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Bob Cooper's

APRIL 15 1997

SatFACTS

MONTHLY

Reporting on "The World" of satellite television in the Pacific and Asia

IN THIS ISSUE

Mark Long's
BATTLE OF THE BANDS

MPEG-2 RECEIVER UPDATE 97-3

-DETAIL-
ADDITIONAL MPEG-2 SERVICES

Latest Programmer News
√ Latest Hardware News
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MONTHLY

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is published 12 times each year (on or about the 15th of each month) by Far North Cablevision, Ltd. This publication is dedicated to the premise that as we enter the 21st century, ancient 20th century notions concerning borders and boundaries no long define a person's horizon. In the air, all around you, are microwave signals carrying messages of entertainment, information and education. These messages are available to anyone willing to install the appropriate receiving equipment and, where applicable, pay a monthly or annual fee to receive the content of these messages in the privacy of their own home. Welcome to the 21st century - a world without borders, a world without boundaries.

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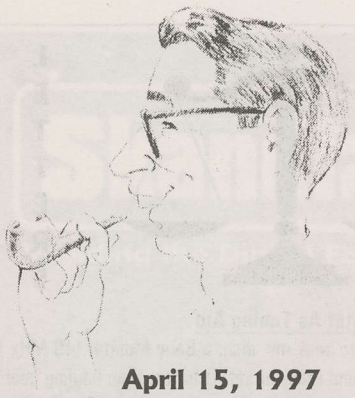
COOP'S COMMENT



April 15, 1997

A slickly prepared business plan currently making the rounds in New Zealand seeks to raise more than $30,000,000 to create a 10 channel (+) DTH service using Ku satellite and small dish antennas. One aspect of the plan is to import and deliver to a 60 cm range dish ethnic programming from "home countries" of immigrants. Buried in this presentation I came across a detailed table taken from 1995 Bureau of Statistics reports issued by Australia and New Zealand. In the long columns of numbers several lines jumped out at me and I reproduce them below in table form.

As an industry dedicated to the dissemination of television, radio and data sources delivered via satellite from distant points, we have a poor record for reaching our target market with appropriate sales messages. In the table here, virtually all of the countries listed now have television that can be received in New Zealand or Australia (or both) with modest size dishes and relatively inexpensive electronics. YES - it would be nice if some enterprising DTH firm bundled all of these services together into a single MPEG-2 bouquet and offered them to our region via 60 cm dish systems. NO - you should not hold your breath waiting for this to happen.

Birth Country	Australia	New Zealand
China	91,700	13,432
Germany	119,900	5,394
Greece (*)	146,500	2,020
Hong Kong	74,300	17,347
India	70,300	9,459
Italy	269,400	1,978
Japan		13,006
Korea (a)		10,104
Lebanon	79,400	
Malaysia	82,800	15,950
Philippines	83,500	6,074
Taiwan (b)		10,643
Thailand (b)		3,305
Vietnam	132,900	3,589

* / No present satellite TV service available; (a) Does not include arrivals prior to 1979; (b) Does not include arrivals prior to 1990.

A report in SF #31 (p. 28) told us that a Taiwan based firm plans a sizeable bouquet of Mandarin, Korean, Japanese and Vietnamese through Intelsat 703 (177E); an update in this issue says next month (May) is the hoped for operational date. A less ambitious multi-lingual 5 programme channel bouquet (JET-TV) is now testing on PAS-2.

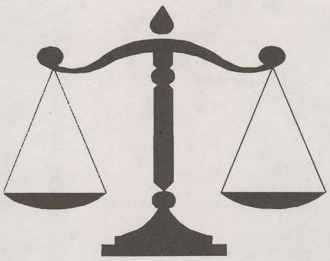
Setting aside the new digital entrants, good old fashioned analogue offers programming in FTA format from India, Japan, Malaysia, (the) Philippines, and Thailand (through Laos). Many of these services work very nicely on dishes as small as 1.5m. One example of a market begging to be identified and served: between Australia and New Zealand there are nearly 100,000 Malaysians in residence. On Palapa C2 there are several good quality Malaysian services. The market seems obvious to me.

Too few dish system sellers have gone to the trouble to identify and then seek out these obvious markets for systems. If you cannot be bothered to find the Malaysians in your town, at least make an effort to allow them to find you. A small newspaper advertisement run every week advising "*We can provide TV reception from (list of countries)* " will put your trading area on notice that you have special skills that might be of interest. Remember - it is programming that sells systems, not the hardware.

In Volume 3 ◆ Number 32

-ON THE COVER-

Just how strong is it? John Lynam (left) of distributor Bay Satellite TV hauled a Paraclipse 1.5m hydroform dish from one end of NZ to the other during March-early April measuring levels on key AsiaSat 2, Palapa C2 and PAS-2 transponders. Loads of surprises here and a detailed report scheduled for our May issue. Bottom line: Signal levels vary widely over NZ on all 3 satellites -there are hot spots!



LETTERS

BABY Monitor As Tuning Aid

"If I wish to peak my dish, a Baby Monitor (49 MHz transmitter and receiver set) is better than hauling gear into the back yard. Take C2 as an example: Set the Baby Monitor transmitter next to your TV set and haul the receiver to the back yard. Tune in CNNI (1175Hz) and set receiver audio to the CNN radio channel at subcarrier frequency 6.3. Most of the time this is an unmodulated carrier. The quiet carrier transmits as 'no noise' when the dish is peaked, slightly noisy to very noisy as the dish loses the C2 signal. Simply listen to the monitor and peak the dish for maximum 'quieting' through the Baby Monitor receiver. If the Baby Monitor is voice activated (many are), tune off of 6.3 a small amount to cause noise in the reception - the background noise will activate the monitor transmitter. If you satellite receiver has memory built in, select a suitable signal (such as CNNI) with a suitable audio sub-carrier frequency for each satellite. Recall the special 'tuning' channel number, move the dish until you hear best audio, and lock it down. It is simple as that and the Baby Monitor package is under $50!"

SF Observer, Queensland

Nifty. Most people do not realise how "dB sensitive" their ears are (or should be). Try this: Shut your eyes and move the dish listening only to the audio. Surprise - you CAN align a dish without seeing the screen!

THERE Is A Way

"SF March 15 mentions Steffen Holzt in New Caledonia running a Panasat IRD520 on the Galaxy CDTV service without a forced download from Galaxy affecting his IRD. For an IRD to have its software upgraded the receiver box must be of the same manufacture as the software being played out; i.e., Pace software to Pace IRD. A Panasat IRD will not download software developed and destined for a Pace IRD. Additionally, the software must contain a broadcaster signature (keys). For the download to be successful the IRD must contain within the Irdeto loader software the broadcaster keys; i.e., a Pace software downloaded from Galaxy to a Pace DGT400 - the DGT400 must contain the Galaxy keys. A PACE DVR500 with (preloaded with South African MultiChoice) keys will also not accept the Galaxy download even though it is the same manufacturer's IRD. And your answer that "NO, there is not a way" is incorrect. There IS a way to turn a programme rating downloaded DGT400 back into an IRD that will work with services such as the European Bouquet."

Reader AP, NSW

There may be two ways to recover a lost DGT400. John Lynam at Baysat has been successful replacing the DGT400/DVR500 family rating chips with new ones. The bad news is that you may have to fly to South Africa to get the new "clean' chips!

PROGRAMMER PROGRAMMING PROMOTION UPDATE

APRIL 15, 1997

12 - not 10 - Provincial Chinese television programming channels, using 11 uplinks on As2 Chinese Bouquet. Two more sites have been identified as either on now or soon on: Shaanxi and autonomous region Guangxi. For update, see p. 30 here.

MegaTV is new, perhaps Singapore based, MPEG-2 format service that began testing on Palapa C2 late in March. Service is on vertical 3780/1370, FEC 3/4 and Msym 27.500. Seven programme channels including HBO Asia are included; it is FTA at presstime but not for long. SF readers in Hong Kong, Thailand, PNG report good signal levels - to the south Brisbane is within coverage but reception is not possible with DTH size dishes in the Pacific nor New Zealand. Details p. 30.

JET (Japan Entertainment Television) is new PowerVu five programme channel service that began testing PAS-2 (3962/1188Vt, FEC 1/2, Msym 13.740) March 15. Service will be 24 hour with separate programme channels for Thai, Mandarin, English and Japanese drawn significantly from Nippon TV and Tokyo Broadcasting. Details p. 33.

WARNING! This transponder could be dangerous to browse. And it is all CA (conditional access) anyhow. AFRTS on 177E (4177/973 LHC, FEC 3/4 and Msym 28.000) apparently has up to 8 video channels plus 12 audio services numbered (not surprisingly) 1-20. SA D9223 will lock but beware - as you browse the Service Menu and MPEG Status (see p. 10., SF March #31) that if you see notice that says "BOOT LOADER, WAITING FOR INFORMATION" - get the hell out of there. Fast! Those who lingered too long (out of curiosity of course) report their receivers locked up and would not move - in any direction, any mode. Way out? Unplug input line from antenna, unplug receiver, wait several minutes, replug receiver to AC mains but leave antenna lead out. Then go to receiver default reset following instructions p. 12 SF March #31. "BOOT LOADER?" The uplink is sending data to your D9223 and you won't like what it does to everything you previously had in memory. AFRTS detail p. 31.

Deutsche Welle sponsored MediaNet VBI transmitted Internet created so many problems for other users of AsiaSat 2 European Bouquet, DW has launched separate MPEG video programme channel (#6 in what was 5 channel set) just to carry the VBI data. What you get is DW video (with VBI-Internet data buried inside) and so as to not confuse you - DW#1 radio for audio (both channels). MediaNet has other problems - up to 65% German language text content, an uncertain contractual arrangement with an Australian firm claiming to be "exclusive agent" for service in Pacific. There are some serious legal problems in all of this - don't look for a quick resolution.

Rolling on. Rupert Murdoch's Indian version of STAR TV will use seven (!) Ku-band transponders on PAS-4 from 68.5E, probably Pace DVS-211-*** series receivers, STAR India expects standard DTH dishes to be 65cm in size (offset no doubt); official start date not given for what could be a 100 programme channel service.

SKY Network (NZ) fired up their new SA 9m uplink to Optus B1 early on the 8th of April (12.545Vt, IF 1245) and believes commercial Videocrypt Sport channel service will begin April 15th. Signal levels are as optimistically pre-announced; 2.1m dish sees C/NR of low 20s; anything larger than a empty can of beer ought to produce a watchable picture. In Sydney: will require 3m solid dish based upon early tests. Power levels were up/down first day, should be stabilised now. Details Coop's Technology Digest April 23.

New Release

Skandia

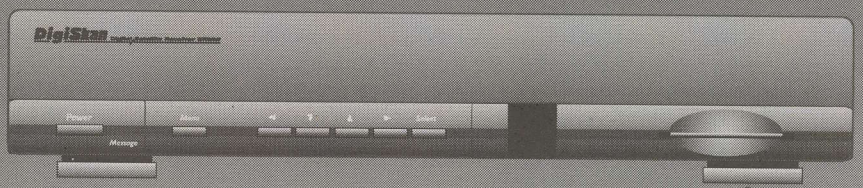
Providing the Digital Edge...

Skandia is proud to announce the release of the all new DIGISKAN SK888 family of SMS/ADB Digital Satellite Receivers, which has been designed for low cost consumer receiver applications compatible with several digital satellite receiver broadcast systems worldwide. The receiver utilises the MPEG-2 audio/video compression scheme and is primarily DVB compatible.

DigiSkan

Digital Satellite Receiver SK888

The Flexi One



also receives
10 World Radio Stations

The Receiver is designed for the European Bouquet which includes programmes from - Deutsche Welle (German) - RAI International (Italian) - MCM Music (French) - TV5 (French) - TVE (Spanish)

Paraclipse

NEW RANGE

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1.5m Steel
1.2m Steel

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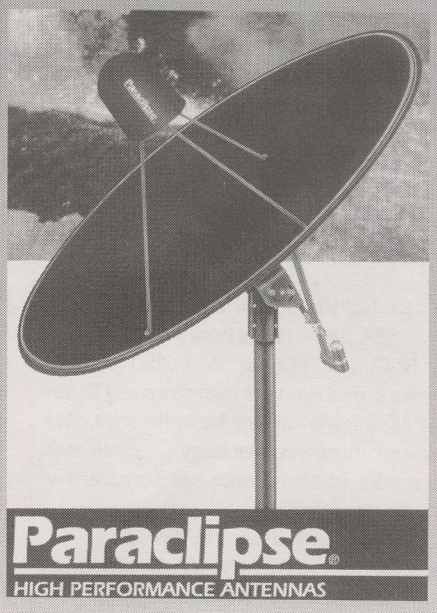

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SETTING Sun

"Could you please advise why on Rimsat 142 I cannot find the SatFACTS listed transmissions of SUN TV? On my Promax analyser only three active transponders light up. Does it have a particular time that it is on the air - I've gotten up at all early hours (my wife believes me mad) and no luck?"

Richard, Horizon Antenna Systems, Upper Hutt, NZ

Only Laos, EM TV and Music Asia are on transponders that have beam coverage to NZ. SUN, now on 57E I703, when on Rimsat 142, was on a beam only covering into India and SE Asia. Some NT and northern Qld Australians also had marginal reception. They advise, "Go back to bed - even if you could see it, you wouldn't watch it - very long!"

POMMIE Ex-Pats

"As a group of Pommie ex-pats, we are very anxious to follow the Major v. Blair fight round by round, blow by blow. Aunty BBC World is useless for UK news; our solution is London based SKY News. We see it listed on several digital bouquets - can you suggest a receiver to access this? The first rounds are underway - help, please, fast!"

D. Morris, Bangkok, Thailand

SKY News, fed to Australia for use by cable TV, is presently FTA MPEG-2 within STAR TV package at 3900 MHz, AsiaSat 2. The numbers seem reasonable (FEC 1/2, Msym 28.100) but there are some clever extra "bits" in the transmission stream that make it difficult to receive unless you are using one of the following receivers: Nokia V1.63, Nokia V2.0, NTL/DMV 3000 (for which the data stream is configured). We cannot recommend purchasing any receiver just to receive this service since STAR promises that it will become conditional access one day "soon."

HAVE TRANSPONDERS - Will Lease

"I believe there are SatFACTS readers who might have an interest in leasing transponder space. I received the following fax late in March from Satelindo:

' At this time the Palapa satellite system has available for leasing transponders on C1 at 150.5E. Most of our present customers on this satellite are using it for (narrowband) telecommunications but we assure you it is equally suitable for analogue or digital television as well.'

Raymundus Rochadie, General Manager Engineering
PT, Satelit Palapa Indonesia
Tel 62-21-545-1745; Fax 62-21-545-1748

This answers several questions I had concerning C1 and as all SatFACTS readers already know, there are a few really excellent transponders on board C1 which could do an outstanding job for television over Australia, New Zealand and most of the Pacific.

David Leach, Newcastle, NSW

Yeah - but will they allow an 'Adult' channel to use their satellite? We doubt it.

B-MAC To The Tip?

"March issue is very thought provoking. So what happens to those 10,000 RABS B-MAC units when they convert to MPEG? And you cannot convince me there is not a master plan at SA to corner the RABS business when the time comes!"

Trevor Sorensen, Tambellup Electrical, WA

Today's hot decoder, tomorrow's trash.

HARDWARE EQUIPMENT PARTS UPDATE

APRIL 15, 1997

VideoCrypt source. Drake ESR2000XT receiver has slot on for externally added "VideoCrypt" board. Drake does not manufacture this but one European source is John Barry (tel 44-1353-669-009, Fax 44-1353-669-120) at around Sterling 75. If your use happens to require a Videocrypt "smart card" as well as decoder, same source can assist in providing cards. Mechanics: Connect cables to board, set two jumpers, readjust ESR 2000XT video level from 0 to +9 and you are off and running with decoded Videocrypt.

HAVE DISH - will travel. Using Paraclipse 1.5m Hydro, analyser and surviving on coffee and quick food, Baysat's John Lynam did marathon five day swing throughout North Island to research and record signal levels from selected Palapa C2, AsiaSat 2 and PAS-2 transponders. Detailed results in SF#33 but here's a peek preview: Best C/NR of any Palapa signal? HBO Asia (encrypted of course) on 1150Hz - more than 1.5dB hotter than next best TPI and third best CFI. On C2 vertical - no-surprise hottest is CNNI but it is 7.2dB weaker than HBO on horizontal. Second best vertical was TV3, 1.6dB below CNNI. Best North Island (C2) location tested? Te Aroha and Whangaparaoa dead tied for horizontal coverage, Whangaparaoa and Napier for vertical side. Anyone with a quality small dish, suitable measurement instrument, and a week to kill could do the same thing - but no need. John Lynam's full report in May SatFACTS. Sad note: Measurements prove HBO could be sold to NZ DTH subscribers with dishes 2m and smaller if only the programmer would accept customers here.

UNRAVELLING PowerVu. Lennart Bjorklund, heading engineering team from Nokia, travelled to Taiwan during Mid-March to access PAS-2 PowerVu signals with a number of software version receivers. Bjorklund reports, "We have now tested these signals and the 22 second 'blackout' report in March SatFACTS (p. 6) is caused by the receiver set up to receive only PAL 625 lines. The PAS-2 NTSC 525 line signals cause the dropout. We will soon be able to change our software to allow proper NTSC reception. We also found other PowerVu problems that make the PAS-2 signals not DVB Compliant: 1. The original network ID and transport IDs are the same on all transport streams. 2. The stream type in the SDT was not digital TV (0x01 or 0x02) but defined as 0x00 (reserved). " Translation? Nokia says PowerVu is NOT as announced - DVB Compliant. But - with software changes a clever receiver can access some if not all of the data stream as long as it is FTA.

BIG PLANS. Space TV Systems, Inc., as reported SF March (p. 28), is now modifying their plan to provide multi-channel satellite service to "Chinese and other overseas Asian people around the world." Original plan as we reported was 6 channels in MPEG-2, through Intelsat I703 using Ku beam into Australia (coverage in NZ not defined yet). New plan: 8 TV channels, 20 audio channels 2 teletext services using 36 MHz Ku band transponder width "in May (1997) to individual homes using a small dish and set-top digital receiver." That is Phase One. In phase two - 120 video channels using nine transponders on 8 satellites "for all overseas Oriental people around the world by end of 1998." Languages included will be Chinese (initially 5 programme channels), and one each Korean, Japanese and Vietnamese. New contact: David Chao, tel 886-2999-2939 and fax 886-2999-2989.

DELIVERY SCHEDULE for do-everything Hyundai origin (not Taiwanese!) MPEG-2 + PowerVu format receivers through Pacific Satellite: 25 April. You can obtain information from Alfred Kung tel 61-7-3344-3883, fax 61-7-3344-3888.

Dedicated to the proposition that
all satellite TV broadcasts are NOT created equal

The Battle of the Bands

by Mark Long in Thailand

Today's communications satellites covering Asia, Australia and the South Pacific transmit hundreds of satellite TV signals; however, all of these satellite TV broadcasts are not created equal. The following article explains how satellites fit into the electro-magnetic scheme of things, why certain satellite broadcasters have a superior ability to deliver crystal-clear TV programs with a minimum of muss or fuss, and how to adapt large aperture satellite dishes to receive the latest direct-to-home (DTH) satellite TV services.

Catch The Wave

Whenever we listen to radio broadcasts, watch TV, use a cellular phone or talk on a CB radio, invisible waves of electro-magnetic energy are bringing us messages from distant locations. These invisible waves continually bombard us as we walk down the street, play sports or putter about the garden. We only become aware of the 'electro-magnetic soup' that surrounds us if we have the right antenna and receiver for tuning in to these signals.

Back at the turn of the Century, Marconi discovered that it was possible to combine messages with invisible waves of electro-magnetic energy that radiate through space at the speed of light. For the first time ever, mankind was able to communicate over vast distances almost instantaneously. By the late-1920s, millions of people world-wide were tuning in to AM radio stations:

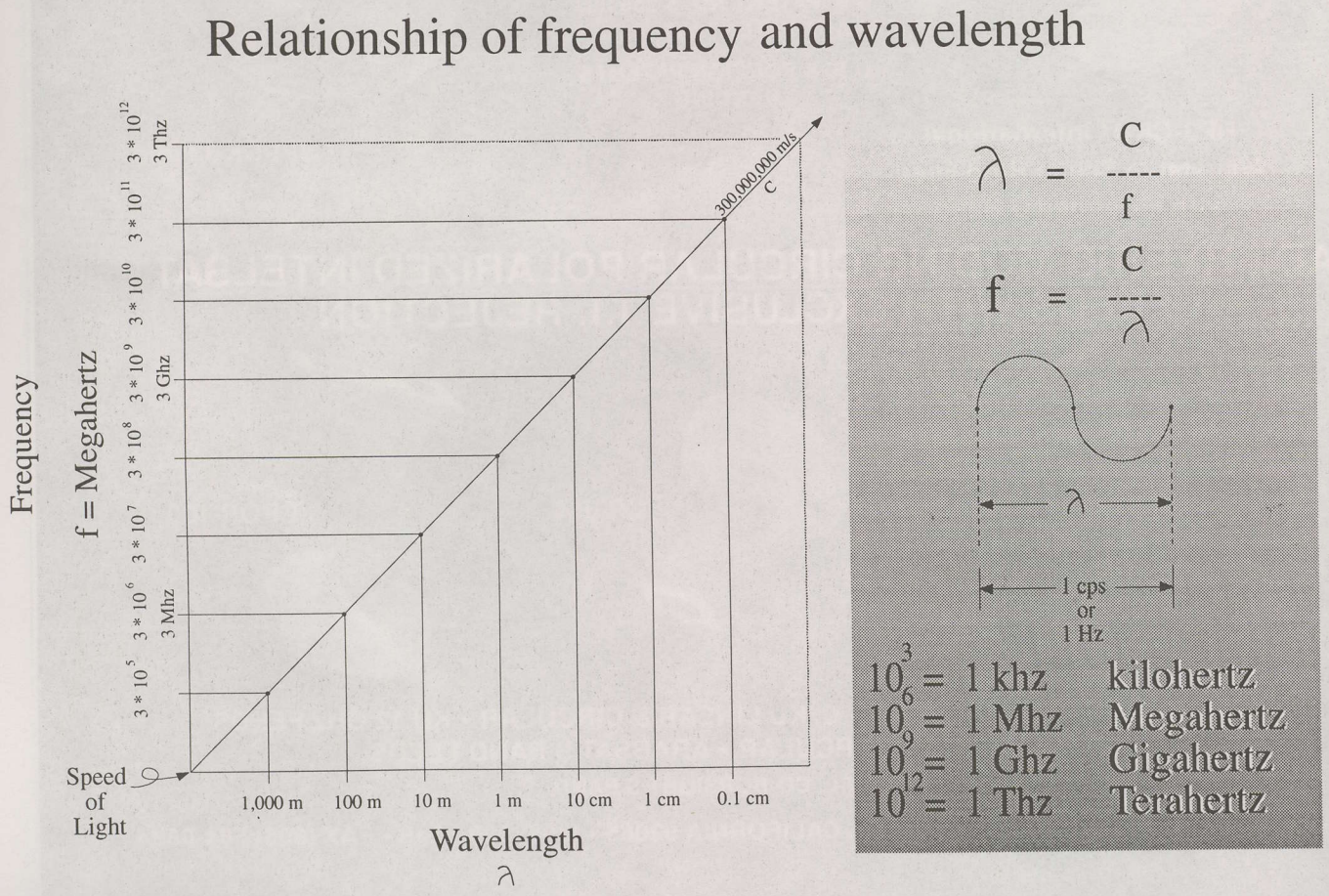


Figure 1 illustrates the inverse relationship between frequency and wavelength (C = the speed of light in m/s).

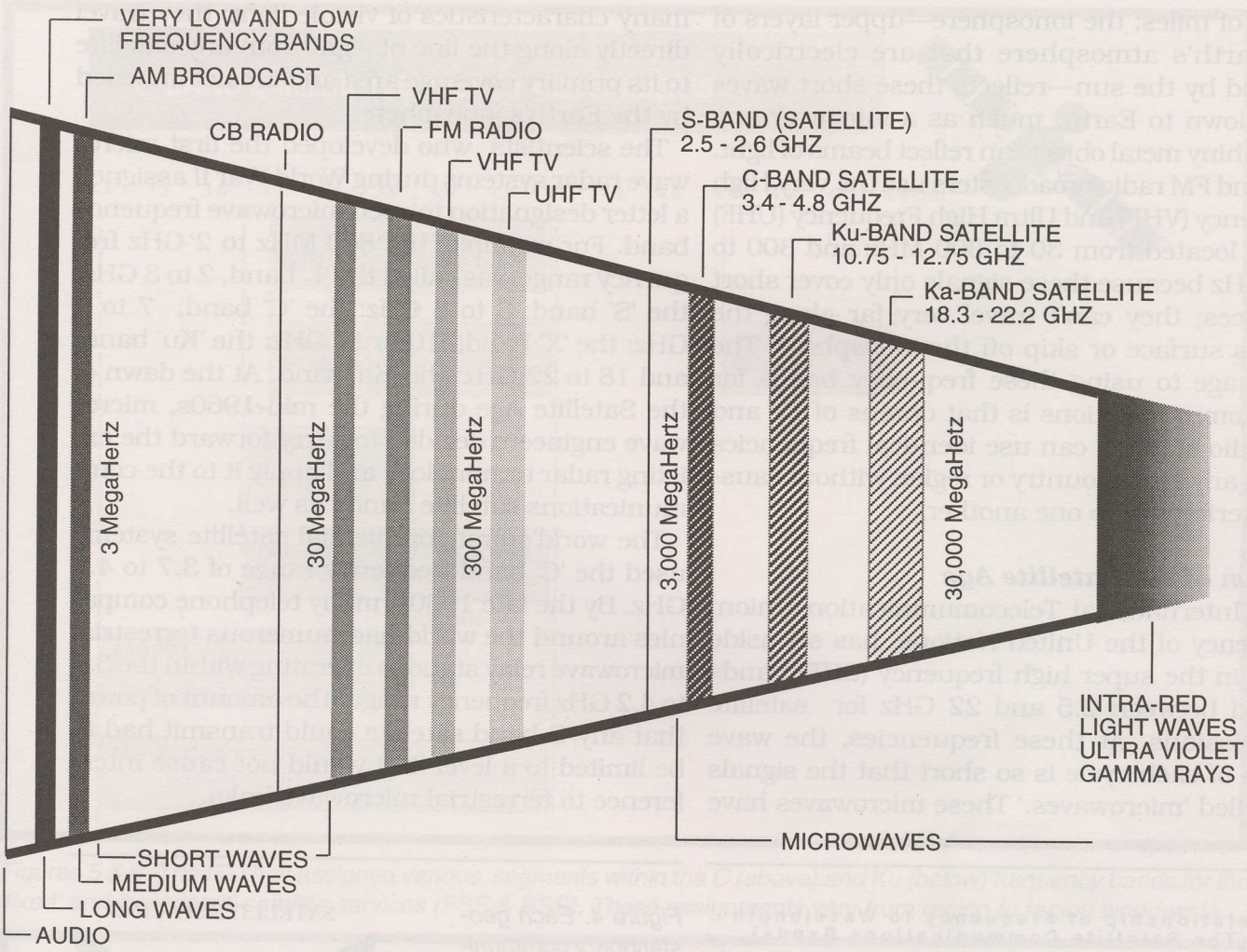


Figure 2: The electromagnetic spectrum. Because wave length decreases as frequency increases, each sub-set or 'band' of frequencies has its own unique set of propagation properties. Communication services are assigned to specific frequency bands in order to take advantage of these unique properties.

the world's first electronically generated 'virtual realities.' Back then, these transmissions were simply called radio waves. As time went on, however, it became apparent that waves of electro-magnetic energy could be used to transmit all sorts of information, including TV pictures.

In many respects, electro-magnetic waves are similar to waves on the ocean. In one complete 'cycle' of a wave, water rises from sea level until it swells to reach the crest of the wave, then plummets downward into the wave trough before rising again to sea level. A communication signal is the electro-magnetic equivalent of *a message in a bottle;* it rides a never ending succession of waves before arriving at its final destination.

The 'frequency' of any communications signal is the number of cycles per second at which the radio wave vibrates or 'cycles.' Electro-magnetic waves cycle at phenomenal rates: one thousand cycles per second is called a kilohertz (kHz), one million cycles per second a megahertz (MHz), and one billion cycles per second a gigaHertz (GHz). Today we refer to the continuum of frequencies used to propagate communications signals—100 kHz to 100 GHz and beyond—as the 'electro-magnetic spectrum.'

The distance that each wave travels during a single cycle is called its 'wave length.' There is an inverse relationship between frequency and wave length: the higher the frequency, the shorter the wave length.

Each sub-set or 'band' of frequencies within the electromagnetic spectrum has unique properties that are the result of changes in wave length. For example, 'Medium Wave' signals (500 kHz to about 3 MHz) radiate along the Earth's surface over hundreds of miles—perfect for relaying AM radio stations throughout a region.

International radio stations use the 'Short Wave' bands (3 to 30 MHz) to span distances of thou-

sands of miles; the ionosphere—upper layers of the Earth's atmosphere that are electrically charged by the sun—reflects these short waves back down to Earth, much as a mirror or any other shiny metal object can reflect beams of light.

TV and FM radio broadcasters use the Very High Frequency (VHF) and Ultra High Frequency (UHF) bands located from 30 to 300 MHz and 300 to 900 MHz because these signals only cover short distances; they can't travel very far along the Earth's surface or skip off the ionosphere. The advantage to using these frequency bands for local communications is that dozens of TV and FM radio stations can use identical frequencies within any given country or region without causing interference to one another.

Dawn of the Satellite Age

The International Telecommunication Union, an agency of the United Nations, has set aside space in the super high frequency (SHF) bands located between 2.5 and 22 GHz for satellite tranmissions. At these frequencies, the wave length of each cycle is so short that the signals are called 'microwaves.' These microwaves have many characteristics of visible light: they travel directly along the line of sight from any satellite to its primary coverage area and are not impeded by the Earth's ionosphere.

The scientists who developed the first microwave radar systems during World War II assigned a letter designation to each microwave frequency band. For example, the 800 MHz to 2 GHz frequency range was called the 'L' band, 2 to 3 GHz: the 'S' band; 3 to 6 GHz: the 'C' band; 7 to 9 GHz: the 'X' band; 10 to 17 GHz: the 'Ku' band; and 18 to 22 GHz: the 'Ka' band. At the dawn of the Satellite Age during the mid-1960s, microwave engineers decided to carry forward the existing radar terminology and apply it to the communications satellite bands as well.

The world's first commercial satellite systems used the 'C' band frequency range of 3.7 to 4.2 GHz. By the late 1960s, many telephone companies around the world had numerous terrestrial microwave relay stations operating within the 3.7 to 4.2 GHz frequency range. The amount of power that any C-band satellite could transmit had to be limited to a level that would not cause interference to terrestrial microwave links.

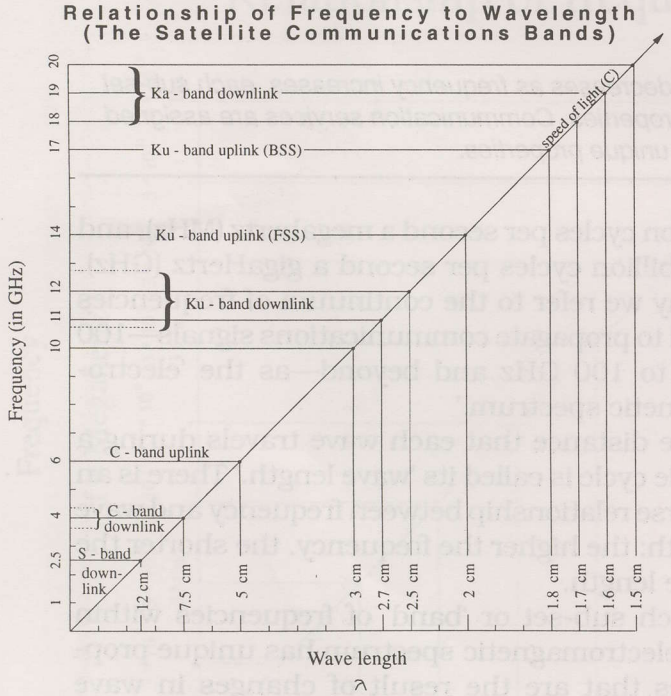


Figure 3 illustrates the relationship of frequency to wave length for the satellite communications bands. As we shall see in subsequent illustrations, each satellite frequency band also has unique properties which are a function of wave length.

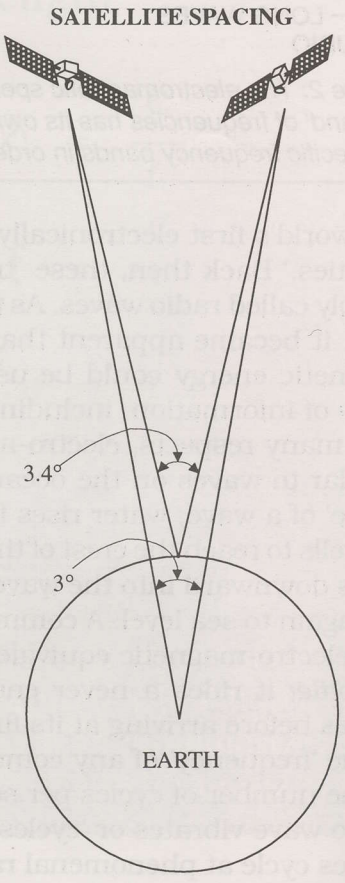
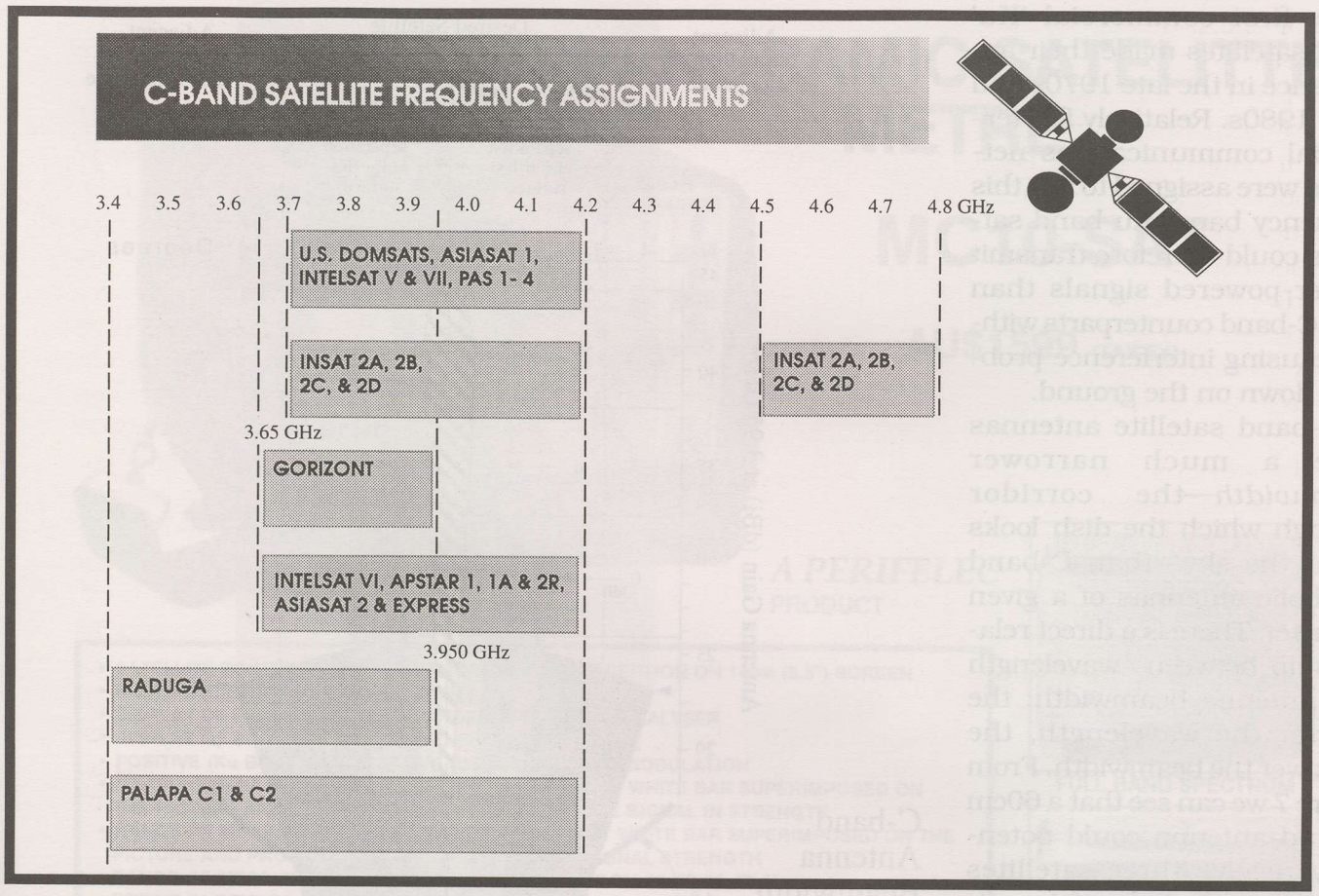
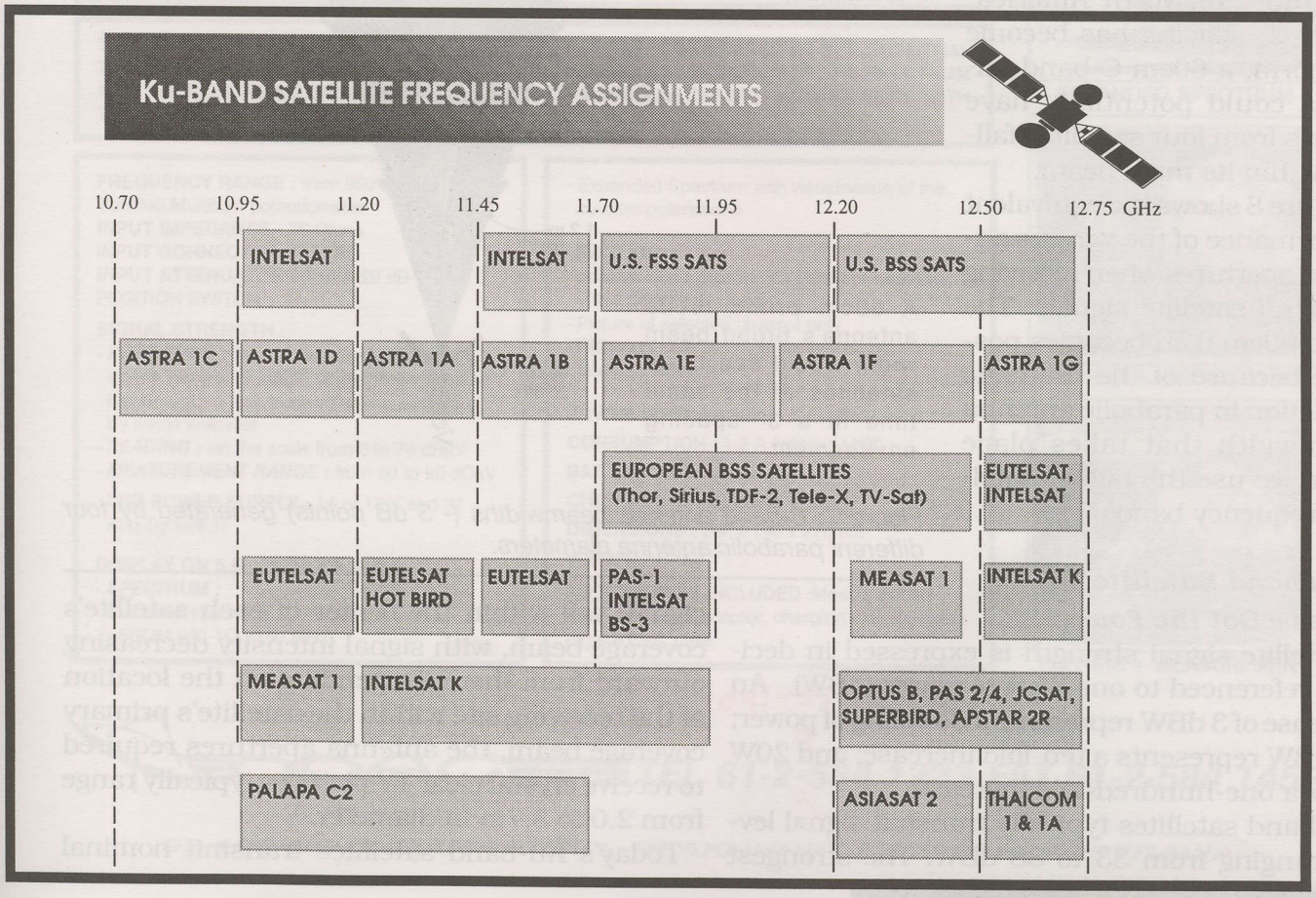


Figure 4. Each geostationary communications satellite is assigned a position over the Earth's equator which is defined in degrees of east or west longitude. The apparent spacing between two satellites as seen from the earth's surface is actually a bit wider. In the example presented right, 3° spacing in longitude between two geostationary satellites translates into an apparent spacing of 3.4° as seen from the surface.





Figures 5 & 6: The ITU has assigned various segments within the C (above) and Ku (below) frequency bands for the 'fixed' and 'broadcast' satellite services (FSS & BSS). These assignments vary from region to region world-wide.

The first commercial 'Ku' band satellites made their appearance in the late 1970s and early 1980s. Relatively few terrestrial communications networks were assigned to use this frequency band; Ku-band satellites could therefore transmit higher-powered signals than their C-band counterparts without causing interference problems down on the ground.

Ku-band satellite antennas have a much narrower *beamwidth*—the corridor through which the dish looks up at the sky—than C-band parabolic antennas of a given diameter. There is a direct relationship between wavelength and antenna beamwidth: the shorter the wavelength, the narrower the beamwidth. From Figure 7 we can see that a 60cm C-band antenna could potentially receive three satellites within its main beam if the satellites are separated by 3° in longitude. In North America, where 2° spacing has become the norm, a 60cm C-band antenna could potentially have signals from four satellites falling within its main beam.

Figure 8 shows the equivalent performance of the various antenna apertures when receiving Ku-band satellite signals. The 30 to 60cm dish becomes possible because of the dramatic reduction in parabolic antenna beamwidth that takes place when we use the higher satellite frequency bands.

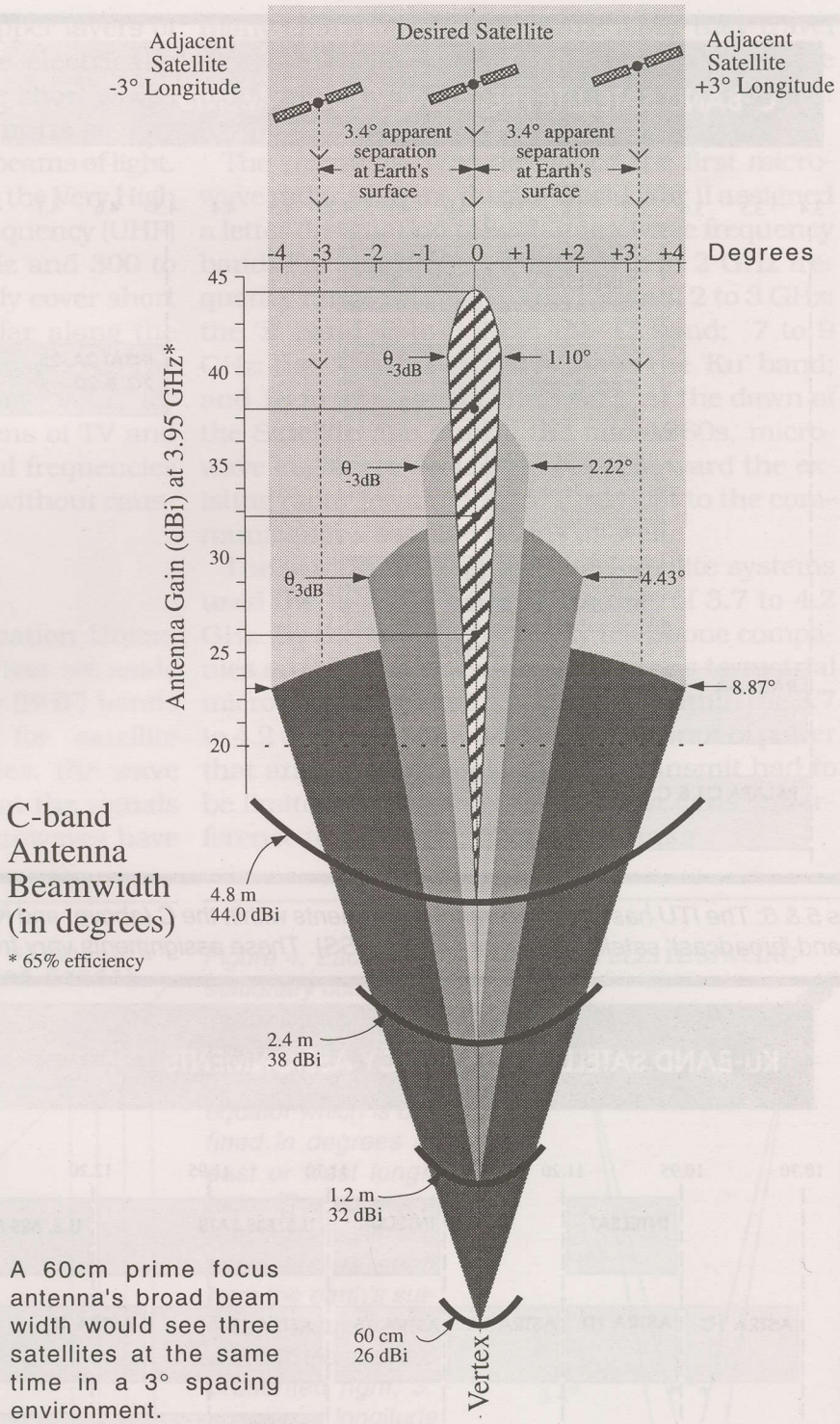


Figure 7: C-band antenna beamwidths (- 3 dB points) generated by four different parabolic antenna diameters.

Ku-band Satellite TV: We've Got the Power!

Satellite signal strength is expressed in decibels referenced to one Watt of power (dBW). An increase of 3 dBW represents a doubling of power; 10 dBW represents a ten-fold increase; and 20W dBW a one-hundred-fold increase.

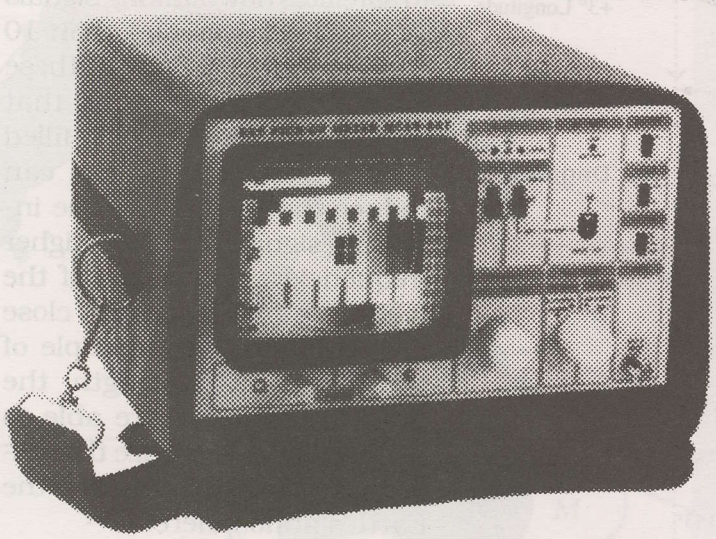
C-band satellites typically transmit signal levels ranging from 33 to 38 dBW. The strongest signals fall within the center of each satellite's coverage beam, with signal intensity decreasing outward from there. Depending on the location of the receiving site within the satellite's primary coverage beam, the antenna apertures required to receive crystal clear TV pictures typically range from 2.0 to 3.7m in diameter.

Today's Ku-band satellites transmit nominal

PANORAMIC SATELITTE METRE

MC10-SAT

AU$1599 (TAX-EX)



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- SATELLITE POINTER AND FIELD INDICATOR WITH RECEPTION ON 14cm (5.5") SCREEN
- FREQUENCIES FROM 950 TO 2150 MHz
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- DISPLAY OF PICTURE OF SELECTED CHANNEL
- POSITIVE (Ku Band) AND NEGATIVE (C Band) VIDEO DEMODULATION
- MEASUREMENT OF SIGNAL RECEPTION STRENGTH BY WHITE BAR SUPERIMPOSED ON THE PICTURE AND PROPORTIONAL IN LENGTH TO THE SIGNAL IN STRENGTH
- RANGE OF MEASUREMENT OF SIGNAL STRENGTH BY WHITE BAR SUPERIMPOSED ON THE PICTURE AND PROPORTIONAL IN LENGTH TO THE SIGNAL STRENGTH
- RANGE OF MEASUREMENT OF SIGNAL STRENGTH FROM 50 TO 90 dBµV
- POWER SUPPLY TO LNB IN 14 OR 18 VOLTS AND 22 KHz
- BATTERY LIFE : ABOUT 1 HOUR
- WEIGHT : 5.1Kg

THE MC10-SAT SATELITE FIELD STRENGTH METER IS NOW CONSIDERED AS THE ESSENTIAL TOOL FOR ADJUSTING SATELITE RECEPTION DISHES.THE VISUALISATION OF THE SPECTRUM AND THE PICTURE ALLOWS THE CARRYING OUT OF ALL THE NECESSARY ADJUSTMENTS WITH THIS ONE INSTRUMENT.

FREQUENCY RANGE : from 950 to 2150 MHz
TUNING:Multiturn potentiometer
INPUT IMPEDANCE : 75 Ohms
INPUT CONNECTOR : F-TYPE
INPUT ATTENUATOR : 0.10 & 20 dB USING 3 POSITION SWITCH

SIGNAL STRENGTH :
- ***INDICATION :*** by a white bar superimposed on the picture, its length being proportional to the strength of the received signal, and also by audio indicator
- ***READING :*** on the scale from 0 to 70 dBµV
- ***MEASUREMENT RANGE :*** from 50 to 90 dDµV

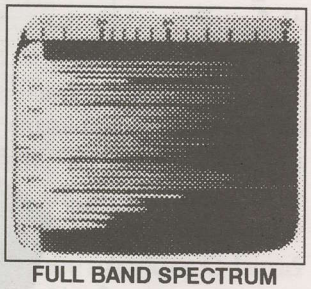
LNB POWER SUPPLY : 14 or 18 V and 22 KHz by switch

DISPLAY ON 5.5" CATHODE TUBE
- ***SPECTRUM :***
- Full band spectrum
  (FROM 950 TO 2150 MHz)
- Expanded Spectrum with visualisation of the counter-polariations

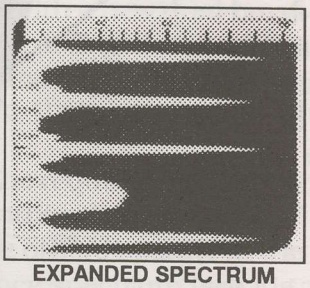
- ***PICTURE :***
- positive video polarity (Ku Band) or negative video polarity (C Band)
- Picture of selected channel only
- Picture of selected channel with signal strength indication

POWER SUPPLY : 12V, 3 AH battery
CONSUMPTION : 1.2 A (without LNB)
BATTERY LIFE : about 1 hour
CHARGING TIME : about 4 hours
DIMENSIONS : 240 x 140 x 270mm
WEIGHT : 5.1Kg

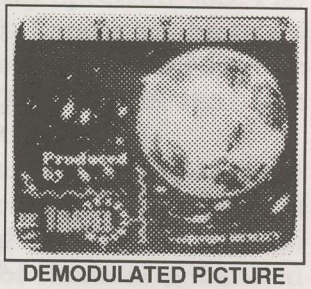
ACCESSORIES INCLUDED : Measurement cord, AC mains adaptor, charging lead for car cigar-lighter, case.



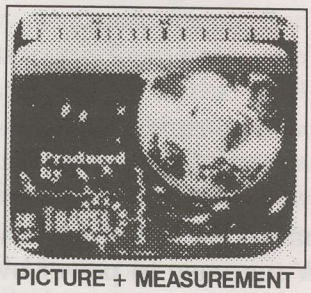
FULL BAND SPECTRUM



EXPANDED SPECTRUM



DEMODULATED PICTURE



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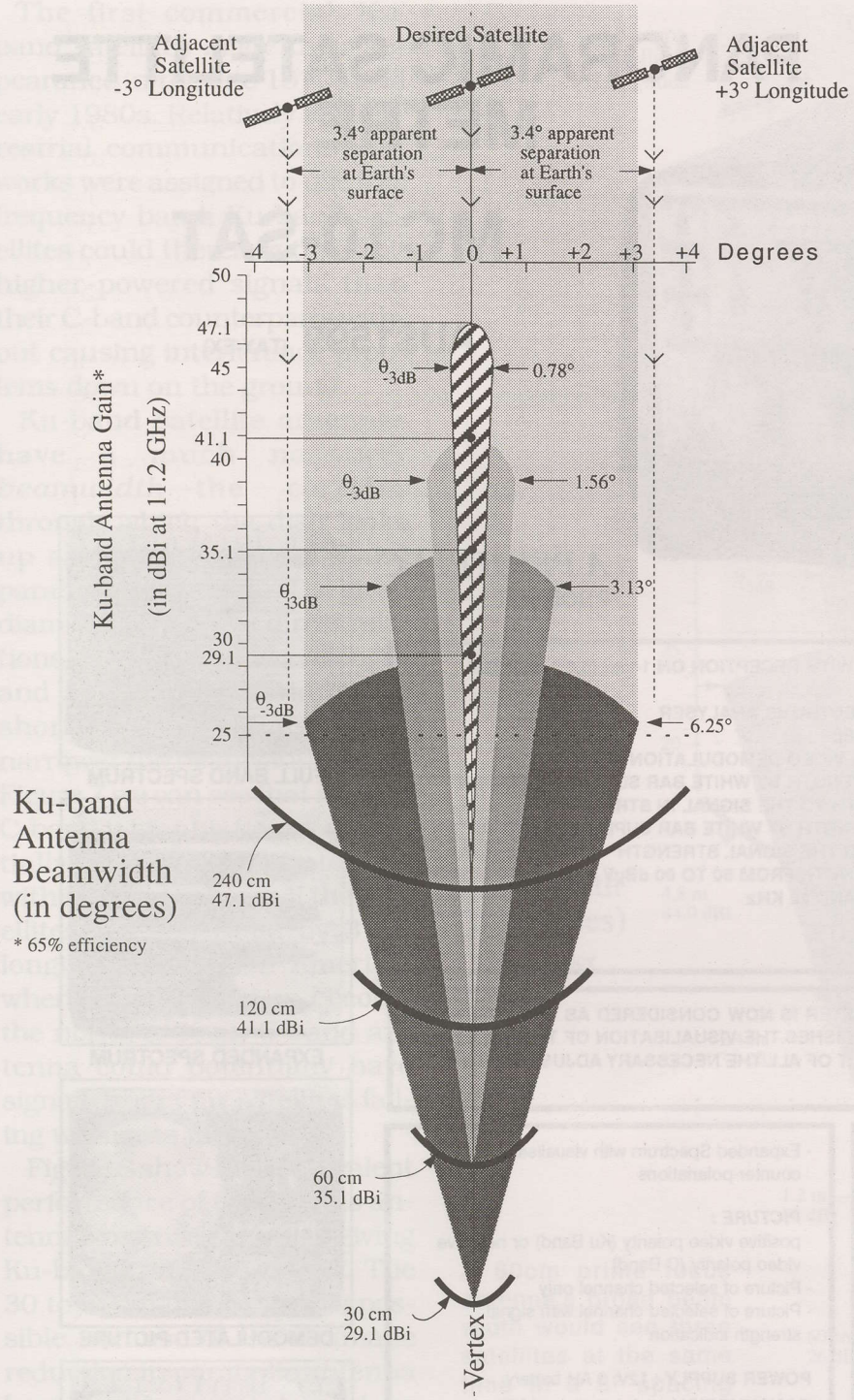


Figure 8: Ku-band antenna beamwidth (- 3 dB points) generated by four different parabolic antenna diameters.

signal levels ranging from 47 to 52 dBW—a 14 dBW increase in power over what most C-band satellites can deliver. Receiving antennas as small as 30cm in diameter can therefore be used to receive Ku-band satellite signals. This significant reduction in antenna size lowers the cost of the receiving equipment and simplifies the system installation requirements.

Blame It On The Rain

There is one major drawback to satellites downlinking signals at frequencies greater than 10 GigaHertz: the length of these microwaves is so short that rain, snow or even rain-filled clouds passing overhead can reduce the intensity of the incoming signals. At these higher frequencies, the length of the falling rain droplets are close to a resonant sub-multiple of the signal's wave length; the droplets therefore are able to absorb and de-polarize the microwaves passing through the Earth's atmosphere.

In places such as Southeast Asia or the Caribbean, torrential downpours can lower the level of the incoming Ku-band satellite signal by 20 dB or more; this may severely degrade the quality of the signals or even interrupt reception entirely. The duration of rain outages, however, is usually very short and typically occurs in the afternoons or early evenings rather than during the prime time evening viewing hours. For most Ku-band satellite TV viewers, these service interruptions will only amount to the loss of a few hours of viewing time over the course of any year.

To help counteract the effects of rain fade, Ku-band system designers typically use a larger antenna than what would be required under clear sky conditions. This increase in antenna aperture gives the system several dB of margin so that the receiving system will continue to function in light to moderate rain storms

Satellite TV viewers in arid regions such as central Australia or the Middle East will rarely experience rain outages. In the Middle East, however, satellite dish owners may experience outages caused by intense sand storms. The presence of any atmospheric particulate—even sand—can have an adverse effect on satellite TV reception.

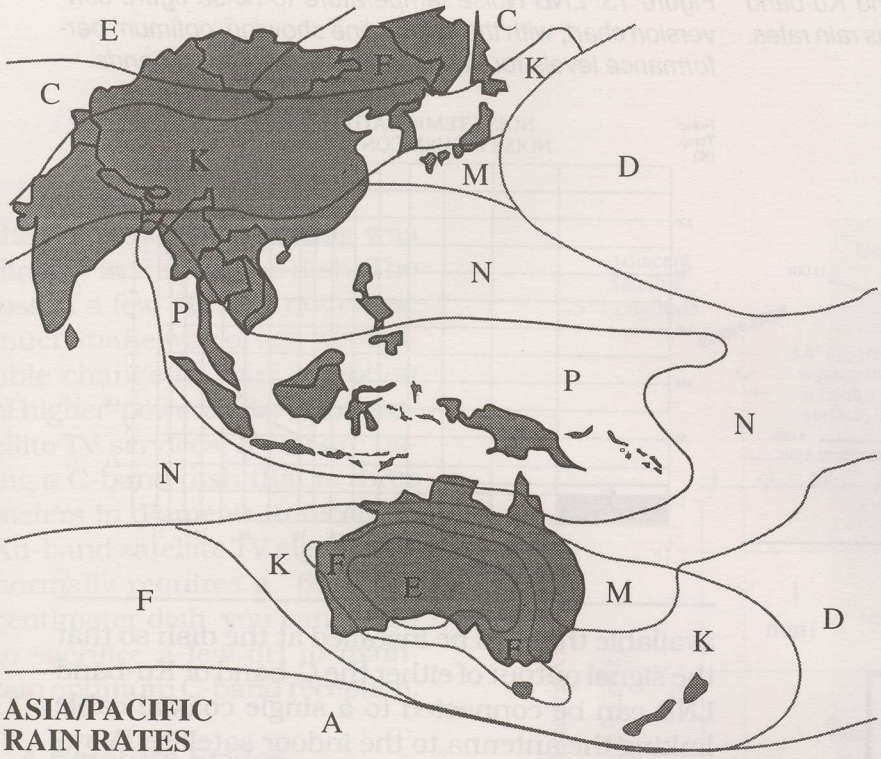


Figure 9: Asia/Pacific rain rate regions. Use Figure 9 below to compute the rain rate percentages for your area.

curacy of the dish. Does the antenna surface look smooth and continuous, with little variation in how the mesh material adheres to the frame? Mesh antennas should not have major bumps or depressions in the mesh material. Variations of as little as a fraction of an inch can affect antenna performance. The wave length of a Ku-band satellite signal is about one-third the wave length of a C-band signal; surface inaccuracies which wouldn't have much of an affect on C-band signals will affect the antenna's ability to receive Ku-band signals.

Special dual-band feed horns are available for simultaneous reception of both satellite bands. It is a relatively simple affair to replace an older C-band feed horn with a new dual-band feed. The existing C-band LNB can be removed from the older feed horn and attached to the new dual-band feed.

Upgrading Systems from C- to Ku-band

Just about any C-band satellite dish can also be used to receive Ku-band satellite signals. Solid metal dishes tend to perform best, but even perforated or mesh antennas will work—especially if the holes in their surfaces are extremely small. One important consideration is the surface ac-

A Ku-band LNB also will be required. Some Ku-band satellites transmit within the 10.7 to 11.7 GHz frequency range, while others operate in the 11.7 to 12.75 GHz frequency spectrum (see Fig. 6). Make sure that the Ku-band LNB matches the frequency range used by the satellite TV services that you want to receive.

Ku-band LNBs are graded according to a 'noise figure' that is expressed in dB/K. A certain amount of noise is generated within any electronic circuit. For best system performance, the noise contribution of the LNB must be kept to a minimum. Therefore a Ku-band LNB with a noise figure of 0.82 dB/K is superior to an LNB with a noise figure of 1.06 dB/K.

It usually is not necessary to add a second coaxial cable between the receiver and the Ku-band LNB when upgrading to a dual band reception system. Electronic band switches are

Rain Rates in mm/hr versus Percentage of Time

RAIN RATE ZONES A - P (SEE ACCOMPANYING MAP FOR ASIA/PACIFIC)

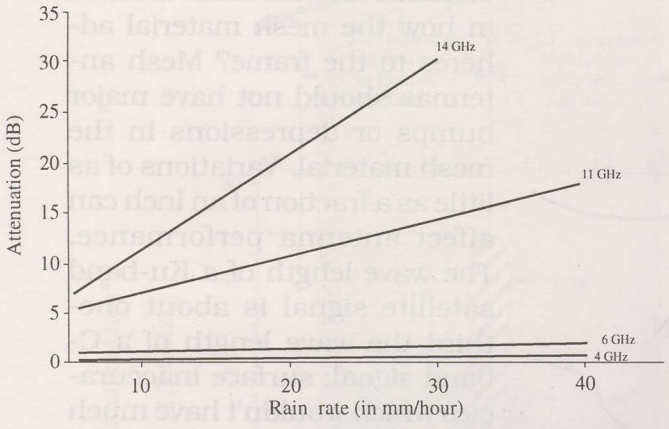
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
Time														
1.0%	0	1	2	3	1	2	3	2	8	2	2	4	5	12
0.3%	1	2	3	5	3	4	7	4	13	6	7	11	15	34
0.1%	2	3	5	8	6	8	12	10	20	12	15	22	35	65
0.03%	5	6	9	13	12	15	20	18	28	23	33	40	65	105
0.01%	8	12	15	19	22	28	30	32	35	42	60	63	95	145

1 Year = 8,760 hours
1.0% = 87.6 hours
0.3% = 26.28 hours
0.1% = 8.76 hours
0.03% = 2.63 hours
0.01% = 0.86 hours

99.7% availability in rain zone 'P' requires that the receiving system have sufficient built-in margin above receiver threshold to overcome rain rates of less than 34mm/hr. A rate of 0.3% rain outages equates to 26.28 hours of signal interruption per year.

Figure 10: Rain Rates in mm/hr as a percentage of time annually. The author currently resides in zone P, which experiences the highest level of rain fades in the world.

Figure 11: Rain attenuation (in dB) of C- and Ku-band satellite (uplink and downlink) signals at various rain rates.



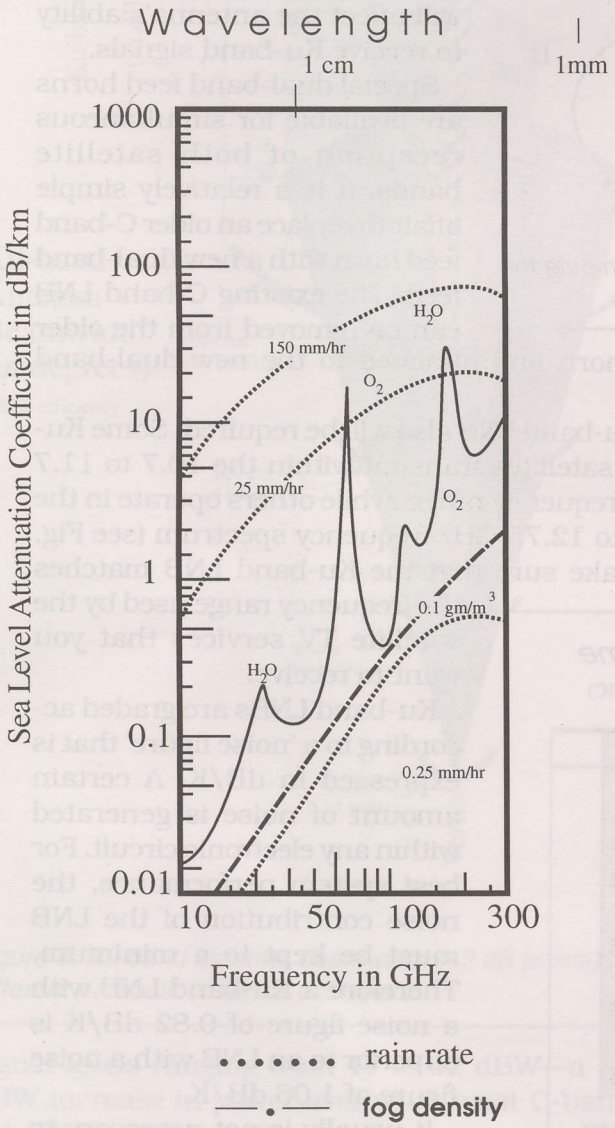
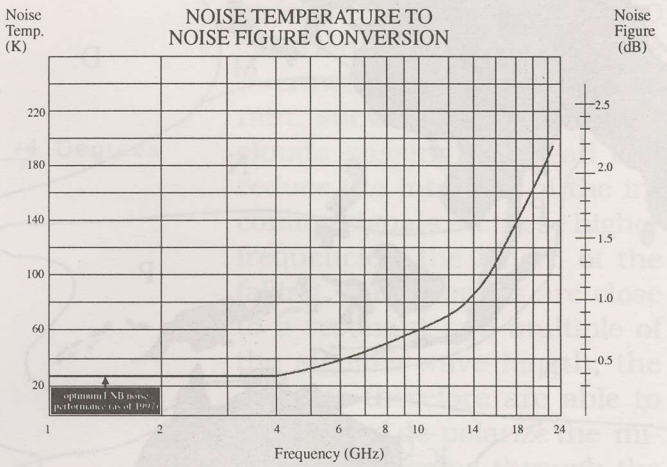


Figure 12: Sea Level Attenuation Coefficient in dB/km. Keep in mind that the portion of the Earth's atmosphere that the satellite must pass through and which may contain rain drops or moisture will only be a few kilometers in thickness. Molecular absorption by H_2O in the atmosphere will have a measurable effect on Ka-band signals.

Figure 13: LNB Noise temperature to noise figure conversion chart, with the curved line showing optimum performance levels for various satellite frequency bands.



available that can be installed at the dish so that the signal output of either the C-band or Ku-band LNB can be connected to a single coaxial cable linking the antenna to the indoor satellite TV receiver. If you intend to use a remote band switch, be sure that your satellite TV receiver is capable of switching its LNB power supply voltage between 13 and 17 volts dc—the essential requirement for triggering the remote band switch installed in proximity to the antenna.

Special Cases

The use of a dual-band feed horn may not be the best choice for small-dish installations (2m or smaller) or where the reception quality from one of the popular C-band satellite TV services is already borderline. Dual-band feeds place both the C and Ku band feed openings directly at the focal point of the antenna. This placement of both feed openings at such proximity to each other results in some C-band signal loss. If some of your favorite C-band TV services already display impulse noise or 'sparklies' in their pictures, then switching to a dual-band feed will only further degrade your reception of these channels.

Chaparral Communications manufactures a Ku-band retrofit feed that bolts directly onto one side of their C-band feed horns. In this case, the Ku-band feed opening is offset from the C-band feed horn's wave guide and thus will not significantly affect your reception of the C-band channels. The Ku-band retrofit feed horn is offset from the C-band feed horn along the plane of the antenna that is perpendicular to the polar axis of the dish; signals received by the Ku-band retrofit feed will therefore be several dB lower than if

the Ku-band feed opening was directly in front of the dish. The loss of a few dB may not cause much in the way of any perceptible change in your reception of higher-powered Ku-band satellite TV services. If you are using a C-band dish that is three meters in diameter to receive a Ku-band satellite TV signal that normally requires a 60 or 90 centimeter dish you can afford to sacrifice a few dB to maintain optimum C-band reception.

A Satellite Bridge to the 21st Century

Sixteen years ago, the number of commercial Ku-band communications satellites orbiting the earth could be counted off using the fingers of one hand; today there are more than seventy-five Ku-band satellites in operation world-wide. Within the past few years, satellite operators have begun exploring the brave new world at 20 GHz. Only a few Ka-band satellites are currently in orbit: ACTS (USA); Superbird and N-STAR (Japan), DFS Kopernikus (Germany), and Italsat (Italy). However, expect the use of this higher frequency band to increase dramatically during the first decade of the 21st century.

Mark Long is the author of several books and instructional videotapes on satellite communications, including the best-selling World of Satellite TV, now available in new editions for Asia and the Middle East; and for Australia, New Zealand, and the South Pacific. He can be contacted by e-mail at: mlesat@cm.ksc.co.th

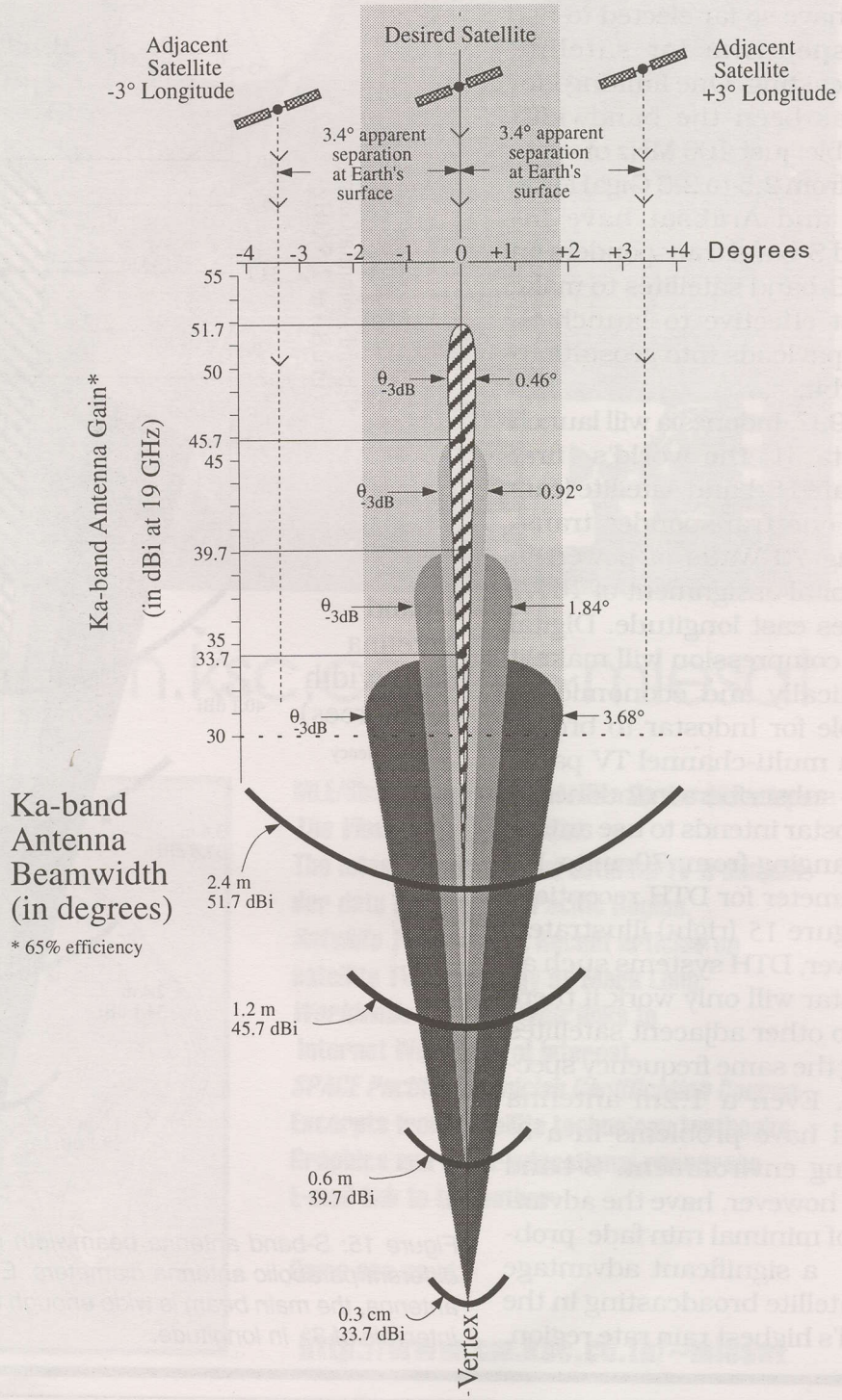


Figure 14: Ka-band antenna beamwidth (- 3 dB points) generated by four different parabolic antenna diameters. In the crowded orbital environment of the 21st Century, narrower Ka-band beamwidth will be an attractive option.

The Saga of S-Band

Although the International Telecommunication Union has assigned S-band frequency spectrum for direct-to-home TV transmissions, few organizations have so far elected to use this spectrum for satellite broadcasting. One limiting factor has been the bandwidth available: just 100 MHz of spectrum from 2.5 to 2.6 GigaHertz. India and Arabsat have included S-band transponders on their C-band satellites to make it cost effective to launch S-band payloads into geostationary orbit.

In 1997, Indonesia will launch Indostar 1, the world's first dedicated S-band satellite (carrying one transponder transmitting 70 Watts of power) to an orbital assignment of 107.7 degrees east longitude. Digital video compression will make it technically and economically feasible for Indostar to broadcast a multi-channel TV package to subscribers in Indonesia.

Indostar intends to use antennas ranging from 70cm to 1m in diameter for DTH reception. As Figure 15 (right) illustrates, however, DTH systems such as Indostar will only work if there are no other adjacent satellites using the same frequency spectrum. Even a 1.2m antenna would have problems in a 3° spacing environment. S-band does, however, have the advantage of minimal rain fade problems, a significant advantage for satellite broadcasting in the world's highest rain rate region.

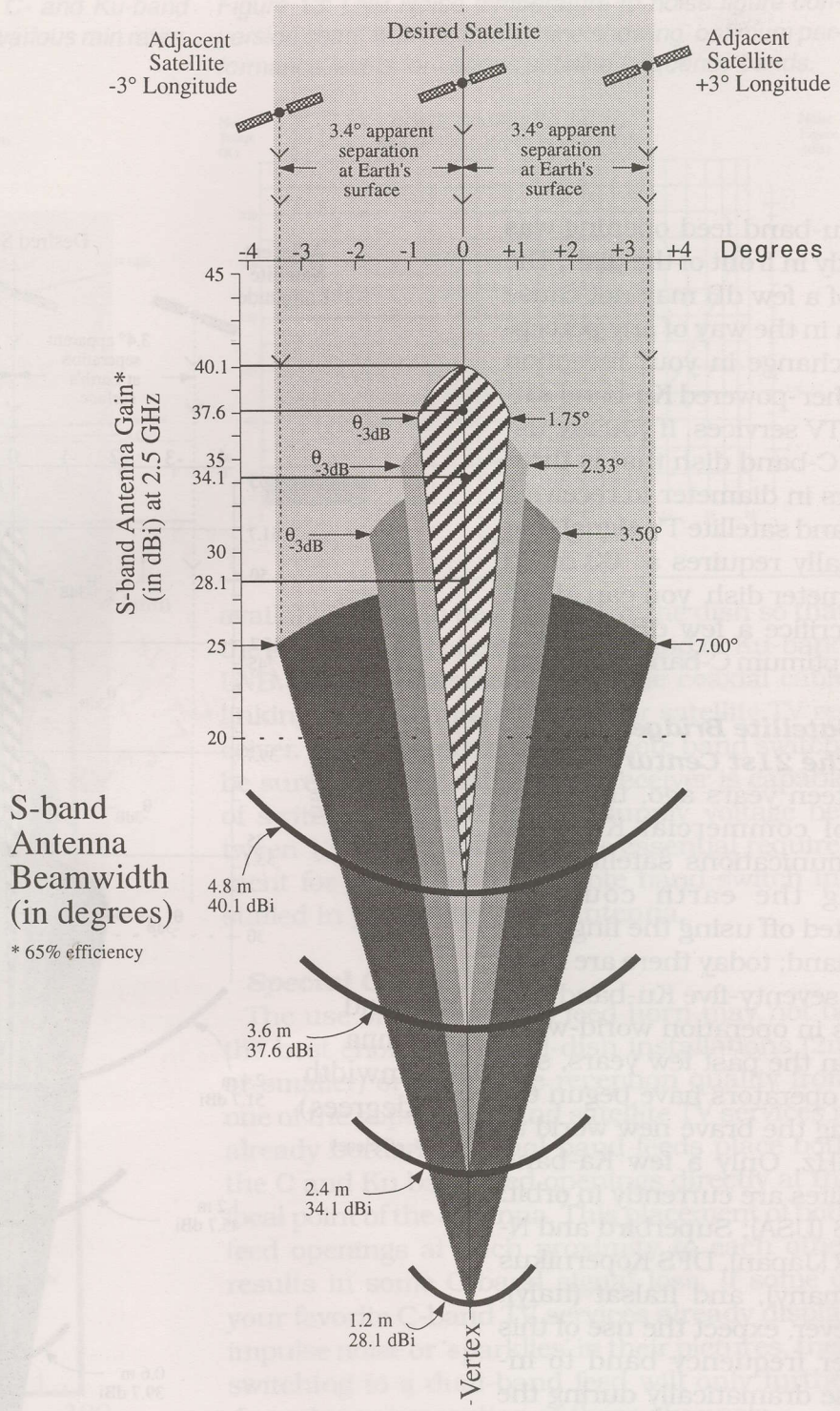


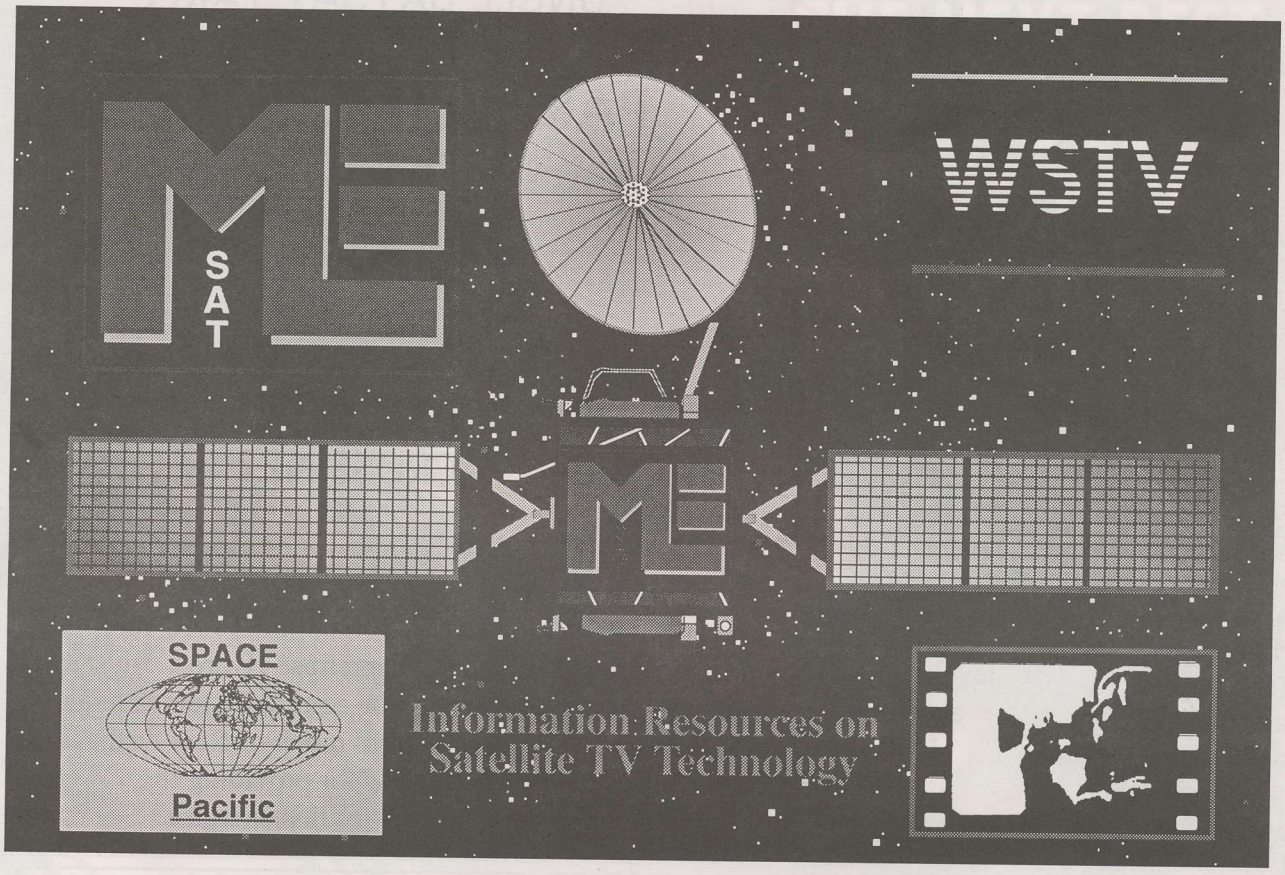
Figure 15: S-band antenna beamwidth (- 3 dB points) generated by four different parabolic antenna diameters. Even when using a 1.2m parabolic antenna, the main beam is wide enough to receive multiple birds spaced at intervals of 3° in longitude.

Formulas used in the preparation of this article:

Wavelength (m) = C/f
where C = the speed of light: 300,000,000 m/s
and f = the frequency in GigaHertz

Antenna Gain (dBi) = 10log(pi^2xE(D/W)^2
where E = antenna efficiency
W = wavelength in meters
and D = antenna diameter in meters

Antenna Beamwidth (°) = 70 x (W/D)
(at -3 dB points)



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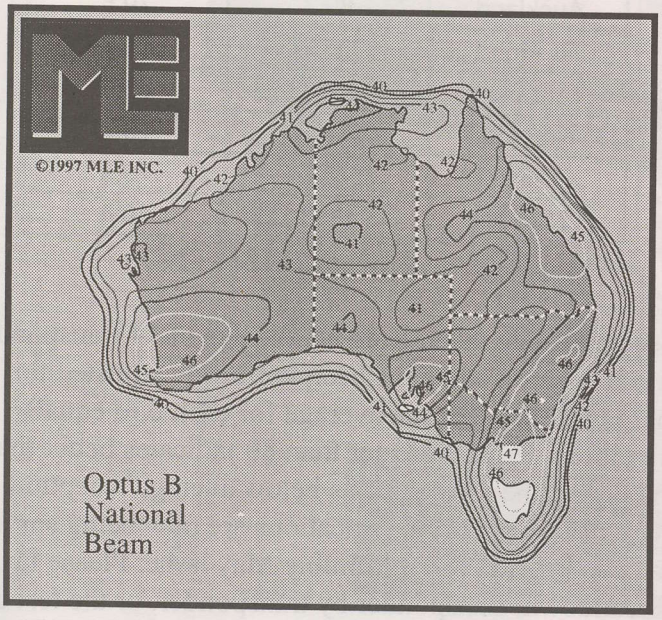

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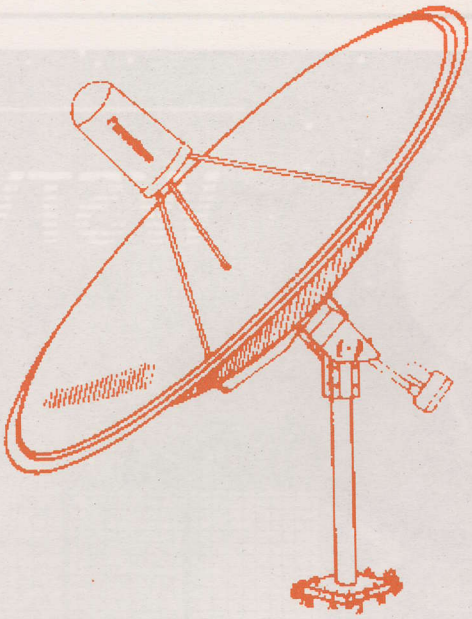
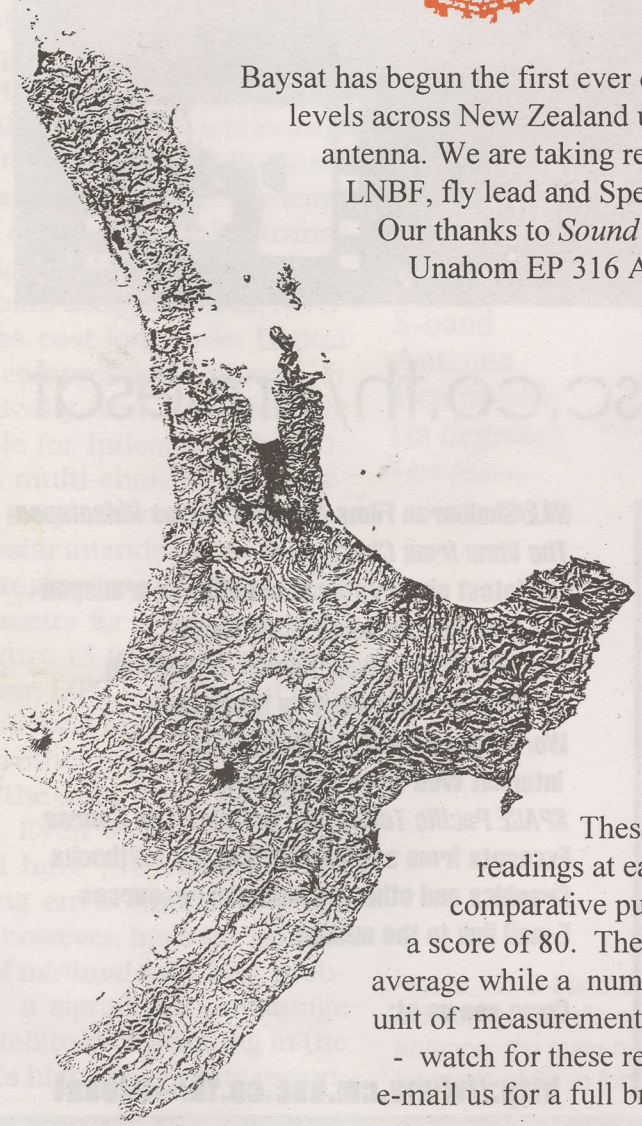


UNCLE BAYSAT TAKES THE NEW **PARACLIPSE HYDRO** ON THE ROAD ...

JUST HOW EVEN IS PALAPA C2 RECEPTION ACROSS NZ?



Baysat has begun the first ever detailed evaluation of Satellite TVRO reception levels across New Zealand using the amazing Paraclipse Hydro 1.5m steel antenna. We are taking readings using the same control system antenna, LNBF, fly lead and Spectrum Analyser across much of New Zealand. Our thanks to *Sound & Vision Systems Ltd* for providing the Unahom EP 316 A Spectrum Analyser for this exercise.

Location	Palapa C2	PanAmSat PAS2
Mangonui	79.4	80.1
Whangaparaoa	80.6	80.1
Auckland	80.3	79.5
Te Aroha	80	79.9
Tauranga	80.2	79.9
Rotorua	79.9	79.9
Taupo	79.2	79.9
Napier	80.3	80.4

These results are taken from an average of 14 transponder readings at each location and have been uniformly adjusted for comparative purposes such that the average for each bird equals a score of 80. Therefore a reading greater than 80 indicates better than average while a number less than 80 suggests below average reception. The unit of measurement is dBuV. Additional locations are now being surveyed - watch for these results in SatFACTS Monthly May issue. Please fax or e-mail us for a full breakdown, transponder by transponder, or the test data.

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New Services - No New Receivers

MPEG-2 RECEIVER UPDATE 97-3

A letter to a SatFACTS reader dated April 7th from SA's Elizabeth Jennison, notes:

"We do not have a software version at this stage that will guarantee interoperability with (non SA) transmissions, and are currently pursuing this with our office in Toronto. We are actively working with other manufacturers on interoperability issues, however, backwards compatibility to existing transmissions would then require the broadcaster to upgrade their uplink equipment."

"We have in the past 'retrofitted' software on an experimental basis, with non proven software versions, which our customer advised, provided to him a suitable level of interoperability on MPEG (non-SA) transmissions."

With respect to SI (system information) instructions which all MPEG receivers require, from the uplink data stream, to function, a reader in Hong Kong notes:

"The original network ID is one of those things in the SI an IRD requires to operate. DVB defines what it should be and if the network ID gets screwed up, interesting things can happen. We have noted that the DMV 3000 receiver is least affected by incorrect SI data while the SA is most affected.

"SA elects to diddle with this and that in the SI stream to make the life of the receive system engineer miserable. Mucking around with the Network IDs isn't nice, but the Reserved Stream is intended to be used by proprietary stuff so as to flag itself that something entirely different is there.

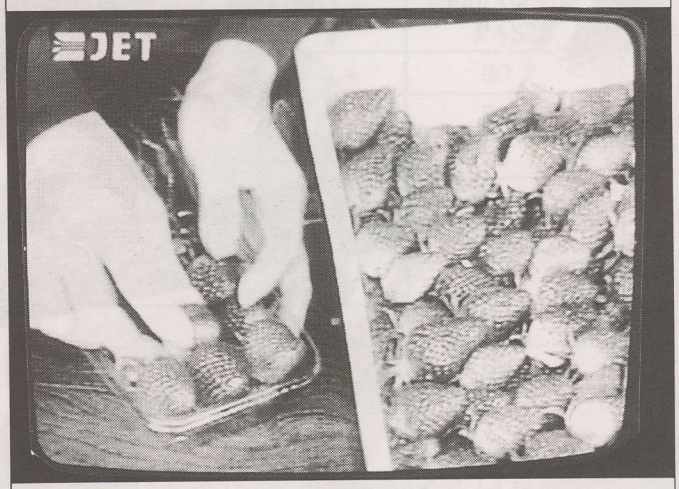
"As soon as you mess with the Network ID SI it is my opinion the service is no longer DVB Interoperable - maybe it is still OK to claim you are 'DVB Compatible' since the transmission data stream is to the (DVB) spec. Pretty tricky rope these people are walking."

All of this becomes relevant after Nokia engineers reported (p. 3, this issue) "We (have found) problems (with the PowerVu service) which makes it not DVB Compliant.

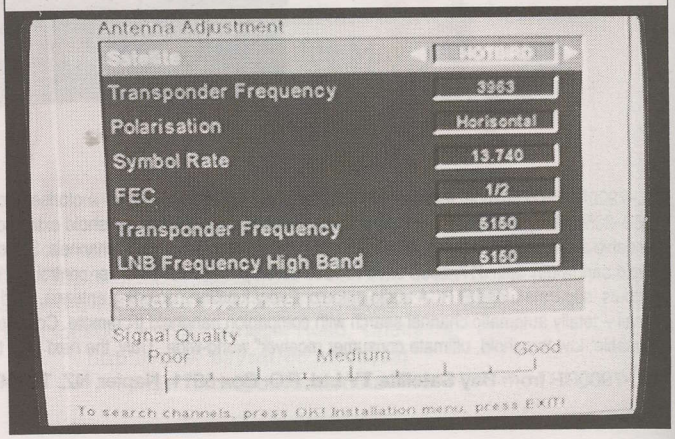
"For example, on PAS-2 the network IDs and the transport IDs are the same on all (transport) streams. And, the stream type in the SDT is not digital TV (0 x 01 or 0x02) but defined as 0x00 (reserved)."

Out of all of these claims and counterclaims comes the realisation that SA is not likely to be swayed by either public opinion nor the pressure of competitive engineers who are now calling their bluff on compatibility. People

ADDITION of Deutsche Welle Teletext (#6 on listing) allows MediaNet to deliver connection to Internet. Unfortunately, only DMV 3000 receivers presently support this service.



JET (Japanese Entertainment Television) is 5 programme channel service testing on PAS-2. Operational date not known; 4 languages including English. Nokia search and identify routine parameters below.



who, like Robin Colquhoun, have some measure of success in causing a D9223 to function with MPEG-2 DVB Compliant services, will be frustrated if they attempt to take their findings back to SA for support from the SA engineering team. Colquhoun comments on this on p. 22.

Nokia Hiccups

European experience with the Nokia 9500 S is highlighted in our "At Sign-off" report in this issue. Some readers report delivery of a "Version 2052" early in April.

The March 19th edition of Coop's Technology Digest (CTD) reported:

"Nokia produced an initial 100 quantity test run of their 9500 S software version 1.63 receiver in December. Late in January an additional 500 of this model was produced under the part number 2053 to test the Chinese market where 9 new SCPC services have gone into operation and Nokia appointed Genesis Plastics and Electronics (Hong Kong) to distribute the 2053 for SE Asia." Nokia advised CTD in mid-March, "The Chinese needed receivers and we could deliver. It was as simple as that." Perhaps. But controlling who would receive the "2053/2052" might prove to be more difficult.

A New Zealand reader obtaining a model the seller described as a "2052" found the 9 Chinese SCPC services preloaded in the auto-install menu as the unit came out of the box. Attempts to deload the Chinese services resulted in loading one new channel at a time to the first memory position. Another reader testing the same unit found it will load NBC and the EBB but not with the flexibility of the seemingly older V1.63.

Nokia advised SatFACTS April 8th that a new software version (number not known) would be available "later in April." As this will be the first software revision since Nokia engineers have travelled to Taiwan to set up tests using PAS-2 PowerVu services, it will be of considerable interest to see if their "Taiwan field trip" results in greater receiver "interoperability" for the latest version.

Reader Howard Small in Australia attended the CeBIT '97 show in Hannover, Germany where he found "crowds of people" that prevented "spending worthwhile time playing with the equipment" at the massive Nokia stands. There, Small located a Nokia engineer who told him:

► A number of 9500 S receivers are presently at Chinese cable headends in a final pre-release "test"

► Software upgrades for the 9500 S will be available to IRD users through Internet; there will be a fee for each upgrade (fee not yet determined)

Reception Tid-Bits

An alert Francis Kosmalski (Auckland) noticed a new strong analogue transmission on PAS-2, 1405Hz the

Robin Colquhoun writes-

THE D9223 SAGA COMES TO AN END - or does it?

"I have to begin by stating that I know everything and I know nothing. The software writing I have done to allow me to operate the D9223 without touching the front panel could have been done by anyone with the desire to get the job done. During the past month I have taken a HP1000cx Palm Top (PC) with 1 meg of RAM and loaded into it all of the various bouquet parameters for the many services now operating in PowerVu or FTA MPEG DVB. The Palm Top is basically a larger than normal remote control that ends the drudgery of having to enter and re-enter (and re-enter etc) all of the new parameters each time you wish to change programming service bouquets with the D9223.

"The 'Saga Of The D9223' comes to an end because although SA have stated they never promised to receiver would work on free to air non PowerVu, they apparently accept that some versions of the software may well indeed work (with limitations). SA in Canada (the manufacturing home of the D9223) has been made aware that the demand for the D9223 to work on other services does warrant a software change to allow this to happen. Corporate policy seems to have terminated any present attempt to release such software however. When I was visiting SA Australia (during March) I suggested they release a version of the software to me so that I could load it into D9223 receiver boxes in New Zealand. My plan was quite simple: It costs upwards of NZ$200 to air ship a D9223 across the Tasman and back and if we could avoid this cost (as well as loss of receiver use for several weeks) everyone would be better off. Alas, SA decided against my offer citing 'commercial software sensitivities' as their reasoning. It is, after all, their software and I do not begrudge them for the decision. I suggested an alternate plan: Would they supply a software version that would allow the D9223 to only access the non-PowerVu services (i.e., those that are truly FTA MPEG DVB)? Their response: 'We may be coming out with a D9223 version of our own that does this.' The operative phrase here is 'may be.'

"Those who witnessed the demonstration at January's satellite show, went home and ordered a D9223 certain that with new software you would be able to download the FTA DVB services. I understand your frustration with a receiver that does not work the way you saw mine work in Auckland. In fact I took with me a videotape to SA Sydney to illustrate what happens with the latest version software when you try to access FTA DVB services. It turns out the SA Sydney office does not have a functional C-band dish and cannot itself access PAS-2 (etc) to check out their equipment. My tape received an indifferent response as the video displayed froze, the audio dropped in and out, the screen turned various unpleasant shades of pink and blue.

"One software glitch I have discovered with the receiver relates to switching polarity. I use a dual feed dish with separate LNBs for vertical, horizontal. I had been doing this with a separate LNB switching supply; could I not do this with the software?

"In the installer menu, the receiver is set to channel 0 to accept commands. And once you have lock, you can go to channel 1 (etc.) to watch TV. However by switching to channel 1, the 13 volts switches to 18 volts if the receiver is operating in the DVB mode. By resetting the receiver to the MPEG mode, this unwanted voltage switching does not occur."

morning of April 8th. Closer examination revealed it was LBC, the Lebanese Broadcasting Company, with a test run of programming for the Australian marketplace. Kosmalski noticed that for a few seconds at a time he was seeing not programme video but the Installer Menu from a SA D9223 receiver. Watching intently he was able to pick out the IF number, the Msym and FEC from the infrequently transmitted menu screen.

It seems the uplink operator arranging the Lebanon feed was taking his service from a digital platform. On a hunch, Kosmalski entered the numbers into his D9223 and low and behold - there was the original LBC digital feed off the horizontal side of PAS-2!

And it was not alone. At 997 MHz (4153 C-band) Kosmalski also found an unused (at the time) programme channel, LBC (ch. 2) and RAI International (ch. 3). At the time of checking, the RAI feed was not the same as the EBB RAI feed through AsiaSat 2.

Rumours of start-up of a Lebanese service to Australia have been circulating for several weeks. The good news is that at least for the test purposes of April 8th, it was there in both FTA analogue and PowerVu. Later on the 8th the analogue service channel had reverted to a PAS-2 Napa test card indicating the feed was for some purpose other than full-time, regular service. The continuation of the PowerVu feed is another matter.

The Kosmalski discovered LBC PowerVu feed seemed free to air but the audio on both LBC and RAI was broken (sporadic). The audio and video PID numbers were non-PowerVu numbers (i.e., 512) although clearly at least for the test seen the service was PowerVu. What all of this says about the continued availability of the service, or how LBC intends to market itself in Australia is unknown as this issue goes to the printer. Note on page 1, there are more than 79,000 Lebanese living in Australia which might be enough to pay for a subscription TV service linkup through PAS-2. Stay tuned!

a technical and marketing advisory

memo

to the membership from your industry trade association

SPACE Pacific

Satellite
Programme
Access
Committ**E**e

A trade association for users, designers, installers, sellers of private satellite-direct systems in the Pacific Ocean & Asia Regions

IFP/ Internet Forum Provider

It has become increasingly clear during the past month that before 1997 is gone major regions of the Pacific will have a version of Internet available to the consumer masses at what is today considered very inexpensive pricing. It all began at the past January South Pacific Region Satellite & Cable Show (SPRSCS) where Deutsche Welle attempted to demonstrate their VBI (vertical blanking interval) technique of delivering Internet. There were technical glitches resulting in system failure but the seed had been planted none the less.

Internet can be delivered by many different forms of radio or television transmitter and in the case of a television transmitter, the Internet data stream can be tucked away within the TV broadcast signal such that users of the TV portion are not even aware of the Internet data stream presence. In effect, Internet becomes a "hitch hiker" riding along essentially for free.

Transmitting television pictures has always been a low efficiency technology. A terrestrial TV channel in PAL-B format requires 7 MHz of "space" in the spectrum; 700 separate "AM" radio stations could occupy the same amount of spectrum. A PAL format TV signal has unused space within that 7 MHz resulting from these inefficiencies. A portion of this unused space is termed the "vertical blanking interval" and for each line of VBI not presently used for anything by the broadcaster it is possible to insert a digital stream containing Hypertext Markup Language (HTML) data equivalent to approximately 80 kbps. VBI lines are used for TV broadcaster "house keeping" functions (control signals, instructions to remote transmitter sites) and in some regions of the world (Europe, primarily) VBI lines are used to transmit Teletext data.

Teletext data is useful as a reference source but it can hardly be described as "exciting." The Internet is "exciting" to use because it is largely in real time, always changing in content. You might say Teletext is like a stack of books in a reference library; always there, dependable, but not compelling to use. Internet is in transition at all times, more like a newscast on CNN or Sky News London.

There is nothing in technology that limits use of the VBI to a "reference book" status. It just happens to be the format adopted for Teletext that this is the Teletext lot in life. The same VBI lines could be utilised to transmit "Internet in real time" as now transmit Teletext.

Every analogue TV transmitter in the world has VBI lines; most of these lines are unused. As Deutsche Welle has learned in a painful way, MPEG-2 digital video can also be used to transmit a data stream as well but not as conveniently as with an analogue format signal. The Deutsche Welle pioneering in this area of technology has created the recently added sixth TV signal to the European Bouquet (EBB) on AsiaSat 2; you will find it on your EBB friendly DVB Compliant receiver as video number 6, just above TV5 Paris. This programme channel looks to the eye to be the same Deutsche Welle TV as we find on programme channel 1; your first clue it is not the same comes when you try to listen to the audio and find the sound channels are not TV

MEMBERSHIP IN SPACE

Membership in SPACE Pacific is open to any individual or firm involved in the "satellite-direct" world in the Pacific and Asia regions. There are four levels of membership covering "Individuals," the "Installer/Dealer," the "Cable/SMATV Operator," and the "Importer/Distributor/Programmer."

All levels receive periodic programme and equipment access updates from SPACE, significant discounts on goods and services from many member firms, and major discounts while attending the annual SPRCS (industry trade show) each January in Auckland. Members also participate in policy creation forums, have correspondence training courses available. To find out more, contact (fax) 64-9-406-1083 or use information request card, page 38, this issue of SatFACTS. Page space within SatFACTS is donated each month to the trade association without cost by the publisher.

programme audio at all. This "technical solution" worked out by DW and DMV makes it possible for the digital equivalent of the vertical blanking interval to carry the MediaNet version of Internet to receivers equipped to extract the data stream.

At the same time this VBI technology is maturing, Internet, the telephone line delivered data service access system, is facing serious growth problems. World-wide, telephone companies are trying to figure out how they can make money with Internet. In areas of the world where the telephone company has been forced by government to make available "no charge local calls" the telephone firms are especially distressed. Telephone delivered Internet works on an "ISP" (Internet Service Provider) architecture. A town or region has an ISP and his service provides interconnection to the larger Internet universe. For most users, Internet is a local call away. An Australian study last month revealed that 31`% of all available telephone circuits are on average tied up by data, not voice, flowing through the wires. And telephone planners predict this will grow to 50% by 2000.

Telephone companies have established charges for interconnecting the ISP to Internet; they are based upon time (so much per hour or fraction) or time plus data (so much per megabyte of transferred data). Users complain of the rates, long delays in accessing the ISP (which the telephone company always blames on the lack of ISP planning to have enough incoming lines available), and software glitches that disconnect without warning.

Clearly, the telephone networks of the world are perplexed and under prepared for the mushrooming growth of Internet. The situation is ripe for an alternate delivery method to be introduced, one that takes as much of the traffic off of the telephone networks as possible.

VBI is one such possible technology. Alas, it is one-way and most Internet users demand two-way communication. MediaNet, the German system, provides a detailed advance schedule (not unlike a TV guide) alerting you what categories of material will be transmitted and the time for each. This is supported with software that allows you to "click on" the material you wish, from the advance schedule, and then leave the equipment alone. At the scheduled time the material flows through the network and your PC, having "clicked on" to certain desired categories, loads these data stream segments to the PC hard drive for your later review.

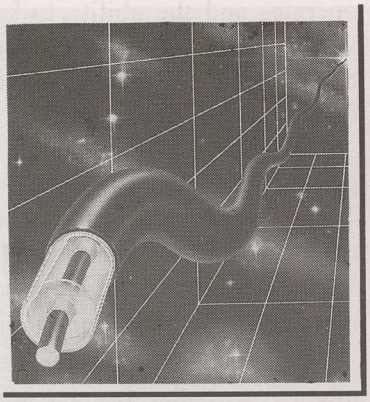
For some users this will be an adequate service level given the speed at which it operates and the ability to select in advance materials you wish saved. For others the lack of an ability to seek out and request specific material (i.e., Web pages) on demand is a serious drawback to VBI delivery.

The MediaNet decoder is inherently a one-way processing device. It locates the VBI hidden within the TV signal, extracts it from the TV signal and processes the data into a format which a PC will recognise. A Windows software program has been created for the PC that makes all of this "point and click" functional.

The next step is to somehow make the service interactive. If the decoder box processing the VBI was equipped with a (telephone) modem, or if the PC the decoder box plugs into was equipped with a modem, at least the physical capability for interactivity would be present. But the more important element, designing the data stream delivery system to function as an interactive environment, must still be solved.

Fortunately there is nothing leading to interactivity to be invented nor created anew. Every ISP already has the appropriate software to make this happen. Provided ... provided the network service originator (i.e., MediaNet or someone like them) is equipped to respond to client requests. It is precisely here that events of the past month have escalated leading to the promise that before 1997 is gone we will see VBI delivery of interactive data streams with an Internet base. Yes, there is a satellite network in all of this as we shall see soon.

The CABLE Connection



Programming Source Rules

Not all programmers are willing to deal with all cable systems. And not all programmers have a clearly defined set of rules for dealing with cable systems. This makes life very complicated for anyone who is trying to get a new cable system up and running.

Programmers with an established track record and good management know more about your prospects of reselling their product than you will know. As a cable operator you are struggling to create a channel line-up with sufficient interest to cause people to subscribe. You know you need sport and movies because every cable system ever built says you need these elements to progress much beyond a 10 to 15% penetration rate. If movies and sport are a given, what about less clearly defined services?

NBC Asia, for example, has some sport, some movies, and at least a sampling of virtually every other programming category known to man. In fact, NBC Asia is arguably the best over all programmed cable service in the Pacific these days. And moreover, they support their affiliates with generous promotional packages, detailed advanced schedules, and the opportunity to turn the service into a household word in your cable community. But - will people watch it?

Branding of a product is everything in the TV business. 'ABC' or 'TV1' mean far more than a mere station or network identification. ESPN and CNN stand for a quality of dependable service which viewers can relate with. HBO, the Palapa movie service, is instantly recognisable world-wide as a brand denoting superior movies. Two years ago the New Zealand over the air pay TV Sky Network actually negotiated the right to call itself 'HBO Movies' as a brand name; it pays the owners of HBO (Time Warner) a fee for using their brand name. Yet this particular HBO does not use the same movies nor in any other way act like the real HBO. To Sky Network, buying the right to call themselves 'HBO' was an investment in brand recognition.

'The Disney Channel' is now available through Australian cable. Logically Disney would be interested in expanding to New Zealand as well since the same PAS-2 feed now delivering to Australia could also be used for New Zealand. Alas, Disney people advise the present Australian channel feed "contains perhaps 30% of its content material which cannot be cleared for copyright use in New Zealand." When material cannot be cleared it is because either the programmer does not actually own the copyrights itself (and must purchase copyright clearance for each country it wishes to serve) or some existing broadcaster in the country (New Zealand) already has certain programming under contract. There are examples of this in the NBC service; the Enid Blyton series carried by NBC cannot be carried by cable in New Zealand because the series has been previously purchased for over the air use there by TVNZ.

Disney has other rules that dictate where the service can be reshown through cable. Minimum market size is one such hurdle. Disney wants a minimum of "100,000 cable subscribers paying (through the cable systems) not less than US$1 per cable home per month" before they will allow their service to launch in New Zealand. In other words, they want an assured (by contract) revenue base of US$1,200,000 per year just to allow 'The Disney Channel' into New Zealand. They are suggesting that "all of the cable operators in New Zealand come together to create the necessary base (100,000 homes served). Logical but perhaps 90,000 more homes than exist connected to cable at this time.

On the other hand, the Sky Network wireless subscriber base is in the region of 260,000. And they are over the next 18 months changing from a 4+ channel analogue service to a satellite delivered 20+ channel digital service. At some point in time there would be an opportunity for Disney to saddle up with Sky and offer 'The Disney Channel' through a Sky digital bouquet package. For Sky to make this work they would have to be quite sure than at least 100,000 of their subscribers would in fact take 'Disney' before committing to the minimum guarantees Disney requires.

Creating markets for brand recognisable product is a marketing challenge taken seriously by the likes of HBO and ESPN. Galaxy, Foxtel and Optus are still struggling in Australia to create brand superiority while in New Zealand 'Sky' is accepted as the brand name for pay television. ESPN, Disney, HBO and Discovery are simultaneously brand names and product names. HBO is the movie product for Sky but it does not stand alone. Seemingly, by purchasing the rights to the brand name HBO in New Zealand, Sky has pre-empted the real HBO from also selling here.

It is far more difficult for cable TV to create a brand name for itself than it is for Sky or Galaxy. Cable is the sum of its individual channel programming parts; Sky and Galaxy are constantly offered as a "package" within which the individual channel names are almost transparent to the consumer. Sky and Galaxy, by being nation-wide within their respective countries, can build a cohesive brand identity image that carries with it instant recognition by the consumer. Cable TV, typically

in a single town or handful of close proximity towns, can only be "branded" within its trading area. And this requires that the cable operator work consistently to promote recognition of his (cable TV) brand to educate new arrivals to town or those passing through.

To make brand recognition more meaningful for cable TV, world class cable operator United International Holdings (UIH) plans to provide their cable systems in the Pacific with an extensive channel package made up from programming sourced from North America and Europe. UIH owns New Zealand's Saturn (cable TV), holds a quantity of cable and wireless licences for secondary markets in Australia and has invested heavily in cable in the Philippines. We reported on the UIH plan to use Intelsat to deliver 10 channels of programming to the Pacific in our April 1996 issue (p. 22). In the intervening year UIH has expanded the channel line-up to 18 TV programme channels. A start date still depends, it appears, on the availability of a suitable Intelsat class satellite in the 174-180 region and resolution of a number of issues effecting the July 1 (1997) rollback of regulations affecting cable and pay TV within Australia.

By creating its own programming source, UIH takes a major step towards "brand differentiation." With unique sport, movie and general programming channels, a UIH brand (name to be announced) is more capable of meeting existing competitors such as Sky in New Zealand head-on in a marketing clash.

The 'game' then becomes channels versus dollars against channels versus dollars. One side proclaims "40 channels, $39.95 per month" and gives it a name. The competition counters with "42 channels, $9.51 per week" and gives it a name. And the marketing competition is underway.

In any competitive marketing environment, name is everything. "Pepsi sets you free!" but "Coke has the classic taste." The Pepsi message suggests you are in a repetitive lifestyle rut if you continue to drink Coke. The Coke message in response says "We were first, we are the original."

Cable without a recognisable branding is at a serious marketing disadvantage when facing a competitor such as Sky. The one word - "Sky" - tells a person all they need or want to know about the pay TV service on offer. When they hear Sky, they know the approximate price, the range of channels, the quality of the service. They know these things because Sky has done a credible job of establishing itself as a recognisable brand throughout New Zealand, even in areas where until satellite they could not reach.

"Cable TV" means almost nothing to people. "More channels than Sky?" "Less money than Sky?" "What are the programming channels - what do they broadcast?" For cable to be successful, it needs to establish its own identity in the marketplace, be instantly recognisable and without mystery. This is a sizeable challenge!

SatFACTS Pacific/Asian Region Orbit Watch: 15 April 1997

Free-to-Air 57E to 80E

Sun Music	57E/703 1400RHC
Sun Movies	1342RHC
Gemini	1257RHC
Sun TV	1220RHC
AsiaNet	1170RHC
WorldNet	1100RHC
NEPC	1090/LHC
TVi	1020LHC
Muslim TV	975LHC
ABN	68.8/Pas4 Hz/1365
Sony Enter. TV	68.8/Pas4 Hz/1240
Doordar & Iran TV	68.8/Pas4 Vt/1116
CNNI	68.8/Pas4 Hz/1065
TNT/Cart.	68.8/Pas4 Hz/1040
ATN	68.8/Pas4 Vt/972
BBC World	68.8/Pas4 Hz/1350
MTV Asia	68.8/Pas4 Hz/965
TK Rossija	80/Exprs 1475RHC
VTV4	80/Exprs 1275RHC
AST	80/Exprs 1127/RHC
Russia 3	80/Exprs 1025/RHC

Free-to-Air 80E to 113E

Dub'l II	90/S6 1475RHC
Orbita II	90/S6 1275RHC
Dub'll I	90/S6 1234RHC
Orbita I	90/S6 1208RHC
Doordar.1 National	93.5/In2b 1030/Vt
Doordar.1	1160/Hz
Doordar.9	1080/Hz
Doordar.7 Telugu	1070/Vt
Doordar.9 Kanada	1180/Vt
Doordar.1	1268/Vt
Doordar.	1310/Vt
Doordar.3	1348/Vt
Doordar 4	1388/Vt
Orbita II	96.5/S14 1475RHC
Madagas-car	96.5E/S14 1325RHC
ERTU Egypt	100.4/As2 1508/Hz
TV Shopping	100.4/As2 1490/Vt
TV Mongolia	100.4/As2 1470/Hz
5 China MPEG-2	100.4/As2 1430/Hz
5 China MPEG-2	100.4/As2 1310/Hz
CCTV4	1190/Hz
RTPi	1170/Vt
EBB (DVB)	1150/Hz
Dub'l II	103/S21 1475RHC
ART	103/S21 1275RHC
CFI	113/C2 990/Hz
SCTV	113/C2 970/Vt

Free-to-Air 113E to 145E

Brunei	113/C2 1010/Vt
MTV Asia	113/C2 1030/Hz
TPI	113/C2 1070/Hz
TV Indosiar	113/C2 1090/Vt
ABN	113/C2 1120/Hz
ANteve	113/C2 1130/Vt
CNNI	113/C2 1183/Hz
GMA	113/C2 1230/Hz
TV3	113/C2 1250/Vt
ATVI	113/C2 1270/Hz
TVRI	113/C2 1310/Hz
RTM	113/C2 1330/Vt
RCTI	113/C2 1408/Vt
CNBC	113/C2 1530/Hz
Orbita-I	140/S7 1475RHC
NTV	140/S7 1425RHC
Music Asia	142.4/R42 1475LHC
RAJ-TV	142.4/R42 1425LHC
Laos TV	142.4/R42 1375LHC
ViJay TV	142.4/R42 1325LHC
EM TV	142.4/R42 1272LHC
Dub'l-I	145/S16 1275RHC

WorldNet has announced move to As2 to replace I511.

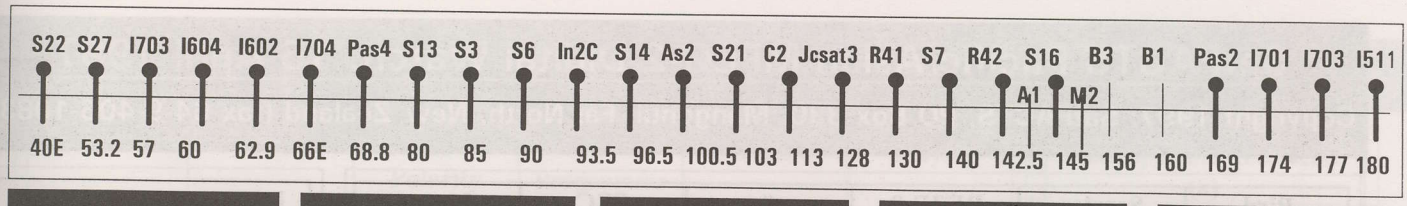
Free-to-Air 145E to 180E

CNNI	168/Pas2 1183/Hz
CNN Feeds	168/Pas2 1155/Hz
NHK	168/Pas2 1114/Hz
TV Shopping	168/Pas2 1400/Hz
Feeds	174/I701 984RHC
Feeds	174/I701 973RHC
Feeds	177/I702 984RHC
Feeds	177/I702 963RHC
Feeds	180/I511 1430RH
WorldNt (**)	180/I511 1175RH
RFO	180/I511 1105RH
Feeds	180/I511 1020LH
Feeds	180/I511 984RHC

ENCRYPT/MPEG SERVICES

Discov. India	68.8 1365/Vt
Sky Racing(a)	100.4 1130/Vt
European Bouquet	100.4 1150/Hz
Star TV (b)	100.4 1250/Vt
APTV (b)	100.4 1351/Hz
WTN (b)	100.4 1363.6/H
Rebar TV (c)	100.4 1410/Vt
Star TV (c)	100.4 1450/Vt
ESPN (d)	113/C2 1030/Hz
HBO Asia (d)	113/C2 1150/Hz
TNT + (d)	113/C2 1390/Hz
Discovery (d)	113/C2 1430/Hz
Star Indovis'n (c)	113/C2 1570/Hz
Star Indovis'n (c)	113/C2 1650/Hz
RPN-9 (c)	142.4/G2 1375LHC
Galaxy (c)	156/B3 12.437Hz
Galaxy (c)	156/B3 12.373Hz
China PowRvu (b)	168/Pas2 1433.5/ Vt
Discovery (c)	168/Pas2 1374/Hz
Disney Aust. (b)	168/PAS2 1346Hz
ESPN (a)	168/Pas2 1288/Vt
Satcom (b)	168/Pas2 1288/Hz
California PowRvu (b) (c)	168/Pas2 1249/Hz
TNT + (a)	168/Pas2 1218/Vt
SCPC3 Ad Hoc (b)	168/PAS2 1208/Hz
Fox/ Prime (c)	168/Pas2 1161/Vt
Filipino Ch. (b)(c)	168/Pas2 1060/Hz
NBC HK	168/PAS2 1057/Vt
HK PowRvu (b) (c)	168/PAS2 1002/Vt
TCS Singapore (b)	168/Pas2 967/Hz

No home DTH subscriptions



OPTUS B3 156E (Ku only)

(B-Mac)	1425/Vt
Central ABC HACBSS	1393/Hz B-Mac
Imparja	1351/Vt
(B-Mac)	1297/Vt
Net 9, Sky specials	1233/Vt B-Mac
	1169/Vt
OptusVis. (analogue)	1230/Hz
Galaxy	1137/Hz Irdeto Mpeg 2
	1105/Vt
Galaxy	1073/Hz Irdeto Mpeg 2
ABC SA	1041/Vt
	1009/Hz

Optus A3/152E

ATN7png	1297/Vt
ATN7png	1430/Vt

Palapa C2 Ku (seen South equator)/113E

Test bars	11.148/Vt

MeaSat 2 148E

Tests	1065Hz*

* Colour bars 5-03, audio 6.8

OPTUS B1 160E (Ku only)

Net 9, Sky feeds	1425/Vt B-Mac
Data	1402/Hz
QSTV	1377/Hz B-Mac
NE ABC HACBSS	1370/Vt B-Mac
NE SBS HACBSS	1344/Vt B-Mac
SE SBS HACBSS	1339/Hz B-Mac
SE ABC HACBSS	1313/Hz B-Mac
Sky Channel	1296/Vt B-Mac
ABC Radio	1276/Hz (digital)
OmniCast	1270/Vt (FM/FM)
ABC feeds	1247/Hz Pal
Sky Nz (April 15)	1232/Vt VidCrypt
Net 9 feeds	1219/Vt Pal&Ntsc
	1214/Hz
Net 10	1182/Vt E-Pal
Net 9	1180/Hz E-Pal
Net 10 feeds	1155/Vt Pal
QTQ9	1145/Vt
Net 7	1120/Vt E-Pal
Net 9 feeds	1091/Vt Pal
CAA air to ground	1009/Vt Nbfm

PAS-2 169E (C + Ku)

CCTV3,4, test	1433.5/Vt (Sa9223)
Test/LBC	1405/Hz
Value Ch.	1400/Vt
Discovery PowerVu	1374/Hz (Sa9223)
ESPN	1288/Vt B-Mac
MPEG-2 PowerVu Sylmar	1249/Hz (Sa9223)
TNT+ (1/2Tr)	1218/Vt B-Mac
CNN+ (1/2Tr)	1183/Hz
FoxSports	1161/Vt (Sa9222)
NHK	1115/Hz
Filipino Channel	1060/Hz (GI Mpeg)
NBC Mux MPEG	1057Vt (Pace)
MPEG-2 PowerVu HonKong	1002Vt (Sa9223)
TCS Sing.	967/Hz

PAS-2 Ku

Napa TC	12,415V
PowerVu	12,415V
H-Life	12,415V
Super Ch Taiwan	12,485H (MPEG)
K-TV	12,735V (MPEG)

Rimsat R41 at 161E and Palapa C2 at 150.5E and B2P at 144E are functional.

Intelsat 701 174E

Feeds	963
Feeds	984

Intelsat 703 177E

AFRTS	973 (*)
Feeds	984

* LHC; PowerVu operational

Intelsat 513 177W

Feeds	963
Feeds	984

(513 Ku)

Service	RF Freq.
US Nets	10.980V
NBC	11.015V
Feeds	10.510V

Ku Services
Intelsat Ku band services shown here are boresighted to Japan and nearby Asia, have not been reported south of equator. At boresight, signals of <2m levels.

TDRS5 / 174.3W

Fuji TV	1305 Hz
BBC World	1163Hz MPEG

Intelsat 511 180E(W) +/- 2.9deg.

TVNZ	964/Dmv 3000
TVNZ	972/Dmv 3000
TVNZ	980/Dmv 3000
TVNZ	988/Dmv 3000
Occ Vid.	1,020**
9 Aust.	1,025
Canal +	1,054 **
RFO Tahiti	1,105
Asian	1,130
World-net	1,175
NHK	1,225**
ABC Oz	1,256
7 Oz	1,274
10 Oz MPEG	1,385 (PwRvu)
Keystone	1,432

* RHC & LHC
** LHC only

(511 Ku)

NHK	11.135H
CBS	11.475H
CNN	11.508H

TDRS5 "north" only

UPCOMING SATELLITE LAUNCHES

China DF3- location unknown
Filipino Agila to 153 or 161E
Thaicom 3 to 78.5E
Japan BSAT 1A to 110E
ApStar2A to 77E

(a) B-MAC encrypted, no access available.; (b) MPEG format, requires special receiver; (c) MPEG, encrypted, access may be possible (d) B-MAC, subscriptions available in some geographic areas. No indication - MPEG DVB FTA.

SatFACTS Pacific/Asian MPEG-2 Digital Watch: 15 April 1997

Bird	Service	RF/IF & polarity	# Programme channels	FEC	Msym	Interoperable Receivers (a)
I704/63E	CFI	4055/1095 RHC	2	3/4	27(.500)	N163, probably others
PAS-4/68.5E	Walt Disney	3982/1168 Hz	2	3/4	6(.632)	PowerVu (FTA test)
Measat 1/91.5	India Bouquet	12284/12346Vt	10+TV?	7/8	30(.000)	Philips, SK888 (w/CA)
As2/100.5E	European Bouquet	4000/1150 Hz	6TV, 12 radio (#1)	3/4	28(.125)	DMV, Gng, N163, N17X N2000, P400(b), P500, Pn520/630, Sk888
	Hubei TV (HBTV Main)	3854/1296 Hz	2	3/4	4(.418)	N163, N17X, N2000, Ph3950/11
	Hunan TV (SRTC)	3847/1303 Hz	1	3/4	4(.418)	N163, N17X, N2000, Ph3950/11
	Guandong TV (GDTV)	3840/1310 Hz	1	3/4	4(.418)	N163, N17X, N2000, Ph3950/11
	Inner Mongolia TV Zizhiqu	3828/1322 Hz	2	3/4	8(.397) (1-China) (2-Mongolia)	N163, N17X, N2000, Ph3950/11
	APTV London	3800/1350 Hz	1	3/4	5(.631)	DMV, N163, N17X
	WTN Jerusalem/ London	3790/1360 Hz	1	3/4	5(.631)	DMV, N163, N17X
	WTN London	3786/1364 Hz	1	3/4	5(.631)	DMV, N163, N17X
	Liaoning TV (Service 2)	3734/1416 Hz	1	3/4	4(.418)	N163, N17X, N2000, Ph3950/11
	Jiangxi TV (JX Sat TV)	3727/1423 Hz	1	3/4	4(4.18)	N163, N17X, N2000, Ph3950/11
	Fujian TV (SETV)	3720/1430 Hz	1	3/4	4(.418)	N163, N17X, N2000, Ph3950/11
	Henan TV Zenghou	3713/1437 Hz	1	3/4	4(.418)	N163, N17X, N2000, Ph3950/11
	China (Not in use)	3706/1444 Hz	1	3/4	4(.418)	N163, N17X, N2000, Ph3950/11
As2/100.5E	STAR TV (Hong Kong)	3900/1250 Vt	5TV, 1 Radio (#2)	1/2	28(.100)	DMV; N163, N17X (Nokia - not all services)
	"QQQ" China (Backup)	3813/1337 Vt	1, 1 Radio	3/4	4(.418)	N163, N17X, N2000, Ph3950/11
	Guangxi GXTV	3805/1345 Vt	1, 1 Radio	3/4	4(418)	N163, N17X, N2000, Ph3950/11
	Rebar TV Taiwan	3785/1365 Vt	4TV (#3)	3/4	18(.000)	Pv9223 (CA) [Video inverted?]
	Myanmar TV	3766/1384 Vt	1TV	7/8	5(.080)	
	STAR TV Hong Kong	3700/1450 Vt	5TV, 1 radio (#4)	3/4	28(.100)	Pace DVS-211 (CA)

Bird	Service	RF/IF & Polarity	# Programme channels	FEC	Msym	Interoperable Receivers (a)
C2/113E	Star Indovision	3500/1650Hz 3580/1570Hz	20 TV (#5)	7/8	26(.850)	Pace DVS-211 (CA)
	MegaTV	3780/1370Vt	7TV (#6)	3/4	27(.500)	
AP1/138E	Reuters	3732/1418Vt	1TV, data	3/4	5(.632)	N163, N17X
Optus B3 156E	Galaxy	12.438Hz (d) 12.373Hz	20+TV (#7)	3/4	29(.473)	Gng, P400, P500, Pn520, Pn630, Sk888 (c)
Optus B1 160E	Aurora (MPEG test)	12.367Hz	2+ TV (#8)	2/3	30(.000)	N163, N17X
	ABC Exchange	12.539Hz 12.548Hz 12.557Hz	1 each	3/4	6(.980)	Pv9223 (FTA)
PAS-2 169E	Hong Kong PowerVu	4148/1002 Vt	8TV (#9)	2/3	24(.430)	Pv9223 (some FTA)
	NBC Hong Kong	4093/1057 Vt	7TV (#10)	3/4	29(.473)	Gng, N163, N17X, P400 (b), P500, Pn520, Pn630, Sk888
	JET Singapore	3962/1188 Vt	5TV	1/2	13(.740)	Pv9223 (currently FTA)
	Ku California PowerVu	12415/1115 Vt	7TV (#11)	3/4	30(.800)	Pv9223 (some FTA)
	CCTV China PowerVu	3716.5/ 1433.5 Vt	3TV (#12)	3/4	19(.850)	Pv9223 (all FTA)
	TCS Singapore	4183/967 Hz	2TV (#13)	1/2	6(.620)	Pv9223 (usually FTA)
	LBC/ RAI Int	4153/997 Hz	3TV (#14)	3/4	5(.632)	Pv9223 (new-CA likely)
		4114/1036 Hz		5/6	21(.093)	Pv9223 (CA)
		4104/1046 Hz		5/6	21(.093)	Pv9223 (CA)
	SCPC3	3942/1208 Hz	1TV	2/3	6(.620)	Pv9223 (CA)
	California PowerVu	3901/1249 Hz	7TV (#10)	3/4	30(.800)	Pv9223 (some FTA)
	Satcom 1-6	3862/1288 Hz	6TV	7/8	19(.465)	Pv9223 (CA)
	Walt Disney Australia	3804/1346 Hz	1TV	5/6	21(.093)	Pv9223 (CA)
	Discovery Singapore	3776/1374 Hz	7TV (#15)	3/4	19(.850)	Pv9223 (occasionally Ch. 2 FTA)
1703/177E	AFRTS	4177/973 LHC	8TV, 12 radio & data (#16)	3/4	28(.000)	Pv9223 (CA)

(a) Interoperable receivers - see p. 32; **(b)** For Pace DGT400 to work on this service, it must be 'factory pure' without Programme Rating upgrade; **(c)** Access to Galaxy Pay TV service requires subscription, CA module and valid smart card; **(d)** 12.438 GHz transmission includes TVSN FTA service which requires no CA/smart card.

Not Yet Identified: As2: 3917Hz, 3765Vt, 3940Vt.

SatFACTS MPEG-2 Digital Watch: 15 April 1997 ◆ Support Data

Receivers: (a) By our definition, a receiver is deemed "interoperable" when it will turn on and routinely receive the service in question with no persistent glitches, no special tricks (such as loading software from an external source). Receivers in abbreviated listings are those that have shown these qualities for the transmission service listed. There is a time lag of 30 to 60 days after introduction of new receivers before sufficient data is accumulated for inclusion here. Nomenclature: DMV is DMV/NTL 3000 (a professional model receiver); Gng is Grundig DTR1100 (manufactured by Panasat - see SF#31, p. 15); N163 is Sweden sourced Nokia 9500 S with version 1.63 software; N17X is German/European Nokia "d-box" software modified for C-band use; N2000 is Nokia sourced IRD created for Chinese SCPC market with AsiaSat 2 and Intelsat manual search software; Ph3950/11 is Philips DVB IRD created for China SCPC project; P400 is Pace DGT400; P500 is Pace DVR500; Pn520 is first version Panasat (July 1996); Pn630 is latest version Panasat (February 1997); Pv9223 is PowerVu by Scientific Atlanta; Sk888 is Skandia DigiSkan.

Bouquets: **1)** European Bouquet. (1) Deutsche Welle, (2) MCM, (3) RAI International, (4) RTVE, (5) TV5 Paris, (6) Deutsche Welle special programme channel with MediaNet VBI included [lines 10-15, requires DMV M2/Pro/Txt board inserted in 3000 series receiver]; Radio (1) DW#1 (stereo), (2) DW#2 (stereo), (3) DW#3 (stereo), (4) YLE (left) & RCI (right), (5) SRI (l) & WRN (r), (6) REE, (7) DW#1 (stereo), (8) DW#2 (stereo), (9) DW#1 (stereo), (10) NN RA6, (11) NN RA8; **2)** STAR TV Hong Kong. (1) STAR + [Japan in NTSC], (2) says 'CNBC' but is test, (3) horse racing feeds very 'occasional' to TCNA Australia, (4) Sky News London, (5) Star Radio (test); **3)** Rebar Taiwan. (1) "U1" [movies], (2) "U2" [news], (3) "U3" [sport, cartoons, general entertainment], (4) "Rock TV"; **4)** STAR TV Hong Kong. (1) STAR Movies SEA [661], STAR Chinese Channel [660], (3) NBC [658], (4) CNBC [657], (5) SKY News [655], (6) VIVA Cinema [654]; **5)** Indovision. (1) HBO Asia, (2) STAR Movies SEA, (3) Film Indonesia, (4) MGM Gold, (5) ESPN Asia, (6) STAR Sport, (8) Channel 'V' International, (9) Channel 'V' Asia, (10) RCTI, (11) STAR +, (12) Discovery, (13) STAR Movies and NBC Asia, (14) Phoenix Chinese, (15) CNN, (16) BBC World, (17) CNBC, (18) Cartoon + TNT, (19) Preview 1, (20) Preview 2; **6)** MegaTV. (1) CNNI, (2) Discovery, (3) ESPN Asia, (4) HBO Asia, (5) Cartoon + TNT, (6) MGM Gold, (7) Cinemax; **7)** Galaxy. Presently 20+ programme channels. **8)** Aurora. (1) ABC SA, (2) Australia Sky News; **9)** Hong Kong PowerVu. (1) CTN 1, (2) CTN II, (3) TVBI Hong Kong, other feeds [NTSC], (4) **Ad-hoc 1 PA** [PAL], (5) **Ad-hoc II** [NTSC], (6) **ABN**, (7) CTN II, (8) CTN I; **10)** NBC Hong Kong. (1) CNBC, (2) CNBC Mandarin A, (3) NBC Asia, (4) colour bars, occasional feeds, (5) CNBC Taiwan, (6) NBC "2" Asia/Taiwan, (7) Colour bars, "future" use; **11)** California PowerVu. [Note: Ku band listing may not be operating except for test periods, programming line-up identical to C-band] (1) **CMT** [NTSC], (2) **CBS feeds**, others, (3) ESPN, (4) **EWTN** [NTSC] with Global Catholic Radio channel 2, R, (5) **BBC World** [NTSC], (6) **Bloomberg Financial** [NTSC], (7) Golf Channel [NTSC]; **12)** CCTV China. (1) **CCTV4** [NTSC], (2) **CCTV3** [NTSC], (3) **CCTV tests** [typically NTSC]; **13)** TCS Singapore. (1) **TCS Test**, (2) **TCS Default** [repeats channel 1]; **14)** SCPC3: (1) ad-hoc use, (2) LBC Lebanon, (3) RAI International; **15)** Discovery. (1) Disc. Aust/NZ, (2) **Disc. default**, (3) Disc. Japan, (4) Disc. SE Asia, (5) Disc. Taiwan, (6) Disc. Philippines, (7) Disc. China; **16)** AFRTS. (1) News, Sports [ACII, CW, RR, 9.6 kbps, TV], (2) Spectrum [Urban, 64 kbps], (3) AFN Pacific [TV], (4) Channel 1 - Mirror [TV], (5) AFN Korea [contingency, 1.536, TV], (6) The Jim Lambert Test Channel [!!!], (7) EPG, voiceline, (8) EPG, u/i voiceline, (9) AFN Atlantic [Top 40, HR, NPR, TV], (10) AFN Americas [Top 40, TV], (11) AC1, (12) Country, (13) Adult Rock, (14) NPR [US National Public Radio], (15) Urban, (16) Pure Gold, (17) Top 40, (18) Hard Rock (19) Contingency. NOTE: Listings in **bold face** are PowerVu transmissions that are typically (but not always) FTA (free to air).

MPEG-2 DVB RECEIVERS:

[NOTE: This data is collected from SF readers, conversations with suppliers, Web Site postings. We believe it to be accurate but assume no responsibility for errors that may appear. Individual dealers not listed: Only primary importers, sources.]

DMV/NTL 3000. Skandia Electronics Pty Ltd (tel 61-3-9819-2466)
Grundig (Gng) DTR1100. Av-Comm Pty Ltd (tel 61-2-9949-7417)
Hyundai-TV/Com. "Do everything" [FTA, PowerVu FTA, MegaTV et al) due April 25. Pacific Satellite (tel 61-7-3344-3883)
Kristal K-100. Likely to be same unit as Hyundai described. Kristal Electronics (tel 61-77-791-565)
Nokia 9500 S (V1.63). This version may now be superseded by version 2.X series (2.052 is promised; exactly what it does is not known!). G&G Imports (tel 61-8-8941-8860) and Telsat Communications Ltd (tel 64-6-356-2749)
Nokia "d-box" (V1.7X) suitable for C-band use. Instructions, on-screen prompts in German. OPAC Pty Ltd, (tel 61-2-584-1233)
PACE DGT400. Through Galaxy offices, Australia.
PACE DVR-500. Bay Satellite TV Ltd. (tel 64-6-843-5296)
Panasat 520 (Pn520). OPAC Pty Ltd (tel 61-2-584-1233)
Panasat 630 (Pn630). Antares Satellite (61-7-3205-7574)
PowerVu D9223. Telsat Communications Ltd. (tel 64-6-356-2749)
SK888. Skandia Electronics Pty Ltd. (tel 61-3-9819-2466)

Receiver Swaps: As a trial, SatFACTS is agreeing to act as an intermediary for individuals seeking to swap (trade for another model) receivers. All communication is via FAX only, through SatFACTS (64-9-406-1083). If you don't receive a response in 5 days from sending your fax, consider the desired receiver 'gone' by previous trade. To be listed here (as space permits) you must be a SatFACTS subscriber, must list only one receiver swap per month, must follow format shown below. Deadline for May issue is May 1.
#497A: Looking for receiver that is functioning on STAR TV As2 3700Vt service (Pace DVS-211-CA); will swap recently authorised CDE-2000 (Palapa C2)..
#497B: Looking for PowerVu cleared for at least AFN Pacific; will swap SA 9708 B-MAC operating TNT + Cartoons.
#497C: Have spare Nokia V1.63, will trade for receiver with authorised MegaTV subscription good for at least 10 months.
#497D: Want D9222 (not 3!) working on Fox feeds PAS2, 1161Vt. What do you want?
#479E: ACER Technology (Taiwan) will provide MPEG-2/DVB receivers for new Space Systems Asian service. Am planning ahead - want receiver that will access these I703 Ku feeds, can trade Nokia V1.63 or ?.
#479F: EMTV Videocrypt decoder, SCART cord, ready to go. What do you have?

NOTE: Because of printed space limitations, SatFACTS reserves the right to edit or be selective about listings accepted for this space.

WITH THE OBSERVERS

AT PRESS DEADLINE

Lebanese service reported p. 21 in PowerVu (FTA with glitches) format continues with companion RAI International + unused third programme channel (PAS-2, 4153Hz); service may go under name "AAR Australia." JET service PAS-2 3962Vt carrier still present on analyser but programming tests are dormant at this time.

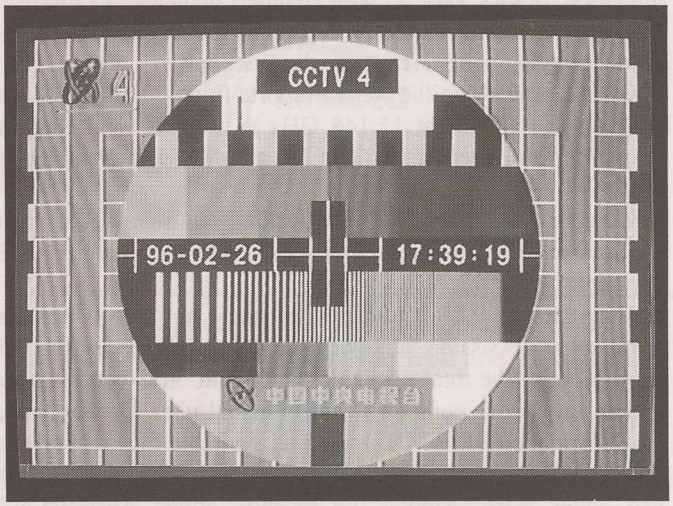
Alert observers found Optus A3 (152E) relaying ATN7 news feed coverage from PNG to Australia during the March political unrest period in PNG (24-25-26). The inclined orbit use of A3 was apparently required because of the unique PNG feed coverage of this satellite. Feeds were seen on vertical 1297 and 1430 with audio typically at 7.38 and 7.56. **Kevin Green** (Manilla, NSW) was one of the first to report it to SF.

Significant changes in the 50E-90E region are underway and we ask readers who live where they can check the accuracy of our Orbit Watch listings (p. 28/29 this issue) do so and advise us where changes are required. **Joris Van Pelt** reporting from Sultanate of Oman says CCTV-4 in FTA analogue is now gone from 68.4E PAS-4 and 96.5. He also finds the TV Madagascar (TVM) service from Gorizont at 96.5 P2 on a Winegard 10' dish; audio is 5.8 with a radio channel at 7.80, service in French SECAM.

David Weaver (Satellite TV Rentals Ltd, Hong Kong) provides an extensive survey of all analogue and digital video signals viewable at his location. He reports a Taiwanese made MPEG-2 receiver, the DVSR 2000, does a satisfactory job on the European Bouquet service channels (As2) but will not accept the parameters for the Chinese SCPC services on the same satellite. His firm routinely supplies SA D9223 and DMV 3000 receivers to commercial clients throughout the Asian region.

Iranian TV is reported on PAS-4, 4034Vt by **Gregorio V. Hermosa Jr.** in Oman. The programming seems to start around 2300 hours local time and apparently shares this transponder with Doordar (India) at other times of the day. **Bojan Tonev** (Underwood, Qld) reports Iranian TV programming transmitted between 5-6AM Brisbane time on As2 3680Hz. This transponder is normally used after 0900UTC by TV Mongolia for on average 6 to 8 hours nightly and by the USIA for TV programme exchanges for brief periods at other times. Apparently when special feeds are required and they do not conflict with either the USIA or TV Mongolia, this might be where the operators of AsiaSat 2 place them.

Gregorio Hermosa also reports CFI is now gone from 66E, adding, "only E-TV is left on this satellite at this time." Intelsat's new 801 bird, launched to 64E March 1, should begin testing shortly. This one will consolidate many of the other Intelsat spread services in the region and promises to bring several new Indian programmers on the air. Gregorio also finds P5 quality service on his 3m SAMI dish from numerous 80E feeds, verifying the basic coverage and power of the new Russian Express bird located there. He finds TB3 (4120 RHC), ACT (4020 RHC), TV6 (3875 RHC) and VTV4. His new Echostar LT-830 cost him US$103 - there are obviously some analogue bargains out there!.



Apparently only CCTV-4 FTA analogue feed remaining on satellite is on As2, 1190 Hz with feeds on PAS-4 and Gorizont 96.5 now gone.

Observer **D. Morris** (Bangkok, Thailand) reports a significant increase of signal strength from Intelsat 703 (57E) raising WorldNet and T.V.I. levels from P2 to P5 at his location (2.5m dish). He suggests UK English language films from around 1600 UTC daily on T.V.I. (IF1020, LHC). New Indian programming on Insat 2B/2C (93.5E) observed by Gregorio Hermosa Jr. (Oman) includes DD (1310Vt), DD3 (1348 Vt), DD4 (1388 Vt). These in addition to previously available DD1 National (1030Vt), DD8 Telugu (1070Vt), DD9 Kanada (1180Vt) and DD1 Tamil (1268Vt).

Laurie Fava (Jabiru, NT, Australia) finds 'The Disney Channel' is now transmitting on ApStar 1A to Indovision customers. Also noted - and reported by numerous others - the long present JcSat 3 C-band test card at IF1170 (Hz, 128E) is now gone.

WITH THE OBSERVERS: Reports of new programmers, changes in established programming sources are encouraged from readers throughout the Pacific and Asian regions. Information shared here is an important tool in our ever expanding satellite TV universe. Photos of yourself, your equipment or off-air photos taken from your TV screen are welcomed. TV screen photos: If PAL or SECAM, set camera to f3.5-f5 at 1/15th second with ASA 100 film; for NTSC, change shutter speed to 1/30th. Use no flash, set camera on tripod or hold steady. Alternately submit any VHS speed, format reception directly to SatFACTS and we will photograph for you. Deadline for May 15th issue: May 3 by mail (use form appearing page 38), or 5PM NZ May 5th if by fax to 64-9-406-1083.

Steve Jepson (Levin, NZ) and others found the new 5 programme channel PowerVu bouquet from Japanese Entertainment Television (JET) on PAS-2, IF1188Vt. As of our press deadline this service continues to run short video segments in a continuous loop, same content all 5 programme channels with no formal word as to when service might actually begin. As reported in Coop's Technology Digest March 19, JET is reported to be uplinked from Singapore and plans to provide 24 hour entertainment (documentaries, animation, drama, variety) with channels dedicated to English, Japanese, Thai and Mandarin. Jepson also notes that RAI Italy is now carrying commercials for the first time.

Kevin Green (Manilla, NSW) reports finding Palapa C2 Ku band service signals at 11.148 GHz as well as weak signals below P1 from Measat 11 GHz Ku at 148E. His dish size is 1.8m.

Steve Jepson (Levin, NZ) in checking out a new 1.2m dish acquired to keep an eye on Optus B1 finds a P5 level PAS-2 Napa test card at 12.710.

The status of PAS-2 transponder space not yet on lease is worth some discussion. Knowledgeable sources tell SF that all but 9 MHz of the total available bandwidth on C-band is now spoken for (under contract if not in actual use). On Ku-band, 3.5 transponders (189 MHz) remains available for lease on the Australian-NZ beam whereas most of the Asian beam Ku is also under lease. Among the recently added Australia-NZ Ku-band users is an Internet group bringing a direct feed from the USA to New Zealand on 12.380 Vt. That unspoken-for 9 MHz represents 25% of a single 36 MHz transponder so for all practical purposes "*This bird is full (on C-band)!*" The effects of this include a postponement to "after PAS-8" of plans for TNT/Cartoon (and possibly CNN) to shift to digital, and a significant slow down in new PAS-2 services until PAS-8 launches (mid 1998).

Optus Transponder Changes - Near Term

April 16: B3 TR12 ABC South Australia moving to TR2 (polarity change); TR14 Imparja will move to TR7 (polarity change).

May 15: B3 TR15 ABC Northern moving to TR12 and go from full to 1/2 transponder; TR14 Imparja Northern will occupy 2nd half of TR12 in 1/2 format.

May 15: B3 TR12 ABC South Australia having moved to TR2 will turn-off this date.

May 28: B3 TR15 ABC North, TR14 Imparja North having moved to TR12 will turn off this date.

(Information courtesy Av-Comm Pty Ltd)

Similarly Optus B1 and B3 transponder loading has also reached a critical point with no new service contracts likely to be let nor new services scheduled until mid-1998. B1 and B3 are embarking on what Optus calls a "$25 million retrofitting" of existing networks to convert virtually all analogue transmissions to digital - a project which could extend past the end of 1998 before it is completed. A particular challenge is the necessity to dual-feed existing RABS analogue TV services while the new format digital streams are also put into operation. As the analogue services are turned off, Optus will gain back valuable transponder space which it can then recycle to additional users. An early, small, example of the transponder shuffling now underway appears above. That there may be some operational errors and confusion within this giant reorganisation is also possible. Observer **Charles Wright**, for

example, found QTQ Channel 9 Brisbane test card on B1 12.445 while Channel 10 News Exchange was operating on 12.455. A 10 MHz difference is not quite enough to keep them separate.

The "slack" to be taken up by the shortfall in PanAmSat and Optus transponder space will fall first on Intelsat and spill to some unknown extent to JcSat-3 and Measat; both of which have C and Ku band capabilities into Australia and New Zealand.

MCM encryption on AsiaSat 2 within the European Bouquet. Yes, MCM is scrambling, no it will not affect the AsiaSat 2 feed at this time. MCM Europe was scheduled to begin encryption April 1 and in the week leading up to this date they did extensive testing of the new system. This testing affected MCM Asia to the extent that AsiaSat 2 service was cut-off for several hours at a time. An advisory from **Manivel Malone** (MCM Network Development and Sales) dated late in March said, "*The signal will not change for Asia and will still remain clear and digital.*" This does not mean that from time to time through April MCM may disappear from view for up to 12 hours at a time as they fine tune the European encryption system.

Using Plessey B-Mac decoders for C-band services; curious minds want to know if it is possible. The short answer is no. The longer answer says the B-MAC authorisation chip found in the Plessey units utilises a unique-to-Australia hexadecimal coding scheme and before the one-day-to-be-retired Plessey units could find a home in C-band applications, the decoding chips would require a change out. This is not a unique problem as anyone who has attempted to get an SA 9708 B-MAC unit authorised for use on the Palapa C2 service already knows. In the case of Palapa, the encryption scheme is unique to the chip sets found in the companion CDE-2000 decoders; conversely, CDE-2000s cannot be authorised for TNT/Cartoons off of PAS-2 for the same reason - in reverse.

EMTV has launched their long promised 2nd subcarrier (FM) radio service on 7.40; 'Pidgeon English' calling itself 93FM.

Services that look like MPEG-2 SCPC - but refuse to "reveal" themselves. Following our detailed guide to using a Nokia V1.63 receiver as a search device to identify the transmission parameters of SCPC and MCPC signals initially located with a spectrum analyser (SF#31, p. 6), a number of observers have reported signals that simply refuse to "reveal" their operational details. There are two good possibilities, several lesser ones why this might be so. Any service utilising the General Instrument DigiCipher routine cannot be "read" by the Nokia; example - PAS-2 4090Hz (Filipino Channel) or the twin SCPC digital services tucked up beneath the GMA analogue service on Palapa C2. Reason two: wideband data (such as an Internet feed) has the same approximate bandwidth as SCPC digital video and being digital it looks identical on a spectrum analyser.

P-Code Reporting System (analogue)

P5 ► Fully above threshold (no sparklies, tearing in 27 MHz bandwidth)

P4 ► At or above threshold with reduced bandwidth

P3 ► With reduced bandwidth, some sparklies but still satisfactory DTH viewing

P2 ► Significant noise in video, noise in audio even at reduced bandwidth

P1 ► Must be an "enthusiast" to watch!

AT SIGN off

German magazine Tele-Satellit in their March-April issue features the now Pacific-Asia familiar print of the Nokia 9500 receiver on the front cover while an array of clever authors tell you how to get inside the secret menus and do everything except tune-in PowerVu signals. They probably overlooked PowerVu simply because there are very few SA networks operating in Europe and if you don't have the signals to "play with," well, you can't very well be expected to "get inside" their gates.

In their Digi Doc section, a writer asks:

"Why do the SCPC channels overwrite the Italian Mediaset (MCPC) package?"

And the answer:

"This is a known problem of the d-box and its software, may feeds over write one another for no reason at all. Also channels in packages overwrite feeds and vice versa. This problem can only be fixed by a change in the software."

In a separate section entitled "The d-box in Operation," the writer tells about two secret 9500 menus.

"The d-box has two undocumented menus which can be called up using certain key combinations. The first menu is designed for traders and is called up by entering the following combinations from the basic screen display:

Menu-Settings-Pin-Pin

"To be on the safe side I would recommend that you do not call up this menu as I have heard several reports of the box giving up the ghost after it has been called up.

"The second menu is much more interesting and is called up by entering:

Radio +99 + radio + menu

"If this does not work the first time, try again from the radio menu. When it works, a red screen (Main Menu) appears with various setting options. You can use this menu to receive any unencoded MPEG2/DVB feeds and packages provided you have the relevant data including the PIDs."

It is apparent that a growing number of people, some perhaps with real skills, are working overtime to force receivers such as the 9500 S to reveal their innermost secrets. As regards the 9500 S, let us remember that it is also called the "MediaMaster" and that it was designed to be a single box that will cope with every variant of unencoded MPEG-2 imaginable. The same basic unit is being sold for cable, terrestrial and satellite use and to do this the software must have as "open" an architecture as possible.

Moreover, variations of software can be created and loaded to receivers such as the 9500 S to change their receiving parameters. Just as Galaxy in Australia has "upgraded" the DGT-400 boxes with a program rating system through over the air instruction, so too can the 9500 S (and others) be "updated." This updating can be done through the satellite link, by a dealer equipped with a PC and the new program upgrade on a disc (through the receiver 232 port) or externally in real time (through an interactive PC program).

Robin Colquhoun's SA D9223 software programme demonstrated at SPRSCS '97 has now been rewritten and loaded into a Palm Top PC. All of the D9223 instructions are held in the Palm Top memory and when the user enters one or two key strokes on the Palm Top, the small computer instructs the D9223 to utilise a new set of parameters for a new TV programme (bouquet). In effect, the Palm Top loaded with instructions for Star TV, EBB, all 12 of the Chinese SCPC channels, NBC Asia, the Hong Kong PowerVu channels, the California PowerVu channels, TCS Singapore, the CCTV channels (and so on) becomes a "remote control" for the D9223 user. The Palm Top connects to the rear apron RS232 port on the D9223 with a small ribbon cable; a clever person could convert this to an infrared circuit and eliminate the wire. The user still must move the dish (with a separate control) and select the correct polarity (Robin believes this could be made a part of the Palm Top instruction) but all of the hassle associated with having a dedicated desktop PC connected to the D9223 is gone.

A commercial product? Probably not since Palm Tops still cost upwards of $500 in local currency. But as a one-off project for the shop that demonstrates and sells satellite television, for the cable headend requiring a single instant access backup receiver, the Palm Top Control (PTC) approach makes excellent sense.

And somewhere out there in our universe of readers there is a better idea now forming; someone has just seen how something they know about can be put to work as a controller for satellite IRDs, as a saver and retriever of special instructions the receiver requires for each of the various programming bouquets. When you have it all worked out, give us a call. We'd like to share it in detail with the balance of the satellite industry!

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• NEW programming sources seen since April 1st: _____

_____

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• OTHER (including changes in your receiving system): _____

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NOTE: Please use P1 - P5 code when describing signal levels and receiver IF/RF settings.

Your Name _____ Is this contest entry? _____

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Bonus Word Entry: _____ on page _____

March BONUS WORD - majuscule / p.34!

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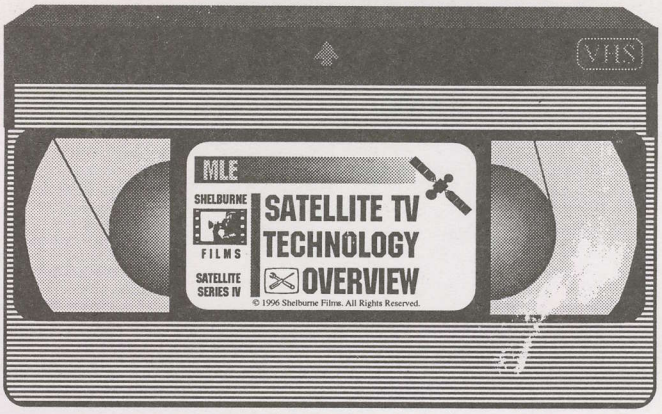

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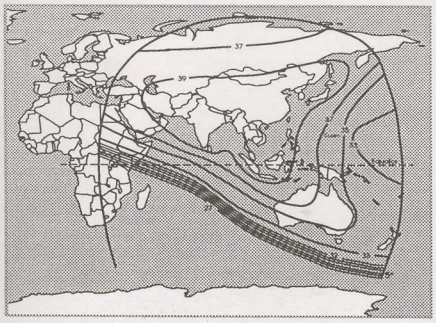

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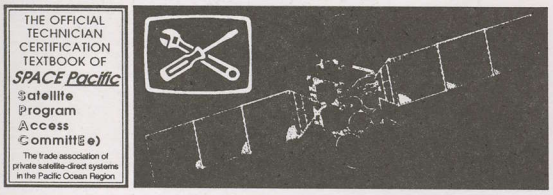

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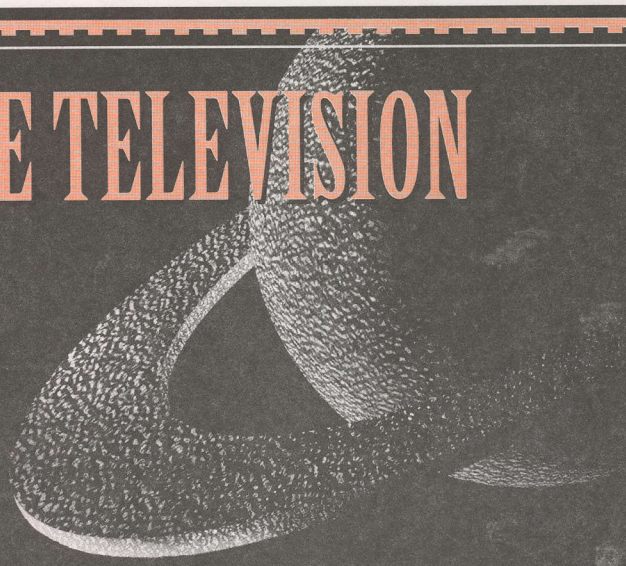

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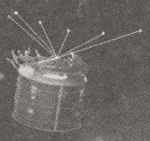

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