

Bob
Cooper's

SAT
FACTS - Sept 1994



A monthly report on satellite positioning, programming, equipment of interest to retailers, installers, system planners in the Pacific. Mailed Fast Post on or about 15th. 12 issues NZ\$40 within New Zealand, outside US\$40. Copyright 1994 Robert B. Cooper, Box 330, Mangonui, Far North. Tel: 64-9-406-0651; FAX: 64-9-406-1083.

TWO NEW SATELLITES BURST TO LIFE: 139.9, 142.5 East now have television!

RIMSAT, Limited (834 Raintree Dr., Naperville, Il. 60540) has once again caught the 'big boys' napping by moving their latest Russian built EXPRESS class satellite (launched late June) to 142.5 east. This satellite has 10 C-band transponders (TR6-11, 13 to 17) on board plus a pair of Ku band (TR12, 20). Two Indian language channels (*Asian Television Network*; ATN) operating up to 12 hours daily are receivable on at least North Island on 3m size dishes with varying quality in PAL format. This new-to-orbit satellite is geo-stationary but observers report variation in the received signal levels with the pictures degrading from 'near perfect' (3.4m dish) around 6PM local to 'barely visible' around 10PM local. No suitable explanation for this unusual variation has yet been brought forth. The EIRP appears to be in the 23-29 dBw region.

Just a 'notch' west at 139.9 east, a second (Russian built Gorizont) satellite has come to life carrying a new international service called *MUSLIM Television* (3,725 MHz). This also appears to be up to 12 hours per day but the bird requires north-south and east-west tracking; typical of Gorizont birds. The footprint from this satellite, according to a FAX received from Intersputnik (Moscow), should be in the 27 dBw region. *MUSLIM TV* operates a similar service in Europe and North America. Elevation angles for 142.5 and 139.9 are as follows (142.5 first): Kaitaia / 37.88 & 36.22; Auckland/ 35.93 & 34.29; Wellington/ 32.35 & 30.88; Greymouth/ 33.23 & 31.88; Christchurch/ 31.71 & 30.35; Dunedin/ 30.84 & 29.63.

Credit for 'discovering' the new satellites and obtaining the preliminary operational details goes to TISCO Director of Research and Development Tony Dunnett. Business plan? If you have customers who originate from the Southeast Asia/Indian region, these three new TV channels may help you sell a dish. All three channels are advertising supported and will not be scrambled.

AND - ANOTHER ASIAN SERVICE DROPS INTO NEW ZEALAND

Close to our western horizon, Russian Gorizont 25 (102.7 east) has suddenly 'turned up the power' (or been replaced by a new satellite) and is delivering sparklie-free Asia Net PAL format services to dishes down to 3m in size. This satellite had been 'detected' with noisy signals in May and June with Asian television on 3675 MHz; the new signal is 'up' in level by as much as 5-6 dB from the previously seen service. The elevation on this one is 7.24 degrees for Kaitaia, 4.75 in Auckland, 4.95 in Wellington, 7.16 in Greymouth, 5.97 in Christchurch and 6.85 in Dunedin. The polarisation is circular but as strong as this signal is, most any feed will recover good to excellent pictures. Business plan? Another service to help you sell a 3 metre dish to New Zealanders of Asian extraction but you'll need a 'clear' western horizon.

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OPTUS CHANGES IN WIND?

With the successful launch late in August of Australian Optus B3 by a Chinese launch facility, carefully structured plans to increase the usefulness of the Australian Ku band satellites is receiving serious restudy. Optus New Zealand Director John Humphries, to appear at SCS '94 on Thursday September 15 (1 PM), is expected to suggest a much larger role for New Zealand users of Optus after the middle of 1995. Humphries is also expected to reveal a 'Super Beam' high power capability for New Zealand service using newly launched B3 able to deliver high quality television pictures to home antennas "about the size of a dinner plate." Optus B3 was scheduled to arrive at 152 east and unfurl its antennas and solar array by September 10th. Ground controlled satellite testing will require five weeks.

PANAMSAT PAS-2: WHITHER THOU GOEST?

The successful launch of PanAmSat's PAS-2 satellite on July 9th and word the satellite had properly found its 169 (east) geo-stationary position by mid July left many wondering, "where are the signals?"

PanAmSat itself revealed the satellite's post-launch testing had been completed by August 23 and each day following the check-out found dozens of New Zealand and Australian dishes trained at 169 east.

Between July 9th launch and August 23rd check-out completion, PanAmSat and US satellite programmer Country Music Television (CMT) jointly announced the CMT service will be available 24 hours per day on PAS-2, C band. Then on August 30 PanAmSat announced US network operator NBC will also be a 24 hour per day user. Meanwhile, in the United States, religious broadcaster Trinity revealed they plan to extend the Trinity 24 hour channel to the Pacific (using PAS-2). PanAmSat's Sydney office has repeatedly refused to release their complete list of transponder users citing, "It is the responsibility of each user to make their own programming announcement; we provide the satellite, they provide the programming." Other sources have told SatFACTS, "Some of the PAS-2 users are waiting to see how the Australian legislated rules sort out and with tremendous activity now in Australia for conventional cable TV services, there are sound, competitive reasons to play this matter close to the vest." Cynthia Dickens of PanAmSat Sydney's office told SF on September 11: "Australian plans are of secondary interest to the transponder planners. The primary consideration is how each programmer views their transmission options; do they come up on analogue or do they decide in favour of digital?" The 'turn on' of PAS-2 is occurring at what most believe is the tail-end of the analogue video era; 12 months back the signals would have been analogue, no question. Twelve months into the future, they would just as surely be digital. Today, a programmer can go analogue quickly because everyone is equipped for it. Or, he can hold off just a little bit and go digital. But if he goes digital, all of his customer receive sites must also be digital. And that's the unknown; when will digital receive equipment be available in quantity?

The 'Official PanAmSat' list of customers for PAS-2 now shapes up as follows:

1) ABS-CBN (Philippines); **2) Country Music Television** (CMT); **3) Discovery** (US cable programmer with National Geographic-like programming); **4) ESPN** (presently also on Intelsat 180; will eventually drop in favour of only PAS-2); **5) KDD** (Japan; plans Japan-US-Japan feeds as well as exporting of Japanese programming to the Pacific 'on a schedule'); **6) Liberty/ Prime International** (believed to be a customised programming package from USA to Australia, for cable/MMDS use there); **7) Turner Broadcasting** (operator of CNN which is on Intelsat 180, as well as CNN-2, Cartoon Network, Turner Network Television et al); **8) Viacom International** (US cable programmer with Showtime, The Movie Channel and MTV), and, **9) NBC** (for its CNBC service). To that 'official list' add Trinity's self-styled in-USA announcement for religious programming. PanAmSat's Cynthia Dickens suggests the next transponder to 'light up' will be about October 1st via a newly completed Hong Kong Telecom uplink.

There are 16 C band transponders on PAS-2; 8 vertical and 8 horizontal (unlike Intelsat's circular polarisation). If you set up a receiver for transponder 1 with an IF of 1420 MHz (centre frequency), you will switch to transponder 2 by turning the polarisation control from vertical (TR1) to horizontal (TR2).

No other changes, they both share the same centre frequency but being opposite polarisations will not interfere with one another. A table of PAS-2 IF settings for typical set and forget (memory) receivers appears here.

Of the 16 (C band) transponders, 12 are 54 MHz wide while 4 are 64 MHz wide. Traditionally, a 54 MHz wide transponder is 'split' in two, into a pair of 27 MHz wide transponders, to transmit a pair of separate (unrelated) programming services. A 64 MHz wide transponder can also be split (2 X 32). Thus the 16 C band transponders are capable of handling 16 X 2 or 32 separate analogue TV programmes.

The announced programmers (10 in all) to date are some distance from filling all 32 'programme' channels; although VIACOM, Turner and possibly ABS-CBN have suggested they will use more than one 'programming channel' each. Complicating this analysis is digital TV service which most anticipate will be the favoured mode of transmission by the end of 1995. In the digital mode, a 27 MHz 'space' can easily handle upwards of 3 separate, unrelated digitally formatted programmes.

Bottom line? The spectrum capacity for PAS-2 is sizable and we are a considerable ways from filling it with the known or suspected programmers.

Tips for locking-in on PAS-2:

1) If you have a 'circular polarity Teflon block' in your feed, take it out for serious viewing (otherwise you will see both vertical and horizontal transponders - on the same transponder - mixed together). If you have a switchable linear/circular feed, find the best position for the polar-rotor control for each service.

2) If your receiver has a variable IF bandwidth, start at 27 MHz and go narrower for optimised pictures. This may also vary from transponder to transponder.

The PAS-2 co-ordinates for seven key New Zealand areas are as follows:

- 1) Kaitaia: Elevation 49.01, Azimuth 352.75 true
- 2) Auckland: Elevation 47.21, Azimuth 350.87 true
- 3) Hastings: Elevation 43.74, Azimuth 348.25 true
- 4) Wellington: Elevation 42.09, Azimuth 351.72 true
- 5) Greymouth: Elevation 41.14, Azimuth 356.85 true
- 6) Christchurch: Elevation 39.90, Az. 355.05 true
- 7) Dunedin: Elevation 37.58, Azimuth 358.18 true

The PAS-2 locator 'beacon' is on 4,199.5 MHz with a radiated power of 0 dBw, horizontally polarised, for those with a passion to dig for really weak signals.

SKY: CALCULATES PAS-2 DISH SIZE

The engineering department of SKY Network has completed paper calculations of the size dish they will require at their Auckland studio to take ESPN, CNN and other services 'directly' from PAS-2. Presently SKY 'buys' CNN and ESPN feeds through TVNZ and Telecom respectively from the Intelsat

Transponder	IF Freq.	Polarity	BEAM
1	1420 MHz	Vertical	Pacific Rim
2	1420 MHz	Horizontal	Pacific Rim
3	1360 MHz	Vertical	Pacific Rim
4	1360 MHz	Horizontal	Pacific Rim
5	1300 MHz	Vertical	Pacific Rim
6	1300 MHz	Horizontal	Pacific Rim
7	1235 MHz	Vertical	PR or Ocnia
8	1235 MHz	Horizontal	Pacific Rim
9	1170 MHz	Vertical	Pacific Rim
10	1170 MHz	Horizontal	Pacific Rim
11	1110 MHz	Vertical	PR or Ocnia
12	1110 MHz	Horizontal	Pacific Rim
13	1050 MHz	Vertical	Pacific Rim
14	1050 MHz	Horizontal	Pacific Rim
15	985 MHz	Vertical	PR or Ocnia
16	985 MHz	Horizontal	Pacific Rim

In this 'example' receiver format (courtesy Garry Cratt, AV-COMM Pty Ltd), receiver is a 950-1450 MHz IF. Pacific Rim equals 29 dBw over NZ; Oc(ea)nia is 2 to 3 dB weaker in New Zealand.

180 bird. Their calculations suggest to SKY they will require a receive dish in the 8 to 9 metre range for the quality of ESPN/CNN (et al) reception they require for networking throughout New Zealand.

TARGET DATE: SEPTEMBER 18

University of Auckland pioneering 7.3 metre Orbitron dual-axis dish to be used for language and other international studies was scheduled to clear New Zealand Customs September 12. Elaborate electronics for receiving and transcoding NTSC/PAL/SECAM video services plus narrow band audio and data signals was virtually completed by contractor TISCO at end of work day September 10 and huge concrete pad to support 3,000 pound dish assembly has been 'curing' since September 2nd. University has 'open day' scheduled September 18th to show off the new facility; it could be a close call. Technical Officer Brian Oliver describes the planning for the unusual system at SCS '94 September 16, 10:30AM.

APSTAR vs. RIMSAT: BIG TIME DOLLARS ON THE LINE

APSTAR 1 was successfully launched July 21 by a Chinese Long March III rocket. The 24 channel C band satellite, built by Hughes, is the first of two scheduled (Apstar 2 is December planned). Apstar is owned by Hong Kong based Asia Pacific Satellite Company and its backers include the China Telecommunications & Broadcast Satellite Company. Important US based programmers that have signed up for transponders include: CNN (for CNN plus TNT/Cartoon Network), ESPN, Discovery, Viacom International (for Showtime, MTV), and Time Warner. Additionally, Asian based Robert Chua Productions and Hong Kong Broadcaster TVB International hold transponders. Apstar 1 had announced it would be at 131 east and would place Apstar 2 at 134 east. These locations would allow 2 to 4 metre dishes to be equipped with twin feeds, making possible a single reflector for two satellites 3 degrees apart.

Unfortunately for Apstar 1, another C band satellite operated by RIMSAT was already operational at 130 east. When Apstar began limited testing of its satellite late in August the closely spaced RIMSAT satellite made it impossible for Apstar to utilise those transponders (channels) which RIMSAT at 130 was using. While RIMSAT has only a pair of transponders from 130 east at this time, it will replace this satellite with a new Express in 1995 with 10 C band transponders. This means Apstar would be unable to utilise at least 10 of its 24 transponders from that location; an economic disaster for Apstar. The Hong Kong company has known about RIMSAT's 130 orbital position for several years and none of this should have come as a surprise.

If Apstar expected RIMSAT to 'cave in', they misjudged the situation. If they expected RIMSAT to 'sell' its position to Apstar, at least through September 12th they have been disappointed. Both satellite operators report they are 'talking with one another' but industry sources suggest to SatFACTS the ultimate solution may be for Apstar 1 to move east to another position. There are not many options remaining as the Pacific orbital belt is now very full with operational or planned satellites. One location speculated is 138 east which is held by Tongasat; the Kingdom of Tonga controlled concern that also holds rights to 70, 83.3, 130, 134.3, 142.5 and 170 east. Tongasat had originally leased 70 and 138 to US firm Unicom but Unicom now says they will not use the 138 spot. That might be a temporary home for Apstar 1 but with Russian Gorizont 7 at 139.9 moving Apstar to 138 will still be 'too close' to avoid interference. Apstar 2, which they claim will go to 134 later this year, is equally at risk since RIMSAT has another satellite already operating at 134.3.

Apstar is in a bad situation. And its programmers, such as Turner, have already begun promoting their availability in Asia (via Apstar) as early as October 6th. One of the possible solutions is for Apstar programmers to abandon the satellite, and move enmasse to PanAmSat PAS-2 which just happens to already have many of them as clients. For New Zealand and the south Pacific this would be the best possible scenario since we would suddenly have access to the full compliment of 'free-to-air' and 'encoded' transmissions which already have client users in Asia. If this does not sort out before September 30th, October promises to be a very uneven month for Asian programmers and viewers alike.

SOUTH PACIFIC: SATELLITE SERVICE EXPANSIONS

Television New Zealand's minority stake in newly authorised Fijian terrestrial television service is resulting in increased television traffic from New Zealand to Fiji on Intelsat 180, TR 23. New Zealand TVNZ studio produced commercials, news material now often transmitted to Fiji mid to late afternoons local time.

10 metre 'spare' Scientific-Atlanta dish owned by Paraparaumu Kiwi Cable has been sold and shipped to Papeete, Tahiti. Multinational United Investment Holdings which bought 50% interest in Kiwi Cable earlier this year plans use of dish there for cable system development; Tahiti presently has no cable TV.

French RFO network (Intelsat 180, TR18) plans conversion to digital format transmissions as early as December this year; will also add digital transmission of new 24 hour per day all news 'La Chaîne Info' into Tahiti at same time. Thompson digital equipment has been ordered; it is capable of carrying four separate digital format video services on single Intelsat transponder; RFO and La Chaîne Info are but two.

TNT, Turner Network Television, has announced October 6th start-date for Asian distribution of TNT service; "5 movies every night." The service, Turner says, will be uplinked from Hong Kong to Apstar 1, will not pass through PAS-2.

'Award' for first New Zealander to catch television on PAS-2 goes to Francis Kosmalski of Auckland who caught ESPN feed in B-MAC around 1AM local time September 7th. John Lynam of Hastings was close behind. Initial reports are that the signal level from ESPN, though encrypted, is "equivalent or better than CNN from 180". However, levels could fall (up to several dB) if ESPN is not running 'backed off' to allow a second programme channel through the same transponder. It shows up on the dial around the same spot CNN does from Intelsat 180. ESPN will run 'parallel' on PAS-2 and Intelsat 180 until at least the end of the year.

BIG REWARD: FOR FUNCTIONAL THRESHOLD EXTENSION

Most consumer style DTH receivers have a 'threshold' of around 8 dB CNR. That means if your satellite signal carrier is 8 dB greater than the system noise, the 'threshold' is where all sparklie (on screen snow) noise disappears. If, on a particular satellite, you obtain 8 dB CNR with a 3 metre dish and the best LNB available, switching down to a 2.4 metre dish lowers the CNR to 5 dB; a 3 dB loss. Dish size equates directly to antenna gain. Receiver threshold equates to LNB noise temperature, antenna noise pickup (characterised as G/T, or, gain over (noise) temperature), and, the receiver's design ability to cope with low signal levels spread over a sizable bandwidth (typically 27 MHz).

In comparing receivers, keep in mind that two receivers connected to the same antenna (through a splitter) displaying on two more or less identical TV sets can be compared when both are tuned to the same satellite signal. Two receivers connected to two separate antennas, even if both are tuned to the same signal, cannot be compared as easily.

Threshold extension (TE) is a 'black magic' art that addresses receiver threshold by modifying the receiver's processing circuits. Threshold extenders that claim to reduce the threshold to as low as 3 dB are advertised. Narrowing a receiver's IF bandwidth from 27 MHz to 18 MHz is a form of threshold extension, but with a price paid: a 27 MHz wide transponder processed with an 18 MHz wide IF rejects 33.33% of the received 'information'. In some situations, this is an acceptable trade off; fewer 'sparklies' in exchange for a degraded bandwidth picture. Other TE approaches electronically search out sparklie noise and replace 'noise hits' with substituted video information. This approach is generally more pleasing to the viewer than narrowing the IF, but it costs considerably more money to implement because video memory chips are involved.

Threshold extension is a valid option; by reducing the dish size, you may be able to 'fit in' a satellite antenna for a customer who simply lacks the space for a full sized dish. However, while a 2.4m dish is less money than a full-sized 3m, the customer may actually pay more for the system since quality threshold extension usually adds more dollars to the system than the smaller dish saved.

SatFACTS NEW ZEALAND ORBIT WATCH: SEPTEMBER 15, 1994

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TR #	Frequency	INTELSAT 180	INTELSAT 177	INTELSAT 174	PanAmSat 169	RIMSAT 142.5	GORIZNT 139.9	GORIZNT 102.7
-1	3,675					Asia TV Net		Dub'l TV
1	3,720	ESPN B-MAC			3,730/TR1+ 2	3,725/ Asia TV Net	3,725/ MUSLIM TV	
3	3,765	Vidiplexed			3,790/TR3 +4			
7	3,845	CNN			3,850/TR5 +6: ESPN B-MAC			
9	3,876	Vidiplexed						
10	3,894	Vidiplexed			3,915/TR7 +8			
14	3,975	World Net/D-W			3,980/TR9 +10			
16	4,015	NHK/ Encrypted						
18	4,045	RFO			4,040/ TR 11 + 12			
22	4,135	9 Australia			4,100/ TR 13 + 14			
23	4,166	TVNZ	Fuji TV/others	News Feeds	4,165 TR 15 +16			
23A	4,177		AFRTS B-MAC					
24	4,188	BBC/CBS		News Fds				

CODING KEYS

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Vidiplexed: Not encoded but
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