

**COOP'S
SATELLITE
DIGEST**



OCTOBER 1983



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TOP OF THE MONTH

IQ-160. Fact or fiction? Never, perhaps, has a relatively small TVRO manufacturer gambled so much of their future on a **single** new product. And **NEW** is what the 160 is all about. Perhaps, they say, it is **too** new; **too** advanced for the marketplace, and, **too** complicated for the dealer to handle. We look at the 'controversial' IQ-160 here this month and come to our own conclusions.

ANTENNAS. With wild performance claims sprouting up for dishes of every size from 4 feet to 20 feet, **CSD** begins a multi-part series on antenna measurements this month. We begin our look at antenna system performance by traveling to San Diego, California where Coop has the opportunity to operate a 'far field' antenna test range where antenna performance is checked and verified to the last tenth of a dB. We think you will enjoy what goes into a **real** antenna test, and profit from the knowledge that antenna testing really is not that complicated; provided. Provided you do it properly on an antenna test range. Where does all of this lead? Hopefully to more honest antenna performance numbers, as we shall judge in the months ahead.

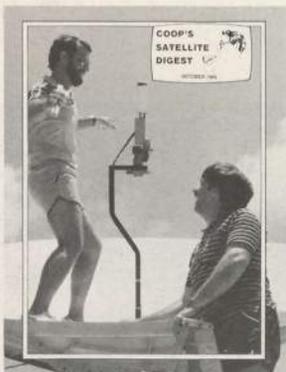
SPACE has come out swinging at the STTI show myth. **SPACE** will be in Las Vegas and that means two industry trade shows in Vegas in March. Good or bad? Coop comments, here, this month.

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OUR COVER — Don McLaughlin (left) and Dave McClaskey (right) indulge in a little structural testing of the **Challenger 11** antenna portion of the **IQ-160** receiver system at **CSD's** Providenciales test facility. The antenna survived McLaughlin's tight-rope walking act but the real test of field acceptance is still ahead.

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COOP'S SATELLITE COMMENT

- \$750,000,000 BOOST To Industry?
- CANADIAN CABLE SYSTEMS STEALING
- ORLANDO/ Watershed?

FINANCING/Insurance

Since we wrote in our August issue about the 'possibility' that an industry-wide financing and insurance package 'might become available' to the TVRO dealers, there has been mixed reaction to the concept. I have listened to those who **think** they understand what the proposed package is all about, filing away mentally their affirmatives and negatives. The former outnumber the latter I hear but there is a surprising number of both.

I have my own reservations about somebody (anybody) marching into the industry with a band playing and announcing they have solved **all** of our problems. I doubt anyone can solve even 25% of our problems, but then, 25% is a big step forward if it all comes in one giant bite.

Let's re-look at some of the problems dealers face. If the dealer faces problems which are damaging to **his** business success, ultimately the distributors and OEMs must also come to grips with the same problems since the dealer 'network' is the critical link in the chain to the consumer's pocketbook.

Number one is financing. I am amazed, looking back at how the industry has developed (I hesitate to use the word 'matured!') over the past four years to see us shipping, and I suppose installing, as many as 20,000 home TVROs per month when virtually all of the systems being installed are sold for cash money. I didn't realize there were so many Americans out there with ready cash reserves to cough up \$1995 or \$2995 or \$3995. I'm certain many of these are going into their banks or to the friendly local finance company to borrow the money; it is nice to see that 20,000 Americans have either the cash **or** the credit rating to do such a thing each month. Still, this is hardly the proper long term answer for solid industry growth.

I am reminded that the US auto industry faced a similar situation until the late 40's; if you wanted a new car, you paid **cash** for it. How you got the cash was your problem. Then General Motors started GMAC and using their corporate financial muscle they made available financing packages through the dealers. A smooth move and the auto sales immediately doubled, and then doubled again. If you can sell more cars by financing them, you should be able to sell more TVROs by financing them. Certain am I that having TVRO financing available cannot **hurt** the selling posture of the typical TVRO dealer.

Number two is insurance. I thought, and I was wrong, that having a solid warranty/guarantee program behind the dealer was the single most important step to improving the dealer's lot in life. I had formed this opinion after reviewing the hundreds of dealer survey responses to our April issue 'Dealer Survey.' What I saw in those returned forms was often uncontrolled anger, frustration from dealers, who felt they were getting the short end of a sharp stick from uncaring OEMs and distributors. Certainly such dissatisfaction **does** exist. Certainly there **is** considerable room for improving the lot of the dealer's relationship with his or her supplier. And certainly industry-wide, national insurance/warranty/service in one comprehensive program **would be** a major step towards correcting some of those ills.

But I no longer feel that a lack of this sort of available coverage is the **number one problem** facing dealers. I **now believe** that if the dealers can get the bank-rate funding they need to offer TVRO systems on easy to handle monthly (time payment) terms, **THAT** will be the most important single step the industry could take.

This is not to brush-off the extended warranty/service program part of the problem. This is not to suggest we don't really need such a plan, afterall. We do, but I now believe that **if** we had to make a **choice** between having only (1) nationwide time payment financing, **or**, (2) nationwide extended warranty/service protection, we would be better off to get the financing.

Well, I can now report to you that no such choice is likely to be forced upon us. We apparently can have both!

Late in August, the chap on the front cover of our August **CSD**, Bill Young, called me to report that his firm had signed the final agreement papers guaranteeing our industry no less than \$750,000,000 (that is three-quarters of a **billion** dollars!) for system/terminal financing during the next 14 months or so. The entity that will make all of this possible is called **Satellite Financial Planning Corporation** (SFPC for short) and it is '**another Bill Young company.**' This funding is being provided by a major (major!) national group of banks; it is not money found lying about the gutter someplace. It is not money with a 'taint.' It is the **same money** you could borrow to **build a house** or **buy a car**, if that was what you wished to do.

I have never been faced with the logistics of loaning out \$750,000,000. I cannot even begin to conceive the problems associated with such a project. I do not **want** to know about such problems, but I have a feeling that before it is all over I will know far more about it than I ever wished to know!

That was half of the story Bill Young related to me. The other half was that the same week Young finalized the money arrangements, he also closed all but the last of the gaps in the national extended warranty/guarantee program. This will assure dealers that if they elect to sell equipment which has been properly 'rated' by the insurance industry, the dealer will never again have to worry about equipment breaking down and putting customers out of service.

Now, other than reading my comments here, when might **you** have the opportunity to learn all of the details of these twin-programs? It happens that **SFPC** will be trotting out all of the details at the **SPACE** show in Orlando November 3-4 and 5. I think I can assure you that if you travel to Orlando for whatever reasons you need to justify the trip, you will be treated to the opportunity to learn all about how your TVRO dealership can tap into the \$750,000,000 'instant-available-credit,' **and**, how you can **also offer** your customers the peace of mind that goes with having a fully protected system for three or five years into the future.

While many of **you** were in Nashville the first weekend in September, I was locked up in Florida with **Joseph Gammon**, President of the **First National Bank of Wilmington (De)**, **Kermit Zieg, Jr.**, for **Commercial Credit Management Corporation**, Young and another chap I will mention shortly. I was invited into the meeting because Young wanted me to have the opportunity to question Gammon about the program. Young is a very careful businessman, I have learned, and he wanted me to have every opportunity as 'the press' to test the program and the sincerity of this multi-billion-dollar banking corporation. I **played the part of a dealer**, pretending that I was trying to get financing for several of my customers. I found out I could sell a customer a TVRO, throw in a big screen projection set, stereo adapters, big speakers and anything else I could stock in my store and get **instant credit approval** with a **single telephone call**. I was more

than casually impressed with the totally computerized, depth of field operations they have put together. I guess I should have done my homework better before going to the meeting; the bank is part of a huge conglomerate owned by **Control Data Corporation**, the Minneapolis high tech firm that leads the world in several fields of electronics (among other things).

I spent part of two days with these people. They know their business like Andy Hatfield knows receivers and Taylor Howard knows feeds. Total, complete, from top to bottom. Oh yes, the other fellow with us.

"**Larry James will be joining us,**" Bill Young reported on the telephone. I thought that strange but passed up asking why Larry would be there. I **thought** he was in Nashville covering the STTI show for our **CJR** publication. I found out differently.

Two elements of this come very close to home for me. This whole thing (financing and warranty protection) **started on Providenciales** where Bill Young maintains a residence. I had started a conversation with him one day when he came by to pick up some ice cream at Susan's Candy Cane Shop. I had asked him how an experienced person in the insurance/warranty business would approach the problems our dealers were having. The April **CSD** survey was fresh in my mind; I was up to my neck tabulating the hundreds of dealer responses that day. After I spoke for thirty minutes relating the problems dealers were reporting to me, I had his fulltime attention. And he has been hot on the trail of solving our dealer's two most important problems ever since that shared milkshake.

So because Bill Young is a 'neighbor' of mine, I have a special interest in seeing that the program is not only viable, but in the process, **my industry** is not mis-led by what the program can (or cannot) do for the dealers.

If having Bill Young as a neighbor is not sufficient to keep me on my '**detached-editorial-journalist**' toes, what follows really puts me on the spot. Back in June Bill Young had accompanied me to the Minneapolis STTI show. I introduced him to a wide range of people in the industry at that show, including Guy Davis of Intersat and Larry James of Patmar. That trio appeared on the front cover of our August issue of **CSD**. It was only shortly after this social-introduction that I outlined to Larry for the first time my concept for the now-launched **CJR** monthly newsletter, and asked him to join with me in putting **CJR** together each month. The '**J**' in '**CJR**' stands for James.

When I showed up at Young's Fort Lauderdale home for the meeting, there was James; fresh off an airplane from Nashville. They told me that during the intervening months, from the initial introduction, they had talked together quite a bit and that on September 1st Larry had turned in his resignation with Patmar Technologies. He was joining SFPC as the **Senior Vice President**. I asked how Peter Sutro (President of Patmar) had taken that news. I value Peter as a friend, and in the back of my mind I could see Peter wondering what kind of friend I was if I turned Larry onto Bill Young, and vice-versa! I hope he understands that all I did was introduce the two; I had introduced Bill Young to several dozen industry people in Minneapolis.

If Peter and I can still be friends, I am not nearly as sure how to handle the obvious dual-relationship that James now finds himself involved with. On the one hand, he is a very important cog in the processing of \$750,000,000 to TVRO dealers for consumer financing; plus an equally important part in the machinery of the nationwide system guarantee program. At the same time he remains the '**J**' in **CJR**. Hummmm.

Way back when I first talked with Larry about **CJR**, I explained to him that there could not even be a hint of bias in what he did; that to be a journalist in a small industry such as this, it was paramount that he separate his mind from Patmar when he was working on **CJR** material. I also told him that if he consciously or sub-consciously began to handle material in ways that advantaged Patmar, I would promptly find another way to 'spell' **CJR**.

After the shock of the \$750,000,000 and spending time with the President of the banking group responsible for this program, I began to focus on the possible conflicts brought about by the new dual-role for Larry James. On the one hand, there is no competition to what they will be doing. **Who else** has \$750,000,000 to 'give' to dealers to help them 'sell' TVROs? **Nobody**, that's who else. **Who else** has a complete nationwide protection program backed by a major, international

insurance carrier? **Nobody**. So for the moment, at least, there was no point in Larry being cautious about playing a 'favorite' since the SFPC game was the only game in town.

But there will be plenty of other pressures, and temptations, on the road ahead. **The door will swing open on the vault on November 8th.** That is the Tuesday after the weekend-long **SPACE** gathering. Those attending the **SPACE** show will be shown how unbelievably simple the bankers have made the program to implement. The dealer will be set up and in business with as much of the \$750,000,000 to 'loan out' as he can handle. In effect, no limits (I have this image of a dealer going back to Left Overshoe, Iowa and placing an ad in the paper telling people **he has** \$750,000,000 ready to finance home TVROs; nothing down, flexible terms, interest rates pegged to prime rate and far lower than commercial money rates and so on!). Boy will that make for a **SUPER** Christmas season!!!

I see Larry totally buried by work for many-many months. That won't help me with **CJR** very much. But that is the least of my worries. Equipment selection has me concerned.

The warranty/protection part of this program has been busy these past few months building a list of 'acceptable equipment.' That means equipment which the banks will loan money on, **and**, equipment which the protection people will cover for long term operation. I have not seen that list yet. I would like to see the list and I said so. I was told I could see it in Orlando.

Let's suppose 'XYZ' brand of equipment does **not** appear on the list, the first time around. That means this equipment has been found 'wanting' by the insurance industry based rating system. That means also that this equipment cannot get financed because the insurance people don't think it will hold together for three to five years. If I was a manufacturer and I got to Orlando and found my equipment not on the list, I think that could ruin my show. I also think I might be really angry about this, and maybe even justifiably angry if I felt the rating guys had made some error in checking over my equipment.

And I'd look for the first person to 'pound on.' If I couldn't find Coop to spill my guts to, I'd head straight for that guy James. He's the VP in charge, right?

And that is what concerns me most about the position, that dual-relationship, that Larry now finds himself in. Ninety-nine percent of the time, he is busy approving things related to the \$750,000,000 'fund' or handling warranty program start-up pains. If I get 1% of his time for **CJR**, I will be doing well.

"**My receiver is not on THE list,**" the guy yells at Larry. Larry knows that; he has the list memorized. "**WHY**"!!! the guy demands to know.

I asked lots of questions about this myself. I was assured that since the money and insurance people want the money and insurance programs to be useful to **as many dealers as possible**, that equipment will be left off the list '**only for good cause.**' "Will the OEM be told what the cause is"? I asked. I was assured he would be told, and he would be given time to straighten it all out.

I still **think** the guy who finds 'his baby' or 'his creation' missing from THE LIST is going to be ticked off. **And sooner or later**, he is going to come to **me** and make all sorts of noises. I will assure him, as I tell you now, that I am simply a journalist standing off to the sidelines watching the parade go by. That I have no more influence over THE LIST than a dealer might. I doubt that will satisfy somebody who finds his gear missing from the list. Sooner or later I expect to be told "**BUT you know Bill Young; you share a milkshake with him on Provo,**" and, "**BUT you work with Larry on CJR and you can GET TO Larry.**"

No way will I allow myself, the journalist standing off to the side of the parade, to get stuck into that can of worms. But Larry will; he's both the '**J**' on **CJR** and the Senior VP of SFPC.

Hummm.

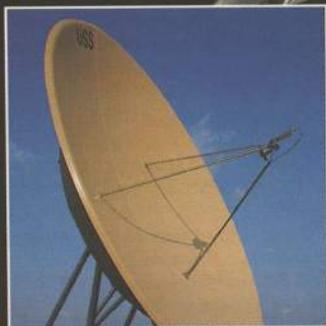
So after I thought about this a while I took Larry aside and explained my delight with what I was learning, and **then** I outlined my fears of what this was going to possibly do to his budding career as a 'journalist.' He understood. I also told him that just as soon as people started reminding me that Bill Young and I shared milkshakes and Larry and I shared the masthead of **CJR**, I was going to have to find some other way to spell **CJR**. He said he understood that one also.

Track Through The New USS SR-1 System

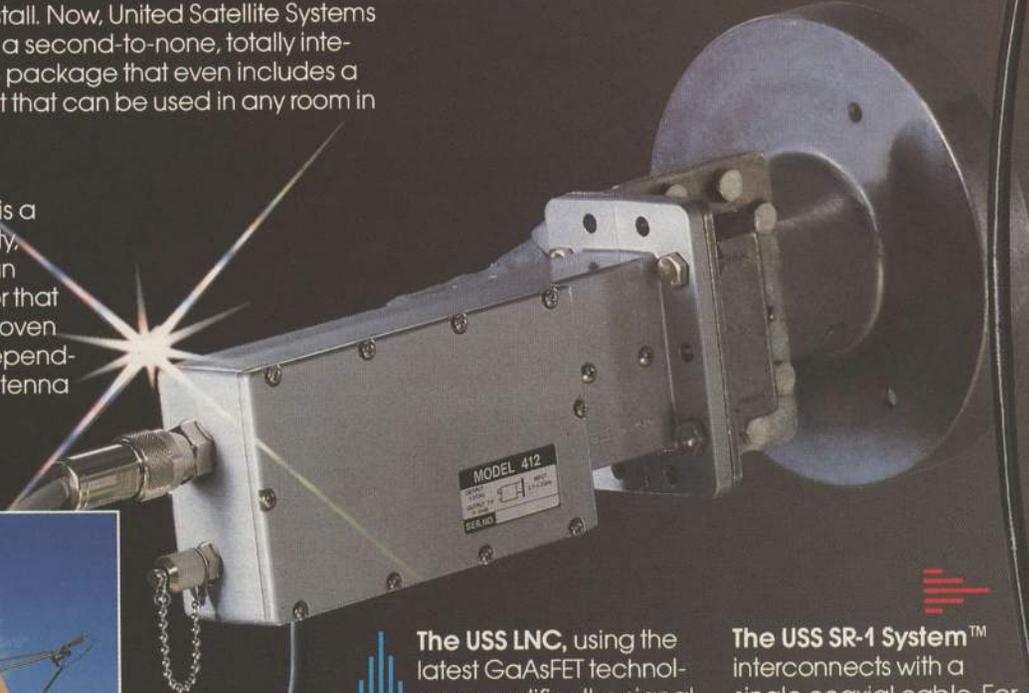
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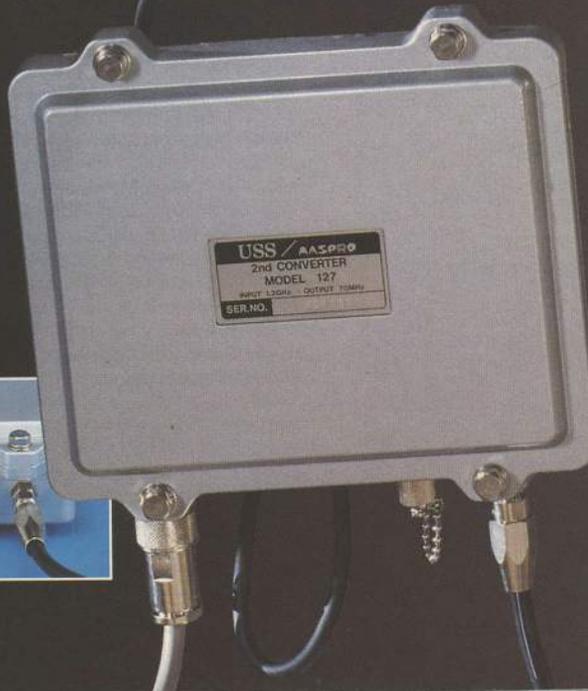


Track it through. See for yourself that USS has put it all together for superior quality earth-station viewing.



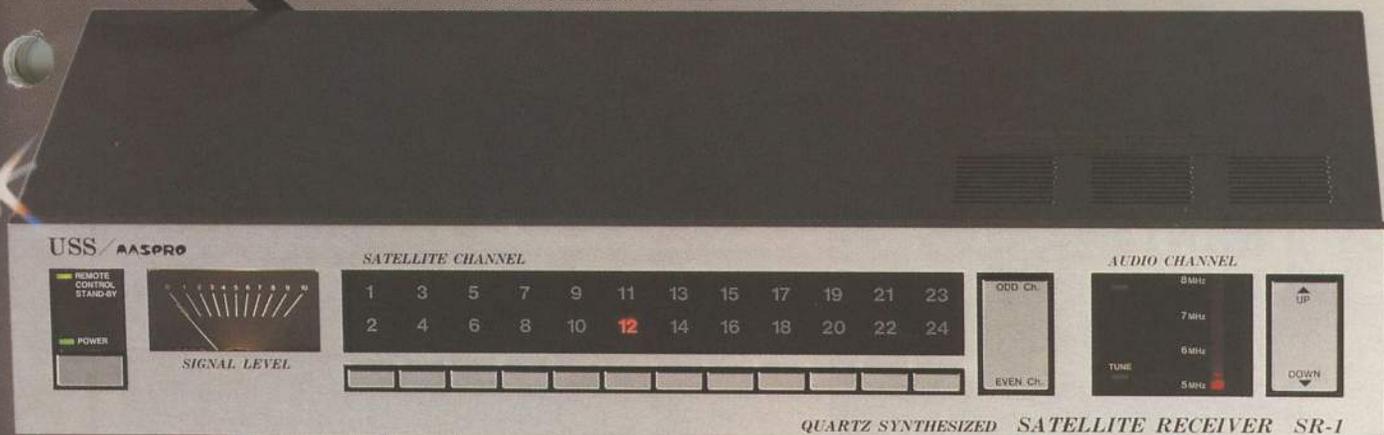
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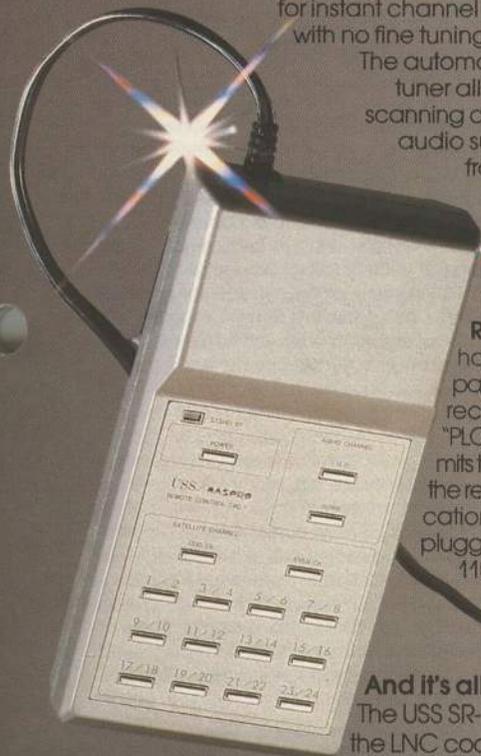




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TWENTY FOOT INSTALL IN HONDURAS

The Boat No Is Here!

Well, the two-week long three-day job was completed. The people of the coastal area of Honduras were gathered in a carport watching American television movies radiating from a color TV set propped up on a washing machine. Out of the crowd there were distinctive moans, groans and the occasional "Ole" as Mr. 'T' and Stallone engaged in combat on the screen. In the side yard, Central American moonlight reflected through the banana and mango trees and bounced from a newly installed 20 foot ADM dish. Connecting the sizeable dish to the electronics, coaxial cable and support wires wound through the grass. The wires were in no danger of being damaged although they laid on the open ground. Every person in the crowd knew that the cables and the big dish antenna provided them with their connection to **Norte Americana** and anyone who might have stumbled over the wires would have been in serious peril from those who took 'ROCKY' very seriously!

One might wonder how what should be a three-day job could stretch out to two weeks. I have family in Florida who wonder that. But to anyone who has ever spent anytime in Latin America or the Caribbean . . . well, things like having the wrong papers filed with local customs, or, an obstinate local official, or a boat that runs late ("Manana; manana, it come . . ."), bad weather, lost luggage and much more all contribute to the unwanted (if not unwelcome) 'stretching' of a three day job. When I arrived the pad was in place and seemed like it was correctly positioned. After learning that the parts that **should** have been on hand, were not, the only common sense thing to do was to simply act like a tourist, relax, and await their arrival. Since 'the war' in the neighboring country of El Salvador was much in the stateside press, and the part reportedly being played by Honduras was frequently mentioned, it seemed like a 'neat thing' to do to go looking for the war (I admit that is on the surface an unusual way to spend one's time!). I obviously did not know **where** to look for 'the war' since I could not find it. I must have turned right rather than left at the wrong banana tree, because after several days of looking I came to a private conclusion that Honduras is not at war, nor is it involved in a war. **I know**; that is **contrary** to what the network evening news reports. Like I said, I must have made a wrong turn someplace. Or maybe the American journalists covering 'the war' just **thought** they were in Honduras.

To be sure, Honduras, like its 'CA' neighbors, has many, many problems. But the root of the problems is primarily economic, not political nor sociological. At the moment Honduras is 'home' to not only the native 'belongers' but also to many who have fled El Salvador and Nicaragua. I suspect Honduras is an 'unwilling' host to these tens of thousands, and this taxes an already poor countryside. Honduras is also 'host' to a contingent of American 'advisors' who appeared **to me** to be more active as 'troops' or even 'snoops' than as advisors. I'm sure, as I said, that I made a wrong turn at a banana tree. My

by
Bill Miller
PROMAR
P.O. Box 22133
Tampa, Fl. 33622



qualifications, admittedly, do **not include** political science or foreign affairs advisor so let me simply note that Honduras would have a far stronger ability to resist whatever might come its way if it had American **technology** and perhaps **funds** to build roads, port facilities, airstrips, water systems and electrical systems. If such facilities do not exist (they usually do not), or they are very poor where they do exist (they are), progress towards economic stability is both very slow in coming and perhaps it never comes at all. I remember a wise man who once suggested that rather than sending food to a starving people, you should send them seed so they can learn to be self-sufficient.

The Republic of Honduras is entirely self-governed; a democracy with an elected President. Honduras is a good 'international friend' of the US, and in the two weeks I was there waiting for the boat to come, I heard nothing negative said about the USA. The closest such comments I heard was some good-natured ribbing about 'weak Gringo stomachs.'

Principal local industry includes agriculture, fishing and lumber; including bananas, pineapples, coffee, tobacco, lobster, shrimp and Mahogany. Some roads are quite good, some are very poor, and yet others are not there at all. And there are not many of any of the classifications, excepting perhaps the last!

Land Rovers and 4-wheel drive trucks are surface transportation, while very large dugouts with diesel engines as well as small freighters are used for transit along the abundant coastal lines, and to and from the offshore islands. The Cessna 206 and the old DC-3 are the 'mules' of the country; you can go almost anywhere in one or the other, or both. The pilots I rode with are excellent; they are not dare-devils and in fact the US extends reciprocal licensing to Honduras pilots and treats them while here as US licensed pilots.



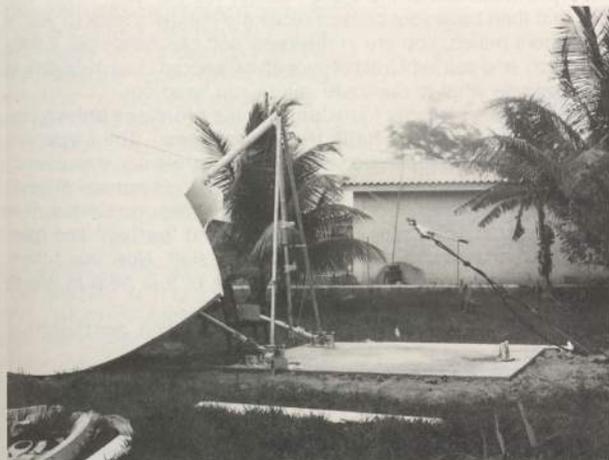
IF YOU are going to have to wait for the boat, you might as well have a nice place to wait!

Well, finally the boat did come and sure enough there was the equipment shipped eons before from Tampa/St. Petersburg. The first major problem we ran into was to continue with us through the entire assembly process; the terrible (sorry Jamie Gowen!) assembly instructions. The first problem was that the book received had no drawing of the correct base layout. Fortunately, buried deeply in my paperwork was an older manual which contained the required information. In fact, this original book had been utilized to send down ahead of me a layout drawing for the pad itself. **Surprise.** When we uncrated the antenna, we found that the south 'foot' on the dish required **four** bolts protruding from the base (foundation); the original plans had a **pair** of bolts shown. Additionally, the plans supplied made no mention of where the azimuth 'slide bar' must connect at the bottom, and none of our holes seemed to fit anything we had on hand. So we improvised locally and it all turned out OK as we shall see. Still, a first class twenty foot antenna (I judge the ADM 20 to be everybit of that) **does deserve a first-class instruction manual.** Suppose the antenna had gone into 'the bush' to a 'first-timer' in the installation business? I shudder at the possibilities.

The product itself is excellent. I was not surprised with the performance, but was very pleased and satisfied, especially after the 'rocky' start. This dish was to replace a Vidare dish which had been removed before my arrival since the dish did not perform and there was concern that the mount supplied could not support the dish safely.

Returning to the manual, briefly, it would appear that it is always in the best interests of a supplier to provide clear, easily understood, and adequate assembly and installation instructions. A distributor such as **Promar** loves to ship product to people like our Honduras customer; but, **we** have to have the confidence that **when** the product arrives, it **will be** assembled and installed **correctly.** Not every potential customer is willing, or financially able, to pay for the additional cost of a 'gringo engineer/consultant' to come to the site and supervise the installation. I believe that any product that might be sold into 'virgin territory' must have well documented instructions, written with the assumption that the installer/user **has never seen** a (working) satellite TVRO previously. If you can, as an OEM, create a manual which satisfies that simple requirement, you will have the international market by the proverbial tail!

During the assembly, our next problem (after the base) was the housing for the LNAs, dual-pole feed and attachments. Since we were using California Amplifier LNAs, we did not have the problem previously reported here in **CSD** (LOCOM LNAs would not fit inside of the housing supplied). We did have a problem with the housing however; the mounting holes, for the hardware that stuffs inside of the housing, were on the exact opposite side from where they should have been drilled. Maybe we did something backwards, certainly we could not check an assembly manual to tell us! At any rate, when the feed/LNA assembly was completed and the cute slide-bar arrangement for setting focal length was slid inside of the 'housing/can,' it was quickly



SOUTH is to the right; north to the left. Fifty percent down and time to haul the dish over on the mount with a 'come-along.'



FORTUNATELY F3R was not behind this tree. Imagine chopping it down to get 'clear air shot!' Better yet, imagine how large a dugout could be carved out of this monster.

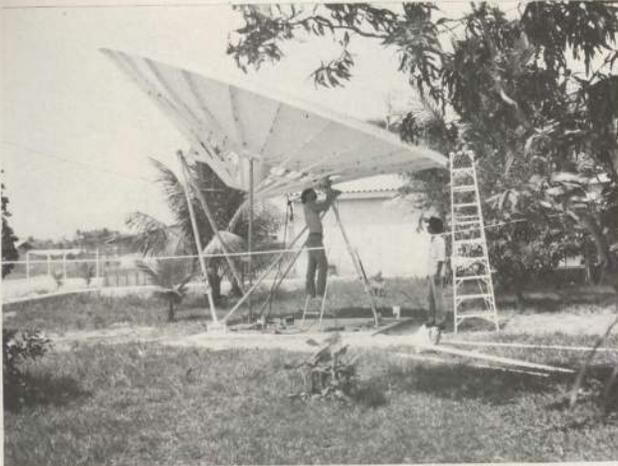
apparent that something was amiss; the whole feed was obviously 'off-center.'

In our situation, there was not to be a 'rotor' to adjust the polarization; the dish would be locked onto F3R and once the cross-pole isolation was adjusted (by hand) the dish would not require additional feed adjustment. However, it was apparent that the feed housing would not have supported a mechanical rotor (such as an Alliance rotor) as it stood; that a previous report appearing in the July **CSD** concerning the installation of a rotating dual pole feed at WIV was very accurate indeed.

The equipment in use consisted of a pair of **California Amplifier** 85 degree LNAs, and **DX Antenna** (block down conversion) and **Microdyne** receivers. They say the proof is the performance and when we were finished we had no-noise (i.e. sparkie-free) pictures on 14 of the 24 transponders on F3R. Those that were hottest were in the expected antenna sets (TRs 3, 7, 11, 15, 19, 23; 4, 8, 12, 16, 20, 24 plus 2 and 10). A check on F4 and W4 revealed signals to be 3 dB 'hotter' than the **best** of those on F3R. Those would wait for another installation, however, since the 14 on F3R that were noise-free more than satisfied the needs of our customer.

If one accepts the specifications for the equipment in the system, it is possible to use some math and back into the **apparent** EIRP levels on the ground in (north central) Honduras. I come to the mathematical conclusions that we were dealing with 26 dBw on the hotter F3R transponders and 29 dBw on the (hotter) F4 and W4 signals. The end result, a very satisfied customer, is what counts.

As readers may have guessed from prior contributions to **CSD**, this writer does like to pre-plan installations with the aid of a computer (see **CSD**, February 1983; page 8). When I arrived, I had unfurled the computer print-out for the customer and told him (with some nervousness) what to expect. The installation, to the apparent amazement of the customer, came out right on the money; no surprises. Since the



NEARING completion, the rim-perfect ADM 20 footer is about to light up the carport with 'ROCKY.'

success in a venture like this depends almost totally on the ability of the antenna to achieve 'in-field' the gains anticipated from 'test range measurements,' the end results speak highly for the ADM dish. Any antenna with as many pieces as this antenna has, capable of meeting its design specs and gain claims **after** being assembled in a jungle with virtually no real instructions has got to be well engineered! (Of course the same also goes for the rest of the equipment, including the California Amplifier LNAs.)

For my next parlor trick, we plan to try a Paracclipse 12 foot antenna in an even more remote location in Central America. I am attempting this with an eye only towards the 29 dBw region F4 and W4 transpon-



TRIPOD/'dual' feed.



BIG EVENT. American television in Honduras. Thank you ADM. Thank you California Amplifier. Thank you DX Antenna and Microdyne. Thank you, the people of Honduras!

ders because it is still impossible to fit an ADM 20 foot antenna into a Cessna 206 aircraft. If we succeed, a report will be forthcoming. If, by accident or whatever, we happen to locate the 'missing war' in our travels, you can find out about our misfortune by watching Max Robinson on W4!

HINTS To Other Jungle Buffs

Hint number one; "**learn the language.**" If my Spanish had been better, I would not have asked the airline clerk if my luggage was **an airplane(!)**. He probably would have been more anxious to help me find it if he thought I knew what I was talking about, or, if he wasn't concerned that my luggage **might turn out to be an airplane!**

When attempting to 'boss' a crew, efficiency is attained by speaking clearly to the crew with words that they understand. If you can say "3/4 inch wrench" in Spanish, you are far better off than stumbling through "... the thing that turns the screws with six sides on it ..."

Hint number two; "**if it is even remotely possible that you will need it, take it.**" Forget about trying to find an 'N' connector or a tie-wrap in Central America. Not possible, anyplace. Take extra LNAs, power supplies and receivers. But; beware of trying to return to the USA with a non-American made product (A DX Antenna receiver is not, for example, made in the USA; they charge you a new duty on coming back with it, **no matter** that you took it out with you, or even that you attempted to 'register' it as you left.)

Hint number three; "**be assured by telephone, telegraph, Telex or carrier pigeon that everything you have shipped is on hand before you head out of the USA.**" Simply number your boxes and crates and then have your contact recite the numbers back to you. If the numbers match, you are in business and can safely go. If they don't match, and you kept a list of everything packed in each carton, at least you know what to duplicate before you head out.

And finally, hint number four; "**don't make promises unless you are certain that you can fulfill those promises.**" The Latins are wonderful, trusting, people. However, if you promise and then cannot deliver, in their eyes you become a 'liar.' And you'll not sell another (anything) in that area. For this reason it is best to have a firm understanding of key words like '**working**' and '**perfect**' and '**pictures**' and '**noise/sparkie-free**' before you start. Now that I think about it, we could probably use a tad more of that here in 'Norte Americana' as well!

All in all, a fun, peaceful, productive trip. Not my first, and I hope not my last.

IN ORLANDO

Be sure to stop by the CSD/CJR booth at the SPACE show in Orlando to meet and talk with Coop and pick up a set of special industry promotional materials from CSD. That's November 3-4-5 in Orlando, Florida.



CONIFER MAKES IT EASY TO SELL THE COMPLETE PICTURE

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MODEL AN-1200 ANTENNA: Conifer's 12-foot antenna features the Micro-Grid "see through" expanded aluminum reflector surface especially suited for most discriminating environmental areas. Reduces overall weight by 66% over comparable 12-foot solid dishes. Cuts wind-load factor drastically resulting in a durable installation and more consistent quality satellite TV pictures.

Every Conifer antenna and mount is factory finished with a special "Polymer" coating which is electrostatically applied to protect against rust or corrosion caused by acids, alkalines, salts and other destructive chemicals. Aluminum Micro-Grid reflector surface is accurately prebonded at the factory to high strength aircraft grade aluminum alloy frame. . .eliminates hours of field assembly required by comparable mesh dishes. Your choice of black or white finish. Stainless steel hardware is also a

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MODEL RC-2001 RECEIVER: The contemporary styled receiver fits with any decor. It features channel and audio tuning, LNA polarity control, inverted video, scan tune and Polarotor I™ control. A special feature is the front panel push-button control which allows for programming the positions of the consumer's two favorite satellites while allowing variable selection of the entire satellite spectrum.

THE COMPLETE "DEALER READY" SYSTEM: Conifer's DE-2001 is the industry's first "Dealer Ready" home satellite TV system. You get the complete package - antenna, feedhorn, LNA, motorized mount, receiver and wire - right down to the last nut and bolt.

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SAGA OF INTERSAT IQ-160 SYSTEM

BRAVE, New Technology

To borrow a phrase from a time-proven television program, the **Intersat Corporation** (2 Hood Drive, St. Louis, Mo. 63376; 314/278-2178, or, 800/325-6122) **has dared to travel where nobody has gone before.** They have dared, possibly with more than a mild amount of trepidation, to push and shove at the frontiers of TVRO system technology and to package into their latest home TVRO reception package (the **IQ-160 Receiver System**) more new technology than the industry has seen in many years. There are not many backwards-looking opportunities to draw from in creating a parallel to the 160 system; within our TVRO industry.

KLM did it when they brought out the first mass produced single conversion receiver; time frame the late summer of 1980. But KLM was new in the TVRO business at the time, and the size of their gamble was relatively small. **If it didn't work,** they could simply go away from TVRO as quickly as they had come into TVRO. **DEXCEL did it** with their introduction in the spring of 1981 of their block LNA plus downconverter (LNC). But Dexcel had a considerable set of resources to fall back upon; LNAs to mention a single product area. No other examples, from our own industry, come quickly to mind. Rather, it has been the time honored tradition to **upgrade existing receivers,** a knob at a time, making changes slowly and not upsetting the existing appletart or to gamble that the marketplace might not be ready for so much change and so many changes all at one time.

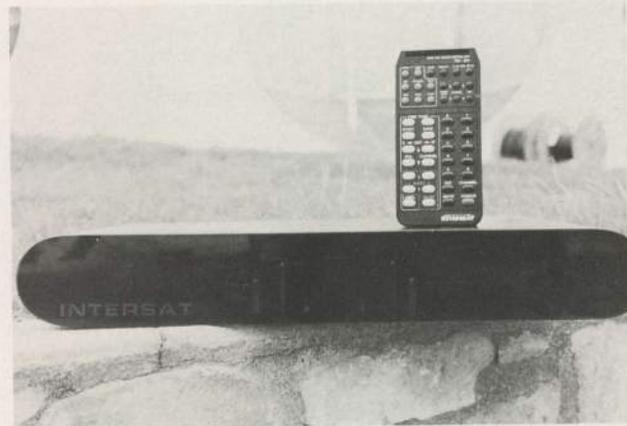
Ford tried it. The Edsel. Some very bright design engineers sat down and made a list of all of the technology available to them which was **not** being employed in either Ford or GM autos at the time. They took this technology and designed a brand new car around that list. The Edsel. Intersat certainly will hope that the IQ-160 does not turn out to be an Edsel.

HOW Complete The Change

Designing a system so totally new and totally innovative had to proceed from the sky-down end to meet with the technology being added at the ground-up end. Since the heart of the system is 'just another TVRO receiver' one may wonder how a new approach to receiver design would, among other things, affect such things as the design of the feed or the dish or drive system. Some background is required.

The genius behind the 160 system is **Don McLaughlin,** Intersat's youthful co-leader and man-about-bytes. Don is as comfortable with sorting out computer programs as you and I are with the Sunday comics. Don professes that he wanted to design a system that would function as a 'robot-extension-of-the-viewer'; a system that the viewer-user would look upon as being a tool of its own hands and mind. Don thinks alot about futuristic things, space colonies and stuff like that. He would be right at home with Arthur C. Clarke.

What Don wanted was a receiver system that held in memory the location and parameters of every satellite service now in use; with the capacity to add the same information for any new services (or satellites) that might come later. Don wanted the memory to be recalled upon 'user command' so the user could ask the computer/receiver (in effect) **"what are my choices in viewing?"**. Since the system func-



tions as a part of the viewer's normal television receiver, Don decided the simplest way for the computer/receiver to 'talk to' the user would be on the TV screen of the viewer's TV set.

Don accomplishes this by building into the memory a number of set (but user changeable) 'programs'; one program initiated by the hand-held remote infra-red unit tells the user what satellites are in the sky. Another program tells the user what program services are associated with each satellite. Yet additional programs further refine the data given to the viewer; a listing for a single transponder (selected out of the master 'menu' for the entire satellite) advises the user about the programming source's audio sub-carrier, for example.

Now that he had the computer-receiver and the user 'talking' to one another, he took it one step further. Recognizing that the typical user is neither a satellite hardware freak nor a computer buff, he had to boil down the operation of the system to a very simple set of commands. Since there was so much data to work with, and so many possible commands available, this proved to be one of the more difficult challenges. The solution goes like this:

- 1) The neophyte satellite user first asks the computer-receiver to tell him or her what satellites are available. The screen answers.
- 2) Not totally familiar with what each satellite has on it in the way of programming, the user then must select either one satellite or he/she may select a number of satellites to inspect closer. The user can do this by asking the computer-receiver to list (i.e. 'Menu' format) all of the services on each satellite of interest, or, the user can simply command the receiver to provide him or her with that satellite.
- 3) Having selected a satellite to view, and having told the computer-receiver which satellite has been selected, the user barely has time to settle back in the easy chair before that satellite is found and displayed on the TV receiver.

In selecting the satellite, the user is telling the computer-receiver to do whatever is necessary to place pictures and sound from that satellite on the TV set. This can involve moving the dish, adjusting the polarization system, and adjusting the audio sub-carrier system to be ready for the various audio sub-carrier frequencies found on the selected bird. All of this is done by computer command within the receiver. The dish moves, the polarization system pre-sets for the proper polarity and the audio sub-carrier routine sets itself for the upcoming satellite.

Once on the satellite (a matter of seconds) the user can again see a display of the full 'satellite menu' for that satellite, or he/she can go directly to a pre-selected transponder and program. If the user wants to change transponders within the same satellite, a single command changes the channel, readjusts (if required) the polarization, and readjusts (if required) the audio sub-carrier frequency. All of this is done from the computer memory in the system.

Since McLaughlin had the receiver functioning as a robot-extension of the user's own mind and hands, he then added some additional features which he deems "user friendly." If all of this data is stored, permanently, inside of the 160, why not give the machine the ability to operate totally by itself, from 'internal' command? For exam-



HAND HELD 'key' to the world; IQ-160 Infra-red remote control does just about everything including re-label your on-screen displays.

ple, you end the day on transponder 12 of F4. **Maybe** you are up to turning off the receiver; maybe you simply fall asleep after the fifteenth lap of the breast washing contest. Using an internal second-accurate clock, the receiver will shut it all down for you at a time you have told the keyboard you want the system shut down. Dawn breaks and you are supposed to get up at 7 AM. You also would like to be awakened by the soothing tones of Jane Pauley on the TODAY show. No problem; the IQ-160 will be your alarm clock. Before you retire you tell the hand-held remote that you want the receiver to switch to D3, transponder 1, at 7 AM, and turn itself (and the TV set) on. At the appointed hour, the computer-receiver does what it has been told and you are awakened on schedule. Lashed up to a VCR, you can tape any number of events your VCR will handle in your absence; the dish will move, the polarization will set itself, the audio sub-carrier will be set properly by the computer memory and the whole system will turn on (and off) when you tell it to, even in your absence.

Since the system would operate whether you were there or not, McLaughlin then took it one additional step; he gives you the ability to tell your receiver **NOT to function** when you are **not** there. You can enter your own 'private code' and tell the receiver not to operate **at all**. Or, you can be very selective about it all and tell the receiver it can operate anyway it wants; **except**, for example, on F4, TR12. If you are going to be out for the evening and you don't trust your 11 year old with the PLAYBOY channel, the IQ-160 will 'child-sit' the youngster for you and insure that he or she is not exposed to the wild antics on the Hugh Hefner channel. When you come home, you override your own secret code with another secret code and you are back to your 'adult ways.'

Now, why would all of this (and there is more as we shall see) require that Intersat start all over again; even down to the dish?

Let's start out at the feed. Let us say that you have selected the

'scan tune mode' of operation. The 160 has a user optional slower scan mode; it can hang, for example, three seconds on each channel as it zips through the 24 on F3R. This has been done so that the user can 'sample' the programming in the scanning mode; three seconds of religion, three seconds of The Jeffersons, three seconds of Bo Derek and so on. Each time the receiver scans ahead a channel, it is asking the polarization system to 'flip'; from one side (say vertical) to the other side (say horizontal). Twenty four channels; twenty four potential flips. That's a lot of action for a polarization rotating scheme.

As the September/October issues of **CJR** point out, there has been some concern within the industry about how long polarization switching systems will hold up. Will they last 100,000 switches? Fifty-five hours of total switching? At some point, **they will quit**. The IQ-160 was going to be asking the switching system to switch more often, with greater speed and greater repetition, than any polarization system had ever previously been asked to react. That bothered Intersat and they eventually settled on the Omni-Spectra feed since it does not actually switch (as in move) any part at all; it uses some microwave diodes to electronically switch (as in 'conduct signal energy') each time the 'command' is given to it. We'll come back to that particular sub-part later on.

The next problem was the LNA/downconverter combination. This one may not have any direct association with the computer-receiver but it became a part of the new product nonetheless.

Most of the industry has been using 50/54 dB gain LNAs for many years. Within the last year, a number of LNA suppliers have brought out LNAs with gains in the 40/44 dB range; at lower prices than their beefy brothers. And this has prompted the people who design receivers to look down the ladder to the next rung; which happens to fall in the 30 dB of gain region. As past **CSD** articles have shown you (see **CSD** for September 1983, **page 35**), you must have some minimum amount of gain in the LNA portion if you are going to expect your downconverter stage to give you clean, sharp, frequency-translated signals. One of the trade-offs you can make, if you are very good at downconverter design, is to mount the lower gain LNA plus the downconverter together; tying the LNA directly to the downconverter through a 'double male type N fitting.' In other words, **eliminate the cable** that normally runs 10 to 15 feet from the LNA to the downconverter.

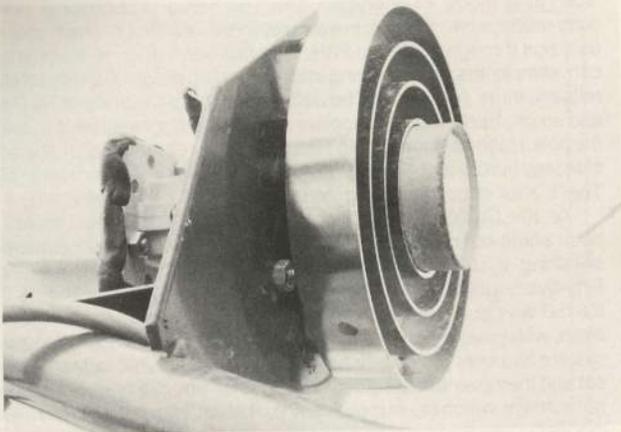
Since lower gain LNAs cost less, since lower gain LNAs are smaller, and since lower gain LNAs can be found in the marketplace when their higher gain brothers often are in short supply, Intersat made a tentative decision to go with 30 dB gain region LNAs. And bolt the LNA to the downconverter right at the back of the feed.

So far we haven't asked the system to adapt very much. Or have we?

Actually, we have. By reducing the amount of LNA gain available, we are now asking our downconverter to be **extremely noise free**. A typical downconverter in our field has an internal noise figure of approximately 15 dB (see **CSD** for July; **page 32**). Intersat calcu-



REAR OF 160 receiver; unlike simplistic front panel appearance, this one has plenty of attachment and adjustment points.



OMNI FEED uses 'diode switching' to track user's selection of horizontal or vertical polarization.

lated that if they could bring that down to say 13 dB, they could achieve results comparable to 44 dB gain LNAs and 15 dB noise figure downconverters with their 30 dB gain LNAs and their 13 dB noise figure downconverter. We'll come back to that; noting that this did require an entire new generation of carefully tuned downconverters if the system was going to perform "as advertised."

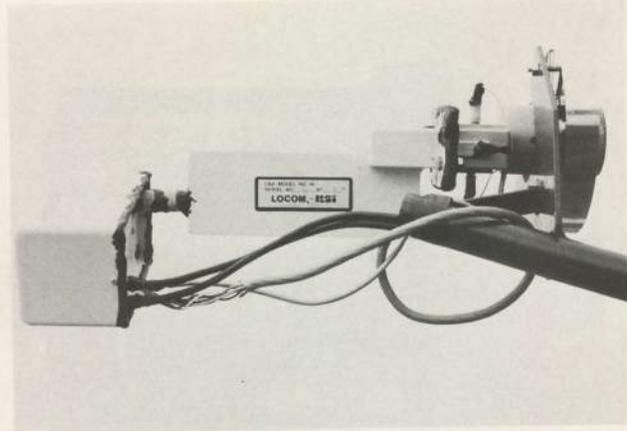
Which brings us to the dish drive system. There are many, many motorizing systems now on the marketplace. All have some degree of 're-settability.' That is, each has a set of parameters which allows the user to punch in a 'go to' command and the dish takes off and travels until it has reached the 'stop-at' command point. There are both electronic commands and mechanical starts and stops involved in this process. The electronic part can usually be quite accurate; the mechanical part has a certain amount of 'slop' built in. The dish may land in the general vicinity (say within 1/2 inch of physical-true-alignment) of the bird, and then the user has to touch it up with a 'tweaking control.' Good, but not perfect.

McLaughlin would not settle for this and he set out to discover what was standing between the then-state-of-the-art and a system that always landed squarely on the chosen satellite. Without any need for manual 'tweaking.' He found out and he redesigned the drive systems to correct what he discovered was the root of the problem. He doesn't talk much about how he did it, but as we found out, this is no longer one of the major system problems when you are using the IQ-160 system.

And that brings us to the dish.

And it brings into the picture some of the other key players at Intersat. People like VP **Dave McClaskey** and National Sales Manager **Guy Davis**. McClaskey was largely responsible for taking all of this wonderful new technology and convincing people he was not bringing out an Edsel. He faced some difficult marketing problems; some of those marketing problems were mechanical. "How," for example, "could Intersat be certain that the people out there buying and installing IQ-160 systems would properly interface the McLaughlin regenerated drive and positioning controller system to an XYZ dish"? There were no guarantees and McClaskey had been around the industry long enough to know that if there was any human chance to beat and hack and crush and ding parts with a hammer, some yo-yo sooner or later was going to end up stuffing his system into a #10 tin can and trying to make the #10 tin can function as an antenna. And that got Intersat into the space age antenna business.

The Challenger-11 antenna is a part of the IQ-160 package. You cannot, **today**, purchase a 160 system **unless** you also take delivery on a Challenger 11 antenna. Their reasoning is already stated; they see the 160 as a complete package which has Intersat **totally responsible** for **every** piece and part. They know, because they have been in the industry several years, that the industry is filled with creative 'field technicians' who will try anything once. They would prefer you not try it with an IQ-160 for reasons we will explore. They feel that if you use only 'certified IQ-160 parts' designed to be a part of a complete 160 system, your chances of 'space-age success' with the



OMNI FEED (right), LNA, 160 downconverter (left) retro-fitted to Paracclipse 12 footer.

'computer-receiver' are excellent. But as soon as you start substituting parts for their own, well, all bets are off.

Getting all of this outdoor electronics connected up to the computer part indoors required some special cables. Remember that all of the commands for the antenna system, down to and including the polarization switching (as opposed to rotation) system come from the indoor 'computer.' So Intersat found itself in the 'custom cable' business; you don't run out of cable on an IQ-160 installation and run down to Radio Shack for another 25 feet!

And finally we are inside. Now we have two boxes to contend with; overlooking for the moment the 'user friendly' hand-held remote control. Box number one is the receiver itself. From the front, it looks like a piece of art Peter Sutro hauled back from a modern Italian art shop. An oblong, rounded-corners, dark piece of smoked glass with the unobtrusive Intersat logo on the front. No knobs, no controls, no lights, no flashing LEDs. You never even know it is on.

The backside makes up for the knob-light-LED less front. A myriad of jacks and cable receptacles and controls. But nothing that the **average** installer with a few installations under his belt cannot handle. With all of the cables plugged in, you are in the picture business. Well, almost.

There is another box; not nearly as art-decor and heavy enough that you don't swing it around in one hand. Inside is the massive power supply and a very well thought out stereo amplifier system; 12 watts per channel which is enough to shake, rattle and roll most living rooms. More cables connect this audio amplifier/power supply to the faceless receiver's rear panel. **Now** you are in the picture business.



POWER SUPPLY and 12 watts per channel audio system is housed in separate box that can be stuck away out of sight.

TUNE IN THE SATELLITES

The DRAKE ESS2250 is a *complete* satellite TV reception system—*everything* you need to bring satellite TV into your home for the ultimate in selective TV viewing pleasure. At the heart of the system is a precision-contoured, ten-foot antenna which anyone can easily assemble "on-site", using simple hand tools. Mounted in the shroud at the focal point of the antenna is a sophisticated array of electronic gear capable of capturing weak satellite signals with impressive results. And the sturdy polar-mount is designed for easy manual or motorized rotation (optional) over the entire satellite arc.



You exercise complete control over the entire system with the DRAKE ESR224 earth station receiver which features the latest in solid-state microwave technology to provide superb performance and reliability. The functional design and contemporary styling of the receiver (along with a full line of accessories) will complement and ensure compatibility with any audio/video entertainment center for years to come. This system can be simply attached to any TV set and detailed instructions make it easy for the homeowner or local dealer to install everything with confidence. The entire package is easily shipped via U.P.S. to any continental U.S.A. location.

The DRAKE ESS2250 is pre-engineered to provide sharp, interference-free reception to most continental U.S. locations.

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OPERATION

There are two hurdles for anyone who sits down with the IQ-160 for the first time. One is the installer hurdle, which we will come back to. The second is the user hurdle. Both can be formidable.

Don McLaughlin is more attuned to 'user friendly controls' than most of the people who wander about talking in 'bytes' and 'modems.' He has done a superb job with designing a hand-held control which can direct the 'computer-receiver' to do anything that it was designed to do. **But there is a learning curve here.**

It may well be that the learning curve is less friendly than the hand-held remote. Not everyone is willing to take the time to learn. And as soon as you tell someone that 'this is a computerized receiver' you can almost see the little goose bumps rise on their body. "Computer"? It can be frightening.

I have never been computer-friendly. I do not feel comfortable with a computer; even the TRS-80/TI-99-4A grade units that seem to proliferate around WIV under young Kevin's guiding hand. Dave McClaskey makes the point better than I.

'Children seem able to grasp the operating sequence far faster than adults. Give them a basic lesson and in just minutes they have the receiver standing on its toes and doing flips.'

If you are fortunate, as I was, to have McLaughlin himself taking you by the hand through the operational and programming steps, it all turns out quite well. If you are on your own to sort out the printed or videotaped instructions, and you are (like I), not 'computer-friendly,' it could be another story.

The hand-held remote is quite a piece of equipment. You can use it to set new 'menu' listings (i.e. change the name of satellites, or the name and transponder of services), just as if you had an electronic typewriter in your hand. You can use it to set the time and the date and the day (this appears on the screen in several of the 'language sessions' between you and the receiver). It helps you know how strong the signal level is (a set of numbers appear on the screen as you adjust the receiver's manual controls, telling you by number when the receiver and dish are 'peaked in') and it even guides you through the initial step-by-step system set up process. But the user cannot be frightened by computers, or he or she is in a heap of trouble.

"Not really" might be McLaughlin's response. "We have built in a 'toggle' function, where the user can simply avoid the totally automated control functions and 'switch' or 'toggle' from one channel to another or one bird to another much as you would with a 'normal receiver.'" Don's right, you **can** do this, but then **that** is not why the user bought the receiver in the first place!

So there is, we judge, a potential problem that is human related; people who are so uncomfortable, or awe-struck, or fearful of the 'power' they hold in their hands, that they never really relax and enjoy the amazing capabilities of the system. That's a tough one to engineer 'around.' The problem becomes especially bothersome when it is a **dealer** who is 'uncomfortable'; how does Intersat deal with a qualified dealer who feels 'nervous' each time he picks up the all-powerful



PREPARING THE CONNECTORS/ Intersat's McClaskey gets the Omni Spectra feed ready for mounting.

hand-held? Nobody knows for sure, yet.

The system comes out of the box partially programmed. The dealer must complete the programming during his 'set up phase' of the system. Thus the dealer cannot 'avoid' the use of many of the 'set and forget' hand-held control functions; if he is going to leave the customer's home with a check and a smile, he will have to get the hang of making the system do all it is supposed to do. How long does it take to complete the individualized programming? An hour is a safe allotment of time. If you are 'teaching' the user how to do it him or her self at the same time, make that 90 minutes.

We found that once we were **partially over** the fear of the power of the system, we actually enjoyed making it do crazy things. There are, for example, two separate audio channels built into the system. That's what it takes to make it function in stereo for many of the present stereo satellite services. That means you can program the system to flop over to WGN on TR3 (F3R) and **ignore** the WGN audio; selecting, instead, your favorite country and western or Top 40 or whatever stereo music service. You can program this sub-decision into the memory of the system and then on command flip back and forth between the chosen stereo music service and the regular WGN audio on the channel. This gives you totally hand-held, automatic, selection of either video (plus program audio), or, stereo audio services. No knobs to twist or tune; just enter the command.

Of all of the personnel at Intersat, the one who always seemed most excited about the built-in 12 watts of stereo audio was McClaskey. We like music as much as the next person. But we never really could see why Dave kept returning to the stereo audio/12 watts per channel package, in conversations. He had an advantage we didn't have at the time; he had a system in his home.

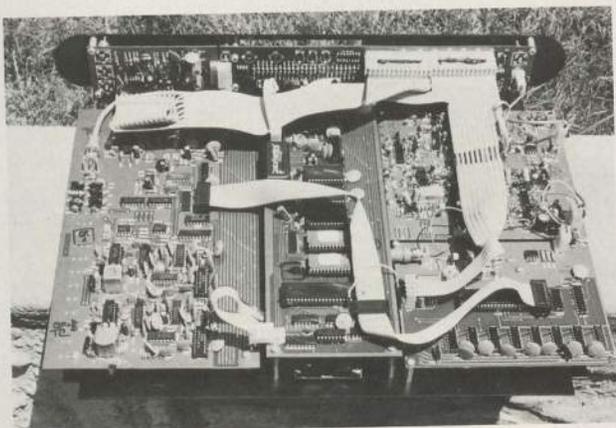
After having our system operational for a couple of days, we found out why McClaskey kept bringing up the audio; having it all built-in, requiring only that you plug in some decent quality speakers, was a gratifying experience. **Once you do this, you will never** go back to 3 inch speakers stuck in the side of a cabinet again. Even WTBS sounds better on big speakers properly driven with decent audio/power!

PERFORMANCE

Ahh yes, but how well does it perform?

There are at least a couple of things Intersat has done which are evident in the video quality. We will be surprised if several other manufacturers don't copy their new waveform dispersal video clamping circuit. It is a dandy; resulting in markedly improved video quality. Six points for the guy who did this one. No more low level flicker, no more varying color background levels as the clamp fights the dispersal waveform. This one **really works good** and there is a positive contribution to the picture you see. This becomes especially noticeable on a big screen, projection set where that annoying flicker seems to 'modulate' the darkened room.

We will also be surprised if there is not some scholarly study done of the Intersat downconverter. No big breakthrough here, just a refinement of what was already one of the lower noise and better performing



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downconverters in the marketplace. If you can, on paper, reduce your LNA gain requirements by doing a better job with the downconverter, that becomes a cost effective change for almost any manufacturer.

Let's deal with the negatives that impact on the dealer first.

The system may ultimately be 'user friendly' but in its present form not all dealers are going to find it 'installation friendly.' This next statement is a **pure guess** on our part; it probably requires 50% more installation time to properly install an IQ-160 system than it does a system with comparable dish size. There are several reasons why this is so.

The dish and the mount is the first such reason. Intersat has gone to a space age approach to creating dish segments. Each dish section is and should be exactly like every other one. Prodelin started all of this years ago with a system that created dish panels in a giant machine. The Intersat 11 foot antenna panels come out of the very same machine which turns out Chevrolet Corvette fiberglass parts. So far, so good.

What we did not care for was the base assembly, and the manpower required to install the completed reflector on the base. The base is a large steel tube that bolts to a pad or pier (concrete). Close inspection reveals that you have 3 legs that straddle the tube and attach to all-thread or bolts imbedded into the concrete.

The dish **must be** assembled on the ground (**no**, you cannot do it on the mount) and then raised (lifted by manpower or by crane) to the mount. Three people **can** lift it, if they are large and strong people and the mount is not too high above the ground. **Four are really required.** Guy Davis tells about a clever dealer of theirs who has worked out a system to do this all by himself. We hope that Intersat spreads that information to other dealers since having to round up four people to set the dish on the mount is not very 'installer friendly.'

And the 3 attachment points to the pad. In our judgement, they should be spread further from the base vertical tube to increase the stability of the mount. There is a fair amount of 'rocking motion' in the mount-plus-dish when assembled, even after all of the bolts are tight. We took some of this out by drilling some new holes and shoving some lock pins into a couple of spots. But the dish surface is solid, and heavy (nearly 350 pounds) and it does present quite a 'sail surface' to the wind.

These problems can be corrected without major production changes at Intersat; we believe that some have been made or are being made. Remember, our concern here is that the installation be 'installer friendly,' if that is possible.

The next negative was more something Don McLaughlin said than we experienced. Those who read **Coop's Comments** in the September issue will recall that we handed Intersat an unsafe 117 VAC outlet into which they plugged the receiver; and we promptly tripped a 15 amp breaker and sent electricity into parts of the system which were not designed to withstand electricity. Just prior to that happening, McLaughlin remarked that 'ground loops' had been a problem. Ground loops?

A ground loop is where you have two or more different grounds in the system; the dish part, for example, sees one ground (with a measurable system to ground resistance) while the indoor electronics sees another 'ground' with a separate system to ground resistance. Electricians the world over have different approaches to providing a ground at **each** electrical outlet wall socket. Some don't provide any ground at all (**that's frightening**), some ground to a nearby plastic water pipe (**and that's no ground**) while others hunt around for the nearest piece of metal conduit running along the innards of the wall. Many of these normal household grounds are very poor grounds, or



GUY DAVIS (left), Don McLaughlin (center) and Dave McClaskey (right) through the screen mesh surface of Paracclipse 12 footer installing the retro-fitted IQ-160 focus point electronics.



SUPPORT SYSTEM for Challenger; reception tests underway beyond.

not grounds at all. They walk away not caring since they have their paycheck.

Computerized equipment does care. It cares a great deal. And McLaughlin's point is that if you get yourself into one of these 'ground loop' problems you are apt to have big, fat hum bars on the TV screen even though the satellite picture (as viewed 'through' the hum bars) is perfect. Obviously the customer is not going to allow **you** to walk away **with your check** if you have hum bars.

The solution to this is to either get the equipment properly grounded (that could involve driving your own ground rod outside the home, and bringing in a big chunk of #6 or #8 copper wire to 'attach' to the metal receiver chassis), or 'float' the entire system by going to a three prong/two prong adapter. **An adapter is dangerous** itself since it allows you to operate the equipment without a ground, and if your AC legs on the wall socket are not properly 'balanced' you could blow everything up; as we did (see **CSD** for September, **page 75**).

Whether the 160 is more susceptible because of its heavy use of computer chips to ground loops, than other TVRO gear, is not known. McLaughlin **admits** there **are** problems and individual installations may require specialized solutions. And we judge that to potentially not be 'installer friendly.'

And then there is the Intersat use of the (28) 30 dB gain LNAs. We simply do not agree with them that this is good engineering practice.

McClaskey left us with three of their present supplier's 28 dB gain LNAs. We spent half of a day putting them on and taking them off a handful of different dishes here, with the LNA bolted directly to downconverters or the LNA feeding a nominally short length of RG-213 cable. **We did not like the results** but have this quick explanation which is important since our findings are not necessarily a blanket indictment of 'low gain' LNAs.

Every system must have certain **overall** minimum gains. You get gain from the antenna, from the LNA, from the receiver. Every system also has losses. You have losses in the cable (or double barrel type N connector) to the downconverter, you have losses in the downconverter itself (the noise figure of the downconverter is really an indication of its loss), and you have losses between the downconverter and the receiver, in the cable connecting the two. You must **balance** these gains, and these losses.

It is possible to be so located, **in hot signal areas**, where even after balancing the gains and losses you are still comfortably on the safe side of noise with a 30 dB gain LNA. This is evident since Intersat has shipped hundreds of the 28/30 dB gain LNAs to installers. And **we** of course function in a portion of the footprint world where even **slightly reduced performance** systems come apart in a hurry in the performance tests.

We found the 28/30 dB gain LNAs were **not** adequate **here**. That's why you see a beefy 50 dB gain unit in the photos of the system here. The people peddling the 28/30 dB gain units would do well not to set up shop in weaker footprint areas. And if **we** were selecting LNAs for the IQ-160 system, **we** would be specifying 44 dB gain units as a

minimum. Anyplace.

Which brings us to the 11 foot Challenger antenna, and the Omni-Spectra feed.

Some years ago Hewlett Packard brought out some technical 'application notes' regarding the use of fancy little 'diode' devices for 'switching' signals. A switch? That's a device an engineer uses to select between two or more 'input signals' when he has one 'output cable.' In our world, we have vertical signals (input one) and we have horizontal signals (input two). If you took a feed system and inserted a **pair of probes** into the cavity or mouth of the feed, you could position the 'probes' so that one would always be in line with the vertically polarized signals while the other would always be in line with the horizontally polarized signals.

Now, the trick is to 'switch' to the signals coming into the vertical probe, or the horizontal probe, **on command**.

More than 40 years ago, they invented signal switching 'relays' to do this. A relay is an electro-mechanical device that physically moves a set of contacts from one connection point to another connection point, on command. Relays are expensive, subject to moisture ingress, and their contacts get 'dirty' in the air, reducing the 'switching efficiency.' Enter Hewlett Packard and 'microwave switching diodes.'

HP discovered that they could cause a small, special diode, to conduct signals (i.e. pass signals through the diode) when a certain voltage was applied to the diode. This happens to be a very small voltage so what you do is connect one diode from the vertical probe to the output connector, and one diode from the horizontal probe to the output connector. In the real world, it is slightly more complex than this, but not much.

Now when you **want** the vertical side, you send a small voltage



CHALLENGER 11 antenna with older style Intersat down-converter mated directed to the LNA at feedpoint; 28 dB gain LNAs are a 'normal' part of the package.



DO THAT AGAIN. Tom Humphries (right of center) operates 'A'/'B' switch on JVC receiver hand-held to bicycle back and forth between Challenger 11 footer and Paracclipse 12 footer on FNN feed off of F4, at WIV Provo.

through the microwave switching diode connected to the vertical probe. And the vertical side signals flow through. **Switch to horizontal?** Take the voltage off the vertical side microwave diode and put it on the horizontal side microwave diode. Very neat. But . . .

But there are signal losses with this type of microwave switching diode. If you believe the technical 'Application Notes' published by Hewlett Packard, for the guidance of the design engineers using their microwave switching diodes, you learn that the signal 'loss' can be between 0.5 and 2 dB at our frequency range of interest; 3.7 to 4.2 GHz. This is not an insignificant amount of 'raw' antenna signal to 'throw away' before the signal even gets to the LNA. Throw away 2 dB of signal, and your 11 foot antenna just became a 9 foot antenna!

The amount of loss in the chosen feeds has not been measured. This will be done within the next several months when CSD returns to San Diego (see page 20, this issue of CSD) to have a number of industry feeds measured on the Microwave Specialty Company test range. We'll tell you what we measure there, **after** the tests.

In the meantime, you can (as we did) swap back and forth just the feeds that bolt onto the Challenger 11 antenna or any other antenna that is equipped with a system under test, and if you are in a weak footprint area, you **can detect** (if not actually measure) the difference

in feed performance. If the microwave diodes are not 100% efficient (none are; they all have **some** loss), you will see signal loss on weaker transponders/birds.

As noted early-on, Intersat was forced into selecting a rapid-fire polarization switching system by the unique demands of their IQ-160 system. When it scans, **it really scans** and the polarization switcher sitting out there is moving at a rapid clip. To hear Dave McClaskey tell it, finding a feed that would function at their 'on-demand' rate, for a long period of faultfree time, was not easy. They chose the **Omni Spectra** feed because it did do what they had to have done. There **may** have been some signal loss compromise in the process; only measurements yet to be made will tell us for sure.

GETTING The Dealer Friendly

The biggest hurdle we see for Intersat in their brave new world of space age technology is to convince the dealers that the dealers **can install** and **can program** and **can profit** from handling the IQ-160 system.

As we have noted, not everything about the system is 'installer friendly.' We know Intersat is aware of this, and is taking steps to correct those problem areas. The system suffers by not having a thorough manual available (one is being prepared), although a videotape made by Don McLaughlin is an excellent step towards making the dealer 'more friendly.' Anyone who watches the tape **has to learn** how to handle the programming part of the package or he/she just is not paying attention.

The features in the 160 should command top retail dollars in a marketplace where it is not always possible to point out unusual or unique features to the potential customer. The 160 has **more** unusual, unlike-anyone-else features than any other system on the market today, and it should lend itself to big dollar, high profit installations.

But we have a suggestion. If you are a dealer who is interested in being a part of the 'leading edge' of technology, as represented by Intersat's IQ-160 system, we suggest YOU insist that Intersat take you to 'school' for at least two days. You should travel to St. Louis, if possible, and spend two days putting 160 systems in with them standing over your shoulder telling you what you are doing wrong or how to do it better. Just because you know how to slap in a 10 foot dish and a four wire cable installation for \$1995 does not mean you are the least bit qualified for the big-time professional type package which the 160 represents. You cannot install this package, **and cut corners**, and survive. The system is a challenge to your own abilities to master and you need schooling to do it right. The rewards are clearly there because nobody else will be able to touch **your systems**, feature for feature, in your market area. And your profits, if you use common sense and sell them properly, will never be better.

ANTENNA TESTING I: WHAT IS A TEST RANGE?

PART ONE/Of Many

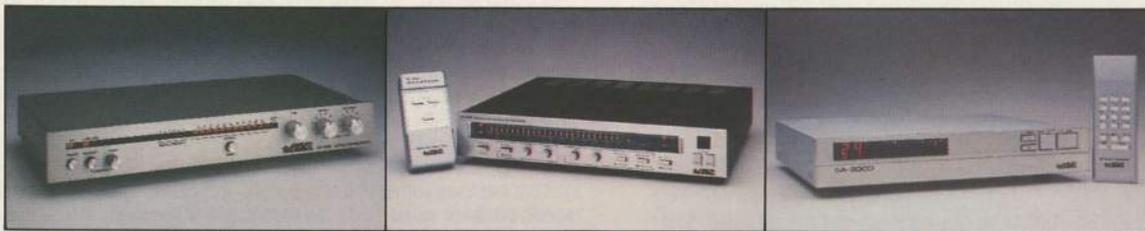
While it is true that no single part of a TVRO system can be inefficient if the total system is to 'play' properly, there is a tried and true rule which tells you that if you cannot create sufficient signal with the dish antenna to make the grade, no amount of electronic black



magic is going to compensate for an inefficient antenna system.

The first TVRO antennas were not TVRO antennas at all; they were parabolic or dish antennas created for terrestrial (point to point) microwave, or for over-the-horizon microwave 'scatter' circuits. Many of the true pioneers in the home reception field began their quest of

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Arlington, TX 76011 (Regional Sales)

Kansas City, KS SA Marketing—Midwest— 913-829-5900,
427 N. Rawhide Dr., Olathe, KS 66061, (Regional Sales)

SA International—301-344-5111, 4450 Hardesty Rd., Huntingtown, MD
20639, (International Sales) Telex: 469-077

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satellite TV signals by locating second-hand (as in 'surplus') parabolic reflectors at local junk yards, Bell telephone equipment dumping grounds, or nearby cable firms where terrestrial dishes were being taken out of service. The earliest home dishes did not appear, to the eye, to be measurably different than today's dishes although the antenna feeds certainly did not have that 'scalar-look' that we take for granted today.

The dish is nothing more than a 'focusing device'; a collector of microwave signal energy. Ideally, all of the energy intercepted/collected by the dish would find its way to the electronics in the system; the LNA/LNB/LNC in our TVRO situation. This is not an ideal world, and there are certain irrefutable laws of physics at work which limit just how far you can go with any system. To understand the limits of the laws of physics, we must first break the antenna system down into its component parts.

CSD has been concerned for more than a year that people who do not understand either the basic laws of physics or the principles involved in microwave signal reception are making statements for products which are not always 100% accurate. In a more sophisticated marketplace such 'false statements' would quickly disappear since the statements would be 'beaten down' by a knowledgeable field of equipment buyers. Unfortunately, in our young industry, we have a classic situation of the blind leading the blind; those who would make such statements, often out of ignorance rather than intentional malice, are making their statements to others who know even less of the principles and laws of physics.

"You say this 8 foot antenna has 40.7 dB of gain? How is it that others are only managing to get 38.5 dB of gain out of an 8 foot?"

The seller smiles. **"We build a better dish; we have a more accurate surface. And our feed, well, it is really special. We have solved the feed efficiency problem."**

Words. They sound good. All of the correct buzz sounds are in place; "... more accurate surface," "... feed efficiency." The listener has heard those words before. He doesn't really understand what they mean, but he shakes his head in agreement.

Perhaps one of the more honest statements in the home TVRO antenna world is found in the advertisement appearing in CSD from DH SATELLITE. It says:

"We didn't invent or improve anything! We just manufacture in quantity the antenna that has always been best. An aluminum antenna spun to a true parabolic curve."

In this series we are going to be looking at what makes a good antenna good, and a not so good antenna ... not so good. We hope that dealers and others who are 'fed' sales lines will learn from this series and that equipped with more knowledge about antennas they will be better able to separate the 'crap' from the facts.

'OUR' Reference

In mid-August we traveled to San Diego, California where we spent some time with a group of professional antenna engineers who are, for the most part, totally unknown in the home TVRO world. These are the people of **Microwave Specialty Corporation** (7312 Convoy Court, San Diego, Cal. 92111; 714/278-5711), a firm that builds a wide range of very specialized microwave antennas, couplers, feeds and other gadgets which interconnect microwave receivers (and transmitters) to the 'ether' (i.e. the airwaves).

MSC has been doing what they do for nearly three decades. They exist on a reasonable number of military contracts and a large number of professional commercial contracts. In their facility you see elaborate microwave antenna systems for military fighter planes, huge passenger jet aircraft, and a wide range of fixed and transportable microwave applications (up to 16 feet in size).

We chose MSC for our 'reference data base' because they have virtually no interest in the TVRO marketplace; they have no ax to grind and their reputation is excellent in the professional microwave field. We also chose MSC because they are a small enough company that we were able to get the direct attention of the company president as well as all of the chief antenna design engineers and testing engineers. In short, they opened up the facility to us, and were patient enough to show us how 'real' antenna engineers design, create and evaluate antennas. Often the projects they work on are "money is no object" projects. Some military type, or some commercial/space proj-

ect type simply wants to see just how far technology can be pushed. **Duane Tubbs**, chief engineer for MSC, tells about one such project.

"I was once on a project where we were asked to design a radar antenna which would achieve the maximum system efficiency possible. Money was no object. The project lasted six years and we spent \$11,000,000, plus we were working with the very best test equipment and the very best microwave antenna model shop then in the industry. In six years of constant work, a team of engineers, we were only able to create a radar antenna with a total efficiency of 69%. We did that once and once only! The contract called for ten antennas; only one of them made 69% efficiency. The next best we could do was 67% efficiency and the other eight were down slightly from that."

Sixty-nine percent efficiency? That was the best they could do with 11 million dollars to play with!

Duane smiled. He knew what was coming; he had spent his lunch hour pouring through the advertisements in the August CSD.

"Those who are claiming 70 or 72 or 75% efficiency?" He smiled again. "Maybe they know something we never found out!"

Unlikely. Maybe there was another answer. That is what we were at Microwave Specialty Company to learn.

HOW You Begin

"I know that some of the prophets in your field like to tell you that hidden away in some obscure Russian or French literature there is a 'secret formula' which will unlock that last 30 or 35% of antenna efficiency. And they keep tantalizing you with little bits and pieces of data, designed to make you (the TVRO industry) believe they have that secret data, or are working with it, to design the ultimate antenna."

Not so?

"Well, let's put it this way. Microwave antennas were brand new at the start of World War Two. Nobody knew very much about them and what was known was either very empirical (i.e. cut and try), or very mathematical (i.e. high theory). The crash design projects during the second World War, created by the need for early radar and microwave antenna systems, established the bed of knowledge we reference today. Then, after the war, the commercial people at Bell Labs went to work with that basic knowledge as a starting point and using the kind of funds that only Bell could generate and pour into a project, we entered our second phase of knowledge. Finally, in the mid to late 50's, the circle of knowledge was pretty much completed as the early day satellites and the first microwave equipped tactical fighter aircraft got into the microwave realm. I cannot recall any truly important discovery that has taken place in the field of microwave antennas for, say, the last twenty years. No, make that the last twenty-five years."

What about some of the fabled antenna designs and tests done by NEC (claiming a 77% efficient Cassegrain antenna) or Rantec (claiming a 79% efficient Cassegrain)? Did this not suggest that perhaps improvements over today's 70% efficient 'limitation' was possible?

"Gain is a very perilous commodity. The system engineer is always interested in gain. But, he is also more interested in system



MSC'S CARL GRINDLE/ (left) and USS's Doug Dehnert (right) on the balcony of the 'range station' receiving location.

performance; the so-called G/T of the system. An antenna can have high gain, but at the same time it may also have a higher-than-optimum noise temperature. The G (gain) of the system is important provided you don't compromise the T (noise temperature) of the system. Remember that in almost any application, the system performance is dependent upon the ability to extract the desired information (the signal carrier) from that onrush of system noise. An antenna designer who pays attention only to the G and who neglects the T portion of the equation is overlooking what the antenna has to do in the real world. It has to create as much signal as possible (gain), but in the process it also has to pick up as little noise as possible."

Does that suggest the NEC (77% efficiency claimed) or Rantec (79% efficiency claimed) antennas had good gain but also had uncomfortably high noise temperatures?

"**They were Cassegrain design antennas.** I personally feel that the Cassegrain antenna is worth considering only when you are dealing with relatively large apertures. For the world, I cannot figure out why Harris has done what they did, for example, with the 3 meter size antenna. I respect their design people but someplace between the design people's concepts and the marketing people's printed statements, they lost touch with reality. You do understand what happens with that first sidelobe on a Cassy antenna, don't you?"

We'll come back to that subject later on. The first sidelobe is that bit of antenna energy (or pattern) which squirts out of the antenna's main lobe down along the side (hence 'side' lobe). As the **diagram here shows**, a sidelobe is a no-no. The ideal antenna would have NO sidelobes. There is no such ideal antenna.

The sixty four dollar question. Can somebody build a 75% efficient antenna, that also has an acceptable low noise temperature? We'll find out, perhaps, here.

Carl Grindle, President of MSC.

"There is no way known to evaluate an antenna except on a suitable antenna test range. You cannot use a satellite signal; you cannot use an existing microwave transmitter that just happens to be in your area. **You must have an antenna test range,** a clean antenna test range, and you must have the equipment and personnel and experience to use that antenna test range properly."

That was one of the primary reasons we had come to San Diego. MSC, we were told, had just such a range.

Grindle.

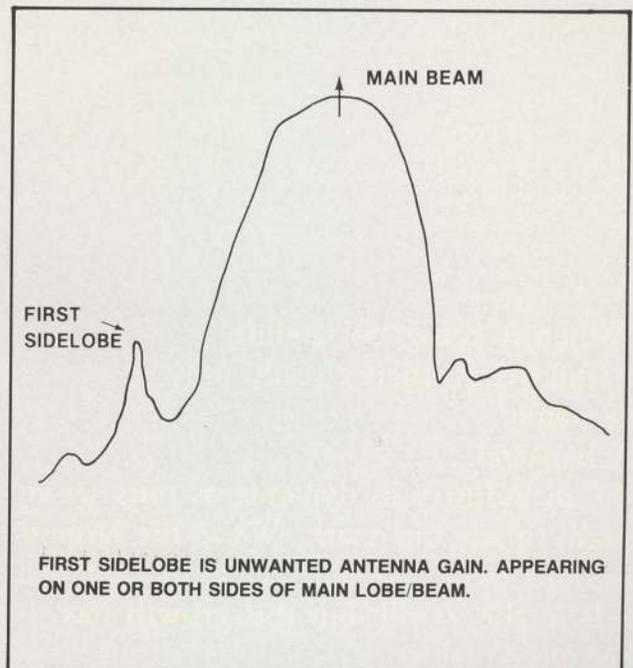
"**Actually, you can, as we do, have more than one range.** It all depends upon the aperture (size in wavelengths) of the antenna you are testing, and the 'apparent' (theoretical) pattern of the antenna you are testing. We use a relatively short antenna test range to check out feeds, for example. A feed is a relatively broad-beamed antenna and as a consequence it seldom has much (if indeed any) 'signal gain.' It may even have 'negative gain,' reference say an antenna dipole. Then as the antennas get physically large at the operating frequency, that is, many wavelengths across, and the beamwidth of the antenna tightens



URBAN SPRAWL to the right/ US government property with no man-made objects in the path over the MSC test range in San Diego. Source transmitter is lost in the 'smog' straight out in front of the lip of the 10 foot antenna being tested.



RECEIVING END/ MSC far-field antenna test range. A wooden structure designed to eliminate any close-in signal reflections from the signal source transmitter.



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TEST RANGE/ continued from page 23

up, you need to have a longer range which is 'clutter free.' "

The MSC range is on the edge of some U.S. government property. That is important to MSC since the range is more than a mile in length and if the 'path' between the signal source (the transmitting end of the range) and the receiving/measurement point (the test end of the range) was filled with buildings and freeway bridges and other prominent objects, the delicate microwave signals would bounce from building to building and bridge to ground causing a multitude of different 'signal paths' between the two points. Such a multitude of signal paths would in turn cause the test antenna system to react to not only the direct, primary path signal traveling through the air but also to those 'reflected' or 'off path' signals coming from the source via the man made objects or ground in between the two points.

Tubbs.

"Ideally, there would be infinite free-space between the test receiving antenna point and the signal source. Some test ranges are built using something called a 'slant range technique.' That means they raise the signal source way up in the air, many hundreds of feet. There is nothing between the source and the receiving point but pure atmosphere. No objects are there to bounce the signal source energy around and head it towards the receiving antenna from some off-path reflection point. In our case, we selected our site because the ground dips sharply between the source (mounted on a tower approximately a mile away) and our receiving terminal station. Between elevating the source a reasonable amount at one end, elevating the test antenna stand a reasonable amount on the measurement end, and, the dip in the ground level between the two points, we come very close to approximating a 'free space' environment. What reflections as may still be present are very low in level, and after more than twenty years of using the range, we know what they are and where they are and thus are able to work around them or compensate for them.

THE Technique

MSC's antenna test range is available for commercial use. At least one TVRO antenna manufacturing company already uses the range on a regular basis (United Satellite Systems, St. Hilaire, Mn.). Others have used it from time to time. For a one-day fee of \$1200 you get the range, a set of engineers and technicians to perform your antenna tests, and the use of the equipment that makes the range work. All \$100,000 plus in equipment.

A test range is designed to tell you just exactly what the pattern of your antenna (or feed) is, how that pattern varies in say the vertical or horizontal polarization mode, the effects of the struts and other feed support pieces in the system, and, the overall gain of the antenna being tested. All of this is crucial if you want to be sure what your

antenna will do, or does, in a real world environment.

The test range functions in the following manner.

- 1) **There are two ends to the range.** One end has a low power transmitter source (10 milliwatts or 1/100th of a watt is typical) which is connected to a transmitting antenna. the transmitting antenna is intended to be a 'point source'; that is, a clean, one-location source of energy which the receiving antenna (under test at the opposite end of the range) can receive.

As noted, the goal of the source end is to insure that the only signal coming from that end of the range comes from the transmitting antenna itself. No signal should come from secondary sources, such as might happen if the energy struck the side of a building or hill along the way, creating a new (secondary) 'source of signal/radiation.'

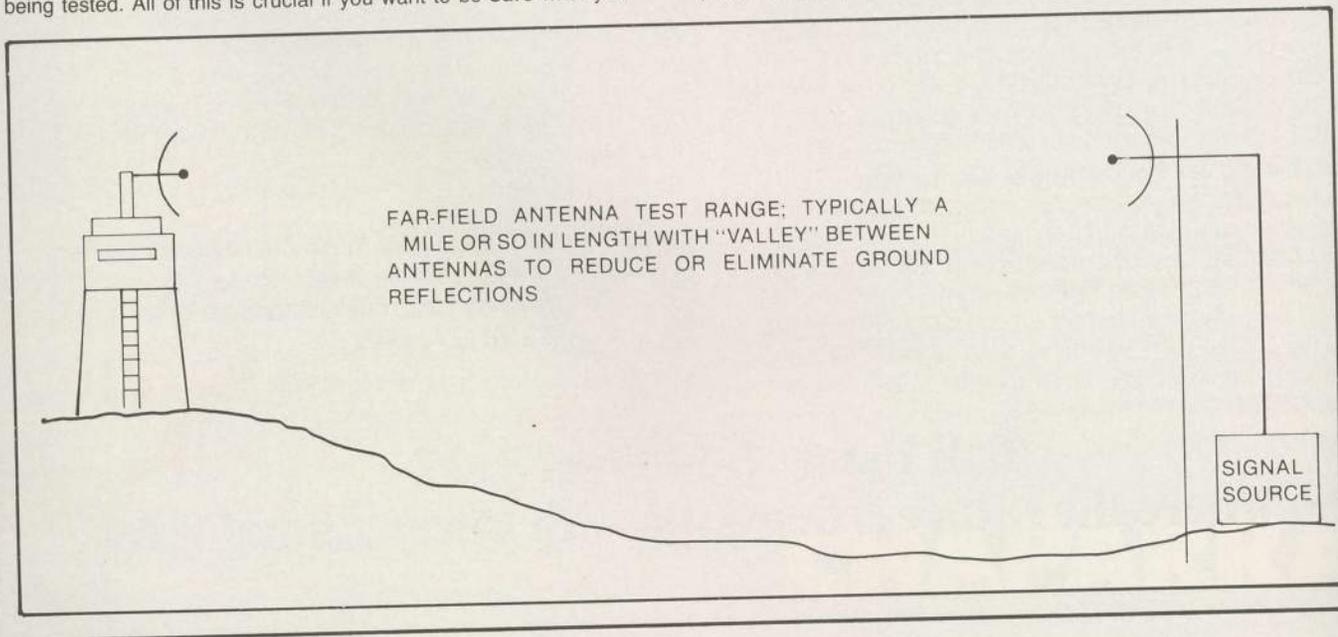
- 2) **The opposite end of the range** is where all of the measurements take place. Most of the professional antenna test ranges in use today use equipment manufactured just for this purpose by Scientific Atlanta. S/A has been building test range 'packages' of equipment for nearly two decades, and to set up a range today requires in excess of \$100,000 in gear by S/A or someone like them. On top of that, you have the cost of the range itself and the elevated building where the testing takes place.

At the receiving antenna end of the range, the test antenna is mounted high above the ground on a wooden (non-reflective, non-conductive) platform. The entire 'perch' is wooden, at MSC, because metal reflects signals and that creates new, secondary signal paths. There are some modern, clever designs that suspend the antenna portion of the platform out over the ground below, on a 'porch' away from the 'perch' structure but in every case care has to be taken to insure that nothing acts like a secondary signal source for the antenna under test.

You climb the old, wooden stairs to the control room at MSC not quite sure whether the building will hold you up. It does, just as it has held up thousands of people and antennas up to 16 feet in size in decades past.

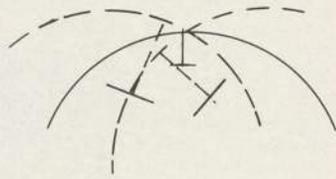
The first upper level of the platform is a single room, inside of which there are control panels and racks filled with receiving equipment and chart recording equipment. Glass windows surround you on three sides; not unlike an airport control tower. The heart of the system, for record purposes and for the purpose of antenna performance analysis, is a set of sophisticated 'chart recorders.' We'll see why shortly.

Overhead, there is a massive 'turntable,' perhaps the ultimate motor drive system for a dish (or any other type of antenna). The turntable is a **mount** for the dish, and it is controlled from the equipment room directly below. The turntable holds the antenna being tested, and using the 'joy stick' controls below you can **rotate** the dish (azimuth control), **tilt** the dish (elevation control) or **turn** the dish on its

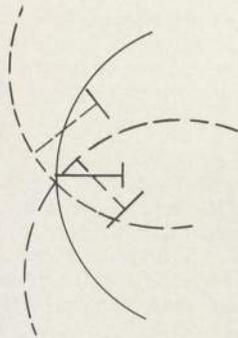


own axis (i.e. shift the dish on its own center so that the quadrant that was facing down towards the ground for one test is now facing towards the 3 o'clock position for another test).

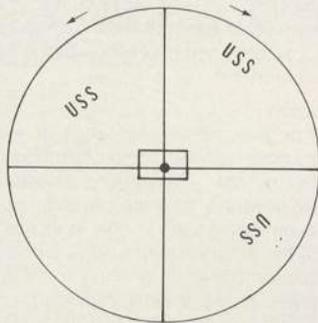
ANTENNA ON TEST STAND TURN TABLE . . .



ROTATES ON AXIS (AZIMUTH) AND . . .



TIPS UP AND DOWN ON AXIS (ELEVATION) AND . . .



URNS ON AXIS LIKE A RECORD ON TURN TABLE

As part two of this series, in November, will detail, while we were visiting MSC to learn about modern antenna range testing, we also took that opportunity to perform a series of tests on a 10 foot USS fiberglass dish. Only this dish was a little out of the ordinary; it had an obvious flaw in the antenna surface. We took advantage of this fact to measure just how much degradation in performance there would be when a dish of known performance characteristics was somehow damaged and might arrive in the field in a damaged state. We felt that the on-purpose damaged dish was a fair approximation of the type of antennas many dealers were installing from many manufacturers; dishes that were not known to be damaged, but which nonetheless had structural or design defects which made them less than 'optimum dishes.' We'll come back to all of this in November; a test, as it were, of a 'flawed' dish.

So for our purposes the ten foot USS dish was assembled onto the mount on top of the turntable platform and the electronics connected to the dish. But before we could begin, it was time to 'sweep the range.'

A test range, properly designed, properly equipped and properly operated can tell an antenna designer/manufacturer points about the antenna's performance which no other type of testing can reveal. Antenna creators, such as MSC, maintain a test range because it is essential to antenna design.

Why, if the primary bodies of information concerning antennas were created in the World War Two era and in the years following, would somebody have to 'prove' an antenna on a range, anymore? Isn't it now practical to simply 'copy' an existing, proven design?

MSC's Grindle.

"You have two types of projects which require a range. The first use of the range comes when you are trying to develop a very unusual antenna pattern. Not everyone wants an antenna that has maximum gain, straight ahead, for example. Perhaps for some applications there should be gain straight ahead, and then on purpose an equal amount of gain at say a 45 degree 'down' look angle. Aircraft radar and communication systems are a good example of this. This may require a parabolic dish that is not a parabolic dish; the lip gets 'folded in,' for example. So the range is essential when you are 'modeling' an antenna, trying to perfect a specialized antenna for a specialized application.

"Then you have the customer, and most of ours fall into this category, who demand 'proof' of the antenna's performance. Even antennas that were perhaps first modeled in 1946 or so. They order two or two dozen or two hundred antennas for a specific project. It could be a military project, or a commercial project. Their computers and engineers have 'modeled' an entire system built around the antenna part doing some specific job in a specific manner. When you get ready to deliver, they want to see that the antenna portion of their project is exactly the same in performance as their original computer model. In other words 'prove it.' The range is a necessary part of that process."

So what is sweeping the range?

The range is not 'pure' all of the time. A pure range would never have secondary signal sources (i.e. reflections from objects nearby or



"SEVEN FEET/ center." The entire area to be occupied by the dish is 'swept' with the reference horn to insure that the source signal level is within a 1 dB range of being equal over the full area. A signal that is 'hot' in spots won't give you a true gain or pattern check on the test antenna.

within the range). The signal transmitted from the source would always be at the proper level and the transmitting antenna at the source end of the range would always be pointed directly at the receiving end. **You can take none of this for granted.** And you therefore 'check out' or 'sweep' the range in advance of any serious testing. This involves a number of testing procedures, including taking a reference 'horn' antenna to the antenna platform turntable and verifying the 'evenness' of the signal pattern from the source.

Let's suppose you wanted to be very careful in determining the gain of an antenna. If the source antenna was slightly twisted, off of the direct heading to the receiving location, you might be **receiving** the 'source' on a **'sidelobe'** of its transmitting antenna, rather than receiving the main beamwidth of the source antenna. That does two things to your tests.

- 1) Because a sidelobe tends to be very narrow, and perhaps not totally predictable at this 'distance' or 'range,' you could have an uneven amount of signal being 'painted' across the turntable/platform.
- 2) With the main beamwidth pointing off to the side, slightly (or more than slightly) away from the test antenna, the region parallel to the normally uncluttered path profile between the two locations gets extra signal. This can cause reflections, secondary signal sources which **bounce back** at the test receiving antenna.

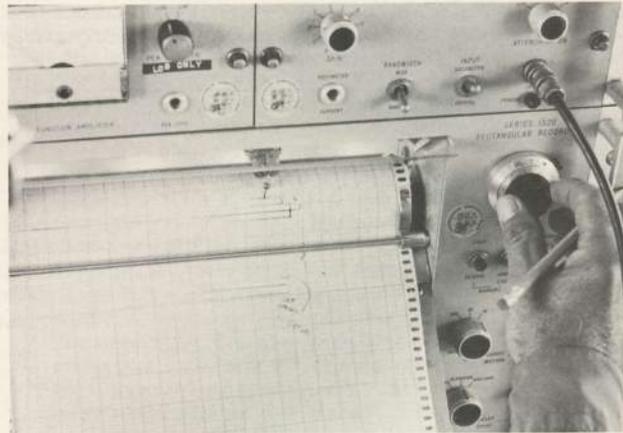
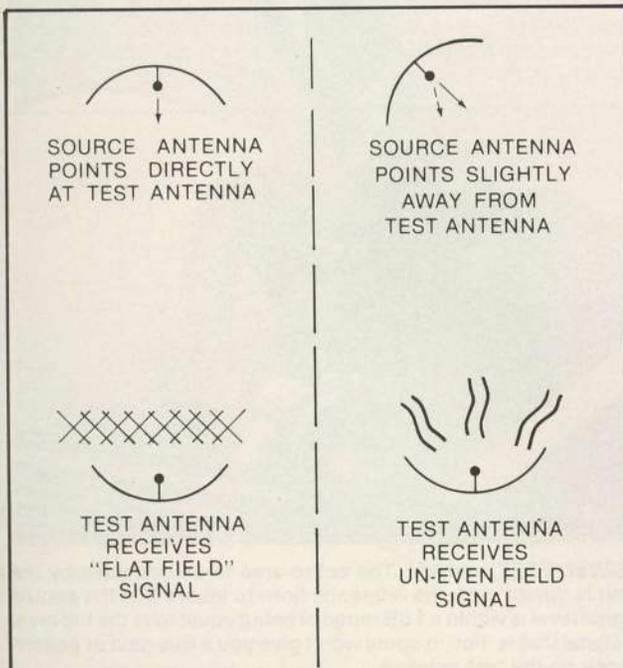
If case you haven't figured it out yet, the whole test range exercise is designed to insure that the **ONLY** signal that the antenna-under-test 'sees' is the signal from the test source. If there is some amount of signal (although lower in level) coming from a secondary source (such as bouncing off a building located to the side of the test range), the test antenna will 'see' that secondary source signal as the test antenna is 'rotated' (in azimuth) on the turntable.

"Is **that a sidelobe** on the (main) antenna pattern?" they ask. Or,

"Is **that a reflection** from a building, coming in on the main lobe"???

You have to avoid all of this, in advance, by 'sweeping' the test range. This is a sort of electronic detection service; every range has a 'signature' or pattern which the skilled operators recognize. In an hour or two hours time, they can 'test' the range itself, and pronounce it 'clean' or 'dirty.' If it is clean, the tests with the subject antenna can proceed. If it is dirty, you get rid of the dirt before you start serious antenna range tests.

One of the first steps in sweeping the range is to insure that the source antenna is indeed pointed dead-on the elevated test range



SWEEPING THE RANGE/ while horn antenna is being moved across the front field of the antenna on the turntable platform above, the received signal level is recorded on the chart recorder below to verify that the field is 'even' and the 'paint' is of 'even thickness.'

platform. If it is, the signal level from the source, as 'painted' across the turntable platform, should be very uniform. Now if the platform is pretty much taken up by the test antenna (ten foot or larger dish), you can't really be sure using the test antenna (which has unknown gain values at that point) how even the 'paint job' is. So you use the turntable to rotate the test antenna out of the way, and then you take a smaller 'calibrated' antenna (a 'reference gain horn') and you carefully move the reference gain horn over the full 'aperture' or space which the test antenna will occupy when it is swung back into position. In effect, you are checking the 'thickness' of the paint job (i.e. strength of the received signal from the source) in the exact same space that will later be occupied by the test antenna. What you should find is a fairly even 'paint job'; a signal level that varies no more than ± 1 dB as you move the 'reference gain horn' about over the area. Having assured yourself that this is the case, you can then proceed with the setting up of the test antenna for measurement.

THE Detection System

Everything done on an antenna test range is 'recorded'; that is, there is a permanent paper record of the performance of the antenna, even the 'reference gain horn.' This is done for several reasons.

- 1) **To develop an antenna 'plot' or 'pattern,'** you have to move the antenna itself; swing it left or right in azimuth, up and down in elevation. If the antenna is moved at a precise 'speed' and the signal detection system is 'printing' a real time 'record' on a roll of graph paper as the antenna moves, you can also 'roll' or move the graph paper at a selected speed. In effect, then, you have **the antenna moving**, and the **graph paper moving**. The signal level from the antenna changes as the antenna points at and then away from the source. This signal level is connected to 'recording pens' which draw lines on the graph paper. The graph paper is also moving, so when you get done you have an antenna pattern, **drawn on paper**. It tells you exactly what the antenna pattern was as the antenna moved.
- 2) All of this happens with considerable speed. The operator (or operators) are a little bit like circus jugglers; motors are moving, lights are flashing, paper is rolling through the pen recorder, and overhead the antenna is moving. It all has to be done in unison, either automatically (with operator overrides) or under manual control. There is no time, or opportunity, given these conditions, for a human being to watch a set of meters and read off (or write down) the changes in signal level **precisely**. Remember, the whole system is 'calibrated.' The graph paper is calibrated in dBs; the graph paper is operator calibrated in degrees of azimuth (or elevation) change, so that when a pen draws a line on the permanent (graph) paper record, he can go back and tell you with considerable accuracy "the first sidelobe is down 14 dB and it is 1.78 degrees off of the main beam . . ."

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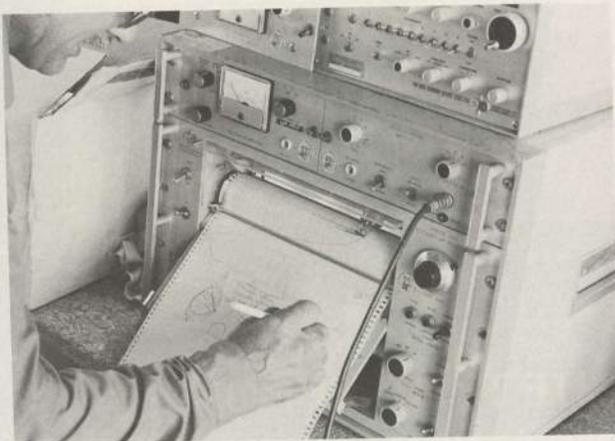
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- 3) Unless you are bringing an antenna to the range for the sole purpose of checking its 'static gain' and 'static pattern,' you have the opportunity to run a test graph or two and record the results. Now you can go up on the antenna platform and make a change in the antenna. We, for example, took our on-purpose warped dish which will be the subject of our November part of this series, and loosened one of the four bolts that holds the back of the antenna to the antenna mount. In effect, we allowed 1/4th of the antenna to 'flop' in the breeze; unsupported by the mount. Nobody would do this in the real world, or would they? What we wanted to see is what happened to the dish shape when the large structure was supported not at its designed four points, but rather at three points. Is a dish so (under) supported going to lose its parabolic shape?

It is difficult, perhaps impossible unless done with fancy theodolite instruments, to 'visually sight' a dish for accuracy (yes, people walk around shows all of the time trying to impress their friends by 'rim-sighting' one edge to the other edge). Of course if a dish is really out (1/2 inch or more on a ten foot surface), you can see it with the eye. But what about lesser 'warps'; say 1/4th inch or so? If you select the proper attachment point on a four point attachment (four bolts that hold the dish to the mount frame) dish, and take out the bolt, the weight of the dish will pull the dish out of true.

Having done that, and having in front of us the antenna pattern created by the dish when the dish was fully supported by all four bolts, now we back the graph paper up and repeat the tests. The pen drops to the paper and the paper rolls. Properly done, the first set of lines on the paper was the pattern of the dish when it was fully supported. Now the second set of lines (which can be laid down with a second color of recorder pen if that turns you on) gives you the pattern of the dish with only three mounting points. Right there, on the graph paper, you can see quickly and accurately what happened to the pattern of the antenna when the dish was allowed to 'field warp' by leaving a bolt out.

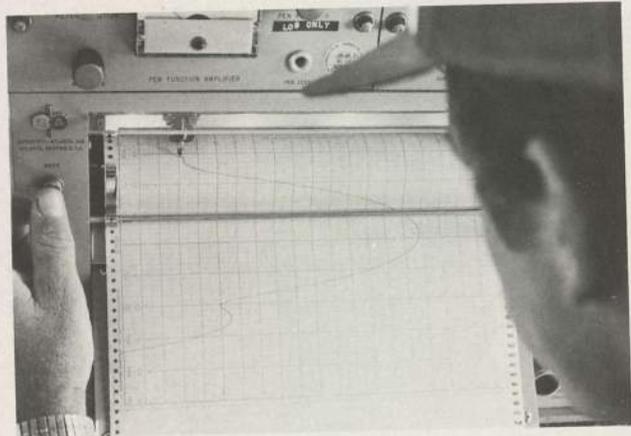
"Look here; the sidelobe on this side of the mainbeam bounced up at 1.8 degrees out. That's a five dB change. And over here, the main beam is shifted slightly; see that dip in the center of the main beam? That tells us something about what has happened to the focus integrity of the dish."



THIS IS WHAT HAPPENS/ Tubbs explains, on the graph sheet from the tests being conducted, how the struts on a dish can be moved about and what happens to the sidelobe patterns in the process.

This facility has many other uses. The paper can be left in the machine, on a 'take-up roll,' and recalled at will. Just push the button and the paper reverses. Instant recall.

Suppose you want to use your antenna test range 'time' to tweek your antenna design for maximum performance? Let's assume a hypothetical situation; your dish (it is 'yours' because you are an antenna manufacturer, or, a large distributor trying to decide whether this antenna brought to you is one you wish to handle with your name



QUICK CUT pattern/ to verify that the system is operating properly, the dish is placed into an automatic movement mode as the S/A gear and the chart recorder draws out a sample pattern.

on it) has a rather broad in and out focusing adjustment for maximum signal. You have noticed that you can move the feed 3 or 4 inches and 'detect' (i.e. see on the TVRO receiver signal strength meter) only a very small change, if any at all. Now, what happens to the antenna's 'pattern' within that 3 to 4 inch span? Does it change? Maybe, just maybe, the gain seems about even but at the same time as you move that feed in and out with the 'sweet' or 'hot' spot you are actually making quite a change in the sidelobe appearance in the antenna. It could happen. The test range is the place to check this.

First you run the antenna pattern with the feed in the middle of the 'hot' spot. The results are recorded on the graph paper. Now you back it up and reset the graph paper at the beginning again. At the same time you re-adjust the feed in or out to the opposite end of the range where your own tests indicate 'about the same signal level.' And you start the machinery rolling again. Yup, the gain seems the same (you can read relative gain by how high up the graph paper the pen draws the main beam or lobe pattern) but what is this? Over here to the side, see how the pattern is changing out 2 degrees or so?

You can also change the position of the struts, or the type of feed you are using, and do accurate, real-time one on one comparisons with your dish. No more guessing, no more "I think it is better the other way." It is all there for you to see on the graph paper.

Now, what about gain tests?

A Standard Reference

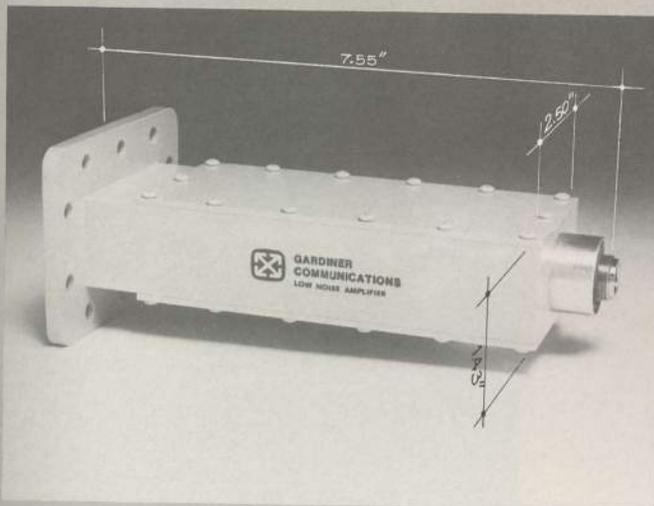
"This 8 foot antenna has 40.7 dB of gain." You read it in the data sheet. But where did they get that number? Something you read in CSD told you that a 70% efficient 8 foot dish was only capable of 38.5 dB of gain. So where do these guys get off with a 40.7 dB gain figure?

It boils down to the reference.

All gain is referenced to something. The antenna has 40.7 dB of gain? That means it has 40.7 dB MORE gain than some reference antenna. But what reference antenna?

There are two types of reference antennas which professional engineers allow onto antenna test ranges. One is called a dipole antenna and the other is called 'the standard gain horn.' For microwave work, the dipole antenna is 'dangerous' since it has no directivity. Well, almost no directivity. A dipole, by definition, receives equally well from any 'source' that is perpendicular to its flat sides. A dipole has no front, back, top or bottom. It has two ends (where gain is greatly reduced) but it has no other important 'sides.' A dipole could be used as a reference antenna, but in the process of doing this with microwave signal sources you are likely to experience signal coming to the dipole from secondary sources, say 'behind' the dipole, on the side away from the signal source. Those back-side secondary sources, or the platform you are standing on as a secondary source, can destroy your 'reference dipole' signal reading. And, a dipole is physically very small at most microwave frequencies. So small that things like coaxial cable, nearby, affect its performance.

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So most professional ranges will use a 'standard reference gain horn' as a test reference antenna. This 'reference gain horn' does indeed have some gain at the operating frequency. It might have say 10 dB of gain. Ooops. Ten dB of gain? Over what reference antenna???

The dipole. Sooner or later, all referencing comes back to the dipole, or a mythical antenna called an 'isotropic source.' Now, how does that work, and what is it all about?

The isotropic source first. Remember that the dipole has no top or bottom, no front or back. It receives or 'sees' signals from any source that is perpendicular to its straight edge, equally well. It does have two ends however; directions in which it is 'blind' to signals. You cannot change this; a dipole, by its physical shape, will always have two ends, and therefore two blind spots.

Engineers for years tried to build or design an antenna that had **no blind spots**; an antenna that picked up signals equally well from any direction, at any angle. They failed. But they did not give up the challenge. What they could not build in the real world they created on paper; a mathematical model of their ideal, **non-directional antenna**. They called it an **isotropic source** and by using long equations and lots of computer time they determined that **this ideal, non-existent model antenna** that could receive signals equally well from all directions and all angles, had approximately 2.2 dB **less gain** than the dipole does. They can't build an isotropic source, but because they can reduce it to an equation, it has great use when they are modeling antennas on a computer or on paper, for example.

So the ultimate reference antenna is an isotropic source. On paper. In the real world, the dipole is the **first step** towards a reference antenna. You can build it, and use it. And it, therefore, **can be** a reference. After you build it and test it, on a test range or better yet in a small, carefully designed short-field antenna test range 'chamber,' you can determine whether your dipole is a true dipole or not. By applying its observed performance to the mathematical performance one would expect from the imaginary isotropic source. That's how you prove the dipole is in truth a dipole.

Having done that, next you build a more suitable antenna for test range work; the '(standard) **reference gain horn**.' A horn is a small antenna, capable of being held in one hand at 4 GHz, which looks like a funnel with square sides. Decades ago, a horn was the predecessor to the present day parabola. You can build small horns or large horns and all horns have more gain than a dipole. The trick is to know how **much more gain** than a dipole.

Enter the short-field test range. By being very-very careful, since you only have to do this one time, you can calibrate the horn for its gain using a dipole. The length of the test range in this case may be very short, and the power level at the source may be very low. But when the design engineer is finished, he has done the same testing with the

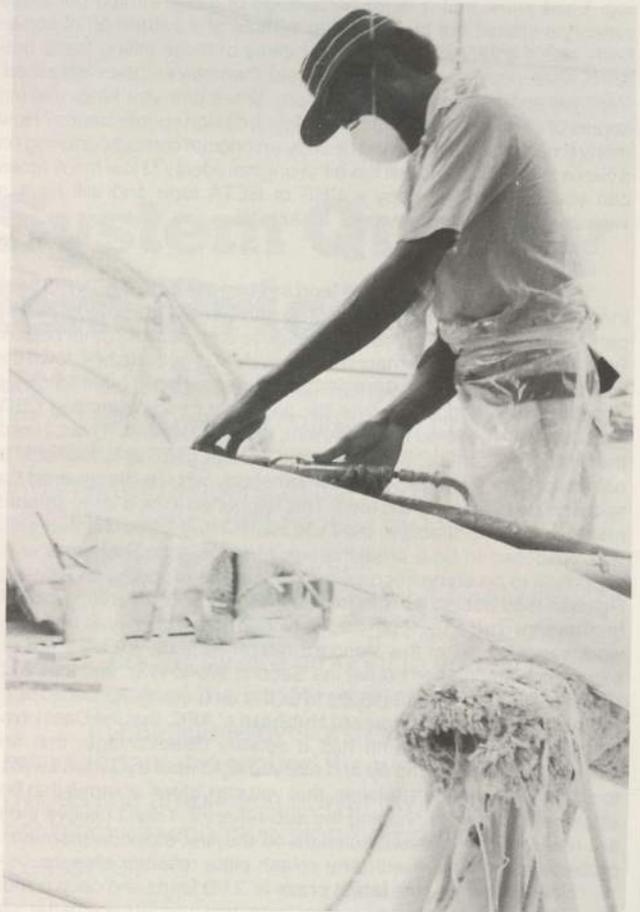
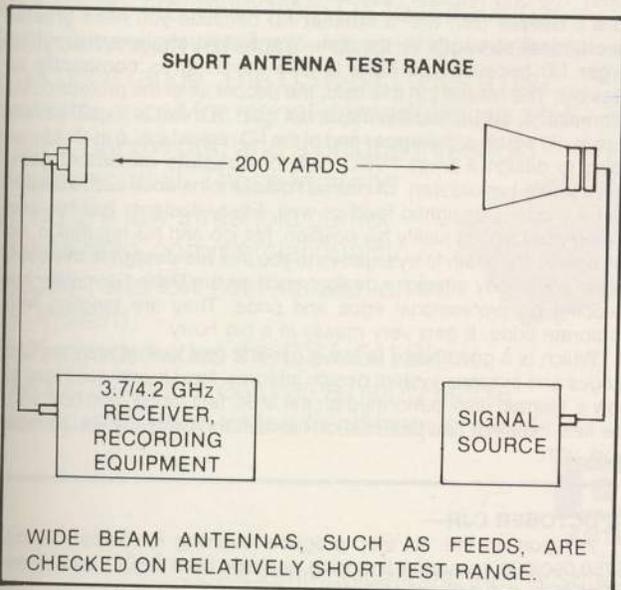
horn which we are relating here with the ten foot dish; he has checked the pattern and the apparent gain of the horn, against that of a dipole. Now the horn is **'calibrated'** and aside from periodic re-verifications of the horn's performance, the horn from that point onward becomes the 'far field test range' **reference antenna**. It is big enough that you can handle it with skill, it is small enough you can handle it with ease. And stamped right on the side of the horn is the gain of that horn, as previously determined, at say 3.7, 3.8, 3.9, 4.0, 4.1 and 4.2 GHz. Now you have a reference antenna you can work with.

The 8 foot dish again.

"This 8 foot dish has 40.7 dB of gain." Reference to what?

If an 8 foot dish exhibiting the top-end efficiency of 70% had a gain (reference a dipole) of 38.5 dB, where do they get 40.7 dB of gain? Well, 40.7 minus 38.5 happens to be 2.2 dB. **Is that a familiar number?** Of course it is; that is the **difference between a dipole reference** (the ultimate base-standard for the industry) and an isotropic source. So the guy that says he has 40.7 dB of gain for his 8 foot dish? He is telling you, without telling you, that his antenna is referenced to a mathematical reference called an isotropic source. Of course he is counting on you **not knowing** the difference between an "isotropic reference" and a "dipole reference." **He wants you to think he has performed some type of magic with his antenna;** that HIS antenna has somehow found 2.2 dB MORE GAIN than his competitor's 8 foot antenna!

A few (not many) of the antenna suppliers in the field will tell you, in their data sheets, what their gain number is **referenced to**. You might assume, if you are a trusting sort, that if the number "seems to be in line with others of a similar size," that they are all at least using the



DIRTY/HARD WORK. Working in fiberglass, which is the basic material for most MSC commercial antennas, is someplace between a health hazard and a precious skill. Here MSC workman grinds away on a fiberglass section for the finish work on an MSC product.

same reference. Most do use the dipole since virtually all certified testing numbers issued by test ranges such as that at MSC are done with the dipole as the ultimate reference. You can also assume, if the numbers seem to be 2 to 3 dB "too hot," that those quoting to you such numbers are playing the 'isotropic game.' Very few who play that game bother to tell you, in fine print or elsewhere, what their reference is. Chances are that most don't even realize the difference between the two; knowing only that one set of numbers is 'bigger' than the other set of numbers. Bigger is better, right?

MSC's Grindle.

"I have to be amused by what I have seen happen to the microwave field since 'you guys' were turned loose. I have been a part of this industry for a long-long time. I remember when firms such as Boeing used to spend as much money testing an antenna, proving that it did or did not do certain things, as they did designing and modeling the antenna. Nobody in the microwave industry of that era would even consider purchasing an antenna system that had not been wrung out thoroughly on a series of antenna test ranges. In those days, they didn't even trust antenna test ranges; they wanted to see the same antenna on a half dozen test ranges, and they wanted to see ALL of the results before they would accept the antenna. Now here comes the TVRO guys and I judge 90% of your antenna manufacturers have never even seen a test range; much less understand how one works or what it can do for you. If they spent 1/10th the budget they now spend on four color brochures taking their antenna to test ranges where competent engineers could carefully evaluate their products, and show them how they could get better gain or better patterns or better G/T, they'd have a whole new approach to marketing. I just know that a large percentage of those turning out these antennas started out by 'splashing' a mold or a pattern off of somebody else's antenna. I suspect that many of those taking these patterns were copying antennas that had themselves been 'splashed' from yet another antenna. How many times can you keep making copies of a copy and still retain the original design specifications? How many times can you copy and re-copy an original complex drawing on a Xerox® machine and still have the original fidelity? How many times can you copy and re-copy a VHS or BETA tape and still have a viewable picture. You guys are amazing!"

Guilty.

MSC's Tubbs.

"I AM more amused by the feed systems I see in the TVRO field, than I am by the dish surfaces. I agree with Carl that the integrity of the parabolic surface suffers badly when guys start copying other copies. But ultimately, the performance of the system is going to boil down the way the feed illuminates the parabolic surface. I have been following what has been happening over the past year or so by reading CSD. First everyone seemed to be following the .4 f/D legend. It was, I read, the best 'compromise' between good or high gain, and, sidelobe or pattern control. Then along came somebody who re-discovered the splash plate or Cassegrain feed. This happened to be a large antenna manufacturer not directly in the TVRO field. Their 'Delta Gain' antenna was supposed to be a breakthrough of some sort. There was even supposed to be some secret German literature reporting on long-ago Russian feed design work in this field. Pretty soon everyone and his brother was coming out with a splash plate feed. No wonder that didn't work very well; all of the standard reference texts will tell you from experience first gained during the Second World War, and then substantiated and re-substantiated over the next couple of decades by Bell and others such as Howard Hubbard at AFC, that the Cassy type (splash plate fed) antenna has a serious disadvantage; that first sidelobe is going to jump up and bite you right where you don't want it to do so. Yes, there are 'claims' that you can 'steer' or move that first sidelobe by carefully shaping the sub-reflector. I don't believe those are real-world or relevant solutions to the first sidelobe problem; a problem you will have with any splash plate reflector antenna."

"Now I see where the latest craze is .3 f/D feeds and deep dishes. The claim is made that you control terrestrial interference better with such a feed. Again, I have serious problems with this. What I really see happening here is the 'Detroit Syndrome'; every new model year somebody thinks they have to re-invent the parabolic antenna. They have to come out with something so spectacular and so innovative that everyone else is at a tremendous 'marketing disadvantage' be-



FIBERGLASS SHOPS are seldom a thing of beauty. Antenna sections come out of their respective molds 'rough' and must undergo many hours of finish work before they are ready for the field.

cause they are not on the same bandwagon. Let me suggest that in 1984 somebody will come along and make great claims for a really shallow dish; say a .5 or .6 f/D. Then we will see the main body of the TVRO industry charge off in that direction simply because it is the 'new model' for the 'new year.' I don't think very many people out there really understand feeds, what they do and how they are an integral part of the system. Let's look at that someday."

We will. CSD will be taking two-each of all of the popular feeds in our industry to the MSC test range and there we will be performing a series of tests to determine the pattern and the gain and the match of each of these feeds. We will publish the results and from those results we will, with the guidance of MSC engineers, make recommendations to readers on which feeds will perform best under what circumstances. To coin a word, we expect it to be an 'illuminating' experience.

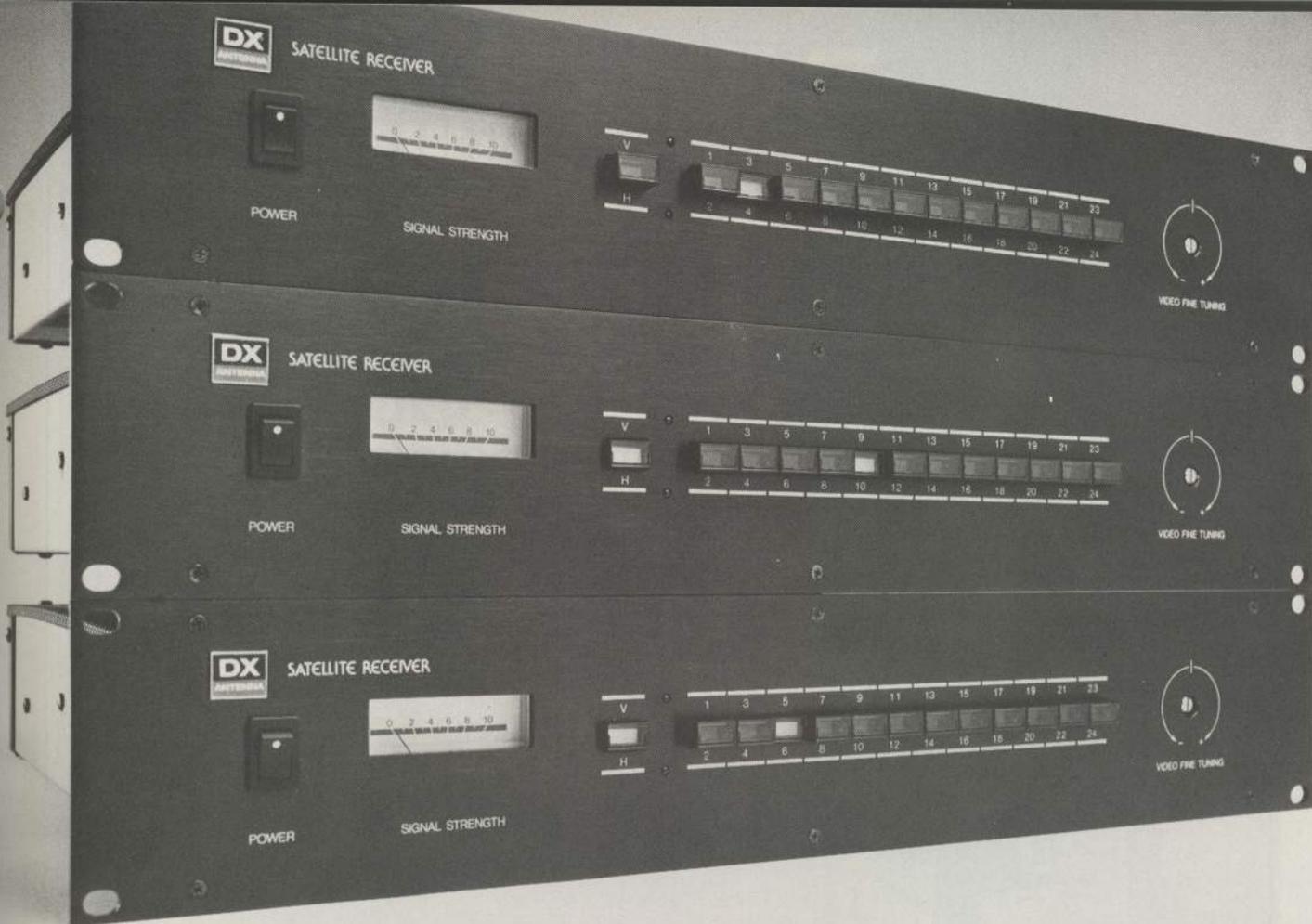
Is there really a 'best' f/D for gain or pattern? Tubbs again.

"There are very small differences between a dish with an f/D of .25 and a dish with say an f/D of .75. If someone came to me and said 'select the f/D which will give me maximum gain,' I would have to respond 'there is no such single f/D.' It is my opinion that given what we know today about feeds, you can make any dish with any f/D from .25 to .75 perform like any other dish with an f/D in the same (wide) region. So why do we lean towards certain f/Ds for various applications? The only reasons I can think of are mechanical reasons; you build a deeper dish with a smaller f/D because you need greater mechanical strength for the dish. You build a shallow dish with a larger f/D because you have to ship the thing as compactly as possible. The masters in this field, the people all of the professionals reference to, tell us that the maximum gain (if there is a gain advantage at all) will be at the upper end of the f/D region' say .5 to .7. If I was going to design a small TVRO dish for absolute maximum gain, that's where I would start. Of course I'd have to balance such a design with a properly designed feed as well. Every designer has his own preferences and to justify his position, his job and his reputation, he will fight to the death to try to prove to you that his design is the best. When somebody attacks a design, such as the Delta Gain, they are stepping on professional egos and pride. They are tangling with corporate pride. It gets very messy in a big hurry."

Which is a good place to leave our first part look at antenna test ranges and antenna system design integrity. Next month we'll look at how a 'warped dish' performed on the MSC test range, and how you, the field installer, can detect such flaws in the products you have to work with.

IN OCTOBER CJR—

A report on the 'six step program' evolving for dealers in the \$750,000,000 consumer financing package from SFPC, and, a detailed look at distributor attitudes.



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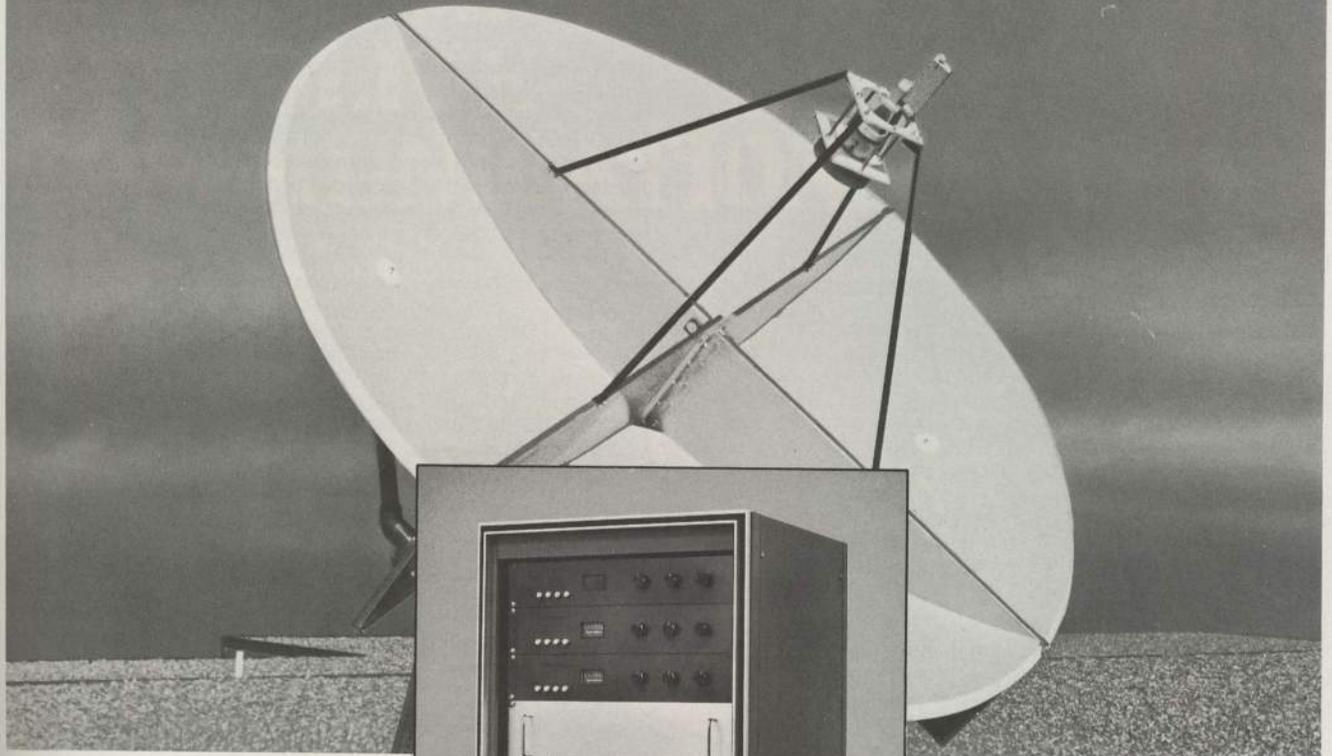
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HAS SMATV COME OF AGE?

Correspondent Sutro attended the recent gathering of the National Satellite Cable Association, held in Denver. The group has attracted more than a small amount of controversy because they specialize in installing SMATV (satellite master antenna television) systems into multiple dwelling buildings which many consider prime targets for direct multiple channel (locally franchised) cable television. The group is experiencing both growing and identity pains, and many of the battles they are facing and fighting are similar in context to those being braved by the home TVRO field; as well as the 'mini-cable' system installers who operate at a lower level of visibility. CSD feels a report on this meeting is important to our industry and accords the space to NSCA and Sutro for that purpose.

On January 26, 1983 the fledgling **National Satellite Cable Association** (SMATV, or Private Cable) held its first (national) convention in Dallas. As a veteran of many STTI and other TVRO industry trade shows, I was equally impressed by **their pioneering spirit** and the entrepreneurial quality of the exhibitors. And for a first show effort, there was what I considered to be 'good trade' support in the form of equipment booths and personnel from firms such as Scientific Atlanta, Harris, M/A Com, Microdyne, Standard Communications, General Instruments (GI), DX Antenna, Anixter Communications, ESPN, Selec-TV, ON-TV, Home Theater Network (HTN) and many more. What intrigued me the most, perhaps, was the turnout of the firms listed here, many of whom would not be found at an STTI show, for example.

Less than seven months after their first convention and show, NSCA banded together with "Private Cable Magazine" to stage a second show; this one at the Regency Hotel in Denver in the middle of August. There were some sixty exhibits, perhaps 500 attendees and banners that proclaimed "**Entrepreneurs and Private Cable.**" The keynote address was delivered by **Sid Topol**, Chairman of the Board of Scientific Atlanta and luncheon speakers including **U.S. Representative Timothy Wirth** (Chairman of the House Subcommittee on Telecommunications), and **Paul Kagan**, a respected publisher of some 16 different communications industry newsletters.

All of those previously mentioned from the inaugural Dallas show again exhibited (with the exception of Harris) and there were additions that included Blonder Tongue Labs, Precise Manufacturing, PhaseCom, Channel Master, Birdview, Gardiner Communications Corporation, Delta Benco Cascade, TEST, Winegard plus others. There were but ten antennas in operation including a pair from Scientific Atlanta, a 3 meter Simulstat and a pair from Mirrolite with multi-sat feeds.

Seminar sessions covered virtually the full three day period and covered a very wide range of topics; the legal and regulatory aspects of SMATV, financing, marketing, contracts with property owners,

technology and construction, programming, scrambling and piracy as well as a look at the newer technologies; multiple channel MDS and of course DBS. Without going into great detail on each topic covered, here is an overview of the problems, and opportunities, facing the SMATV industry entrepreneurs gathered in Denver.

LEGAL And Regulatory

The number one topic coming up when regulatory actions were being discussed was a recent ruling in the State of New Jersey court system. That court decision said that SMATV systems were to be regulated in the same manner as the state's cable TV systems; by and through the State Cable Commission. **Crescent Park Apartments** in East Orange has been told it could not activate (turn on) a completed SMATV system. They were seeking federal (FCC) ruling to pre-empt the state decision, and they **sounded** optimistic. I personally found it unsettling that SPACE, the trade association, had seemed to turn a blind side to the case since the precedent for all SMATV operators was important.

If by chance the FCC agrees (or agreed, if action is taken before this appears in print), appeals are sure to follow and there was talk of the case going to the Supreme Court. The very foundation of SMATV, at least in New Jersey, is challenged by this particular case.

Of equal concern perhaps is the impending decision from the New York State Cable Commission, which has been threatening to shut down the SMATV system now under construction for the very large 15,000 apartment **Co-Op City** complex in the Bronx. Again, the SMATV operator maintains that because no public streets are being crossed with the cables, and the system is entirely upon 'private land,' that no state regulatory body has jurisdiction. New Jersey obviously disagrees and from press statements it appears New York does as well. Those who have an interest in SMATV projects, who are concerned that such rulings might ultimately cripple the young industry, are urged to contact the NSCA attorney (*), Jim McNaughton, to find out what **you** can do to be supportive in this important watershed battle.

(**Editor's note:** Indeed, the New York Cable Commission **did** move to close down the construction of the Co-Op City 15,000 unit apartment complex SMATV project late in August. Citing their opinion that SMATV was simply cable television operating under an alternate name, the New York officials lamented that such a system might operate without 'supporting local and state revenue raising measures' [cable pays an annual fee to one or both]. The issue was headed for court determination at press time.)

Financing

Many of the SMATV operators attending report success in raising capital to wire large projects through such approaches as venture capital, limited partnerships, tax shelters, public underwriting or even banks. **STARCOM of Denver** brought out a public offering on July 1st and raised several million important operating dollars; in spite of the fact that at the time it had but ten operating SMATV systems, only a few hundred real subscribers, and an operating history of less than a year.

Marketing

I suspect one of the most shocking, and surprising statistics revealed that many SMATV systems are achieving subscriber penetration levels of only 20%. Another distressing statistic; the average SMATV system serves but 65 subscribers. Clearly, with going-in capital costs averaging between \$30,000 and \$50,000 per system (resulting in a per subscriber cost of around \$500), such a low penetration, if it continues, will doom the industry. There was considerable discussion on marketing strategies, demographic studies of the potential marketplaces, tele-marketing and other techniques to achieve a higher subscriber penetration level.

Property Owners

The mood of the gathering seemed to be that real estate developers and property owners no longer feel they **MUST** go along with the local cable firm's service offering(s). In days recent, if a cable firm approached a complex owner or a developer, he usually had no

by
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President
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difficulty gaining access to the property (some situations in New York City aside). The 'buyers' are far more apt to listen to an 'SMATV pitch' than in the past, but it was stressed that the SMATV system package offered must be a viable alternative to full cable service, in both programming service and cost.

Technology

The overriding concern of those sitting on panels and talking in aiseways was the FCC decision to move to closer satellite spacings. Most SMATV systems are using relatively small dishes (3 to 4 meters in size) and multiple-satellite reception 'pods' are common. The consensus was that it is truly too early to tell, since we have no operating 2, 2.5 or 3 degree same-polarization/to/same-polarization satellites in the air, yet, to tell what the damage may ultimately be. The trend to using block down conversion techniques was also evident. The single channel modulators from Jerrold (GI) and Blonder Tongue continue to be used almost universally. Delta Benco Cascade was displaying their addressable taps which allow the system operator to 'address' as in turn on and off service to a specific location from a remote location.

Construction

Almost to the man, those operating systems agreed that typical MATV 'loop through' cabling techniques will not function properly for SMATV. In a loop-through system, the signal channels leave the head end in one or more 'trunk lines.' The trunk lines in turn divide into 'feeder lines' which then go floor to floor or apartment to apartment. As the feeder passes an apartment, some of the signal is 'tapped' off to be fed to the outlet(s) in that apartment. In effect, it is a tree with a 'main trunk' and a series of 'branches' each of which ultimately terminates at its end with the last apartment served on that branch or leg.

Many buildings with existing systems cannot handle the SMATV channels in this manner since you are faced with the problem of providing the optional SMATV service channels only to those apartments which are **willing to pay** for the service. Traps and other 'negative options' aside, the thrust of the industry seems to be that you go in whether in a new building or in an older building and install a 'home run' system. This is a cable approach where every apartment has its **own line** directly back to the head end equipment. Security is a matter of connecting, or not connecting, that apartment's dedicated 'home run' line to the master head end equipment.

Also discussed was the need for reasonably priced addressable equipment; to allow the operator to 'tier' or stack optional services on the single home run cable feeding each apartment. Selec-TV, for example, operates 24 hours per day but their midnight-onward segment is an 'adult theater' package. By being able to 'address' in time each subscriber, you can offer the normal 18 hour per day service of Selec-TV and then for an optional surcharge offer the Adult Theater material.

Programming

There were no really new programming announcements; ON-TV has gone through a very small reduction in their pricing schedule and they have also reduced the price on the Orion signal decoder package. Selec-TV and ON brought out some new marketing tools designed to increase the sell-ability of their products, and they re-stated their commitment to SMATV service. Doug Dexter of Warner Amex (The Movie Channel) was present and reaffirmed his company support for SMATV, but also told the group that **'for the time being there would be no new contracts let.'** With the merger between The Movie Channel and Showtime now approved, there is little likelihood this attitude will change in the near term. The new and relatively new 'sex' channels, The Pleasure Channel and Blue Max, were both on hand but relatively low profile. At the moment, Home Theater Network (HTN), CNN, ESPN and the three super stations WILL deal with SMATV systems; Playboy and Disney (plus the premium movie services) will not.

SCRAMBLING AND Piracy

Nobody seemed afraid of scrambling; in fact most felt it would be a blessing to the industry, provided the cost of the descrambler equipment was not prohibitive, and the equipment was reliable. The concern expressed in CSD for August (see 'Piracy: The Seeds Of Our Destruction,' page 22) was evident at the meet; many of the potential customers for legitimate SMATV services were receiving illegal service with their own TVRO systems, and if scrambling came along, perhaps many of these would then be more willing to follow a licensed

SMATV route with programming contracts. The group was certain that until ALL of the movie services encrypted, however, the enormous piracy problem we all face would not improve. As long as there was one un-scrambled movie service left, those motels and others stealing service would continue with their 'wayward ways.' The group agreed that motel piracy was the worst category but expressed concern for the rising number of hotels, apartments, condominiums and trailer parks which were installing 'illegal' systems.

NEW Technologies

The attitude of those gathered was that multiple-channel MDS (a recently approved, new service authorized by the FCC) might one day offer multiple channels of service to S(M?)MATV systems. Multiple-channel MDS will be kind of a cable without cable; as many as ten channels or so in some areas, one suspects (but can only guess) programmed with satellite delivered signals such as WTBS, CNN, ESPN, and so on. They will over perhaps a 25 to 35 mile radius of the transmitter sites, like present day MDS does on a single channel, and be yet another delivery method into American homes. However, the service is so new (just authorized) that nobody seemed to have a 'handle' on how it might impact SMATV down the road.

Closer to 'now' is the DBS service(s) which keep promising to change the way we eat, dress and wear out underwear. The earliest entrants are being called 'interim DBS,' or medium-power DBS; to separate them from the 1986 and after era 'high power DBS' which COMSAT and others are now building towards. Of the early entrants, United Satellite Communications, Inc. (the Galesi-Prudential Insurance-General Instrument joint venture) was expected to be in the exhibit area. Many of us were disappointed that they withdrew at the last moment and substituted a set of hospitality suites for the booths. Those attending from USCI were low-level type employees who seemed not to have the answer to **any** questions asked. The final session of the group was to have been an address by USCI and it featured an empty chair; the young lady who was scheduled to be 'in that chair' was paged throughout the hotel without success. No representative of the Murdoch DBS group or COMSAT was in evidence at NSCA either.

It was more than a slight disappointment to me and many others attending that the (medium power/interim) DBS people paid such little attention to the NSCA meet. In the extremely high stakes game being played with DBS, with the very large amounts of money promised to be spent in launching these new services, it occurs to those who are active in the SMATV industry at the present time that we could get them off the ground and running faster than anything else they might do. With hundreds of thousands of living units 'passed' by SMATV cable, with potentially several million 'dwelling passings' that could be created for DBS via SMATV almost overnight, it would seem that a marriage between the struggling but at least operational SMATV industry, and the yet to be born DBS industry, was a 'natural' alliance.

The SMATV industry came to Denver loaded with important questions for the DBS people. The empty chair dedicated to the USCI representative in the session they asked to have scheduled perhaps said it all; DBS is still 'out to lunch.' The little bit we did learn from the lower level USCI personnel on hand was that they 'now plan' to inaugurate interim DBS service on November 15th from ANIK C. The service will consist of five channels (two movie channels, one sports channel, one news channel, and one 'special events' channel) and it will cost (wholesale) about **\$12 per subscriber**, per month. This price did **not** thrill SMATV operators, especially after you factored in the \$6-7,000 cost of the headend (antenna, LNC, receivers, decoders and modulators), to which you must add the operator's costs associated with distributing the service within the complex, and his costs of security.

It was noted that SMATV operators have grown accustomed to putting together a pretty decent 4 GHz services package of programming (consisting, for example, of ON-TV or Selec-TV, ESPN, CNN, WTBS or WGN, and USA) for around \$7 (wholesale) cost per month. And, the price for the 4 GHz equipment is not appreciably different from the projected price on 12 GHz gear.

On the positive side of the DBS ledger, 12 GHz should not have terrestrial interference problems and there is something to be said for

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What Is ASTI?

Terrestrial interference (TI) is fast becoming a major economic consideration for the installers and operators of TVRO earth terminals. Thousands of dollars, even hundreds of thousands, may be at stake when the earth station is turned on — only to discover that TI is degrading or altogether preventing reception of desired satellite signals. At this point, conventional wisdom used to advise packing up and moving to another site. But now, with many of the available TI-clean sites already taken, and with the advent of a huge and still growing transcontinental microwave telephone relay system, finding another site can be impractical if not impossible. Consequently, most dollar-conscious installers and operators would rather stand and fight TI than switch to another site.

The purpose of this volume is to integrate two practices — avoidance and suppression — into a logical, unified approach that can be effectively applied in the planning and installation of any TVRO earth station system. Conscientious application of ASTI — the avoidance/suppression approach to eliminating TI at TVRO earth stations — will reduce the possibility that TI will be discovered at turn-on, enhance the probability that unavoidable TI can be eliminated, and increase the effective operating quality of the TVRO system.

The authors of this handbook, with years of experience as designers of RF and microwave filter networks, have had ample opportunity to test the ASTI approach—it works! Measured over a period of time, the costs involved in the ASTI approach have proved to be substantially lower than any alternative, especially in terms of dollars saved when the initial site was made operable. Furthermore, both cost and complexity of filtering to eliminate TI are lowered considerably when all essential aspects of the ASTI approach are conscientiously employed.

Contents Include:

The TI Avoidance/Suppression Approach; Why Satellites; How Your Earth Terminal Works; TI Sources; TI Symptoms; Selecting the Antenna for Least TI; TI Susceptibility of Other TVRO Components; How to Select a Site; The Pre-Installation Site Survey; Defensive Installation; Use of Artificial Shielding; Filtering the TVRO; Filtering Special TVRO Systems; SMATV Techniques; Standard TVRO and Satellite Data; Formulas and Derivations...

About the Authors:

Glyn Bostick is the founder, president and chief engineer of Microwave Filter Company, Inc. He has been designing filters for the suppression of interference in cable TV systems, industrial and defense communications equipment, and satellite earth stations since 1967. Mr. Bostick has written a plethora of technical articles for trade publications, holds several patents and is a senior member of the IEEE.

John Fannetti is MFC's senior technical consultant and head of the company's new Field Service Division. He has 30 years of engineering and earth station troubleshooting experience, including 7 years as president of JDF Communications, a CATV consulting and TVRO installation firm.

William Johnson, chief engineer of research and development, is MFC's "voice" and travels around the country, upon request, to deliver ASTI-type lectures at various industry gatherings. In his technical capacity at MFC, Mr. Johnson is the design engineer in charge of special developmental projects. He earned his BSEE at Syracuse University and is currently engaged in graduate studies there.



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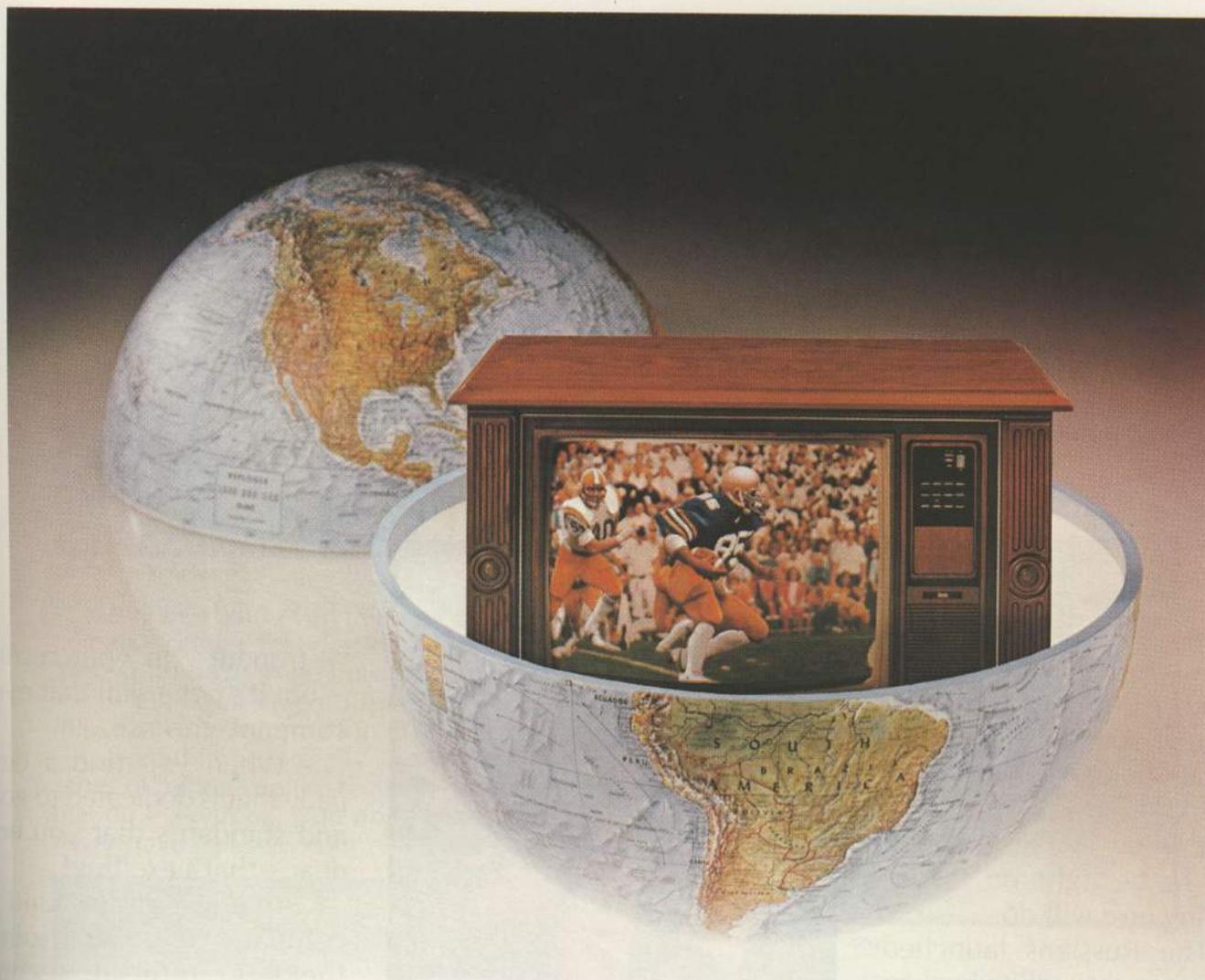
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The Russians launched the first earth satellite back in 1957. They called it Sputnik. It excited the world and jarred America into response. Sometimes an external influence can cause positive results.

It happened to us. America wasn't the first in space, but within a few years, no one could touch our Apollo moon program.

Remember the thrill when we heard, "The Eagle has landed?"

Man on the moon.

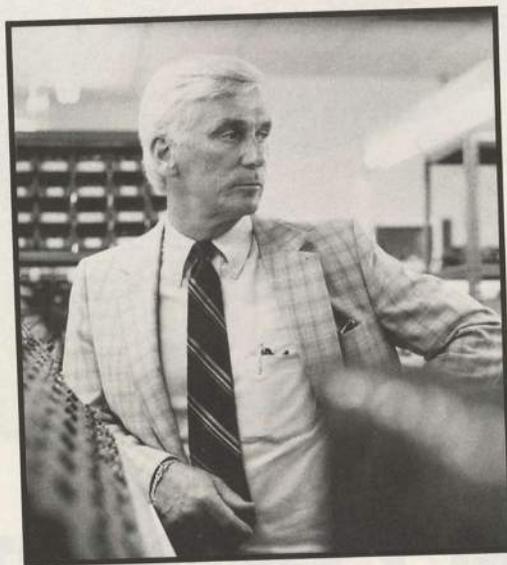
Once Neil Armstrong stood on the moon, things would never again be the same.

You could offer me anything in this world but if I had to give up my experiences in the Apollo moon program, I'd say, NO!

Since those days we have even broken through the external regions of the solar system.

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Gene Cernan, Commander of Apollo XVII, who left man's last footprint on the moon.

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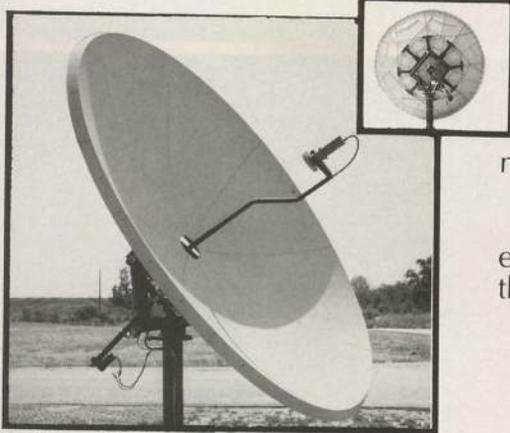
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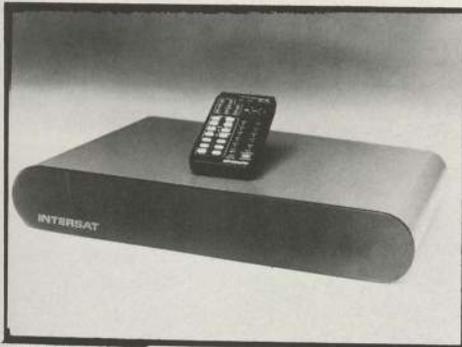
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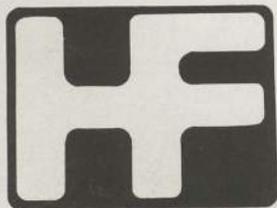
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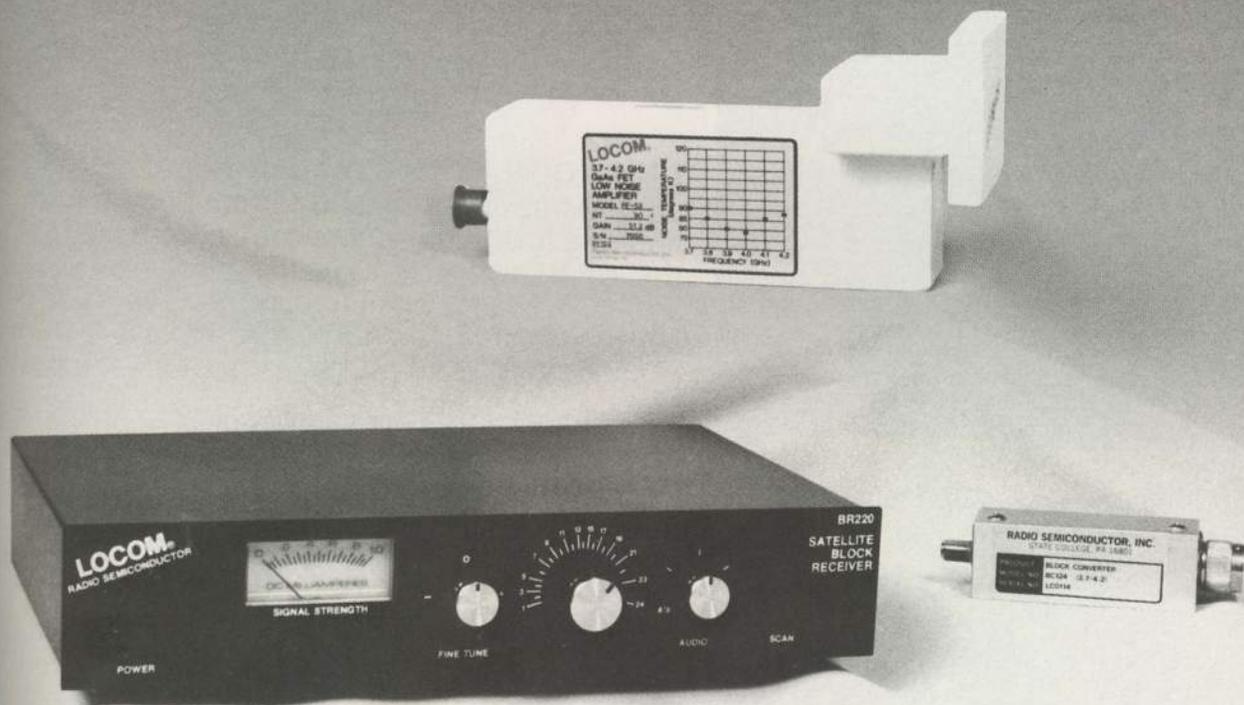
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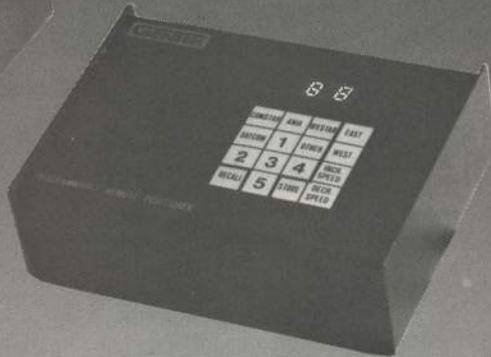
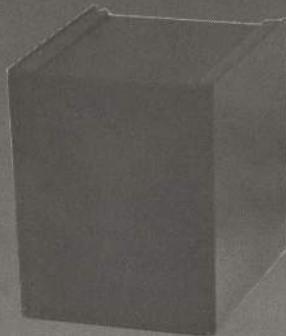


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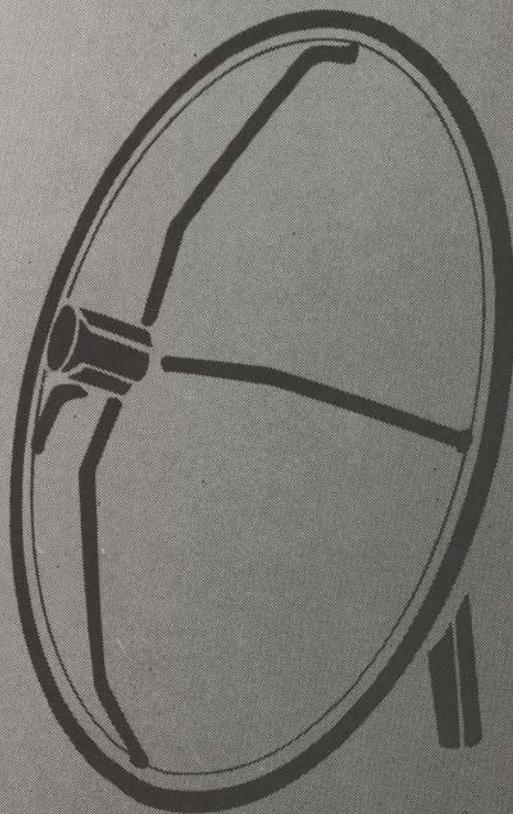
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PIRACY Copies

Would it be possible to obtain copies of the Piracy article appearing on page 22 of CSD for August 1983? There are (quite) a few motels in this region of Oregon that are not really convinced whether they should go with a legal SMATV system or simply install a TVRO system from a 'pirate installer.' I would like to hand them a copy of the August CSD article as proof to them that illegal terminals making commercial use of premium service channels is against the law.

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1757 Highway 66
Ashland, Or. 97520

Permission is granted to anyone in the same situation to simply copy the CSD article; wallpaper the motel and hotel world with it as you see fit! If the article convinces just one motel owner to 'go straight' with a legitimate, authorized system, it will have served a useful purpose.

PIRACY/ Side Two

We recently acquired a TVRO and it is the best toy I have ever bought. We enjoy it immensely. After reading your (August 83) Piracy article, I continue to feel uncomfortable. I don't really feel like a thief and I doubt that very many TVRO owners do.

When I contacted our local cable system to ask them to extend service to the six homes in our neighborhood, they wouldn't even consider it. We offered to provide the capital (bucks) for materials and installation. Still 'no' interest. Obviously this particular cable firm is in a 'fat' situation, and is not eager for new customers. I really doubt very many people would spend the \$3-5,000 required for a home TVRO if cable services were universally available, and reasonably priced. Your August CSD article sounds like some of the motel operators are installing a TVRO for the owner's entertainment, and then they make it deductible by connecting it to the other rooms as well. To make it worse, they hang an HBO sign on the marquee. This is the modern, electronic, spaceage equivalent of the old bait and switch technique! Most 35 room motels are probably borderline profitable anyhow and would not justify the \$8.50 per room per month for cable service.

Since quality equipment is now so cheap, why are cable services continuing to be so expensive? And, if HBO is paying so dearly for the movie rights, why do they continue to be so prosperous? Frankly, I am confident that law suits would have already been filed if the TVRO impact were as great as the article imagines. In our area, cable service is only available in town and most people live in rural areas; widely spaced, and thus not economic for cable TV delivery.

George Kiricenkov, M.D.
1900 W. Fourth
Mt. Vernon, In. 47620

A modern, twenty channel (some may argue that is 'not modern') cable plant, installed on utility poles 'above ground' (i.e. aerial construction) costs between \$5500 and \$7500 per mile to capitalize. Some, in very rural areas, using 12 channel capable equipment, are still doing it for under \$4,000 per cable-mile. That's bare bones costs, equipment (materials) and labor. More sophisticated plants, run in underground cable vaults with con-

crete 'risers' for the equipment, top \$100,000 per mile in major big city jungles, such as Philadelphia. The rural areas, where homes are widely spaced, have always been a problem for cable. If you spend \$6,000 for a mile of cable and reach six homes in the process, and all six homes subscribe, your revenue for that six homes might average \$25 per home per month (basic service plus a couple of premium service channels). So that is \$150 per month for that mile, or \$1800 for a year. At that rate, the bare bones cost of the plant at \$6,000 would require 3.33 years to pay back. That's on the principal. On the principal plus interest on that \$6,000, the payback term comes closer to 46 months. Now, on top of this, the cable operator has two other factors to consider up-front. Number one, his depreciation schedule on that new mile of plant can be a direct benefit to his annual tax return. The IRS still allows 3 to 5 year depreciation schedules (up to 80% of original cost), so you can see if you are into depreciating capital investments that it won't really take 46 months to recover his costs. That's factor number one. Factor number two is the 'added value' of the cable plant based upon the resale value of the system. This is a function of system 'cash flow,' or the excess cash generated annually after all operating costs but before debt retirement. At the moment, the cable systems in smaller towns such as Mt. Vernon are bringing between \$600 and \$900 per cable subscriber on the open market. If the guy has 1,000 cable subscribers, he can expect to peddle the system for between \$600,000 and \$900,000. That means that six new subscribers will add to his system value between \$3600 and \$5400. If he adds that mile of cable plant, and sells the system the next day, he loses money (he spends \$6,000 but gets only \$3600/\$5400 for the six new subscribers on that mile). If he waits three to five years, he has taken the depreciation (80% of \$6000) off his bottom line on his taxes, and he has also taken in \$150 per mile for as many months as the six subscribers have stayed on the line. If he can then turn around and sell those six subscribers for between \$3600 and \$5400, to the next owner of the whole system, he makes money. Good money. Why won't they agree to run a line to you and five neighboring homes when you offer to pay for the materials and labor? They want to own the plant; if you pay for it, they won't own it; unless you (foolishly) agree to pay for it and then 'sell' it back to them for a dollar. Then they are fools not to take you up. If they still won't do it? They are too busy hauling wheelbarrow loads of cash to the bank to mess around with six more subscribers; as you say, they are 'fat.' HBO is indeed prosperous. See CSD report for last month (September 1983).

RIPPED OFF In Vegas

In March of 1983 we attended the STTI convention in Las Vegas, representing our TVRO installation business. During the course of the convention we noticed a pair of small (1 foot) fiberglass TVRO dishes set up in the lobby, right in front of where you register for the convention. These were displays and were being marketed as such. My husband picked up the business card and a flier with the small dishes and when we returned home we called to get additional information. First of all, we called Glenn Snell since his name, address, telephone and beeper numbers appeared on the card. He could not answer my

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questions and directed me to Roberta Arvin. With her information we placed an order for a pair of the 1 foot display dishes. The check came back, folded and cashed and we, to date, have never heard another word from this company.

I called the company, and all of the numbers I had collected in the course of tracing them the first time to place the initial order. I left messages asking for a return phone call. I never received one. We even threatened to take the matter to the Better Business Bureau but we still did not receive a return call.

Next I called STTI and talked with Rick Schneringer. He said he did not show the firm (**Southeast Satellite Distributors**; Charleston, SC) as an exhibitor at Las Vegas. He also said he was not even aware of their presence at the Vegas show; I find that difficult to understand since the display for the dishes was directly in front of his registration booth and he had to pass it several times each day just to conduct his own business affairs! I then asked him to keep an eye out for them at future conventions, but I have never heard a word back from him.

I have turned this matter over to the local Bureau of Consumer Protection, and like any such agency they are 'dragging their feet.' Has anyone else had such an experience with this firm? Since we are members of SPACE, is there anything that SPACE can do to either protect dealers in a situation like this, or help us get our money back. What would **CSD** suggest that we do?

I really wanted to receive the two small dish displays since I felt, and still feel, they would be a good way to help illustrate our TVRO product in our showroom. Thank you for a tremendous magazine; we'll be regular subscribers forever!!!

Judy Showers
Carlisle Radio & TV Co., Inc.
1322 Spring Road
Carlisle, Pa. 17013

Supporting documentation included a copy of the canceled check, a letter to STTI's Schneringer, and a form letter from the Cumberland County Bureau of Consumer Affairs. The check was marked 'For Deposit Only/Southeast Satellite Dist. Inc.' The \$86.40 will probably not bankrupt the Showers but the facts clearly show that if nothing else there are people selling stuff at STTI shows who have no booths there, who are not paying for the privilege of displaying there, and whom STTI does (apparently) not even recognize as being present; the 'out-in-front' display adjacent to the registration desk aside. Show security is not what it could be. Can anyone shed any light on 'Southeast Satellite Distributors, Inc.'?

LATE COMER/ Old Problem

I am looking for a downconverter/demodulator combination with characteristics that just don't get included in most production designs. From our location in Quito, Ecuador, we really have to fight for every last tenth of a dB in system performance. Yes, there are some US DOMSAT signals available here (specifically, the Hawaiian beamed transponders on F3R, horizontal side only; plus a handful of the horizontal transponders from F4 and CBS [alone] from D3; plus, by some amazing quirk, the ANIK D signals that are as strong or stronger than the US signals!). But on a 7.5 meter dish, these signals are either laced with sparklies or far enough down that while you can watch them, you could not tape them (for example). Seemingly, the answer would be with a high quality ten meter (or larger) antenna, plus with state of the art electronics. The truth is, however, that the Intelsat signals are actually far stronger here than the DOMSATs and for that reason my interest is turning to what it takes in the way of innovative electronics to produce good quality signals from the Intelsat birds.

I would like, for example, to find equipment with front panel switching between half and full transponder. I would also like to have front panel switching between NTSC and CCIR deemphasis, as well as fully tunable wide and narrow band audio. If the Taylor LPLL circuit is now available, I'd also like to have that in a receiver system for Quito. In this part of the world, these features are far more important than remote controls, armchair digital time displays and so on.

I have written to Clyde Washburn asking him why he does not incorporate Intelsat grade features into his Washburn receiver. I made the point that everywhere in the world, except North America, the standard television system via satellite is Intelsat. And that the DOM-SAT services in use in North America are unique to North America; by

not addressing this marketplace, the receiver suppliers are 'limiting' their market to just a fraction of the world.

I would like to be able to make the next show (Orlando) and I look forward to meeting with others who operate in areas where DOMSAT signals are not so readily available.

J.M. Edgerton
P.O. Box 8917
Torres de Almagro
Quito, Ecuador

The receiver you describe, except perhaps for the NTSC/CCIR switching for the deemphasis, is manufactured as a 'stock' item by AVCOM of Virginia. It is called the COM-3R 'International.' There is also a block down conversion model in the same family; the COM 66T 'International.' We have one of each and recommend them as excellent pieces of equipment. We also feel sure that AVCOM would adapt NTSC/CCIR deemphasis to a front panel switch if that is what you wanted.

SCHEMATICS Upon Request

I have been building satellite receivers for about 3-1/2 years and I have worked on and (successfully) repaired just about every brand you can name. Very often I find myself working on some very junky products! My biggest single problem with my job is to get the OEM to send to me a schematic diagram of the products. Sometimes it is difficult to repair a product without a schematic; or at the best, expensive. Many the time I have sat down and laboriously traced all of the PC board traces on a circuit board just to dope out the schematic on paper. What is a company such as mine to do when you can't get a proper schematic? I find that most individuals, and the installers who sell the equipment, do not want to wait weeks or a month or more to have a receiver go back to the factory for a single part repair or a simple alignment. I have found that most of the equipment being sold is usually very similar in design, and there are at best (subtle) changes so that the receiver is modified just enough that the new company can claim they have created a new product all of their own. Is there not a law someplace that says the OEM is supposed to furnish schematic diagrams to a legitimate repair shop, upon request?

E.H. Bindley
Satellite Repair Service
5024 Olivia Drive
Antioch, Tn. 37013

We know of no such law. I'm sure a case could be built for requiring a schematic diagram for any equipment shipped in 'interstate commerce' if you wanted to get the FEDS in the act. Frankly (this will tell you something about our politics) the less the FEDs have to do with ANY business, the better off that business traditionally is. As to manufacturers supplying schematics, several now maintain regional repair centers (KLM, for example) and others have 'factory authorized repair centers,' often run under contract with skilled people such as yourself acting as a 'nearby' service agent. The factory doesn't want one out of every ten radios coming back to their plant for minor parts repairs or new alignment anymore than you want to send it back to them. Perhaps what you need to do is to contact several of the larger brand name suppliers, explain your experience and qualifications as a repair center, and ask if you can handle their repairs in your area.

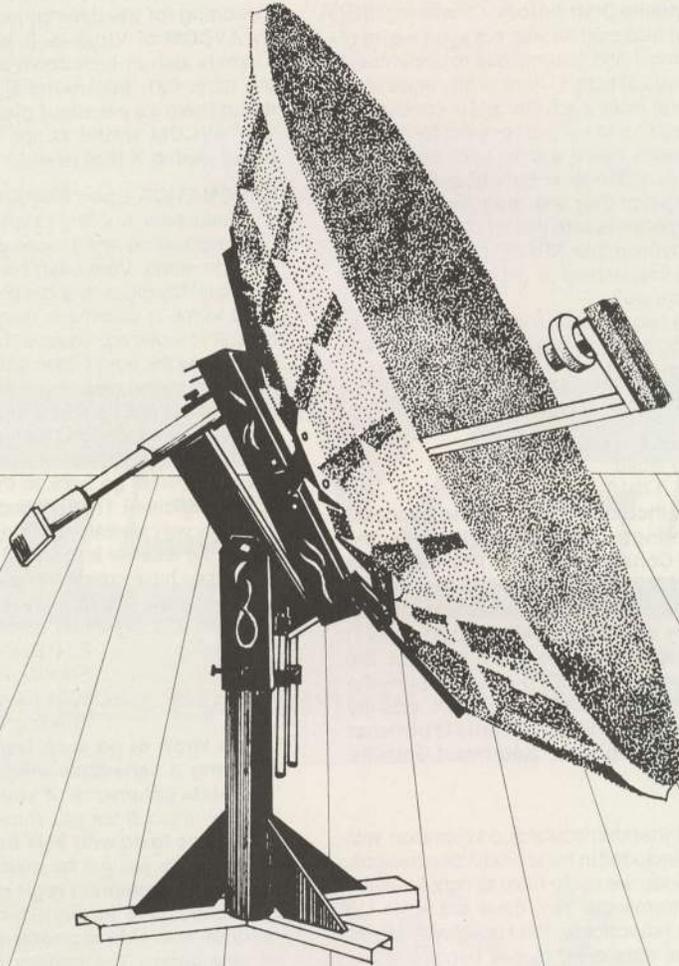
CSD is currently looking for a person, or persons, who are active on a daily basis in repair and alignment of TVRO receivers. What we would like to begin, in CSD, is a regular column where those who fix radios pass along alignment and trouble shooting tips to those who use radios. We feel there is a significant data base now out there from people who do this for a living, and we'd like to see that data begin to get into general circulation. The more the dealers know about TVRO repairs, ultimately, the better off the OEMs will be. Let's face it; the black magic of microwaves is long gone!

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RC-10 Satellite Receiver System

RDL-10 Satellite Receiver System



CORRESPONDENCE/ continued from page 63

try would read CSD every month! If they did, they would quickly find out what a disservice they are doing to themselves and their customers by selling 'junk equipment' which stands absolutely no chance of working properly when we end up with uniform 2 degree spacing. A great number of 'average American viewers' are going to be very-very angry when the 2 degree spacing starts; people who purchased systems in good faith and who discover too late that they bought junk equipment that cannot perform under those conditions. CSD tells it like it is, and as it should be told, and those who deal in equipment without this knowledge are in for a rude and perhaps painful experience in the months and years ahead.

Anonymous

We would like to think that every dealer in the industry does read CSD. Alas, there are a few who do not. Often the little guys, those who are just getting started with a single system to their name, are those who need the 'CSD education' the most, and who for whatever reason figure they can do without the guidance found here monthly. Dealers who run into such guys can help us all clean up the industry by steering them to CSD. The more dealers out there who run around without benefit of CSD data each month, the more problems we will ultimately have with slip-shod dealer practices.

DO IT Right/ The First Time

I am thinking of purchasing a home TVRO system. We live in a rural area where our choice of dealers and products is very limited. There are two dealer types in my area whom I have confidence in; one sells the complete Channel Master system while the second sells a packaged system that includes the Prodelin dish, MTI dish mover, and the USS MASPRO receiver. I am leaning towards the latter system. Can you give me your feelings concerning the MASPRO receiver? I have read your analysis of the Earth Terminals receiver, but that unit is not available in my area.

I feel that buying strictly by price (i.e. cheap) would be a mistake. I want to do this once and do it correctly. Is the MASPRO reliable, or would I be better off searching out others who might carry Earth Terminals or other higher quality receivers?

Jay Coleman
P.O. Box 444
Bellevue, Idaho 83313

You seem to have eliminated the Channel Master package from consideration already, suggesting that if the MASPRO is not advisable that you might search for other 'high quality' receivers. The primary advantage with Channel Master is that you are buying from a firm, through an authorized dealer, that has been around the TV reception business for more than 30 years. They are good, solid, people and if you find your local dealer not responsive to a problem, you can take the problem 'upstairs' and get resolution. MASPRO, by USS. Frankly, the USS MASPRO receivers have suffered from a sensitivity problem. That's not a problem with a ten foot dish in Idaho (or, it should not be) and we are told by USS's Doug Dehnert that as of early in August that sensitivity problem is now past them. We have wanted to do a technical evaluation of the MASPRO receiver for more than a year (it was first shown in Omaha at the first SPACE confab in mid '82), primarily because it had then (and still has) more new innovations in it than you can shake a stick at. We like the plug-the-control-into-any-AC-outlet and have wireless control housewide feature. We like the quality of picture we have seen when you are in a decent footprint area. We did not like the 'graininess' that it had in a weaker footprint area and told Dehnert this. On his own, without our pushing, he was already working to get that rectified. The Earth Terminals receiver, on the other hand, is very top drawer and the people behind it 'the best.' Perhaps the biggest decision is to stick with firms who have been around long enough to prove that they will be here, still, when and if you need them to repair or replace something that breaks.

ROHNER LAYS The Blame

I thought you might be interested in the enclosed clippings pub-

lished in the Muscatine (Iowa) Journal, an area newspaper.

Ken Havermann
Satellite TV Systems
Muscatine, Ia. 52761

The clippings are dated May 10th and 11th. The May 10th clipping relates that J.P. and Georgia Rohner, dba several different trade names all related to the satellite TV industry, had been charged with fraud by the Iowa Attorney General; all previously reported in CSD (see CSD for July, 1983; page 104). The May 11th issue contains a response by Rohner to the charges brought by the Iowa Attorney General. Some of the Rohner statements are classic. For example:

"There are zero complaints against Satellite TVRO Technology Ltd," he said. That company publishes a trade journal and is headed by Rohner's wife, he said.

"He claimed only five complaints, all of them routine, have been registered against ACE, a firm Rohner said also belongs to his wife and Karen Shimon of West Liberty.

"Rohner said he acts as that company's engineer but was unaware until recently that he is listed as the company president. The ACE company markets kits for satellite receivers and has sold over 1,400 of the units.

"Of the 36 complaints registered with the attorney general's office Rohner said 31 are against J.P. Rohner and Associates. He acknowledged those complaints and said most of the dissatisfied customers have previously taken individual court action against the company. He said Rohner and Associates is entering bankruptcy.

"Rohner said financial difficulties with Rohner and Associates arose when a derogatory article about the company was printed in Coop's Satellite Digest.

"Over the next five days, we had \$138,000 in stopped-payment checks," said Rohner, after the article appeared. He claimed his attempts to sue the publication have been stymied since the magazine's owner has moved out of the country."

The report goes on to quote an official in the attorney general's office who noted "We are saying that it amounted to consumer fraud; the defendant never intended to honor the orders made by the purchasers. I am pretty confident with the way the 'order' (charges) are written up; I think he (Rohner) is the principal person in all three firms."

The same official also noted that the case had moved beyond the 'mediation stage,' noting "we tried to handle this on a refund basis; the refund checks we got from Rohner bounced . . ."

TELE-X For Scandinavia

In the absolute last hour of negotiations, the Scandinavian countries of Sweden, Norway and Finland have finally agreed to create and launch something called TELE-X; a smaller (than originally planned) multipurpose communications satellite that may carry one or two television transponders. The planned launch date is sometime in 1986. The earlier plans for an 8 channel NORDSAT, DBS, type of satellite fell apart when the principal countries involved could not agree on the satellite's design or how it would be used.

Bengt Garby
Amerikanska Bilimporten
P.O. Box 6261
40060 Gothenburg
Sweden

A poor decision. By the time the TELE-X bird is operating, Scandinavian homes will have access to perhaps a dozen or more channels from the UK, Germany, Belgium and other countries via ECS or other 12 GHz satellites. Many will end up on cable there; and many more will be privately received by individual homes. The Scandinavians blew this one.

SMATV/ continued from page 40

reducing the DBS antenna size to four (or even 6) feet.

Feeling the pangs from the New Jersey cable decision, and the threat of a similar action in New York state, very few felt that the state regulatory agencies would elect to differentiate between 4 GHz

SMATV and 12 GHz SMATV systems **even if** the FCC was to decide the two were **not** the same.

One thing was certain; the total meeting broke up in utter confusion regarding how DBS and SMATV were going to get along; if at all.

Conclusion

As you read this report in early October, there is always the chance that some of those issues raised in Denver will have worked their way to some type of resolution. I happen to believe that given just half an

opportunity from the regulators, given more professional and insistent marketing efforts, given the support of the satellite delivered program suppliers and an even break in the financial community, **this industry can flourish**. On the other hand, there are so many loose ends there, and there have been so many adverse decisions handed down to date, that one major blow from a court or regulatory agency in the near term could cripple SMATV forever. The next six months will, I judge, be critical.

TRANSPONDER WATCH

RECENT REPORTS OF ACTIVITY ON DOMESTIC / INTERNATIONAL SATELLITES

Send your reports to CSD Transponder Watch, P.O. Box 100858, Ft. Lauderdale, FL 33310. For late news, call (305) 771-0505.

MEXICAN government sent up fighters to shoot down pair of US charter-cargo planes hauling satellite electronics hardware across the border. One pilot made it back to US territory and safety; other with more than 60 direct bullet hits, forced down in Gulf, is in Mexican jail. Both claim they were 'set up' by US Customs officials who knew of their flights and turned information into Mexican authorities. Mexico charges 100% plus 'import duty' on satellite hardware.

EBU (European Broadcasting Union) has recommended to all members that they adopt the British C-MAC "packet system" for international satellite transmissions. Neither West Germany nor France likely to go along; many others will. West Germany wants to be able to serve East Germany, France has its own reasons for not agreeing to anything.

M/A COM has risen to major competitive position in 11/12 GHz DBS field by landing contract to design \$500/700 range DBS receive terminals for early starter Inter American Satellite TV (IAST)/SKY-BAND.

ARIANE satellite launch in June of ESA satellite marred by unintentional 'bump' given to amateur radio OSCAR 10 bird sent along in same launch. After OSCAR was ejected, third stage of Ariane apparently 'bumped it' causing depletion of maneuvering fuels and loss of full planned orbit position control.

IAST now says it will be 'first of 1984' before they start using the five SBS 11 GHz transponders for DBS purposes. It will take that long to get their programming in place, and hardware on hand, to launch service. Payments totaling more than \$1M per month meanwhile are

rolling for 'reserved' transponders.

RUMORS and facts surrounding apparent \$26M loss in first six months of 1983 by SNC (TR11, W5) causing major confusion in cable marketplace. Cable operators don't like to back a loser; are deathly afraid of adding a service that may quit on them. SNC is losing big sums, ABC says and Westinghouse confirms that they expected to lose big amounts before turning corner financially. They both admit sale of advertising time has not been up to expectations; plans for an SNC-2 channel are delayed indefinitely.

NBC's use of 11 GHz SBS service via Comsat General shaping up; FCC applications for uplinks at Houston, Burbank and New York City filed along with applications for 23 first-phase downlinks. An additional 150 receive-only terminals are coming, to reach all NBC affiliates as far as Puerto Rico and US Virgin Islands.

CUBA may be joking but US officials are taking it seriously. Cuba has filed international paperwork to launch and operate 'regional 4 GHz satellite' from 84 degrees west; barely 1/2 degree away from F4. Cuba's coverage map shows 30 dBw plus contours from Washington, DC to Mexico City, all of Central America, most of Caribbean and virtually all of northern South America. Move might suggest Russian designed G(h)orizont bird for Cuban domestic use. In separate but perhaps related move, Robert Wold Communications has been denied permission to provide Cuba with coverage of 1984 Olympic games via US DOMSAT bird. Wold and Cuba cite 'sold-out' status of Intelsat for Olympics, and 'urgent need' to use US domestic facilities to backhaul coverage to Cuba. A \$250,000 fee just for getting it approved hangs in the balance.

COMSAT cutting back work force; perhaps by 200 or more executive level personnel. Move is probably caused by desire to go to public for greater funds to back up STC DBS effort and knowledge that if they appear to be running a lean, trim ship, public will be more apt to buy new stock or debentures.

INTERNATIONAL Satellite, Inc. has requested orbit slots at 56 and 58 west for private 12 GHz service between USA and Europe. These are superb locations (Intelsat serving Mexico now at 53 west, 4 GHz) offering direct view from as far west as Los Angeles, and, east to Italy. This would be a 'one hop' capability for the firm which must clear FCC and COMSAT objections.

ABC has killed short lived plan to serve West Coast affiliates with 4 GHz direct linking via COMSTAR/TeleStar birds. ABC started off two months ago equipping west coast time zone affiliates with 7 to 9 meter terminals, using both F4 (TR22) and D3 (TRs8, 13) feeds. That was **before** installers discovered many ABC affiliates have virtually unsolvable terrestrial interference problems at station locations and

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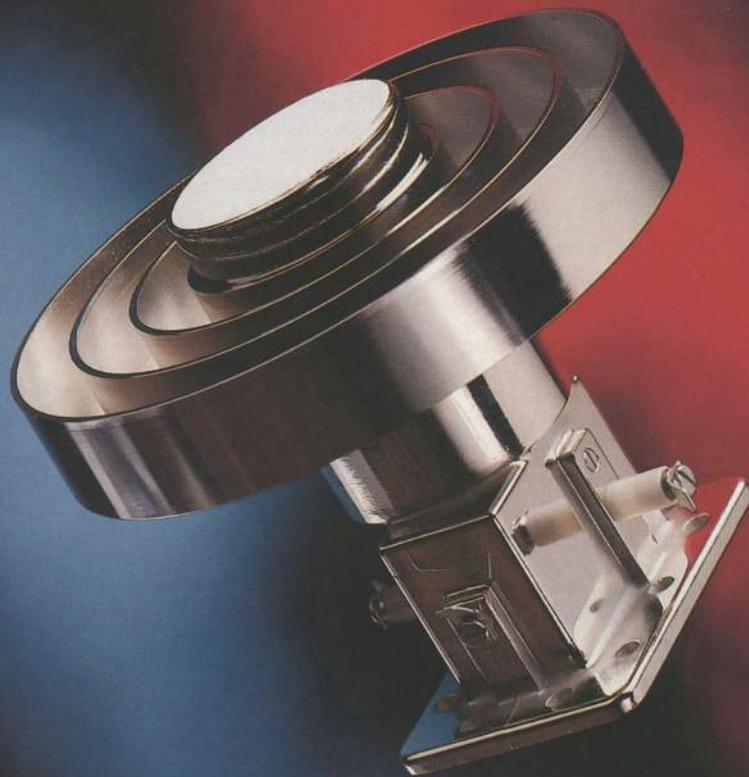
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M/A-COM OMNI SPECTRA, INC.

TRANSPONDER WATCH/ continued from page 67

require 'remote antenna sites' and terrestrial microwave back-hauling to studios. This shot up per-station budget more than \$100,000 and ABC called it off. ABC still plans to use capacity on new 95.5 west TeleStar I bird for mountain and central time zone stations; provided TI problems don't kill the plan.

ST. LOUIS SCUC show (August 22/25) had great program, miserable weather, low attendance and unhappy participants. Show was largest ever in booths, but crowd was about 50% of projected 3500.

ANOTHER hospital directed channel of information and entertainment; this one to debut around 1 December on SATCOM F1R. Programming will combine instruction for hospital professional staff (daytimes) and entertainment (movies, specials) on a pay-as-you-view basis in evenings. It may start off as 24 hour per day service. HSN (Hospital Satellite Network) is the trade name.

ULTIMATE satellite scrambling, encryption system has been announced by NEC. Called MAAST, NEC bought rights from US firm (Telease) that developed package. Audio is moved around within transponder at 'random rate,' frequency hopping to avoid detection by unprogrammed, unauthorized receivers. Video is stripped of horizontal and vertical sync and inverted. Market for system, says NEC, is homesigning up for DBS service.

FCC announced requirements for those who would request FCC sanction to operate US DOMSAT birds in last of remaining (open) 4 and 12 GHz orbit spots. New FCC standards are 'tough' requiring greater control of satellite position, better control of transmitting and receiving antenna pattern sidelobes. "Orbital conservation" is the catch-word.

INITIAL tests of TRDSS 1 bird's non-4GHz transponders have shown the bird is operating properly from electronic viewpoint. STS-8 used the massive satellite for special in-flight communications during its late August/early September flight.

INDUSTRY supplier Microwave Filter Company (E. Syracuse, NY) has done a two-for-one stock split bringing number of outstanding shares to in excess of 2,000,000. MFC manufactures TVRO filters along with broad line of other VHF/UHF/microwave filter products. Current fiscal year sales are expected to be close to \$4,000,000.

SECOND generation European cable programmers, not able to get onto ECS-1 bird that goes into formal service this month, can now sub-let from British Telecom on Intelsat V. BT has 5 transponders available, can carve them up into as many as 12 TV channels, and will handle uplink and satellite for \$1.5M per year. Legally, cable programmers from USA can use this 'service' but they cannot uplink from USA; would have to go to Europe on 4 GHz Intelsat and then re-uplink on 12 GHz courtesy of BT. No early takers. Oh yes, another 'small' problem; BT wants to lease cable operators the downlink terminal at \$60,000 per year (\$5,000 per month). The same terminals are sold, installed, in states for around \$12,000. All part of the learning curve.

BBC, meanwhile, has announced its format for providing DBS for the UK. Funded with the considerable sum of \$337,000,000, it will launch a pair of subscription channels including one movie channel and one 'Best Of BBC/Sports' channel. Both channels will be mandatory -carriage by the UK cable systems but BBC also looks to the balance of Europe for subscriptions. Stereo (digital, C-MAC) audio is part of the package and 1986 is the target date.

NFL FOOTBALL is now seen in various European cities via Intelsat, and the UK based Satellite TV PLC subscription service. Locations in West Germany, France and throughout all of Europe (primarily cable systems plus individual hotel 'mass viewing' locations) have been playing to 'SRO' crowds.

AUSTRALIA has announced it will be ordering 45 uplink/downlink stations from US suppliers as part of its 1986 scheduled launch for Aussat 12 GHz system.

GALAXY ONE has problems; not yet 'terminal.' Satellite has four separate receivers, all broadband to cover all 24 Uplink channels. Two are in regular use for vertical, and, horizontal Uplink reception. Other two were intended as back-up spares. One spare has now developed bad problems (loss of 40 dB of sensitivity) leaving only single spare.

TELESTAR I also has spares; bird was built by Hughes (as was Galaxy) and it has 18 solid state 8.5 watt transponders and 12 older



style TWTA (traveling wave tube amplifier) transponder amplifiers. Of the 30, 6 are held as 'spares.' Bird is now operational at 95.5 west.

COMSAT (Intelsat) still fighting at FCC to keep US DOMSATs from 'authorized service' expansion into Caribbean. COMSAT has asked FCC not to include Caribbean region in master study now going on to determine needs of western hemisphere satellite users through latter part of this decade. FCC has already authorized US DOMSATs to serve cable and broadcast station terminals in areas of Caribbean and Central America.

MOBILESAT is new \$300,000,000 funded firm that plans to offer ground to satellite mobile telephone services with a custom designed bird; launch schedule 1987. Ahead; FCC response to application for license.

OAK, not to be outdone by M/A COM and NEC, says it will have satellite receiver decoders for 'early entry DBS systems' in first quarter of 1984; price under \$200.

CANADA may have a 24 hour satellite delivered news service ala CNN; Baton Broadcasting seeks official approval to provide service on ANIK C 12 GHz channel.

BIRDVIEW Satellite Communications is solidly in the black; reporting \$4.9M in sales and profits of \$256,000 for recently ended first quarter. Birdview is traded over the counter.

OCTOBER 12th is first formal operating date for now thoroughly checked out ECS-1 satellite, first 'cable-TV-capable' European satellite. Bird will have permanent home at 13 east; operates on 12 GHz.

IAST has adopted a marketing name which will be known by the advertising the company does for the new 11 GHz interim DBS. It will be called 'SKYBAND.'

G(h)ORIZONT is now officially offering transmission time into Europe from bird at 14 west; **CSD** readers will recall trial run conducted by North Carolina television station more than 15 months ago, and reported in **CSD**.

ANNUAL Scientific Atlanta earth station seminar, re-dubbed 'Communications Symposium,' being held Atlanta November 7/9 at Hyatt Regency.

SPACE's second 'annual' meeting is November 4-6 in Orlando, Florida at Sheraton Twin Towers (contact 202/887-0605).

WIN. Department of Justice has finally approved merger plans between Showtime and The Movie Channel.

LOSS. Weather Channel president John Coleman (ABC GMA program) is no longer; president of the Weather Channel. Coleman had 30 days to raise \$4M to take Landmark Communications majority owner out of the company. He didn't, and now Landmark owns it all. Coleman also lost ABC contract. Landmark is trying to talk cable systems into paying for service, which until now has been 'free.' More troubles ahead.

LPTV EAST is gala three day event October 3-6 in Washington, DC's Sheraton Washington; features extensive array of low power TV seminars and considerable showcase of low power broadcast equipment.

EUROCAST 84 scheduled for Basel, Switzerland May 5-9 will attempt to focus on the satellite television plus cable relationships

coming on line in Europe. Details from Michael H. Hyams, Cable & Satellite Television Exhibitions Ltd., 100 Gloucester Place, London W1H 3DA.

COOP—\$750,000,000/ continued from page 5

Now Larry knows, Bill Young knows, and so do you. Perhaps my concerns are without foundation. Bill Young keeps telling me **they have a way** to handle the equipment manufacturer who has a less-than-acceptable 'field-failure-rate' with his equipment. I trust Bill Young, but won't understand what his 'way' is until they explain it to **all of us** in Orlando.

\$750,000,000?

I cannot leave this subject (there will be more detail in the November CSD, which should reach you just in time to be good reading material for you on your trip to Orlando) without at least touching on the magnitude of this program. I know that the US government doesn't fool around with any numbers smaller than a billion. And although I am 'zero-shocked' like most people by such big numbers, I still could not resist the temptation to 'run' the numbers on my handheld calculator.

The first thing I found was that I cannot enter \$750,000,000 into my handheld. I am missing a 'zero.' That told me something. I wanted to see how many dollars might be available, each month, for say 18 months if the industry took 18 months to 'eat up' \$750 plus six zeroes. The number turns out to be \$41,666,666 per month. I did it by 'long hand.'

If \$41,666,666 might be available to fund time payment purchases of TVROs (and accessories) **each month for 18 months**, I then wondered how many terminals that represented. Since terminal prices vary from \$2,000 to \$4,000 (in the 'mainstream'; some are certainly lower and some are higher), that involved dividing the monthly sum available for 18 months by the dollar cost of an individual terminal.

1) **At \$2,000 per terminal**, (retail price, installed), the industry

would have funding for **20,833** terminals.

2) **At \$3,000 per terminal**, that works out to **13,888** terminals per month.

3) And, **at \$4,000 per terminal**, it works out to **10,416** terminals per month.

The money, all \$750,000,000, is not being 'parceled out' monthly of course. It is there. If the industry gets its 'sales shoes on' and Larry James and company can process the loan applications fast enough, and the equipment can be manufactured fast enough, it may only last six months! I asked Bank President Joe Gammon about that. He smiled as only a banker can smile and said in a firm voice, "There is plenty more where the first 'seed money' comes from." Hummm again.

Now if you believe, as many do (I do not believe it, personally) that we are clipping along **today** at a rate of 18,000 to 20,000 new terminals per month, it is obvious that Young's SFPC has arranged for sufficient funds to carry us for about a year; if **all** of the terminals being sold now are financed after November 8th.

That is, of course, pure foolishness. I would guess that between the equipment that does not make THE LIST and the guys who figure they are able to get along just fine without using somebody's \$750,000,000, perhaps 25% of the terminals sold will be financed in this program. You never get 100% of the people to agree to do anything one certain way.

I suspect that if I were to ask my friend Dave Fedric about what might happen in a marketplace where today perhaps 95% of the sales are for cash or very short terms, and you came along and offered the very same equipment for no money down and long, extended low-interest rate loans, he would tell me "**The marketplace just got much bigger.**"

I suspect **Satellite America's** young Fedric would be right on this matter; that by having universal financing available all over the USA (oh yes, **in Canada as well!**), what you will NOT do is switch over the bulk of the **present buyers** to credit. Rather, you will suddenly reach an entire new level of buyers who did not have the cash reserves to

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plunk down between \$1995 and \$3995, or the **local credit** to merely stop at the bank and pick up the funds. It certainly should be easier for the dealer to sell a buyer on \$65 a month for 48 months than it is to sell the same buyer on \$2995 all at once.

So the real potential of all of this financing is that the marketplace will explode by several orders of magnitude. Chaparral will sell more Polarotors, Amplica will sell more LNAs, Dave Wolford will sell more **SATguide** subscriptions; everyone will sell more of everything. The best studies done to date suggest that **as a minimum**, having this money available for consumer home TVRO financing will expand our industry by 50% in the first year. And that is on top of whatever normal growth we can expect in the next 12 months.

Take out your own calculator and 'play' with the numbers. See how you, as a dealer, could improve your own business status if you had that kind of financial strength and make-good warranty strength behind you. Bring your thoughts to Orlando and the Satellite Financial Planning Corporation booth where there is certain to be a beehive of activity. Look over your shoulder now and again; I'll be standing there notepad in hand taking it all in and watching the parade go by.

SPACE To 'Show' Vegas

After a non-productive attempt to work out a compromise with industry trade show operator STTI, our trade association SPACE has come out with the decision that there will, indeed, be a 'SPACE/VEGAS' show this coming spring. That means that those who exhibit at shows, and attend shows, will now have **two** opportunities to visit Las Vegas this coming spring. Unfortunately, the two opportunities are but a week or so apart. And therein is the crux of the problem.

As we have noted in past reports, STTI and SPACE found themselves planning industry trade shows in Las Vegas only a week or so apart. STTI claimed they had announced 'first,' apparently confident that public opinion would support the one that announced first. SPACE countered by noting that it had no advance knowledge of the STTI show and commitments had already been made and plans drawn for a Vegas show, when STTI got into the squabble.

And then in Minneapolis, where STTI held a trade show and SPACE convened for a Board meeting, the two sides met in a closed session and after additional blood letting agreed to attempt to work out a compromise 'joint show' for Vegas. A two man SPACE committee was to meet with the STTI leader. Unfortunately, before this meeting could take place STTI became enraged with a press release prepared and circulated by SPACE; that release announced that SPACE was attempting to work out a 50-50 show split for Vegas. After more name calling, the negotiations collapsed.

STTI's position is that SPACE should be a trade association, not a show creator. STTI dominates the industry's trade shows and likes it that way. SPACE's position is that in every other industry, the trade shows are created by the trade association and the revenues earned at such shows help defray large chunks of the association's budgets each year. SPACE further adds that a trade association without a trade show or two each year is not much of a trade association; the shows are an important part of the 'political process.'

STTI has allowed the shows to develop into exhibits first and learning sessions second. More and more of the emphasis has been on exhibits and equipment and less and less has been on teaching or learning. STTI's boss-man has been quoted as telling a major supplier **"I am not an educator."**

SPACE has't been in the show business long enough to know what it can do for industry participants at its trade shows. The up-front talk seems split between hard educational courses and providing a showplace for notables (Barry Goldwater, Ted Turner, et al) to appear and be on center stage. SPACE needs the open public display of notable people appearing at its conventions; those appearances help cement the political relationships that are needed when the 'chips are down' in Washington, or elsewhere. Having Senator Goldwater or Ted Turner appear at an industry (SPACE) convention is good for us all; it means we have attained a certain degree of respectability.

STTI apparently gave up trying to attract (and pay for) famous people to appear at its trade shows a year or so back; in place of famous people STTI hands out a wall certificate to virtually anyone that attends, 'certifying' that the attendee has been a part of 'instructional courses.' That means they attended, or **said** they attended, the

seminars that are a part of STTI shows. Taking a certificate home to hang on the wall makes a nice souvenir and some who do this undoubtedly point to such certificates with a certain amount of 'pride.' **"See, I attended this seminar course to learn how to be a satellite installer."** Whether STTI suggests that attendees 'write off' their STTI event costs as an 'educational learning experience' necessary for the attendee to 'stay up with his craft,' or not, is not known. The illusion is there nonetheless.

SPACE probably needs more time to get a good grip on just how and why its convention business/training sessions should work. Since there has been nearly 15 months time lapse since the **last** decent industry trade show **concentrated on teaching** the basics of satellite systems to newcomers, there will be a full day of that type of classroom sessions at the forthcoming Orlando show. There should be a ready market for this type of one-day cram course; everyone new to the industry in the last 15 months has never previously been exposed to basic-facts teaching sessions. But the real SPACE effort will apparently wait until the forthcoming March Vegas SPACE show. That's the one that comes just a week prior to the forthcoming STTI Vegas trade show.

The plan goes like this.

The subject is 'downlinking.' That's where some group (for example, the U.S. Chamber of Commerce BizNet system) decides they want to take a prominent speaker (such as President Reagan) and spread his talk over several hundred locations coast to coast. Their problem is arranging for qualified transportable terminal entrepreneurs to set up at each of these several hundred locations, acquire the appropriate satellite and transponder, and then cable the reception into the meeting room where it is displayed on several receivers/monitors, or on one large screen television set. Several groups do this for a living (**NetCom** is one of the better known names here). NetCom, for example, will package the whole program; starting with the live video and audio gear at the origination site, then through a fixed or portable uplink, via satellite time they already lease, down to one or several hundred (transportable) downlink systems which they hire for the event. NetCom charges the program creators a single fee for the whole ball of wax, and the guys out in the field, those with the trailer mounted rigs, get a small slice of the pie because they are hired (by NetCom) to be at a certain place at a certain time, to receive and pipe in the program to a waiting crowd.

SPACE has looked into this whole business and it has held serious discussions with a number of groups that create a bundle of closed circuit up/down links per year. What SPACE has heard, over and over again, are horror stories relating to the apparent lack of 'qualified downlink operators.' SPACE has been told that as many as 15% of the downlinks hired for a program such as this cannot produce usable picture and sound at the assigned location(s). Some get stung by terrestrial interference, and because the downlink guy doesn't understand terrestrial interference, he has no traps on hand to clean it up; or, he can't figure out how to move his trailer mounted rig to get some shielding from TI by placing a building between him and the source. Others get stung because the **only** LNA they have on hand goes west and there they stand with no backup equipment. Still others get the picture and sound fine on the test set at the dish and then flub getting it wired into the building to the monitors/projection sets. In a nutshell, SPACE has been told, "there are a tremendous number of people out there who own a trailer mounted antenna, who **think** they are (transportable) downlink operators, who are simply not able to cope with even the most basic of field problems."

When SPACE heard this from enough people, bells started to go off. This sounded like a job for an educator; someone to come along and teach present and potential downlink operators how they can be prepared for, and solve, the myriad of problems that do come up in the real world of 'downlinking.' An ad-hoc committee was formed and the problem studied in depth. Out of that study came a series of recommendations. I'll give you the bottom lines here.

- A) **At the SPACE Vegas Show**, those attending would have the option of attending approximately ten classroom-course hours designed to prepare attendees for the real world of (profitable, hassle free) downlinking.
- B) **Attending would not be sufficient**; testing would be done at the end of each five hour session to qualify those who had

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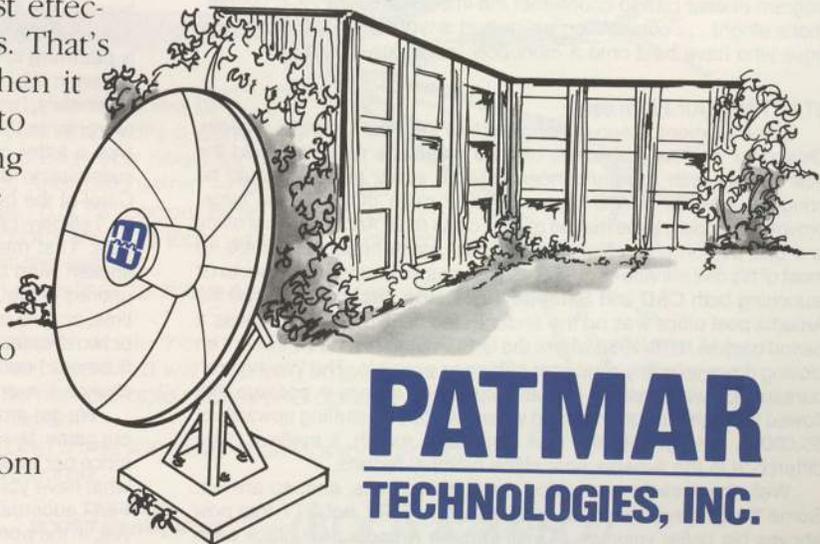
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learned what was being taught.

- C) **Those who attained a 'passing grade'** for the full ten hour course would be granted a certificate. Unlike the STTI certificates given out freely just for asking, this one would have considerable value since it would verify that the fellow attending the course **had passed written exams** showing his ability to handle downlinking problems.
- D) And the frosting on the cake. Having created a course for downlink operators, SPACE would then publish a booklet which would be circulated to all of those dozens (today; hundreds tomorrow) of groups who are into uplinking of events such as this. A fellow wanting to create a 110 city downlink system for a special event would merely flip to the '**SPACE Certified Downlinkers Guide**' and select those that matched the cities he wished to cover. In effect, having attended and passed the SPACE downlink course, the fellows/firms would have SPACE out there 'selling their abilities' nationwide.

You figure there must be a catch to all of this. There are two, actually.

Number one / The course will be open **only to Dealer Members** of SPACE. That's the classification where it costs you \$300 per year to belong to the trade association. Look at it this way; **one downlink job**, and you have just gotten your SPACE membership fee back for the year!

Number two / Even though you are a SPACE dealer member, there will be a nominal charge for the course. Why? Well, first of all, you will be given a complete set of downlinking text books; a special set of books prepared as a course guide. They will go home with you, and probably be used by you each time you run into a downlink problem. Next, putting on a course such as this means considerable planning, preparation, and direct expenses for the program. Some of those participating as 'teachers' will not be sellers of any type of equipment (or services); they will have come to teach because they have special information nobody else has available. And they will have to be paid for their teaching time as well as their travel expenses.

Is all of this a good idea? Probably one of the better ideas to come out of SPACE since the trade association formed. How will you know about signing up for this event? Well, first of all, remember that attending the 'Downlinking Seminar Course' will only be open to SPACE dealer members. If you are not yet a SPACE dealer member, that should give you your first clue as to what your first step might be. After that, through its own internal mailing system, SPACE will be contacting all dealer members with an opportunity to sign up for the Vegas 'downlinking' course.

How will this impact on the tug-of-war scheduled for Vegas in March; between STTI and SPACE? Obviously, **this type of certification course** gives SPACE a leg up on attracting the dealers in the industry. STTI will probably bounce back with a beefed up certification program of their own to counteract the impact of the SPACE course. That's alright . . . competition never hurt anyone. Except, of course, those who have held onto a monopoly for far too long a time.

STARTING Our Fifth Year

Some 48 months ago, I stumbled into the Post Office in Arcadia, Oklahoma with several boxes of CSD magazine and frightened the post master with the announcement that every month I would be bringing upwards of 500 copies of a 32 page magazine, in large, brown envelopes, to be mailed off first class mail. Arcadia's post office is a one person post office and the post master has been there for most of his civil service career. I have always suspected that prior to us launching both CSD and **Satellite Television Technology**, that the Arcadia post office was on the endangered species list. There was a period back in 1978-1980 where the U.S. Postal Service was intent on closing down as many rural post offices as possible. The Washington bureaucrats were looking at mail volume (by dollars in postage that flowed through each month) and when we started stuffing upwards of \$5,000 in postage into the mail slots each month, it made a huge difference in the Arcadia post office monthly reports.

Well, the Arcadia post office is still in business, and, so are we. Some things have changed, of course. It is STTI, not STT that now shoves big dollar volumes of mail into the Arcadia post office each

month. And CSD moved down to Florida more than 18 months ago where our total postage bill hardly makes a ripple in the huge mail volume that flows through the main Fort Lauderdale facility.

Being five years old in the publishing business is no mean trick; I am sure that CSD is one of the most unusually produced publications in the world today. None of this really interests anyone but me, or another publisher, but since it is my birthday (so to speak) please indulge me while I relate to you how it is done each month.

The 'heart' of CSD may well be here in the Turks and Caicos islands, where I choose to live, but the 'soul' is in Hangar 26 at Fort Lauderdale Executive Airport. That is where **Carol Graba** operates a one-lady office five days a week, maintaining outside communication to a 'waiting world.' Carol, as those who have talked with her either know or suspect, is a Scottish lady. Those who saw the movie 'Gregory's Girl' on HBO (et al) during August will recall that Scottish people speak with an accent that is both delightful and exhilarating. Carol calls things 'wee' rather than small and she starts her office day around 8:30 AM eastern five days per week. Since she is all alone in the office, there are periods when the office is not 'manned'; she simply must get out to pick up needed supplies or interface with a printer or what have you from time to time. I agonized about how to handle her absence, never even seriously considered an 'answering service' since I hate their very concept, and finally we installed (quite recently) a Radio Shack telephone answering system so that when she was going to be gone for more than thirty minutes or so people would not think we were out of business.

It is Carol's responsibility to handle all of the incoming mail, all of the suppliers to us, create and maintain all of the many computerized mailing lists, stay on top of three separate printers, process all orders for advertisements and subscriptions, and handle a myriad of Cooper affairs. For example, the group traveling with us around the world (by way of Sri Lanka) late in November will be traveling on complicated arrangements worked out by Carol. Our quick jaunt to London in September, for the Coopers, Hatfields (AVCOM), Gowens (ADM) and A.V. Butterfield and his wife (a minister for the Turks and Caicos government) was totally handled by Carol.

And then there is the constant flow of equipment back and forth. We average around **15 boxes** of equipment and supplies from Florida to WIV here in the Turks and Caicos **per week**. The shipments come to the CSD office, are checked for contents and so on, and then hauled by Carol in her car to the most recent Provo Flying Service office, now located some 30 minutes away at Fort Lauderdale's International airport. Add to that Carol doing the buying for Susan's Candy Cane Shop (ice cream mix, sundae cups, syrups, et al), and most of the supplies for WIV, and you have a pretty hectic life just as a 'traffic manager.' Carol manages.

Top that now with the broken equipment I send back to the states for repair, and the constant hassles with US Customs officials and you have a busy day for a lady from Scotland. Larry James, spending a few hours in the Fort Lauderdale office this past summer, was amazed at how often the telephone rings. Larry likes to talk and he was apparently **planning** to talk with Carol for two hours or so. I think he may have gotten in five minutes of conversation in that two hour span. Carol, fortunately, has a habit that I also learned years ago; being able to do two or three things at once. She can handle you on the telephone and type a letter or complete computer forms for new additions to the subscription list and never miss a beat. We are very fortunate to have Carol at the office.

I seldom talk to Carol all month, except when I am in Fort Lauderdale. That means we go from 22 to 25 days per month without a spoken word between us. That is possible simply because the telephones to the Turks and Caicos don't work very well almost all of the time, and we only use the telephone late in the evening since the one or two overseas lines into Provo are jammed constantly during normal business hours. And, it takes a real emergency to get either of us to chance it even in the evening.

We get around this problem, since communication is the name of our game, by relying on a 'mail pouch service' via Provo Flying. Twice, three per week a mail bag stuffed with letters, notes, information and what have you wings to Provo. In the best case the mail bag leaves Fort Lauderdale at 2 PM and I get it the following morning at around 9 AM. In the worst case, they forget to take it off the airplane and the bag

travels back and forth (and back and forth) between Provo and Fort Lauderdale several times before it finally gets off in Provo. No extra charge for the additional trip mileage.

I, in turn, send up two or three 'mail pouch bags' per week myself. They leave Provo at around 8 AM and that means I have to be at the airport not later than 7:30 AM. I used to hand the mail bag to the pilot and ask him to give it to Carol on the other end. Those were the good old days. Now, with the US Customs involved we have to complete various forms and just to be very sure that the bag gets **off** on the Fort Lauderdale end I personally climb aboard an empty plane at about 7:30 AM and carry the bag **to the pilot's seat**. Leaving it **there**, where he **has** to move it **before** he (or she) can sit down, I am reasonably certain it **will get noticed**, and off, in Fort Lauderdale.

Not every bag has gotten to where it should, on time. I remember one month where the very last of the **CSD** material was scheduled to leave Provo on a Monday. I was going up on a Friday to put the magazine together. That gave the typesetter three working days to set about 50% of the magazine. They usually insist on five working days for that much copy. The plane, and I, were running late. I rushed to the airport just as they were getting ready to load. People were already on board so I couldn't shove my way in ahead of general loading to deposit the bag in the pilot's seat. I did something foolish; I handed the bag to the owner of the airline, Ed Hegner, and he gave me his assurances it would get on board. I muttered something about five days worth of typesetting and three days to do it (Ed never heard, nor understood a word of what I said) and I headed back home. By some quirk when I got back to WIV I stopped at our local VHF two-way radio that everyone has down here and listened to Pilot Hegner as he was about ten minutes out of Provo heading for Florida.

"Ahhh Ivy, is there something laying on the baggage cart"?' he asked.

I couldn't hear Ivy, but she apparently said there was.

"Ahhh, is it yellow"?' Hegner asked again.

It apparently was. My mail pouch was yellow.

"Ahh, gee whiz, well, tomorrow . . ."

That's when I grabbed my own microphone and 'asked' Ed to turn

around and come back to pick up the mail pouch.

"Ahh, well, gosh, we have a plane full of people, and we are running late, and it will come up first thing tomorrow, Bobby." Ed always calls be 'Bobby' when he wants something.

After another 'transmission' from me, they turned the Beech plane around and came back for the mail pouch. **CSD** was on time after all, but it was dangerously close to being several days or even a whole week late.

CSD runs with almost no margin for error. My schedule to get it written (I write mostly in the evenings, often quite late) is reasonably flexible but there is each month some 'last date' when the material can be stuffed into a mailbag and shot to Fort Lauderdale, with sufficient time to get it typeset and turned around to us so I can have it ready to work with when I fly up myself. Twice, in the fall of 1981, we had close brushes with tropical storms (hurricanes) and that was just enough, with bad timing, to cost us a week in **CSD** production time. The combination of distance, no telephone contact, and a less than reliable air service into and out of here is a constant battle for us.

I have a small corner in the WIV TV studio where I keep huge piles of ever flowing paper, photographs, drawings, and my trusty Remington Rand typewriter.

"Boy, you need a word processing system" said the four hundredth guy to visit here. "You could do **CSD** much faster with a word processor." I tried one, once. They are not for me.

I learned my trade on my own, back as a teenager. I started publishing a monthly 'newsletter' for TV DX (long distance television reception) wierdos when I was 16. We had a paid circulation of about 200 and the year was 1954 or so. My mother, teaching school in Fresno, California at the time, used to go in early and run the ten or twelve page publication off on the school duplicating equipment. I'd cut the master and she'd run off the copies for me. Then I sharpened my skills while training with an ABC radio newsman named Gene D'Accardo in Modesto, California. Gene had me in the field from 6 AM to 11 AM daily collecting the local news, and then writing his 15 minute radio newscast for 12 noon airing. It was my job to take all of the day's news and boil it down to 2,200 words or so. Gene, and the pressures of

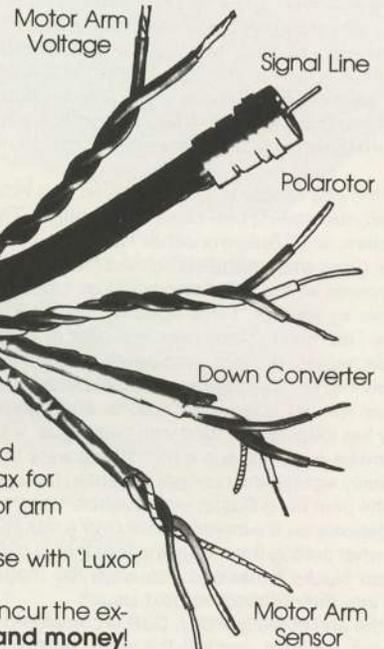


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'live radio news,' forced me to learn that **you write it only once**, you **don't stop** to think about anything as you write it; the words must simply pour out of the end of your fingers.

In my case, I use two fingers to type. Since I can hit upwards of 100 words per minute, that means the words have to flow out of two fingers at great speed. I can fill a double spaced page with words in less than seven minutes when I am really moving; thank God for Gene D'Accardo.

Once the copy is done, and the drawings are on their way to the artist we use on a freelance basis, I have a (whole!) week to screw off. That's the week **between** the last **CSD** copy heading for Fort Lauderdale, and my following it there. That is the week where I work on WIV television or radio problems or projects. We have just completed a new studio this past month; I am a 'nut' about designing the **ultimate one man**, fully automated TV studio. My ultimate dream is to have a studio where the one local newsman can come in, open up with his key, sit himself down in front of a pair of pre-adjusted cameras and after turning everything on, 'go on the air' with a local newscast, interview show, news bulletin or what have you. Our latest design has two separate studio 'sets' plus a control room plus a waiting room off camera in a master room that is only 19 feet long and 9 feet wide. I've designed it so that the fellow who goes on the air has full push button control, just off to the side of camera range, of which camera is on the air, what graphics he uses and so on. In other words, the guy on the air can also be the director and producer, including running VTR'd commercials, 'supers' over video, slides through the film chain and what have you. When you live and operate in a small place, you have to innovate in such ways to get maximum expertise from a single person, or piece of equipment, as you are able.

Well, that week always flies by and pretty soon I too am waiting at the airport at 7:30 AM to fly to Fort Lauderdale. When I arrive, there should be a rental station wagon sitting in the parking lot where we end up, and 30 minutes later I am in **CSD's** office facing Carol and huge piles of materials destined to be the next issue of **CSD**, and, **CJR**.

Since we started **CJR**, my life has become slightly more complex. Larry James and I split up the editorial assignments; Larry has the telephone that works, and he gets to go after the dealers and others who are surveyed on a regular basis to create the special **CJR** dealer-oriented editorial material. Since we pride ourselves on taking the late news in on the 11th or 12th, and placing into the mails 1,500 or more copies of **CJR** on the 15th, there is a 'newspaper' like quick-turn-around mentality at play here. After several hours of diagnosing what has to fit into **CSD** for that month, my attention turns to **CJR**. There are 11 editorial pages in it and that means around 4 hours of layout-board work.

For the first couple of years I stayed at a Holiday Inn each time I came into the states; one close to the office. That was never totally satisfactory, and if Susan or either Tasha or Kevin came into the states with me, there was a considerable added expense of having to take a pair of rooms so the magazine could go together in one, and I or we could live in another. I managed by myself when I came in alone because I learned to stack piles and piles of editorial material all over the beds, tables, dresser, and paste magazine copy galleys on the walls. But two or more people, and that became impossible. So earlier this year we did some calculations and figured out that for what Holiday Inn lodging and food was costing us, we could rent an apartment and be even. On some months we were turning out far ahead. I was initially against the concept because I hate rented apartments but it was the best thing Susan ever pushed me into. Now we have more than adequate space for me to take over a sizeable room for 'paste up' (that's what putting the magazine together is called), leaving my little piles and stacks hither and yon while the magazine or **CJR** slowly evolve into their respective next issues.

By the end of the first day, **CJR** is completed and at the printers. It will be out, typically, and into the mails, **before** I head back to Provo. Carol sees that it gets mailed promptly and I turn my attentions to **CSD**.

It takes me about four hours to juggle advertisements, color 'forms', article lengths and so on to figure out (1) how many pages it will fill, and (2) where it will all go. After twenty five or so years of doing this, I've gotten pretty good at judging material for length and now simply operate by 'feel' rather than going to the trouble of meticulously

measuring everything to the last line.

CSD starts with page one (table of contents) going 'down' and then I do the first two pages of "Coop's Comments," in the front of the book. You will notice it always jumps to the rear. I do too when I get that far. Only I jump to the **very end** at the point, page 104 for example in a 104 page, and then I work **backwards**. Having completed the front three pages, 104 is next followed by 103 and so on until I run out of my 'Comments.' In a 'windy' month I may be in the 'sixties' at that point.

When I get to the point where the back part of 'Comments' jumps to the front part, I stop and go back to the front again; working on the first and then the second (etc.) feature articles, now moving to the back of the issue. All along the way our color advertising pages have to be worked around, since the color only runs on certain 'flats' (groups of pages). That's a restriction imposed by the printer, his particular printing equipment, and so on. Advertisements, especially the color ones, 'group' as they do because of the printing requirements.

Approximately 20/22 hours after starting, **CSD** is 'pasted up.' There follows another two or three hours to write instructions for the printer, triple check the ads and otherwise make the two big piles of materials (editorial copy and ads) ready for the printer. That 20 hours may stretch over two or three days or it may come all in one setting if I can handle it. I usually cannot and when I can't keep the copy straight with the 'T' square anymore, I knock off. It is usually 3 or 4 AM.

Interspersed into all of this are two other primary functions that go with every trip to the states. Telephone calls, and, emergency provision shopping.

There are usually a dozen or so 'important' calls waiting for me when I first see Carol. I'll return three or four of those since everyone **says** 'it is important.' The rest will wait until I have the time, if I have the time, that trip. A number of people know the apartment telephone number and it is not unusual to have a two hour call with someone in the industry, or close to the industry.

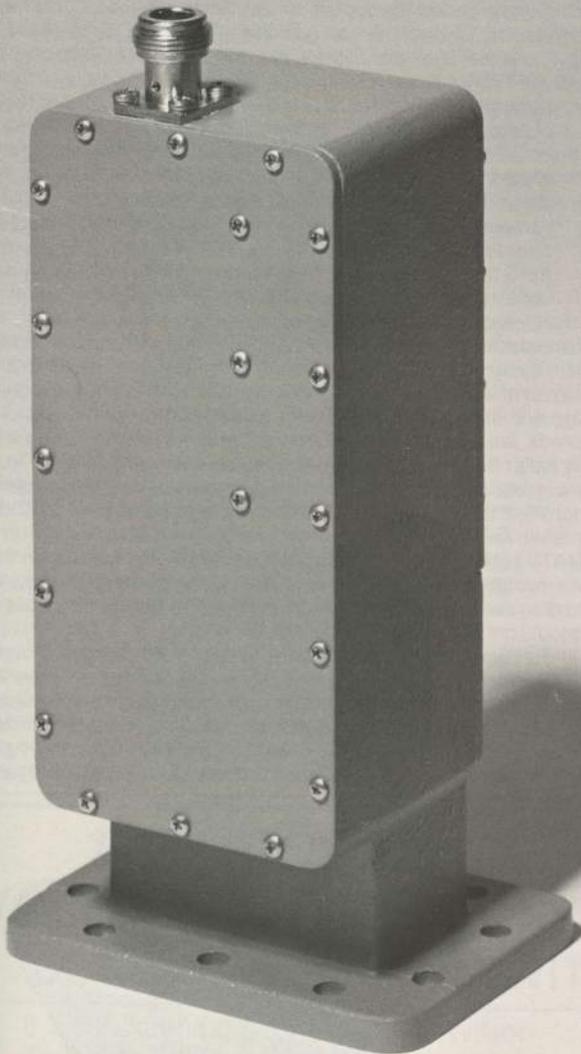
Emergency provision shopping is another matter. After three years of being in and around South Florida, for a percentage of each month, it is like a second home. Actually it is a nice place to **visit**, but I wouldn't want to **live** there! And since we have to buy everything from nails to transistors, tires to videotape in south Florida, a typical monthly shopping list is about 100 items in length and that requires perhaps ten to 15 stops all over a 2500 square mile region. Some fun. I'll paste up for four hours and then hit the freeways and do an equal amount of shopping time. 'Refreshed' from shopping, back to paste up and then finally some sleep. And repeat the process all over again.

By the time my visit is over, our apartment front room has transformed from an art paste-up room for magazines to a storage facility for provisions for Provo. As the last of the **CSD/CJR** material heads for the printer, I am hitting a good lick in the shopping and when I finish I'll have between one and two very-stuffed station wagon loads of materials to get back to Provo. Most of these have to be lugged over to Fort Lauderdale's airport where Provo Flying Service will haul them down for me; it often takes a week for the **last** of my stuff to follow me down. Some, however, goes to other freight carriers serving Provo.

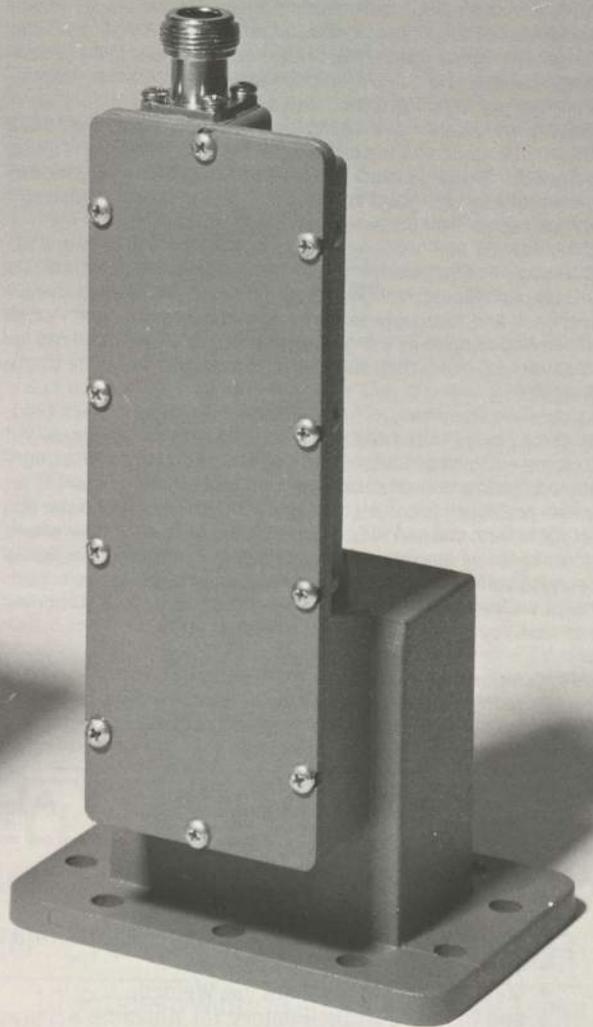
Little things can create havoc with the full schedule. Like a leak in a tire. A person with more common sense than I would either change the tire, or yell at the car rental agency to get a new vehicle over. I did neither, in August; I simply kept running out to the parking lot to check on the state of the tire, every couple of hours, and then when required, running the car to the nearest filling station that had an air pump (have you noticed how few filling stations even **offer** air anymore!). Well, I noticed the leak late Saturday. By mid afternoon Sunday I was filling the tire every six hours. I was leaving for Provo on the 8:30 AM flight on Monday and by now it was so close to leaving time I didn't have even a spare minute left to screw with changing the tire, or calling the rental people. Boxes were stacked to the ceiling, I needed two trips to get it all to the airport, I had four very important calls to make, a long list of letters to write and it was raining outside. By 10 PM, four hours after the last air refill, the tire was down from its normal filled state to less than 10 pounds. Great. Another ten minute trip to the filling station for another load of air, and **then** it hit me. I was down to four hour refill intervals; it was coming up on 11 PM and that meant the tire would need refilling at 3 AM. Good grief. What a tangled web we weave.

So I set the alarm for 3 AM and sure enough after stumbling outside half dressed, there was the tire, on its last leg. When I pulled

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Colorado:

Echosphere Corporation
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Nationwide: (800) 521-9282

Georgia:

Kelgo International
Out-of-state: (800) 241-8189
Georgia: (800) 282-6070

Indiana:

Hoosier Electronics
(812) 238-1456

Kansas:

Hawkeye Satellite
(800) 255-0050

Mississippi:

Satellite America Marketing, Inc.
(601) 227-1820

Texas:

Satellite America Marketing, Inc.
(817) 860-6577

Canada:

Star Satellite, Ltd.
(306) 242-3383

Avantek
Telecommunications Division
481 Cottonwood Drive
Milpitas, California 95035
(408) 946-3080

into the filling station, the gauge told me I had five pounds of air in the tire. I doubt there was that much. Driving in a downpour at 3 miles per hour in a 45MPH zone with caution flashers on at 3 AM is not very bright. Not changing the tire the day before was also not very bright.

The 6 AM 'tire feeding' was equally exciting and somehow I got me and two loads of provisions to the airport by the 8 AM deadline. Exhausted, wrung out, I stumbled onto my chosen seat at the rear of the small 11 seat airplane and promptly went into hibernation. Another fun filled, 'glamorous trip' to the states.

"**Boy, some guys have really got it made,**" said the Provo ex-patriot as I bounced off the airplane with two hours of sound sleep under my belt. "**I wish I could jump off to the states every month for a week of fun and good food.**" I curbed the urge to flatten him with the pineapple he had under his arm.

I think that the self-chosen life schedule we lead, in getting **CSD** and **CJR** and all of these other (good) things to you each month, is a form of self-punishment. Nobody **has** to live on an island. Nobody **has** to travel back and forth between an island and 'civilization' on small aircraft. Nobody **has** to hit the ground 'running' in Florida and run for five to seven days and then run just to catch the plane back to the island again.

But I'll share something with you. Of all of the places I have visited, and all of the places I have lived, I wouldn't trade Provo for any two of those (some sections of Switzerland **come close**, but the Swiss very cleverly don't allow non-citizens to own property there so there is an immediate problem if you want to **stay** there). So having **chosen** this form of life, having **chosen** to be where we are when we are here, and being free to leave whenever we wish, I can only assume that we do this because we like the punishment that goes with the hectic schedule. I think we'll try to keep it up for another five years; as **CSD** begins another new year of publication.

ORLANDO Maturing

The 1983 SPACE show and technical session will be held November 3-4-5 in Orlando, Florida. The Disneyland complex is the general setting and this will be the first time that there has been a meeting so

located that it is convenient for travelers from south and southeast of the mainland since way back in February of 1980; SPTS Miami.

The last SPACE show, the first and only SPACE show to date, was held in Omaha back in the summer of '82. On the other hand, the most recent industry 'trade show' was held this past Labor Day weekend in Nashville. A few lines about the 'apparent' differences between an industry (STTI) trade show, and a SPACE 'convention,' are in order.

1) **Recognizing that there is a huge void in the area of technical training**, SPACE is attempting to fill that void. Elsewhere in 'Comments' this month we talk about downlink training; that is **part** of the challenge, but hardly all of it.

Since it has been 18 months or so since the industry held a gathering where anyone sat down and actually tried to create a program that **teaches** something, **rather than hyping** something, we are starting from near-ground-zero with a one day series of technical training sessions in Orlando.

The Orlando training sessions, scheduled for Thursday the 3rd, will concentrate on two areas of concern; the basics (from elementary system design considerations to installing the complete system), and two areas of 'advanced' training. Number one will be antenna system design and measurements. As this issue of **CSD** begins to explore, antennas are frightfully misunderstood and the only way you can really judge the ultimate performance of an antenna is to know from antenna test range measurements what the antenna is capable of doing. We'll be looking at test range testing techniques in Orlando. The other area of advanced training we will be concentrating on is (S)MATV cabling and system layout techniques. Any installation that hooks two or more television receivers to the same dish requires special expertise. We'll start to find out what that is all about in Orlando.

2) **Recognizing that our ever-present battles** involve some very formidable 'foes,' SPACE has aligned several influential speakers for Orlando; people whom we must, as an industry, cultivate if we are to have their support and understanding when the chips finally fall in Washington. For this reason there are people such as **US Senator Barry Goldwater (R/Az)** and

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satellite entrepreneur **Ted Turner** (WTBS/CNN) on the agenda.

You may not **like** the concept that we **are** in a political arena. I don't like that concept either. But we **are** there and if we are going to stay in business, individually or collectively, we will have to face up to this fact and adjust our thinking and actions accordingly. There is a game which we 'have to play,' like it or not. Those games include being in a position to talk with, know and understand various people in positions of 'power.' Our industry has grown too large, and we have touched too many individual lives, to simply be left alone in the marketplace any longer. In short, our success is the root of our political problem.

The cable industry went through this not that many years ago. I remember the period in the mid 60's when the FCC was jumping on the cable industry with both feet. Susan and I were doing in the cable industry what you are now doing in the TVRO field; building systems without regard to law or regulations. There were no laws then. If you could obtain a local (city) franchise to build a cable system, the only thing that stood between you and a successful system was your ability to design and install a good working system. We were right in the middle of starting a small 12 channel system in the California (Sierra Nevada) foothill town of Sutter Creek, California. When the system was completed, it would serve perhaps 250 homes.

"The channel 10 news said that the FCC just adopted some new rules regarding cable," Susan told me. "I am not sure I understood it all, but I think they said that from today onward, before you can turn on a new cable system, you have to go to the FCC for permission." I said something not very complimentary about the FCC. I was waist deep in RG-59 and about three working hours away from sending 12 channels of TV down the 1/2 inch trunk line to the first amplifier station. We had a half dozen homes immediately after the first amplifier already plugged into the cable and in each of those homes anxious people were waiting to see **their first television**.

Days later, when I had the system operating, I received my weekly cable trade press publication and there it was; **you could not build any more cable systems without FCC permission**. And they were not going to grant permission to you if you were planning to carry ANY

television stations from beyond their normal fringe (grade B) contours, into the grade 'A' contour of another TV station.

So without warning, without any period to adjust, the FCC put me and hundreds like me 'out of business.' It doesn't have to be the FCC; it could be a court decision, or a new law in Congress, or any number of other 'left field' attacks. I would later end up in court about this small cable system, defending my right to complete a system that brought to 250 homes their **first television of any kind**. The legal bills would cost us more than the damn cable system did to build before we were all through. I vowed that never again would I be caught in an industry where we were all so fat, dumb and happy doing our 'technical thing' that somebody could sneak up behind us and 'blind side' us before we knew what happened. I have a long memory for such things, and when we held our very first STT 'SPTS' (seminar) back in the summer of 1979, I used the podium to urge those attending to create a trade association, **immediately**, for this new industry. It took the second gathering, in Miami in the spring of 1980, to get SPACE started but start it did.

I remember attending a cable meeting in Santa Barbara, California shortly after the FCC did its thing to Susan and I. I was mad as were dozens of other cable operators on hand. One guy had it all figured out.

"**You guys** (he said, pointing his finger at one of the big time leaders in the industry at the time) **did this to us!**" The fellow with the finger pointed at him wondered what Jake meant.

"**The FCC had no choice**; they **had** to do this because people like **you** wouldn't leave a good thing alone. Here we have been operating for ten or fifteen years without the FCC. Nobody bothered us and everything has been fine. Now guys like **you** are starting to wire the really big towns and cities; places like Santa Barbara. As **you** wire Santa Barbara, **you** are scaring the local (Santa Barbara) television station to death. They think **you** may put **them** out of business, by bringing 12 channels of TV into this city where only one TV channel existed before. It is no wonder to me that the FCC, the agency charged with protecting the broadcasters, fears that this also may happen. So **you** guys did this to **us little guys** by getting so carried away that you have started to cable the big cities. The next thing you know, **you** will

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be wiring Los Angeles or San Francisco!"

Well, Jake was right of course. They **did** start wiring parts of Los Angeles and San Francisco, almost as Jake spoke. And yes, the FCC of that era operated in a vacuum which included the mandate that 'their wards,' the broadcasters, must be protected at all costs. Thank God those days are gone, if not forever, at least for now. But for ten years or so cable hung around not growing very much because one influential group (broadcasters) 'feared' what another not so influential group (cable operators) was going to do to them. Between FCC rules, new laws, court cases and what have you, the cable industry was tied up (and down to the ground) for ten years. It took the technological breakthrough of satellites, and 'exclusively on cable' programming to break away from the ten year FCC imposed cable drought. It happened with no warning, and it could happen to our industry just as easily. But for SPACE.

3) **Finally, there is a 'fraternity' of TVRO people in our industry** who share not only common problems but common solutions. SPACE wisely recognizes that for our industry to 'hang together' we have to develop some sort of 'pecking order' from within the ranks. That means that the SPACE Board of Directors, largely invisible to date, needs to be 'shown off' just a tad. It also means that we as an industry need to establish some 'awards,' some industry-wide recognition systems to salute those members of the industry who have given more than token support to the growth of the industry. One way to do this is to stage an annual awards banquet; an opportunity for SPACE and its friends to gather socially, to be at ease and to exchange good conversation and instill a sense of industry loyalty on those who attend. It's that old 'team spirit' thing.

The Orlando show will try to bring all of these things and more into focus. The Orlando show will attempt to provide some much needed 'structuring' to the industry and its participants. The Orlando show, unlike the STTI shows where your whole reason for attending is to stand and gawk at a parking lot filled with antennas, will be a good first effort at creating a true industry out of what has to date been chaos. I **don't expect** a perfect first effort; but I **do expect** to see more smiling

faces in Orlando than I saw in Minneapolis.

EXCELLENT (first) Effort

The saga of David Wolford's **SATguide** has been a story that has paralleled the growth of the industry itself. For a period of time, **SATguide** acted as if they were the only 'game in town' and was not responsive to pleas from readers who wanted to see US network listings (D3) and Canadian ANIK listings (Anik-B and D) included. Then along came **Satellite Week** and a format that obviously worked; and it included most of the listings which **SATguide** would not carry. Competition; it does work.

And so **SATguide** followed the **Satellite (TV) Week** lead and added the missing network and Canadian listings, and picked up a few more of the odd-ball listings, including the D4 listings (scrambled). Things were looking better for the satellite watcher who wanted to know what was going on someplace other than F3R.

Having gotten into the 'if they can do it, we can do it (better)' routine, the latest (September) issue of **SATguide** shows some real innovation for which they should get special recognition. By the time you read this, your **SATguide** for October will be on hand and you will have been able to judge for two months running just how helpful the latest 'data-batch' is.

With the September issue, **SATguide** has added a new (third) section to the rear; "International Programming Guide." Since the front section already carries Mexico and Canada, this time when they say 'international' they really mean international. The section starts off with a master listing of G(h)orizont birds (two listed), then Intelsat IV birds (two listed), Intelsat IV-A birds (4 listed), and Intelsat V birds (5 listed). This is followed by the Indonesian Palapa bird, the Russian Raduga satellite, and the French Symphonie. Within each listing is a sub-listing that tells you what transponders are active on each bird, the type of transmitting beam pattern in use (Global, northern hemispheric, eastern hemispheric, spot), the format of the transponder (half or full), the frequency of the video carrier along with the type of polarization (right hand circular, etc.), a description of the service, how the audio is transmitted and finally, the predicted 'boresight' EIRP if

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you are fortunate enough to live where the transmitting beam is pointed.

The data is straight out of the Steve Birkill master computer memory file and it is good data, for the most part. Since the strange world of international satellites involves antenna (transmission) patterns which are confusing to the occasional North American viewer, the section includes a set of typical 'footprint maps' that tells you how strong the various signals 'should be' in your part of the world for at least some of the satellites (Intelsat V birds primarily).

This is a lot of data. Then to make the data useful on a 'Yeh, but I want to know when Good Morning Siberia is on G(h)orizont viewership basis, there is a 'sample programming week' shown which lists the seven days of the week, and the full 'probable' schedules in a 'typical week' for such services as the four Mexican channels on Intelsat at 53 west, the Colombia, Peru, Venezuela, Argentina and Brazil services on the various Intelsat birds over the Atlantic, plus G(h)orizont at 14 west.

Sitting down with all of this data at your fingertips, if you are already into international satellite watching, is satisfying. Short of formulating your own survey and guide, there is no way to start off knowing in advance what you are likely to find as you scan the 'international skies.' That is what makes international satellite watching part of the fun it is; the 'unknown' program fascination. Having some idea, in advance, of the program contents is a help and because of the 'typical week' format of the international guide, you won't find its inaccuracies all that disturbing. The header to the program guide portion does, in fact, 'warn' you of what to expect in the way of inaccuracies. One line tells you "You will find . . . programming . . . can be interrupted at any time by governmental announcements, conferences or other special programs." While that is true, it also provides a convenient 'out' for those engaged in the difficult task of obtaining, months in advance, program plans for such diverse services as Rede Globo (Brazil) and Programma One (Moscow). Those who use the guide (any guide) as a crutch, or as a reason to turn on the TV (or not turn on the TV) will be disappointed by the admitted inaccuracies of the 'International Programming Week.'

Perhaps the greatest value for this section of **SATguide** is that it hands to potential buyers of home TVROs a concrete example of what their terminal could bring to their living rooms. The folks at **SATguide** have taken the time to list the programs in their native language (example "Nuestro Cine Presenta — Las Risa En Su Hogar") as well as the English interpretation of same (example "Our Movie Presentation — Laughter In Your Home"). If you are into selling terminals in the **international marketplace**, handing a customer a copy of the latest **SATguide** should do much to enhance your chances to make a sale.

But, be advised that at least for now the international edition is not capable of the accurate listings we have come to expect from North American satellite sources; nor is it as complete as real TV watchers will ultimately demand (Ghorizont, for example, has but three programs listed in the typical day [all news types], while some of the best Russian satellite television consists of East German and other eastern bloc nation movies and plays). For a start, it is good stuff and **SATguide** and staff are to be commended for stepping off into dangerous, uncharted waters with a fine first attempt.

GALAXY ONE Notes

Hughes has promised that Galaxy One, all 9 watts of power per transponder, would be an excellent satellite offering unusually good service and coverage. They have come close to their expectations.

It will probably be at least another month before sufficient reports are in to provide a comprehensive **CSD** map of the Galaxy One coverage area; in this regard those readers throughout the Caribbean, northern South America and Central America are urged to send off their Galaxy One observations (from 134 west) posthaste so that the tedious job of translating that data to a map base can be completed. Here, however, are observations that should hold up in the 90% accuracy range even as the last pieces come on board.

First of all, the boresight from Galaxy One (central USA) seems to be on target. No reporters at the fringes (north of the arctic circle, middle Caribbean) note any unusual coverage 'holes' to date. The two areas where critical data is not yet available (Pacific Ocean; Hawaii and beyond, and, the northwestern corner of South America) may

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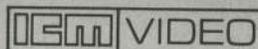
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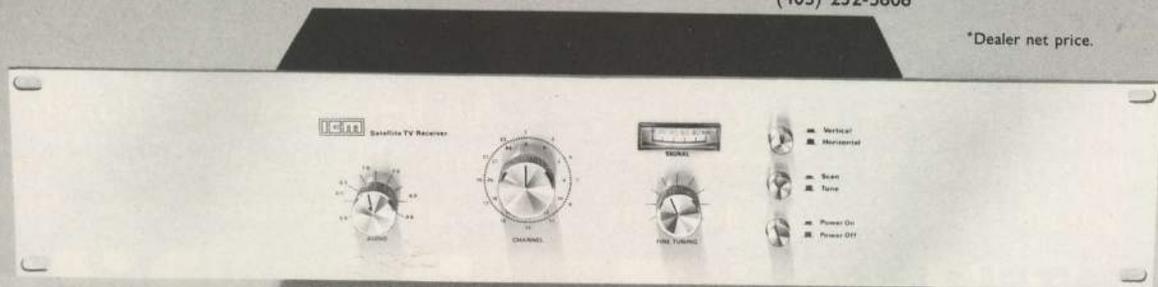
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prove to be a different story, but for now, it all looks good.

Jim Vines, reporting from the 'High Arctic,' found the 8 transponders that had carriers turned on, in mid-August, at "levels equivalent to the 8.5 watt F3R bird signals" in the Canadian Northwest Territories (using a 4.85 metre dish).

Stanley Jeffcoat, reporting from central Oklahoma, tells about his quick experiments with relatively small (8 foot) dishes and attempting to separate the 8.5 watt/5 watt F3R signals at 131 west from the 9 watt signals of G1 at 134 west. This issue has been of considerable concern to all of those who sell or manufacture dishes smaller than 10 feet in size (as well as to **many** who manufacture ten/11 foot size dishes). Jeffcoat cautions, as does **CSD**, that his data is preliminary and subject to further refinement. He notes "We got excellent separation between SIN on G1 (TR6, vertical) and WTBS on F3R (TR6, horizontal), and between TR20 (vertical) on G1 and TR20 on F3R (horizontal). However, it was possible to park the antenna in between the two birds (roughly on a heading to 132.5 west from here, or 1.5 degrees off of each bird) and pick up weak but copyable signals from TR19 (F3) and TR20 (G1); both being of the **same** (vertical) polarization."

Swapping back and forth between a popular 8 foot antenna, and an equally popular 11 foot antenna, Jeffcoat and partner **Fred Reeves** decided that for their tests, the 11 foot **could handle** satellites as close as 3 degrees even if both of the satellites happened to be using the same polarization scheme (i.e. evens horizontal, verticals odd, or vice versa); but, the 8 foot would (they judge) have problems in a similar situation. "The saving grace with the F3R/G1 situation is that we have opposite polarizations on the same (general) transponder assignments" notes Jeffcoat "and for this particular pair of birds, the additional isolation provided by cross-pole isolation makes the test no test at all."

Their point is well taken; there will be those antenna manufacturers who will hop on the presence of F3R and G1 to attempt to **prove** that their 8 (or 7 or 6 or 5 or 4) foot antennas will function with 'close' satellite spacings. This is a no-test kind of test since by dumb luck or careful planning (the choice there depends upon whether you are

talking with the FCC, or Hughes) **F3R and G1 are opposite-polarized on the same transponders**; that is, G1 is like a Westar bird flipping the verticals to even and the horizontals to odd. Those who might be 'tempted' to run their own tests for small antennas, and then use that 'test data' to make marketing points are warned in advance that such 'test results' will not be published in **CSD** since this is **not a true close spacing situation**.

As for the ultimate coverage of G1, well, the big surprises are, we suspect, going to be in the backwater coverage regions; perhaps, as previously noted, along the northwestern coast of South America or out in the Pacific; **perhaps** as far west as the Solomon, eastern Caroline and Marshall islands. Only time and observation will tell. Going to the east, I do have these personal observations from the Turks and Caicos. I am told that Puerto Rico finds G1 signals 'about on a par with F3R's stronger signals.' Given this data, and my own to follow, I would forecast that as long as there is visibility (i.e. line of sight to the bird) that G1 should do very well far into the eastern Caribbean.

My own observations involve some rather careful carrier level measurements.

Since so many others have referenced the G1 signals (and the only two that are active at the time of this writing are SIN on TR6 and Galavision on TR20) to F3R signals, we will do the same. F3R's hot transponders (8.5 watt TR3, 7, 11, 15, 19 and 23), the pair of G1 transponders, and the even lower look angle (for us) single regular service transponder of F1R (TR20; AFRTS).

- 1) F3R TR15 as reference (only one sub-carrier)
- 2) Average difference from F3R TR15 and Galaxy 1 TR's 6 and 20 = **-.75 dB**
- 3) Measured difference between F3R TR15 and SATCOM F1R TR20 = **-.10 dB**

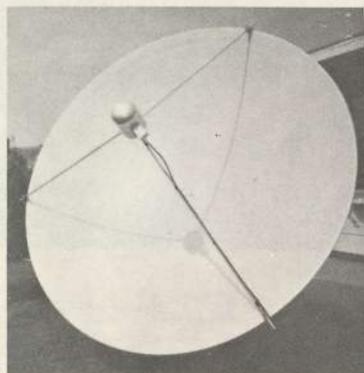
Thus in our situation, the G1 transponders are slightly weaker (close to a full dB) than F3R, in spite of their 0.5 watt greater power. The F1R signal on TR20, the AFRTS feed, on the other hand is so close to the F3R reference signal level that it takes several hours of

COOP/ continues page 84

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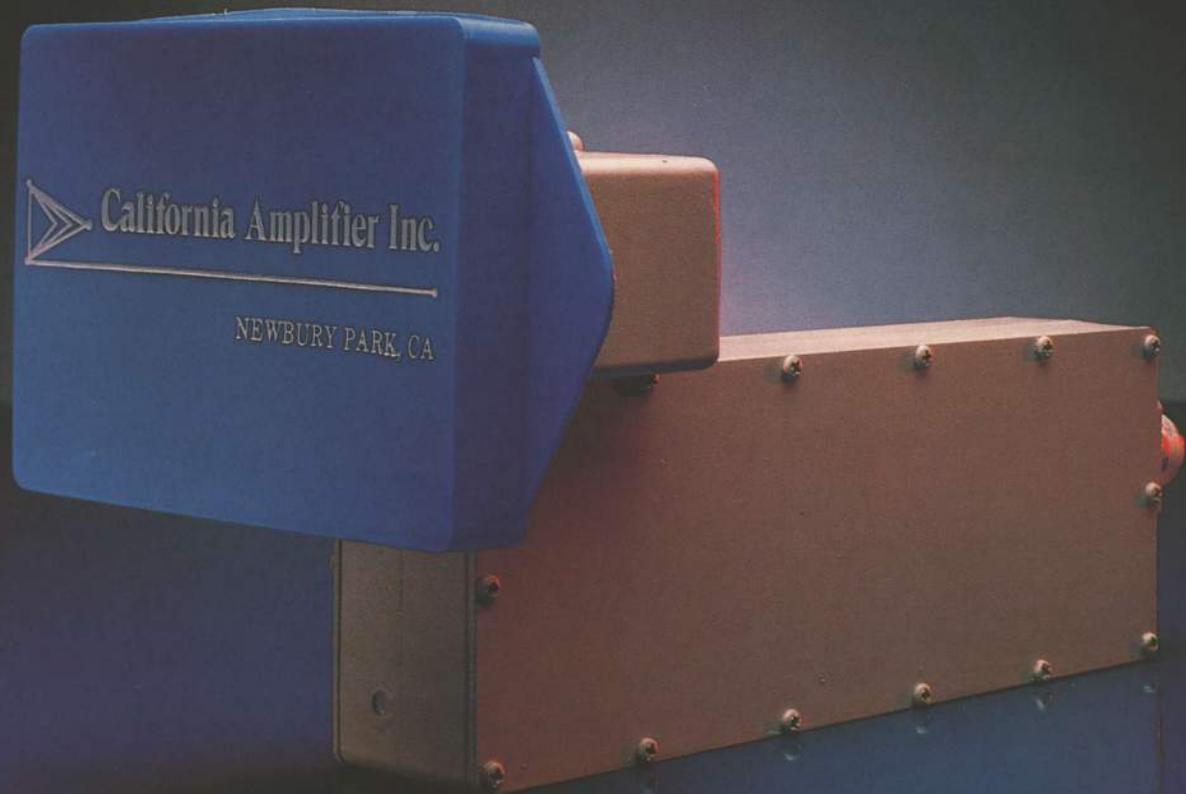
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COOP/ continued from page 82

separate readings and dish tweaking to determine that it is indeed any weaker at all (.1 dB which is only enough to say "it is [somewhat] weaker," not sufficient to tell anything on the screen). F1R is also an 8.5 watt (per transponder) bird so it has predictable service contours that should come close to those of F3R. F1R is also the bird which earlier this summer did a 'handstand' in the sky, flipping over without warning and giving RCA flight engineers several very upsetting days before they got it back under control, and, defied attempts to explain the wayward action.

As long as Galaxy One continues to carry only the SIN and Galavision regular use channels, interest in this bird will not be high; at least not in most of North America. However, if (or should) HBO decide to move ahead with plans to inaugurate a 4 GHz DBS type of service to small home terminal systems (using some or all of the six transponders HBO parent Time, Inc. owns on G1; see CSD for September 1983, page 14), interest in G1 service contours will soar. Such a service is bound to be scrambled, using some type of scrambler system not yet placed on the market. Chances are good that such a scrambling system would be less sophisticated than say the Oak Orion system, and experience with similar (terrestrial) type scrambling systems has taught us that you MUST have relatively clean signals to start with or the descrambler simply will not descramble. Therefore the relative strength of G1 is of vital concern to us all; we will need big, strong footprint signals if HBO (or anyone else) is to create a G1 based scrambled home/SMATV private DBS service at 4 GHz. The bottom line, at the moment, is that we seem to have such a bird in G1.

With this caveat; G1 is brand new, and the signals today are stronger than they will ever be again. We can expect a decrease of not less than 0.4 dB over the first year, for each transponder in service, and additional decreases amounting to approximately 3 dB over the first seven years of life.

MPAA Hypocrisy

We haven't heard much from the Motion Picture Association (of)

America in recent months. That is both dangerous and interesting. You will remember that the MPAA was behind a move early this past spring to coerce the Reagan administration into modifying the Caribbean Initiative Act so that any nations that allowed their national television (and one assumes radio as well) 'networks' to 'steal' US satellite signals for fun and profit would automatically be cut off from the benefits of this Caribbean version of the Marshall Plan. This cut-off was to be so 'automatic' that not even the President of the United States could overrule the regulations. The MPAA had done some leg work and thrown the spotlight on tiny Jamaica where the recently elected non-socialist government was allowing its one and only television service channel to freely 'borrow' from such diverse services as CBS and CNN, so that its people could have access to the latest world news. Jamaica was forced to become a 'news thief' because it wanted its people to not be shut off from world events, and because if it had to subscribe to the Intelsat news services for such coverage, the fees charged by Intelsat were so high that only a few minutes per week could be paid for by the modest JBC budget available.

This angered the MPAA which felt that a "steal our news today; steal our 'Rocky' tomorrow" attitude was developing throughout the Caribbean. Unable to come to direct terms for copyright payments with Jamaica, the MPAA went to the White House and Congress to seek relief. The MPAA knew that Jamaica, attempting to recover from a long period of backward economic rule, would do almost anything to stay inside the good graces of the Caribbean Initiative Act.

Jamaica happened to be doing the wrong thing, at the wrong place, at the wrong time. Their 'guilt' in this situation was not as overt as it may have seemed at the time. First of all, Jamaica had never become a party to either of the two international Copyright 'conventions.' That is, Jamaica **was not and had not ever agreed to** either of the 'international laws' regarding copyright. They are hardly alone in this respect; fewer than 50 nations of the 125 plus recognized in the world have signed both agreements. From Jamaica's viewpoint, they were not violating any laws which their government was a party to or recognized. The MPAA insisted that the "Jamaicans must 'join' the

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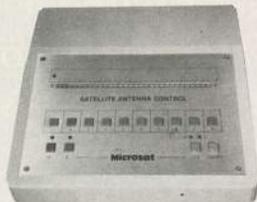
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'civilized world' and become a party to the agreements of the world" by accepting the international Copyright Conventions. This would be a laudatory example of forced progress were it not for the fact that in the process of becoming "civilized," MPAA members became 'richer' from copyright payments made by Jamaica. There is no enlightened self-interest to compare with 'pocketbook self-interest.'

Well, now we have another shining example of just how the nations of the world feel about Uncle Sam's "electronic imperialism" and in this instance the nose-thumbing comes not from a tiny Caribbean nation with a backward socio-economic condition. It comes from Canada. You remember the Canadians? They invented domestic satellites.

Back on September first the Canadians began transmitting the CBS network (plus local program) schedule from Detroit's WJBK, the NBC and local programs of Detroit's WDIV and the PBS (plus local) programs from Detroit's WTVS, on ANIK D. Ahead are the ABC programs of Seattle's KOMO. On the Canadian side of the respective borders, the folks who operate Canadian CANCOM are picking these signals off of the air, processing them, and then sending them out on ANIK-D on horizontal transponders pressed into service for the first time on ANIK D. **The Canadian CANCOM outfit is selling this service to Canadian cable systems.** At this writing more than 350 of the Canadian cable systems have applications on file with the Canadian authorities to carry these four signals.

Ho hum?

Well, the Canadians are **not going to pay** US copyright for these signals. They have told the US authorities (in effect) "No way, Jose"! Canada is a signatory to the two international copyright conventions, by the way. Canada does NOT stand to benefit from the Caribbean Initiative Act of course so the MPAA will have to find some other pending piece of legislation, affecting Canada, to 'get even.' It could be an interesting battle; the MPAA movie moguls against Canada. Picking on little Jamaica is one thing. Picking on big Canada may be quite another.

In the case of Canada, most of the cable systems involved in this on the Canadian side already carry US ABC/CBS/NBC/PBS pro-

gramming. They do so by going as close to the US border as possible, erecting tall towers and lacing those towers with huge antennas. Then they use terrestrial microwave to haul the US network signals 'inland' to the respective cable headends. But in doing this, they typically end up carrying smaller, more localized network affiliates. A CBS affiliate in Williston, North Dakota is not nearly as appealing as a CBS affiliate in Detroit; given the differences in programming resources one finds between Williston and Detroit.

So the network programming, except in far northern 'outback' Canadian cable towns, will not be new. What will be new is the 'big city' versus the 'little town' approach of the stations carrying the respective network services. And what is also new is that the signals are being delivered via **satellite-microwave** rather than **terrestrial-microwave**.

The Canadian view of US copyright is interesting. On several occasions US programmers (including ESPN, HBO) have been to Canadian courts asking that where carriage of US programming takes place, the Canadian firms involved must be made to pay for that programming; either through copyright fees, or through direct licensing fees. The Canadian courts have held, without exception, that "simultaneous redistribution by a cable system of a broadcast program does not constitute a public performance" and thus "is not subject to copyright liability." There have been other Canadian court decisions as well, all supporting the Canadian's "right" to view as they please, and to use as they please, any 'foreign' broadcast (or satellite) signals that happen into their territory.

The 'trans-border-use' of satellite programming aside, the Canadians are really in the driver's seat on this one. The US had a similar type of copyright law back until 1976. That was the year when a 1909 US law was finally rewritten and signed into law by President Ford. That was the year that US cable systems began scheduling copyright payments for programs they were carrying. In that law, a special 'fund' was set aside for any 'foreign' telecasts received by and re-distributed by US cable systems. The primary beneficiary of that special fund are the Canadian broadcasters who can now draw money (US money) out of that fund each year. The money is paid-in by US cable systems. It

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doesn't amount to very many dollars per year but the principle is established nonetheless. So while Canadian **broadcasters** are getting a 'subsidy' from US cable systems, Canadian **cable systems** are getting a subsidy of their own; US programs without a copyright fee attached. That would seem to place the Canadians at a 'legal disadvantage' in the battle sure to come in the future. Actually, it gives them a position of strength when dealing with the likes of MPAA which is sure to become incensed by this "Canadian Piracy" of US television programs.

So here we have a pair of nations being impacted in separate ways for their use of US satellite signals. Jamaica is pushed into a corner by Uncle Sam's negotiators, driven by MPAA, and it faces the threat of losing funds and benefits from a bill yet to be passed by Congress. Jamaica is not doing anything illegal and the world courts would support that statement. Canada, on the other hand, is not being pushed by Uncle Sam at all because Canada comes into the situation from a position of strength. It probably is doing something illegal, if you count their signature on the international copyright conventions as worth something. Canada says "No way, Jose"! while Jamaica says (under duress) "Let us work this out." Just a few scant years ago none of this could have happened. Isn't technology wonderful!

WHITHER Goest SMATV?

Our August issue report on 'SMATV Piracy' (in motels, et al) drew more than the usual amount of mail; a sampling of the letters received appear in this month's magazine. I have feared for some time that the SMATV industry is in big, perhaps irreversible trouble. Peter Sutro, an experienced SMATV operator, a very bright man, and a leading supplier to the SMATV operator through his Patmar Technologies, writes about an August gathering of the (NSCA) SMATV clan in this issue (see page 38).

SMATV is an industry without an identity. It is floundering trying to **pretend** it is cable without all of the political hang-ups of cable. That creates an easy opening for the cable folks to brand SMATV as 'pirates.' The word has many meanings. Based upon our August issue story (**Piracy: The Seeds Of Our Destruction?**), it means systems installed in multiple-dwelling developments where nobody pays for the privilege of being connected to the 'master' satellite antenna. It also means the taking of private property (HBO et al) and using it to make your establishment more attractive; to stay in, or live in.

But in New Jersey it **also means** any cable-type system which tries to operate without the written authority of the state. In New Jersey, cable systems first deal with their local community and then they must deal with a state regulatory commission. Failing either of these two tests, they cannot build and operate. The SMATV systems thought they saw a 'loophole'; one that allowed 'private cable' to operate on 'private property' **without state permission**. Obviously they have the permission of the private property owner or they wouldn't be there.

Not all states have regulatory agencies for cable. Thank God. But many do, and ultimately many more will. And like any government body it wants to control anything and everything it can get its hands on. If you think private business is driven by 'growth' forecasts, you haven't seen anything until you have witnessed a state or federal bureaucrat laying out for you how BIG his agency is today, and will be tomorrow, as the field he is involved in GROWS! Every bureaucrat wants to rule his own fiefdom and they will fight tooth and nail to see that a group such as SMATV does not get started; unless, of course, they agree to operate **under** the auspices of the bureaucracy.

Peter writes that the August NSCA event was in a turmoil because of the events in New Jersey, and those expected from neighboring New York. The whole **premise** of 'private cable' is under attack since the concept is built upon the belief that you can do what you want **on your own private property** as long as you are not endangering others. SMATV is in trouble.

SMATV is in trouble because whereas we have a present federal government which is hell bent on backing away from 'unnecessary regulation,' we have state agencies who rub their hands with glee each time the feds delete a rule or regulation or law. They are poised, at the state level, to jump in and **replace** the outward bound federal rules with brand new incoming state rules. Only the bureaucrats will change. The end result will be the same.

The SMATV guys hope that the FCC will tell New Jersey that the

FCC has pre-empted state regulation of SMATV. They hope the FCC will also tell New Jersey that the mere absence of regulations at the federal level regarding SMATV does not signal the states that they can move in with their own regulations. **They hope . . .**

Peter delicately chastises SPACE for not taking an active role in the New Jersey battle. I would like to suggest that SPACE probably has very little business being in the SMATV business, even though we have a few seats on the growing Board of Directors set aside for SMATV entrepreneurs. I felt that SPACE was off on a dollar hunting safari when VP Brown first proposed that SPACE be 'expanded' to include SMATV operators, and nothing I have seen in the interim convinces me to the contrary. Having said that, I also happen to believe that whenever an SMATV issue comes up (such as the New Jersey case) which could, **in any way**, establish a precedent for home TVRO viewing, SPACE does need to be in there participating tooth and nail. I further feel that if SPACE is going to actively represent SMATV, it needs to do so with a professional staff dedicated to SMATV problems. We can't hit and run and then ignore their day to day problems if we are going to be in the SMATV representation business. Like anything in life, either you sit down and do the job right, or you get out of the ballgame. A watershed is coming on this issue and I for one look forward to the opportunity to debate and vote upon it within the sanctity of the SPACE board meeting.

Perhaps the most revealing portion of Peter's report deals with SMATV and DBS. Peter has been after me for several months to travel to New York City and sit down with the people who are behind the USCI 'interim/medium power' DBS program. That's the one scheduled to launch this November 15th on ANIK C. Peter wanted me to be exposed to their thinking, and to report to you what that thinking is. I have managed to schedule around a trip into New York City for several months simply because I didn't feel they had enough to say to make my trip worthwhile. Now Peter writes that of the three 'early entrants' in DBS, only one showed up at the SMATV convention and they were so poorly organized that when it came time for their scheduled seminar presentation, the speaker had left the hotel and could not be found. That certainly is a professional approach for you. Peter also reports that the 'low level' (his term, not mine) personnel who were on hand could answer virtually none of the questions posed by the SMATV operators. No wonder; I suspect they had no answers. Not because they were low level, but rather because this whole interim/medium power DBS thing is being run by people who couldn't spell satellite four months ago, and who have virtually no experience in microwave equipment, programming, marketing or any of the other facets required to make DBS fly.

I will make a fearless forecast.

None of the 'early' DBS entrants will make it. Some will dump upwards of \$50,000,000 into various holes in the ground and in the sky and then they will quit. They will hang in there just long enough for COMSAT to come along and do it with skill and efficiency. They will hang in there just long enough to get a few hundred thousand 11 (12) GHz packages into the field, and then along will come COMSAT's STC and the ballgame will be all over. While this is happening the clock will tick through 1984 and 1985 and services will come and go. **They will fail** because they do not know what they are doing, and they will **never learn** how to do it right. **They will fail** because they are allowing the wrong people to make hardware decisions, and the wrong people to make marketing decisions. **They will fail** because they have no more idea what rural and suburban America will pay \$20 or \$25 a month for than you and I do. Probably less.

DBS, I predict, for the next few years, is going to be a giant boondoggle. It will cause many well heeled companies now getting into the 'ground floor' to sustain tremendous losses which they may never recover from. We would all do well to stay as far away from it as possible, unless of course you stumble into a deal where you get your cash money up front and you can bank it before the check bounces!

OFF Into the Night

It is not the first time it has happened; it probably will not be the last. Consumer fraud in the TVRO field.

The August 10th edition of the **Redding (California) Record Searchlight** (newspaper) reports on the mysterious disappearance of

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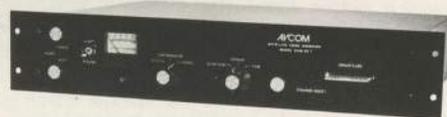
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COOP/ continued from page 86

a duo who had opened a TVRO retail sales shop. According to the report, a fellow who called himself Jack Lynch along with another man who identified himself as Craig Carnahan opened 'Alpha Satellite Antenna' in Redding on the 18th of July. The pair took out a city business license, and then proceeded to obtain office furniture, office supplies, a word processor, a telephone and considerable video equipment using checks that would in short order 'bounce,' or credit which proved in about three weeks time to be no good.

Among the other activities of the pair, they wrote 'payroll' checks to themselves totaling approximately \$5,000 and cashed their payroll checks at local businesses. They did this just before skipping town. During their short tenure in the business, Alpha managed to inundate the local radio airwaves with commercials offering a completely installed TVRO for the amazing price of \$1199; oh yes, that **also included** a new television set! Since one of their principal creditors was a TV store in Redding to which they apparently owed some \$5000, one must assume that the 'economics' of this package only played because they didn't plan to pay the creditor for the TV sets. Chances are pretty good they also didn't plan to pay the TVRO suppliers for their satellite hardware as well. Anyone can sell a system such as this for \$1199, when all of the hardware is 'free'!

Well, the Redding police and the Hilltop Drive branch of Bank of America and about a dozen creditors are looking for the pair. They left behind a trail of debts and probably a very confused local population who wonder why **they should pay** \$1995 or more for a completely installed system when they remember these guys offering a complete system plus a new TV set for just \$1199.

We'll survive incidents like this. But in the meantime, we'll all pay the price.

HERO ONE/ World Zero

There was a period in our not too distant publishing past where virtually every new issue of **CSD** brought forth a new tale from Hero Communications' Bob Behar; Behar was in some new spot in the world pioneering TVROs for this continent or that country, almost monthly.

Having conquered most of the free world, Behar's profile has been far lower during the past eight months or so; roughly parallel to his acceptance of the number one elected post in SPACE, our national trade association. Since Behar headquarters in South Florida, and I spend about a week a month there getting **CSD** together in its printer-ready mechanical state, it is only natural that Bob and I have dinner together every other month or so. We swap the latest tales, exchange data which cannot be put in print (even in **CSD**!) and then talk about his latest exploits. Recently our talk turned to his sizeable business in the middle east. I guess Hero has been giving fits to a number of very large, very monied big-time names in the satellite terminal business throughout Saudi Arabia and Kuwait, to name a pair of countries.

I give Bob superior knowledge to me in several areas. Number one, he is the world's foremost expert on world standards for TVRO service. He has spent more weeks in Phillipine jungles, South American hell holes and burning Arabian deserts than all of the rest of the globe circling TVRO installers combined. He can rattle off what transponder carries what national or international service, what or where the audio is hidden away, what their operating hours are and what television format they use, like you and I know the transponder listings on F3R. He can tell you how the Intelsat at 1 west drifts, and all about the control problems the Russians are having with the latest Ghorizont over the Indian ocean, carrying the national Indian television service on lease. He does this in confidence, and threatens me with some terrible pain if I ever print what he tells me. I abhor pain so I simply file it away, probably retaining no more than 25% of what he says anyhow since it flows out of his mouth at about 200 words a minute.

On a recent Sunday afternoon, Bob and I and his son drove down to their new 15,000 square foot plant in Hialeah. I was not the best of company; I had just wrapped up **CSD** for September, had flown to San Diego for three days to create the story you see in this issue on antennas, gotten the first issue of **CJR** created, to bed, and then into the mails (a day early no less!), and I was beat. I had really been looking forward to having **that** Sunday afternoon to catch up on some correspondence and packing the endless cartons that would return to

Provo with me the next morning. But Bob wanted me to see their latest antenna creation so I agreed to the drive.

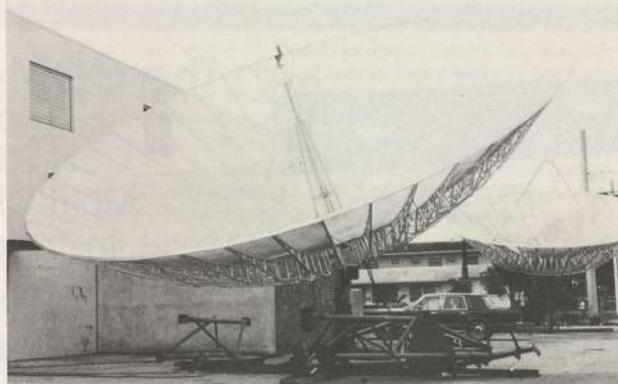
HERO Communications got into this business at the second STT show; Miami in February of 1980. Bob attended the first show in Oklahoma that previous summer, and went home to figure out what part of the TVRO world he wanted to get involved with. He had a ten foot dish in his back yard, and an excellent background in both VHF/UHF two-way radio, and, television production. Years ago Bob used to spend Sunday afternoons running the video portion for CBS football games. He got several awards for being a (very) creative director. In the two-way radio world, he had concentrated on being an exporter of communications repeaters (FM) into countries in South and Central America. All of this served him well when he decided to get deeply involved in the TVRO world.

Bob is perhaps a puzzling figure to many. He is youthful (far younger than I), very outgoing (I of course am quiet and reserved) and unmistakably of Cuban heritage (my mother saw a Cuban on television once; Lucille Ball's husband). His command of English is as good as any native born citizen but his accent carries an edge that makes some people nervous. I guess they half expect him to whip a stalk of sugar cane out from under his shirt and flail them about the head and hands with it.

Bob travels to Saudi Arabia as easily as you and I go to Chicago. It is just another trip, and a not very exciting one at that. His 'world class systems' are big, **and**, expensive. They solve some very unique reception problems which most of us haven't even recognized yet. When the birds move north and south of the equator, and the customer wants full time service from such a 'figure 8' bird, Hero provides the customer with not only a horizon to horizon polar mount, but a fine-tune elevation jack control as well. That means you can dial up say Intelsat at 1 west, and then if the bird controllers have allowed the bird to drift north of the equator, you simply operate the elevation tweek control and the big dish heads north until the signal is peaked. If you are after Nigerian television and you find the video is great but there is no audio, Hero provides you with a special receiver that lets you find the audio even if it is carried several transponders away on a special 'hidden' sub-carrier. If you want the dish at 'this estate' but you want to watch television from 'that estate,' Hero installs a complete wireless link between the two, and even provides you with two-way control so you can operate the dish controls from several miles away. None of this comes cheap.

"I was in Paris last week" Bob casually mentioned. "I was in a room with representatives of (name of famous US antenna company) and (name of famous European antenna company). We were all there at the request of (name of famous international political figure). We were asked to bid on a complex system for his palace in (name of city)."

I asked Bob how it went; I knew Bob well enough to suspect that he would not be telling me this story unless (1) HERO got the job, or, (2) there was some 'moralistic story' involved in why Hero did not get the



TEN METERS BIG/ this latest Hero dish dwarfs the 7.5 meter version behind.

job.

"Oh, we got it. The system was for a pair of ten meter antennas, completely capable of horizon to horizon coverage, plus a pair of smaller dishes for the new ARABSat satellite to be active late next year."

A ten meter HERO antenna. I have a pair of six meter HERO antennas on Provo. Old time readers have read my analysis of them in the past. Those who keep up with such things know that HERO has been producing and shipping and installing 7.5 meter antennas for several months now. But a TEN METER HERO?

"We got the job because I simply told the buyer that we would guarantee the performance of the system; or we would take it away and give back their money. Neither of the other firms was willing to guarantee that."

Bob would later add that the other two firms were bidding around \$1.2M (that's \$1,200,000) for the installation. Bob's HERO bid was but a tiny fraction of that price. The two 'big boys' were so far out of line, with HERO, that they had used this price difference to try to destroy the faith the buyer might have in the HERO system. You can be **too cheap**, of course, in this world. "Who ever heard of HERO???" they had asked the buyer. Unfortunately for them, **the buyer had heard of HERO.** One of his good 'Kingly Buddies' had a couple of HERO 7.5 meter antennas and was delighted with the pictures.

Bob is not a name dropper. But his list of international customers reads like the Barbara Walters' address book. King this, Sheik that, Prince that. The Honourable this and Her Lady that. "I think we may have finally found our 'niche' in the marketplace," Bob offered.

Many would aspire to that 'niche.' Selling TVROs to Kings is not just a matter of having the right equipment; it is more a matter of infinite patience, and, the ability to adjust to local custom without blowing your stack. Bob was talking about spending ten very long days in a Middle Eastern country **waiting** for a person of high responsibility to see him. That person had 'commanded' that Bob fly to see him; a ticket on the country's national airline had been sent to Bob as an inducement to visit. Bob obliged, and then found the person of high responsibility was pre-occupied when he arrived. **Ten days later**, ten days of being escorted anyplace he wanted to go, doing anything he wanted to do, wore thin. He finally saw the man and made a deal. But it cost him ten frustrating days. Meanwhile, back in Hialeah, his 22 employees were having their usual share of problems which he couldn't help solve. Not from 9,000 miles away.

"Taylor Howard is due down here Monday; are you **sure** you have to go back to Provo?"

Taylor is Bob's antenna Guru. When HERO was building antennas up to six meters in size, Bob felt quite comfortable doing his own antenna pattern measurements and gain tests. He had a few rocky months with the six meter and then finally got the hang of it; but he knew that as the antennas got bigger, they required far greater experience to 'proof' than he had. So Taylor Howard was flying to Miami to spend a couple of days checking out the proto-type 10 meter dish that we were going to see.

"**There it is.**" We had just rounded the corner and sitting on the parking lot, held in position with several tons of 'dead steel,' was the largest **open mesh dish** I had ever seen. I wasn't alone; nobody had ever built one ten meters in size before, as far as we knew.

"We can't move it through the full belt of course; it runs into the ground to the east and the building shields it to the west. But we can look at Intelsat at 53 west (the one with Mexican channels on it), plus W2, F4, D3 and W4." I allowed as how if it was working properly, the hotter transponders on W4 would probably melt the phosphors off the picture tube. Bob smiled.

"**What do you think of our new feed mount?** We got started with the splash plate fiasco and when that didn't work, we were ready with this tooling. It actually makes a very neat way to run the cables down and it is very sturdy." I was less concerned about the sturdiness of the mount for the feed than I was about the ability of ten meters of open mesh to all stay in one finely tuned parabolic curve.

"It takes maybe four days for two men to put it together. Of course we have just done one, so maybe we will get better at it. It is just a tad different than two men, four hours for our ten footer"! I also could see that you would not be installing a ten meter dish on a mount without a crane; a pretty hefty crane at that.

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"When the crane picked it up, with the center eye hooks, it just moved perfectly onto the mount. I think it actually goes on the mount easier than our 7.5 meter." I wanted to ask how many bolts, nuts and sheet metal screws were in the antenna but knew that Bob wouldn't know at that point. They probably list them on the parts list by the 'pound' rather than by the piece count anyhow. Wow. This was one **big antenna!**

"Well," I observed, "it has taken our (home) TVRO industry exactly eight years to come back around to where the CATV industry started; ten meters"! Bob laughed. "Yes, but **our** ten meter antenna system tracks from horizon to horizon, adjusts for birds that wander out of the Clarke orbit belt, and produces pictures with signal levels in the 20 dBw region; **their** early CATV antenna systems didn't move at all, and did well to produce noise free pictures from HBO"!

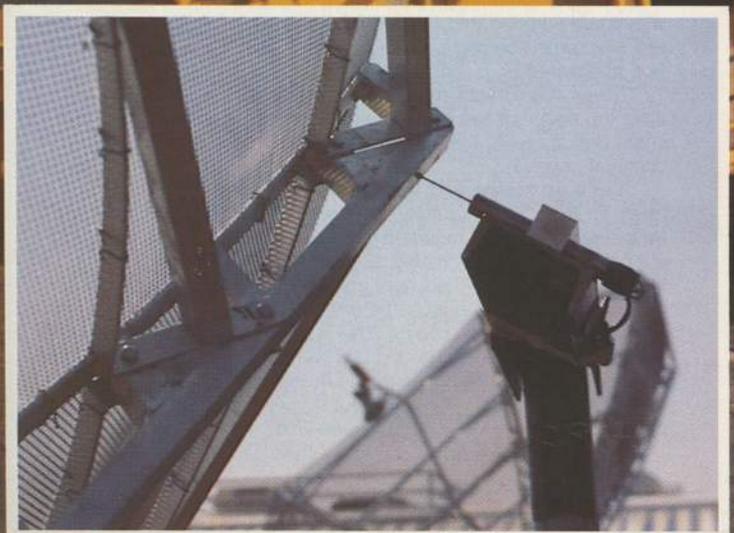
Moving this monster looked like it might be quite a chore. It was with some surprise that I noticed the same motor drive mechanism that I had on my six meter HERO in Provo. "Not quite . . . look again," Bob suggested.

Oh yes, there it was; a **dual-chain** drive. Not just one huge chain to drive the dish, but two huge chains. One motor, two chains. "If one chain should break, the other one will hold it anyhow." I knew about chains that broke.

"**Let's go inside** and see how it plays," Bob suggested. I was ready for that. "Unfortunately, we can't do an A/B test with say the 6 meter or the 7.5 meter mounted over the roof," Bob pointed out. "They are cabled to the front display room, and back here in the shop, only the ten meter is hooked up, right now." I knew that Taylor would insist on side by side comparisons before he left.

The dish was parked on F4. This is one of your stronger domestic birds in South Florida. The signals were overpowering. We talked about measuring the video signal to noise ratio (the equipment to do that was on the bench next to us) but since I was pressed for time, we passed. Besides, I knew 55 dB video SNR when I saw it.

"The only 'weak one' we can see with the limited motion is Intelsat

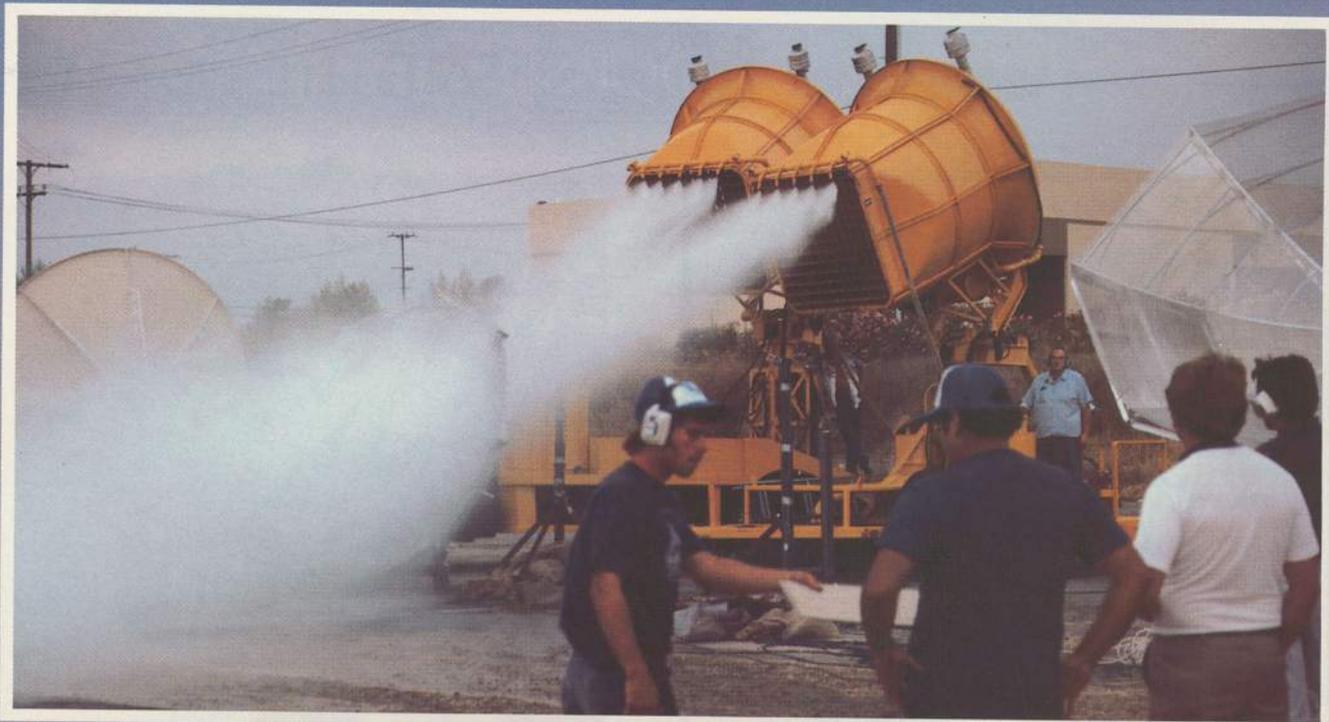


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performance, so we hired a "professional hurricane" to see if we could break a Paraclipse.

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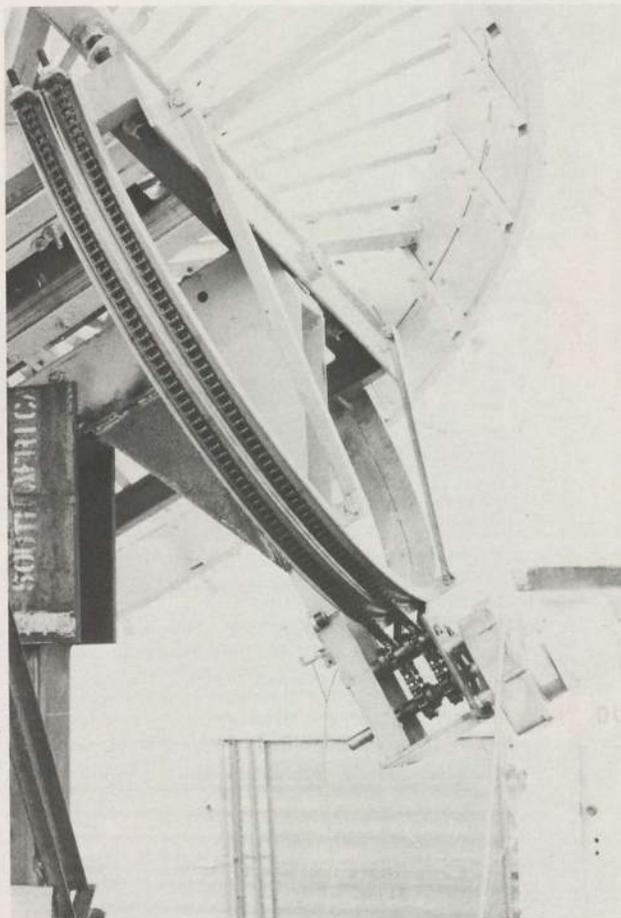
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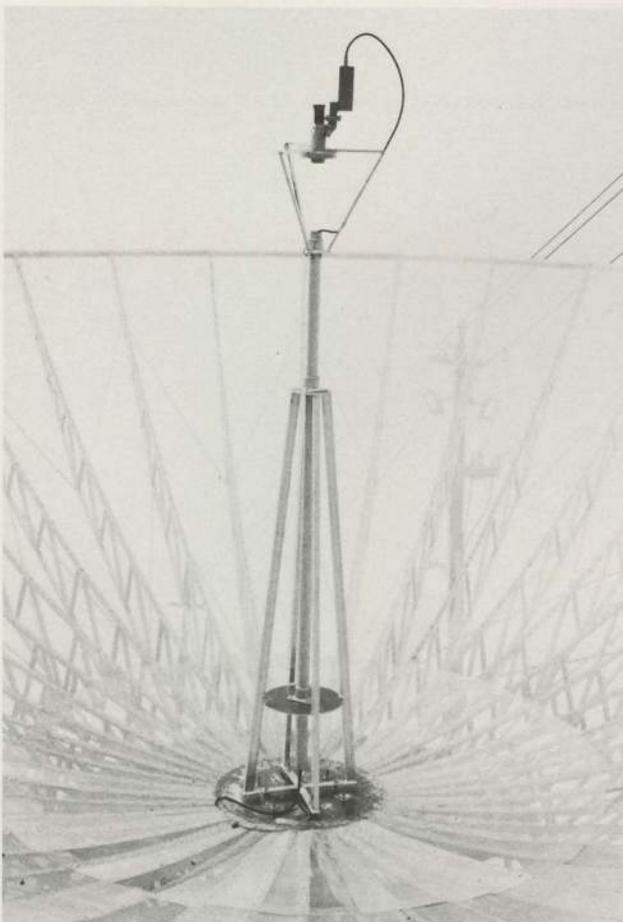
DOUBLE chain drive adds extra measure of security plus reduces load on drive mechanism.

at 53 west," Bob suggested. The dish was already moving. That surprised me since we were perhaps 30 feet away and I didn't hear the chains driving. **My** six meter chain drive makes sufficient noise that you can hear it a hundred feet away. "I think we have finally fine tuned the chain drive system," Bob allowed. I agreed and with the dish moving I went to the door to watch it closely. Hydromatic smooth; a definite improvement.

"**Here it is,**" Bob called as 53 west popped up. I walked back to the receiver to see what we had. Bob was playing with the half transponder peaking controls on the AVCOM receiver. The picture was noise free but the video quality stunk. "**Can you believe** they re-transmit video **that looks that bad,** on their terrestrial network"? I remarked. Bob just smiled; always the CBS video engineer.

Judging the gain of an antenna based upon the quality of reception from a poorly operated Intelsat bird, leased to Mexico, is for amateurs. I passed. The pictures were good, very good. If you overlooked the fact that on this particular Sunday the guy running the Mexican uplink hadn't bothered to turn on his video waveform monitor. But in all honesty, the reception was not 'that' good. Frankly I was disappointed, and Bob could sense it. We both knew that levels into Miami vary by as much as 3 to 4 dB on this particular bird, day to day. On some days you could get pictures almost that good on a 6 meter.

"**Take it to D3,**" I suggested. I have a particular affection for the D3 network fed channels and I can pick out flaws in a system on D3 faster than most people can on F3R. The dish moved. I'll say this about a ten meter dish; the beamwidth is so tight that you **must** use an accurate signal level meter to peak the dish. Just a nudge of the dish drive and the picture snaps in, and out; quickly. D3 came up that way and we went through it almost before we realized it. The meter was pinned on the AVCOM so we reached to the rear to turn down the



FEED system can be fully adjusted from surface of dish; an important consideration when the focal point is nearly ten feet above the center of the dish!

meter sensitivity. The meter was still pinned. **That** told me something; I couldn't even come close to that scenario with my six meter.

Reaching inside, Bob reduced the IF gain level and finally the meter fell off of the far right hand side 'pin.' Now we could peak the dish. The picture was already perfect. But we picked up another couple of dB by watching the meter. Now **that** was a fat signal! And I was suitably impressed.

On the way back to Bob's house and my car, Bob asked me what I thought about the dish. "You need one of those on Provo," he suggested. Always the salesman. I avoided answering the second suggested-question.

"**I am impressed,**" I noted. "Not just with the way it apparently works, but with the energy you have put into the project. As always, you never give up until you have mastered something." I then wondered if he was going to stop at ten meters, or push to 11 and beyond. There HAD to be some limit to open mesh dishes. Maybe it was ten meters. Maybe it was nine, or eight. Only time would tell. I did know that I didn't want a ten meter monster on Provo **until** HERO had a few out there in the world. Let some King in the Middle East try them out first!

"**Ten meters is it.** I would have stopped at 7.5 but we had a customer in Ecuador who has been trying to get the last of the sparklies out of the transponders he sees on F3, F4 and ANIK D. So we entered into the project as a 'test' to help him out. Then when the middle eastern job came up, and the King **insisted** on ten meters, I decided we would go ahead to ten as a product. **I have found that you don't stand in the bedroom of a King and try to explain why there**

COOP/ continues page 96

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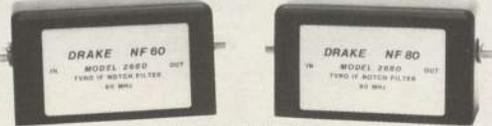
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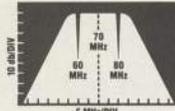
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SPECIFICATIONS		
Model Number	Model	Description
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2680	NF80	80 MHz notch filter/70 MHz IF
Notch depth:	45 db MIN	
3 db bandwidth:	± 1.5 MHz of center frequency.	
Impedance:	75 ohms IN/OUT	
Size	4.2" x 2.25" x 2.4"	
Weight:	12 ounces	



For further information,
write or call:
1-513-866-2421

R. L. DRAKE COMPANY

540 Richard Street, Miamisburg, Ohio 45342

COOP/ continued from page 93

are sparklies, ANY sparklies, on the screen on ANY channel. He simply will not accept imperfection in anything. He is so wealthy and so powerful that he has to but snap his fingers and whole cities move. You don't try to tell a man like that 'this is the best we can do.' He immediately asks why, and if you say 'it will take a bigger antenna to clean that up' he immediately tells you 'get a bigger antenna.' It would be an affront to suggest that the 'price' might be out of line. So you simply do it. It is just that simple."

'Just that simple' to Bob Behar; he's been there. But to others, who have yet to approach their first 'royalty' with a TVRO system, or who have yet to find themselves in the private bedroom of a world known figure, it is still just a dream. An illusion. This can't happen, not to you. Right?

HERO Communications has found its own 'niche.' And the same drive that has gotten HERO into that posture has also driven SPACE from the seat he occupies as President, for the past year. Bob's approach to our business, and life, differs from many of us; and our industry is stronger because he and dozens in similar positions continue to bring fresh, new ideas and concepts into the marketplace daily.

POLICING Action

For the first time in more than a year, our September issue of CSD did not contain a full page advertisement for JV (Electronics) Satellites. Those who read the 'correspondence' section last month will recall that a W.T. Todd of Wichita Falls, Texas wrote to report he had ordered approximately \$900 in over-the-phone hardware from JV, and charged it to his VISA card. Todd then found, when his VISA card statement came in, that he had been charged not \$900 but \$1300. To add insult to injury, he had not received the equipment.

When we returned the JV Satellite ad to JV in mid August, we wrote a letter to the firm explaining why they were not going to appear in CSD again. Not until they took remedial action to straighten out not only the Todd-Affair, but nearly a dozen others that stretched back more than a year. There is, for example, a complaint from a CSD reader in New Guinea. He had wired international funds to JV way back in April or so; no equipment, no refund, no response to subsequent messages. Then there was the reader in San Diego who pestered JV until he was promised a refund. When he opened the envelope that allegedly contained the refund, he found a blank piece of white paper inside. A cruel hoax at best.

Well, for W.T. Todd there is some justice. We notified JV of our reason for not accepting their advertisement on August 15th. After receiving that notice, JV processed a refund for \$1300 to Todd; on August 19th according to paperwork provided to us by JV. In the meantime, we are pleased to report that Todd did locate another supplier who could (and did) sell him (and ship to him) a 9 foot Paraclype antenna as he originally ordered from JV. Now, when JV squares away all of the other remaining complaints we have on file here, including the poor chap in New Guinea who stands to lose his job over the way he handled his agency's order with JV back this spring, we'll reconsider allowing them back into the pages of CSD. Being a policeman to an industry gives us no particular satisfaction and we will be pleased when we can report to you that an entire month has gone by and nobody has written to complain about being mistreated by anyone else. We suspect we will also report to you that Provo had six inches of snow that same month.

ARE YOU A TVRO DEALER/MANUFACTURER?

Then CJR, our mid-month TVRO newsletter, is for you. CJR concentrates on statistics, dealer news releasing to new products and advance warnings on equipment flow with insider reports on marketing trends, hardware features and exposé articles.

CJR turns around from final copy to the U.S. Postal System in just 3 days time, that's fast!

For more information on subscribing please turn to page 43.

VHF · UHF

Tunable **SATELLITE** New Improved

VIDEO-AUDIO MODULATORS
Micro-Verter II series

EXCELLENT NATIONWIDE DEALER PROGRAM!

- AVAILABLE CH. 2-13 plus LOW UHF.
(Each unit tunable over 2-4 channels.)
- CRISP, HIGH FIDELITY COLOR
- NEW TEMPERATURE STABILIZED AUDIO SUBCARRIER CIRCUITRY.
- DUAL REGULATED POWER SUPPLY.
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13C - Broadway DAKOTA CITY, NE 68731

**You could spend more
but you won't see a
better picture . . .**



KLM's Sky Eye IV Satellite TV Receiver

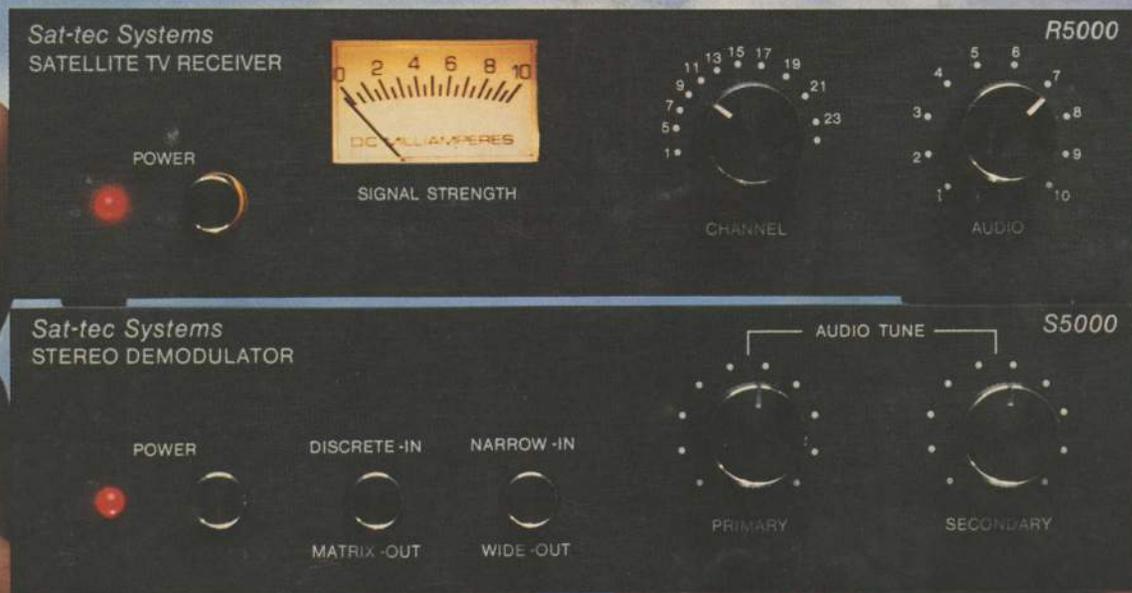
Superior design and engineering mean unsurpassed performance at a very reasonable price. Picture quality, electronics, ease of operation and installation compare with units costing much more. The **KLM Sky Eye IV** features slide-rule tuning, signal strength LED bar, "Center Tune" LED, AFC and video polarity control, fully tuneable audio (5.5-7.5 MHz), and remote downconverter. State-of-the-art single conversion/image reject circuitry, with SAW filter, produces sharp, clean, bright video that makes even big screen and projection TV look better than you've ever seen it before.

Complete UPS SHIPPABLE systems, too

KLM's new high performance **X-11** antenna features slide-in screen panels and double-reinforced aluminum support ribs for high strength, low weight and windload. The matching **Polar-trak** mount delivers all the satellites, horizon to horizon. Motorized model with KLM's exclusive Tangential-Drive makes jackscrew designs obsolete. Switch satellites from inside the home with KLM's **Polar-trak** or **Memory-trak** remote consoles. X-11 antenna and Polar-trak mount can be assembled by two people in 2½ hours. Both are **shipped UPS!**

MADE IN U.S.A./ONE YEAR WARRANTY. KLM's receivers, antennas, and systems are built at its own manufacturing complex in Morgan Hill, California. KLM stands behind all its satellite TV components with a full 1 year warranty.

KLM electronics, Inc.
P.O. Box 816,
Morgan Hill, CA 95037
(408) 779-7363



SAT-TEC TVRO SYSTEMS

**dollar for dollar, performance for performance,
you couldn't offer your customers a better system**

Performance is built into the chassis of SAT-TEC components, not the panel. We could modify the panel to look more impressive. But that's not the way to get the results your customers want. So we put the quality they demand on the *inside*.

And SAT-TEC components *get results*. The R-5000 receiver delivers unexcelled picture quality. The S-5000 stereo demodulator provides dynamic stereo reception.

SAT-TEC performance is backed up by reliability ensured in extensive quality control that includes unique triple level board tests; receiver burn-in; and final, on-the-air checks.

At SAT-TEC, we've pioneered improvements in satellite technology to develop advanced systems incorporating tomorrow's features for today's market. Because videophiles are far and few, we've targeted our TVRO systems to satisfy the broader spectrum of the market—the group that wants

maximum performance at reasonable prices.

What's more, versatile SAT-TEC components are compatible with other related equipment, so you can put together economical TVRO packages that don't stint on performance. Your "do-it-yourself" customers will welcome our current limited fool-proof hook-up, too.

Dealers who know us have used our products more than any other in making up TVRO packages. You just couldn't sell a better TVRO system. So when you're looking for satellite TV systems, choose SAT-TEC. SAT-TEC quality can be seen.

For more information, contact your nearest SAT-TEC distributor.



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TELEPHONE 716-586-3950
TELEX 466735 RAMSEY CI

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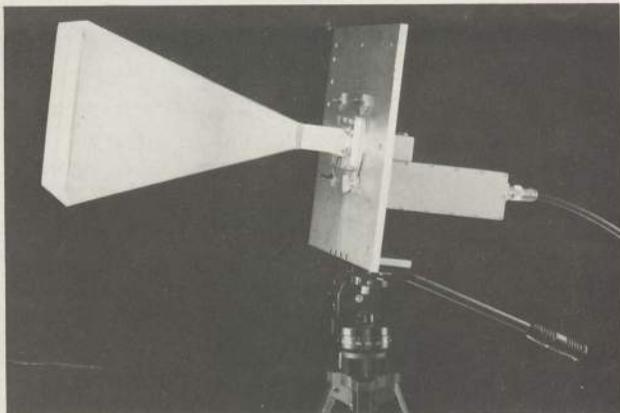
NEW PRODUCTS/ SERVICES APPOINTMENTS

ANTENNAS/ACCESSORIES

BOMAN INDUSTRIES (Satellite Products Division, 9300 Hall Rd., Downey, Ca. 90241; 800/421-2533 outside of Ca., 800/352-2553 within Ca.) announces an 'instant interface' polarization changing system for dealers selling Drake, Automation Techniques, Wilson products. Model PC-75 requires no internal set wiring changes, connects directly to terminals provided on TVRO receivers.

BOMAN also announces model EFH-90 Polarizer using magnetic field system pioneered by Robert Luly (no moving parts) and a model EFH-90-HG for .3 f/D 'deep dish' antennas.

MICROWAVE FILTER COMPANY (6743 Kinne St., E. Syracuse, NY 13057; 800/448-1666) announces antenna model 4377, a pyramidal horn calibrated (18 dBi) for the 3.7/4.2 GHz band to be used as a



MICROWAVE FILTER terrestrial interference finding horn.

terrestrial interference survey tool. Optional extra accessory is a mounting tripod. The horn attaches to a standard LNA and allows the user to pinpoint terrestrial interference sources accurately and quickly. Price is \$350 for horn, \$275 for mount.

PARADIGM MANUFACTURING, INC. (6911 Eastside Rd., Redding, Ca. 96001; 916/244-9300) announces results of wind and water loading tests conducted under professional test conditions. Nine and 12 foot antennas were tested at elevation angles from 0 to 90 degrees and from azimuth angles of 0 to 315 degrees. Wind speeds to 95 mph were created with water added at the rate of 337 gallons per minute; simulating hurricane conditions. The net effects of the wind and water (equivalent to wind loading of the antennas at 140 mph) revealed no loss of antenna performance, no warping of parabolic welded trusses, no loss of mesh surfaces or tie-down clips. Winds measured through the dish with 78.5 mph winds on the front surface were 64 mph, indicating considerable wind-porosity for the structures.



WIND/WATER 'hurricane test' for Paracclipse antennas.

SRS/SATELLITE RECEPTION SYSTEMS (145 N. Columbus Rd., Athens, Oh. 45701; 800/592-1956) has introduced a new light weight (875 pound) trailer for hauling dish antennas to sites. Equipped with a polar mount, dish raising and lowering hand cranking action, stabilizer bar support and a turnbuckle for fine latitude adjustments. Leveling jacks are included.

SRS also announces it is now selling the **Commander 8'** dish from Canada. The Commander antenna is spun aluminum pressed on a steel-tooled mold; no ripples. A heavy steel back plate strengthens the dish. Finish is anodized gold. Extender panels to increase the dish size will be available.

SUPERWINCH (Winch Drive, Putnam, Ct. 16260; 203/928-7787)

PRODUCT NEWS/ continues page 14

LATE NEWS

100 degree LNAs very tight in supply and prices up. Large surplus 120 units. Selected TVRO receivers in tight supply as industry experiences best fall season ever. Ahead; expect antenna prices to jump sharply after across board raw aluminum price increases of up to 35%.

ENGLAND's Steve Birkill will appear in **Orlando** in down-converter forum. Special sessions Thursday Nov. 3rd include antenna and feed measurements, novel 24 channel (S)MATV system design, SFPC presentation on \$750,000,000 TVRO 'loan fund.' SPACE board will meet Nov. 2 with candidate for new trade association manager job.

NOTICE TO READERS

CJR is provided **without charge** to Dealer Members of SPACE, the national trade association for the home TVRO industry in the United States. **This contribution** is made by **CJR Limited** in recognition that a strong national dealer base is essential to the continued maturity of the TVRO industry. **CJR** is published as the mid-month companion to **CSD** (Coop's Satellite Digest) and is available to non-members of SPACE for a nominal subscription fee; see fine print on page one, here.

Original Equipment Manufacturers (**OEMs**) are encouraged to submit new product releases as well as news of personnel appointments and changes to **CJR's** Assistant Editor **Carol Graba** (CJR, P.O. Box 100858, Ft. Lauderdale, Fl. 33310) for consideration for publication here. **OEMs**, distributors, others who wish to reach the mid-month TVRO dealer marketplace are encouraged to talk with **CJR's** Ms. Graba concerning advertising programs available in **CJR** (telephone 305/771-0505 weekdays between 9AM and 4PM eastern time).

DOUBLING MARK-UP ON TVRO RECEIVERS

\$400 = \$999

How do you take a TVRO receiver that leaves the OEM for \$400 and turn it into a \$999 retail product? And, have people waiting in line to buy them from you?

TX Engineering, Inc. (P.O. Box 7007, Renton, Wa. 98057; 206/228-5216) has it just about figured out and a track record behind them to prove that it works. TX Engineering is a small TVRO OEM in the Pacific Northwest. You probably have not heard of them. They have made few 'waves' to date in the national TVRO marketplace. But in the northwest, they are producing some of the most profitable TVRO sales in the industry and proving that if you approach the marketplace from a different perspective, it can pay off in big profits and very satisfied customers.

TX Engineering is the brainchild of a pair of men; **Roger Linde** who makes the business operate day to day and **David Lantz** who designs and oversees the installation of the unique TVRO hardware which the firm produces.

Linde explains.

"We started like almost everyone else in the field; intensely interested in the challenge of the field, but not certain how we could create our own niche in the marketplace." That's when he got his head together with David Lantz; the engineer. Lantz had spent some time working with **Keith Anderson of Anderson Scientific** in South Dakota. While working with Keith, Lantz developed some strong convictions about how a piece of equipment should function in the home viewing location.

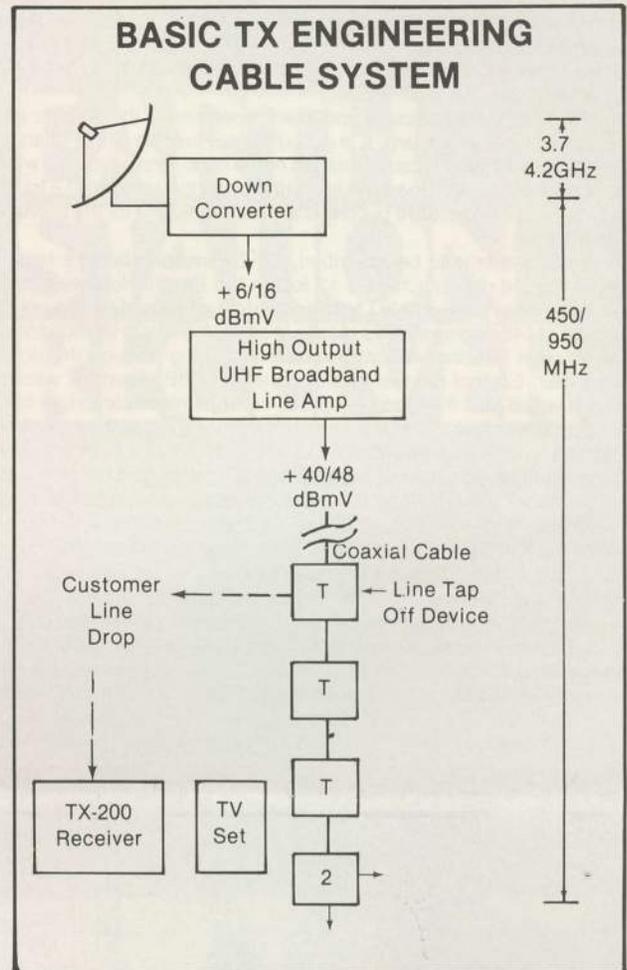
"I felt that Anderson was onto something quite substantial with their block down conversion package. They took the 3.7-4.2 GHz band and converted it to a frequency range of approximately 400 to 900 MHz. Then they ran a piece of cable (RG-59 or RG-6) into the home where the individual home viewer would tune his indoor receiver to a specific TVRO channel in the 400-900 MHz band. Since the system was using a frequency spread roughly equal to the UHF TV band (470-890 MHz), you could amplify the output of the down converter and split it just like you do standard VHF-only cable television systems. That told me that you could connect two or two dozen or two thousand separate indoor receivers to the same antenna, and each home would have independent access to say all 12 channels on a satellite's single polarization."

But Lantz saw some problems with the Anderson receiver in this mode of operation.

"Every receiver in the system shared the same down converter. Electrically, this should not present a problem provided the down converter is stable, sensitive, and capable of reliable operation. I felt, however, that the Anderson down converter could be improved upon."

Pioneer Anderson had been telling people that it was possible to get **more than 12 channels** through such a 'cabled TVRO system.' He had demonstrated, as early as the spring of 1981, 24 channels out of a single antenna. He did this by parking the LNA and feed at a 45 degree angle, sort of 'half way' in between the vertical and the horizontal transponders on say F3R.

Lantz again.



"This worked, after a fashion. But the tuning was very critical and the Anderson receiver really did not have a selective enough IF to allow you to cleanly tune in the succession of transponders from 1 to 24. It was more of a novelty than a commercial product."

"I owe Keith Anderson a great deal for the schooling he put me through. I was sold on the concept and I wanted to do it on my own. I didn't want to copy what Keith was doing, both because Keith had worked it out on his own and he deserved a fair chance to make it sell without someone copying him, and, because I had some pride in doing it my own way anyhow."

What has evolved is a unique package of equipment created by Lantz and designed to suit the marketing philosophy created by Roger Linde. We'll touch briefly on the different engineering approach taken by Lantz, and then concentrate on the marketing approach developed by Linde. The **December** issue of **CSD** will cover the engineering in considerable detail, for those who want to know why and how it differs from other block down conversion approaches now in the marketplace.

IMPROVED Technology

David Lantz starts off his system with a high quality, relatively state-of-the-art down converter that from outward appearances looks like many others on the market today. A more or less square box, a type N fitting for the input signal from the TVRO antenna/LNA, and an F fitting at the output to send the output signal in the **450-900 MHz region** on through some RG-59 or RG-6 cable to one or more waiting receivers.

In his TX-200 receiver, he has taken a cost effective but high quality approach to handling **24** separate channels, **all at once** without polarization switching. Because he found other tuneable receivers

trying to make pictures from a 400-900 MHz region IF somewhat 'broad' in tuning, Lantz decided to use a SAW filter device to create highly selective tuning. The filter is 21.5 MHz wide and as the user tunes the channel selector knob across the spectrum, he is moving a 21.5 MHz wide 'window' around.

"Normal tuned circuits and filters, operating in the 70 MHz (IF) region, are not very sharp. It is difficult to get precise single-channel reception without very careful tuning of the knob, and when you want to send 24 channels down the line rather than the standard 12 found on a single polarization, it becomes almost impossible for the average user to tune."

In the systems to be described, TX Engineering takes a larger-than-required dish (such as a 13 foot in the Pacific Northwest) and carefully adjusts the single LNA and feed for a half and half situation; parked at "45 degrees." This results in signal from both the horizontal polarization and the vertical polarization getting through the down converter. Each of the two sets of signals is 3 dB 'down,' or weaker than it would be if the feed/LNA probe was optimized (adjusted) for a single polarization. That's the reason for the bigger-than-required dish; if you lose 3 dB because of adjusting the feed for both polarizations together, you make it back up again by enlarging the dish 3 dB larger than is required for noise free pictures on a single polarization.

Others have tried this. None have apparently tried to do this on a large scale, using a receiver which was designed from the ground up for just this application. Lantz elaborates.

"The standard transponder is 36 MHz wide. But we have found that you can reduce the bandwidth of the receiver to recover only a portion of that bandwidth, and not sacrifice the essential picture elements. When you adjust your LNA probe/feed for 45 degrees, you are now sending signals that are 20 MHz apart (vertical, horizontal, vertic-



TX's Roger Linde (left) and David Lantz. Linde holds TX-200 receiver, Lantz holds antenna for unique application of system to be detailed in CSD for December.



al, etc.) through the system. That's twice as many signals as you have with a single polarization and they are now half as far apart signal to signal. The 21.5 MHz SAW filter IF separates the half-width signals just fine for the average viewer."

Lantz has also designed a special detector circuit for the system to help compensate for the less-than-full-width signal information present. And whereas many of the narrow IF receivers have some difficulty retaining the audio quality, Lantz has created a custom designed audio detector circuit to keep the audio crisp and clean. It all works very well.

TX's Linde.

"We knew as the package came together that our marketing emphasis was going to be different than anyone else's. I always felt we were creating a brand new market, one not addressed by the existing equipment suppliers. I don't look upon Anderson, or Janeil or others in the marketplace as being in our marketplace. I honestly don't think anyone else has focused on the market we are addressing yet."

The TX market is variously described as 'private cable,' 'custom cable' or even 'SMATV' although Linde adds, "I do not like the SMATV label at all; it suggests that the systems themselves are being operated for profit, which is not our approach at all."

Not for profit? Surely there has to be profit in there someplace! Linde.

"Our best approach, after trying several, works in this manner. We approach the owner of a condominium complex, say the condo owner's association; or, a trailer park. We are very selective with our trailer parks, concentrating on those where the occupants are permanent residents. There are many in the Northwest, primarily retirement villages. If we go into a trailer park and see the wheels still on the trailers, we turn around and leave immediately. We want to see double wide trailers up on blocks or concrete foundations, trees and plants growing thickly, and other signs that the people are there to stay.

"We work out an agreement; we will put in a single satellite antenna and install a cable distribution system for the park or condo complex. We do all of this on our own money, as a speculative venture. Of course someplace in here we have conducted a door to door marketing survey to determine the interest level of the residents in having a '24 channel satellite service.' The antenna is parked on F3R.

"When the system is complete, we are then ready to begin marketing. Most of the parks or condos will have an existing VHF type MATV system operational. And most of these systems will be poorly maintained if maintained at all. As a sign of goodwill, we offer at our own expense to completely update the existing VHF system. That may involve new off-air antennas, some new amplifiers, single channel strip amps, even replacing sections of cable. We do this because it gives us an entry into each trailer or condo unit. We always make the VHF systems work better than we found them, and since we like to 'check' the quality of the reception in each unit after upgrading the VHF system, that puts us inside the resident's living room talking

\$400 = \$999/ continues page 6

EARTH STATION RECEIVER



ESR224 RECEIVER

FULL PERFORMANCE SATELLITE TV RECEPTION

- All 24 Satellite Channels • Attractive Styling
- Detent Channel Tuning • Normal/Inverted Video Switching
- Variable Audio Tuning for All Subcarriers
- Channel "Scan" Function • FCC Approved Modulator Available
- Polarotor™ Interface Standard • Optional RT224 Remote Control Available
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PIONEER MEMBER OF
SPACE

with them on a friendly basis. That's when we explain our program to them."

And the program?

"We offer to sell them a receiver; a satellite receiver. We explain that with the satellite receiver they will add 24 new channels of TV to their TV set. We have literature that explains what these 24 channels amount to, what programming is involved. We further explain that each owner of a receiver is also a part owner of the master system; a true viewing cooperative. Since we are doing this at a time when we have the 450-950 MHz system already installed and operational, the scenario gets something like this."

"If you are interested, I can install one of our receivers here in your living room right now for a one week trial.' Almost everyone says yes and we simply bring in a receiver, make the necessary connections to the cable system already coming into the home, and show them how to operate the receiver. One week later we come back and ask them if they wish to keep the satellite service. A very high percentage says 'yes'."

TX Engineering tries to make it as easy as possible on the buyer. "We have worked out a financing plan, using a regional finance company. The receivers are sold for \$999 each. The only additional charge may amount to \$50 or \$75 for the drop into the house if we have an unusually long drop situation requiring some additional UHF band amplification. There is a high consumer awareness, at least in the Pacific Northwest, that if you have cable service available, you pay around \$35 a month for the 'basic service' plus perhaps two or three premium services. So we have worked out our financing arrangements so that they may buy the installation for cash (\$999 plus a drop charge if required), or, they can pay approximately \$33 a month for 42 months. The difference in the two is the financing charge."

So one of the keys to the success of the business is to show the people what they will have, in their homes, by simply giving them a 'trial period.' Another key to the program is to emphasize that they actually own the system, each viewer has a pro-rated ownership right to the full system. Yet another important ingredient is to keep the charges in line with 'cable TV' since people already have a 'fair-price-picture' for cable in their minds.

Size. How many outlets does it take to make this project worthwhile?

Linde. "Our systems to date have been as small as 98 outlets total or as many as 250. There is a lower limit to this shared concept since everyone who becomes a part owner of the system is carrying a portion of the cost of the satellite antenna/LNA portion of the package, plus the cost of the distribution cable plant. I have a rule of thumb that tells me that if 30% of the potential outlets become a part of the system, we are in the black. But no two are exactly alike since it may take two miles of cable plant to reach 30 in one instance and only a half mile of cable plant to reach 30 in another instance. The headend, consisting of the dish and the LNA and the first high powered line amplifier, is usually a small part of the total distribution package. The plant itself, consisting of the cable, the line amplifiers, the signal splitters, the power supplies, and the tap off devices adds up far faster. You can be profitable with 30 homes out of 100 potential, but the real money comes when you get beyond that 30% rule of thumb."

TX separates their selling function from the design, engineering and installation phase. They use sales people who have been trained to make the individual receiver installations, and the sales people work on a commission basis.

Linde. "Our salesmen can make really good money, but not before we reach that 30% plateau. We have to cover the cost of the system itself first and everyone knows that. When you reach the plateau, then everyone involved really gets turned on because there are some substantial dollars there for a few weeks work."

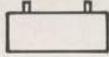
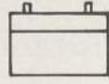
TX has found that there are several dangers in their approach. Lantz first.

"This is NOT a business for people who have no background in cable distribution systems. Cable television is a well documented technology. But cable distribution plants function at much lower frequencies; typically 50 to perhaps 440 MHz. Where cable stops, at the high end 440 MHz, is where we begin. There are very few engineers around who have ever designed and installed high quality 450-950

MHz distribution systems. It is an entirely new ballgame; everything from the fittings to the component parts MUST be swept by sweep gear before installation. You can 'lose' a channel or block of channels faster than you can crimp on an 'F' fitting simply because the way you have grown accustomed to 'getting by' at lower frequencies will not hold up in this UHF portion of the spectrum."

TX has found that their greatest success with 'franchising out' their package and equipment has come from firms who have a solid history in cable TV distribution systems. One firm, in Oregon, came directly from cable contract work into the TX system. They have made it work because they had the experience and test equipment to insure that the systems are installed properly. Linde again.

"This is not a system which is forgiving; if it is done properly, it works beautifully. But you are dealing with several new commodities here; FM transmission in a new spectrum are the two most important new commodities. A reasonably high quality spectrum analyzer (such as a Texscan VSM-2) is a must. You can't use a field strength meter to

ITEM	DESCRIPTION	COST	PRO-RATED PER HOME/50 HOMES	SALES COMMISSION	PROFIT/INSTALLER
	DISH, LNA, DOWN CONVERTER	\$2000	\$40	—00—	—00—
	HEAD END HIGH OUTPUT AMPLIFIER	\$ 400	\$ 8	—00—	—00—
	CABLE PLANT	\$4000	\$80	—00—	—00—
	LINE AMPS. SPLITTERS	\$2000	\$40	—00—	—00—
					
	INDIVIDUAL HOME RECEIVERS (50 x \$400)	\$20,000	\$ 400	\$90	\$509
TOTAL PLANT COST 50 SUBSCRIBER HOMES			\$658 PER HOME		\$341 PER HOME

PRO-FORMA PROFITABILITY FOR SYSTEM PASSING 100 POTENTIAL SUBSCRIBERS WITH 50% PENETRATION

check levels and system 'flatness' in this application."

TX insists that those firms who would become part of this program commit to both the test equipment and the staffing required to make it work. A new 'master distributor' must purchase his own test equipment, hire or allow TX to train a chief engineer, and then send their personnel to TX for a week or more of on-the-job training. There are no exceptions.

"We could ship twice or three times as many of our TX-200 receivers every week if we played the 'pipeline fill up' game played by others. That would produce a great quarter, or maybe two quarters in a row. Then we'd spend the next two quarters of the year on the telephone trying to sort out problems created by people who simply did not understand the technical parameters of the system."

The Legalities

One of the primary reasons that Linde does not like the 'SMATV' label for his systems is that he considers his firm to be professional in every area. He feels that SMATV is often a thin disguise for pirating of

satellite signals. But, do TX system viewers pay for their use of HBO et al?

"No, they do not," he responds.

Is that not just as illegal as a motel that installs its own dish and pipes the services around to rooms; without contracting for the services?

"**Nobody has been able to show me where it is illegal.** Remember, **each viewer owns** his own receiver and a portion of the system itself. He is no different than the individual home TVRO viewer who, to date, has not been challenged by the courts. TX earns money for the equipment involved, because we manufacture it and sell it. But we collect no money for the viewing and we have no gain for our work after the customer buys the equipment from us. Our system differs from an individual home system only because all of the viewers are sharing a single antenna and set of amplifiers. We don't demodulate and process the signals; the headend is simply a broad banded amplifier. We don't control the signals, nor do we in any way change the contents of what comes off the satellite. We are doing with satellite signals what the early cable TV pioneers did with off-air VHF signals; amplifying them and sending them down the line. **But there is one significant difference;** the cable pioneers owned all of their plants and we don't."

TX is not about to bait the 'cable boys' nonetheless. It is not looking for a 'test case' to prove its thesis. Linde.

"**We try to be price competitive and service competitive with cable.** But we never take our system into an area where cable is now or is likely to be available, soon. There are thousands of pockets of people all over the USA; pockets created by clustered rural housing, condo developments alongside a lake or river, trailer parks, and what have you. These people-pockets are as often as not miles and miles from the nearest cable lines. They are not big enough to qualify as stand alone cable system opportunities if you have to spend the kind of money it takes to individually process each signal that you would deliver to the residences. I can see where we will be very busy for ten years or more just servicing those pockets of people where cable is not and never will be. They don't like being second-class TV citizens and we offer them an opportunity to do something about their second-class status."

Why It Is Cost Effective

SMATV or MATV systems function by individually processing each of the channels of service to be carried on the small cable plants. If the signals are local VHF or UHF channels, each channel requires a signal processing amplifier. If the signals are satellite delivered, you have individual satellite receivers and individual modulators for each channel. Add this to the dish and LNA(s) and other hardware, and you have as much as 75% of the cost of the system tied up in the 'headend.'

The TX approach shifts that burden; leaving only the dish and an LNA and a UHF line amplifier at the 'headend.' The balance of the system cost shifts to the individual homes where the service will be enjoyed; in the form of the cost to the user of the individual satellite receivers.

TX versus The Others

At the present time there are at least three other similar product lines in the marketplace. As noted, the concept for cabled distribution of satellite TV signals probably originated with Keith Anderson of Anderson Scientific. Add to that a recent market entry from Janeil and a slightly older market entry from LOCOM. The latter is a licensee of Anderson.

Lantz on 'the competition.'

"**We don't feel they are in the same marketplace;** we send people to one or more of them on a regular basis when the system is too small to warrant our higher priced equipment. I feel their approach is fine for perhaps a half dozen outlets or so, provided they limit themselves to a single polarization (12 channels): One of the keys to our success has been our full line of equipment for the service."

Those who began playing around with cable distribution of the 450-950 MHz range signals promptly discovered that in addition to new 'engineering requirements,' there was an almost total lack of adequate support equipment in the field.

There is an almost 3 dB cable 'tilt' between 450 and 950 MHz. That means that if you start out with exactly **equal** signal levels at 450 and 950 MHz (the low and high end of the band; transponders 1 and 24 respectively), at the down converter, by the time you go through 100 feet of cable, the high end signals will be approximately 3 dB weaker (half as strong) as the low end signals. This is not a situation which you can allow to continue or before you get to the customer's service drop, you will have lost all of the higher channels in the noise. TX did what others to date have not done; it designed a line of amplifiers covering the 450-950 MHz region, with 'tilt' built-in. That gives the system designer the ability to space his amplifiers so that both the low and high end signals end up at the customer's satellite receiver, through the signal drop, at the same approximate levels.

"You cannot simply produce a down converter and a receiver and survive in this field," notes Lantz. "You have to address every portion of the system, specify by exact part number those parts that you know from test will work in this application and then stick to those parts when you put in a system."

Cable, fittings, line splitters . . . every part that is between the master antenna and the home receiver unit must be 'quantified' for performance. Lantz. "We have boxes and boxes of line taps, splitters and what have you which the manufacturer **told us** were good to 950 MHz or more. They didn't make it in our testing program and we don't want to get someone out there in the field installing a system and then finding out after the fact that he has used a series of splitters which don't work above say 800 MHz."

TX-200 SYSTEM SHORT-FORM FACTS

Mfg: TX Engineering, Inc., P.O. Box 7007, Renton, Wa. 98057 (206/228-0980).

Products: TX-200 (home) receiver, DC-20 down converter, TX LA 25 U/V line amplifier, TX PS 24 Power Supply/Mixer, PD 430 U/V Power Divider, and, GE 420 Graphic Equalizer.

Application: 'Custom Television Network' (CTN) cable distribution satellite fed plants allowing individual homes to make individual program choices from any of 24 separate transponders from F3R (typical application).

Sales Technique: Groups own their own receivers and 'headend' and 'distribution plant,' sharing between all users everything but the individually owned receivers proper.

Contact: Roger Linde, David Lantz.

Part of the problem is that until now the only real 'market' for distribution equipment above the cable spectrum cut-off near 440 MHz has been the occasional UHF TV band distribution system. Most of these go into motels and there has never been that much of a market for this equipment. Plus, most of this equipment is rated to perhaps 825 or 850 MHz; shy by 100 MHz or so from the magic upper limit of the required 950 MHz.

Lantz. "You cannot simply 'ignore' this problem; it causes you to roll off or lose those higher channels and obviously that is not a satisfactory way to handle your customers. We have tried to take a professional approach, dealing not only with the satellite part but every other part as well that might affect the ultimate picture the viewer sees on his television set."

This has required many sessions with passive equipment suppliers who sell to the distribution markets. And it is a classic chicken and egg confrontation. The passive people, who make taps and splitters and so on, are more than anxious to upgrade their equipment to 950 MHz, or even 1 GHz. But they want to be assured that there is a market, in volume, for their equipment when they make their engineering changes. TX and others in this field, meanwhile, are saying that until they have the bits and pieces that are good to 950 MHz, there cannot be a market in volume. Which comes first? The equipment, or the market???

Looking Ahead

Both Lantz and Linde feel that the marketplace they are working in is unique and different; that it is only 'slightly related' to what others are

doing in the (home) TVRO field at the present time. They hope the concept will catch on because if it does there will be a much better acceptance of the approach.

There is some surprise that firms who have a leg-up on distribution system technology, folks like Channel Master and Winegard for example, have not entered this market with their own receiving systems. Linde.

"Since those firms already have the engineering ability to handle the 450-950 MHz segments with a line of products designed to function here properly, and since they also have TVRO receiver manufacturing capabilities, we would not be surprised to see them combine those disciplines into packages similar to what we are offering."

Lantz is already hard at work combining the normal VHF distribution systems (50-220 MHz) with the satellite distribution systems (450-950 MHz). He feels that the future systems will make use of the entire spectrum, from 50 to at least 950 MHz, including normal off-air VHF service in the 50-220 MHz portion. And that portion between 220 and 450, now not assigned to any particular service?

"Well, **who says you have to limit your satellite service to say 24 channels** from a single satellite? There is sufficient room in the

'cable' for another 10 or 11 satellite delivered channels between 220 and 450. First you install a second dish, point it at another satellite that offers consecutive channels such as we find on F3R, and then you block down convert them to 220-450. And then you expand the tuning range of the in-home receiver so that the viewer has tuning in the wideband FM mode from 220 through 950. Now you have a 35 or so channel system . . ."

In Orlando

Dealers who will be traveling to Orlando and the November 3-5 SPACE gathering will have the opportunity on Thursday afternoon, November 3rd, to attend a two-hour training seminar session to be conducted by TX Engineering's Dave Lantz. The TX sessions will start off with the basics of installing a dish for high quality reception and continue on through the design and installation of a distribution system using the technology explained here. This will be a 'learning exercise,' not a sales and hype exercise and dealers should come prepared with notebooks and tape recorders to absorb as much as possible in the two hour period.

FINANCING CONSUMER TVRO PURCHASES

\$750,000,000 Available

As initially reported in the October issue of **CSD**, a group backed by a prominent bank holding company headquartered in Wilmington, Delaware has made a sizeable financial commitment to the home TVRO industry. **Satellite Financial Planning Corporation (SFPC)**, headed by insurance industry entrepreneur **Bill Young**, kicks off a nationwide (plus Canada) 'Consumer TVRO Financing Package' at the forthcoming SPACE show in Orlando, Florida; November 3-5. Here, basically, is how it will work and what it can do for you as a TVRO dealer.

SFPC has attempted to structure the financial program so that the dealer has as much consumer-flexibility as possible. The concept is to make it possible for a dealer to use the financing package so that sales lost because the consumer cannot come up with the total required installed-retail price will now be 'saved.' At the same time, the dealer will be able to use the financing package availability to 'sell up' the buyer to perhaps a more complex and higher ticket package than the buyer might be able to afford for a cash purchase.

The dealer joins no organization, pays no fees, signs no papers to be a part of the program. All the dealer needs is an understanding of how the program works, the proper 'application' paperwork, and the advance approval of SFPC to be a part of the program.

The business is headquartered in Baltimore, Maryland where a staff of more than a dozen financial processing people will be instantly available via an 800 number program. The business will be open for extended hours to accommodate the three major US time zones. The dealer kits will explain to the dealer the various loan application procedures, the type of data required from the loan applicant, and the several options available to the consumer for term financing. A 'school' will be conducted at the SPACE Orlando show to teach

interested dealers in the fine points of handling the program.

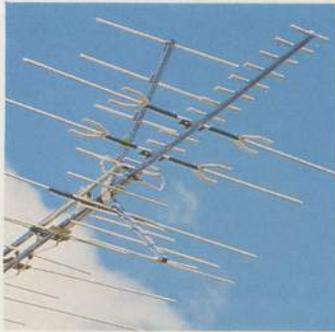
There are several 'plus factors' associated with the program. They include:

- 1) There is a total commitment by the bank consortium backing the financing program of \$750,000,000. That tells us that there are the dollars available to finance more than **20,000** brand new **\$2,000** price range TVRO terminals **per month** for more than a year. Behind that 'initial' fund is more money.
- 2) The consumer will not be paying an outlandish rate of interest. The interest will adjust on new loans monthly, based upon the then standing prime interest rate. It will be approximately 6 points (percent) over the so-called prime interest rate. That works out to a fraction of the interest many consumer finance firms presently charge or 75% of what a user of a VISA or other major credit card is charged. Nobody likes to pay interest, but in this case the 'rate of interest' should not be a stumbling block.
- 3) The consumer can purchase an installed TVRO terminal on a variety of terms; he can put some of his own money down as a down payment, and bring his monthly payments 'down.' Or, he can buy a terminal with **no money down** and finance the system for as long as 6 years. The dealer is equipped with a set of financing tables with which both he and the consumer will have an accurate idea of the monthly payments involved.
- 4) The procedures for getting a consumer approved for a loan will be similar to the following example:
 - A) The consumer selects the terminal he or she wishes and elects a payment schedule based upon down payment or no down payment, and the length of the payback schedule. The consumer signs an order form for the system, conditioned upon the dealer being able to secure financing for the terminal.
 - B) The dealer uses the SFPC 800 number line and telephones-in the customer's name, address and social security number. This information is immediately fed into the national credit checking computer system at SFPC.
 - C) In as little as three working hours, and in no case in more than a working day, the approval (or non-approval) information is back in the hands of the dealer. The dealer has a 'loan authorization number' which he places on the form already signed by the consumer.

Then the dealer goes ahead and advises the consumer that the loan application has been approved, and schedules the installation. **At the same time** that SFPC advises the TVRO dealer that the system loan has been approved, the dealer will hear a second 'number' on the telephone. Let's assume the initial system was scheduled out at \$2995 installed. When the SFPC office approves the loan, they will also tell the dealer a 'maximum loan number,' or amount, which the consumer qualifies for. Perhaps the credit check revealed that the consumer is 'credit-worthy' for a \$6,000 loan. The dealer already has a

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\$2995 sale posted with the consumer's signature. But now he knows that the consumer rates well with the credit people, and that he could sell up to \$6,000 in equipment and services to the consumer **with no additional approval required.** That allows the dealer to not only tell the consumer the \$2995 loan is approved, but to **also** tell the consumer that if he or she wishes, they could 'up-grade' their purchase to a \$3995 system, or add in a big screen television, or anything else the dealer sells, **up to \$6,000.** This, in effect, gives the dealer one additional opportunity to 'sell up' or expand the sale before the actual installation.

- 5) The system is installed and when it is completed, the customer signs-off on a form indicating that the system has been installed and made operable to their satisfaction. This form, less a copy that stays with the dealer, is then sent to SFPC. Those in a hurry can use overnight express mail or air priority envelopes.
- 6) Typically within three working days the funds for the system sale are processed and winging their way back to the dealer from SFPC.

SFPC will maintain both 800 credit approval lines and 800 'dealer assistance' lines. The concept is to provide daily, close liaison with those dealers who have sales underway so that the dealer is kept advised of the status of sales and payment processing every step of the way.

Now, what are the negatives with the program?

The first one that is apt to cause you some concern is that the loans will only be available to homeowners; sorry, no apartment dwellers or trailer home owners (*).

The second point that you may have some trouble understanding is that there is a mandatory insurance/warranty policy that goes with the sale. In other words, built into the cost of the financed package (i.e. monthly payments) is a warranty/guarantee program. This 'insures' that the system will function for at least three years, as intended. That's good for your customer since he is getting guaranteed performance for the first three years, and an option to renew his coverage after that point. That is also good for the people providing the loan money since they are now assured that the customer will not be protesting his or her monthly payments two or twelve or twenty months into the 'contract' because the system has stopped working. Yes, this brings up the per month price of the package. But in this case it makes good sense because it gets you, the installing dealer, off the hook for out-of-pocket repairs and warranty work after the sale.

Those appear, to **CJR**, to be the only formidable hurdles you will have to adapt to, as a seller of TVRO packages which are financed by SFPC. There are some fine print nice features worthy of note as well. For example:

- 1) Using something called 'Flex Payments,' there is no penalty of early payback of the loan. This gives the consumer the freedom to pay off the remaining balance on the system at any time without a 'prepayment penalty.'
- 2) **The loan is transferable.** If the consumer sells his home, he can also transfer the TVRO to the new homeowner provided the new owner is willing to take over the unpaid balance on the loan. The equity the homeowner has in the system (i.e. amount paid in to date) becomes an added equity in the 'home' as a result.

IN Orlando

The official 'roll out' of the national plan will be in Orlando, as noted, November 3rd. Dealers attending the Orlando show will have several opportunities to learn how they can adapt their own selling programs to the plan. Some of the OEMs have scheduled 'private SFPC seminars' at Orlando and they are inviting their dealers to attend the seminars where SFPC personnel will outline the program and answer

* — Trailer park buyers may not be totally 'off-limits.' At least one OEM who specializes in selling TVRO systems to trailer park owners maintains that occupants of 'retirement trailer parks' have a far higher 'stability factor' than the average American family. A special study at SFPC now underway will attempt to verify that claim and if it is found true, then certain types of trailer park installations may become possible with SFPC funding.

questions. Others have arranged for special videotaped presentations from SFPC and these OEMs will be holding mini-seminars all across the United States in the coming winter months to expose dealers to the huge line of consumer credit available.

Additionally, the SFPC booth in Orlando will be staffed with personnel to answer dealer questions and get dealers started. The first official day of business will be November 8th, the Tuesday following Orlando.

WHAT Could Happen

The logistics of handling \$750,000,000 in loans to ultimately a quarter million consumers or more spread coast to coast in all 48 of the continental states, plus Canada, has got to be mind boggling. SFPC's Bill Young points out that this program is a "**very positive indication that the (home) TVRO industry has finally reached a stage of maturity where the major financial community in the United States believes in the industry, what it sells, and what it has to offer to the American consumer.**" Young goes on to point out that given the amount of money initially pledged to the program, dealers and dealer groups will be in a position to create their own 'aggressive selling programs.'

Prior to Orlando and the roll out of the program, SFPC is putting the finishing touches on explaining the program at the OEM and major distributor level. It is important to realize that the funds **go directly from 'the bank' to the dealers;** that the program does **not involve** individual OEMs or distributors. However, many of the OEMs and distributors are quick to realize that if their dealers are aware of the program and know how to use the program to their advantage, that will mean more equipment being moved at both the OEM and distributor levels. One OEM told **CJR** "**I expect to double my volume in 1984 just on the strength of the SFPC program. I want ALL of my dealers to know all there is to know about the program, and to use the instant cash program as a positive selling tool. This is perhaps the most significant boost to the (home) TVRO industry since the industry started.**"

SFPC's Young pioneered the program by carefully analyzing the problems facing TVRO dealers. The program has taken nearly six months to put together and it represents thousands of man hours of investigation and exhaustive study by some of the best financial and warranty planners in the US. Getting backing for the program from a major US banking conglomerate was of course essential.

It is likely, now that the industry has a national financing program for (home) TVROs, that within six months there will be a number of 'me-too' programs springing up backed by other major banks. Banks are typically very conservative and fear being pioneers in a new financial area. However, history shows us that after one major bank has taken the first step, it is not very long before others will follow.

The strength of the program should become quickly evident; it is coming out just weeks ahead of the traditional 'slow down' that the industry always experiences as we enter the colder, winter months. How well the program is 'selling' through the dealers will be evident as early as January, and this places the OEMs in a difficult spot.

Last year gave us an exceptional winter period; major suppliers such as **KLM** and **RL Drake** experienced January/February sales up to 110% ahead of what they had projected. Traditionally, the OEMs anticipate a slow down in the winter months and cut back on their own planning and scheduling of raw parts for equipment. Drake, for example, had cut back on its scheduled raw parts delivery for last February and when the sales did not drop off as predicted, found themselves out of parts to build receivers. This caused some momentary bubbles in the equipment distribution patterns in the industry when several major suppliers were unable to keep up with the equipment demand. Promptly, dealers began ordering from back-up sources; OEMs they normally did not buy from, or only bought from 'lightly.' This started a 'ripple effect' in the entire industry that did not sort out until late in April.

After the sales-surge pattern of last January/February/March, the OEMs are more wary of the winter period. Add to that, now, the potential positive effects of the SFPC \$750,000,000 'loan fund,' and you have OEMs caught between past experience and 'best guesses' as to the number of units they should plan to build and sell through the



FIRST NATIONAL's President Joe Gammon (left) and SFPC's Bill Young. "The \$750,000,000 is 'seed money'."

traditional 'slow period.' In the best case, it suggests there **could be some real equipment shortages** in the first quarter of 1984, and dealers are advised to pay extra attention to the state of distributor and OEM inventories through that period.

AND There Is More

Finally, there is the 'floor plan' portion of the SFPC program; a situation where, under the right circumstances, a dealer can look to SFPC for some very substantial long term (48 month) financial backing to get his initial stocking inventory financed. The details of this part of the program will **not** be released until SFPC makes its presentation in Orlando. CJR has learned that as much as \$50,000 in 'floor planning' funds can be made available to qualified dealers, however.

Floor planning is a technique often used in other 'mature' retailing industries to cause the products being sold to move more quickly. It works in this way.

The dealer finds he could sell more equipment if he could 'deliver from stock.' The three days to two weeks that he may have to wait for the equipment to show up from a distributor creates problems for his selling and installation organization. If he could sell a system at 5PM on Monday, have approval from SFPC for the system's financing at 12 noon on Tuesday and start installation of the system at 2PM on Tuesday, **because he has the equipment on hand**, his cash flow improves dramatically. Everything happens quicker, and the cash moves quicker. All of this is possible only when the dealer has the goods in inventory.

Floor planning makes that possible. Using funds from SFPC, the qualified dealer will find he can keep goods in inventory. He does this using SFPC money and he of course pays interest for the money he is using for as long as he is using it.

** — SFPC/ Satellite Financial Planning Corporation, Baltimore, Maryland; 1-301- 964-1990 until November 1, 1983; thereafter, 1-800- 932-DISH.

SERVICE: MORE POLAROTOR INSTALL TIPS

CJR SEPTEMBER began series on feed polarization systems and how they work. This month we conclude this initial part of series with additional polarotor data. Upcoming in December **CSD**, antenna range measurements for TVRO feed systems.

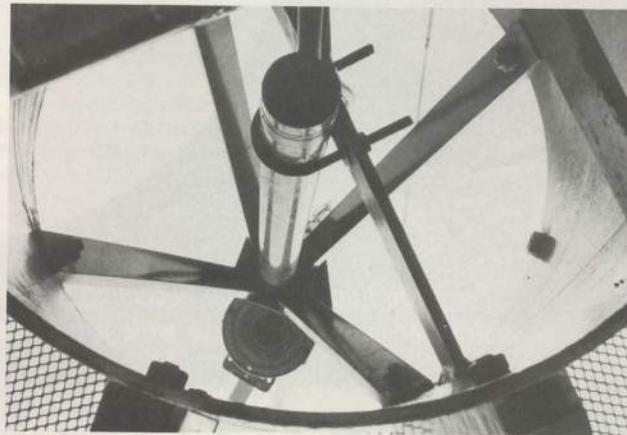
Obviously you would feel much better about the installation if you could show the consumer that as he/she operates the control, it goes to a **peak position and then past** that position, on both vertical and horizontal. The consumer will eventually figure out, if you don't, that if you cannot actually go **'through'** the proper peak signal, you cannot be sure that you ever arrived **at** the peak signal.

The answer does not lie with the Polarotor mounting scheme at all. A 90 degree twist is only going to shift the problem for you to the opposite polarity. It will not solve the problem.

So what is the answer? Cursing Chaparral for not giving you more rotation room is not the answer either.

Take a close look at your feed support. Something on it, **some part** that holds the flat plate or ring to which you bolted the Polarotor, **turns on its own axis.** There may be a set of U/C clamps (see Paracclipse example) that holds the tube, or some other system that allows the feed support to rotate. Your solution is to rotate the feed, just a tad.

Start off with the Polarotor up against the stop. Where you came up on, but could not go **'through'** the polarization peaking exercise (vertical in our example), rotate the entire support (support, Polarotor, feed, LNA/LNC, etc.) about twenty degrees. If you selected the **'right'** direction to rotate, you should **now** be in a position where you have vertical (plus a 'go-through' amount of slop) on one end of the control and horizontal (plus a 'go through' amount of slop) on the other end of the control.



LOOSEN U/C clamps and twist slightly (usually 20 degrees will get you off of a 'stop/dead-end' position) **so your installation has breathing room at both ends of the control.**

POLAROTOR/ continues page 13

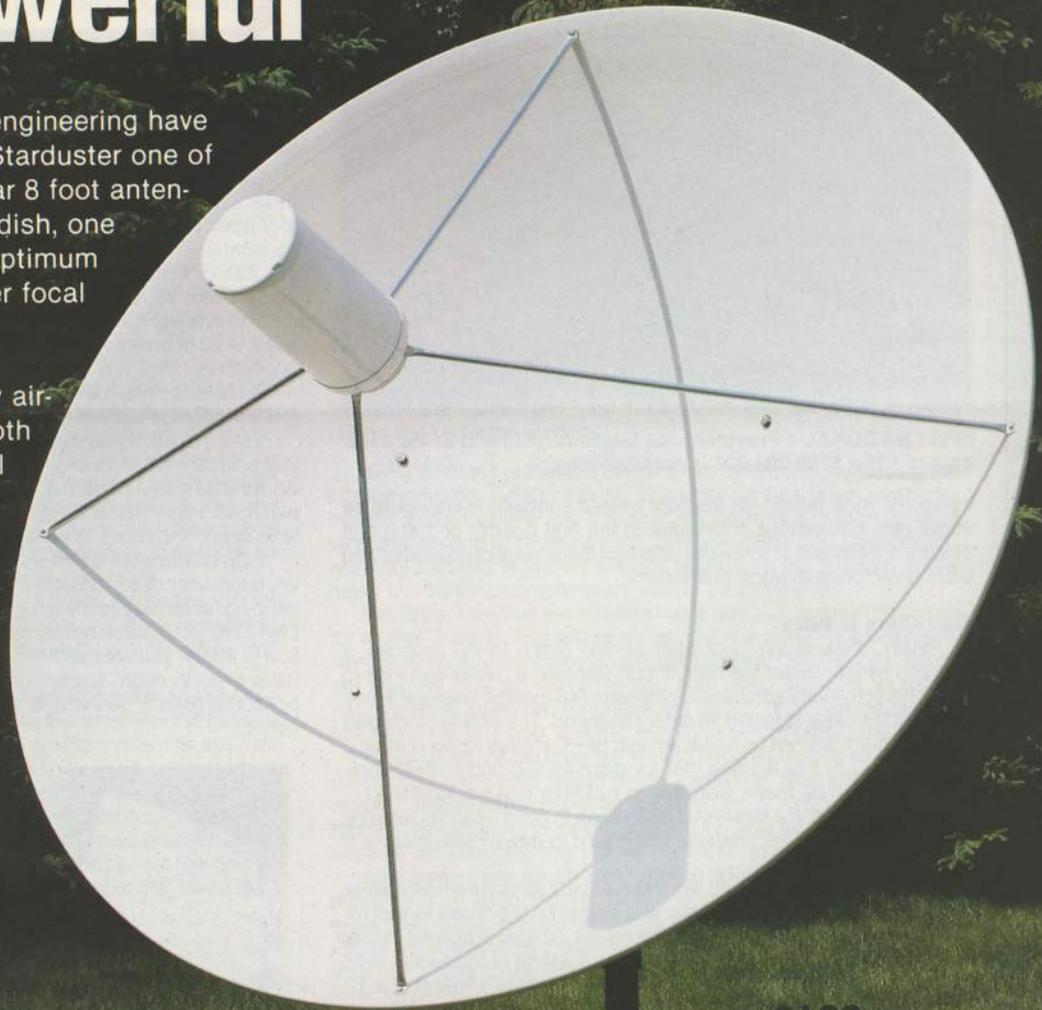
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\$499.

QUANTITY PRICING AVAILABLE



POLAROTOR/ continued from page 11

The slop?

Let's take it a step further. As you turn the full dish through/over/ across the geo-stationary Clarke orbit belt, the apparent polarization of the signals arriving at your location will change. Those furthest to the west (lowest in your sky) will have their vertical and horizontal 'skewed'; twisted away from true vertical or horizontal. The satellites most nearly due south of you will most closely approximate true 'vertical' and true 'horizontal.' That's why you cannot set up your Polarotor 2 and expect it to properly adjust vertical to vertical and horizontal to horizontal as you move across the 'belt.'

Huhh. What is this all about?

A satellite has to have some reference for vertical and horizontal. There are no 'straight lines' out there in space for the satellites to look at. They don't know vertical from horizontal, up from down, **unless they have a reference.** The reference is the north pole of earth. Let's say the satellite is located at 95.5 degrees west (Telestar I). When it 'looks north,' it looks directly 'up' the 95.5 degree longitude line. If it sent a signal out, it would point at the north pole as a reference; in other words, the vertical signal would be straight up and down vertical, and the horizontal signal would be straight across horizontal **as long as you were on that 95.5 degree west line yourself.**

Now, if you are west of the 95.5 degree line, the signal would be canted; twisted or skewed. The earth is round and you are 'off to the side' of the straight-ahead look of the satellite. So the vertical and horizontal will twist slightly (or alot, if you are far west or far east). And when you point at Telestar I, you have to twist your feed polarization so that its 'skewed' vertical aligns with your up-front probe.

If that is confusing, let's simply deal with the end result. If your feed was adjusted on a bird exactly south of you (on the same longitude line as you), vertical would be vertical, horizontal would be horizontal, and the two would be 90 degrees apart. Now if you swing the dish to a satellite far to the east or west of your longitude line, the apparent polarization of the signal skews or twists. Vertical is still 90 degrees separated from horizontal, but rather than being straight up and down (vertical) it can be shifted to the right (clockwise) or left (counter clockwise) from a satellite that is **due south** of you. The further the satellite is west, or east of you, the greater this 'twist' or 'skew.'

So you set the polarization up on F4, and it is more or less due south of you. Now you swing to F3R and what happens? There is some 'cross pole signal' (i.e. the opposite, unwanted polarization) leaking through. It looks like a (vertical) bar down the screen, or if it is not quite that bad, you have unusually heavy noise (coming from the opposite polarity modulation signals) in the desired polarization. Yup, 90 degrees is no longer 90 degrees. Well, it is, but it is **not the SAME 90 degrees!**

Does this mean that you cannot really use a Polarotor 2 device (or any polarization switching system that simply moves your up-front probe in straight 90 degree switches)? Yes, and no.

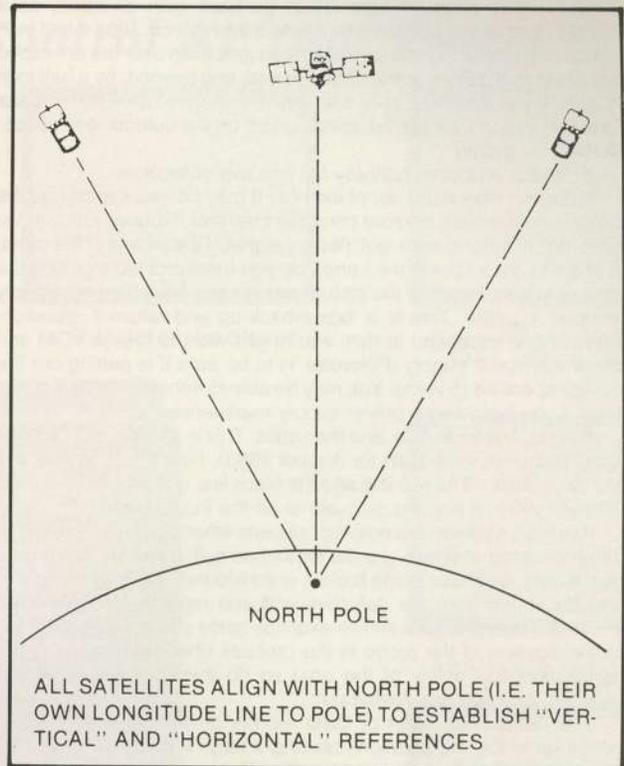
What it means is that you have to have some type of 'skew adjust' in the system. It may be a manual skew adjust (front panel control on the receiver; rear panel if the designer wasn't thinking properly), or, it may be a fancy automatic skew adjust that senses where the dish has moved to, and then corrects for that much geo-stationary belt movement by telling the Polarotor 2 to shift a little one way or the other. If you don't do this?

No problem if you install in areas where most of the signals are strong, and about equal in strength. But when you get to either coast, or the southeast, or outside the USA, this problem can be a tough one to solve.

WIRING Up The Polarotor

There are three wires connecting the controller (or receiver in the case of Polarotor 2) to the motor/probe. Coming out of the controller, the red wire is a 5 volt level, the black is ground and the white one is a 'pulse.' What is critical about any of this?

Wire size. Chaparral tells you that you must use certain gauges of wire for various 'run lengths.' What does this mean? Simply that as you **increase the length** of the run between the controller (receiver) and the motor/probe, you have to also **increase the diameter** of the wire connecting the two together. Larger wire has lower resistance,



and that means there is less 'drop' in voltage for a given length of wire. Too little voltage will cause many problems; the end result being the Polarotor will not operate.

Chaparral tells you that the 'maximum resistance' in the cable should be 1.3 ohms. That one may be tough to equate to your friendly local Rado Shack store; they don't always specify the resistance factor for their cables. Here is a quick guide, but you will possibly need to apply some elementary math as well:

- 1) If the run is **80 feet or less**, use wire size as small as #22 (larger won't hurt);
- 2) If the run is **between 80 and 130 feet**, use #20 gauge wire (or larger);
- 3) If the run is **between 130 and 200 feet**, use #18 gauge wire (or larger).

If your run is longer than this, compute your losses by finding out the resistance of the cable (usually stated as so many ohms or parts of an ohm, **per 100 feet of wire**). For example, if the resistance is specified as .4 ohms per 100 feet, and you need to run 300 feet, how do you figure this out?

Simple enough. The maximum resistance Chaparral recommends is 1.3 ohms. If you have .4 ohms per 100 feet, and you need 300 feet, then your total wire resistance will be 3 (for 300 feet) times .4 (resistance per 100 feet) or 1.2 ohms. That's close, but on the safe side of 1.3 ohms.

The Polarotor gives you three short pigtailed wires (about 9 inches long) coming out of the motor housing. A red, a white and a black. The common sense thing to do is to find a cable that has three wires inside of a poly jacket; and to find a cable that has a red, white and black wire. In that way you can splice/match the red to red, white to white and black to black. That's at the feed. Inside, you do the same thing. By keeping all of the colors the same, all the way through, you have less opportunity to forget what colors connected to what other colors outside, after you are inside. The wires coming out of the motor (and the controller) are very thin and very easily broken. Use a very light action cleaning/stripping the colored insulation from the wires. Clean back 1/2 inch and then splice by tightly wrapping the appropriate wires together. Wrap one set (red to red, for example) and then take a three inch piece of electrical tape and **wrap just that splice**. Now repeat for white to white and black to black. **And wrap each individually,**

carefully, with electrical tape. Then go back over all three, as a 'bundle,' and re-wrap again with a new 5 inch piece. Start a half inch to inch one side of the start of the splices and wrap over the pre-taped individual wire splices to the opposite end, and beyond, by a half inch to inch. If you live in an area with lots of moisture, take some **Coax Seal** and wrap it over the full splice length on the outdoor-end splice.

OOOPS — It Quit

Polarotor problems typically fall into two categories.

It doesn't work right, out of the box. It may not work at all (i.e. the motor is on the fritz), or more common than that, it rotates OK but you have that 'mid-band-suck-out' (loss of signal in the middle of the band, or at some other spot in the band), or, you have problems getting the unwanted polarity out of the picture on one or a few channels closely grouped together. This is a 'box-it-back-up and return-it' situation. There is one exception to this; you **might** want to take a VOM and check the power supply (Polarotor 1) to be sure it is putting out the voltage specified (5 volts). You may be able to substitute a part or two here, if you have some power supply experience.

It works fine for awhile, and then quits. This is another one of those 'logic' exercises (see **CJR** for August 1983). First check to see that you have power. The red line and the black line should read five volts between them. If not, the problem is on the indoors end.

If you have power, but nothing happens when you flip the switch or rotate the knob, that tells you the motor has quit. If you are clever with your hands, and have some broken units around, you may be able to strip the motor from the defective unit and replace it with another motor. But that is a quite critical exercise since you are able to screw up the position of the probe in the process (thereby destroying the signal reception ability of the unit) so do this only as a learning exercise, or if you are desperate.

The September issue of **CSD** reports on a Polarotor unit that locked up in the 'on' position, causing a large amount of heat to be dissipated in the plastic hand controller. The controller started to melt after a few minutes of being 'locked on'; the case was literally turning into a plastic liquid. You should be aware that this **CAN** happen, and that if a customer ever calls you to report the controller 'feels warm' or worse yet, 'hot,' the very first thing you should tell them to do is to yank the AC plug/power supply out of the wall. **Promptly.**

In a subsequent issue we will look at the wide variety of polarization rotation units from Boman, and discuss how they differ in many ways from the fabled Polarotor unit.

CALENDAR/ Through December 1st

OCT 18/21: 'Space Communications In The 80s' (conference on risks of investing in satellite communications, other forward technologies). (Washington, DC). Contact 202/331-1154 (***).

OCT 23/25: 'Televant 83' (conference preceding ITU meeting; policy, regulatory, technical aspects of European telecommunications). (Geneva, Switzerland). Contact 202/857-4612. (**).

NOV 3/5: 'SPACE Convention and International Exhibition' (1983 annual meeting of Society for Private And Commercial Earth stations). All day "Coop Technical Seminar" Nov. 3, "SMATV Seminar" Nov. 4, International seminar Nov. 5th. More than 225 exhibit hall booths, Senator Barry Goldwater, R.E. Ted Turner (WTBS), others. Orlando, FL. Contact 202/887-0605. (****).

NOV 19/20: 'Great Lakes/Ohio Valley Satellite Technical Show and Consumer Fair' at University Hilton Hotel, Columbus. First time event, open to dealers only on 19th, general public on 20th. Special activities for registered dealers, door prizes. Contact 800/592-1956 outside of Ohio, 800/592-1957 within Ohio. (No rating; first-time event.)

NEW BIRDS/ Through December 1st

Hughes Galaxy II scheduled to begin testing of 24 transponders at 74 west around 15 October. Bird largely pre-sold for narrow band data and telephone communications. Video **not** expected.

RCA F2R testing at 72 west, 24 channels, all 8.5 watts.

AT&T TeleStar I should begin operations at 95.5 west replacing ailing D1/D2 birds flown in combination at same location, at any time. 24 channels, all 8.5 watts, moderate use by television net-

works (CBS and ABC) expected.

Explanation of rating system:

- * — Event **not** recommended.
- ** — **Marginal** event with one or more serious flaws.
- *** — **Good** event, recommended if topic matter is of interest to you.
- **** — **Superior** event, recommended if you have any interest in satellite communications.

PRODUCT NEWS/ continued from page 2

announces Skywalker II, a programmable actuator and control system. Sixteen satellite positions may be stored in memory; illuminated lights indicate antenna position. Three-digit LED display and adjustable externally set limit switches. Automatic back-up memory retains programmed positions for up to one week. Dealer pricing 2-49 is \$599 and 50+ is \$420 per unit.

INSTALLATION ACCESSORIES

UNIVERSAL ELECTRONICS (4555 Groves Rd., Suite 3, Columbus, Oh. 43227; 614/866-4605) announces new retail dispenser packs for **Coax Seal**; the weatherproofing material recommended for all TVRO installations. The 50 foot 'industrial roll,' commonly used by TVRO installers, continues to be available with six rolls per case.

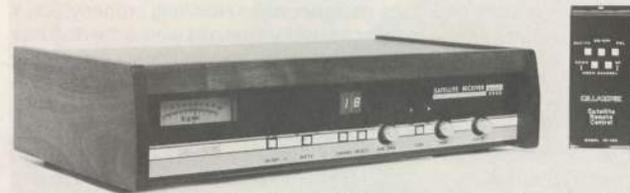
MICRODYNE CORPORATION (P.O. Box 7213, Ocala, FL 32672; 904/687-4633) announces SCB-2 Subcarrier demodulator to recover audio from FM subcarriers carried along with video signals on satellite transmission systems. The unit is a companion for the 1100 series video (plus audio) receivers and may be ordered to recover from 1 through 4 additional audio subcarriers between 4.5 and 7.5 MHz. Output is 600 ohms, front panel controlled from 0 to 6.8 volts in level.

MICROWAVE FILTER COMPANY (6743 Kinne St., E. Syracuse, NY 13057; 800/448-1666) has released model 4373 bandpass filter for satellite TVRO receivers using the block down conversion technique. The filter will pass any 200 MHz portion of the 900 to 1400 MHz band with a 1 dB bandwidth. Insertion loss is 0.8 dB and input/output impedance is 50 ohms. Price is \$900.

MICROWAVE FILTER COMPANY has also announced model 4088-FM/FF, a DC inserter to block or insert DC power into a TVRO system between 220 and 720 MHz. F female/male connectors are standard, 75 ohms. Maximum insertion loss is 0.5 dB and price is \$125.

RECEIVERS

GILLASPIE AND ASSOCIATES (365 San Aleso Av., Sunnyvale, Ca. 94086; 408/730-2500) announces their new model 9600 TVRO receiver with wireless remote control is now being manufactured and shipped from a new conveyerized, computer aided testing and production facility. Other 9600 features include built-in switchable channel VHF modulator, digital transponder read-out, automatic polarization switching control, tunable audio, video invert and AFC.



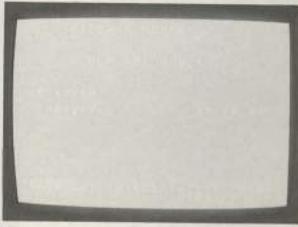
GILLASPIE REMOTE controlled TVRO receiver.

STS/Satellite Technology Services, Inc. (St. Louis, Mo. 314/423-6564) announces that all present owners of their Swedish import **Luxor model 9530** receiver can return them to the St. Louis firm for updating with the latest features found in the recently released 9540 unit. STS will add an internal modulator, align the receiver, add recently released factory upgrades and add a remote control sensor to allow the receiver to be controlled from numerous locations throughout the house.

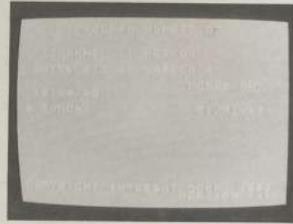
INTERSATTM

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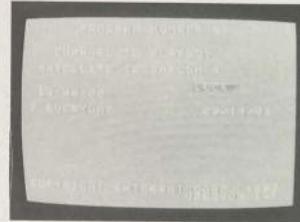
The IQ-160 . . . Complete Control At Your Finger Tips



Set Day, Date, Time



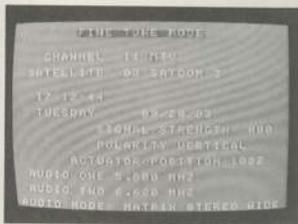
Selects Lockout, Power On,
Power Off



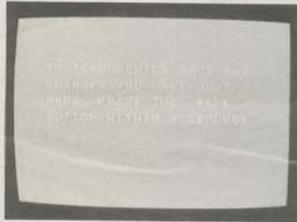
Parental Lockout



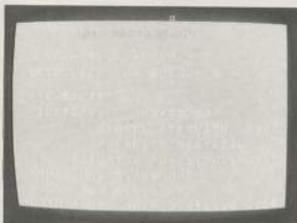
Channel #, Satellite,
Day, Date, Time



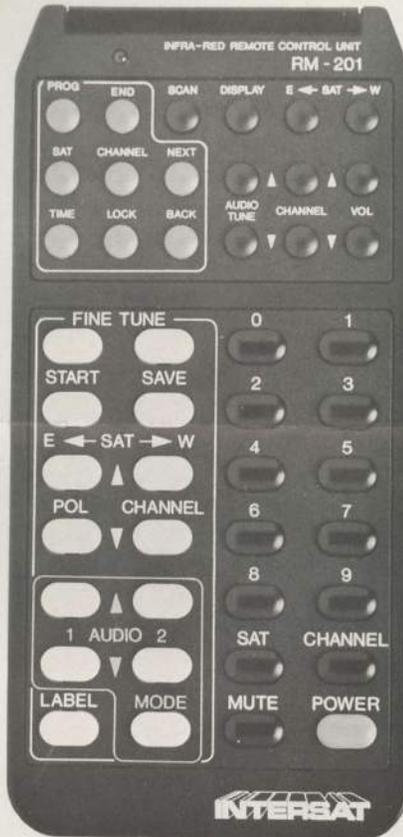
Label Change, Satellite
Location, Fine Tunes Audio



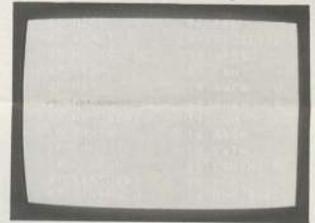
Stores All Changes
In Program



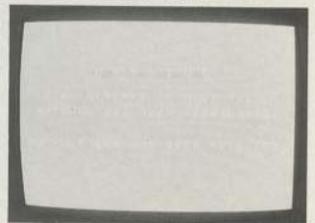
8 Modes of Audio/Tunable
12 Watts Stereo



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306-569-2882

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PETERSON ELECTRIC
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318-259-8891

SAT. TECH
BOGALUSA, LA. 70427
504-735-9915

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ESA
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DOCKERY SATELLITE
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MONTANA
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201-766-4408

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PORTER SATELLITE
NEWARK, OH. 43055
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LEBANON, PA. 17042
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AMERICAN VIDEO CORP.
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