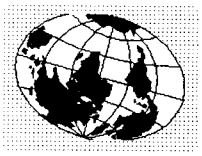
Bob Cooper's

SATFACTS



December 1994/No.4

A monthly report on satellite positioning, programming, transmission formats and equipment of interest to retailers, installers, system planners and dish users in the Pacific Ocean Region (POR). Mailed fast post on or about 15th; 12 issues NZ$40 within New Zealand, US$40 elsewhere except in Australia through exclusive agent AV-COMM PTY LTD, PO Box 225, Balgowlah NSW 2093 (tel: (61) -2 -949 -7417; FAX (61) -2 -949 -7095). PO Box 330, Mangonui, Far North., New Zealand. Tel: 64 -(0)9 -406-0651; FAX 64 -(0)9 -406-1083.

LEADING THE MONTH-

Multiple new programmer starts have occurred on PanAmSat PAS-2 further complicating the task of allowing each of its contract-users access to analogue transmission space while the universe of compressed digital video (CDV) equipment is slowly coming on line. As detailed in SF No. 3, most holders of PAS-2 transponder space have contracted for CDV spectrum and this is less than the bandwidth required to transmit a normal analogue television programme. However, the equipment required to transmit and receive CDV is simply not yet available, or available only to 'preferential customers' in small quantities at exorbitant pricing. Those known to have at least 27MHz on lease (enough for a single analogue programme) are: ESPN, Discovery, ANBC, PRIME Sports.

Further complicating the situation is the projected non-availability of full MPEG-2 (world standard) CDV equipment until the second half of 1995. MPEG format equipment delivered today is some variant of the world standard, and each supplier has its own unique MPEG format. Thus the very area which the world standard MPEG-2 sought to avoid, multiple non-compatible MPEG variants, is precisely what we have available today. It will be late in 1995 before the hardware will be available to sort this problem out.

PanAmSat and its programmers are faced with tough decisions:

1) Go 'on-the-air' now using a variant of MPEG-1 (such as S/A's MPEG 1.5 pr GI's Digicipher 1), knowing that in doing so they will want to upgrade to full MPEG-2 when the equipment is available;

2) Not go on the air and wait until the second half of 1995 when the MPEG-2 equipment will be available in quantity and at more reasonable pricing.

3) Go on the air now using analogue format as an interim step to going full MPEG-2.

'Choice 1' involves spending money twice for MPEG; now on the MPEG-1 (variant) which is an interim stage, again in late 1995 to modify and upgrade both their transmit-side MPEG-1 and more importantly (in dollars and unit quantity) their receiver universe as well.

'Choice 2' means they not begin serving new POR customers until the proper MPEG-2 hardware does become available late in 1995. This decision would set back the launch of MDS and cable TV in

INSIDE SatFACTS NUMBER FOUR

NEW Programming starts on PAS-2 -p.1
Intelsat 508 at 180 is replaced with 511 -p.3
RAJ-TV at 130E Springs To Life -p.4
THRESHOLD EXTENSION - Fact or Fiction? -p.6
Space Notes: Head to Head With Sky -p.12
POR Satellite Antenna Sizes -p.15
PAS-2 Programmer Status -p.16
POR Satellite Operational Schedules -p.17
DECEMBER Orbit Watch -p.18

Australia, for example, because without the programming to be delivered into Australia on PAS-2, the new "pay TV" industry there simply cannot begin. Hundreds of new businesses are geared up for the launch of "pay TV" there and putting everyone off until the end of 1995 is not a satisfactory answer.

'Choice 3' is quick, but legally and technically difficult. First, there is only a limited amount of bandwidth available on PAS-2 and if each of the programmers planning to use this satellite required analogue bandwidth as an interim step to eventual full MPEG-2 CDV, there would simply not be sufficient bandwidth to go around. This places PanAmSat in the awkward position of deciding which of its CDV customers can use bigger bandwidth chunks for temporary analogue, and which cannot. Those not allowed to analogue spectrum are more than inconvenienced; they could lose out, for example, getting in on the launch of "pay TV" in Australia and elsewhere. A service such as CMT that misses the "pay TV" launch period could well find itself seriously handicapped for Australian "pay TV" channel space (on MDS and on cable) by late in 1995 when the MPEG-2 gear is available; in quantity.

YES - this is a mess. A real mess.

The pushers and movers of interim MPEG technology (GI, S/A and others) are doing their best to talk the CMTs of the world into going with them now, to use the interim CDV formats, and making perhaps rash promises concerning how fast they will be changed over to full MPEG-2 when the equipment finally becomes available. When a programmer selects, say, the Digicipher system, he has to believe that GI will be good to its promise and produce MPEG-2 Digicipher II on schedule, that GI will be able to supply Digicipher II receivers to the programmer's customers on time later in 1995, and that everyone will be happy. This requires a great deal of faith.

PAS-2 FOR NEXT 30 DAYS:

Although there would appear to be "confusion" on PAS-2, with analogue programmers moving about from day to day, there is a plan in effect. The participants are not anxious to have the plan revealed, but careful investigation suggests to SatFACTS the following:

C BAND MECHANICS and REPRESENTATIVE CHANNEL LOADING FOR PAS-2

Transpon.	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15-16
Centre Frequency	3,730 MHz	3,790 MHz	3,850 MHz	3,915 MHz (3902)	3,980 MHz (3992)	4,040 MHz	4,100 MHz	4,165 MHz
IF Centre (Tr. B/W)	1420 MHz (54 MHz)	1,360 MHz (54 MHz)	1,300 MHz (54 MHz)	1,235 MHz (64 MHz)	1,170 MHz (54 MHz)	1,110 MHz (54 MHz)	1,050 MHz (54 MHz)	985 MHz (64 MHz)
Antenna Pattern-Vertical	Pacific Rim	Pacific Rim	Pacific Rim	Pacific Rim **or** Oceana	Pacific Rim	Pacific Rim **or** Oceana	Pacific Rim	Pacific Rim **or** Oceana
Antenna Pattern-Horizontal	Pacific Rim	Pacific Rim	Pacific Rim	Pacific Rim	Pacific Rim	Pacific Rim	Pacific Rim	Pacific Rim
Vertical (Actual IF)	CBS Network	PAS-2 Sylmar 1364 MHz	ESPN (B-Mac) 1284 MHz	CMTV 1249 MHz	Prime Sports 1156 MHz		ANBC 1040 MHz	CTN Zhong Tian 994 MHz
Horizontal (Actual IF)	CTN/**Dg**(2) 1416 MHz	(will be Discovery)	(CTN will move from 15)		Turner/**Dg**	NHK	ABS/**Dg** 1055 MHz	

1) CTN (Chinese Television Network) now available on TR15C (odd numbers are vertical, evens are horizontal; see page 2 here) has begun feeding their second (Dadi) channel along with the Zhong Tian channel in MCPC digital on TR2. The levels are a tad hot; they will possibly come down around 2 dB shortly. The TR15C analogue feed of Zhong Tian will move to 6C quite soon as PAS-2 considers TR15 to be an "itinerant" (temporary user) channel; the continued "free to air" analogue is "temporary."

2) Discovery will begin feeding, probably on TR4C, around December 25 ready for full-time service on the 26th. They could be in either B-MAC analogue, or, MCPC. They will NOT be free to air.

3) CMT will stay on TR7C in free to air analogue "until early in 1995;" yet another delay in their starting MCPC (nobody we know is complaining about this delay!).

4) The CBS programming on TR1 was a "test" coincident with an Asian TV programming conference in Hong Kong early in December. This was a test; no contract has been signed.

5) NHK (TR12C), Prime (TR9C), ANBC (TR13C) have no immediate plans to go digital; their analogue feeds should continue for awhile longer.

INTELSAT 508 (180E) Is Replaced:

If you happened to be watching I508 around 1600 hours (UTC) on December 10th, your heart may have stopped for a beat or two as CNNI and others, one by one, "went away." You perhaps have seen 508 "problems" previously; but never one quite like this. By 2000 UTC every programmer seemed to be gone. Had 508 died?

Not quite dead, but dying fast. Intelsat's 508 bird was launched on May 5, 1984. It has been in the "Comsat Manoeuvre" (inclined) orbit since 1991 but was not scheduled for replacement until the first quarter of 1996. At 1600 hours UTC on the 10th of December I508 was replaced, in orbit, by I511. You may remember 511; through mid-November it was functioning from 177E until it was replaced there by I703.

As Clarke Orbit satellites begin to run low on "station keeping" fuel there are two choices:

1) Use the remaining fuel to "kick it out of orbit", essentially kissing the bird good-bye as it turns into a solar system nomad;

2) Use the remaining fuel to operate the satellite in an "inclined orbit" which allows the satellite to drift north and south of the equatorial belt much in the same way a tether ball rotates around a fixed pole at the end of a chain.

In an inclined orbit, the satellite gains an extra few years of "useful life" but the earth stations using the bird must now track it north and south of the equator as it is no longer "geo-stationary," as it began useful life.

Over time (a few years) the inclined orbit path lengthens and the satellite wanders further north and south with each passing month. I508 was moving north and south 1.68 degrees on February 1, 1993; by this December 10th it had increased its travel to +/- 3.10 degrees. Two adverse things transpire as the inclination orbit increases:

1) The ground stations using the satellite must be able to track it over ever increasing distances either side of the equator;

2) The satellite flight engineers find it increasingly difficult to maintain the satellite's intended boresight (spot on earth where the centre of the coverage beam points).

At some point the inclined orbit project is abandoned; December 10th for I508.

I511 began its "second life" life by being moved to 180E and then it was "flown" to be 1 to 1.5 degrees behind (lagging) I508. As the video and other "traffic" was passed off to 511 (i.e., transferred by moving each of the uplink earth station's from the 508 to the 511 heading), 508 was emptied. I511 begins its inclined orbit period at 180E by flying +/- 2.0 degrees about the equator. Intelsat plans to replace I511 (now at 180E) with a new Intelsat VII series satellite during the first quarter of 1996. One year from now,

ATN: One of three Indian (Hindi) services now available on 3m dish

I511 will be inclined by +/- 2.85 degrees; that's about what I508 was just before it was taken out of service at 180E.

I508 and I511 are essentially identically capable satellites. Some Intelsat sources are suggesting users may witness changes in the I511 on-earth signal levels (reference previous service from 508). On page 20 here is a "Report Form" and we encourage all readers to complete this form and return it to SatFACTS. We'll publish the observations from readers throughout the Pacific Ocean Region in the January 15th edition.

RAJ-TV - BRAND NEW AT 130E:

Satellite operator RIMSAT has apparently received delivery of a brand new Ghorizont satellite for its 130E Clarke Orbit position. And judging from the signal level being reported by observers throughout the (south) Pacific, a small tin soup can outfitted with a probe may be the only antenna you need at the satellite's boresight!

The first (SatFACTS) reader to report RAJ-TV was **Tyrell Ruscoe** of Wanganui (November 26). On his 10' ex-Telecom dish, he finds the programming from RAJ-TV (a Hindi language service for India) *"On a quality level with Country Music Television from PAS-2."* With the twin ATN Hindi language channels at 142.5E, this makes a trio of Indian language services now available in the POR with dishes in the 3m class.

INDIAN LANGUAGE SERVICES

There are now three (3) Hindi / Indian language programme channels available throughout most of the POR on 3m class dishes.

ATN (Asian Television Network) from RIMSAT at 142.5E operates two channels (-1; 3675 MHz, and, 1+, 3725 MHz) in a 24 hour per day mode. Acceptable pictures from music videos, plays and sporting events on a 3m; essentially noise free on a 3.7m.

RAJ-TV from Rimsat at 130E is stronger, noise free on a 3m antenna, presently operating on 3675 MHz (-1) from approximately 7PM to 7AM (NZT) daily. Both satellites are using 'global beams' and if you can "see" 130/142.5, you should have good pictures.

CHINESE LANGUAGE SERVICES

PanAmSat PAS-2 now typically has three operating Chinese (Mandarin) language services. The appropriate dish size for your area will vary between 2.5 and 4.5 metres (see chart, page 15).

Taiwan **CTC-36**, a Taipei commercial network service, has been testing on PAS-2; Hong Kong based **Chinese Television Network** (CTN) is now operating the Zhong Tian Channel (Timely Information) on TR15 (vertical) while the Dadi Channel (human interest programming, fashion trends) is now with Zhong Tian in MCPC digital on TR2C. Zhong Tian (only) is available on MCPC on IRD subscription with S/A receivers; contact Bernard Cheung, FAX 852-505-7430.

Tyrell's Samart (Thailand manufacture) receiver is producing "*Full PAL format colour pictures with audio at 6.6 MHz subcarrier in a standard pre-emphasis.*" RAJ-TV comes up with a test card at 0800UTC (7PM NZT) and goes to programming at 0830. The channel appears to be signing off at around 2000 UTC (7AM NZT). The video carrier frequency is 3675 MHz, or -1 for western receivers (6 for the Russians). There is only very slight repositioning of Tyrell's dish required, towards the end of the telecasting day (near 1900 UTC), indicating the satellite is basically geo-stationary at this time.

RIMSAT has been operating an older Ghorizont from 130E during the past 18 months. Earlier this year, this satellite position was placed in some jeopardy when Apstar 1 "tried to create squatter rights at 131E (see SatFACTS October 15)". The new Ghorizont at 130E is apparently operating in global footprint pattern. If this is a standard Ghorizont, it would have a beam centre maximum eirp of 34 dBw on 3675 MHz. Or, if the satellite was operated with only the 3675 MHz transponder, and all others were shut off, the boresight centre could be as much as 44 (!) dBw. In the 34 dBw boresight pattern, the edge of pattern signal level would be in the vicinity of 31 to 32 dBw; which is by observation the apparent level reaching into Wanganui. The boresight is believed to be in east-central India where, if the full 44 dBw capability of 3675 was employed, a C band antenna as small as 0.3m could be used (!). SatFACTS will be interested in hearing from others who are within range of 130E; please use the monthly reporting form on page 20 in this issue.

APSTAR 2 / 20 December Launch:

While Apstar 1 continues to function in a something less than desired manner from 138E, the second generation Ap2 follow-on satellite is scheduled for Chinese Long March launch on the 20th (December). But, where will it land?

You will recall the fiasco when Ap1 tried to squat at 131E without appropriate co-ordination to users at 130 and 132. Most Asian sources believe Ap2 intends to operate from 87.5E, visible from some portions of Australia but "over the hill" from New Zealand and the balance of the Pacific. Now, close to launch time, comes a European report that Ap2 will "squat" at 112E. We already have Palapa B2P at 113E (and loaded with TV service carriers; plus the planned launch of Palapa C1 to 113E early in 1996), and, Chinasat DFH2-A2 at 110.5E. With Ap2 planning to cover essentially the same footprint regions as both Palapa B2P and DFH2, that it could operate without interference from 112E is not even debatable. It could not.

Under normal circumstances we would have ignored the European (112E) report as "foolish information." But with Apstar's track record, anything is possible. Stay tuned.

PAS-3 DESTROYED "LIVE" ON PAS-2

Dozens of SatFACTS readers reported to us the "live launch coverage" of a satellite carried on PAS-2 midday on Friday the 2nd of December. PAS-3 was being launched courtesy of Ariane flight 42P from the coast of northern South America. It was pretty exciting "live TV" and it got better.

Ariane lifted off without incident but as the third stage fired the rocket failed to develop sufficient "lift." News reports suggested a new fuel mixture in use may have failed. With a top-stage plus satellite out of control, ground control sent a telemetry signal destroying the launch by blowing it into a zillion pieces; before it could fall on something below.

The loss of PAS-3 is a blow to PanAmSat which had scheduled the satellite to fly to 43W where it would take up cross-Atlantic and North to South America C and Ku band duties. Not many in the POR had seen a live launch before; even fewer had witnessed purposeful destruction of a US 200 million dollar satellite. PAS-4 is scheduled for Indian Ocean service launch in May (1995). If it is carried "live" on PAS-2, the viewing audience could be sizeable.

THRESHOLD EXTENSION

DOES IT REALLY WORK?

(Part One of Three)

BASICS FIRST

A television receive only (TVRO) home or commercial satellite receiving system typically operates "close to the threshold" of picture degradation. Threshold is defined as the point where the receive system has sufficient satellite received "energy" to produce television pictures which have no objectionable amount of noise. In the satellite trade, noise is called "sparklies" while in the normal terrestrial TV world noise is called "snow."

There are two elements in satellite TV reception of interest here:

The signal
The noise

Signal comes from the satellite; noise originates in your receiving equipment, the earth around the dish ("earth noise") and space itself. In an FM (frequency modulation) transmission system, as employed in analogue satellite TV, noise is sensitive to something called bandwidth; the greater the bandwidth of the receiving system, the larger the quantity of noise.

The downlink signal has a bandwidth fixed by the uplinker. From the uplinker / programmer perspective, more bandwidth equals greater "fidelity." An analogy: AM radio has low fidelity, FM radio has high fidelity. In satellite programming, a bandwidth of 18 MHz is low fidelity, 36 MHz is high fidelity.

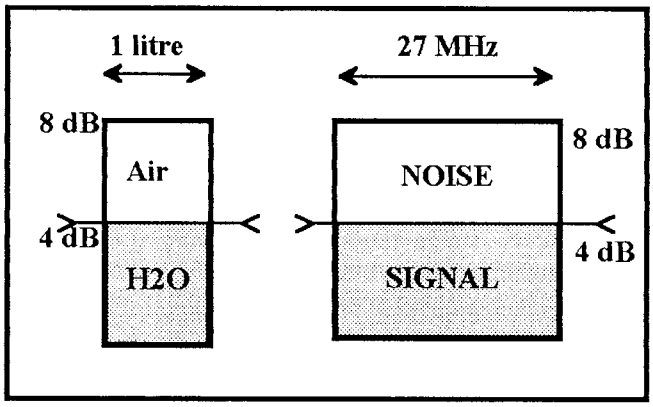
There is a trade-off; higher fidelity in a larger bandwidth comes along with more system noise since more bandwidth also equals more noise.

The Threshold

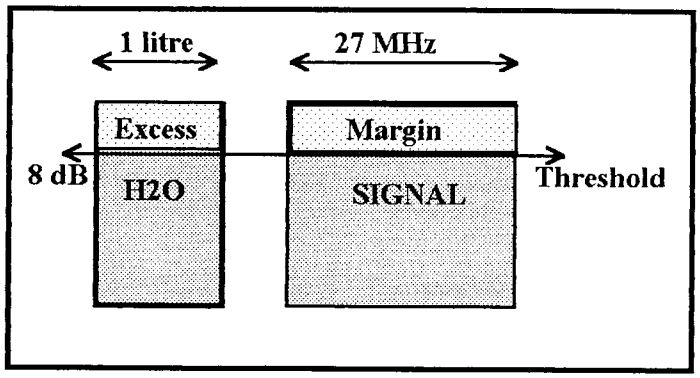
Most of the analogue satellite signals now being received average a 27 MHz bandwidth. If 18 MHz is low "fi" and 36 is hi-fi, you can see that 27 would be "medium fi;" a trade off between reasonable picture quality and reduced bandwidth noise.

An FM analogue system has a characteristic known as threshold. In practical terms, threshold is where your receive system produces virtually perfect pictures. "Below threshold" the pictures have noise while above threshold "perfect gets better" (creating something called "margin" or excess signal above and beyond threshold).

The concept of threshold is not complicated. Think of it as a "full transponder;" full in the same way a litre container of water is full when there is room for no more. When the chosen bandwidth is filled with signal, there is no room for noise. Hence the noise is gone. With a one litre container, the air in the bottle is "noise". As the water goes in, the air is pushed out. When the container is totally filled, all of the air is gone. So too is all of the noise "gone" when the bandwidth of the transponder is "filled" with satellite signal. The "threshold" occurs at the



point when the last air is pushed out of the bottle. When you have more water than bottle, you have excess liquid. When you have more signal than you need to reach threshold, you have a "margin" of extra signal; a "safety valve" as it were.

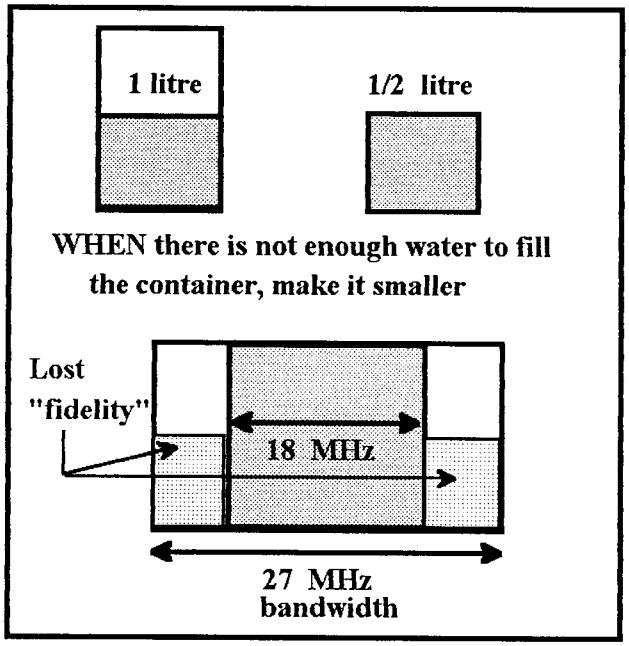


Working Below Threshold

When the transponder is not filled with signal (i.e., there is air in the bottle), engineers attempt to reduce the effects of the noise by "threshold extension" tricks. The easiest "trick" is to reduce the bandwidth of the receiver. If you don't have enough water to fill a litre bottle, substitute a half-litre bottle.

This is accomplished by taking a receiver and narrowing the bandwidth. If there is too much noise in a 27 MHz (receiver) bandwidth, reduce the bandwidth to 18 MHz; or even less. Unfortunately, if the transmitted signal is 27 MHz wide, reducing the receiver bandwidth to 18 MHz leaves some of the signal "outside" of the bandwidth. The noise is less, but in the process some of the original signal is eliminated also.

In our litre container of water, if the hose filling it is changed from a high pressure stream to a wide area spray, the amount of water available for the container remains the same but the spray allows some of that water to fall outside of the opening at the top of the container. Remember that an 18 MHz wide downlink signal is essentially "low fidelity" so the best a receiver might accomplish with an 18 MHz bandwidth is a low-fi picture even if the noise is eliminated.



Many satellite receivers give the user a choice of bandwidths: 36 MHz, 27 MHz, 18 MHz, 9 MHz. Some, like the Winnersat series, provide a continuous tuning "knob" that allows the user to adjust the bandwidth to any setting between (typically) 32 MHz and 8 MHz. Reducing or narrowing the bandwidth is a form of "threshold extension" since the definition of threshold extension is that you reduce the required amount of signal to the receiver to produce pictures without noise.

Some of the Intelsat signals are only 18-20 MHz bandwidth to begin with, and for these "intentionally low-fi" pictures the receiver needs to operate with a reduced bandwidth anyhow. Most analogue transmissions, however, are 27 MHz and a few around are still 36 MHz. No matter how much bandwidth comes to you from the satellite, as soon as you use a receiver adjusted to receive less than the full downlink bandwidth you are ignoring a portion of the incoming signal. And when you ignore part of the signal, you give away "fidelity." A signal received with a bandwidth smaller than the actual transmitted signal will always ... always ... be displayed with something less than the full transmitted fidelity.

Bandwidth reduction is an inexpensive "design trick" but it is not really threshold extension. It is a useful tool, but there is a price paid in reduced picture fidelity (overall quality).

The challenge, then, is to create a system that reduces the size of the bottle to the amount of water on hand, without reducing the "fidelity" of the picture. Engineers have been struggling with this challenge since the late 1970s.

SERVICE/ I511/ 180E	Usual Bandwidth
CNN	36 MHz
IDB/ 3,720 MHz	27 MHz
RFO	20 MHz
Nine Net	20 MHz
NBC to Ch. 7 Aust./ 3,876 MHz	20 MHz
TVNZ	20 MHz

Digital Processing

When you have a litre container and only a half litre of liquid, the air is "noise." Can you turn the air into water without adding more liquid?

In a 27 MHz receiver bandwidth half filled with noise and half filled with signal, if you eliminate the noise by some electronic magic you still have a 27 MHz bandwidth only half filled with signal (the other half is simply "empty"). Half a signal is no better to you than reducing the bandwidth since in that "missing half" we have picture detail that remains "missing." During the 1980's receiver designers tried to create "threshold extension systems" that looked at each pixel (part) of the picture. If the pixel was signal, it was allowed to "pass" onward. If the pixel was noise, it was shunted aside before it got to the screen. The effect was interesting; a TV screen with holes in the display; holes where the noise used to be, where the missing signal should have been. What was required was a system that could first identify the noise, then after eliminating the noise, refill the 'hole' in the picture where the noise had been with a substitute for the missing signal.

It happens that most TV pictures are very redundant. They are made up of horizontal lines of individual pixels of energy. If noise occurs where an energy pixel should be at a spot on line 141, and if you were really fast you could:

1) Identify the noise, electronically

2) Take the noise away, electronically,

3) Fill the hole where the noise used to be by "borrowing" a pixel from a line just above, or below; also electronically.

If pixel 237 on line 141 is noise, you could go to pixel 237 on line 140 or 142 and using it as a model duplicate it as a substitute for the missing pixel on line 141. Of course you have to do this at the speed of light over and over (and over) again because the noise-pixels are totally random and moving about the screen with the speed of light.

To do all of these wondrous things the receiver must have "memory," or the ability to receive and store a complete frame (picture) for 1/25th of a second (1/30th in NTSC). You need this "frame storage" so you have a complete picture available (including the noise) to allow the receiver circuits to "borrow" pixels from lines above or below the noise disturbed line. Since the moving picture provides 25 complete frames each second, this magic frame storage must act like a bucket brigade receiving, storing, and then dumping a brand new frame 25 times each second. And while the frame is stored, the electronic circuits have 1/25th of a second to locate all of the noise pixels, eliminate them, locate a replacement

NOISE that disrupts picture is identified to a

specific "line" in the image and pixel or portion of the line. Once it is identified, it can be replaced with pixel(s) from the line above or below the noise riddled segment.

HOW THE THRESHOLD EXTENSION "bucket brigade" FUNCTIONS

1/25th of a second: Store, detect, repair and ..... (new) 1/25th of a second: Store, de

pixel, replicate it and then stuff it into the "hole" left by the noise elimination circuit. And you thought Rugby was a fast game!

If you have no real electronic experience, you will simply have to "trust" the next statement.

Memory costs money. Very fast memory of the "size" required to "save" a complete picture frame (saving two is even better than one, but requires twice the memory capacity at twice the price) is state of the art stuff; digital (in a word) memory. And to allow this "identify / eliminate / replace" sequence of steps to work, old fashioned analogue technology just won't do. The high speed circuits must be digital. So to make this system function, the original analogue signal is ideally converted to a digital "frame store" system, processed as described, and then once the replacement pixels are in place and the picture is "rejuvenated," reconvert it back to analogue since the TV set at the end of the line only accepts analogue signals.

It is far easier to describe the system on paper than to make it work. And it is far easier to make the system work with perhaps a dozen special integrated circuits working together than it is to make it work with a handful of "IC" devices.

Until recently, the only way to make this work reliably was to build special circuits into the receiver using roughly as many component parts for the "digital processor" as the entire receiver itself uses to receive and process the satellite signal. Logic should tell you that when you double the number of parts in a receiver, you will at least double the cost. And because of the specialised nature of the "digital" parts, it should not shock you to learn a receiver equipped with this wondrous ability costs from three to five times as much as a "standard" receiver.

This is true threshold extension. And it costs big bucks to implement. It should not surprise you that there are receiver manufacturers, and receiver distributors, who "bend" the interpretation of the phrase "Threshold Extension" (also called threshold extension demodulator, or TED) in hopes of selling more receivers; when, in fact, the units are actually more a form of bandwidth limiting than "true" threshold

TURNING NOISY ANALOGUE PICTURE TO CLEAN ANALOGUE PICTURE

NOISY analogue received ..... DIGITISE and process ..... RETURN to analogue

extension. Further complicating the "true nature" of circuits is a recent European trend to call their IF bandwidth tuning system a "threshold extension tuner" when in reality these receivers are seldom more exotic than adjustable bandwidth receivers.

What You Can Expect

Any system that makes pictures loaded with sparklies "better" than a standard receiver can produce is worthy of your consideration. In our second and concluding third visit to threshold extension we'll look at two differing approaches; one uses a "threshold extension tuner" circuit and the other has all of the fancy digital store memory required to identify, eliminate and replace noise bits with picture bits (pixels). Both systems are now available in the POR marketplace and you will be a better informed buyer of the right hardware for yourself after reading our concluding reports.

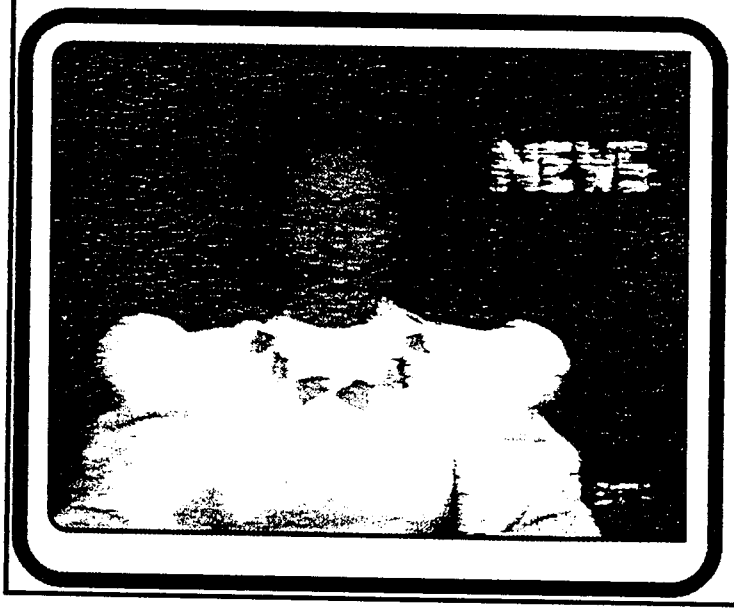
In the two sample photos shown to the right, NTi DIGITEX low threshold demodulator reception is displayed in before and after photos. Unlike common IF bandwidth narrowing devices, this unit will process signals with "digital extension" to identify, eliminate, and replace "noisy bits" in the video.

Digital-based extenders are the top of the line for threshold extension and priced accordingly; US$1,200 to $1,600 for "add-on" units (go with your existing receiver), or US$4,500 up for complete receivers with the threshold extension circuits included.

Faced with the "bandwidth limiting" problem (where narrow bandwidths cause picture degradation as bad or worse than pure "noise-sparklies") new engineering approaches are trying to correct this with something called "deviation compression," a quasi-digital technique. And out of this new technology, largely based upon high speed "digital chips" that did not exist only one year ago, an entirely new era in analogue receivers seems just around the corner.

ANALOGUE 4 dB CNR before threshold extension

ANALOGUE 4dB CNR after threshold extension
(Photos courtesy TELE-satellit, Munich, Germany)



In January 15th SatFACTS-

A look at AV-COMM Pty Ltd. Cherokee, and, NKM RX-2000 receivers, and, Digitex 'extender.'

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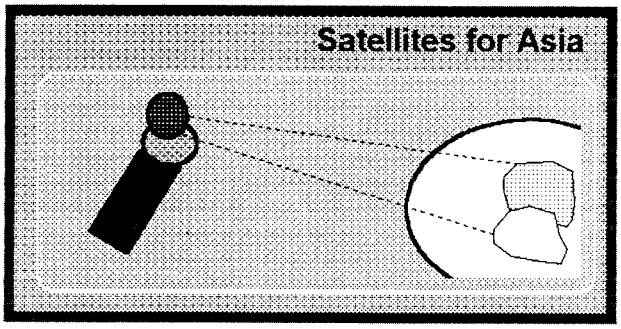

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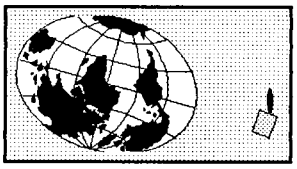
SPACE NOTES

A technical and marketing advisory memo to the membership from your industry trade association group

SPACE Pacific
Satellite
Programme
Access
CommittEe



HEAD TO HEAD with SKY Network

The appearance of dependable, accessible television programming with "commercial appeal" on PAS-2 is creating dish sales. And not unexpectedly, the first sales are "semi-commercial" in nature; motels, pubs and clubs. SKY is not pleased.

Sitting for an in-depth interview in Coop's Technology Digest (30 September 1994) SKY's John Fellet said:

"I suspect the loss of commercial business would be the least of my problems if there was a competitive satellite delivered package of channels available here (i.e., New Zealand). *At the moment commercial business amounts to approximately 5% of my total business."*

On November 22 SPACE co-founder John Lynam, himself a motelier in Hastings and avid user of his motel's 7m dish, reported a series of telephone calls and Faxes from a fellow motel operator in Tauranga. A satellite dish at the Tauranga motel has been inactive for some years but with the new PAS-2 signals the operator was interested in reactivating the system. At the same time a sales representative from SKY was hustling the Tauranga motelier to add SKY.

"O'Brien (the SKY rep) says that on December 15th all of the satellite signals coming here will be scrambled, that only SKY will have access to them, and that if I want them through my dish it will cost me $40,000 for the decoder" faxed the concerned Tauranga motel operator. *"Is this true?"*

SPACE tracked down SKY's O'Brien November 23 on the telephone as he was making a sales pitch to a motel operator. We asked him about this report; had he really said those things? **He had**. We asked him where he got this information he was so anxious to share with possible converts to satellite dishes. His answer was:

"I heard it on CNN, they have been saying that after December 15th all CNN will be scrambled."

What O'Brien did not apparently hear nor comprehend is that CNN is being encrypted on the Palapa satellite December 15th; a satellite primarily serving Indonesia. And that announcement has no bearing on the (present) delivery of CNN to the South Pacific. He claimed he did not understand this "fine point." He apparently also did not understand much else about PAS-2 nor did he really want to do so. He had "grabbed a headline" and oblivious to the balance of the story was parroting the headline to serve his own agenda. Shame on Mr. O'Brien.

On page 13 here we reprint an article appearing in a South Canterbury newspaper the same day Mr. O'Brien was spreading his own version of "the truth." The article speaks for itself. Mr. O'Brien, if he speaks for SKY, will be well advised to get his facts straight in the future. The competition is here.

WHAT IS SPACE? A PROGRESS REPORT

SPACE, the concept, originated at SCS '94 in Hastings, New Zealand; the first-ever South Pacific trade show. Six individuals have volunteered their expertise and time to create a professional trade society for users, sellers and installers of DTH satellite services. A formal incorporated society is underway with a March 01 finalising target. This publication provides **SPACE** with 'space' to report monthly on its agenda and subscribers to SatFACTS are automatically enrolled in SPACE without charge until 1 March 1995.

Dishing up what people want

Motel adopts satellite TV

A new satellite service that promises to bring at least 16 foreign channels direct to your home is now serving the Pacific region. Reporter Jonathan MacKenzie spoke to motelier Lester Melhopt, who is the first to harness the new technology in South Canterbury.

When Lester Melhopt entered the motel business 25 years ago his customer's demands were fairly simple — clean sheets, a roof over their heads, and linoleum on the floor.

Not so today. Lester has just installed Canterbury's most up-to-date satellite television system in a bid to keep abreast of his competitors.

At $18,000 the system is not cheap, but by early next year guests at Parklands Motor Lodge should receive an additional 16 channels beamed from PanAmSat's PAS-2 satellite orbiting 30,000 kilometres above the Earth.

Pacific region

The American owned PAS-2 will serve the entire Pacific region, while its mate PAS-3 is due to be launched this month to supplement the Atlantic Ocean service.

To Lester, the racks of high-tech equipment in his motel kitchen and the large dish on the roof are no different than spa pools, water beds, or agitator washing machines.

"The public never stop wanting things — they want this, they want that," he says.

First they wanted carpet on the floors, then agitator washing machines, next it was black and white television, followed by colour, then videos. For a short time it was water beds, which were succeeded by spa pools, and today it's satellite television.

For Lester the dish is just another means of attracting customers.

PAS-2 is different to Sky coverage and in Timaru it appears to deliver a clearer signal. While I was there three channels were available, but Lester explained the satellite, which was launched in July, was still being loaded with programmes.

Since its installation, the 24-hour country music channel has proved to be the most popular with guests.

"I've been having trouble getting people out in the mornings because they're sluggish from watching satellite TV all night," Lester says.

Which is not hard to believe — especially if you like country music. Take Ken Mellows, for example. Who? Well anyway I caught his latest offering *I'm Just A Jukebox Junkie*, which goes like this "... I'm just an old jukebox junkie a handful of quarters is all I need. It doesn't take much to satisfy me ..." in stereo. Otherwise, like Sky, there's a sport channel and a news channel.

Because the service is new, Lester is unsure how much he will have to pay for the privilege of receiving overseas programmes. He says the service is better than Sky because it offers a wider choice.

PanAmSat's PAS-2 satellite was launched on July 8 on an Ariane rocket from Kourou French Guiana.

Customers for full-time broadcast services on PAS-2 include: ABS-CBN (Philippines), Chinese Television Network, Country Music Television, Discovery, ESPN, KDD (Japan), Liberty-Prime International, NBC, Turner Broadcasting and Viacom International.

Latest

And that's a lot of networks each capable of plugging our screens full of the latest drama, documentary, sport, music, and news. But what the great unwashed don't know is exactly how much it's going to cost them should they shell out for a home system.

Lester Melhopt with the satellite dish that will beam overseas channels into his motel units.

Story that appeared in Timaru Herald, 23 November. Dish system designed, installed by Wayne Fraser, South Canterbury Aerial Services.

Publicity (above) is "good" for satellite dish industry; not so good for SKY. Marketing planners at SKY are trying to adapt to the appearance of smaller-dish satellite signals from PAS-2; the "creativity" required to deal with massive new amounts of programming from AsiaSat2 (mid 1995) and Palapa C1 (early 1996) will be a much tougher test of SKY than the present PAS-2 services.

To counter misinformation about satellite now routinely being spread by SKY personnel, we have created the "O'Brien Truth Test." If you encounter new variations of "the truth" in your endeavours to sell satellite TV systems, bring them to SPACE's attention and we will provide appropriate "quotable responses" here.

THE SPACE "O'BRIEN-TRUTH-TEST"

SKY: *"All satellite signals will be encrypted on December 15th."*

Response: Simply not true. CNNI has elected to encrypt their Palapa feed serving Indonesia on that date. **This has no effect on New Zealand.**

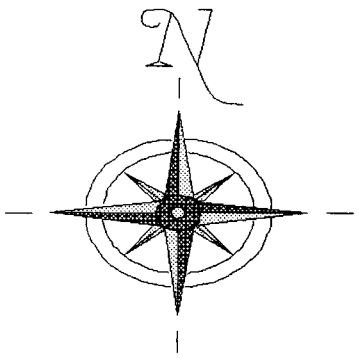
SKY: *"(and) decoders will cost $40,000 each and only be available from SKY."*

Response: If you happened to live where CNNI reaches you via Palapa, their encryption technique will be analogue B-MAC and the cost per decoder is near NZ$2,000. But, **it does not apply** in New Zealand anyhow.

SKY: *"Only SKY will be authorising satellite terminal system access to scrambled programmes."*

Response: SKY would "like" this to be the case. In that way they could try to control who does and does not use satellite signals. The truth is that services such as CMT (on PAS-2) will be available from many "non-exclusive" sources of which SKY may (**may!**) be one of the resellers.

FINDING YOUR WAY IN THE SATELLITE TV WORLD



with the SatFACTS DATA SHOPPE

SatFACTS: Your one-stop source for the difficult, the impossible to find reference and training material you need to be a part of the exploding new world of satellite television! Use this form to select the materials to further your own understanding of home and commercial satellite dish installation.

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POR AVAILABLE TV SATELLITES vs. ANTENNA DIAMETER

AREA	Intelsat 511 Global	Intelsat 511 W.Hemi	PanAmSat PAS-2	RIMSAT 142.5/ATN	JCSAT3 2H/1995	Palapa C1 1H/1996	AsiaSat 2 2H/1995
Australia: Adelaide	7m	3 to 5m	2.5m	4m	5m	2.8m	2.5m
Australia: Brisbane	7m	3 to 5m	3m	4m	4m	3.5m	2m
Australia: Melbourne	7m	3 to 5m	2.5m	4m	4m	2.5m	2.5m
Australia: Sydney	7m	3 to 5m	2.5m	4m	3.7m	2m	2.5m
Am.Samoa	7m	5 to 7m+	5m	4m	7m	7m	Not visible
Cook Islnds	7m	5 to 7m+	5m	4m	7m	Not Visible	Not visible
Chatham	7m	5 to 7m	4m	4m	5m	4m	Not visible
Fiji	7m	5 to 6m	4m	4m	6m	4m	4m
Fr. Poly.	7m	7m+	7m	5m	Not visible	Not visible	Not visible
Gilberts/Kiri.	7m	7m+	5m	4m	7m	5m	4m
Marshalls	7m	7m+	5m	4m	5m	5m	5m
Nauru	7m	7m+	4m	4m	6m	5m	4m
N.Calendon.	7m	3 to 5m	4m	4m	5m	4m	3m
N. Zealand	7m	3 to 5m	4m	4m	5m	3m	4m
Niue	7m	5 to 7m	4m	4m	7m	4m	Not visible
Norfolk	7m	3 to 5m	3m	4m	4m	2.5m	3m
Palau	7m	3 to 5m	2.5m	4m	4m	2m	2m
Pitcairn	7m	7m+	7m+	Not visible	Not Visible	Not Visible	Not Visible
Solomons	7m	3 to 5m	3m	4m	5m	4m	2.5m
Tokelau/Kiri.	7m	7m+	5m	4m	7m	7m	Not visible
Tonga	7m	5 to 7m	3.5m	4m	6m	6m	Not visible
Truk	7m	5 to 7m	3m	4m	5m	3m	2m
Vanuatu	7m	3 to 5m	4m	4m	5m	3m	2.5m
Wallis & Futuna	7m	5 to 7m	4m	4m	7m	7m	Not visible
W. Samoa	7m	5 to 7m+	4m	4m	7m	7m	Not visible

KEYS: Antenna diameter (i.e. 7m) is for calculated edge-of-noise (CNR 8 dB) reception using 25 degree LNB and 60% efficient dish with optimised feed. Certainly by reducing the receiver bandwidth (and accepting video distortion as a trade-off) home quality reception is possible with smaller dish diameters than shown. Those that are shadowed indicate dish look angle is less than 12 degrees and earth noise is a factor. 7m

PanAmSat PAS-2 PROGRAMMER STATUS

Latest information relating status of programming on PAS-2 (169E). CDV (CA) indicates that programmer has Conditional Access (IRD addressing) in operation.

Programmer Transponder	STATUS (As of 12-12-94)	Analogue Operation	CDV Operation	CDV Format	Price Range/ CDV	CDV Sources
ABS-CBN	CDV (CA) (24 hrs p/d)	No	Presently/ Filipino programmes fed to USA	GI Digicipher I	US$1500 range	Maser Technology (NZ)
ANBC	Analogue	Yes/ up to 12 hrs p/d	Not yet	GI Digicipher (NV)	US$1500 range	Maser Technology (NZ)
CBS	Analogue	Yes / up to 18 hrs p/d	Unknown			
CMT	24 hr analogue until "early 1995"	Not yet	Parallel to analogue, possibly January	S/A MPEG-1.5 to upgrade '95	US$1200-1500	
CTN	24 hr analogue	Yes / 2 channels, 24 hrs daily	Now MCPC parallel to Analogue	S/A MPEG-1.5 to upgrade	US$1200-1500	
Discovery	(Scheduled start by 26 December)	May be B-MAC analogue	Switch or start date unknown	GI Digicipher I (NV)	US$1500 range	Maser Technology (NZ)
ESPN	24 hr B-MAC	Plans unknown	Not announced			
NHK	8PM NZT start analogue	6+ hours most days	Not announced			
Prime Sports	6PM NZT start analogue	up to 6 hrs daily; longer likely after 01/1/95	Not announced	Not announced	unknown	unknown
Turner	24 hr custom CDV format/CA	No	CNNI link to Apstar, Palapa	Custom format believed S/A	US$17,500	Turner Direct (FAX 61-2-957-5161)
Viacom	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

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SatFACTS PACIFIC OCEAN ORBIT WATCH: 15 DECEMBER 1994

Freq.	TR#	G/102.7	R/130.0	G/139.9	R/142.5	G/145.0	P169	P169	I174 &	I/180	Patrn
		DublTV	RajTV		ATN	DublTV	VERT	HORZ	I177		
3,675	R6/-1										
3,720	1									IDB	w/29
3,725	1+	Muslim		DublTV	ATN						
3,730	1 - 2						CTN/**d**	CBS			
3,765	3									Vdp	w/28
3,790	3 - 4						PAS-2	(Discov)			
3,825	R9		ATN								
3,840	6									KDD	w/29
3,845	6A									CNN	w/29
3,850	5 - 6						ESPN/b	(CTN)			
3,876	9	JainTV				DublTV				Vdp	w/26
3,894	10									Vdp	w/26
3,915	7 - 8						CMTV				
3,925	R10		Udaya								
3,930	12									Vdp	w/26
3,975	14									Wnt	w/29
3,980	9 - 10						Prime	CNN/**d**			
4,015	16									NHK	w/25
4,040	11-12							NHK			
4,045	18									RFO	G/29
4,100	13-14						ANBC	ABS/**d**			
4,135	22									9/Oz	G/25
4,165	15-16						CTN				
4,166	23								NwsFds	NZ/**d**	G/22
4,177	23A								(Afrts/b)		
4,188	24								NwsFds	TNZ	G/22

Regarding PAS-2 / 169E

As related in detail in SF Nov. 15, this satellite is "in transition" from analogue feed tests to regular CDV operation for most programmers. Analogue feed channels are temporary, and subject to change with no advance notice. Listings change weekly and will continue to do so through mid 1995.

Operating frequencies at downlink (C band) frequency range shown (left hand edge) with nominal analogue receiver transponder numbering system. Under transponder listings:

Prime means service is not presently encrypted; is "Free-to-Air"

CNN/**d** means service is in some form of compressed digital video (see page 1 this issue)

ESPN/b means service in analogue, B-MAC encrypted

9/Oz means service is not encrypted but some day parts are encrypted

Note that KDD feed on Intelsat 180 (3,840) is left hand circular; all others on I/180 are right hand circular. On I/177 AFRTS is left hand circular, others on 177 and 174 are right hand circular. More and more PAS-2 feeds are appearing on linear horizontal or linear vertical. Dishes with circular polarisation feeds are at a significant disadvantage and should be changed out for linear feeds as soon as practical. Under Intelsat 180 (right hand edge) G/25 refers to Global pattern, 25 dBw while w/28 refers to western hemispheric beam, 28 dBw. See 'SF' 11/94.

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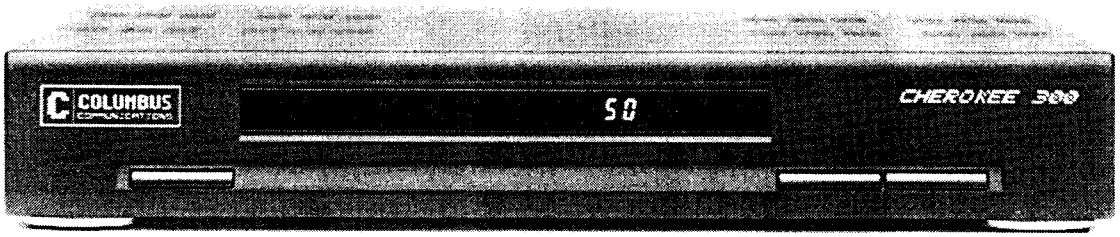

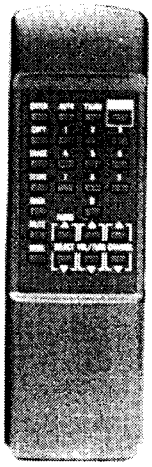

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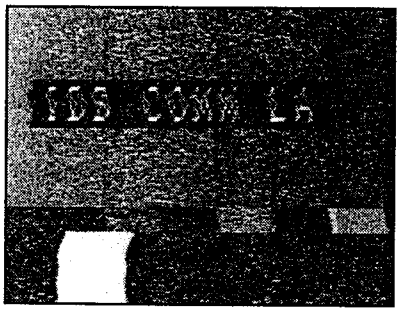
FROM THIS



TO THIS

Here's what "What Satellite" Magazine said:

This is because hidden inside this machine, with surprisingly little song and dance made about it, is a 3dB "low-threshold" tuner. This brings in the weaker signals with comparative ease, removing sparklies from pictures that other receivers would give up on.

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TELL US what you are seeing, and in particular ANY differences in reception you are currently noticing on INTELSAT 511 (180E), versus previous I508 at this location; and, reception differences for I703 (177E) versus I511 previously at this location.

I511 / 180E:

Reception since the change out from 508 is: ☐ Unchanged ☐ ALL transponders better ☐ ALL transponders worse ☐ SOME are better, SOME are worse

Those that are better: _____

Those that are worse: _____

Additional Observations _____

I703/177E:

Reception since the change out from I511 is: ☐ Unchanged ☐ ALL transponders better ☐ ALL transponders worse ☐ SOME are better, SOME are worse

Better: _____

Worse: _____

Additional observations: _____

OTHER:

_____

Your Name: _____ Address _____

Town / City _____ Country _____

Your Dish Size: _____ LNB 'Temperature': _____ Type of Feed: _____

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