Bob Cooper's

SATFACTS

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

THE TRAIL TO TRUTH

The Pacific Ocean Region (POR) is entering the wonderful world of direct to home (DTH) satellite service 'late;' well after hundreds of millions of people in North and South America, Europe, Africa and Asia have had the option of low cost private home dish services available. We enter the DTH realm at a time of massive change; not only are our new satellites offering brand new frequency ranges (such as Palapa C1 that begins the C band downlink range at 3,400 MHz rather than the normal 3,700 MHz) but we are also faced with the underway conversion of many satellite programme feeds from normal analogue transmission to the brand new compressed digital video (CDV). In areas of the world where analogue is established, CDV presents only minor equipment changeout problems. Here, with very little established analogue, CDV forces us to consider whether we really wish to install dishes until the CDV versus analogue wars are settled.

Those who attended Satellite Cable Seminar 94 (Hastings, NZ September) and those who have come into the fold since want to know answers to pressing questions; the answers will help each participant determine when, and how, he (or she) becomes active in the DTH world. The most often asked questions?

"When will programming start (on PAS-2, and so on)?"

"Who will the programmers be, and, what will the programming be?"

"Will these programmers transmit CDV?"

"When, and where, can I get CDV receivers and how much will they cost?"

The questions are many; the answers are few. And those answers you do get are often conditional; "If (such and such happens), then ..... ." Yes, it is difficult to formulate business decisions, make a schedule, enter into serious planning given the lack of answers.

Between October 20 and November 3rd I sat down, face to face, with the top executives for AsiaSat, Star Net, CNNI plus key representatives from PanAmSat, Discovery, CMT, General Instruments and others (many agreed to meet with me conditioned upon their responses to my questions being 'off-the-record'. That means they could speak to me without fear of being directly quoted.) I did this on three continents and logged more than 18,000 air miles.

The information to follow, in this issue and in December, is uniquely direct. It does not originate from "so and so said that so and so said" as has often been the case up to this point. When information given here is suspect as to accuracy the data ends with an (AS) notation. When the data

-SatFACTS NOW AVAILABLE WITHIN AUSTRALIA-

This month we welcome several hundred new-to-SatFACTS readers in Australia, all through the efforts of Garry Cratt of AV-COMM PTY LTD. Garry is providing at his expense one-time-only SAMPLE copies of this issue to many of the Australian brethren as a means of introducing the factual, concise material contained in SatFACTS monthly. Those receiving this SAMPLE copy should immediately contact AV-COMM to sign-up for a year's subscription. SatFACTS is now read in 14 countries throughout the Pacific and we pledge to report on everything of interest for readers from French Polynesia to Australia, Tasmania to the Marshalls!

here is believed to be accurate but not verified by either written documentation or a statement directly to me by a responsible source, it is labeled (NV) for not verified.

What follows is, I believe, the most complete analysis available of the many changes occurring in the POR satellite TV world possible at this point in time. However, be advised: Everything about the POR satellite world will be in a state of change for at least the coming 24 months. Today's "truths" are current only today; tomorrow will see "new truths" and new facts. And that, after all is said and done, is why this is a monthly publication.

THE SATELLITES / West to East

This is a look at the status of each satellite which now has or will have when launched the capability of serving some portion of the 'POR'. As a handy guide to which satellites serve which areas (a function of the satellite location, and, the satellite's footprint) see country charts, this issue..

APSTAR (87.5E):

Apstar 1 was launched in July to 132E. This was unfortunate as RIMSAT at 130E and a Japanese satellite at 132E made this location untenable. Apstar admitted its "error" in September and negotiated a temporary right to use 138E from Tonga. Apstar 1 and follow on satellite Apstar 2 are owned primarily by a consortium of Chinese government agencies. They had selected 131 for Ap1 and had announced 134 for Ap2 without regard to existed, registered, users at 130, 132 and 134. Why they did this remains a mystery.

Apstar is of insignificant interest to most of the POR; the intended audiences, the footprints, all favour areas along and north of the equator; India and China are the two primary 'target' areas. Ap1 has major programmers Turner (CNNI and TNT/Cartoon), HBO and others on board. The programmers on Ap1 will transfer to Ap2 when it is functional; Ap1's future use after Ap2 is unknown.

Ap1 is reported of good quality on DTH (3m and smaller) size dishes in the Darwin area (NV) but there are no reports of its reception in Queensland. The actual coverage of Ap2 will depend largely on its Clarke Orbit position. Any footprint maps published to date will be only 'guides' to the actual coverage; we'll simply be forced to wait to see how it performs when on-station.

The Ap2 programmers (Discovery, Turner for CNNI and TNT / Cartoons, ESPN, Viacom for MTV, Australia's ATVI, Hong Kong's TVB) are primarily now on Palapa B2P (113E). Many use B-MAC encryption. The decision to continue in B-MAC analogue or to switch to CDV has not been made by most programmers to date (NV) but any switch to CDV prior to the last half of 1995 seems unlikely.

ASIASAT 2 (100.5E):

AsiaSat 1 (As1) now at 105.5E is scheduled to be replaced by As2 at 100.5E between April and July 1995. The purpose-built As2 satellite will be the home for all STAR TV programming channels now on As1 plus as many as 24 additional programme channels. As1 will continue to provide service for approximately one year. The As2 services will be CDV in an MPEG-2 format developed under contract by NTL and Pace. The new VSM4000 format receivers from Pace will be available in July or August 1995 and through a new entity called STAR NET (see follow-up report). Neither Pace nor NTL have released details of their VSM4000 format to date but sources within STAR TV have told CTD "There are very real format software problems with the need to provide multiple language on screen graphics; in particular the graphics required for Mandarin and Cantonese." It is CTD's judgment that the first generation Pace receivers available in mid 1995 may not have all of the hoped-for graphics functions.

As2 will provide significant coverage to the POR (see this issue). As1 has been reported as far south as the border region of Victoria and NSW on 3.7m size dishes but generally it has not been successfully received south of the northern coastal areas of Australia. As2 will have low look angles in New Zealand (7 degrees or less) requiring specially designed earth-shielded lower lip antennas although the signal levels will be 3 dB 'hotter' than the present PAS-2 signals. In Australia, the signal levels will be in the +34 dBw region and up along the eastern seaboard with look angles in the high teens and low 20s; very acceptable. STAR TV is committed to providing 'free to air' programming (at

least five channels, possibly more by late 1995) because they believe the 'free-to-air' programmes give people a reason to make the initial dish system purchase. In CDV, each Pace (ultimately other suppliers will be available) receiver will come out of the box with a 'Starcrypt' Smart Card. The receiver will have a 'slot' for the card. When the system is installed, the DTH or commercial customer will dial a (Hong Kong) telephone number and report the identification number for the Smart Card. Shortly thereafter, the receiver will come 'alive' and the free-to-air programming channels will be available. At anytime after that point, DTH or commercial viewers will have the option to re-contact STAR TV and subscribe to any of up to 24 'conditional access' (CA) encrypted programming channels. These will include movie channels and an unusual 'multi-view' sporting channel service. The multi-view sporting channel will typically provide separate camera angles (views) of a sporting event and the DTH home subscribing will be able to push buttons on their Pace receiver remote and switch from a wide angle camera shot to a close-up shot to an end-zone shot (and so on). A minimum of 4, a maximum of 8 separate camera angles of sporting events offered on 'Sports Multi-View' will be available to the viewer at the touch of a button. With a PIP receiver, you will be able to fill the screen with one selected view and then in the PIP smaller insets stack up the remaining images ready for instant switching at a touch of a button (NV).

As2 will have, in addition to CDV, an expanded C bandwidth. Rather than starting at 3,700 MHz, the first channel will begin at 3,620 MHz. This adds 80 MHz to the satellite, the equivalent of two 'normal' 40 MHz wide analogue channels. This additional 80 MHz will affect the design of the LNB and the receiver. Existing receivers that cover only 3,700 to 4,200 MHz will 'miss' the extra 80 MHz; but, existing receivers are analogue and at the present time there are no known analogue users of that 80 MHz segment (AS) so you might be required to purchase a Pace CDV receiver anyhow for its CDV capacity and in the process add the additional 80 MHz segment.

STAR TV is anxious to increase their homes reached coverage (presently they claim 42,000,000 people in 53 countries) and to that end have created STAR NET (SN). This new entity is providing technical assistance to CATV and SMATV system operators including a complete catalogue of equipment through SN that assists the system builder in finding the hardware he requires. SN has announced a US$100m 'equity fund' to help operators finance their new or upgraded systems. Our Coop's Technology Digest (CTD) for December carries a complete report on this programme and explains how a prospective CATV or SMATV operator can become a part of the STAR NET project. Non CTD subscribers may request a copy of CTD 9412 by sending NZ$30 to Robert B. Cooper, PO Box 330, Mangonui, Far North, New Zealand. This could put you into the CATV / SMATV business.

PALAPA C1 (113E):

At the present time Palapa B2P occupies the position of 113E. This Palapa satellite is a major supplier of cable TV and DTH programming and includes the HBO/Turner/ATVI (et al) group of programmers on board. Most of these cable-oriented programmers are scheduled to appear on Ap2 when it is available; whether they will also continue on B2P is not known (AS). B2P places 3m dish size usable signals on at least some transponders into northern Queensland and colour-marginal reception has been reported in New Zealand on a 7.3m dish (see Auckland University report here).

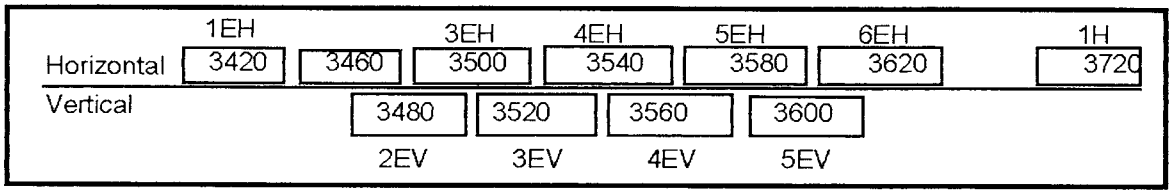
C1's actual launch date has been shifted about of late and a hard date is not known at this time: the best estimates are for the last quarter of 1995. C1 will operate from 113 only for approximately 12 months, and then move to 118 where it will replace aging B4 in 1996. At that time, additional new C2M will have been launched to 113. By the end of 1996, there will be two new, good for POR, Palapa satellites (at 113 and 118).

The C series Palapas have been designed with purposeful coverage of eastern Australia and New Zealand. The signal levels will be strong (as high as +37 dBw into New Zealand; +38 dBw into eastern Australia) and the elevation angles high enough that both C1 and C2M will be formidable sources for programming through much of the POR.

C1 and C2M carry the expansion of C bandwidth another step; an 800 MHz wide band stretching from 3,400 to 4,200 MHz. If it turns out that the new 3,400 to 3,700 MHz portion carries suitable

-PALAPA C2M EXTENDED BAND CHANNEL PLAN-

Note: Present information suggests only horizontal channels shown will reach into New Zealand, (eastern) Australia and the POR.



programming for DTH or SMATV / CATV, existing analogue receivers, LNBs and feeds will have to be replaced with new "wide/expanded band' C units. The special Australia / New Zealand / POR beams on C1 and C2M appear to be all linear horizontal (NV) which will be a small savings for receiver installers putting in dishes only for Palapa; no 'Polarotor' (r) will be required. The probability Palapa C1 and C2M will have at least some programmers in analogue, and, some in CDV is high. Dishes sizes on C1 and C2M in Australia will be 2.4m and less in Australia, probably 2m in New Zealand. Other POR areas are shown in table form in this issue.

JCSAT3 (128E):

Japan's first POR service C plus Ku bands Clarke Orbit satellite is a high tech marvel scheduled for launch in August 1995. The C band service (3,700 to 4,200 NV) has a boresight level of 37 dBw that covers virtually all of Asia from India east to the western extremes of Alaska and south through the Philippines, and Indonesia. Outside of the 37 dBw footprint, signal levels gradually fall off such that all of Australia is within at least the 25 dBw footprint (Queensland's coast is predicted at 29 dBw) and all of New Zealand is also within the 25 dBw level range. Other portions of POR are shown in table form in this issue.

Also on board JCSAT3 will be a special 'Oceana Ku band spotbeam' with Ku levels of at least +43 dBw reaching all of New Zealand, Australia's south coast from Adelaide east and then north to near Brisbane as well as Darwin and Perth. Other areas of Australia fall within at least a 35 dBw Ku footprint.

JCSAT C band transponders are 36 MHz wide, Ku are 27, 36 or 54 MHz. The frequencies that will appear from 128E on the Ku band Oceana spotbeam have not been announced. Programmers have also not been announced, but two major Japanese telecommunication companies have during 1994 obtained their government's approval to 'export' television programming from Japan to other areas in the Pacific and Asia. Japan employs encrypted analogue formats unique to Japan for its Ku band Superbird services and the Japanese satellite industry has remained uncharacteristically distant from the rapid development of CDV during the past three years. So while we don't have a clue how Japan plans to use JCSAT3, its technical capabilities (on paper) are superb and from 128E it could be a very important part of our future for DTH in the POR.

RIMSAT G2 (142.5E):

This satellite, built by the Russians and launched for US firm RIMSAT in June, has limited technical capabilities but very aggressive (recently announced) programming plans. The satellite uses a Global beam footprint which means it is widely received from India to the eastern POR with only minor (gradual) reductions in footprint levels away from the boresight (in SE Asia).

AllAsia ViaSatv is now uplinking programming 24 hours per day from the Philcomsat earth station facilities in Subic Bay (Philippines). The Asian Television Network (ATN) is one of two users of G2 at the present time; the second is Asia Independent Network (AIN). ATN reported it recently paid US$4m for the exclusive rights to provide television coverage of the 1994 World Cricket Matches featuring India, the West Indies and New Zealand. Coverage began on 17 October. Although New Zealand was eliminated by November 3rd, coverage continues until 14 December (18-22 Nov., 1 to 5 Dec., 10 to 14 December).

Prior to the World Cricket, ATN was transmitting Indian music videos 24 hours per day. AllAsia now reports ATN has acquired programming rights to 2,500 Hindi language movies, will also be broadcasting programming from the SBN Channel 21 Network from the Philippines and is scheduling additional programming in Mandarin as well. Programming is being coordinated by the Manila-based Kampana Television Corporation.

This is all analogue at the present time but even these people are talking about the conversion to CDV. A recent communiqué to CTD noted, "AllAsia's current 2-channel analogue feeds mark only the first milestone in the AllAsia ViaSatv programme for establishing a full-scale multiple channel, multilingual satellite television service, soon to take the form of a digitally compressed 10-channel service on a single transponder."

As a practical matter, the 142.5E service is of good quality on 3m dishes over most of the POR including Australia and New Zealand. The two presently in-use analogue programming channels could be expanded; this satellite has the ability to provide up to 6 analogue video programming channels.

PanAmSat PAS-2 (169E):

Programming in B-MAC encrypted form (ESPN) began here late in August. Confusion has reigned since that time. At various times analogue transmissions have been seen (or are being seen at this time) from: CMT / Country Music Television, Prime Sports International, CBNC/ANBC, CTN (China Television Network), CTC-36 (Taiwan commercial channel), and B-MAC encrypted ESPN. Additionally, CDV users include Turner (for CNNI), and ABS-CBN (Philippines). The next major programmer to come on line will be Discovery which is expected sometime prior to December 26. Additional announced users of PAS-2 not yet accounted for are Japan's KDD and Viacom International (for MTV and possibly others).

As you read these words, Reuters is also appearing on C band PAS-2 with live coverage of an Asian heads of state gathering in Indonesia. This feed (you will now know) is uplinked to PAS-2 on Ku band and is then cross-strapped within PAS-2 to C band for the outbound links to the world. This Reuters coverage is the first cross-band (strapped) use of PAS-2 and also the first 'occasional use' of PAS-2 to date.

PanAmSat is faced with the following problems:

1) It has contracts with programmers (such as CMT) to provide transponder space

The nature of the individual contracts is not public. CMT, however, has leased MCPC space; that means "Multiple (programme) Channels Per Carrier."

PanAmSat describes its PAS-2 capacity by noting:

"Twelve 54 MHz channels, four 64 MHz channels"

This language dates from the analogue era where transponder bandwidths are specified in megahertz and are typically related to 27 MHz requirements for a single analogue TV programme transmission. However, in the CDV world, a 27 MHz (or 54 MHz which is two times 27) transponder has no direct relationship to programming bandwidth. With MCPC two or more separate, unrelated to one another, digitally compressed video programme services share a transponder. MCPC is technically superior to an older SCPC (single channel per carrier) because the individual transmitters can be used for two or more separate programmes.

CMT has an MCPC contract. That could be for a single "programme channel" or it could be for just a single 'slot' within the MCPC 'bundle" of programmes. In a 54 MHz transponder, CMT would occupy less than 1/12th the total of 54 MHz. In the analogue days PanAmSat would sell a single analogue (27 or 36 MHz wide) transponder to a single user; such as CMT. With CDV, PanAmSat can sell pieces of the transponder and in the space previously occupied by a single analogue programme, 6 or more CDV programmers can be placed.

BUT - from October 6th to the present time, CMT has been appearing on PAS-2 in analogue form. If CMT only agreed to and one assumes pays for a MCPC 'bandwidth' (about 1/6th of the bandwidth required for analogue), how then can CMT be in analogue at this time?

The answer to this comes from PanAmSat.

"PAS-2 is a new satellite serving a new area. Not all of the contract users are ready to begin operating. So at this time we have a sizable amount of bandwidth at rest from 169E. It is just good business for PanAmSat to allow, even encourage, CMT to feed their service out in analogue while the various CDV pieces come on line."

2) The availability of CDV equipment (whether for the uplink or the earth bound receiving stations) is 'very difficult' at this time.

Programmers already using CDV (such as ABS-CBN) have been forced to make a compressed digital video 'format' (equipment supplier) decision based upon equipment that is now available for delivery. ABS-CBN now using PAS-2 to feed programming from the Philippines to the west coast of North America (using MCPC), has chosen the General Instruments (GI) Digicipher I version equipment. It is available, now, in the unique to GI format and can, if ABS-CBN wishes, be upgraded to full MPEG-2 late in 1995.

PanAmSat allows transponder users to select their own CDV format. CTN (Hong Kong) has opted, for example, to use the Scientific Atlanta MPEG-2 format (NV). PanAmSat itself, at the Sylmar (California) uplink and control site for the Pacific, has also selected Scientific Atlanta (S/A) but is now considering adding the technical capability to offer GI Digicipher to programmers as well.

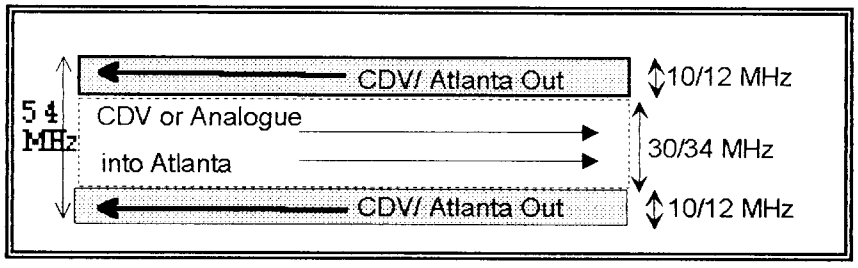
But at what point in time does a programmer elect to convert to CDV? PanAmSat walks a delicate line between providing what it has sold to programmers (MCPC to CTN) and the reality of equipment availability. If PanAmSat adopted a "You bought MCPC, you use MCPC (or, nothing!)" posture, most of their users would not be on PAS-2 until mid 1995. That's the reality of CDV; mid 1995 (see separate report here; When CDV?). So it has taken a more cordial and programmer friendly position.

"CTN will use analogue for perhaps a couple of months. Then they will adopt an MPEG-2 friendly version of MPEG-1 which will be in use until perhaps mid 1995 when the real MPEG-2 becomes available."

In fact, if PanAmSat had refused to make the additional (analogue) bandwidth available to CMT and others, it is likely those test transmissions that have been available on PAS-2 would never have been seen. If PanAmSat had not granted CMT the right to use a full half transponder (27 MHz) for

-TURNER'S TOTALLY UNIQUE APPROACH TO PAS-2-

Turner International's PAS-2 transponder is 1C; vertical polarisation occupying the downlink spectrum from 3703 to 3757 MHz. Unlike others who have leased 'MCPC' programming space and who are dependent upon PanAmSat to determine which space they use, and how, Turner has its own 'spectrum' to do with as they wish. More and more of the Turner operations (CNNI, TNT, Cartoons and others) depends upon the ability to link programming material from around the world back to Atlanta headquarters. To do this with news feeds they require bandwidth; often more bandwidth "into Atlanta" than is required for the transmission of the finished product (CNNI for example) back out of Atlanta. PAS-2 is called a 'contributory link' because it is being used to not only connect Turner Atlanta with regional programming satellites (such as Palapa and Apstar) but to also allow transmission in the reverse direction of 'raw news and sports feeds' back to Atlanta. Within the 1C transponder, there are three traffic lanes. Each outside lane is 10 to 12 MHz wide and carries specially formatted CDV full programme feeds outward. The centre lane, 30 to 34 MHz wide, is for inward bound feeds which may be analogue, digital or both simultaneously. The outward bound feeds are 'customised CDV' requiring unique to Turner MPEG format decoders. The PAS-2 outward feeds were not intended for DTH nor SMATV/CATV use and thus are not available for our use. The custom decoders are priced at US$17,000 each.



analogue video 'preparatory to CMT being able to transmit in CDV' there would have been no CMT analogue service.

"PanAmSat recognises the value to CMT (and others) to have a test analogue signal available at this time. It gives them an opportunity to introduce their service, to solicit viewer response, to measure the extent of their coverage. We have been pleased that the status of PAS-2 allowed this to be done, however temporary it may have been."

Temporary? Because the analogue services are available courtesy of PanAmSat's willingness to allow this to happen (CMT is actually using several times more bandwidth for its analogue tests than it is paying for as a MCPC user), CMT (and others) must be prepared to (1) move from PAS-2 transponder to transponder when PanAmSat requests them to do so, and, (2) cease analogue transmissions when PanAmSat needs that bandwidth for other customers. This explains the "here today, gone tomorrow" nature of some of the analogue feeds to date and also explains why CMT (and others) may be shifted from one dial setting to another without warning. Ultimately, these MCPC PAS-2 customers will all end up in their assigned MCPC spectrum space and the days of 'musical chairs' will be over. What we are seeing today is a temporary growth phase for PAS-2 created primarily by the lack of readily available equipment for MPEG-2 format CDV. Had PAS-2 started up one year ago, all of these customers would have appeared more or less simultaneously in analogue. If it had come on line in November 1995, they would have all come on line using MPEG-2 in some form. Today, now, it is mixed because the CDV equipment supply doesn't allow everyone to pop up on CDV at the same time.

INTELSAT (174, 177E):

Intelsat, the international satellite consortium, has never been very good at responding to real world competition. From 1970 to 1980, they concentrated on keeping other satellite operators out of the Clarke Belt, which they tended to believe was their private territory. After losing a few key regulatory decisions in the early 1980s competition gradually developed as Indonesia (Palapa), Australia (Aussat), and European and North American domestic satellites began to nibble away at the exclusive Intelsat turf. PanAmSat with PAS-1 was the first major break through for private enterprise and across the Atlantic, especially between North and South America, PAS-1 has rewritten the rules of business for Intelsat. But old habits cling to life and in the Pacific the almost exclusive services of Intelsat from 174, 177, 180 and 183 have allowed Intelsat to retain its monopolistic policies and 'take it or leave it' attitudes. That Intelsat would have ever allowed customers such as CMT to sign up for MCPC bandwidth and then turn around and grant them permission to use analogue bandwidth, as PAS-2 has done, is unthinkable.

PanAmSat changed the way Intelsat does business in the Atlantic. They will within a year or less have a similar impact on the way Intelsat operates in the POR. Already, they have been offering very 'sweet transponder deals' to potential cable TV programmers who have inquired for transponder space. On the October launched 703, now beginning tests at 177E, Intelsat has allowed at least one would-be South Pacific cable programmer to take a short-term temporary lease on a 36 MHz bandwidth C band transponder with high signal level capabilities of 36 dBw (2.4m receive antenna or less). Whether this cable programmer makes a go of his fund raising (finding US$5 to 6m to go from short term transponder lessor to full-time CDV format cable programme distributor is a big step) is not ready for discussion; yet. That Intelsat did some 'wheeling and dealing' with the cable operator for this transponder capacity is important. This particular programmer may not succeed with a viable business plan, but the mold is in place for others to follow and Intelsat is suddenly more receptive to 'doing deals.' PanAmSat is what caused this to happen.

Intelsat 701 at 174E is the primary telephone and narrow band data satellite; its future as a distributor of cable or DTH programming is nil. The newer 703 at 177E has many new to the Pacific transponder design capabilities, and it also has the ability to place steerable Ku spot beams of up to 46.7 dBw (1.2m antennas) into POR regions in the 11,700 - 11,950 and 12,500 - 12,750 MHz downlink bands. The technical capabilities of 703 are superb; if DTH or SMATV/CATV

programming fails to develop at 177E, it will not be for lack of qualified equipment at this location. Intelsat, like Optus, can sometimes be its own worst enemy.

INTELSAT 508 (180E):

This tired, old work horse went into orbit in 1984 at a time when 7 years was considered a reasonable lifetime for a satellite. Now several years into 'inclined orbit' operation (requiring full-time tracking in elevation for most users in the POR), Intelsat does not plan to replace 508 until at least the last half of 1996. By January of 1993, 508 was moving in an elliptical orbit of +/- 1.3 degrees. By January 1994 the orbital maneuvers had increased to +/- 2.2 degrees. By January 1995, to +/-3.0 degrees and by January 1996 to +/-4.0 degrees.

Although the bird is old, and low on station keeping fuel, to its credit there have been no major transponder failures (reported). And as long as Intelsat can shift the tracking burden to its customers, and still get paid for providing a faulted satellite relay service, it is in no hurry to replace the bird.

ESPN left their transponder 1 (3,720 MHz) spot on 508 early in November. CNNI is scheduled to leave transponder 7 (3,845 MHz) sometime after 1 March. CNBC/ANBC feeds are already on PAS-2 and may disappear from 508's transponder 3 (3,765 MHz) as early as 1 December (NV).

RFO has plans to convert to CDV and add a new French 24 hour news channel (also in CDV) but a shortage of CDV equipment is presently postponing implementation of this plan (originally targeted for 1 January).

9 Australia continues to allow its transponder 22 (4,135 MHz) to be used for feeding B-MAC encrypted SKY (Australia) horse racing throughout the POR

Television New Zealand's flirtation with NTL format version 1.5 MPEG (transponder 23, 4,177 MHz) has been on and off since mid year. The original bugs in the system are slowly being sorted out and the 20 second, mind boggling 'green flashes followed by complete signal loss' occur less and less frequently these days. TVNZ began to use half of their 36 MHz Global beam transponder for inward bound CDV (typically MCPC two channel service of BBC1 and BBC2, eventually to be 24 hours per day) during October and the remaining 18 MHz service continues to be analogue feeds in and out. Television New Zealand Pacific Operations users in Niue, Cooks, Chathams, Nauru, Western Samoa and Vanuatu have been alerted they can expect to upgrade to CDV format equipment at some future (1995) point, suggesting TVNZ may itself plan to begin running CDV out of New Zealand by the end of the New Year (NV). Rugby feeds into New Zealand from the UK in digital format in the near term include 19/11 (Scotland v. South Africa), 26/11 (Wales v. South Africa) and 03/12 (Barbarians v. South Africa).

CDV: When Compressed Digital Video?

In a more or less orderly fashion, the various standards committees and national telecommunication networks have methodically tested, critiqued and ultimately approved the MPEG-2 'standard' for compressed digital video (CDV). But there have been some hiccups along the way.

-KEY SUPPLIERS OF MPEG FORMAT CDV RECEIVERS-

Compression Labs Incorporated (CLI): Jeffrey Baxter, Exec. Dir. Sales, Broadcast Products Group, 2860 Junction Av., San Jose, Ca. 95134. Tel: 001-408-435-3000; FAX: 001-408-922-5429

General Instruments (GI): Kris Kelkar, VP Int. Markets; Ron Kurth, Director, Asia-Pacific (Tel 001-619-623-2928), 6262 Lusk Blvd., San Diego, Ca. 92121. Tel: 001-619-535-2412; FAX: 001-619-535-2583. (NZ: Maser Technology, Steve Subritzky ; Tel: 9-479-7889; FAX 9-479-6536)

NTL: Barry Crompton, Head of Sales, Advanced Products, 34 A-C Parham Drive, Boyatt Wood Industrial Estate, Eastleigh, Hampshire SO50 4NU, UK. Tel: 0044-1703-498040. Fax: 0044-1703-498043.

Philips Consumer Electronics: Marcel Fuhren, System Concept Manager, PO Box 80002, 5600 JB Eindhoven, The Netherlands. Tel: 0031-40-79-1111. FAX: 0031-40-73-4050.

Scientific Atlanta (S/A): Charlie Hill, Senior Account Manager, 3845 Pleasant Rd., North Building, Atlanta, Georgia 30340. Tel: 001-404-903-5000. FAX: 001-404-903-6464.

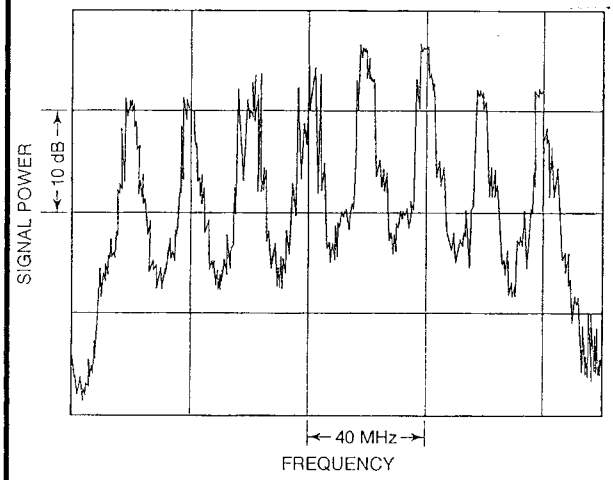
-HOW DO YOU 'MEASURE' CDV PRESENCE?-

Compressed digital video 'signal power' is determined by the number of individual 'programmes' present, and their spacing within a (27) (36) (40) (54) MHz wide transponder. It is possible to detect the 'presence' of CDV with an analogue receiver:

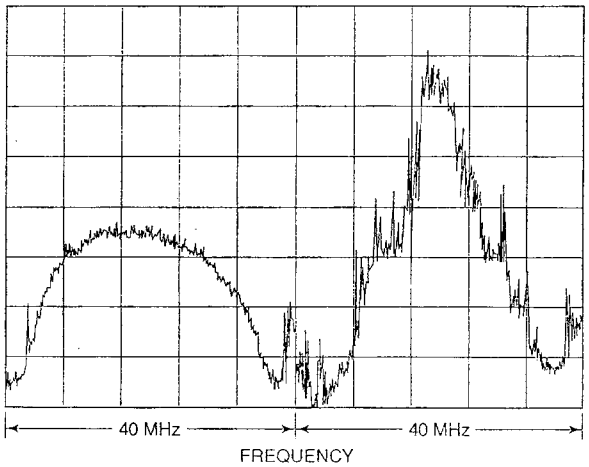
1) The 'S' or signal level meter will rise above the normal no-signal 'noise floor' but the amount it rises will vary from receiver to receiver, and be quite low when an MCPC carrier is using only one or two of its 'programme channels';

2) Most analogue receivers will display a gray or light-black screen when tuned to a heavily loaded MCPC transponder and this gray or light-black screen will display random white dashes or elongated 'sparklies' on the screen.

The best tool for detecting (and measuring) MCPC / CDV video, other than an appropriate format 'CA-approved' receiver, is a spectrum analyser. In display one here we have 8 analogue format transponders (stacked up on 8 consecutive transponders). In display two we have a single MCPC loaded transponder (it has 4 separate programme channels operating) compared to a single analogue transponder 'next door' on an adjacent transponder. Note that the 'average power' of the MCPC 4 programme transponder and the analogue single programme transponder are almost identical, although the energy within the MCPC transponder is at peak value (maximum upward amplitude) nearly 10 dB below the peak level of the analogue transponder.



Display 1: 8 analogue transponders



Display 2: MCPC (4 programme), 1 analogue

While the standards groups were considering MPEG-2, several suppliers rushed into the marketplace with their own variations of MPEG video. At least one of these firms, General Instruments (GI) apparently believed it could 'force a standard' to its own product by flooding the world market with its earlier version MPEG-1 family format. To protect themselves in the marketplace, the UK's NTL and the US's Scientific Atlanta followed with their own MPEG-1 variations. In effect, all three (plus several smaller firms with less marketing clout) 'jumped the starting gun' and raced into the field with less-than-MPEG-2 (perfect) systems.

Some satellite system operators purchased these less-than-MPEG-2 format systems. As we have seen here, programmers such as ABS-CBN (Philippines) so desperately needed to be functional on CDV that they were willing to install less-than-MPEG-2 standard CDV hardware today rather than wait until the fully sanctioned, world standard MPEG-2 hardware became available. Many of these programmers will upgrade their MPEG-1 hardware to MPEG-2 when the new modules become available.

In the US, DBS programmer Primestar estimates it will be required to upgrade no fewer than 250,000 individual DTH terminals during the latter half of 1995 with MPEG-2. Locally, Television New Zealand using the NTL MPEG 1.5 format system has only a handful (perhaps ten) receivers to upgrade when MPEG-2 finally becomes an off the shelf item.

As a DTH or SMATV / CATV user today, you could purchase a GI model DSR-1500 CDV receiver for US$2,030 (see list of CDV suppliers here). This is a commercial grade (rack mounting) unit with 4 video/audio inputs and outputs formatted for the Digicipher I protocols. On PAS-2, ABS-CBN uses this particular transmission format. NTL and Scientific Atlanta CDV receivers in the pre-MPEG-2 formats employed by each are more expensive but are believed only compatible with their own formats (NV).

Virtually everyone in this receiver field agrees with a statement we obtained from GI which reads:

"Pre production models (of MPEG-2 receivers) will be available in the 2nd quarter of 1995 (April-June) with products being shipped in production quantities 2nd half of 1995 (July-December)."

In the case of GI, the new MPEG-2 (DigiCipher II) version will have a pair of video/audio inputs and outputs and be priced at US$1,495. There will be two additional models as well; a commercial grade integrated receiver descrambler (IRD) at US$1,675 and a consumer set-top IRD at US$500-600 each.

The US$500 price range for a consumer IRD is also the target price set by Pace for their AsiaSat 2 series of equipment being developed with NTL. Sources at Star TV, however, are not hopeful the first receivers will come in at US$500, primarily because of the complicated on-screen graphics required for the Mandarin and Cantonese Chinese language market.

The direction of design being followed by GI in their existing DSR-1500 receiver is instructive:

"The DSR-1500 can receive and process digital NTSC television signals from GI's Digicipher (I) system, as well as Videocipher II Plus signals and clear NTSC transmissions. The Digicipher system uses digital video compression techniques to allow transmission of up to 10 television (programme) services per satellite transponder, with accompanying data and audio.

"Addressable conditional access and encryption are provided with GI's renewable security system. The DSR-1500 includes a TvPass card slot for easy security enhancements. The DSR-1500 includes Videocipher descrambling and clear NTSC capabilities; it automatically adjusts to the input signal format. A front panel LCD menu system assists setup and operation which is similar to current analogue IRDs with the added step of selecting a programme (channel) from among several digital services on the transponder."

One of the major shortcomings of Digicipher I is that it only works with NTSC format signals. The new (in 1995) Digicipher II versions will be PAL and NTSC compatible.

Although it will be up to the programmer to implement conditional access, it is believed virtually all CDV format programmers will do so. Conditional access (CA) allows the programmer to individually or collectively 'address' those receivers using the programming with an electronic "decode" or "do not decode" message. In this way the programmer determines, using the unique "electronic address" of each IRD unit in the field, which receive locations can or cannot access the programming.

Unlike the present analogue world where programming in "clear" transmission formats may be tuned in by anyone with a suitable satellite receiving system, CA ends channel surfing (switching from programmer to programmer) at any individual site unless the programmes selected have been "CA approved" for that receiver by each of the programmers involved. Therefore, mere possession of a CDV receiver will gain a satellite terminal user nothing in the way of usable programme material lacking conditional access arrangements being in place. More specifically, owning a GI DSR-1500 receiver to tune in the ABS-CBN MCPC programme signal now on PAS-2 will not produce ABS-CBN unless they have your DSR-1500 "electronic address" on file, and have sent out through satellite approval instructions to the particular receiver you own.

Programmers on PAS-2 are very aware of the projected receiver shipping schedule for CDV and ideally each would hold off conversion to CDV until sometime after 1 July 1995; to allow the ready availability of receivers to match their transmission format. However, while PanAmSat will not specify which of their programmers have bought MCPC and which have purchased at least a 27 MHz bandwidth capable of transmitting analogue video, it is obvious that most have MCPC space and if each were to 'request' temporary use of analogue space (as CMT, CTN and others have done) there

could easily be an unmanageable 'spectrum availability' problem for PanAmSat. Those programmers with limited receive points (such as ABS-CBN at the present time) are being encouraged to go directly to some form of CDV. Those who hope to reach thousands of terminals spread over a wide swath of the POR (such as CMT and scheduled for December start, Discovery) are begging to be allowed to feed in analogue for as long as is practical. The pressures on PanAmSat management are considerable to balance these needs.

Nobody out there is 'picking on the POR' in this situation; no programmer, no satellite operator is involved in a conspiracy to take away programming. Actually, quite the opposite is true and each new POR site that reports to PanAmSat on the reception quality of its signals is adding positive fuel to the building evidence that the coverage of PAS-2 and its programmers is pleasantly better than had originally been predicted. For those who desire to be a part of this new enterprise there is but one piece of advice: Be patient, CDV receivers are coming. Not as soon as you would like, possibly not in the quantities you desire nor at the pricing you hoped for. But they are coming none the less .... in the second six months of 1995.

THE ORBITRON 7.3M

This 23.9 foot diameter dish is equipped with dual-axis (azimuth and elevation) tracking. Gain with an optimised feedhorn is in the region of 47.9 dBi at C, 53.8 at Ku. For comparison an Orbitron 3.7m (12.1') claims 42.2 dBi at C. US list price FOB Wisconsin is US$8,699.

PERFORMANCE REPORT / AUCKLAND UNIVERSITY 7.3m SYSTEM:

You will probably never have a 7.3 metre Orbitron dual axis drive horizon to horizon dish with C and KU feeds attached on your parcel. Auckland University's recently installed system was prompted by the many sources of non-English-language programming available via satellite, and the interest of the foreign language studies department to access that programming. Japanese, Russian, Chinese, French, German and other language studies are now being enhanced by the dish, a bank of three receivers, and a sizable selection of format conversion, audio processing and threshold extension receiving equipment. As the system comes up to speed, each language department will receive current or one-two day delayed tapes in the language of their choice, taken directly from news broadcasts and other programming found on the many feeds now available.

System supplier TISCO won the contract on bid, due to large measure to staffer Tony Dunnett who has been active in the Intelsat and Russian satellite field for a decade within New Zealand., Dunnett's unique grasp of satellite capabilities and the technical parameters of each made him an excellent choice to head up the project on behalf of TISCO. At the University, Audio-Video Technical Officer Brian Oliver began an interest in the feasibility of such a 'near space research tool' 8 years ago. The installation was essentially complete by the end of September, engineering proofs were done during October. During the course of those proofing sessions Dunnett and Oliver performed a meticulous sky-search laboriously checking out every Clarke Orbit location visible to the dish from 125 degrees west to 97 degrees east. Thousands of individual observations were made, hours of videotape of the reception resulted, and piles of spectrum analyser photos accumulated showing 'proof' of the presence of signals on 19 different satellites.

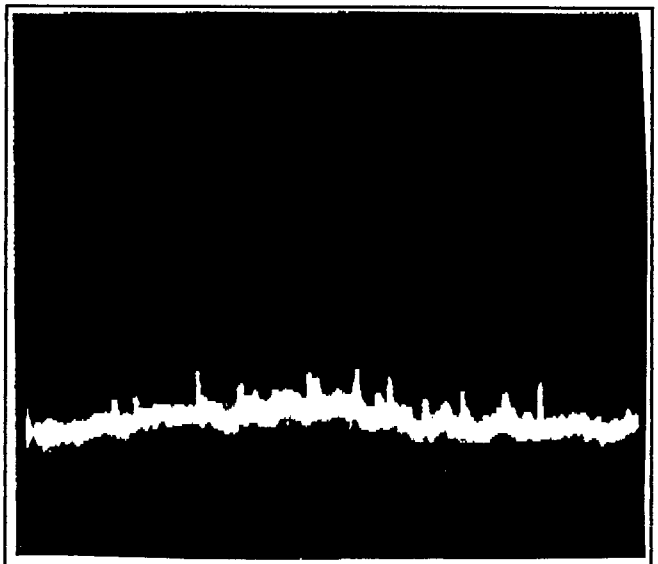
There were pleasant surprises, the most notable being reception from three North American domestic satellites (Satcom C1 at 137W, Satcom C4 at 135W and Satcom C3 at 131W), all close to the eastern horizon for Auckland with elevation angles in the 19 to 24 degree range. Equally impressive is reception from Palapa B4 (118E), Chinasat 5 (115E), Palapa B2P (113E) and Palapa B2R (108E). All of these satellites 'look north' and none on-purpose provides signal into any area south of the equator.

'Off-axis' reception from Clarke Orbit satellites is not new having been first reported in the early 1980s by satellite experimenters in middle latitudes in South America from US and Canadian domestic satellites. A Tahiti installer has been running a pair (two) of the Orbitron 7.3m dishes through a clever (and quite unstable) 'phasing system' taking US domestic satellite signals off the air

RESULTS - US DOMSATS / AUCKLAND UNIVERSITY 7.3M

C1/137W	C4/135W	G1/ 133W	C3/131W	ASC1/ 128W
Best: TR8V, **NBC**	Best: TR5V, **Deutsche Welle**	No Signals Seen	Best: TR6H, **Court TV**	No Signals Seen
Others: None	Others: TR9V,		Others: TR23V,	

for several years. In Sri Lanka a 50 foot grounded mounted all concrete dish was constructed by an experimenter anxious to have AsiaSat reception well outside of the predicted footprint region; he turned this into a two channel over the air telecasting business. SatFACTS will look in some detail at the 50 foot Sri Lankan concrete dish in an upcoming issue.



PALAPA 113E / Vertical pole on spectrum analyzer

Over the past decade, experimenters have learned that 'off-axis' reception is virtually unpredictable. An example: On Satcom C3 (131W) there are 24 programmers; 12 use linear vertical and 12 use linear horizontal polarisation. The output power of all transponders is virtually identical and in theory so too is the footprint (ground coverage area and ground signal levels) for each of the 24 transponders. However, past experience has shown that 'off-axis', down here in New Zealand, the reception of any signals from C3 will be almost without a technical pattern. Or explanation. Dunnett and Oliver found C3's transponder 6 (Court TV) virtually the only signal present. At 135W, C4's horizontally polarised Deutsche Welle (TR5) and QVC Shopping Channel (TR9) stood out head and shoulders above 10 other horizontally polarised transponders on C3. None of C3's horizontal transponders were

RESULTS - WESTERN SKY / AUCKLAND UNIVERSITY 7.3M

SATELLITE	ORBIT POSITION	SAT BEAM	BEST TRs	NOTES
Stationar 18	145E	Northern Hemi	6RHC	Moscow TPT
RIMSAT 2	142.5E	Global	-1 RHC, 1RHC	Asia TV Net
Stationar 7	140E	N.Hemi, Global	1-RHC, 7RHC	Pgrm 1, MTA
RIMSAT 1	130E	Northern Hemi	Only traces	
Palapa B4	118E	Spot Asia	3V, 8V	3V strongest
Chinasat 5	115.5E	Spot Asia	2H,4H, 8H	All horizontal
Palapa B2P	113E	Spot Asia	All about equal	Hz and Vert
Palapa B2R	108E	Spot Indonesia	15H	Particularly strong
Stationar 21	103E	Global	-1 RHC, 1 RHC	Dub'l IV, Jain TV

logged. But on the next satellite west (C1 at 137W) only a single signal appeared; horizontal transponder 8 (NBC Network news feeds).

So although on paper all 24 transponders on all of the US domestic satellites are more or less equal, 'off axis' some are far more equal than others. Off-axis reception has for years been written off as 'freak reception' and various explanations advanced have included the signals bouncing sideways off of satellite dish support members into the southern hemisphere, 'leakage' in waveguide on board the satellite and other purely hypothetical explanations. None of the hypothetical reasons given explain why only certain transponders go off-axis, nor why totally equal transponders traveling through the same waveguide and radiating from the same feedhorn and then reflecting from the same parabolic reflector suddenly become unequal off-axis. (It should also be noted that on the three US domsat

	American	Samoa	Cook	Islands	Chatham	Islands	Fiji	(Fiji)
Satellite	eirp	El/Az	eirp	El/Az	eirp	El/Az	eirp	El/Az
Int.180/ W.Hemi	21 dBw	71/ 321	21 dBw	57/ 313	27 dBw	41/ 348	28 dBw	69/ 07
Int.180/ Global	22 to 29 dBw	71/ 321	22 to 29 dBw	57/ 313	22 to 29 dBw	41/ 348	22 to 29 dBw	69/ 07
PAS-2/ Pac Rim	27 dBw	62/ 304	25 dBw	48/ 300	29 dBw	38/ 333	29 dBw	67/ 333
PAS-2/ Oceana	31 dBw	62/ 304	29 dBw	48/ 300	28 dBw	38/ 333	31 dBw	67/ 333
JCSAT 128E	21 dBw		19 dBw		26 dBw		24 dBw	
Palapa C1/ 113E	23 dBw	05/ 274	26 dBw	Not Visible	35 dBw	02/ 280	27 dBw	15/ 278
Palapa C2M/113	20 dBw	05/ 274	19 dBw	Not Visible	28 dBw	02/ 280	27 dBw	15/ 278
AsiaSat 2/ 100.5E	Not Visible	Not Visible	Not visible	Not Visible	Not Visible	Not Visible	33 dBw	03/ 274

	French	Polynesia	Gilberts/	Kiribati	Marshall	Islands	Nauru	(Nauru)
Satellite	eirp	El/Az	eirp	El/Az	eirp	El/Az	eirp	El/Az
Int. 180/ W.Hemi	19 dBw	49/ 297	21 dBw	81/ 106	19 dBw	72/ 126	20 dBw	75/ 90
Int. 180/ Global	22 to 29	49/ 297	22 to 29 dBw	81/ 106	22 to 29 dBw	72/ 126	22 to 29 dBw	75/ 90
PAS-2/ Pac. Rim	21 dBw	38/ 289	26 dBw	85/ 244	25 dBw	79/ 174	27 dBw	84/ 89
PAS-2/ Oceana	26 dBw	38/ 289	36 dBw	85/ 244	36 dBw	79/ 174	35 dBw	84/ 89
JCSAT/ 128E	17 dBw		23 dBw		25 dBw		24 dBw	
Palapa C1 113E	Not Visible	Not Visible	26 dBw	22/ 269	26 dBw	27/ 264	26 dBw	27/ 270
Palapa C2M/113	Not Visible	Not Visible	23 dBw	22/ 269	21 dBw	27/ 264	23 dBw	27/ 270
AsiaSat 2/ 100.5E	Not Visible	Not Visible	Not Visible	09/ 269	Not Visible	14/ 266	32 dBw	14/ 270

birds studied with some care by Dunnett and Oliver, many more signals encrypted in the Videocipher format were seen than signals in the clear. Some of the encrypted signals showed greater strength on the spectrum analyzer than those 'in the clear' which their available equipment could tune in.)

Although the University's 7.3m dish will be heavily engaged in its original language arts information gathering purpose for much of the time in the future, Oliver is optimistic that with some modifications to the existing dual-band (C + Ku) switchable circular plus linear feedhorn (using an optimised linear feedhorn) as much as 2dB CNR can be picked up. This would make the stronger signals seen (such as Deutsche Welle, NBC and Court TV) at or above the receiver threshold in Auckland; a quite amazing feat for off-axis reception.

To the west they found the following (see table here for comparisons):

1) 118E: Palapa B4. BBTV was the strongest signal seen (TR6).

2) 115E: Chinasat 5. 8 separate TV feeds were logged, all in colour. This is a Chinese national satellite with largely internal-to-China regional feeds.

3) 113E: Palapa B2P. 14 separate transponders were logged.

4) 108E: Palapa B2R. Only one active transponder apparent (TR15) but it was particularly strong.

5) 103E: Gorizont Stationar 21. Although in Global beam, TR1- was as strong as CNNI is from 508.

PRESENT AND FUTURE: Visible Satellites, Footprints

In this transition period between only having limited feeds available from Intelsat 508 (180E) and the ever expanding world of new satellites each with new programming services, here is a 'first-approximation' of satellite footprint levels and look angles (elevation and azimuth) for the majority of the Pacific Ocean Region (POR) locations of interest.

Intelsat at 180 has Western Hemispheric (W. Hemi) footprint patterns for transponders occupied by IDB/1 (was ESPN), Network Ten LA to Australia/3, CNNI/7, NBC and CNBC to Ch. 7 Australia/9, CNBC, CNN, BBC et al to ABC Australia/10, IDB ABC and CBS to channel 9 Australia/12, Worldnet and CSPAN/14. These Western Hemisphere footprints are typically 29 dBw at boresight but some are as low as 22 dBw. There are Global footprint patterns in use for transponders 13 (NHK to Tokyo at 25 dBw), 18 (RFO at 29 dBw), 22 (Nine Network at 25 dBw), and two top end feeds used by TVNZ daily at 22 dBw. In the charts here the eirp levels listed for each location are for the

	New	Caledonia	Niue	(Niue)	Norfolk	Island	Palau	(Palau)
Satellite	eirp	El/Az	eirp	El/Az	eirp	El/Az	eirp	El/Az
Int. 180 W. Hemi	29 dBw	60/ 39	19 dBw	65/ 332	29 dBw	54/ 24	29 dBw	38/ 97
Int. 180/ Global	22 to 29 dBw	60/ 39	22 to 29 dBw	65/ 332	22 to 29 dBw	54/ 24	2 to 29 dBw	38/ 97
PAS-2/ Pac. Rim	30 dBw	64/ 08	26 dBw	57/ 310	34 dBw	56/ 02	35 dBw	50/ 100
PAS-2/ Oceana	31 dBw	64/ 08	29 dBw	57/ 310	30 dBw	56/ 02	35 dBw	50/ 100
JCSAT/ 128E	24 dBw		21 dBw		27 dBw		27 dBw	
Palapa C1 113E	29 dBw	26/ 286	26 dBw	04/ 274	34 dBw	22/ 289	36 dBw	63/ 253
Palapa C2M/113	30 dBw	26/ 286	21 dBw	04/ 274	30 dBw	22/ 289	36 dBw	63/ 253
AsiaSat 2/ 100.5E	33 dBw	14/ 280	Not Visible	Not Visible	34 dBw	11/ 281	38 dBw	49/ 260

best case; i.e., 29 dBw for both western hemispheric and for Global, adjusted to the actual location of the island/country listed.

PanAmSat PAS-2 has both a Pacific Rim beam (all transponders but 7C/8C, 11C/12C and 15C/16C) and an Oceana beam (the three sets just listed). The footprint power levels are not the same for both patterns so there will be differences in eirp from PAS-2 at most locations in the POR. Our tables here reflect those differences showing levels to be expected for both beam patterns at all locations listed.

	Pitcairn Island		Solomon Islands		Tokelau/	Kiribati	Tonga	(Tonga)
Satellite	eirp	El/Az	eirp	El/Az	eirp	El/Az	eirp	El/Az
Int. 180/ W. Hemi	19 dBw	28/ 285	28 dBw	64/ 65	21 dBw	78/ 319	22 dBw	67/ 347
Int. 180/ Global	22 to 29 dBw	28/ 285	22 to 29 dBw	64/ 65	22 to 29 dBw	78/ 319	22 to 29 dBw	67/ 347
PAS-2/ Pac. Rim	19 dBw	17/ 280	31 dBw	74/ 42	25 dBw	67/ 293	28 dBw	59/ 322
PAS-2/ Oceana	23 dBw	17/ 280	34 dBw	74/ 42	30 dBw	67/ 293	30 dBw	59/ 322
JCSAT 128E	Not Visible	Not Visible	22 dBw		21 dBw		23 dBw	
Palapa C1 113E	Not Visible	Not Visible	29 dBw	35/ 299	21 dBw	07/ 272	26 dBw	08/ 277
Palapa C2M/113	Not Visible	Not Visible	30 dBw	35/ 299	21 dBw	07/ 272	24 dBw	08/ 277
AsiaSat 2/ 100.5E	Not Visible	Not Visible	35 dBw	22/ 276	Not Visible	Not Visible	Not Visible	Not Visible

	Truk	(Truk)	Vanuatu	(Vanuatu)	Wallis and	Futuna	Western	Samoa
Satellite	eirp	El/Az	eirp	El/Az	eirp	El/Az	eirp	El/Az
Int. 180/ W. Hemi	27 dBw	52/ 100	28 dBw	65/ 35	22 dBw	74/ 343	22 dBw	72/ 330
Int. 180/ Global	22 to 29 dBw	52/ 100	22 to 29 dBw	65/ 35	22-29 dBw	74/ 343	22-29 dBw	72/ 330
PAS-2/ Pac. Rim	30 dBw	65/ 105	30 dBw	69/ 03	27 dBw	67/ 310	31 dBw	64/ 304
PAS-2/ Oceana	35 dBw	65/ 105	31 dBw	69/ 03	31 dBw	67/ 310	22 dBw	64/ 304
JCSAT 128E	24 dBw		24 dBw		22 dBw		21 dBw	
Palapa C1 113E	29 dBw	49/ 262	28 dBw	25/ 282	23 dBw	10/ 274	23 dBw	06/ 274
Palapa C2M/113	28 dBw	49/ 262	29 dBw	25/ 282	25 dBw	10/ 274	21 dBw	06/ 274
AsiaSat 2/ 100.5E	36 dBw	35/ 265	33 dBw	13/ 277	Not Visible	Not Visible	Not Visible	Not Visible

JCSAT coverage maps were received after our calculations had been completed for elevation and azimuth look angles for the satellites shown here. You can estimate the look angles by taking the elevations and azimuths for PAS-2 and Palapa and noting the differences for the island/country of interest. JCSAT will fall at a point approximately 1/3rd higher than Palapa (or 2/3rds the difference lower than PAS-2.

Palapa C1 and C2M have different coverage patterns. To date, maps for both satellites are for 113E although C1 will move to 118E after C2M is placed in orbit. Therefore C1 will appear higher in the sky at 118E than at 113E and the original coverage pattern from 113 will shift somewhat. We'll provide those details when they become available.

AsiaSat 2 at 100.5 east will be close to the horizon for most of the countries / islands listed, or, unfortunately over the horizon. Fewer editions of SatFACTS will detail how standard antennas are modified to reduce the effects of earth noise for the low look (elevation) angles presented by AsiaSat. For a fortunate few islands / countries listed here, Apstar 2 (if it lands at 87.5E as suggested) will be visible. These include the western 90% of Australia (unfortunately missing much of the eastern Australian coastal area except at low look angles), and, (the) Marshall Islands (01 elevation, 269 azimuth), Nauru (01 elevation, 270 azimuth), Palau (35 elevation, 264 azimuth), (the) Solomon Islands (09 elevation, 273 azimuth) and Truk (21 elevation, 267 azimuth).

POR SATELLITE CALENDAR

November 1994:

CMT scheduled to begin simultaneous CDV and analogue feeds; PAS-2. Intelsat 703 (177E) scheduled to begin testing.

December 1994:

Discovery Channel scheduled to debut on PAS-2. Apstar 2 scheduled for launch to possible 87.5E. Within Australia, at least one source forecasts start-up of 7 pay TV DTH/SMATV encrypted channels via Optus during December (AS).

January 1995:

TVNZ on Intelsat 180E scheduled to begin full-time CDV feeds MCPC on 4,166 MHz. Between January 1 and 31 March new Russian Express scheduled to be launched to 145E.

March 1995:

Between March 1 and June 30, probable launch of AsiaSat 2 to 100.5E by Chinese Long March 2 rocket.

April 1995:

Forecast first pre-production quantity delivery of Digicipher II CDV units for CATV, SMATV; price range US$1500. Alternate Australian sources predict startup of DTH/SMATV programming via Optus during April.

July 1995:

Scheduled launch JCSAT3 to 128E during July 01 - September 30 period. Forecast startup date NTL format CDV programming for STAR TV from AsiaSat 2 at 100.5E with NTL - PACE VSM4000 series receivers in US$500 price range. Forecast availability (1 July to 31 December) of Digicipher II, other MPEG-2 consumer receivers 'in quantity' in US$500-600 price range. Optus B3 arrives on station.

October 1995:

Palapa C1 scheduled launch to 113E between 01 October and 31 December.

June 1996:

Palapa C2M launch window 01 June to 30 September 1996.

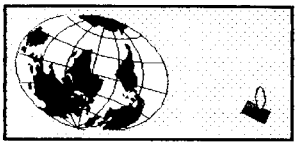
October 1996:

Scheduled launch of replacement Intelsat to 180E. Scheduled move of Palapa C1 to 118E, activation of C2M at 113E.

SPACE NOTES

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

SPACE Pacific
Satellite Programme Access CommittEe



THE LOSS OF CNNI

From the outset of the formation of SPACE (during the Hastings, New Zealand Satellite Cable Seminar '94 this past September) the issue of how we as a Pacific Ocean Region users group of satellite programming deal with the loss of a major programming source has been at the top of the agenda. As is detailed in this issue of *SatFACTS*, CNNI has opened up its 54 MHz 'super highway' on PAS-2, and will at some date within the first six months of 1995 cease to provide an analogue feed (in the clear) on Intelsat 508 (180E). This is a major loss to more than 2,000 resorts, hotels, clubs and other semicommercial users of CNNI throughout the Pacific.

SPACE Pacific has been in direct communication with Turner Asia since early in October; through their Hong Kong office, and their Sydney facility. Late in October a SPACE founding director met with and discussed the problem with Mr. Brian McGuirk, President of Turner Asia. The position of Turner is as follows:

1) With the opening of PAS-2, they no longer require the services of Intelsat 508.

2) Two years ago, as Turner developed plans to use PAS-2 to their best commercial advantage, it was their decision that PAS-2 would not serve enough users directly to warrant setting aside valuable space within their 54 MHz transponder for this purpose.

3) The 54 MHz PAS-2 bandwidth has two purposes: One, to transmit CDV signals from Atlanta to the uplinks serving Palapa and Apstar through which CNNI (plus Cartoons and TNT) are delivered to customers in Asia. And, two, to provide a 'return link' to Atlanta allowing CNN bureaus throughout Asia and the Pacific to send news stories and reports back to Atlanta. We explain how that is to be done, indeed is now being done, on page 6 in this issue.

Turner has made no provision to include a DTH or SMATV/CATV category of CDV feed within the PAS-2 bandwidth. The digital format of the outward bound CNNI feeds within Turner's PAS-2 bandwidth is totally unique, created for the express purpose of being a feed to other satellites, not for direct service.

Within New Zealand, Kiwi Cable as an affiliate and SKY Network will both install a pair (one and a spare) of very special, hand built, customised CDV decoders to use this unique PAS-2 feed. The price is US$17,000 each. In Australia, CNNI affiliates will do the same. Few, in fact probably no other POR users will be able to afford these decoders.

A number of commercially sensitive proposals have been created and forwarded to Turner Atlanta as well as to other possible sources to help SPACE Pacific resolve this problem for Pacific Ocean Region users of the present CNNI service. As a user you can help by putting SPACE Pacific in touch with every dish owner you know about presently using CNNI from Intelsat 508. The more locations we know about using this service, the better our presentations to Turner concerning their loses when the analogue service shuts down without a replacement.

Although AsiaSat 2 at 100.5E will bring us the BBC World Service by July or so, this satellite will only reach a small percentage of the POR locations now receiving CNNI from 180E. And as good as the BBC service may be, it is not the same as CNNI by any stretch of the imagination.

How can you help? Turn to the form on page 19 here and provide the information requested. If you have more locations to report than the form allows, copy it and start again. This is SPACE Pacific's number one priority at this time, but we urgently require help from those spread around the POR!

SatFACTS PACIFIC OCEAN ORBIT WATCH: NOVEMBER 15, 1994

Freq.	TR #	G.102.7	G/139.9	R/142.5	G/145.0	P/169	I/174	I/177	I/180	Beam
3,675	-1	Dubl Tv		ATN	Dubl Tv					
3,720	1								IDB	WH/29
3,725	1+		Dubl Tv	ATN						
3,730	1-2					**Cnn/Dg**				
3,765	3								Vidiplx	WH/28
3,790	3-4					Reuters				
3,840	6								KDD**	WH/29
3,845	7								CNNI	WH/29
3,850	5-6					**ESPN/b**				
3,876	9	Jain TV							Vidiplx	WH/26
3,894	10								**Vidiplx**	WH/26
3,915	7-8					CMTV				
3,930	12								Vidiplx	WH/26
3,975	14								W'NET	WH/29
3,980	9-10					Prime				
4,015	16								**NHK**	WH/25
4,040	11-12					**ABS/Dg**				
4,045	18								RFO	Glbl/29
4,100	13-14					CNBC				
4,135	22								9 Austr.	Glbl/25
4,165	15-16					CTN				
4,166	23						NwsFds	NwsFds	**TVNZ**	Glbl/22
4,177	23A							**Afrts/b**		
4,188	24						NwsFds		TVNZ	Glbl/22

Regarding PAS-2
Transponders shown were current as of 14 November. Anticipate 'Musical Transponders' on PAS-2 for all analogue services during coming 90 days. While most signals have been linear vertical to date, more and more are showing up on linear horizontal; a feed with polarisation selection is now required. **Dg** is digital.

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

Prime means service is not presently being encrypted, is 'free to air'

ABS/Dg means service is compressed digital video

Vidiplx means service is nominally not encrypted but does require special analogue format processing equipment

9 Austr. means service is normally not encrypted although for some day parts it may be encoded

** KDD feed on this frequency is LH (left hand circular) while all others are RH (right hand circular)

Under Intelsat listings at right hand side of table, WH/26 refers to western hemisphere antenna pattern and maximum power level at centre of that pattern (26 dBw). Glbl/22 says this transponder operates in a whole-earth (global) view format and the maximum signal level available is 22 dBw (in this example).

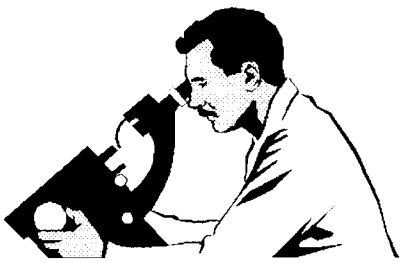
Credits this month to Tony Dunnett, Francis Kosmalski

WHO HAS A DISH IN THE POR?

HELP

SPACE IDENTIFY ALL DISH OWNERS IN THE PACIFIC OCEAN REGION!

There is strength in unity and we are battling to save CNN for the Pacific!



SPACE'S GOAL: To develop an alternative plan for Turner Asia that will convince them they should continue to make available to the Pacific Ocean Region Cable News Network (CNNI). At the present time, they plan to shut down CNNI through Intelsat 508 (180E) on approximately 1 March, and to replace it with nothing! By locating and identifying ALL existing users of CNNI, we believe a serious alternative business plan can be presented to Turner. Your help is requested, NOW, to help us locate every single dish owner in the Pacific to alert them to the change in CNNI coverage and enlist their aid in finding an alternative plan.

Dish
Owner _____
Address _____
Town/City _____
Country _____
☐ Commercial dish ☐ Private (home) dish
SIZE _____ Presently operating? _____

Dish
Owner _____
Address _____
Town/City _____
Country _____
☐ Commercial Dish ☐ Private (home) dish
SIZE _____ Presently operating? _____

Dish
Owner _____
Address _____
Town/City _____
Country _____
☐ Commercial Dish ☐ Private (home) dish
SIZE _____ Presently operating? _____

YOU CAN HELP SAVE CNN FOR THE PACIFIC!

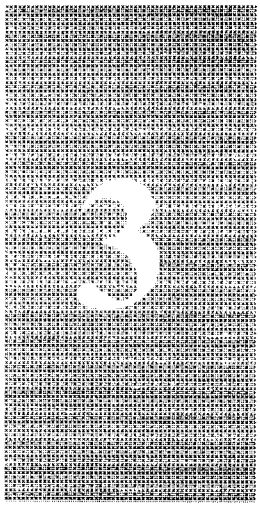
RETURN THIS FORM to:

SPACE Pacific

PO Box 330, Mangonui, Far North, New Zealand

or

FAX to: **64-(0)9-406-1083** 24 hours per day



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Numero tres: You live someplace else. That's OK, not everyone can live in New Zealand or Australia. Make out your cheque for **US$40** and airmail to us with the completed form below. You will receive the next 12 issues via Airmail in return!

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- BELOW THRESHOLD RECEIVERS - How they work (or don't work), what to watch out for when you are shopping for your next receiver!
- TEST and MEASUREMENT EQUIPMENT - What does it do, will it help you improve your installations? The cost effective answers.

SatFACTS DECEMBER on the 15th!

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My cheque for NZ$40 (within New Zealand; US$40 outside) to SatFACTS enclosed.

My name _____

Business Affiliation (if any) _____

Mailing address _____

Town/City _____

Country (if not New Zealand) _____

Return to: **SatFACTS, PO Box 330, Mangonui, Far North, (New Zealand)**