

Landlord

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A work of fiction, meant for adults. Read something else if you are not an adult, or are offended by stories with sexual content. Then again, if all you're looking for is in-out, in-out, in-out, you should probably read something else. I welcome constructive comments. Enjoy.

Let me tell you how I got my second-best customer.

Life in the Silicon Valley... A character I worked with a few years ago compared it to riding a roller coaster sitting backwards -- you've got no idea where you're going, but it's a hell of a ride!

Yeah... I'd been on the fast track, experiencing both extremes. I was on a financially very rewarding ride, but I lost my family in a tragic accident. That left me financially very well off and still doing interesting research work for a fairly well known company in the Valley.

One project I worked on, I needed some specialized antennas. Couldn't buy 'em, so I ended up designing them myself, and had them fabricated on the sly.

In the process I hooked up with a local character and his small machine shop. I had him make stuff for me. Eventually I used Pete and his business as a front for selling my antennas. Helped him out on a bunch of other things, too. We helped each other, for a few years.

Things were looking good. Pete and I got along really well. Fred even accepted me. I joked that we adopted each other... Little did I know...

I went to see Pete one Saturday morning, and found him on the floor of his office, Fred beside him, howling. I called 911. He was alive, but in bad shape. He recovered enough to go from the ICU to a critical care ward.

Dammit, Pete! He didn't have to ask -- of course I promised to take care of Fred!

Pete died two days later. The bastard left everything he had to me; he'd done that months before, without asking or telling me.

Cleaning up things the week after that, taking time off from my so-called job, I heard an old Jethro Tull song on the radio -- "...And the race was won ... by running slowly..."

I was at his (my) office. A trade rag had published a blurb on my antennas. All of a sudden, we were getting not only inquiries, but orders! Lots of orders!

The place I worked for had been bought out by another outfit. The management at the company that bought us turned out to be rabid brain-damaged lemurs. No, that's a slur. Lemurs form stable, cooperative social groups.

The only thing these bastards knew was (1) looting recent acquisitions, (2) infighting, and (3) not spending money (except on infighting). Kind of hard to do research without spending money. They were making my life, and the lives of my fellow researchers, difficult. A number of research projects had already been cancelled -- if you and your research project weren't going to contribute to the bottom line in three quarters, you're gone. My days were clearly numbered.

Fred had his head on my leg, drooling on me, his tail wagging. Let's see... I could go with Fred, or stay with the rabid brain-damaged lemurs until they threw me out. "Hard choice, hey Fred?" I asked him. He kept wagging his tail -- always optimistic. I scratched his head.

I quit my so-called job. I sold the big house for a fortune, and dumped my company stock, coming very close to hitting the pre-indictment peak. I moved into Pete's old place, which adjoins the industrial strip. That felt right. Fred liked it, and it was a better fit, just the two of us.

It's an interesting layout. The industrial strip is a four unit building extending back from the street. I've got the unit all the way in the back. There's parking along the side and the back of the building. At the back there's a chain-link fence, and a gate. The gate opens into the back yard of my house. Fred and I walk to work!

Had a wake for Pete -- in retrospect, the old bastard had been planning for some time, he just never told me. He kept good records, anyway. I invited his customers, and his competitors. Luckily, business at his level was fairly collegial. At least the ones he'd listed were collegial. I made sure his customers connected with folks who could help them out. Even managed to unload Pete's injection molding equipment -- he had three customers he was still making parts for. We worked out a good deal for everyone. I sold the injection molding gear, the supply hoppers, pellets and such, to Tony, a machinist nearby. The customers got their tools, which went to Tony, and they all helped pack and move the stuff. Tony even had his kid, Ben, spend a few days with me reorganizing the shop and teaching me how to better use what I had. Like I said, it's a good community.

I'm an RF kind of guy. In place of the injection molding gear and its supplies I put in a shield room, an RF-tight enclosure, for my kind of work. When I'm talking to someone I like, I tell them I do RF stuff. I design and build antennas for 50 MHz and up, mostly up, from 800 MHz to 15 GHz or so. I have families of calibrated antennas, wideband, narrowband, directional, non-directional, whatever you want. I also do low-noise calibrated amplifiers, and help with pre-compliance product testing, handling overflow from some local houses. It's a niche business, but a good one. I sell to companies, compliance labs and TCBs, government agencies, white hats, black hats, and random people. My stuff isn't cheap. It works, it's well built, and if you need it, I'll guarantee performance and provide calibration certificates and data. I've got gear in labs, test centers, at both poles -- every continent except Atlantis.

If that doesn't make sense to you, then you're probably one of the people I tell I have a machine shop and a testing lab, and let it go at that.

Oh, my design and a lot of the fabrication, and of course the testing, is heavily computer based. It's a good fit, with my background in physics and computer science, and my previous life as a researcher in the Valley.

But like I said, I pulled out of the Rat Race. That old Jethro Tull song -- "And the race was won ... by running slowly." I want to be one of the last standing, and I want to be smiling.

The tenant closest to the street is a non-profit community theatre group. They have the largest space, and use it for a set shop and storage. They're quiet most of the time. The next one is George with his tax/accounting firm. George is a crotchety old bastard, and I love him. He and his niece Ginny handle a bunch of small businesses in the area, like me. They're actively grooming a really sharp Vietnamese woman to take over the business; she bailed from a big-8 accounting firm, looking for quality of life.

Oh, I provide internet access and services for the building, and my house. One of the scams I set up with Pete is a cell tower at the back of the property. In exchange for letting companies site the tower, I get free cell service and a high-speed Internet connection with a fixed IP address, so I also run a small ISP. And they send me a check every month; a hard deal to beat. I'm happy the local tinfoil-hat brigades drove them into our arms... We didn't even force them to make it look like a phony tree!

The third slot, the one next to me, has been in flux. For a long time it had a professional photographer. He retired a couple of years before Pete died, and for a while, it was a RC car - plane - helicopter shop. They went more into robotics, outgrew the place, moved, and are still doing well. Then a bead and crafts deal moved in, and folded. Had a few fold in that spot.

I'm picky about tenants. Nothing involving chemicals or that generates hazardous waste. No food related. No meth labs or drug dealers. I'd rather have the space empty than have it full of trouble. What with the cell site and my two solid tenants, I cover costs, taxes, insurance, upkeep, and keep us in dog food, tamales, and beer. If I manage to peddle some antennas and some of my time, we get better beer. Life is simple. Life is good.

Mid-morning, I was simulating an antenna design for a customer. Fred was asleep in his basket in the next room. The sim looked pretty good; I was about ready to build one and test it. Most of the testing I could do in the screen room, but some I'd have to do outdoors at a friend's place in Pescadero. Fred likes going there; all sorts of things to sniff out.

Ka-ding! Someone at the door.

Quick click to save, and see what's up.

Two young ladies interested in the space next door! Have a seat; tell me more! They were just starting out, had landed a subcontracting gig doing data conversion, and their mentors

told them they should get business space to do it in, start building a track record. I pressed for details. They had a contract from LockMart, under provisions for women, minorities, small businesses, that kind of stuff. I knew that song. They'd be bringing in some computers, some office furniture, and that was about it. Okay, when did they want to start? As soon as possible! I went over rates; I was willing to cut them slack on deposits since they were starting up. I gave them a good deal. I printed up my standard stuff and we filled in details. Water was included, and I'd cut them a fixed rate for electricity and garbage, renegotiable in three months if they went overboard. We do recycling, and I expected them to separate out recyclables. No problems with that.

They took off to get money and their first load of stuff.

"You missed the excitement," I told Fred as he wandered in a while after they left. He sniffed around and looked at me.

"I think they'll be back. They're better looking than George, that's for sure."

Fred looked at me and walked off. I heard the beep of his doggy door at the back of the shop. He's got a protected run out back. Another beep a short while later, then the sound of him at the water dish. Then him mumbling and settling in his bed again -- two and a half turns.

Someone pulling into the parking lot -- they came back!

They opened the door, ringing the bell, and coming in. I heard Fred moving.

"Ladies, may I introduce my business partner, Professor Frederic M. Basset," As Pete did, I pronounce it bass-SAY.

On cue, Fred walked in, pausing in the doorway to show them a profile. Noble beast!

"Professor Basset, this is Mimi, and Rachel. They're going to be our neighbors."

Mimi and Rachel were sitting down; Fred went to Rachel, sniffing her legs, tail wagging. He moved to Mimi, sniffing her as well. She'd set a large purse down beside her; it's top was open. Fred put his snout down into it, snuffling.

Mimi leaned over and gave him a resounding rap on the head with a knuckle. "No!" she scolded.

Fred stepped back, then moved closer, putting his head on her thigh, looking up at her with those big brown eyes and wagging his tail more vigorously.

"What's the 'M' stand for?" she asked as she scratched his ears.

"Stands for 'Mostly' -- not quite pure Basset," I told her.

Both of them smiled. Fred was still wagging. Good -- I trust Fred's opinions of people.

"Professor?" Rachel asked.

"Doctor of Philosophy -- his diploma is up on the wall there. His first owner got it for him. He's Director of Engineering for the company. I'm just an engineer."

"An honor to meet you," Mimi told him.

They gave me a cashier's check for first, last, and deposits. They needed internet access, but didn't need web hosting, e-mail, or the like, at least not yet. I gave them keys and went over rules of the road. They seemed enthusiastic and agreeable. They'd mentioned putting an antenna on the roof -- where was roof access? We walked around the building. I showed them the space, which they were very enthusiastic about. It even had some folding tables and chairs in it, and a desk up front, which they were more than happy to use.

They weren't planning on getting a wired phone, just using their cell phones and Skype; how good was cell coverage? I smiled and pointed to the tower. Should be fine. Showed them how to get on the roof. Nothing sharp or pointy! They were planning on placing some small antennas on a tripod, on a sheet of plywood or two. That's fine, but don't screw up the roof membrane, or you'll pay to repair it! It's three years old, and I expect it to last another decade! They looked at the roof, and figured out where they'd like to put things, and how to run cables through the vents over the door. Yeah, that should work fine.

Back down in their new home, they were so happy! They were going off to get the hardware and other stuff like their refrigerator, a microwave, and such.

Fine, let me know if you need help. There's a recycled office furniture store about a half mile down the road on this same side of the street. I called the name and number they gave me and got voicemail for a contracts person at LockMart who was on vacation for the next two weeks. Oh the joys of working for the government! Another reason I'd departed the rat race. But I did like that small-biz cutout.

I ducked out and went to the bank -- the check was good! Good news, Fred -- we can eat for another few months!

They moved in, multiple trips. They picked up some tables from the recycled furniture place. They argued and yelled at each other, most of the time in English, occasionally slipping into a language I didn't recognize. They primed and hoisted two sheets of plywood to the roof, using a block and tackle. Nicely done! Mimi was the older of the two, maybe mid 30's, dark brown hair, wiry build. Rachel was late 20's, black hair, fuller, but still fit. A lot better looking than George in the accounting office, that's for damn sure!

Fred and I spent a day at Pescadero, field testing the antenna for my customer. Well, I tested, and Fred spent the time sniffing out vermin, rolling in the grass, and laying in the sun. I took a peek on the roof when I got back. They had something under a plastic trash can, anchored

to the plywood, with a power cable and an Ethernet cable running down to their suite. Looks like they left my roof intact.

I heard yelling and arguing early in the morning a few days after they moved in. I had the feeling at least one of them was next door all the time; maybe they were living there. I didn't care. The RC guys lived in the shop the whole time. I looked outside in time to see them lowering an atrocity from the roof.

I say "atrocity" as my professional evaluation as a specialist in RF and antenna systems. I saw a short roof tripod, looked like a rat shack special, with a mast. To that mast were mounted (duct tape?) a very sorry looking assortment of WiFi antennas that they must have picked up at Fry's. Oh, and what looked to be a GPS hockey puck on top. Don't know what they were trying to do, but that rig was *not* going to do it! The rat's nest of cables didn't look very encouraging, either.

I printed off some sheets on my antennas, and added to it the blurb on RF design and testing services. I dropped the package through their mail slot.

So what the hell were they up to with that sorry mess? I went up on the roof. A 4x8 sheet of plywood, nicely primed, with some sections of 2x6 used to attach the trash can (mis)used as a radome. Had my doubts about that, too. Arrows on the plywood with a direction and a normal.

I looked to where the arrow was pointed.

And started laughing! LockMart, huh? Don't think so! Extra points for balls -- the arrow was pointed at an office building! Well, more power to 'em, and I'll help 'em any way I could. A big part of my antenna business was signal intelligence work, with differing hat colours involved... Truth be told, I was a member of the Society of Old Crows, and affiliated with some others...

Rachel came over a little while later, holding one of my antenna spec sheets. "Bob, can we talk to you a bit about this?"

"Sure -- let me save this," I told her, moving the mouse and clicking. "Watch the place," I told Fred.

We walked next door. "Mimi's in the back," Rachel said, motioning me ahead of her.

We walked into the back; I hadn't been there since they moved in. A table with four large LCDs on it, computers under the table. Another table with a smaller computer on it, cabled up to their antenna atrocity.

Turning more, a small refrigerator and microwave on yet another folding table, baskets with clothes, a queen-sized mattress and box spring, and...

Mimi pointing a gun at my head! “Don’t try anything. Don’t say anything. Do what we tell you, Got it?”

I nodded. “Yah.” This had gotten awful serious all of a sudden.

“Sit on the mattress. Now.”

I sat.

“Move to the middle -- on your back.”

I moved to the middle and got on my back. Increasing my surprise, Rachel sat on my chest, her knees over my arms, putting the barrel of another nasty looking gun on my forehead.

I felt something on my right arm and moved it, or tried.

“Don’t,” Rachel said. “Just relax.”

Something cold on the inside of my elbow. I closed my eyes. The bite of a needle. Mimi saying, “Shit.” Another bite. “That’s better,” Mimi said.

Warmth and tingling pouring into me. I opened my eyes, but things were swimming around, and I closed them again.

“Bob,” Rachel said, “We’re going to ask you some questions, and you’re going to answer as best you can, understand?”

“Yes,” I told them. My mouth felt like it was full of wool and rocks.

Why had I dropped off the stuff on antennas and design? I saw them lowering the mast loaded with crap, and I knew they needed help. Did I know what they were doing? I’d been on the roof and it looked like they were pointing at a building, so I figured they were doing sigint or pen testing work. What did I think of that? A lot of my gear went to white - grey - black hats for that kind of stuff. No, I hadn’t told anybody, and I didn’t really care. I wanted them to do a good job. Why did I think they needed help? The antennas they had were junk -- I’d tested antennas like that, and for the distance, they wouldn’t work. I had my doubts about the trash can as a cover, too. Would I help? Of course, that’s why I dropped off that stuff!

More questions, personal questions I didn’t want to answer. Another bite in my arm, and I started feeling sick, like I was going to throw up. They moved me so I was sitting up, holding on to a five gallon bucket. I didn’t feel good. They held me and I started crying. Why? Because I need to be held. Why? I lost my family -- I need to be held. They held me as I cried. More questions, questions, questions, but I don’t remember most of that.

I woke with a headache and a very full bladder. I was on a mattress, dressed except for my shoes, with Mimi and Rachel on either side of me. The area was lit by the LCDs and a couple of nightlights.

I sat up and my head hurt more. “Christ!” I muttered.

Rachel sat up very quickly. “What?” she asked, putting an arm on me. Mimi sat up as well.

“My head hurts, and I need to pee,” I told them. Three of the LCDs on the table were lit up with data displays, the other looked full of green on black Linux command-line shit.

“Here, we’ll help you up,” Rachel said, moving to her knees and standing.

Good thing they helped; I needed it. They helped me to the bathroom for their unit. At least they waited outside.

A little after midnight. What a trip.

“I’m going home to bed,” I told them.

“One of us needs to come with you,” Mimi told me, a hand on my shoulder.

“Fine.” I headed to the door.

My office door was locked; glad I had my keys. “Fred?” I called. “Oh shit -- sorry, Fred, I’ll feed you,” I told him.

Rachel told me, “We fed him dinner already.”

Okay... My head was still full of rocks. “Let’s go home, Fred.” Fred led the way; Rachel followed me. I unlocked the gate and ushered her through, locking the gate again. We walked to my house. It was warm inside. I went to the bathroom and washed my face, brushed my teeth, took two aspirin. Stripped down to my underwear and flopped into bed.

The next time I woke it was almost eight. My head wasn’t pounding, but I did have a bad taste in my mouth. I turned a bit; Rachel was next to me, facing away. I got up and gave Fred his morning biscuit, then took a shower.

Rachel was sitting on the toilet when I got out. “Want to shower? I’ll get you a clean towel,” I offered.

“Yes, thanks,” she agreed, getting up and flushing. She was wearing a tank top sans bra, nothing else. Cute.

I was in the kitchen trying to decide what I could eat and keep down when she came in, still toweling off her hair. She was wearing her jeans, the tank top, no bra. Ah, the wonders of youth...

"That was great, thanks."

"No problem. Where do you usually shower?" I asked.

"Gold's," she replied. That was a gym a few miles away.

"You're welcome to shower here," I told her. "Want to give Mimi a call to come over for toast? She might want to shower as well. And I could use some answers."

She smiled a bit and pulled out her phone. "Come over for toast, and a shower if you want? Yeah, everything is fine. Okay." She folded up her phone. "She'll be right over."

I started to the back door. "I'll get the gate."

"Don't bother -- she'd rather jump it anyway."

Okay, I was starting to figure this out a bit more.

I decided on a Dr. Pepper for me, and started making toast. Mimi came in, a big smile, not even breathing hard. Oh youth... Fred greeted her with a wagging tail. She must have fed him last night.

"How are you feeling?" she asked, pulling up a stool and sitting next to Rachel.

"Confused, my stomach is confused as well. I guess you're not working for LockMart."

"No," she admitted.

I shrugged. "My offer to help still stands. Whoever you're trying to spook is safe as long as you're using those antennas."

They looked at each other.

I buttered toast and got out a few kinds of jelly and jam, and plates for each of us.

As they were taking care of their toast, Mimi admitted, "You're right, this is a security deal. And we do seem to have a problem. Our ... home office is a ways from here, and they're not being much help."

I nodded. "Other than wanting results, like yesterday."

"Or the day before," Rachel added.

I stood on the other side of the bar eating my toast. I pushed a pad of paper and a mechanical pencil to them. “Can you sketch out what you’ve got, and explain in broad terms what you’re trying to do? Looked like Wi-Fi, with GPS for timing I’d guess. 2.4, 5 gig, both, Bluetooth? Passive listening or packet injection as well? SIP and RTP streams?”

Rachel gave me a look. “I thought you said you ran a test lab?”

I smiled. “And you said you were doing data munging for LockMart.”

Rachel smiled and started drawing. “You’ve got it, pretty much. A machine on the roof does data collection and time stamping, sending packets downstairs for analysis. We’re trying to receive on both Wi-Fi bands, Bluetooth, and Wi-Fi phone...”

“RTP streams?” I interrupted.

Mimi gave me a questioning look, but Rachel nodded and said, “Yes. Our ... group ... has used setups like this before. We have four radio cards in the rooftop box, one for 2.4 gig b-g-n, one for 5, one for Bluetooth, one for 2.4 gig Wi-Fi phones. GPS is a USB dongle. The cards break out receive and transmit to separate connectors. We usually use different antennas, but they were lost in transit, so we had to make do. And they aren’t working.”

I nodded. “Let’s tidy up here, and check it out.”

Mimi gave me a questioning look. “Shower?”

I smiled. “I’ll get you a clean towel.”

“I won’t be long,” she said.

I sat with Fred and Rachel after getting Mimi set up in the bathroom. I had Rachel sketch out the wiring. And I didn’t like what I saw. If her description was accurate, she was trying to use one antenna for all the 2.4 gig receive work, one for 5 gig receive, one for 2.4 gig transmit, and one for 5 gig transmit. When pressed, she admitted they’d picked up a bunch of adapters so they could run all the 2.4 gig receivers from one antenna; their main office hadn’t been any help at all, and neither had the airline, who lost their checked bag with the antennas and cables in it, as well as a lot of clothing.

Mimi reappeared, with a big smile. “What a great shower!”

Let’s get to work... We walked back to the shop, Fred leading the way, tail high and wagging. I opened my side, and led them to the back, opening up the screen room. It’s a box fifteen feet by fifteen feet and ten feet high, covered in a phosphor bronze screen cloth, and with a very impressive door. The back wall is covered with ferrite plates and loaded cones to give me an anechoic surface. The raised floor is also covered with plates, and cheesy carpet.

“Test lab,” Rachel tossed out, pointing to the Society of Old Crows emblem on the wall.

“Bring your gear over, the whole lot. We’ll set up the antennas and the rooftop box in the shield room, and the processing gear out here. You can use the cart.” I pointed to a wheeled cart.

They took the cart, and I started setting things up. I configured an Ethernet cable to run out of the screen room, and got the signal generators and spectrum analyzer ready to go.

They brought the antenna kludge over first. Worse than I’d thought! Cheezy consumer omni antennas, and the one they were using for 2.4 GHz receive had a semi-reasonable cable running to a string of adapters from RP-SMA to SMA then SMA to BNC into a mass of BNC tees! From there, it got worse! Three too long BNC cables running off, ending in BNC to RP-SMA adapters for the radios. I looked at one of the BNC cables. Yep, cheap 75 ohm video cable; you couldn’t pick worse. Well, look on the bright side -- the cables were so mismatched and lossy, they provided *some* isolation between receivers... I didn’t want to think about the transmit side, and its rats nest... That sent a shudder through me.

“Bring the trash can, too,” I told them after they delivered the rooftop box to the shield room.

When we had everything, I told them, “Don’t worry about cabling everything up just yet. Let’s go in the shield room and start there. Oh, cell phones and any other electronic goodies go on the table here, and not in the shield room.”

I closed the door, then ran the spectrum analyzer through a quick scan before powering up the rooftop box. “Let’s look at the antenna part,” I told them. “This is impressive -- it’s hard for me to figure a worse way to do it. We start out okay, but this,” I pointed to the adapters and tees, “is a disaster. I’d guess that between this and the cables, you’re losing 20 to 25 dB of signal, at least -- that means far less than one percent of the signal from the antenna is getting to the receivers. Probably closer to a few parts in a thousand, particularly at 5 gig, where these cables *really* suck.”

They looked glum, as they should.

“And these antennas aren’t the best, particularly for what you want to do, which is pick up signals at a distance, and *not* pick up signals nearby, like the cell tower behind us, or other businesses nearby like Starbucks, which runs a handful of SSIDs by itself.”

I looked at the back of the box. Four cards with two RP-SMA connectors each, all with color-coding dots. TX and RX labeled, one card marked 5, the others marked 2.4. “Do you have any diagrams?” I was wondering about the transmit side on 2.4 gig. I got blank looks. “Okay, let’s check antenna system performance.” I pointed to a gadget sitting at one end of the shield room, a little antenna sitting on a pole in front of the dark gray cones on the wall. “That’s a wideband omni antenna, driven by a comb generator. Let’s look at the middle of the 2.4 gig band, and see what we have.” I connected the spectrum analyzer directly to the antenna with one of my cables. Spikes popped up on the display. Poke, poke on the buttons. “Okay, we’ll call

that a zero level. And now look at the signal at the end of one of your cables.” I moved cables around, reconnecting their atrocity, (mis) terminating the other cables with 50 ohms, and connecting the spectrum analyzer cable to one. “Oops -- minus 27 dB... Grab the trash can and let’s see what that does. Yes, just slip it over the thing.” Mimi put the trash can over the antenna rack. “Wow! Minus 41! I’ll have to remember that. Fourteen dB is pretty good, if you’re looking for attenuation. Wonder what it is at five gig? Pull it off for a moment.” I reconnected the spectrum analyzer to the 5gig cable and did a zero measurement. Mimi put the can back over things. “And at 5 gig, we get an even 20 dB attenuation from the trash can! Wow! And I’d bet it’s detuning the snot out of the antennas as well. Did the GPS even work through that? GPS L1 is at one and a half gig, but fleapower.”

Glum looks.

“But all of this is easy to fix,” I told them with a smile.

“And how expensive?” asked Mimi.

I smiled. “Do you want everything brand new, or stuff that works reliably?”

Mimi folded her arms, a closed posture, and not one I needed to see, the way it framed her charms. “Whatever works.”

“That helps, thanks. Parts are going to be on the order of \$800 to \$1200. The difference depends on how much isolation we need on the 2.4 gig transmit side. My fee will be on the order of \$400 for the design and eval work, and includes a report if you want it.”

Mimi nodded, relaxing a bit. “Do it -- we want a brief report. What next?”

“Your processing setup -- can we get it to display amplitude versus frequency, spectrum displays?”

Rachel nodded and smiled. “Sure.”

“Okay, let’s get that set up. I want to do some measurements on the entire test setup. All these computers look custom. Where did you get them?”

Mimi replied, “They were built for us by Central on El Camino near Bernardo.”

Okay, a good local shop. “While you get things set up outside the screen room, I’m going to take a little closer look at this one.”

Rachel was smiling. Mimi said, “I can go to Starbucks. Bob, what would you like?”

I think I know who the techie is... “Usual -- grande hot chocolate with whipped cream, please. You want to make a friend for life?”

She actually smiled. “How?”

I glanced to Fred in his basket. “On the shelf in the office by the door you’ll see a leather L-E-A-S-H. All you have to do is pick it up; he’ll hear it. The folks at Starbucks know Fred.”

She nodded and smiled. “I can do that.”

“He’ll get excited; just tell him to sit.”

Moments later we heard Fred moving fast, his excited barking, followed by, “Sit!” A brief pause, and the bell on the office door rang as they headed off.

I put the computer up on the bench and took the cover off. Generic case, painted. Probably need to sand off some paint, put some star washers on things to get better shielding. Oho! The radio cards were *very* impressive! They were pretty much completely enclosed in copper foil! I was impressed -- a very nice and very thorough job. Oho -- another clue -- hand lettered labels, Hebrew? Intel dual-core processor, memory, SATA hard disk, DVD drive. Pretty vanilla, but that’s what you’d expect. I buttoned it back up, connected the antenna atrocity, and set things up like they’d be on the roof.

Mimi and Fred got back with drinks about the time Rachel got everything cabled together. Fred’s tail was wagging. He stopped by his water dish, then went back to his basket.

“No food or drinks in the screen room,” I told the ladies, “or on benches with my equipment. You can spill things on your gear, that’s your problem.”

Mimi gave me a wry smile, and Rachel a dirty glance. Rachel ducked down a little.

“Ready to do some testing?” I asked.

Rachel took a sip of her coffee and said, “Ready to go.”

“Can you start up things out here without the computer in the screen room running?”

She nodded and said, “Yes.”

“Okay, do that so I can get a baseline. Then I just power the thing up?”

She nodded again. “It should sequence up.”

“Okay, wait for me to tell you to power things up.”

“Will do.”

I went back in the screen room, Mimi following. Fine with me. Closed the door and ran a sweep with the spectrum analyzer for a baseline. Nothing out of the ordinary. “This is to see

how much noise we have to start with,” I told her. Then to Rachel, “Start up your gear.” She replied, “Booting...”

I saw some spikes, what I’d expect from an Ethernet cable. Looked like gigabit. “Powering up in here,” I told them, and plugged in the computer and hit the power button.

“Oh, look at that!” I said, pointing to the spectrum analyzer. A number of wandering spikes in the 2.4 and 5 gig bands. Recorded those. “Let’s go outside.”

When we left the shield room, closing the door again, Rachel said, “Wow! That really made a difference! I could really tell when the door was open!” We looked at her displays. They were showing similar crap to what I’d seen on my spectrum analyzer, only at much lower amplitudes.

“Okay, I’m going in to change things a bit.” Back in the screen room, I unhooked the antenna atrocity and put 50 ohm terminations on all the radio ports. “Dead quiet!” Rachel reported from outside. I quickly exited and took a look. “That’s good news,” I told them. “That means the radio cards are well shielded. Okay, please sequence things off.”

Rachel typed some commands on one of the keyboards, and the systems shut down, even the one in the screen room.

“Design time,” I said, calling them over to the whiteboard. “Guesses on distance to your target? 300 meters? We could check it on Google Earth.”

Mimi said, “About that, why?”

“So we can calculate path loss. 300 meters, figure 86 dB low band, 90 high band. That’s without anything for the windows on the other side.” I drew a simple diagram and roughed in numbers. “Even without the bucket, with the setup you have now, signal levels are way below the weeds -- undetectable. Put the bucket over things, and you don’t stand a chance.” They were both frowning. “No, this is good! This gives us confirmation as to why things don’t work! Better news, the radio cards are tight. I’ll assume they’re reasonably sensitive -- the work done shielding them is first rate, so I’ll assume they perform reasonably as well. Bad news, the computer is radiating where we want to listen, but it’s at a fairly low level. First cut -- replace the antennas with good ones, narrow band and directional. Add low-noise amplifiers on the receive side. Splitter on the low band one. Add power amps on the transmit side; don’t think you’re worried about FCC compliance. 5 gig is easy; 2.4 gig is complicated. First try, we’ll go without circulators, running the three channels into a combiner, and hoping 18 dB or so port to port from the combiner will be enough. Refiguring things, and guessing at 20dB loss for the glass, we should see levels around -30 dB, which should be like we’re sitting in someone’s lap. How does that sound?”

Finally a smile from Mimi! “That sounds very good! But what do we do for an enclosure? I ah ... don’t think it should be exposed.”

I nodded and pointed up in the rafters. “See the white things? I use those for antenna testing all the time -- wood frames covered with Tyvek, no metal used. Transparent to RF at these frequencies. I think we can use the 3 foot one. Oh, and I use ‘em on the roof all the time, so the locals won’t think anything strange is going on. But we have some building to do -- the amplifier platform, and an enclosure for the antennas. It will take me, oh, half an hour to design the antenna enclosure. One of you good with hand and power tools, and soldering?”

Mimi smiled. “Yes!”

“Great! You get to build the antenna enclosure, and Rachel will help me with the amplifier platform.”

I did a quick simulation to get the antenna spacing right to provide isolation, and to size a trapezoidal enclosure around the antennas to shield them from the computer and anything off the back side and bottom. I was going to use two pair of my high-gain narrow band antennas; I keep those in stock and ready to go. I printed out scale drawings of the trough-like enclosure for the antennas, which came out at a little over two feet wide, six inches high at the back, and nine at the front. I pulled out scrap double-sided circuit board material for the trough, and for our amp platform. I went over construction details, how to clean the copper, wearing gloves to keep it clean and keep from getting fiberglass splinters, using copper tape on the edges, and such. We talked about making an assembly jig -- Mimi sounded like she knew what she wanted to do. I showed her where the different tools were, and then gave her a pair of safety glasses. “And if I see you working without these, I will scream bloody murder, bounce your beautiful bottom out of here, and finish the work myself -- safety first, got it?”

Both Mimi and Rachel smiled and nodded. Which was good, because I didn’t think I’d want to tangle with either of them!

I pulled the antennas out of my stock. While Mimi set to work on the mount and shield for them, Rachel and I gathered the parts for the amplifier platform and started laying that out.

We took a brief break for lunch. Rachel and I put the amp platform together with used mini-circuits amplifiers, cables, splitter/combiners, and the like. I figured if I had to go with circulators on the transmit side, I’d do those on a separate board.

Mimi did a first-class job on the antenna enclosure, even building a mount for the thing, and a bracket for the GPS antenna. When I told her I thought it looked really good, she gave both of us a very smug look.

I populated the thing with antennas, and took it into the shield room where we integrated it with the amp platform and ran through some initial tests. As predicted. Both ladies snickered when I suggested it would be like sitting in someone’s lap. We tried one of my Tyvek-covered enclosures; it was hard to measure the added attenuation, which was the whole idea.

A few minutes with sandpaper and adding some star washers knocked down the spikes from the rooftop computer to a manageable level; I was counting on the antenna enclosure to provide shielding from the thing.

“Ready for a test?” I suggested.

The ladies nodded enthusiastically.

I got out another gadget, putting a pair of 30 dB attenuators in series on the output connector and then an omni 2.4 GHz antenna, and put it on my test stand. We put the antenna stack on its tripod and the support computer as close to the door as we could, giving us maybe four meters separation. Also grabbed my Nikon and took some shots of the antenna array and the amp platform from various angles. Damn -- should have gotten some “before” shots. I could fish that gear out of the trash bin, I guess.

“Okay, let’s see what you get!”

We went outside and closed up the shield room.

Rachel started up her gear. No GPS, no 5 gig, but nice activity on 2.4, with multiple displays lighting up, and at least one of the analysis machines beeping.

“What the hell *is* that?” Rachel asked, a puzzled look on her face. Mimi looked at the displays and shrugged.

I smiled. “A gadget a friend gave me -- it throws out malformed packets all over the low band, supposedly enough to confuse a lot of gear.”

Rachel pointed at one of her analysis displays. “It’s doing a good job!”

“Signal levels?” I asked.

Mimi answered, “Full scale and then some.”

I nodded. “Okay, close it up and we can move next door. That thing is fairly low power, and I put 60 dB of attenuation between it and the antenna -- probably more signal leakage from the enclosure. I think we’re in good shape.”

That brought excited cheers and group hugs!

“Let’s move it up to the roof!” Rachel called out.

“No,” I tried calming them down, “Let’s move everything next door for a controlled trial before we move things to the roof.”

Rachel frowned and said, “Yes, Sir!”

I shook my head and laughed. I opened the shield room door and started uncabbling the antenna mast.

Yeah, they were living in the shop -- neatly, too, with baskets of clothes, one folding table set up with microwave and coffee maker, little fridge underneath.

“You’re welcome to use my washer and dryer, as well as the shower,” I told them on one trip. That got more hugs.

I carried the antenna mast over, sitting it in one corner of the shop, pointed about where I thought it should be.

Mimi looked at it. “What are we ... Oh! That’s good!”

Rachel put some equipment on the computer table and looked at how I had the thing pointed. She thought for a moment and yelled, “Starbucks!” Then she gave me a quick hug.

They got things set up. I had a torque wrench for SMA connectors in my pocket, as I usually do, and taught them how and why to use it.

Power-up a few minutes later, and about a minute after that, wild cheers and jumping about, and more enthusiastic hugs from both of them.

But then they turned all business, grabbing folding chairs and sitting down at keyboards, looking from screen to screen, Rachel doing most of the work, but Mimi working on one system as they talked back and forth in a language I didn’t understand.

From one of the computer speakers I heard a conversation. “SIP stream?” I asked.

Rachel looked up, a fierce smile on her face. “Bluetooth! Through walls, and across the street! That gear is *hot*!”

Mimi started chuckling. A window on the big LCD in front of her showed what looked like a Windows desktop. She turned to me and said, “I now *own* a Dell laptop...”

“Guess it works,” I told them.

“We *own* the place,” Rachel said proudly, “and the GPS is still trying to find its ass!”

“*Now* you can move things to the roof,” I suggested.

Mimi said something to Rachel. Rachel smiled. Both of them looked at me. They talked back and forth in their own language, arguing even. I was about to leave when Rachel stood up and dug into a pocket, taking out a quarter. They both looked at it. Rachel tossed it into the air

and Mimi said something. It hit the floor and rolled, stopping a few feet from me. Both of them looked at it, Mimi shouting in triumph and Rachel shaking her head, smiling.

Okay, about time for me to feed Fred and figure out what I'm having...

Except both of them grabbed me and dragged me to the bed! Both of them were kissing me, running their hands over me, trying to be on top of me. One of them said something; Rachel grabbed me, kissing me, and I felt someone at my feet working on my shoes and socks, that must have been Mimi, who pulled off my pants and boxers after she did the socks and shoes!

Rachel pulled away, only to be replaced by a very enthusiastic and very naked Mimi!

She struggled to kiss me at the same time she was trying to get my shirt off, while Rachel was paying very close attention to my rapidly hardening cock.

My shirt off, on my back, skin against skin, oh God sliding together, holding on to her, pulling my knees up, rocking, holding on as we kissed. Too soon, too soon -- too late, coming inside her as we kissed, hearing her moan in my mouth, trying to catch my breath as she sat up, still rocking her hips.

She leaned forward, putting her hands on my shoulders. "That's better," she said with a big smile.

"What was your hurry?" I panted.

She laughed, almost pushing me out. She turned to Rachel and said something, then leaned over me and kissed my forehead. "We didn't want you to change your mind."

I held her and sighed. She laughed, pushing me out just as I felt someone put a cloth between us.

Laying there between them, a blanket pulled atop us, they apologized, a little, for grabbing me like that. I apologized, a little, for not lasting very long. They held me, telling me I'd get plenty of practice!

My eyes clouded up; I whispered that what I needed was to be held, and to hold someone. That quieted the three of us for a while. They held me, and I held them.

We got up and got dressed. I reminded them they could use my washer, drier, shower -- whatever.

Rachel moved closer and whispered, "Bed?" in my ear, kissing my cheek.

I nodded and gave her a hug.

They collected laundry. I collected Fred, and we walked back to the house, Fred leading the way. Fred got his usual dinner in a bowl, eating with his customary gusto. Rachel couldn't believe how quickly he ate. Mimi told her their family had Springers growing up, and the way they ate made Fred look leisurely. I fixed us a chicken and rice dish; the ladies put together a salad. I opened a good bottle of white wine. We drank a toast to kicking ass.

Rachel and I did dishes while Mimi started their laundry and took a quick shower.

We went back to their place; they'd left their systems on automatic, and after poking a few keys and looking at some status screens, Rachel said they'd done quite well, except for the Macs people were using; about the best they could do with Macs was knock them off the air.

Rachel moved to the keyboard of the command-line Linux box and typed in something. Screens changed and systems started powering off. Mimi announced they were going to move things to the roof, if I'd bring over the cover.

Certainly. I went next door and got the cover from where we'd left it in the screen room. Took it next door and dropped it off, expecting that would be the end of it for the night.

But Rachel moved closer, gently, and said she should be over in an hour or so, and she'd need me to keep her warm.

That I could do, I whispered.

"Let's go, Fred!" I hollered next door. I heard Fred grumbling as he got out of his basket. I locked up my place, but left the gate and the back door unlocked.

I sat in the living room area of our little place. Fred put his head on my leg and gave me a whuffling sigh.

I matched his sigh with one of my own. "What the hell have we gotten into?" I asked him as I scratched his head. I started to reach for the TV remote control, but stopped. "Sleep well, Fred," I told him as I stood up and dimmed the light down low.

He went to his basket and did his ceremonial routine, two and a half turns, before settling into bed with a sigh.

I went to the bathroom and did my ceremonial routine before settling into bed with a sigh.

I woke to cold hands and feet but warm lips and thighs joining me. We kissed, taking our time. She let me explore with my hands and my lips, but pushed me to my back and slid us together, rocking for a bit then pausing. I liked that, pausing, kissing, enjoying where we were very much.

She leaned back, one hand helping between her legs, the other fondling a nipple. I held her waist, which elicited noises of approval. As she got closer, I stroked the insides of her thighs, which she liked. As she got closer, her rocking started up again, getting more insistent.

"I'm getting close," I warned her, trying to be the gentleman and let her finish first.

She leaned over and pulled me to a nipple. I held her and sucked -- that did it for both of us.

When we unwound, I stayed on my back and pulled her to my side. She rested her head on my shoulder and I put an arm around her.

That's how we woke in the morning. But soon she was holding me, suckling me. We took a break to use the plumbing, then returned. So comforting, being held.

So comforting, for a while... She shifted, changing the way she held me, holding me tighter, moving more atop me, moving my head around, running her other hand over me. I ended up on top of her, sliding in, pulling her legs up, enjoying everything so much, the sounds she made, her legs around me, holding her and being held afterwards.

I took a quick shower and she took a long one.

"Eggs?" I asked as she came into the kitchen toweling off her short hair. She nodded and I started to ask, "How many does Mimi..." but she was in my arms, kissing me.

When we separated, just a bit, she explained that now they were live, one of them would be with the equipment all the time. She'd have two, though. Okay, we can fix toast and eggs and take them over.

She did toast while I did the eggs, over easy.

She looked in the pan and frowned. "I thought you were having two," she said.

I nodded.

"Then..." she started to ask.

I pointed with my wooden spoon to Fred. One for him. He was sitting on the floor next to us, looking up, his tail going, ever the optimist.

She smiled. "Is that good for him?"

"What do you think?" I asked Fred. "Is this what dogs eat?"

He gave us an enthusiastic bark.

We had our eggs and toast. Fred got some crusts to go with his egg. We did eggs and toast for Mimi; I had to tell Fred to stay when Rachel went to the door with the plate for Mimi.

It didn't take us long to clean up the kitchen, and we walked to the office.

I settled into my routine, and Fred settled into his. Good news -- the website picked up an order overnight! A ham in Oregon -- he didn't need calibration, so it didn't take me long to pull the antennas, cables, and adapters he wanted. Boxed it up and printed out the shipping docs. "Azteca for lunch today," I told nobody in particular, since Fred was back in his basket. They were across the street, next to FedEx and the Starbucks. Fred and I could drop off the package, and get lunch.

Mimi showed up a little after eleven, pulling me out of my chair and into a long kiss.

I held her, letting her rest her head on my shoulder. "Things going well, I take it?" I asked as I rocked her gently.

I felt her nod. "The easy part was easy, thanks to you. The hard part takes longer." She kissed me on the neck, then stood up, taking a deep breath. "What's for lunch?"

I smiled. "You had a nap?"

She nodded. "Right after breakfast, thank you. And I might take one this afternoon; not my turn to stay up all night! Lunch?"

"I've got an order to ship, so I thought I'd go across the street to the Mexican place. We could do some grocery shopping this afternoon, stock up the fridge in the house for lunches and snacks if you're going to be working shifts."

She nodded, still pressing her hips into mine. "We should do that -- too often when we do these deals we don't eat right, and we feel it afterwards." She moved her hips against me, smiling. "But this one is a lot better!"

"I'm so glad someone lost that suitcase," I told her.

She laughed, still pressing against me. "So are we!"

The three of us, Fred, Mimi, and I walked across the street to drop off the package and get lunch. Mimi and I had fish tacos, and she got an order to go for Rachel. Fred hadn't been over for a while, and they gave him a very nice cooked ham hock used in preparing the *refritos*.

The bone kept Fred busy for much of the afternoon. Mimi and I went on a grocery run, stocking up. Yes, you can live a long time on peanut butter and jelly, but it does get boring after a while, a short while. She gave Rachel a nap break for a few hours. I fixed dinner for us, linguini and clams, which went over well. We ate in the shop, the LCDs changing every so often.

Mimi spent the night with me, preferring to snuggle when we went to bed, and be a tigress in the morning.

I didn't know if we'd develop a routine, especially after Rachel got a call in the middle of the next night, and took off. Mimi came back some time later, waking me *very* enthusiastically. After a few more days, they explained that things pretty much just needed to be monitored, with someone there in case they needed attention.

To a certain extent, that did settle us into more of a routine, except for the times when one of them would come over to get me, usually because they decided they needed some *right now*.

Oh, after a few days, they presented me with a bottle of little blue pills... "We" tried one, and liked the results! Rachel had larger, softer, fuller breasts and a fuller bottom. Mimi had perkier nipples. Both liked being on top, and suckling me to get what they wanted. Rachel also liked it when I rode her bottom. Both of them appreciated it when I went down on them.

Their work (which I didn't inquire about) was in the slogging phase. They did add another box, one with a pair of overclocked top-end quad-core Intel processors, a large amount of very fast memory, a tiny hard disk, and a cheap video card. Yeah, the geeks at Central had been confused until they explained it was going to be a computing engine, but once they understood that, it went together quickly, tuned for performance.

I guess the extra horsepower did the trick -- two days later, I was dragged next door by a very happy Rachel, and the three of us spent part of the afternoon on their bed celebrating.

But they had slow times as well, once mentioning that someone was out of town for a few days -- guess they were looting laptops. I thought they'd be more relaxed over a three-day weekend, but they were busy, with Rachel making a run to Fry's on short notice. Tuesday morning, Mimi brought me three terabyte disk drives, and as we put them (still warm) back into their original packaging, she asked me if I could send them FedEx overnight to the East Coast. Certainly. I had enough bubble wrap to pack them safely in a larger box, which Fred and I took across the street.

Rachel liked to surprise me and suckle me into submission, then get me so aroused and hungry for her... Mimi liked that too, but also liked getting me turned on, and then pulling me on top of her, setting my pace with flicks of her fingers. Some mornings I'd wake up being held by them, some mornings I'd wake up with one of them at my side, head on my shoulder.

Waking in the dark to a cellphone ringing. Unfortunately, not unusual; I didn't even look at the clock. Rachel said, "Hello?" and switched to what I'd learned was Hebrew. Her voice got animated; she got out of bed and went to the bathroom, still on the phone.

I sighed and turned over. That usually meant I'd be alone for an hour or so. I settled in and went back to sleep. Hopefully, someone would wake me!

Partially waking to a body slipping into bed. More awake, being pulled to a perfumed nipple, being squeezed and held. Rachel held me, moving partially on top of me, telling me what she needed me to do. One hand holding my head, her other hand wandering, teasing, and soon guiding me into her, so wet and so hot.

After making sure we were securely connected, she sat up, and lifted my hands to her breasts. I knew what she wanted, what she needed -- I started teasing her nipples as she rocked her hips, one hand going between her legs. Good; she was close, and I was a ways off. So good, feeling and hearing her come, feeling her rocking.

She leaned forward, pulling me to a nipple again, swirling her hips as she whispered to me, urging me on, carrying me over the edge.

We snuggled together again, and went back to sleep.

Up early, showering together, she was so close and attentive.

At the shop, she went to relieve Mimi.

She came back a while later, with my little cart; I didn't remember her taking it. I was sitting at my desk in the front as she wheeled the cart into the back. Something on top? Things? I got up and followed her.

She went to the drill press and set it up with a backstop and a quarter inch high-speed bit.

Hard disks? I picked one up -- still warm! She put on safety glasses and took the disk drive from my hand with a smile. She turned on the drill press, and proceeded to put two holes through the disk drive, from top cover all the way through the circuit board on the bottom. She tossed the drive to the bottom shelf of the cart, and picked up the next one from the top.

Well, that's one way to erase a disk! Some sounded a bit different -- those must be the terabyte drives, more platters in those.

I guess I made a noise when she picked up a VelociRaptor drive. She looked to me questioning.

"No... Really?" I asked.

She chuckled shook her head. "If you want these, we have to install them this morning."

"We can do that," I told her.

She handed me the drive, and picked up another from the cart. They were the high capacity ones!

I headed off to swap out some slow drives from my systems!

I'd completed one swap, imaging from a slow (7200 rpm) drive onto the 10k drive, when she walked into the office. "Nobody's going to read those!" she told me. "I put them in your scrap bin, if you don't mind."

"No problem," I told her. "I'll call for a pickup this week."

"What are you doing?" she asked, coming closer, leaning against me as she looked at the screen, and giving me a quick kiss on the head.

I explained what I was doing, swapping in the new drives. She approved, and helped me start the second one, sitting in my lap.

We started the second one imaging. I sat back and gave her a questioning look.

"We're done," she told me, putting her hands on my shoulders, pulling me to her.

"You're leaving?" I asked, snuggling in.

"Yes, tomorrow or the next day," she sighed.

"That was your phone call in the middle of the night?"

She nodded, rocking me.

"Thank you for waking me when you got back," I whispered.

"Mmm... You are so warm, and so nice. I'm going to miss you."

I held her close. After a bit, she gave me another hug, then got up and left.

I sighed, looking at the door.

My main box was done; I rebooted it from the new drive. Damn, that was fast! A few random orders had come into the website overnight. Oh, good -- a set of calibrated wideband antennas. I checked the company -- a TCB in South Carolina. I e-mailed them, asking if they wanted calibration at the end of the antennas, at the end of the 3 meter cables they'd included in the order, or both? I'd do both with certs for an extra \$50.

The three of us had a caucus mid-afternoon. Yes, technically they were skipping out on me, leaving in the middle of the night. They were taking the antenna deck, cables, amplifier deck, RF cards, and leaving the rest -- I could have the computers and the LCDs. Oh, they'd put the original hard disks back in the computers, so they were operational. Rachel grinned as she told me there were a mix of fast drives in there, as well as big ones.

I suggested making dinner reservations for the three of us. Mimi shot that one down; we shouldn't be seen together, particularly if they were nominally skipping out on me.

We had a nice dinner together, a nice evening together. Bed together as well, Mimi and I with Rachel providing encouragement; they wiped me out. We snuggled together after.

I heard them getting up in the dark. Both kissed me. Rachel held me to a nipple for a while and rocked me back to sleep.

When I woke in the morning, they were gone. Just Fred and me again.

After he finished his morning biscuit, he looked around, head up, sniffing the air.

"Yeah, they're gone. Back to just you and me, friend."

When I went to the office, they'd left a mess in their place. When George got in next door, I ranted a bit about being taken by two good looking women, left with a mess. George laughed and shook his head. Ginny, who is in her mid 40's, frowned and shook her head. Min thought she might have some friends interested in the space in another month.

Didn't take me long to clean things up; the mess was superficial. The bathroom was cleaner than when I'd turned the place over to them. Damn, wish I had more tenants like them! And longer-term!

Back in my office, I triaged the computers they'd left. Six machines, one from the roof, the other five each with a widescreen LCD! A quick inventory -- all faster than what I had, and that was the slowest! I decided to upgrade my desktop boxes, and the servers. All of a sudden, I had too many displays! I gave my old LCDs to the theatre folks, who were still using CRTs. They'd get the old machines when I'd migrated everything off them.

But how did this get me my second best customer? Oh, my best customer? That's Rachel and Mimi, easy.

The second best? Tempus fugit. No matter what we do, tempus fugit. Just the two of us again, man and man's best friend. The feds did me a favor, the FCC changing some testing requirements, and all of a sudden some of my antennas were quite popular. In a three week period, I sold more than I usually sell in a year. They're still doing well.

About eight or nine weeks after Rachel and Mimi left us, another morning pretty much like every morning to Fred, either we go to the office or we don't, we're in the office and I'm looking over orders I need to ship and e-mails I need to answer.

Ka-ding, someone at my door.

A man and a woman come in, both mid-30's, dressed business casual.

Fred appears by my side, and he *growls*. And I mean a nasty growl, low, mean, and showing teeth. Now I'm worried -- Fred is usually a very good judge of character.

"What can I do for you?" I asked, not calling off Fred.

My visitors looked concerned as well. "Ah, Doctor Marsh, we were interested in discussing antennas with you," the man said.

The woman added, "We were told Professor Basset was quite charming..."

She pronounced it correctly. "He's usually a good judge of character; who told you that?" I asked.

She answered, "Captain Markus -- Rachel."

I looked over to Fred and told him, "Knock it off!"

He grumbled and sat right next to me, not taking his eyes off our visitors. His ears were back still, and his tail unmoving, his muzzle still twitching a bit, showing some tooth.

"I hope they're doing well. I was glad to be of assistance," I told them. "Have a seat."

Fred grumbled again, and I said, "Hey!"

They introduced themselves; I'll call them Ed and Linda. Ed was a sigint guy, and Linda a physicist.

"We debriefed them, and have had the opportunity to not only review the data they collected, but also to test your antenna array and its supporting electronics," Ed started out.

"We were very impressed," Linda added. "And in questioning them, they suggested we come speak to you directly, and your colleague. Captain Duran, Mimi, wanted me to let you know she misses going for coffee with Professor Basset."

I looked down at Fred; he still wasn't sure. "It was an interesting project. I was relieved to see it worked."

Ed asked, "If you were to do it again, what would you do differently?"

I smiled and brought up a set of drawings on my LCD, turning it some so they could see better. "Call the one I did RM-1. Here's RM-2. As you are probably aware, some dimensions are important, others not so much. If you look at it, remember RM-1 from the side, the 2.4 gig antennas protruded a little. And the structural stability wasn't that good. Rather than using stock, I redesigned the antennas, and fabricated them on substrates with extensions to support the enclosure. Not only is the whole thing stronger and more stable, you can put a piece of radome

material across the whole front of the assembly, either for weather protection, or just to make it more robust to mishandling.”

Linda nodded. “You could encase the entire assembly -- in fiberglass -- that would make it far more rugged.”

“Yes -- and if you did that, another addition I’d make would be to put a small plastic tube, a radio-transparent polystyrene, say, from the back to the front for use as an aiming aid, a boresight.”

“You built the enclosure out of circuit board material -- why not integrate the electronics on to the rear face of the assembly? That would eliminate a number of connectors and jumpers,” Ed suggested.

I shook my head. “Yes, it would reduce parts count. But... Imagine you have such an assembly, with integrated electronics. Someone in the field gets a cable connection wrong, and pushes 500 milliwatts of RF into the back end of a low-noise amplifier. Pfft! The *whole thing* is now junk. While this design has more connectors, it’s also modular, so if someone does fry an amp, they can bypass it, or swap with the amp for another channel. A lot more opportunities to recover from failures. I like recoverable designs.”

“Yes, but we emphasize in training ...” Ed started rebutting.

“Did they tell you what their first try was? What got me involved?” I interrupted.

They shook their heads.

“All that training goes out the window when the airlines lose your gear! Junk commercial antennas, low gain omnis, reverse polarity SMA connector to an adapter to regular SMA, so far so good. But from there, SMA to BNC, feeding a bunch of BNC tees! Not a splitter, or a set of cascaded splitters, but a bunch of junk tees! And coming off each of those tees is a cheap 75 ohm video cable with BNCs on each end, with a BNC to SMA and SMA to reverse polarity SMA going to the radio card. Oh, the shielding job on those radio cards was first rate -- I wouldn’t mind a few sets of those. But the antennas and cabling they pulled together were really spectacularly bad.”

Ed shook his head and Linda shuddered.

I laughed. “Hey, it got you a trip to the Left Coast to follow up on what works. And I hope you can spend some time sightseeing and enjoying the weather.”

Ed gave Linda a look and nodded. “I agree, not integrating the electronics deck into the antenna itself is a good idea.” He looked back to me. “But how about integrating the elements of that deck into a smaller package? Oh, I understand better now the value of using modular components. But what our people tell me on pricing -- an amplifier in its little integrated circuit

package is perhaps five dollars new, but in a metal case with connectors, now the price is ten or even twenty times that!"

I nodded. "Yes, quite true. It depends on the kinds of tradeoffs you want to make, and the failure modes you want to tolerate. If you want to make the entire deck a field replaceable unit, yes, you could knock down the cost a few hundred dollars. A question I never had to answer, think I mentioned it in the report, was whether the 18 dB or so isolation between transmitters that's provided by the combiner is adequate, or if more isolation is needed. If I went to a single PCB, or integrated that portion, I'd design in more isolation; it would be more cost-effective."

Linda smiled and nodded. "We don't have a good answer to that question, either. Supposedly the margins on the transmitters are good, but the manufacturer hasn't been able to provide us any insight."

"If they knew where to start looking," I suggested. "A lot of the designs I've seen... If you were looking for it, you might see transmitter power being folded back as power from the other transmitters leaks into the power sensor -- but I don't know what the time constants are, so it might be stable, or it might oscillate. An interesting question."

Linda smiled a little more. "Would you be interested in studying the issue for us?"

I leaned back a bit. "That might be fun... I'd need a lot of data on the radio cards you use, and a few sets of cards. We can probably agree on something there."

Ed opened the portfolio he was carrying and took out a page. "We are interested in purchasing some antennas, stand alone, and would like you to quote on assemblies, your newer design, as well as examining other options for integration." He handed me the page.

He handed me the largest single order I've seen. We talked. We dickered. They wanted to standardize on my antennas for all their "field work." After lunch, Linda talked about some custom design work as well as the one study. We agreed on prices and delivery; I'd be delivering to a U.S. company in New Jersey, which simplified things for me.

They insisted on fish tacos for lunch! The four of us walked across the street.

I checked my inventory and told them how many antennas I could part with without jeopardizing orders. I showed them the protos of RM-2 I'd done; they wanted both of them, *now*, and a bunch more! Ed placed a call and arranged a wire transfer to my bank, very quickly completed. They walked out with two boxes full of antennas, my protos, and I had my work cut out for me to fill the rest of their initial order!

I looked to my business partner and said, "Fred, I think we can get the spectrum analyzer upgraded!"

Landlord

But I did fill their order, easily, and I get more orders from them every quarter. I even get the requests for quotes on the RM-2 and its associated electronics package from other folks. I quote a higher price than my initial customer gets, but I'd bet I could double that and still sell just as many.

I also get the occasional picture of one of the arrays, pointing out a window somewhere. That and postcards from around the world, signed by Mimi and Rachel.

Well, the postcards are addressed to Professor Fredric M. Basset.

I don't mind. But I do wish they'd come by for a visit some time, even if it's just to see Fred.

FIN
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Landlord

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