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Memories of COMSAT Labs

What has been written on the COMARA website hardly does justice to what I saw you and Mark Kappes and David Layer and the late Gilmore Hourse and Mark Hutchins other Onboard Processing folks (John Poklemba and Chris Cronin added only as a footnote) at Comsat Labs do under very stressful circumstances. Sorry if I left anyone out. Like all of Comsat Labs, ours was a team effort.

My memory of those days are now back in full measure, years after my heart surgery. One of the problems Clarks' geosynchonous satellite telecom tech faced and overcame in those days involved the semiconductor technology used onboard spacecraft including telecomm satellites. At the time, the doped silicon wafer composition that made Bob Davis' Lisa and all of Comsat Labs Apple Macs work so reliably was threatened by space weather, and one strategy to overcome this was to go back to using germanium for larger scale semiconductor integration in spaceborne applications. It had already become known that certain concurrent space-deployed technology had become vulnerable to single point failures, rather like 13th and 14th generation Intel chips suffered recently. Reliability in space was a much bigger deal back then. Spacewalks for servicing the way we think of as routine for Hubble (my current' wife's deceased husband's project) were expensive enough to be prohibitive. The glut of telecom bandwidth we all now enjoy was in part due to Comsat's role in general, and the Onboard Processing group's efforts in particular.

Lin Nan Lee, fresh hire at Comsat from Linkabit where Mr. Viterbi was forging ahead with the error correction technology that eventually became standard and embedded in the successor to that technical advance by other Comsat hires like Farhad Hemmati, made satellite telecom competitive with underwater fiberoptic telecom trunks being placed despite frequent shark attacks. The technology to overcome that problem was far from perfection also.

And so it was that Lin Nan and I, in Russell Fang's new Error Correction Coding group, modified an Intelsat SCPC unit to use a rudimentary Hamming code, in an attempt to clean up the significant problems with geostationary satellite channel noise, of which there was a great deal to be handled. Lin Nan did not use the best technology, which he knew was proprietary to Mr. Viterbi still working at Linkabit. It was the first time an error correcting code had been used to overcome this particular problem. It was historically important (for being a 'first', like Neil Armstrong), as was Comsat Labs.

I am still welcome at gatherings of Intelsat picnics, where I occasionally get an opportunity to rant about my latest technical kick: constructing a fermion (and also the quantum vacuum has been added) from scratch. I even have my very own completely fresh derivation of the Lorentz transformations, without depending on the 'relativity roadbed', so tired and old that it creaks to be replaced, because it is also composed of fermions.

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Lin-nan had worked with Viterbi himself. It took Peter Johnson considerably longer to get that more sophisticated code, and required a double or triple Augat wire wrap card to do so. Peter and

Susan Miller worked together on the Reed-Solomon code (paid for by NASA), together with the modem group led by Mark Kappes. That took up the top of entire equipment rack, and utilized specialized integration (including some cutting edge pressurized heatsinks. I specified the first carbon vane air compressors, which had the downside of leaving fine grains of carbon behind inside of the rather precious pressurized heatsinks. It was replaced by a better filter compressor provided by NASA, operating in a room far removed from the equipment rack.

Most folks at Comsat had difficulty finding the next project after a large contribution. In my case, I was farmed out as an audio engineer running subjective telephony tests, an area which was for the most part a vacuum. It needed work, BECAUSE EARLY ON, BECAUSE SATELITE TELECOM NEEDED TO WORK IN EVERY LANGUAGE, NOT JUST ENGLISH. Over the course of this work, we tested telphony in Mandarin, Farsi, Turkish, and many other languages.

I gave them all instructions in English, although I vaguely recall trying to do the entire thing in Spanish (I have some fluency). Never tried to do it in German. I only learned enough of that to read about Til Eulenspiegel and technical literature.

Franklin Corcoran, a veteran of the echo canceller technology mentioned previously, headed up this working group. This is what I did during the last 7 years of my tenure at Comsat.