowed more 5 or six voice channels per 64 knit digital channel, meant that Intelsat had to spend a lot to time grooming frequency plans to get FDM carriers away from the new digital services. The strong economic push to get rid of FDM to make room for Digital meant that many less advanced countries had to switch over. One consequence of this was that many of these did not have good network timing standards. Typically, such a standard involved sets of earth station Cesium clocks, beyond the financial ability of the less advanced or small voice channel requirement countries.

We developed a technique based on recovering the data clock rate from a station having a clock synchronized to Statum 1 standards. The recovered data clock from the "good" station would be used to discipline a local station standard to the required stability. The catch was the inclined orbit of our satellites, even under normal station keeping requirements, meant that the discipline algorithm used to steer the master clock (Frequency Standard) had to be done an average of a Sidereal Day (23 hours 56 seconds vice the normal 24 hour day). Satellites did not run on human time but rather on earth time. Several companies did make such disciplined frequency references, at costs commensurable to that of an IDR modem. Not long after that a much better solution became available in the form of GPS disciplined frequency standards. The use of a US DOD asset for frequency control was acceptable to many but not all of the Intelsat digital customers.

Intelsat wanted to sell service on some of our older satellites using inclined orbit operation. These satellites had discontinued N-S orbital maneuvers to save on board fuel, extending the in orbit live of these satellites. They were offered at tariff discount to smaller earth station users. The problem was that one reason for the existence of these low-cost small stations was that their beam widths were wide enough to meet the IESS requirements of 1.5 db gain variation under normal station inclination. Working with earth station venders, a low-cost tracking system was proposed that could be retro-fitted at a reasonable cost. To go with this, Intelsat developed and published the 11 Parameter ephemeris distribution system that could be used on a PC grade computer to generate pointing angles, removing the need to use expensive beacon tracking systems, a system that would be hard to use with low G/T small stations. Again, the commercial suppliers of earth station antenna position controllers adopted the 11-parameter system inside the controller's software. I even noticed later some non-Intelsat operators adopt the system.

One fallout of rewriting the earth station operating instructions (The SSOG) was that I got to know them well. So when the Jamaican signatory, Jamintel, was faced with a US company ESPN, wanting to broadcast a golf tournament on the opposite end the island from the Kingston station, it was necessary to bring in a US Domestic uplink truck (4.5m dish) to uplink to Intelsat. I got the dirty job of having to go down to Montego Bay and the Tryall Golf Resort to make sure things were done to Intelsat standards and practices. At the end of the two week project, the

Jamintell staff took me down to Negril, on the far western tip of the island, to see “real Jamaica”. I was impressed, particularly with the European women getting proper tans on Negril Beach. My response was that “I could not see that on Van Ness Street and that we would be back”. And I was, for the next thirty five years, every December.

After nine years at Intelsat, Comsat General beckoned back with the offer of VP for engineering. After a while COMSAT, including General, was swallowed by Lockheed Martin. After Intelsat was privatized, they bought Comsat General and myself back from LMCO. Instead of that, one of my customers offered me a posting to RAF Menwith Hill, North Yorkshire, UK. (Think Harriot’s All Creatures Great and Small). That’s the neighborhood. No commuting down the infernal Route 270. We lived across the street from the facility. Once again, I cannot say much on what was done there, but Google map the UK postal code, HG3 2RF, zoom in on the aerial photograph, (so called satellite view) and use your imagination.

After six years of the last hurrah, we retired to moved to 33 acres of oak trees in West Virginia where we purchased sight unseen from another ham, complete with antennas and no close neighbors. GPS: 39.336826 N 78.982287 W (Google) Still do some very limited consultaning work for Dave Lee GlobalSaTCOM, IN RETURN FOR FOOD.