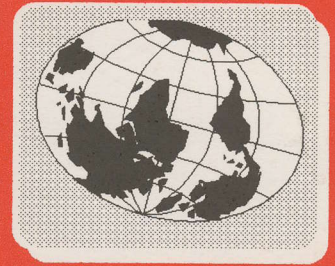


Bob Cooper's

JANUARY 15 1996

SatFACTS

MONTHLY



Reporting on "The World" of satellite television in the Pacific Ocean Region

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1996: The Year Of DVB Compliancy

Any Programme, Any
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Low Look Angle Techniques

Evaluating Antenna
Performance

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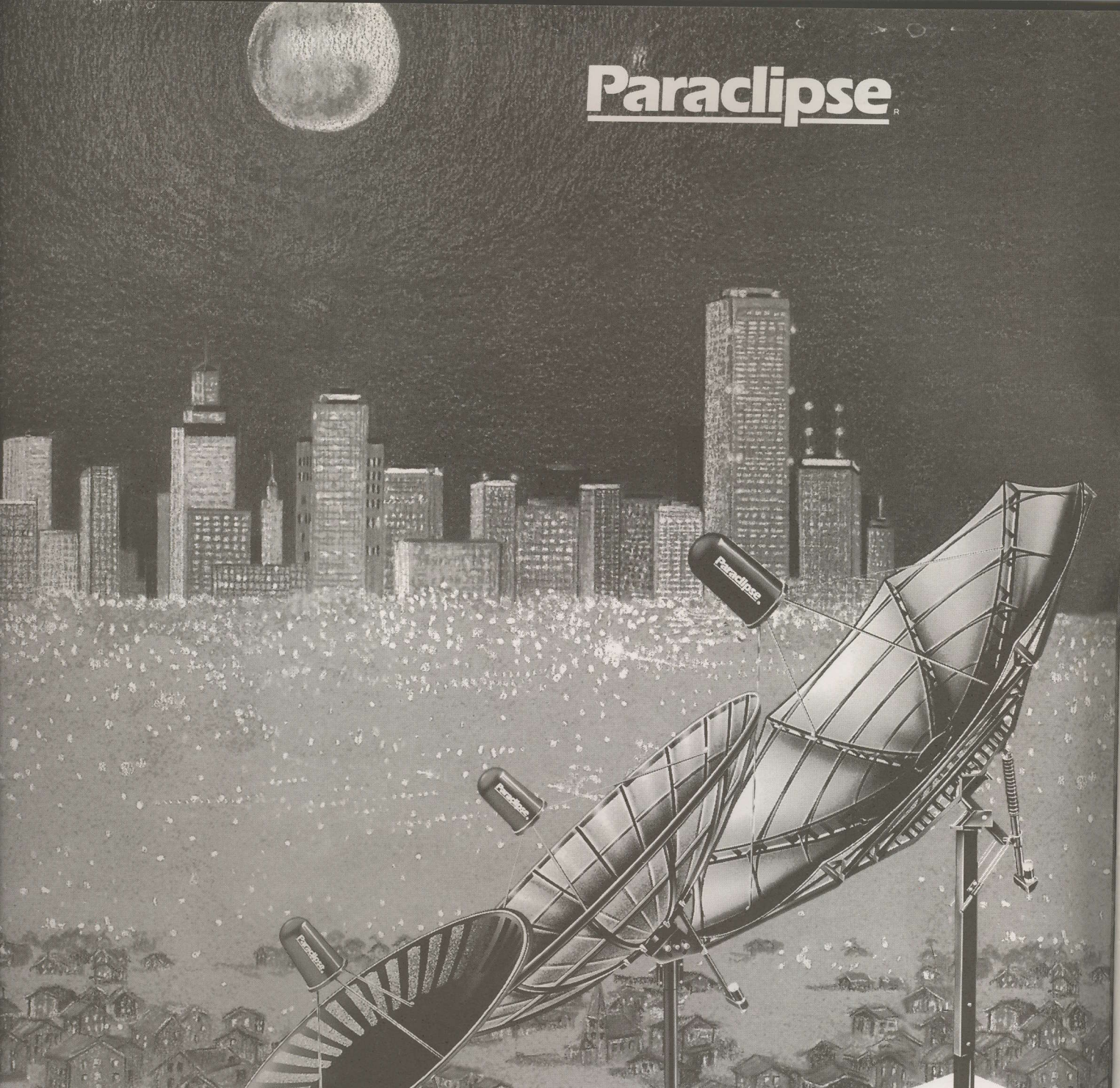
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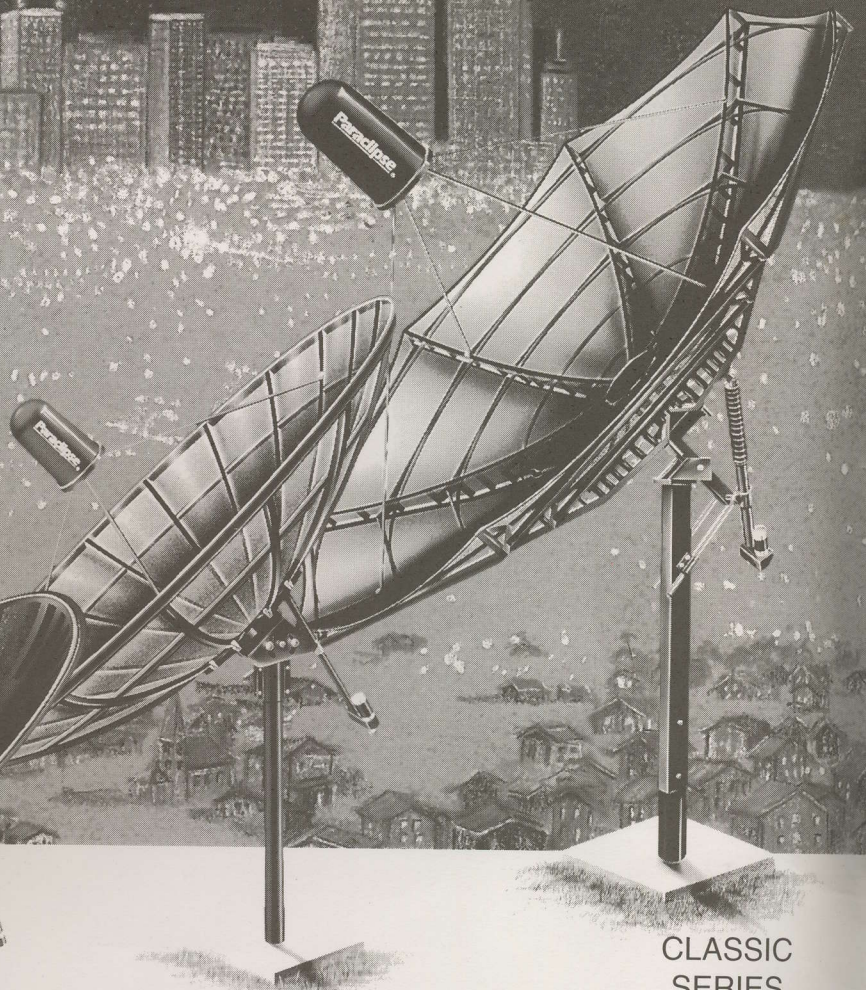
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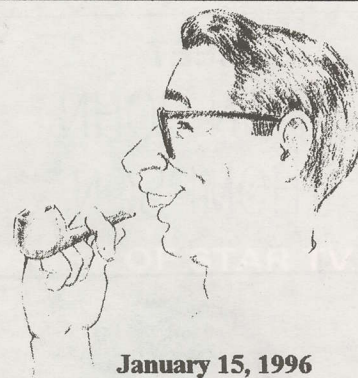
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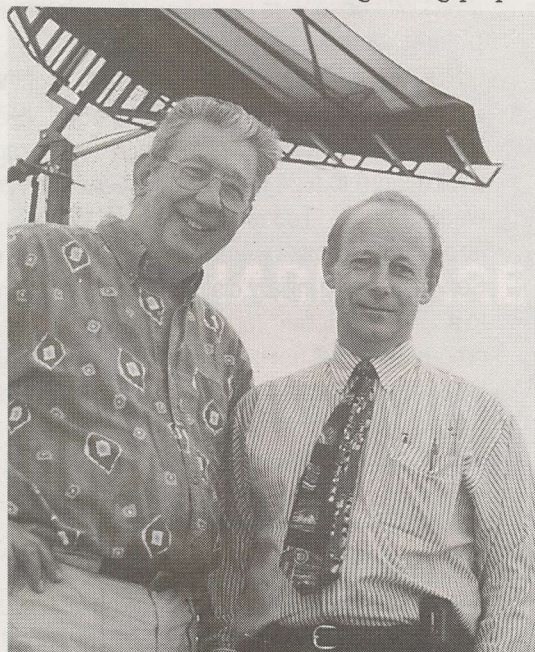
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COOP'S COMMENT

Professionalism. In 1983, some 40 months after the first satellite 'trade show' in the states, a delegation representing Japanese firm Uniden appeared on my Oklahoma doorstep. They came to spend a few hours talking about the American TVRO (home dish) market and stayed for two days. We did a lot of talking. Six months later Uniden "invaded" the American home dish market with the most expansive marketing programme that industry had seen. They purchased advertising space in national magazines, advertising time on the major US TV networks, and sent a cadre of trained sales and engineering people



January 15, 1996



Uniden's David Norrie visiting Coopers Beach

into the field to call on more than 2,500 home dish dealers. One year after Uniden arrived, they had accumulated a 40% share of the US market and dealers who had not been selected to handle the product line were battling for the honour.

Until Uniden, the US home dish market was almost totally US product supported; no Asian receivers of note, no Asian antennas, not even Asian LNBs. Uniden changed all of that in a hurry. By 1985, 2 years after first visiting me, Uniden was selling 50% of all home dish systems in the US at a 50,000 per month clip.

Uniden New Zealand's David Norrie was up to visit with me recently. Uniden, the company, has matured a great deal in the intervening 13 years. Norrie tells me the Kiwi operation began as an add-on to the Australian distributorship. With careful guidance it is now running along at NZ\$20m per

year and has its sights on selling a significant percentage of the NZ DTH product as this new market matures. They have reason to be optimistic concerning our growth, and there is a message here for those who remain cautious about the impact of DTH satellite systems in the (south) Pacific.

Norrie's intelligence gathering operation is firmly rooted in Japan; Uniden's home office. It knows, for example, that come 1997 a major consortium of experienced satellite programmers is scheduled to send 50 Ku band programme channels our way. Uniden's trade space at SPRSCS '96 this month is a cautious toe in the water here but I predict we will hear much more shortly.

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Low Look Angle Tests -p.12

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Departments

Programmer / Programming Update -p.2; Hardware / Equipment Update -p.4

SPACE Notes: Training Needed -p.20 ; The Cable Connection -p.22

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SatFACTS Orbit Watch -p.27; January Reporting Form -p.30

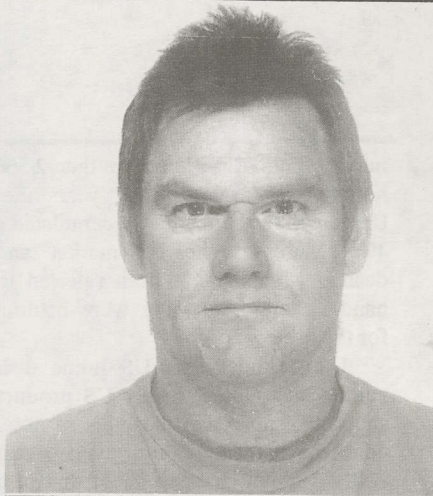
-ON THE COVER-

Not a terrestrial antenna. This 4.5m Paracclipse Islander is now parked at 5.44 degrees elevation pointing directly at AsiaSat 2 from New Zealand. They say you are flirting with earth noise at elevation angles below 10 to 15 degrees. Find out how to minimise this unwanted degradation starting on page 12 here.

-IN SF#18-

A complete report on SPRSCS '96; were you there???

MEET
KEVIN JOHN
THOMPSON



If it has something to do with the radiation of radio or TV emissions between 40 and 2,600 megahertz, Kevin John Thompson is your man.

Ex-BCL (NZ), Johnson is Engineering Manager at the Broadcast Division of Radio Frequency Systems in South Australia. Working with the technical experts at Communications & Energy Corporation (CEC), Thompson's crews have pioneered MMDS pay television delivery systems for Australian operators.

Thompson will compliment the MMDS System Planning seminar by CEC's Glyn Bostick with a session designed to focus your attention on the practical aspects of transmission and reception in the above-2-gigahertz region.

Join Kevin for this firsthand report Friday January 26th at SPRSCS.

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PROGRAMMER
PROGRAMMING
PROMOTION

UPDATE

JANUARY 15, 1996

AsiaSat 2 commenced testing December 15th, only 18 days after launch; a record turn-around. Test video was first seen December 18 at good to excellent levels with observers having a look angle of only (+) 1.9 degrees seeing quality pictures; detailed report page 25.

NBC Asia Marketing Director Peter Knight will use forum at SPRSCS (January 25, 1:30PM) to announce details of new "NBC Asia" channel scheduled for soft launch January 15th, gradually increasing programming hours through April when it will mature to a 24 hour day. NBC Asia will carry heavy sports schedule on weekends, US "Today" and "Tonight With Jay Leno" plus other standard NBC fare including soap operas "As The World Turns, Guiding Light" weekdays. Service is being initially distributed on PAS-2 in S/A MPEG 1.5, plans conversion to a 'DVB Compliant' form of MPEG as early as April. When fully DVB, some programmes will not be allowed into New Zealand nor Australia (such as "Today's Health") pending the next round of copyright clearance negotiations.

Gorizont 42 (formerly Rimsat G2) at 142E should have repositioned itself before you read this. With the correction, it will ride dead above the equator before slowly renewing an inclined orbit figure 8 arc. Gorizont 41 (formerly Rimsat G1) at 130E is inclined +/- 0.7 degrees in mid-January.

Powerful wind storm shifted PAS-2 Sylmar (California) uplink dish a few parts of a degree late in December causing CMT, TMZ, ESPN and other California contributed signals to drop down several dB at downlink sites all over the Pacific. Dish was realigned January 1st, still not right, finally made good January 3rd.

TNT/Cartoons signal level (1218 MHz IF, vertical) on PAS-2 has been adjusted upward after initial levels that were well below similar B-MAC services of ESPN, Discovery. Cable firms from Guam through South Pacific had urged "more power" after TNT shift in transponder in November.

Cable-only programmer Discovery (PAS-2, IF1372) has notified affiliates it will begin simultaneous programme deliver in MPEG-2 during January, shutting down present B-MAC (PAL) analogue service as early as February. Cable affiliates have option of exchanging their present B-MAC IRDs for new General Instrument model 4000 digital IRDs. Yes, GI got this order; only the second one on PAS-2 (The Filipino Channel is the other). How PanAmSat's decision to convert its own digital linking service to a DVB compliant format (see p. 6, here) plays against this Discovery/GI marriage remains to be seen.

Incidental information department: PAS-2 TR9 MPEG service programme channel use: Channel 0/Blank raster, Channel 1 and 2/ PAL Colour bars with HBO promotion audio heard frequently on channel 1, Channel 3/The Music Zone, Channel 4 and 5/ NTSC PAS-2 test card with some sports feeds (i.e., Press Box and others) on 4, confirming that Sylmar (California) uplink is source for programme material.

Galaxy Australia ceased advertising for additional customers mid-December, claiming 75,000 subscribers on line or back logged for installs. Note to Kiwi firms suffering from Sky Network take-up slowdown: Galaxy sorely needs installers. And to further hype the service, some Australian TV set retailers offering six months free Galaxy with purchase of new TV sets.

Malaysian Measat 1 was re-scheduled for January 9 launch from French Guyana heading for 91.5E; testing should be underway by early February. Northern Australia could have reasonable service levels on C-band.



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HARDWARE EQUIPMENT PARTS

UPDATE

JANUARY 15, 1996

US Ku band DirecTV service (DSS), 150 programme channels with .5m dishes and in Thompson variant of MPEG 2, has suffered major security failure. Subscribers (now 1.1m homes and growing at rate approaching 100,000 per month) utilise News Datacom International (NDI) smart card authorisation system, not dissimilar to cards used in NZ for Sky pay TV, Australia for Galaxy services. In September, computer literate hackers were successful in "cloning" authorisation data from a legal (subscribing) receiver-card to a second (third, etc.) unauthorised receiver thereby giving two or more homes access to programming for which only one was making payment. This system is known in the trade as "Paddleboard." In November it got worse; bootleg smart cards appeared across Canada and USA. Cards reportedly are very professional in appearance (approximately 50 x 125mm), hold trio of micro chips plus anti-copying chip; microprocessor and memory chips with a backup battery. Cards are being retailed widely for US\$650 and reportedly give user instant access to all 150 of the DSS channels including pay per view movies (whereas average DSS subscriber takes 35 channels). \$650 street price of pirate card compares favourably with average annual fees paid by US and Canadian viewers of DSS but has advantage of offering entire range of 150 programme channels which if purchased separately by viewers would cost in excess of US\$500 per month! US sources estimate there to be 5,000 clone-type cards in use in US and Canada, no estimate of the more sophisticated stand alone pirate card. Officials at DSS acknowledge break in their security system, say they can live with a 1% piracy universe.

DigiMedia Vision (Ltd) is the new corporate name for Britain's NTL, developer of a significant portion of today's MPEG-2 DVB Compliant technology. If you think you might obtain authorisation to privately view the Television New Zealand 5 programme channel MPEG 1.5 format data streams routinely found on I180 TR23 (RHC), DigiMedia Vision has an offer for you: MPEG 1.5 refurbished receivers at UK2,500 each. No, they are not compatible with the newer MPEG-2 format protocol transmissions. Still interested? Contact Barry Crompton, Sales Director at (fax) 441-703-498-043.

Mark Long's brand new Asian guide to 1996 satellite systems rolled off the presses December 9th; a specific for Australia version is scheduled to be printed by Peter C. Lacey Ltd. in March. The Asian version will be available at SPRSCS '96 in the Mark Long Enterprises trade booth (#234A).

Chaparral feeds manufactured in future could carry statement that they are licensed through an agreement with ADL. Two firms have fought patent litigation battle for nearly a decade each claiming certain priority of "discovery" features. Court imposed settlement includes "gag order" on both parties not to reveal precise terms of judicial findings.

Telsat Communications Ltd. has become first New Zealand firm to manufacture DTH antennas inside country. Using fibreglass moulding technology, dishes from 1.8 to 3.2m in size are being shown at SPRSCS, a move designed to reduce overall dish pricing by eliminating sea container costs which often add 50% or more to base price of dishes imported by suppliers from Taiwan or USA.

Unravelling D9222 secrets: Software programme to operate S/A D9222 MPEG receiver through its RS232 port, with on-computer-screen readout of internal D9222 functions, created by enthusiast Robin Colquhoun will be featured at SPRSCS Technician and Testing room seminar January 26 at 12 noon.

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SATELLITE and CABLE AT THE CROSSROADS

The Onrush of Programming

A decision by PanAmSat establishes a base of reference for this report. When PAS-2 became operational in September (1994) from 169E, they promised that any analogue format video to be found on their satellite was "temporary" and within a reasonable time frame the services renting transponder space on PAS-2 would be in one or another digital format. It was only one year ago that SF was reporting the changeover of early PAS-2 programmer Country Music Television from their initial NTSC (later PAL) analogue to the Scientific Atlanta (S/A) version of MPEG (1.5). And it was only in March of 1995 that the first S/A model D9222 IRD (integrated receiver descrambler) MPEG digital receivers began to trickle into the Pacific in support of CMT (and other services). A great deal has happened in approximately one year's time.

A mid-December press release from PanAmSat claims there are now "40 television programme services utilising PAS-2." You would be hard pressed to count them yourself since one of the "artefacts" of digital video is that even if you own a digital receiver, the programmes not addressed to your receiver are transparent; i.e., you can tune to them and nothing happens on your TV screen. Nothing at all; just as if nothing in fact was there.

PanAmSat plans now to upgrade its entire world-wide satellite network (4 satellites) from the existing hodgepodge of analogue (NTSC, PAL and probably some SECAM from time to time) plus early digital (General Instrument MPEG 1.5, S/A MPEG 1.5) to a common single format. It was widely believed PanAmSat would upgrade from the early 1.5 level MPEG to the more robust MPEG 2; PanAmSat has now decided to skip MPEG 2 altogether and go directly to the present state of the art. Which is?

DVB Compliant MPEG.

We first reported on the European effort to adopt a single MPEG format for all of Europe's satellite and terrestrial broadcasters in our CTD publication (9509, p. 19). The Europeans are convinced (more

so than the Americans or Asians) that the fastest pathway to an all digital television world is through a common standard that will apply to all transmissions regardless of source. The Americans, led by General Instrument and Scientific Atlanta, take a narrower view, each promoting its own variation of the basic MPEG system.

The European DVB Compliant approach simply means that if you purchase a (DVB Compliant) digital TV receiver, it will be capable of receiving any (any!) digital signal broadcast in the companion DVB Compliant MPEG transmission format. Virtually every European satellite TV broadcaster (including the Rupert Murdoch group of channels available under the Sky banner in Europe, the STAR TV flag in Asia [and soon the Pacific]) quickly signed on for this project.

The Americans have been foolishly greedy about all of this. S/A created their own version of MPEG because each time they sold a programmer on their transmission hardware they were building themselves an exclusive marketplace for the companion receivers. PanAmSat was an early purchaser of S/A MPEG and the PAS-2 uplink at Sylmar, California is equipped with S/A version MPEG gear. So, too, is the PAS-2 uplink in Hong Kong as well as the Singapore uplink. This has been a gold mine for S/A; if you wanted to become a part of the CMT, CBS, CTN, CCTV, ABN (cetera) viewing family you have been forced to purchase the S/A D9222 receiver. And depending upon where you buy it, it cost between US\$1,250 and US\$2,500. S/A has refused to license others for D9222 equivalents and without any competition there has been no incentive to lower the price or develop lower cost versions (such as for SMATV and DTH use). S/A has been laughing, at our expense, all the way to the bank for a couple of years now.

S/A competitor General Instrument has tried to play that same game. Unfortunately for GI, they lost the "big sale" to PanAmSat and thereby missed the chance to be a part of the insider club. They did sell their version of MPEG to The Filipino Channel but that hardly contributed to their bottom line profits since the GI version MPEG receivers start at

US\$1,800 and go up to over US\$3,000 and few people bought them at these prices.

PanAmSat should have seen the adverse impact their decision to use S/A (or GI for that matter) "proprietary MPEG" formats would have in the marketplace. Certainly nobody had to point out to PanAmSat executives that they were building a gold plated exclusive marketing club for the supplier selected. That PanAmSat has decided to jump past an upgraded MPEG-2 "proprietary design" is a welcome indication the satellite operator may be finally looking past its cosy relationship with S/A and beginning to think more about the real satellite users out there. Or, it could simply be there are new, competitive, satellites in the world and their operators have more often than not followed the DVB European example and not the American self-enriching proprietary MPEG pathway to riches.

Of all of the decisions likely to have a positive impact upon the Pacific Ocean Region DTH and SMATV marketplace in 1996, PanAmSat's reported plan to convert their entire system to DVB compliancy is the most important we are likely to encounter.

Proprietary Versus DVB Compliant

GI DSR-1500 and S/A D9222 receivers are headed for the scrap heap. Neither firm is willing to state that present owners of these proprietary MPEG format receivers will be able to have them converted to DVB compliancy. Both suggest, with plenty of escape clauses should it prove inaccurate, that the present receivers are either already MPEG-2 compatible (D9222 claims this) or "easily converted" (GI DSR-1500). What neither is willing to tell you is that when they say the receiver is capable of MPEG 2 operation, that it is only capable of their own proprietary MPEG 2 format. A D9222 or a DSR-1500 will never receive the "other" MPEG service signals properly.

DVB Compliant means this:

1) All programmers utilising DVB compliant transmission standards will have a common "bit stream mapping system." That's digital computer talk that simply means every TV programme using DVB is processed in the precise same way.

2) Further, all DVB receivers have a common "access" or code processing system so that any programmer using DVB compliancy is able to "address" (speak specifically to) any DVB Compliant receiver out there.

3) Further, the system is operated such that when a user switches programme channels, the selected channel will appear in a reasonably short period of

time (there are arguments about what is reasonable: Under 1.5 seconds is considered a goal, under 4 seconds is a common present switching speed).

Let's consider the present alternative. It is possible to purchase a D9222 receiver and have it authorised for two or even three separate services (SPRSCS '96 attendees will see this in the Technician & Training work room). Changing programmers can take as little as 1 second (push one button on the receiver) or as much as 20 seconds (if you are changing transponder and polarisation). Alas, the D9222 was never designed for "channel surfing" (rapid switching between programme channels) and as PanAmSat has learned at their Florida uplink centre, maintaining separate address codes for two or more programme sources for a single receiver is a difficult chore. Nothing about the combination of the S/A designed MPEG 1.5 uplink transmission facility used by PanAmSat or the only receiver that works with this service (D9222) is user friendly.

It does not have to be this way. In America, a Ku band DTH service operated by Hughes and others provides up to 150 programme channels to 0.5m dishes with MPEG receivers that are sold with their companion dish antenna, LNB and cable for less than US\$600. Nobody in America complains that it takes too long to surf channels. As of 1 December, 1.1 million of these home dish systems had been sold. A very similar system goes into operation in South America late this year with a target price for the complete dish/LNB/receiver package of under US\$500. Electronic manufacturers Thompson, Sony, Uniden and others are supplying receivers to this market and many more will be doing so by the end of 1996. Thus neither S/A nor GI can claim the technology is too complicated to allow them to build lower cost DTH-version receivers; Thompson et al have proven otherwise.

The S/A and GI mind set is simply this: They know they cannot compete with Asian receiver manufacturers and as long as they control their proprietary MPEG designs, they can refuse to licence Asian firms to build the receivers. By refusing to licence their proprietary designs, by keeping all of the business for themselves, they can continue to charge outlandish prices for yesterday's technology receivers. The key has been their ability to sell programmers on their particular format of MPEG, and having done this, to control the pricing for receivers that must be purchased from themselves by any user of that programming.

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Can you honestly say you would not have done the same, selfish, thing yourself had you been granted the opportunity?

What DVB Compliant Will Mean To You

Let us jump ahead to mid 1996. And let us assume that PanAmSat has been able to replace their present S/A MPEG 1.5 version proprietary uplink equipment with someone's DVB Compliant uplink equipment. And let us further assume that you are a DTH owner or DTH seller.

Now, here is what it means to you:

1) You can purchase any DVB Compliant receiver from any source you wish (amongst those already making these receivers: Pace, Panasonic, Nokia, Sony with many more such as Palcom primed and ready to go).

2) Your DTH receiver or your customer's DTH receiver will be addressable, directly through the satellite, by any DVB compliant format programmer.

3) You, or your customer, can then determine which programme sources to subscribe to and by contacting a single "Programme Authorisation Centre" any channel or channels can be "ordered."

4) You or your customer can order programmes by the event (such as a title boxing match, a first run movie), by the month (TNT + Cartoons, for example, for the month of January only) or by the year.

5) The prices for each event or each programme channel will be widely known (advertised) and with a valid credit card your order will be instantly processed such that shortly after the order is placed the channels or event(s) ordered will appear on your screen. None of this is possible with the present S/A or GI proprietary MPEG format services.

Now, for the first time, as a DTH user or a DTH system seller, buying TV programming via satellite will be similar to shopping over the telephone for CDs or other entertainment. The only significant difference is that with a DVB Compliant receiver, the programming will be "down loaded" to your

Pick-A-Pak™ Best Price List

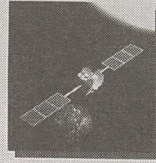
Service Name	Annual
Adam & Eve	79.00
American Movie Classics	11.95
Anti! (Greek Channel)	235.00
Arts & Entertainment History	5.30
Around the World After Dark	89.95
Atlantic 3	19.95
Bravo	4.95
Cartoon Network	5.00
Cinemax	85.00
CNBC	7.00
CNN/CNN & Headline News	14.95
Comedy Central (E&W)	4.95
Country Music TV: MuchMusic	4.95
The Cupid Network	18.95
Denver 3	28.95
Denver 5	44.00
The Discovery Channel (E&W)	3.95
The Disney Channel	64.00
Encore	17.75
E! Television	1.75
ESPN	26.95
ESPN2	2.95
Exxtasy Premiere - special	99.00
Exxtasy II - 24 Hours - special	149.00
Exxtasy Combo - special	199.95
The Family Channel (E&W)	5.95
The Game Show Network	8.95
The Golf Channel	59.95
HBO (5 Feeds)	89.00
HBO Cinemax (8 Feeds)	144.95
Independent Film Channel	2.35
International Channel	29.95
KDVR (Fox)	9.95
KTLA Los Angeles	9.50
Lifetime (E&W)	6.95
MTV Mini Pak (VH1-TLC-BET/Outdoor Ch.)	11.95
The Movie Channel	87.00
The Nashville Network	5.95
NFL 95 Sunday Ticket	Call
Nickelodeon Mini Pak (TLC-BET/Outdoor Ch./Newsport)	9.95
Playboy	79.00
Prime Network (sports)	6.95
Prime Time 24 (E & W)	29.95
Prime Time 24 E & W & Fox (Chicago) SPECIAL	39.95
Showtime (3 Feeds)	87.00
Showtime TMC (5 Feeds)	139.95
Showtime TMC Flex (6 Feeds)	146.95
Splice	79.00
Splice/Adam & Eve Combo	119.95
SSN (Sports) 13+ channels	139.95
Sports Channel 8+ channels	139.95
Starz/Encore	69.95
TBS	9.95
Turner Classic Movies	8.95
TNT/Territory Restrictions	15.95
Travel Channel	1.95
TV Asia	145.00
TV Erotica	139.00
USA Network/ The Sci-Fi Channel	10.00
The Weather Channel	7.95
WFLD (Fox Chicago)	4.95
WFOR, WSBK	19.95
WGN, WPIX, KTLA	24.95
WGN Chicago	9.95
WPIX	7.95

* Account must contain minimum of 3 services. (E & W denotes East & West Coast Feeds)
Prices effective 5/1/95. Subject to change without notice.



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- Full Description Listings
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- Previews for upcoming movies
- Skylights of the best TV of the month.

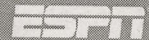


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Price List & Packages

How system works: DTH dealers are agents (collecting a commission for sales) for programming packages on offer by one or more competing companies. DTH subscribers can also order programming directly over telephone using credit card to pay for services selected. This North American model shows pricing on an annual basis, per channel (ala carte) or in discounted packages.

receiver directly by satellite. This is the future and 1996 it when it all finally begins to happen.

PanAmSat Is Not Unique

PanAmSat's decision to jump directly to DVB Compliant transmission formats in no way jeopardises the privacy of their programming customers. If, for example, Encore and Showtime movie feeds (TR9, PAS-2 presently) are not intended for home or SMATV use, they will be no more available through a DVB Compliant format than they are now (1).

The Australian Galaxy service via Optus B3 already utilises a DVB Compliant similar format. A new American Ku DBS service (Echostar) and a new Canadian DBS service (Alphastar) are scheduled to go into operation by mid year. Two new South American services (including one using

another PanAmSat satellite) are scheduled within the coming 15 months.

Closer to home, a new Thailand service is now operational but is restricted for the moment to Thailand proper. Not so a pair of new Japanese JCSAT-3 satellite services.

1) DMC, a Japanese company that includes Etochu, Mitsui Bussan, Nissan Iwai, Sumito Shouji and JSAT as co-owners, will begin "trial broadcasting" of a 50 channel MPEG service on Ku into Japan using JCSAT-3 in April. By June DMC plans to begin test marketing of the subscription service adding free to air programming (an incentive to Japanese viewers to purchase the home dish

1/ This assumes a perfectly functioning conditional access authorisation system; see Coop's Technology Digest December 22 plus p. 4 here.

-LOOKING AHEAD-

THE SATELLITE EVENTS OF 1996 THAT COULD CHANGE YOUR LIFE

January: AsiaSat 2 springs to life at 100.5E bringing 'strong signal' first-time free to air English speaking programming to significant new areas of the Pacific. Analogue at first, conversion to DVB Compliant MPEG April onward. ■ Scheduled launch for Palapa C1 to 113E adding significant new group of English, ethnic programming to region that includes much of Australia, all of New Zealand, portions of Pacific.

February: New Measat 1 (Malaysian) should be operational from 91.5E; Insat 2C (Indian) from 93.5E.

March: Palapa C1 will initiate service to dishes down as small as 2.4m in size.

April: Palapa C2M scheduled for launch to 118E; potentially a(nother) big provider of DTH and cable programming in Pacific region (precise transponder planning has not been announced); service down to 2.4m antennas. ■ Japanese DMC to launch 50 programme channel digital TV service into Japan on Ku using JCSAT-3. ■ Star TV expects first rollout of PACE MPEG receivers to begin for AsiaSat 2.

June: Palapa C2M will be operational. ■ Intelsat 801 scheduled for launch to 174E, to replace 701 now at that location. Note: Intelsat 80X series satellites are highest power C-band satellites yet designed for Intelsat providing 36+dBw (2m antenna size) C-band reception and 47 dBw (<1m antenna size) Ku band service. See August, November to follow.

"First Half 1996": Russian Express #6 to 80E (actually, 2nd in Express series). ■ Russian Express, to be leased by Intelsat, scheduled for launch to 95E.

Possible: Galaxy (Australia) to lease two Optus National Beam transponders providing 2m and down coverage of 12+ MPEG programme channels on Ku to rural Australians as well as New Zealand (probability 3 on a 0-10 scale). Probable: Russians are likely to replace Gorizont 140E with newer satellite making at least 3 transponders available to programmers wishing Pacific area coverage (8 on scale of 0-10).

■ PanAmSat will change to DVB Compliant MPEG causing revolution in signal access techniques.

August: Intelsat 701 at 174E replaced by 801, Intelsat 511 at 180E replaced by 701 (thereby ending inclined orbit tracking for 180E).

September: Intelsat 802 scheduled to launch to 177E to replace 703 now at that location.

November: Intelsat 703 at 177E replaced by 802.

December: Mubahy Philippines Satellite Corp. (MPSC) C + Ku band satellite scheduled for launch to 144E; has C band potential into South Pacific.

"Second Half 1996": Russian Express #5 (third in series) to 53E; #7 (fourth in series) to 90E. ■ Thaicom 3 with expansive C band coverage into Australia, northern Pacific to 78.5E.

systems) in August. And, by January 1, 1997 the DMC service will be in full commercial operation. Alas, not for the South Pacific (although several American programmers will be included).

2) Quite separate from DMC, a second firm calling itself DirecTV Asia (DTA) is scheduling a 1997 launch of 50 channel MPEG DVB compliant service through JCSAT-3 as well, also on Ku. This one includes American DSS (direct satellite service) operator Hughes as a significant venture partner (42.5%) and Hughes will supply equipment as well as expertise it has learned from pioneering high power DSS service in the USA.

The good news. DTA will be using JCSAT-3 Ku beams that cover New Zealand, Australia, portions of the western Pacific (west of 180 and south of 10 south) as well as India and Russia. This means for most of Australia and New Zealand antennas smaller than 1m (how much smaller is uncertain pending MPEG "compression" testing) and certainly by 1997 pricing well under US\$1,000 for complete home systems.

If any Australian or New Zealand firms are planning wide area DTH coverage of the South Pacific, mid 1997 is their start-date deadline to beat DTA to the skies.

The Receiver Manufacturers

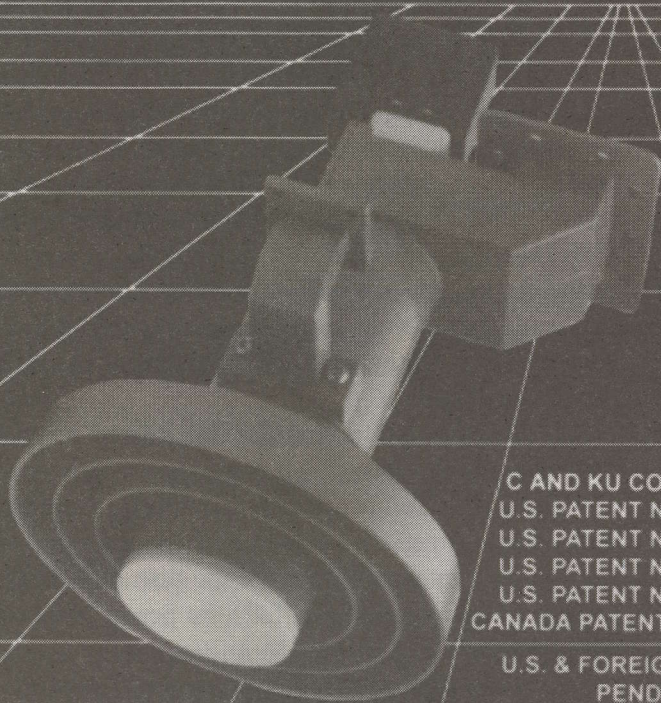
Resolving the DVB Compliant issue is only a "done deal" in Europe. However, with the decision by PanAmSat to adopt it for their globe circling network, this will pretty well force any erstwhile competitors to seriously consider doing the same thing. Nobody wants to end up like S/A or GI with a proprietary system that is incapable of serving world-wide audiences that will surely number in the tens of millions homes by the year 2000.

The innovations in DVB Compliant receivers will be virtually all software created. Palcom, for example, reports, "We have already developed our own digital front end receiver section and as DVB bears fruit we will be able to select a suitable (MPEG) decoder to complete the IRD." Software written to simplify customer use of the extensive range of down loaded services will determine success and failure rates in the early DTH world. On screen menus and step by step "choices" will be a must to be competitive. Firms such as Palcom that already have this challenge conquered will be early leaders in the race to sell large quantities of receivers in what promises to be the first world-wide satellite marketplace.

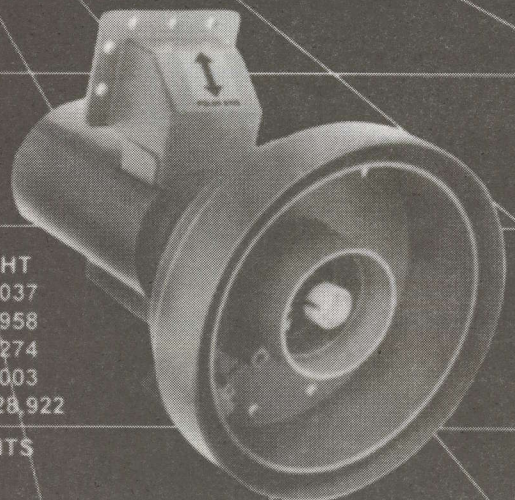
1996: Satellite and companion cable finally begin to make inroads in the Pacific Ocean Region.

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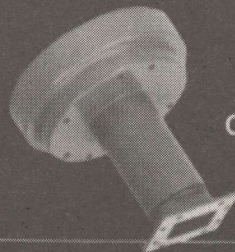
C AND KU CO-BORSIGHT
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U.S. PATENT NO. 5,066,958
U.S. PATENT NO. 5,107,274
U.S. PATENT NO. 5,255,003
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U.S. & FOREIGN PATENTS
PENDING

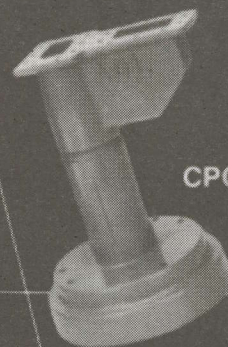
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CP-300



CPOR-100

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MEASURING LOW LOOK ANGLE TERRESTRIAL NOISE

AsiaSat 2 is very close to the western (flat earth) horizon for all of New Zealand. However, from any location in the Pacific there is now or will be within a year or two some bird that is close to your own horizon, regardless of where you live. Several undesirable things happen to satellite signals that come to your receiving antenna at these low elevation / low look angles.

Problem One - Blockage By Obstacles

One of the more significant advantages of satellite over terrestrial transmission is that for most locations the satellite signals come "down" towards your receiving antenna at an (elevation) angle sufficient that you can look over or above nearby objects (a neighbour's house, a tree, a hill). As you attempt to receive satellites towards the extremes of your line of sight coverage (1) you lose this "looking up" advantage and for most locations there will be something impenetrable (2) for at least the last few degrees of elevation look angle, thereby blocking reception for low look angle located satellites.

You get around (or above) this problem by (a) carefully selecting a location for the dish where no objects will come between your dish and the direct line to the satellite, or, (b) raising the dish to an elevated location (on a roof, pole or tower) which allows you to look "over" the obstacles. Satellite signals are very low level (i.e., not very powerful) microwave frequency range emissions and as such they will not go through (over or around) intervening hills, buildings or vegetation (3).

Problem Two - Atmospheric Attenuation

Satellite signals arriving at your dish at elevation angles greater than 15 degrees "slice through" the lower atmosphere with less than 0.5dB attenuation (4). As the look angle goes down below 15 degrees there is a modest increase in "atmospheric signal absorption" such that a signal arriving at your dish at 0.1 degrees (essentially just a tiny bit above your flat earth horizon) will lose an additional 1.5dB. That means that while you may have a 34 dBw footprint level to your spot on earth, the real signal level will be 32.5dB because of the added atmospheric path portion losses.

There is no real solution to this problem except to install a bigger dish to compensate for the higher atmospheric losses.

Problem Three - Earth Noise

Molecular motion is the problem. The earth is a living organism and as such there is intensive molecular activity within the ground, the vegetation, even the top layer of the sea. When molecules are in motion radio noise is generated; this is called "earth noise." Deep space radio telescopes routinely "map" stars, planets, even asteroid fragments by sensing the molecular motion (noise radiated by these interstellar objects). With a DTH dish and high gain, low noise LNB, you are close to the cutting edge of radio astronomy. In other words, you could "map" your own immediate yard by pointing your dish around the yard and "measuring" the noise of molecules in motion.

Although we like to visualise our dish as responding to a pencil thin "beam" of microwave energy coming only from the satellite the dish is pointing towards, the truth is less exact. The combination of the dish design and the feed antenna chosen for the dish (see SF#16, p. 6) determines how thin (or "fat") the pencil like beam is with your dish.

Selecting a dish and feed combination that minimises the thickness of the pencil beam, and which also eliminates undesirable "side lobe" signals, will greatly reduce "earth noise."

All dish plus feed antenna combinations have a "main beam" (the one you picture in your mind as a pencil-thin beam pointing directly at the satellite), and secondary not so pencil-thin beams. When the main beam points directly at the satellite, the secondary ("lobes") point away to the side.

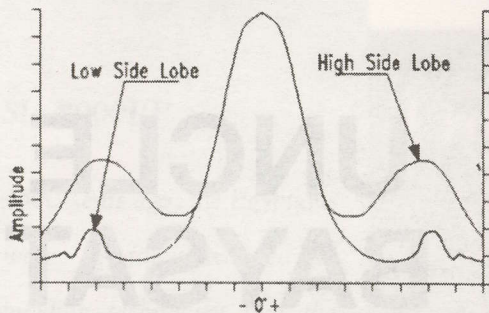
When the dish is pointing towards a satellite with a low look angle, the sidelobes on the lower (earth edge) of the dish point right into the ground. Therefore an antenna plus feed with multiple side lobes will "see"

1/ Line of sight: If your eyes were located at the centre of the dish hub and you looked straight ahead as the dish points, you could "see" the satellite with nothing blocking your view.

2/ Microwave signals penetrate almost nothing, including leaded window glass and deciduous trees.

3/ Trees with low water content in the foliage will attenuate but not stop microwave signals; dishes blocked by trees that lose their leaves in the fall typically have better reception during the winter.

4/ The more moist the atmosphere (i.e., heavy, water laden cloud cover or actual rain) the greater the signal loss, especially at Ku band.



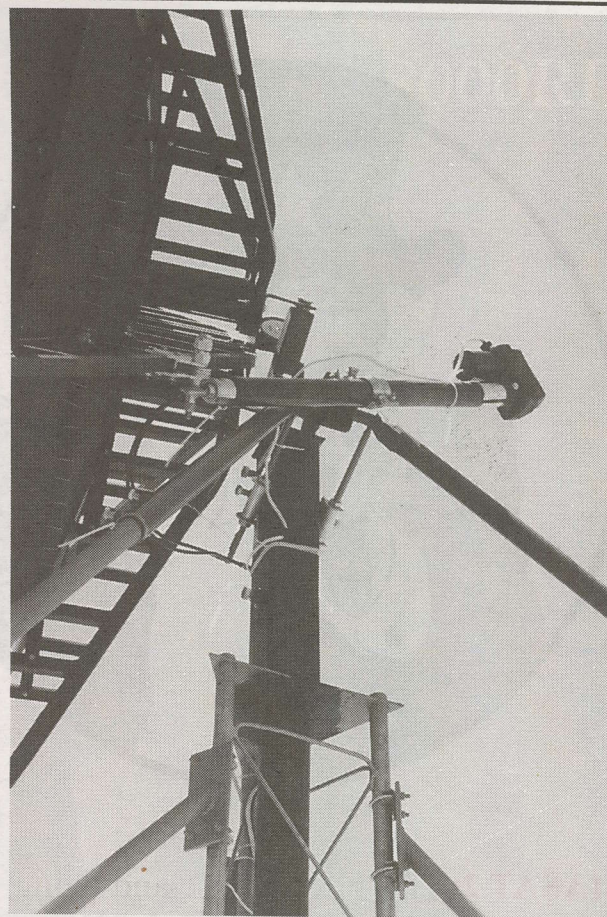
Typical antenna pattern: "Pencil thin beam" is actually more like a blunt-nosed wedge. Of greater importance for low-look angle reception, "side lobes" appear either side of the main lobe and on the earth side of the dish intercept "earth noise."

significant earth noise along with the satellite signal. Now you have earth noise and satellite signal mixed going into the LNB. Both are amplified and the noise becomes sparklies in your picture. Solutions?

a) Raise the antenna higher above ground, to reduce the "strength" of the earth noise;

b) Select a larger dish than you might think you need, with a lower f/D (focal length to diameter ratio; a so-called "deep dish") and then select a feed that is designed for a higher f/D dish (so-called "shallow dish").

Getting the antenna further away from the earth (noise) is an obvious step and you may need to raise it higher anyhow to get a clean line of sight look at the low elevation angle satellite. By selecting a "deep dish" and then purposefully mis-fitting it with feed designed for a shallow dish, you under illuminate the dish; i.e., the feed works effectively only with the inner 60-80% of the dish. This gives away the signal you would normally gain with the larger-than-required dish but it is a good trade. Now, the outer portion of the dish surface becomes a "shield" to block the ingress of earth noise to the feed's side lobes. Net result, somewhat less signal, much less noise and you end up with a better carrier and noise to noise ratio (C+N/N or CNR). In English? Better pictures.



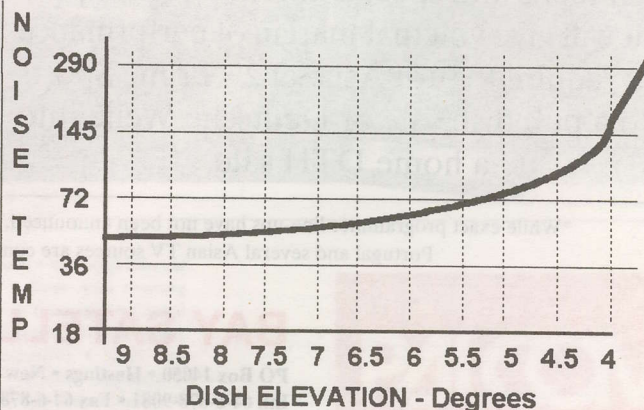
4.5m Islander pointed at AsiaSat 2 for Doubtless Bay Cable TV. Elevation angle finder ("Protractor") is visible against hub back plate just left and up from centre of photo.

Practical Tests

A 4.5m Paracclipse Islander, tower mounted for elevation and a clean line of sight, is equipped to measure the noise contribution from the earth (measured with a bandwidth narrowed spectrum analyser). The feed chosen for the test is a Chaparral Dual (orthomode fixed polarisation) Feed (5). This feed has optimised performance for a dish f/D of .36 so we are under illuminating the dish (proper Islander feed f/D is .3).



Analyser adjustments for earth noise measurements: (1) Slow scan rate speed way down, (2) Narrow scan width to as little as 1 MHz, (3) Use most sensitive scale (i.e., 2dB per division) linear display



-continues page 16-



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ASIASAT 2: This bird is loose and flying; let the fireworks begin! Alas, for New Zealand based bird watchers, this is no ordinary satellite. It's big, tough and strong (34 dBw over most of us).

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Uncle Baysat is on the case. We have special dish feeds and special antenna techniques that will give you that margin of performance you require to turn AsiaSat 2's Prime Sports into a pub dish sale or Deutsche Welle into a home DTH sale.

AsiaSat 2 separates the men from the boys, the home tinkerer from the professional installer. And Bay Satellite has the tools and advice to make you a local hero when you produce pictures that others cannot manage.

Come in and talk with us during SPRSCS '96 (booths 231-A and B), meet US Dish-Pert Tim Alderman, Gourmet Entertaining's Jim Roberts and Paracclipse's Norm Bruner. This fine team is on hand to meet with you and provide practical advice for your difficult dish installations; proof of the Bay Satellite commitment to excellence for New Zealand and Pacific region installing dealers.

Bay Satellite Ltd – we make the difficult tasks routine.

*While exact programmer line-ups have not been announced, five Star TV programme channels, plus, Deutsche Welle, Radio TV Portugal and several Asian TV sources are committed to providing free to air services on AsiaSat 2.

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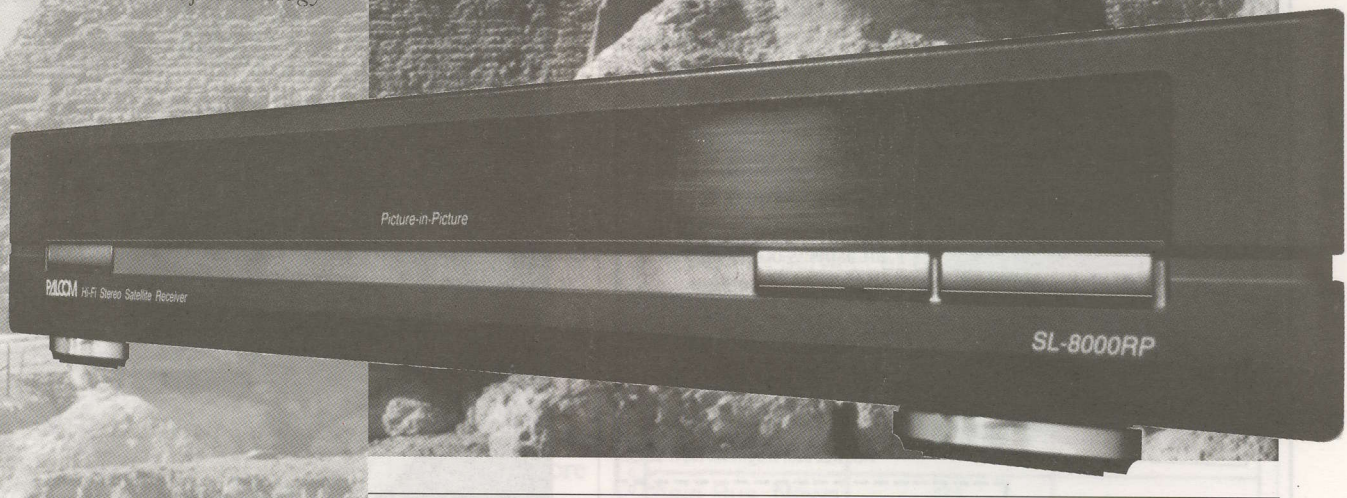


SL-8000RP

4500 years ago, the Egyptians were so far advanced in building technology that the pyramids were considered to be one of the Seven Wonders of the World. Today, still standing, these magnificent shrines to the achievements of man leave us marvelling at the skill and dedication of these ancient people. Fine craftsmanship is truly an ageless art.

Palcom receivers reflect skills and craftsmanship based on the same traditional values. The flagship of the Palcom range, the SL-8000RP is another marvel of technology.

From BC2500 to SL-8000RP



Its unique moving Picture-in-Picture feature permits the viewing of two channels at the same time (on one TV or two) or watching one channel whilst recording another. Mix images from satellite and terrestrial TV, satellite TV with VCR playback or satellite TV and security camera output with a choice of picture size for each image source.

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JANUARY 1st SUBSCRIPTION PROGRAMMING AVAILABLE

Programmer	Satellite	Format
Asia Bus. News	PAS-2	S/A MPEG (a)
Chinese TV Net	PAS-2	S/A MPEG (b)
Discovery	PAS-2	GI MPEG (c)
Filipino Channel	PAS-2	GI MPEG (d)
Cntry Music TV	PAS-2	S/A MPEG (a)
MTV Mandarin	PAS-2	S/A B-MAC (d)
ESPN	PAS-2	S/A B-MAC (e)
The Music Zone	PAS-2	S/A MPEG (a)
TNT/Cartoons	PAS-2	S/A B-MAC (c)
Bloomberg	PAS-2	S/A MPEG (c)

ADDITIONAL BY FEBRUARY 1st

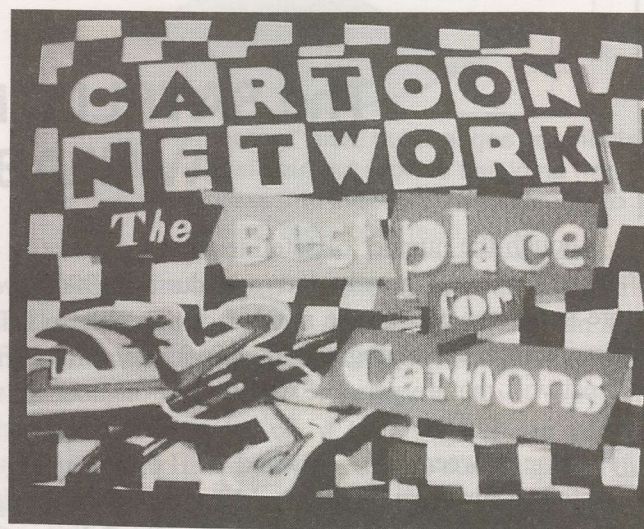
Star Movies	AsiaSat 2	Videocrypt
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ADDED BY APRIL 1st

Discovery	C1	S/A B-MAC (b)
RTM	C1	E-Pal (c)
TVRI	C1	E-Pal (c)
TV-3 (Indonesia)	C1	E-Pal (c)
TNT/Cartoons	C1	S/A B-MAC (b)
SCTV	C1	E-Pal (c)
HBO Asia	C1	S/A B-MAC (b)
GMA	C1	E-Pal (c)
TV Indostar	C1	E-Pal (c)
TPI	C1	E-Pal (c)
ESPN Asia	C1	S/A B-MAC (b)
Singapore TV	C1	E-Pal (c)
Radio TV Brunei	C1	E-Pal (c)

a/ Available to DTH (direct to home), cable and SMATV; b/ DTH packaging only; c/ Cable TV systems only with part of day FTA; d/ Hotels only; e/ Cable, SMATV only outside of New Zealand.

many as 50 separate programme channels simultaneously. They intend to fill these channels with a variety of sports, movie and ethnic programming imported into Asia from throughout the world. Star TV sources have been recently quoted as anticipating at least 20 subscription services being available throughout their



On again: TNT + Cartoons is relooking at the DTH market and studying ways to make it happen, probably with DVB MPEG rather than B-MAC analogue.

AsiaSat 2 platform by the end of this year. Some of these new services will originate in Australia (Fox News, Fox Sports, Fox Net and Fx), being essentially lifted from the Foxtel and Galaxy programming services now operating there. Others are in co-operation with programmers such as NBC (i.e., NBC Super Channel).

The primary competitor to Star will be the basic package that includes TNT/Cartoons, Discovery, ESPN Asia and HBO Asia on C1. This is a service originally created for internal use within Indonesia although sizeable quantities of the S/A B-MAC decoders are scattered throughout northern Australia and the Malay peninsula (taking present reception from the soon-to-be replaced Palapa B2P satellite). The B-MAC system, because it is analogue, is likely to be short lived although before this package can migrate to MPEG there are a number of issues to be settled between the programmers involved. A major issue is how the programme packager marketing this service (Indovision in Jakarta) will "handle" the tens of thousands of model CDE 2000 decoders presently scattered throughout the region; all will require replacement with someone's DVB MPEG IRD unit when a transition takes place.

Finally, there is the DVB MPEG issue on PAS-2 where, as PanAmSat replaces its present S/A MPEG 1.5 format transmission equipment with DVB MPEG during 1996, an entirely new level of programmer will gain entry to this satellite. If the European and North American rate of growth of new programming services can be used as a guide, ten or more new DVB MPEG format programmers should be available on PAS-2 by the end of 1996.

1996 should leave us gasping for breath, but hold on. Wait until you see what 1997 has in store!

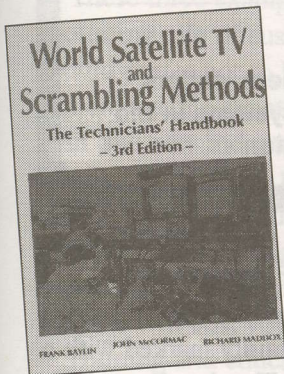


AV-COMM SATELLITE TV EQUIPMENT



WORLD SATELLITE TV AND SCRAMBLING

Cat # B1020

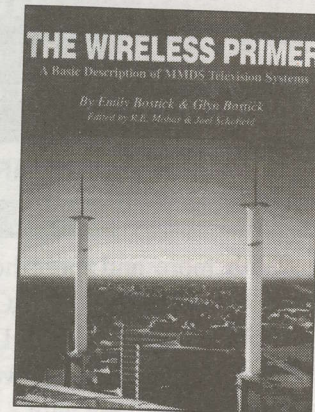


Known as "the technicians' handbook", this text is a must buy for technicians, satellite professionals, and enthusiasts. The design, operation, and repair of satellite antennas, feeds, LNBS and receivers are examined in detail. An in depth study of scrambling methods, and broadcast formats is the backdrop to a discussion of all current American and European satellite TV technologies, including the

Videocypher II, Oak Orion, Filmnet, UK Sky Channel, EuroCypher, D2MAC, BSB and Teleclub Payview III. Circuit and block diagrams of all components are presented and clearly explained throughout the book.....\$79

THE WIRELESS PRIMER

Cat # B1021



A 76 page complete description of MMDS television systems. This first edition, published in 1995, contains thirteen comprehensive chapters covering all aspects of system design, and shows actual on-air configuration of a 31 channel MMDS system. A valuable reference for anyone involved in installation or maintenance of an MMDS system, "The wireless primer" shows how one operator in the USA saved \$100,000 on hardware by following the designs in this book!!\$45

WIRELESS CABLE & SMATV

Cat # B1011

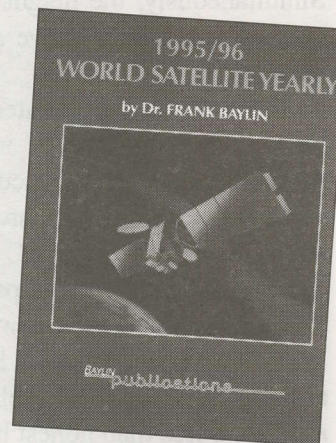


A comprehensive study of the new broadcast method, Wireless Cable, and the closely related field of satellite master antenna TV systems (SMATV). Three chapters are dedicated to details of the site survey, planning and design phases of a private cable system. Off air and satellite headends and all components from antennas to processing and mixing electronics are studied in detail. Ideal for those

considering an MMDS installation.\$89

1995/96 WORLD SATELLITE YEARLY

Cat # B1013



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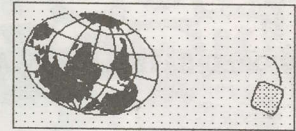
memo

to the membership from you industry trade association

JANUARY 15, 1996

SPACE Pacific

Satellite Programme Access CommittEe



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

With more and more home DTH installations being done each week, SPACE has begun to receive "complaint calls" from DTH customers and others concerning the quality of workmanship being done.

"Can you help me with" is a common starting point all too frequently of late by callers. Here are some abbreviated case histories.

"Some of my pictures and only black and white." The answer here should be obvious; non-PAL format signals (such as CNN and others in NTSC) will play on some PAL-only format TV sets but only in black and white. Simultaneously, the height of the image is reduced and you see black bars above and below the less than full size image.

The problem here related to an installation done for NHK (which indeed is in NTSC) and the installer neglecting to advise the customer that he had choices: Purchase a multi-standard TV set, or, purchase a standards converter (NTSC to PAL). In this instance the dealer advised the Japanese client, "NHK only broadcasts in black and white." Out of this the dealer lost whatever integrity he had built-up with the client, and the Japanese family felt they had been "taken for a ride" by a less than honest businessman.

"The motor drive is defective; it broke." To be sure, there are models and brands of motor drives out there which are not very strong. In this instance the caller had the precise same motor drive as we use on several dishes and because we have experienced no problems, we were suspicious that "it broke" on its own.

There are several ways to install a motor drive (actuator); only one of them is the correct way. Most

motor drives come out of the box with detailed installation instructions. This caller sent us a photo of his installation and the installer had installed the drive upside down (contrary to it being plainly marked with a decal that said "This Side Up"). The bracket which sandwiches the outer tube of the actuator to hold it permanently tight was at best finger tightened. This allowed the actuator to drift in and out inside of the bracket and perhaps on a windy day the actuator arm outer tube was slid back all the way to the motor end. At that point something apparently seized up and the actuator crumpled.

The installer was totally at fault. On query he suggested that the customer "go directly to the distributor where the actuator came from" for a "warranty replacement." Needless to say, warranty does not cover improperly done installations.

"When it rains our picture gets snowy and then disappears." Moisture getting into the LNB to receiver coaxial cable line seemed like an obvious explanation.

We asked the caller to check the fitting at the point where the cable plugs into the LNB, and then to trace the cable from the dish to the satellite receiver looking for nicks or abrasions which might allow water to penetrate the cable.

The installer had used a very poor quality crimp-on F fitting and apparently "crimped" the 'O-ring' with a pair of pliers (or perhaps two rocks beat against each other!). There was no attempt to moisture proof the connector at the LNB. And, the cable installed was a very poor quality (sadly, New Zealand manufactured) 40% copper braid version with no foil shield.

BENEFITS OF BELONGING TO SPACE

SPACE Pacific exists as a vehicle to promote the concepts of private satellite dish system ownership. It does this through education and training programmes, conducting the annual SPRSCS trade show each January, and by serving as an information collection, verification and dissemination centre for developments in the programming access arena. There are four distinct levels of membership including "Individual Member," "Installer/Dealer," "Cable/SMATV Operator," and "Importer/Distributor/Programmer." An explanatory brochure outlining SPACE and its objectives is available on request: SPACE, PO Box 30, Mangonui, Far North, New Zealand (fax 64-9-406-1083). There are presently SPACE Members in 19 countries throughout the Pacific and Asia.

We suggested the caller get the installer back out to redo the installation using nothing less than Belden 9116 (foam RG-6 with 60% shield plus a foil braid) and weatherproof connectors. We also suggested the installer seal the weather proof fittings with silicone or at the very least properly wrap the connector after installation with an outdoor electrical tape.

These three examples barely scratch the surface of the mounting pile of customer complaints and problems. We would prefer not to be placed in the role of arbitrator or remote trouble shooter.

In this new industry dealers will succeed or fail on the merits of the work they do. The most powerful selling tool available to you as a new dealer is "word of mouth" advertising. One happy customer will bring you many more new customers. Conversely, one unhappy customer can and will cost you additional sales.

Training and education is an essential part of entering the DTH world. People who come into this field because they have experience installing UHF TV aerials are at a disadvantage; they are likely to bring all of their bad, sloppy habits along as baggage! Satellite TV operates at microwave frequencies where the margin for human error and sloppiness is measured in millimetres. Everything about the installation of the dish and feed must be millimetre accurate. From the output of the LNB to the receiver, the system is operating at the upper end of the UHF (ultra high frequency) and the lower end of the microwave region with wavelengths that are 1/3rd to 1/2 the length you have experienced with UHF TV installations. Simple connectors become critical component parts; a single drop of moisture that somehow gets into a connector or the cable can completely shut down the reception.

Training. If you attended SPRSCS, you were exposed to several dozen training sessions. And you had the opportunity to closely inspect the dishes in the antenna lot and talk one on one with their assemblers.

Training. Having a DTH system at your shop is mandatory; not only to show off satellite TV, but of greater initial importance, to give you practical experience with this brand new world. The worst possible place to make mistakes is during an installation; it costs you time and money, and, it reduces your prestige with the customer. Learn on your own time at your own shop and make your mistakes there. This will help you avoid our growing file of installers who have trouble getting it right.

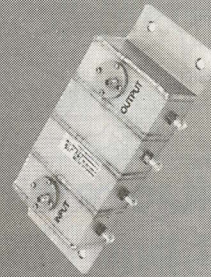
Compressing all of your training into the annual four-day SPRSCS event is not an adequate answer. Training tapes are available (a list is being compiled) and study guides (such as the excellent material published by Mark Long Enterprises) can serve as the foundation for in house training. Have you begun yet?

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Emily Bostick
President

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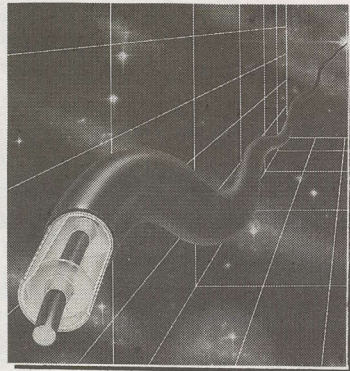
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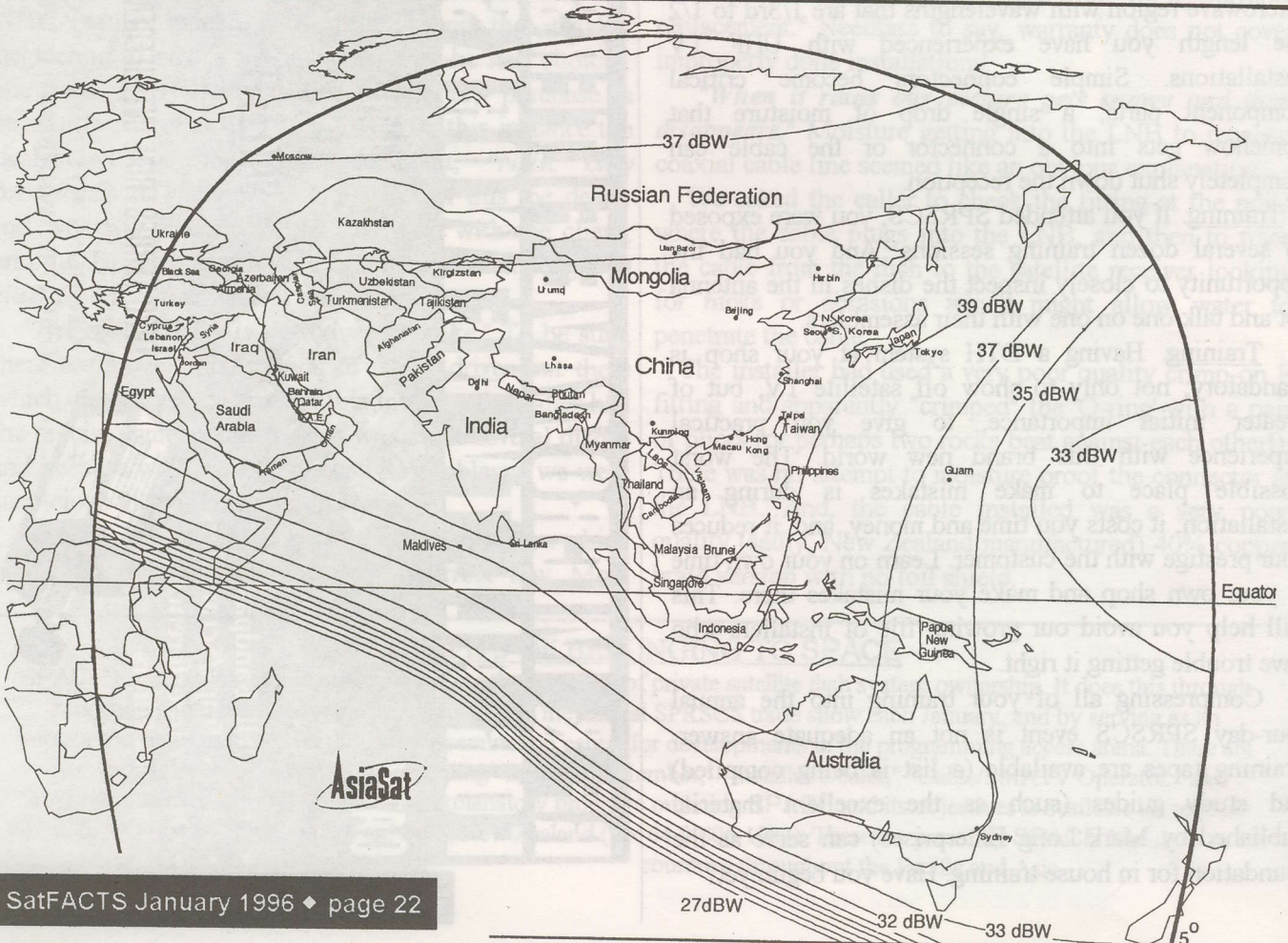
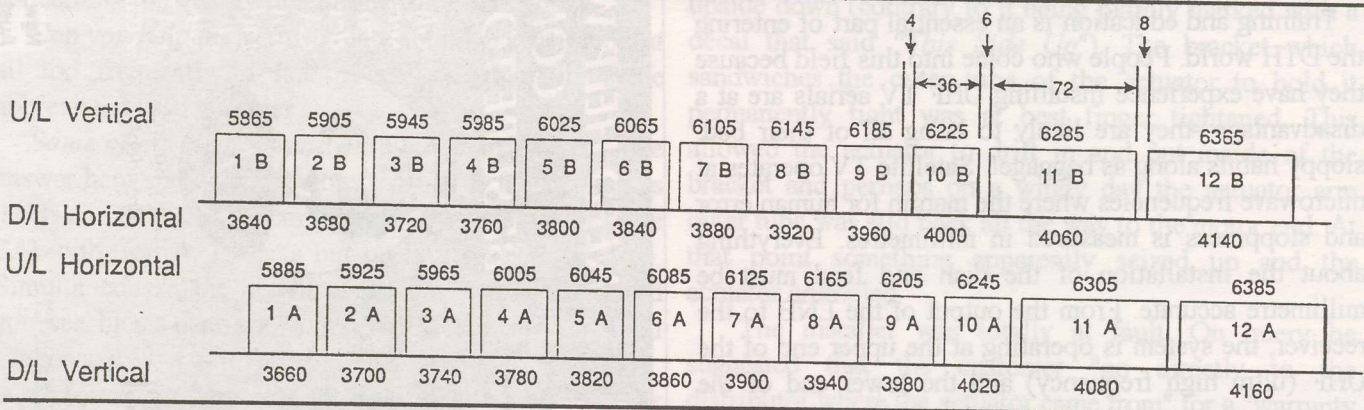
THE CABLE CONNECTION



Setting up antennas for AsiaSat 2 makes these busy days for cable TV and SMATV system installers throughout the South Pacific. Although Australia and points north enjoy the higher look angle (elevation)

location for AS2, many installers are down close to the horizon as our feature report on page 12 of this issue details.

AS2 downlink frequency ranges and its predicted coverage contours are shown here. Note the downlink range is an expansion from the previous 'standard': 3620 - 4200 MHz which translates to receiver IF is 1530 to 950. Also notice that the linear vertical and linear horizontal downlink transponder centres are offset by 20 MHz with the horizontal centres being 20 MHz lower at C-band (but 20 MHz higher at IF). Finally, notice there are a pair of double-wide (72 MHz) transponders (11 and 12) for each polarisation. The only pre-launch frequency assignment we knew about was Deutsche Welle on transponder 10B (horizontal, 4000 MHz downlink centre or IF of 1150). It may not be foolish to

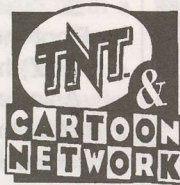




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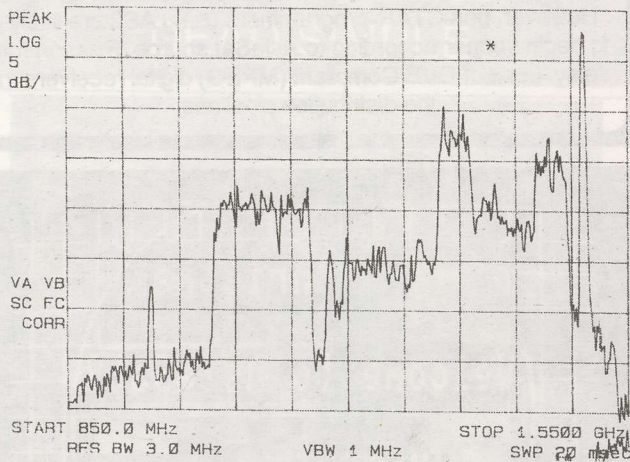
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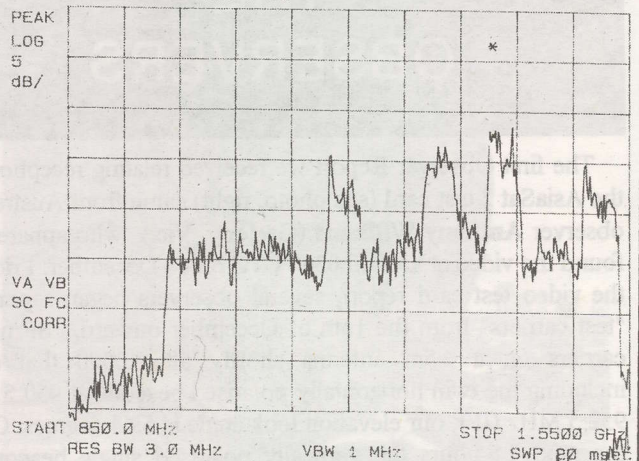
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The AsiaSat 2 Summary: Highlights of Reports Received through January 8

02:32:10 15 DEC 1995
 ASIASAT-2 ?-POL 02:14:43 15 DEC 1995
 REF -10.0 dBm #ATTEN 0 dB



02:43:29 15 DEC 1995
 ASIASAT-2 ??-POL 02:40:39 15 DEC 1995
 REF -10.0 dBm #ATTEN 0 dB



First testing of AS2 as recorded from spectrum analyser connected to STAR TV 9m dish in Hong Kong December 15th (UTC); vertical left, horizontal right.

IF Frequency	Polarisation	Signal Detail	Observer	Location
950, 952	Horizontal	Carriers	Many	Beacon signals
951 approximate	Vertical	Carrier	Many	Beacon signal
1,068	Horizontal	P5 carrier	Colin Wenzel	Mooloolaba, Qld.
1,160	Horizontal	Test Card	Les Brooks	Alice Springs, NT
1,175	Horizontal	Modulated NB carrier	SatFACTS	Northland, NZ
1,252	?	P5 carrier	Shane Wilson	Mareeba, Qld.
1,250	Vertical	Test Card; unmodulated audio carriers 7.46, 7.64	Many	(Dec 27-Jan. 2)
1,272	?	Test Card	Steffen Holzt	New Caledonia
1,286	Horizontal	Modulated narrowband carriers	SatFACTS	Northland, NZ
1,290	Vertical	Test Card	A. Williams, et al	Geelong, Vic., NZ
1,293	?	P5 carrier	Shane Wilson	Mareeba, Qld.
1,330	?	Carrier	Anthony Williams	Geelong, Vic.
1,341	Vertical	Data carriers	SatFACTS	Northland, NZ
1,350	?	Carrier	Anthony Williams	Geelong, Vic.
1,351	Vertical	MPEG TV (test?)	SatFACTS	Northland, NZ
1,360	?	Carrier	Anthony Williams	Geelong, Vic.
1,410	?	Carrier	Anthony Williams	Geelong, Vic.
1,450	?	Carrier	Anthony Williams	Geelong, Vic.
1,471 (varies)	Horizontal	Spread spectrum ?	SatFACTS	Northland, NZ
1,490	Vertical	P5 carrier	Kevin Green	WA

1490 the signals are more than strong enough to create significant problems for AS2 users with similar operating frequencies (see photo, p.25). And because G25 uses circular polarisation, it creates equal amounts of interference for both linear vertical and linear horizontal feeds looking at AS2. One suggestion: If AS2 is strong enough to allow you to move your dish a half degree or so west of 100.5E (i.e., to 100.0E), do so

as this will further reduce the antenna sidelobe pickup of the interference from G25 at 103E. As long as G25 (or a replacement) stays active at this location, the AS2 users of transponders 6A (vertical, 3860 MHz downlink; IF 1290) and 7B (horizontal, 3880 MHz downlink; IF 1270) will be at an interference disadvantage as will users of 1A (vertical, 3660 MHz downlink; IF 1490) and 2B (horizontal, 3680 MHz downlink; IF 1470). Reports from observers once these transponders are in regular use are solicited.

SatFACTS PACIFIC OCEAN REGION ORBIT WATCH: 15 January 1996

Copyright 1996: SatFACTS, PO Box 330, Mangonui, Far North, New Zealand (Fax: 64-9-406-1083)

AsiaSat 2 / Now Testing 100.5E

Pole	IF Freq
Hz	1,510
Vt	1,490
Hz	1,470
Vt	1,450
Hz	1,430
Vt	1,410
Hz	1,390
Vt	1,370
Hz	1,350
Vt	1,330
Hz	1,310
Vt	1,290
Hz	1,270
Vt	1,250
Hz	1,230
Vt	1,210
Hz	1,190
Vt	1,170
Hz	1,150
Vt	1,130
Hz	1,070
Vt	1,090
Hz	990
Vt	1,010

Service
No reports
Strong test carrier
Narrowband noted
Test carrier
No reports
Test carrier
No reports
Test carrier; MPEG?
Narrowband carriers
Test carriers
No reports
Narrowband carriers
AS2 test card
AS2 test card
No reports
No reports
No reports
Narrowband services
AS2 test card/ (DW)
No reports
Strong test carrier
No reports
No reports
No reports

PanAmSat PAS2 / 169E

Pole	IF Freq
Hz	1,426
Vt	1,406
Hz	1,372
Vt	1,346
Hz	1,300
Vt	1,288
Hz	1,249
Vt	1,218
Hz	1,183
Vt	1,161
Hz	1,115
Vt	1,110
Hz	1,060
Vt	1,038
Hz	998
Vt	985

Service
ABN/CCTV/CTN/NBC
CBS/CMT
Discovery/B-Mac Pal
MTV/B-Mac-FTA-N
Occ. Video Feeds
ESPN/B-Mac-NTSC
Asia Feeds/Occasional
TNT/Cartoons-BMac-N
CNN (X2)/FTA NTSC
Prime/TMZ/Feeds
NHK/FTA NTSC
Occ. Data feeds
Filipino/GI MPEG
ANBC/FTA Pal
Data
Bloomberg/MPEG

January 1996 NOTES

B-MAC is analogue encryption system used by Discovery, ESPN et al. **FTA** is "free to air" (**bold face**). **MPEG** is digital (also "dig."). Underlined is subscription available. NTSC is US TV video standard, Pal is European/Pacific standard. All Intelsat not noted are right hand circular while all Gorizont are left hand circular. Readers north of the equator have far greater selection than shown here.

Intelsat 174/177/180E

Intelsat	IF Freq	Service
180E	1,432	K'stone
180E	1,388	MPEG
180E	1,325	MPEG
180E	1,310	MPEG
180E	1,277	NBC/e
180E	1,256	K'stone
180E	1,223	CBS/e
180E	1,179	W'/Net
180E	1,105	RFO.
180E	1092/a	Data
180E	1,054	Data
180E	1050/a	Canal +
180E	1,021	9 Aust.
180E	1018/a	Feeds
180E	984	NZ Dig.
177E	984	Feeds
174E	984	Feeds
180E	980	NZ Dig.
180E	972	NZ Dig.
180E	964	NZ Dig.
177E	963	Feeds
174E	963	Feeds

a/ left hand circular (all others RHC)

Gorizont Satellites (Gz25/103, Gz41/130, Gz18/140 Gz42/142.5, Gz21/145E)

IF Freq	103E +/-2.1 deg.	130E +/- 0.7 deg	140E +/-4.2 deg.	142.5E +/-0.1 deg.	145E +/- 3.5 deg
1,475	Moscow 1	Raj (X2)	Moscow 1	ATN (X2)	Moscow 1
1,425	Muslim	SunMovie	Muslim	JJAY	
1,375	APNA	TestVideo		vacant	
1,325		AsiaNet		EagleNet	
1,265		TestVideo		EMTV	Moscow 2
1,225		SunMusic		Udaya	

Selected Ku Band Signal Targets

Sat	IF / RF	Pol	Service
B1	977	Vt	Data, radio, TAB
B1	1,193	Vt	Occ. Video
B1	1,219	Vt	Occ. Video
PAS2	1,037	Hz	Test Card,feeds
PAS2	1,395	Vt	Occ. Video
PAS2	1,432	Vt	Occ. Video
I177w	11,015	Vt	NBC feeds

Credits to Robin Colquhoun, Shane Wilson, Anthony Williams, Steffen Holz, Kevin Green, Colin Wenzel, Mark Long and others. Inclination numbers for Russian Gorizonts reflects inclined orbit drift within typically 24 hour period indicating birds may not be over equator at most times.

Testing reveals some but not all of the characteristics of the new AS2 bird. Most test card levels, for example, were run well below maximum power available and reception noted to date is certainly not representative of the strength of a fully saturated AS2 transponder (i.e., running at full power). Whether AS2 will operate closer to the full power capacity with each of its transponders remains to be seen. From prior-to-launch information, we know only a single transponder assignment (Deutsche Welle at 1,150 IF horizontal, transponder 10B in DVB Compliant MPEG). As shown on page 22 in this issue, the AS2 transponders on C-band include 10 each vertical and horizontal with a width of 36 MHz and 2 each 72 MHz wide. The double-wide transponders are located at the high IF end (11A, B and 12A, B) or at receiver IFs in the 950-1,126 MHz region). Contrary to our report on pages 22-23 here, it now appears this region will be used primarily for narrowband communications, not TV service. Tests of modulated narrowband data in the IF 1350 MHz region, horizontal (transponder 5B) suggest this one, also, may be used for narrowband purposes. Within the non-narrowband spectrum remaining, STAR TV has 8 transponders to use. Which 8 remains unannounced at this time but we suggest the vertical side is a likely candidate between IFs 950 and 1170.

Non AS-2 Reports

Mark Long (Thailand) reports a decision by Deutsche Welle which has been shopping for partners to share its 36 MHz wide transponder on AS2; Spain's RTVE and France's TV5 reportedly will use the free to air DVB compliant platform. These two services will certainly boost the appeal of owning a DTH system for AS2. Also coming to AS2, RTP (Portugal) which holds a full 36 MHz transponder and says it will stay in analogue for now. RTP programmes a heavy schedule of European league football (soccer) which will have many fans in the Pacific.

Les Brooks (Alice Springs, NT) reports PAS-4 transponders from 68.5E are solid if not perfect on his 4m dish with the following FTA services in PAL: MTV India (IF 968), TNT/Cartoon (IF 1033), CNN (IF 1062), Sony Asia (IF 1245), ESPN Asia (IF 1290) and Asia Business News (IF 1365), all horizontal. From Thailand, Mark Long adds Jain TV on vertical IF 992. Whether these signals remain FTA or even analogue is unknown. Les also finds Canale France International (IF 1097), C-SPAN (IF 970) on Intelsat 704 from 66E at good level with RHCP.

Shane Wilson (Mareeba, Qld) reports B2P signal levels are very erratic with signals fading completely out and then

returning minutes later. With B2P in an inclined orbit and subject to gyrations not always controlled from the ground, we are witnessing the last days of this workhorse satellite before it is replaced with C1 sometime in February (early March). Shane also reports seeing a test card with a fax number (7095 241 3128) on Gz25 (103E; IF 1375) and Gz18 (140E; IF 1425) promoting "Worldsat and Radio Company, Moscow." A UK based programmer affiliated with APNA has been attempting to put together a world circling network of FTA commercially sponsored programming and this is possibly their latest "teaser announcement." The announcement seen on 140E listed Australia and New Zealand as "target areas" for its coverage; in fact the 140E satellite is badly inclined and reliable reception will require extensive north-south tracking. On PAS-2 Ku, Shane finds Asian service on an IF of 1037 at P2 level.

Tyrell Ruscoe finds Muslim TV on Gz18 (140E), IF 1430, with English audio on 6.5 subcarrier. Most people seem to be catching this satellite when it is crossing the equator (so-called "Zero crossing" point), which means there are only a few hours each day when it is usable unless you are prepared to track extensively north and south of the equator. For New Zealand, this satellite remains the best source for Moscow's "1 Programme" (IF 1490) but only if the dish is equipped for tracking as much as +/- 4.5 degrees.

India's Insat 2-C at 93.5E is operational according to many reports. In Thailand Mark Long found two test mode transponders (1060, 1420 MHz IF) in vertical polarity at very strong signal levels (the best estimated to be 39.5 dBw into Thailand). Insat 2-B, also at 93.5E, is horizontal only thus allowing 2-B and 2-C to share the same Clarke Orbit location. We've had no reports on the new 2-C from Australia (the satellite is beyond the horizon for New Zealand).

Robin Colquhoun and others report MTV Mandarin (50% English) went to a free to air mode January 5th on PAS-2 (1346 IF); no official word from MTV as to whether this is permanent or a technical problem. MTV remains free to air on B2P and PAS-4 although some of its European feeds are new encrypted.

Changes Expected

The Hong Kong uplink feeding PAS2 (ABN, ANBC, CCTV, CTN, NBC Asia, TNT/Cartoon et al) is being upgraded to add additional transponder capacity to both PAS-2 and PAS-4. CCTV is already talking about expanding from a single programme channel to as many as 4 and ultimately 6 (at 6, they would occupy an entire transponder on their own). Some of the additional capacity required could come by shutting down the ANBC analogue feed, turn it into a digital feed and then bring NBC Asia back to this transponder to share with ANBC.

Similarly, Singapore uplinking (MTV, TCS et al) is scheduled for a major upgrade to PAS2 and PAS4. A new Singapore based Ku band service for PAS2 is due to begin at anytime feeding into the Taiwan/China beam with music video programming. PAS-2 will for all practical purposes be totally out of transponder bandwidth on C-band within 15 months with virtually 100% digital service.

Meanwhile, SF understands that with Intelsat's new 800 series satellites to the Pacific in July, EM TV on Gz42 is planning to move to 801 at 174E. French RFO has recently decided it will stay analogue on 180 at least through 1996 and perhaps much longer.

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OBSERVER REPORTING FORM - Due February 05, 1996

NOTE: Use MIDDLE card (below) to report on AsiaSat 2!

- New programming sources seen since 15 December (1995): _____

- Changes in pre-existing programming sources since 15 December (1995): _____

- Other: _____

Note: Please include transponder number/receiver IF reading for each programmer and use P1-5 code.

Your Name _____

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Make/size dish _____ LNB _____ Receiver _____

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- AsiaSat 2 test signals first seen here at _____ (UTC), _____ (date) on transponder(s) / IFs of _____
- Subsequent AsiaSat 2 signals seen here include: _____

• I compare the BEST AsiaSat 2 signal(s) [identify which _____]
as being on a quality level with PAS-2 programmer _____

• I compare the WORST AsiaSat 2 signal(s) [identify which _____]
as being on a quality level with _____ programmer _____

Observer Name _____ Location _____

Antenna Size _____ LNB _____ Feed Type _____ Receiver _____

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