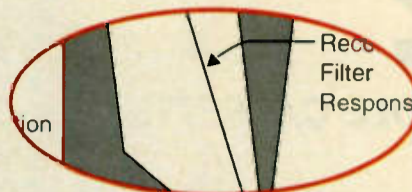


TECHNOLOGY

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Pay-Television Comes to Australia

Telecom, Cable and Satellite Firms Line Up For a Piece of the Action

by Max Throver

SYDNEY, Australia

After 17 years of squabbling within the Australian TV industry, it appears that the introduction of pay-television is finally here. Before this year is out, thousands of TV viewers will be able to take advantage of subscription-based television services similar to those that have existed elsewhere in the world for years.

With the Australian Broadcasting Authority issuance of 343 cable pay-TV licenses, 190 multipoint distribution service (MDS) licenses and three satellite licenses, the race is on between numerous competing companies to begin shipping programs to viewers. Already, a variety of delivery systems are being set up, including direct-to-home digital satellite, satellite/MDS hybrids, fiber/coaxial cable hybrids and eventually MDS-only systems.

For instance, Telecom Australia, the national telecommunications company, is spending A\$710 million to roll out a hybrid fiber optic/coaxial cable network on the eastern seaboard. Meanwhile, the U.S. cable operator Cox Cable, in conjunction with Australian Rowcom Holdings, which has been allocated 28 subscription television broadcasting services, is preparing to compete with Telecom in southeast Queensland with the announcement of an A\$500 million cable network.

HYBRID PLAYER

Another player, Australis Media, owns one of the three satellite broadcasting licenses, as well as 88 of the 97 MDS licenses issued in major capital cities and 30 cable pay-TV licenses. Australis operates with U.S. partner Lenfest Communications and is indirectly linked to U.S. cable giant Tele-Communications Inc. and programming house Liberty Media. Australis will deliver pay-TV using a hybrid of all three systems.

With a new industry opening up, businesses find it imperative to begin operating as soon as possible. So the race is on to sign up customers, generate cash and carve out market share. But it is this pressure to begin delivery that has generated controversy.

For example, because Australia uses the PAL-B standard, the integrated DigiCipher NTSC receiver/decoder in the Australis system required a chipset for NTSC/PAL conversion. The decoder has been drawing harsh comments from observers, saying that without an expensive standards converter, signal quality is being substantially down-graded.

However, Jim Hoggett, general manager of corporate affairs at Australis, said that the system now shows picture quality equal to the national norm. He said Australis' services will be received in the home by late 1994 or early 1995.

Rob Nichols, Australis' chief engineer,

said that Australis will migrate to General Instrument's upgraded DigiCipher II system in the second quarter of 1995. The new system will use the MPEG 2 compression standard, provide full PAL compatibility and deliver 16:9 as well as the 4:3 aspect ratio programming. Other benefits with DigiCipher II will be statistical multiplexing

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**Touring Italy's
Transmission Stars
on Page 12**



The BTS LDK-93 sports a redesigned viewfinder and a 62 dB signal-to-noise ratio.

For a review, turn to page 28.



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BUSINESS

AVID BUYS BASYS NEWS UNIT

TEWKSBURY, MASS.

Avid Technology is preparing to make a major leap into the newsroom automation industry with the intention to purchase Basys Automation's news division and a Maryland software firm known as SofTECH.

Terms were not disclosed.

By integrating Basys' newsroom automation systems with its own lines of non-linear editors and disk-based playback systems, Avid could become a leading provider of turnkey broadcast news facilities.

Basys is currently owned by Digital Equipment Corp.

"Avid's goal is to provide technology for the newsroom of the future, where broadcasters can combine video, sound and text on every desktop," said Curt Rawley,

Avid's president and CEO. "With these strategic acquisitions, we hope to supply a solution that takes news operations all the way from capture to transmission."

Already, Avid is working with Ikegami to develop a disk-based camcorder that would eliminate the sometimes lengthy process of converting tape-based recordings to disk for non-linear editing. Avid is also at the forefront of the Open Media Framework movement designed to provide a convenient file exchange format for differing video systems.

Meanwhile, software for future Avid automation products will likely come from SofTECH, a maker of PC-based newsroom automation software.

"...broadcasters are demanding the integration of the various systems used to create and distribute news," said Tony Mark, vice president and general manager of Avid's Broadcast Group. "Avid plans to respond to this growing demand by eliminating the barriers between newsroom automation and production systems..."

CABLE

JAPAN BACKS DIGITAL CABLE

TOKYO

While the Ministry of Post and Telecommunications tiptoes around the digital/analog issue for broadcast television, it is pressing forward in the area of digital cable.

In August, the ministry abruptly announced that it would financially support a joint plan by government interests and the private sector to digitize cable television in Japan.

Ministry officials say they will request the yen equivalent of several million dollars (U.S.) to finance one-quarter the cost of construction, facilities and software.

The system is expected to allow connection to computers, as well as the expansion of channels and information-gathering capabilities.

And in somewhat defiance of the NHK analog HDTV system, ministry officials suggested the digital system would be proposed for various media, including satellite and terrestrial operations. An advisory panel to the ministry also suggested the system could be adapted to a planned nationwide fiber optic network.

BUSINESS

AVS UNIT MERGES WITH TEKNICHE, INNOVISION

SURREY, U.K.

Three U.K. manufacturers of video equipment, Tekniche, Innovision and AVS's standards converter unit, have announced a merger into a single company.

The new company, which had yet to be named at presstime, will be 35 percent owned by 3i, a U.K. investment capital group, which is putting in a large share of the funding. Another group, Avesco Plc. will hold an 18 percent share, while Tekniche and Innovision shareholders will own the remainder.

The new organization will draw on the product lines of all three manufacturers to deliver a wider range of products to customers. Tekniche will bring to the group its lines of digital and analog converters, fiber optic transmission equipment, as well as encoders and audio processing equipment. Innovision specializes in digital format translators and PAL/NTSC codecs, while AVS will contribute its standards conversion lines. Other AVS products, such as switchers, format translators and digital test equipment, will remain with AVS.

Manufacturing will take place at Tekniche's plant in Woking, U.K. Product development will be located at Woking and Tekniche's Hong Kong site, while Innovision's facility in Slough, U.K., will become the group's Advanced Research and Development Center.

As one of its first moves, the group recruited Tony Nowak, formerly director of Vistek, as managing director for operating subsidiaries.

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BROADCAST INDIA '94**

Bombay. The fourth annual Broadcast India will take place at the World Trade Centre. The event will be coordinated with Broadcast Sri Lanka '94. For information, contact Saicom Trade Fairs and Exhibitions, 184, Admiralty House, Bombay, 400 005, India; telephone: +91-22-215-1396; FAX: +91-22-215-1269.

**25-28 OCTOBER —
BROADCAST CABLE &
SATELLITE INDIA '94 AND
COMMUNICATIONS INDIA '94**

New Delhi. Exhibitions India will present these concurrent events at the Pragati Maidan. For information, contact Prem Behl at E-6, Defence Colony, New Delhi-110024, India, telephone: +91-11-4622710, 4622711; FAX: +91-11-4633506.

**31 OCTOBER-2 NOVEMBER
— 1994 PAN ASIA CABLE &
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Hong Kong. Asia's first cable and telephone event will take place at the Sheraton Hotel and Towers where leading executives will discuss the breakdown of barriers between the two industries. For information, contact AIC Conferences, 1302 Jubilee Commercial Building, 42-46 Gloucester Road, Wanchai, Hong Kong; telephone: +852-520-1481; FAX: +852-866-7340.

**9-11 NOVEMBER —
INTERBEE '94**

Tokyo. The Electronic Industries Association of Japan (EIAJ) hosts the 1994 International Broadcast Equipment Exhibition. For information contact the Japan Electronics Association: The Tokyo Chamber of Commerce & Industry Building, 3-2-2, Marunouchi, Chiyoda-ku, Tokyo 100, Japan; FAX: +81-3-284-0165.

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Standing on the Global Stage

by Brian Kelley

GUEST COMMENTARY

The past few years have been ones of unprecedented opportunity for those involved in the television and video industry. The Cold War is over. The Pacific Rim is exploding economically. NAFTA has been signed in the Americas with the possibility of extensions to the rest of the hemisphere. The European Community is now the European Union. GATT has finished the Uruguay round...

But not all opportunities will come to you. Today, if you want to get ahead, you have to know where the opportunities are.

WHOLE NEW WORLD

If you are a typical TV professional, you work in the mature, saturated markets of the west. In these markets professionals discuss topics such as the future of delivery systems, digital technology and interactivity. In the rest of the world (which is also the vast majority of the world) these issues are not of pressing importance. How can you get overly concerned about non-sequential digital editing if you have problems getting a supply of quality VHS tapes — and then have to use them as broadcast masters? Welcome to the developing world — full of challenges, full of opportunity.

Many generalizations cannot be made

about all developing-world markets. Included in this assembly are places as varied as industrial Russia, agrarian Ethiopia, booming China and warring Yugoslavia.

In a sense, the countries of the developing world make up an island. On this island live the castaways of the information age, busy using homemade rafts while the rest of us are jetting around the globe.

While the technology might not be on the cutting edge, there are a number of things to remember when navigating within the new world order. Here are a few tips for those venturing into the international market:

Think globally. Do not look at the developing world as merely a market for junk products or services that cannot be sold elsewhere, even though this may be true in the short term. Plan your product or service to extend globally. Ask questions now about what must be done today to insure greater possibilities tomorrow. If you lay aside some misconceptions about distant and exotic lands, you can better begin to think and act globally.

Do not condescend. Bad equipment does not equate with poor human ability. Often, talented individuals involved in either the software or hardware side have honed their skills with the technical equivalent of lead weights on their ankles. With this burden removed through joint ventures and international cooperation, many can run like the wind.

Get in early. When financial newsletters say it is time to buy a stock, managers of equity funds already know it is too late. Attractive markets become more attractive when good people network and get

involved in partnerships at an early stage. Only one person has the distinction of being first in a field. (How many Olympic silver medalists can you name?)

Play leapfrog. If you own a car for which you have all the spare parts, it is harder to make the leap to buy a new vehicle — especially if the old one still does what you need it to do. In the worldwide video and audio industry, too much has already been invested in old systems. Many developing broadcasters will do a technological leap frog, bypassing the tools we learned our trade on and jumping directly into the future.

WINNING COMBINATIONS

Look for win-win situations in the long term. Any successful cooperation must provide

benefits to both parties. Many developing world broadcasters use standards equivalent to what is acceptable in the west; others do not. But in all cases there are multiple outlets for a product or service in a global market.

Keep a positive attitude. A creative mind can find an opportunity in what the majority sees as an insurmountable obstacle. The

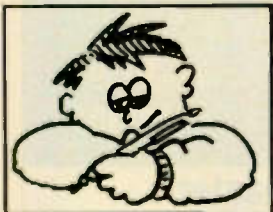
biggest single thing that can be changed to effect success in this field is a negative attitude. Is the work easy? No. Is it worth the effort? Most decidedly yes.

So why not give serious thought to opening the door to the developing world. Don't knock it until you knock on it. ■

Brian Kelley is director of Germany's New Life Network, an international distributor of family and educational television programming produced around the world.

**Do not look
at the developing
world as merely a
market for junk
products or
services . . .**

LETTERS TO THE EDITOR

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Pay-TV Programmer Gears Up

by Barrie Smith

SYDNEY, Australia

As deep-pocketed interests scramble to establish the satellite, cable and microwave delivery methods for Australia's new pay-TV services, the first of those services is well on its way to launching.

Cable Television Services (CTS) was announced earlier this year and is already slated to be carried on a future fiber-optic network by Telecom Australia, the nation's national telephone carrier. CTS was scheduled to go on the air in September.

FAST TRACK

CTS's headquarters is in the suburb of Lane Cove, barely five miles from Sydney. Ian Betts, chief engineer at the station and a veteran of broadcast in Australia and Asia, said he is still "a little dazed at the pace involved in establishing the enterprise."

If the September launch is a success, barely seven months will have passed since its initial public announcement. Planning began with only a handful of staff, no equipment and no site location for a central facility.

Initially, CTS will provide 10 channels to cable headends. However, when it came to selecting and designing a central facility, Betts had to anticipate at least 20 more program lines at a later stage.

In addition, it was essential to provide a cost-effective result to subscribers but still

offer a high-quality signal. Betts was adamant that CTS was not to be "equated with some of the less-than-ideal cable operations in some other countries, particularly those originating from VHS."

"Their technical operation and presentation standards are much lower than in Australia," Betts added. "My brief — in our operational look, presentation and technical quality — is to be equal to or better than the free-to-air guys."

Early on, Sony Broadcast Australia was engaged to provide turnkey facilities. It was a natural choice, Betts explained, "because they could give it to us on the incredibly tight time scales we wanted."

The design approach was to adopt a very flexible system and floor layout.

"We see this industry having huge changing technological and operational requirements over the next five or 10 years," Betts said. "For these first 10 channels, we are taking on eight Sony SP Flexicarts for program replay, plus professional Pioneer magneto optical laser discs for promo replay, all running under computer control. That is the heart of the system."

"There will be a large dubbing and transfer facility on top of this, using mass standards conversion," Betts added. "Analog Betacam SP is our main in-house format."

"I am hoping that for the second and third lots of 10 channels, we will be looking at a disk solution. I see tape as being pretty much an interim technology."

Digital Betacam was not an option for

Betts, as he felt the format provided "very marginal extra quality gain" in the CTS environment. "And it is a lot more expensive," he said.

"It was unlikely the consumer would be willing to pay for the marginal, if at all (noticeable), picture quality increase," he added.

Other decisions, such as the routing switcher control, had not been decided at presstime. However, Sony Broadcast managed to pass on the information of the likely configuration of their client's facility.

"The whole system had to rely on a total automation system to cover control of everything, from tape 'housekeeping' to control of robotics," said Ross Peacock, product manager for Sony's Broadcast and Post Production Division.

CAMERAS AND CONTROL

A small two- or three-camera housing studio will be equipped with BVP90 or DXC537 cameras. The studio's associated control room will have a BVS-3200P switcher, an XP390 audio desk and CCUs (camera control units). When not in use, the studio will double as an edit suite, with access to tape machines directly from an edit controller capable of full A/B roll edits.

There will also be a dedicated A/B roll edit suite with associated BVW-75P VTRs and an edit controller.

At the outset, 20 to 30 percent of material will be arriving via satellite, but the majority will originate on tape from the Lane Cove premises.

CTS will provide CNN's International 24-hour-a-day news service plus other Turner products — the MGM movie library, the Hanna-Barbera cartoon network, and negotiations are under way for a 24-hour-a-day international sports channel, a contemporary movie channel and lifestyle channels.

It is intended that the satellite downlink

signals from these and other sources will feed directly into the building. In the meantime, outside downlinking will be utilized as an interim measure. After that, the surrounding landscape will be a "garden" full of satellite dishes.

Additional staffing will consist of an engineer, a tape operator and a network presentation-type director, plus operators to handle viewer telephone inquiries. In an engineering sense, there is also provision for on-camera presenters and robotic cameras.

For carriage on Telecom Australia's network, the output from the Lane Cove facility will feed directly into Telecom's fiber network. Telecom has run 24 fibers running into the CTS building.

The technology that Telecom will be employing at this stage can be likened to a backbone technology; signals will be input to the network and sent to a number of drop-off points. One of these will be the Sydney headend, another the Melbourne headend, Brisbane and so on. From the headend, the signal goes to local exchanges, then to what Telecom calls "neighborhood pods." Coaxial cable is used from the pod to the customer's house — about 600 to 700 meters.

Billing system options were still being finalized at presstime, but there was an intention to arrange joint billing with Telecom, which is responsible for installing and maintaining the cable and providing the set-top unit.

By the end of 1994, Telecom's fiber is expected to "pass" 150,000 homes. The end of July, 1995, will see 320,000 homes passed, and by December, 1996, the total should reach 1.1 million homes. CTS expects to achieve a 15 percent audience penetration.

The capital cost of the operation center is targeted between A\$7 million and A\$8 million. Operating costs are confidential.

At this stage the anticipated subscription charge is \$A10 per week for 10 channels. There is also an initial Telecom connection cost of between A\$250-300 plus rental for the set-top decoder at an additional A\$2 a week. ■

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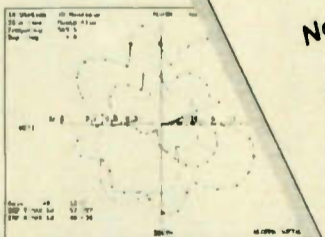
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ALDENA NEWS N.C.
A technical bulletin aimed at broadcasting and telecommunication - October 1994 -

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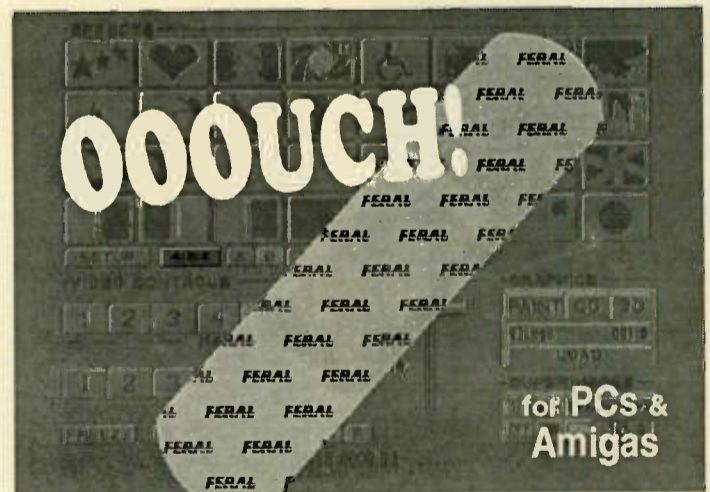


A printout example of the famous ALDENA antenna system design software.



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Circle 110 On Reader Service Card

CONTINUED FROM PAGE 1

Australis Media Set to Launch

for maximum utilization of bandwidth and the ability to provide a completely digital signal path for satellite-to-home subscribers.

PROGRAMMING CONCERNS

Of course, picture quality may not be the "make or break" issue for Australian pay-TV providers. Because pay-TV is such a recent development here, about 80 percent of Australian households contain a VCR, and video-rental outlets number in the thousands. Back in 1989, the Australian Bureau of Statistics estimated national household expen-

diture on VCRs, video cassette tapes and video cassette tape rental to be A\$907.3, a significant amount for a country of 17 million people.

As in most video start-up services around the world, it is widely recognized that the crucial issue for pay-TV is programming. Viewers are accustomed to watching first-release movies on video cassette, and Australian-produced programs are immensely popular on free-to-air television. Meanwhile, sporting events remain ratings winners, with anti-siphoning regulations likely to keep many major sporting events

on free-to-air television.

In addition, program production is expensive. Free-to-air broadcasters are required by law to invest heavily in new Australian product. However, only predominantly drama-based pay services will be required to invest in new product, and even then, at much lower rates than the free-to-air stations.

Programming quantity is also an issue. First-release movies will not fill an entire schedule on a movie-based pay service, and viewers may not want to watch the tele-movies and back-catalog product that will

fill the rest of the schedule.

Still, Jim Hoggett at Australis remains confident about the company's programming needs.

"We have been inundated with program offers from local production houses, international suppliers and movie producers," he said.

In the end, consumers may put up with less than perfect picture quality to view their preferred product. But they may not subscribe at all if they cannot find anything worthwhile to watch. ■

Max Throver is a technical and creative writer based in Bellingham NSW Australia and can be contacted by FAX at +66-55-2436.

news watch

DATA HIGHWAYS

CHINA HINTS AT DATA NETWORK

BEIJING

Chinese leaders continue to intrigue western businessmen and government officials with continued talk about a massive "information highway" in the East.

Most notably, the quasi-governmental Federation of Economic Organizations (Keidanren) has proposed constructing such a network from Japan to Turkey, a 6,000-mile project that would connect almost all of Asia and the Middle East.

At presstime, the plan was to be put forward at a November convention in Beijing intended to attract Japanese, U.S. and European business leaders.

OLYMPICS

POLE-VAULTING IN 16:9? OUCH!

SYDNEY, AUSTRALIA

As Sydney prepares to host the 2000 Olympics, much concern is being given to the likelihood that the event will be covered in HDTV.

To show Australians how to do things in widescreen, a European HDTV team from Vision 1250 and HD Thames recently conducted a well-attended conference on the subject.

However, one industry elder managed to unsettle the audience by foreseeing a major disaster when the 16:9 HDTV cameras try to frame vertical sports, such as pole vaulting, the high jump and the high dive.

One wisecracker in the audience answered "that's why they invented the tilt head."

PEOPLE

NTL GETS NEW CHIEF

Dr. John Forrest, former chief executive officer of NTL, has been appointed deputy chairman of the U.K. satellite firm, and the company has turned to the telecom industry for a new CEO.

Andrew Sukawaty, former chief operating officer of Mercury One-2-One, a joint venture partially owned by U.S. telecom U.S. West, has been named as Forrest's replacement.

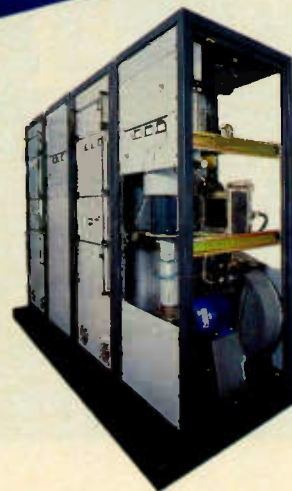
According to company officials, this top-level shuffle is designed to put NTL at the forefront of the merging of the satellite, telecom, cable and broadcast industries.

Meanwhile, NTL has announced that it will build a two-channel C-band uplink facility in Battersea, U.K., for the Arabic-language channel MBC. The channel will be carried to the Middle East on Arabsat 1C.

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Broadcast India '94 Aims High

BOMBAY, India

Despite the cancellation of its sister show in Sri Lanka, Broadcast India '94 is set to show the world the economic dynamism of the Indian video and audio industry.

The show is scheduled to take place October 21-23 at the World Trade Center here in Bombay with speakers and manufacturers from around the world scheduled to attend.

Broadcast India '94 will convene amid a growing spirit of optimism this year, as both the number of visitors and the number of exhibiting companies appear to be on the rise. Last year, about 10,000 visitors attended the show, a whopping 40 percent increase from the year before. Exhibitors numbered 95 last year, and this year's projection is for more than 100 exhibitors.

As of presstime, Broadcast India '94 had

accumulated about 85 companies, including many leading audio and video technology firms.

Thomson Broadcast and Sony Corp. will display their wide ranges of television cameras, monitors and studio production equipment, while Abekas Video Systems will no doubt bring out its disk-based recording systems, switchers and special effects devices.

Audio systems will be presented by Germany's AKG and the U.K.'s Amek/Tac.

In addition, the show will highlight a number of companies involved in the growing field of computer video and multimedia. Silicon Graphics will bring its line of high-end graphics workstations, while such companies as Quantel, Fast Electronics, and Avid Technology will display their computer-based non-linear editing systems.

Also on the computer side of the industry

will be advanced graphics and animation companies, such as Getris Images, SoftImage and Autodesk.

In addition, there will be companies representing the radio, film, cable television and satellite industries.

The conference portion of the show will feature discussion on a wide range of topics.

Leading the event will be Trends in Broadcasting Hardware, which will present comments on the future of television audio, digital audio broadcasting, satellite broadcasting, cable TV, HDTV and the merging of professional and consumer equipment.

Trends in Broadcasting Software will focus on such issues as HDTV technology in film production, in-house and outside program production and the social responsibilities of broadcasters.

A topic called Emerging Technologies for

Program Production will include discussion on cartoon animation, non-linear editing, video formats, newsroom automation and bit rate reduction (compression) of digital signals.

A session on Delivery Methods will examine digital audio broadcasting, fiber optic technology, multichannel television and satellite news gathering.

A session entitled Non-Governmental Broadcasting will examine satellite services, signal encryption, cable television, and broadcast privatization and regulation.

Finally, a session on Broadcast Policy will look into modernization and financing issues, copyrighting and conditional access.

Meanwhile, the Sri Lanka show has been canceled following the election in August of socialist Prime Minister Chandrika Kumaratunga, overcoming a 17-year rule by the country's United National Party.

For further information on Broadcast India, contact show organizers at telephone: +9122-215-1396; FAX: +9122-215-1269.

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READER SERVICE NO. 109

Czech Republic Wires for Cable

by Charles Recknagel

PRAGUE, Czech Republic

Thanks to clever use of technology, cable television is growing substantially in Eastern Europe by offering numerous services that terrestrial broadcasters do not provide.

Here in the Czech Republic, Cable Plus, the largest cable company, already has connected 280,000 homes since beginning operations in early 1991. And an equal

number of homes has been connected by a field of smaller competitors.

"The industry is growing quickly," said Jiri Donat, director of Cable Plus' Prague office. In Prague alone, Donat noted, Cable Plus expects to increase from 160,000 homes to 190,000 by next year; this in a city with a population of little more than a million people.

One reason cable is growing rapidly here is because the technology promises to solve one of Eastern Europe's more vexing prob-

lems: a lack of telephone lines. In the Czech Republic, only an estimated 30 percent of households have telephones.

CALL WAITING

"In some localities, it is possible to be on a waiting list for up to 20 years to receive a home telephone," said Donat, who also noted that telephone service in the country remains a state monopoly.

Taking advantage of cable's ability to carry telephony, cable companies are offer-

ing homeowners a potential for dramatically reducing their wait for phone service.

Telephone service through cable will become available early next year in the northern part of the country as Cable Plus builds its newest exchange based on Synchronous Digital Hierarchy (SDH) technology.

But telephony is not the only service that is making cable an appealing medium in Eastern Europe. Cable Plus is also using its system to offer television to viewers in their choice of two languages.

"No terrestrial stations broadcast in stereo," Donat said. "We do."

The station uses stereo to simultaneously transmit the commentary for Eurosport, a popular sports channel, in both German and English. In the future, viewers will be able to select between English and Cable Plus' own dubbed commentary in Czech.

To speed the growth of cable, Cable Plus is using a technology known as AML to first serve the communities that can be wired the fastest. In an AML system, multiplexed television and radio signals are transmitted via microwave from a cable headend to a remote site. Since many historic districts of Prague are slow to approve the laying of cable, the company has started with modern apartment blocks surrounding the city.

"We use AML connections to distribute our signal to a variety of different locations in Prague where, for example, we have a thousand subscribers," Donat said.

For smaller clusters of viewers, Cable Plus uses satellite broadcasting to a local dish.

"One AML connection costs about US\$30,000," Donat said, "but a satellite dish is US\$3,000. To reach just a few hundred people, we choose satellite."

Currently, the company broadcasts over one of Russia's Intersputnik satellites. But Donat hopes in the future to switch to Eutelsat. A Eutelsat dish, he estimates, costs only US\$1,000, and more importantly, "Eutelsat is more stable politically" than Intersputnik.

CRISIS CONTROL

Recently, the company faced a sudden crisis when the Russian government made a last-minute decision to interrupt availability of Intersputnik for one day for its own official transmissions.

"We solved the situation just in time by switching to a spare European satellite that had space," Donat said.

As Cable Plus seeks new viewers, it has dedicated part of its total investment of some US\$30 million to building an in-house production capability using Betacam technology.

"There is a great interest here in more Czech-language programming," Donat said.

The company tries to meet the demand with its own daily one-hour "Prague Information Magazine" and a talk-show on financial topics co-hosted with a city business paper. The programs supplement the cable station's most popular offering, a film channel with films dubbed into Czech, and add variety to its full menu of 21 television channels and 30 FM stations, many of them broadcasting in foreign languages.

"The only limit on our amount of in-house production is advertising revenue," Donat said, adding that advertising support in the Czech Republic still falls short of what the television industry needs to be profitable. Currently, the station matches its in-house production to its advertising revenues, while relying on subscriber fees of US\$40 per month for a full packet of channels to support its other operations. ■

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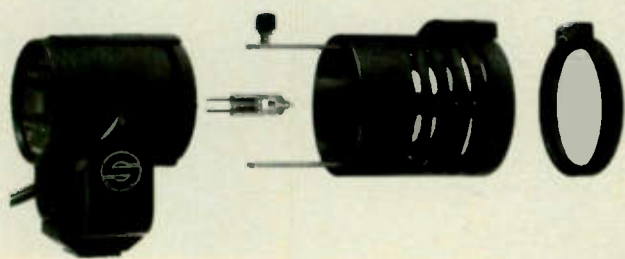
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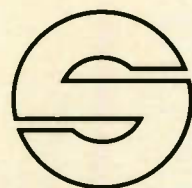


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Touring Italy's Transmission Stars

by James Wood

SPECIAL REPORT

It will come as a surprise to many, and a few who should know better, that Italy is not just world class in the TV and FM transmitter export markets but has already overtaken the rest of the countries in Europe when measured by its number of manufacturers.

This industry has grown so fast that unless you were tracking what was going on, you could quite easily remain in ignorance.

All those who have been in the industry for more than 20 years will be familiar with the origins of this manufacturing industry: the introduction of deregulation in radio and TV broadcasting. Small companies were established very rapidly to satisfy the demand for low-power transmitters of the cheap and cheerful variety.

As is the way of the world, that image has lived on because those manufacturers were honing their craft, building to better and better specifications while watching production costs. This young and virile industry had its sights on something bigger than just the Italian market. It was nothing less than a global objective.

Competition is the key to technical excellence and competitive prices. Nowhere was the competition more intense than in Italy from the late 1970s. But this was not the only reason for the spectacular rate at which this transmission manufacturing industry has grown. Contributing to this growth was innovative and creative ability. Traits such as these are to be found in small companies with work forces between 75 and 150. Hence, the giant international companies of the broadcast world are always on the lookout for such small companies, with a view to their acquisition.

Yet in the case of Italy, the well-established electrical giants in Western Europe failed to see the changes that were quietly taking place in the broadcast transmission industry. These new Italian companies were improving quality and performance in their products, and they had already shown their ability to produce competitively.

With eyes on capturing export markets, these companies began to produce transmission products that were intended to meet the technical standards laid down by European authorities in Germany, Sweden and other

Western European countries. Though it may have seemed audacious to some of the established companies at the time, it was with hindsight the right strategy.

As a result, Italy has captured the initiative in many sectors of the broadcast transmission industry. Specifically, these sectors are: the FM transmitter market at all power levels; VHF and UHF TV transmitters, both solid state and tubed, up to 30 kW; and now the 40 kW IOT transmitter market in Europe.

BIDDING THEIR TIME

True, the Italians have not tried out their skills in more traditional markets, like high-power AM for shortwave and medium-wave broadcasting — markets in which famous companies like Marconi, RIZ, Telefunken and Thomcast are firmly entrenched — but maybe some attempts will come in a few years. After all, who would have dared to be so bold as to predict that by 1993 a medium-sized Italian company, Itelco, would be the first transmitter manufacturer in Europe with a 40 kW UHF TV transmitter, incidentally beating well-established companies like Marconi, Rohde & Schwarz and Telefunken. Yet this is exactly what happened, notwithstanding the advantage that Marconi had being based in the same town as the English Electric Valve Co. (EEV) works, where the EEV IOT tubes are manufactured.

Itelco is one of about 15 Italian transmission equipment manufacturers. Italian

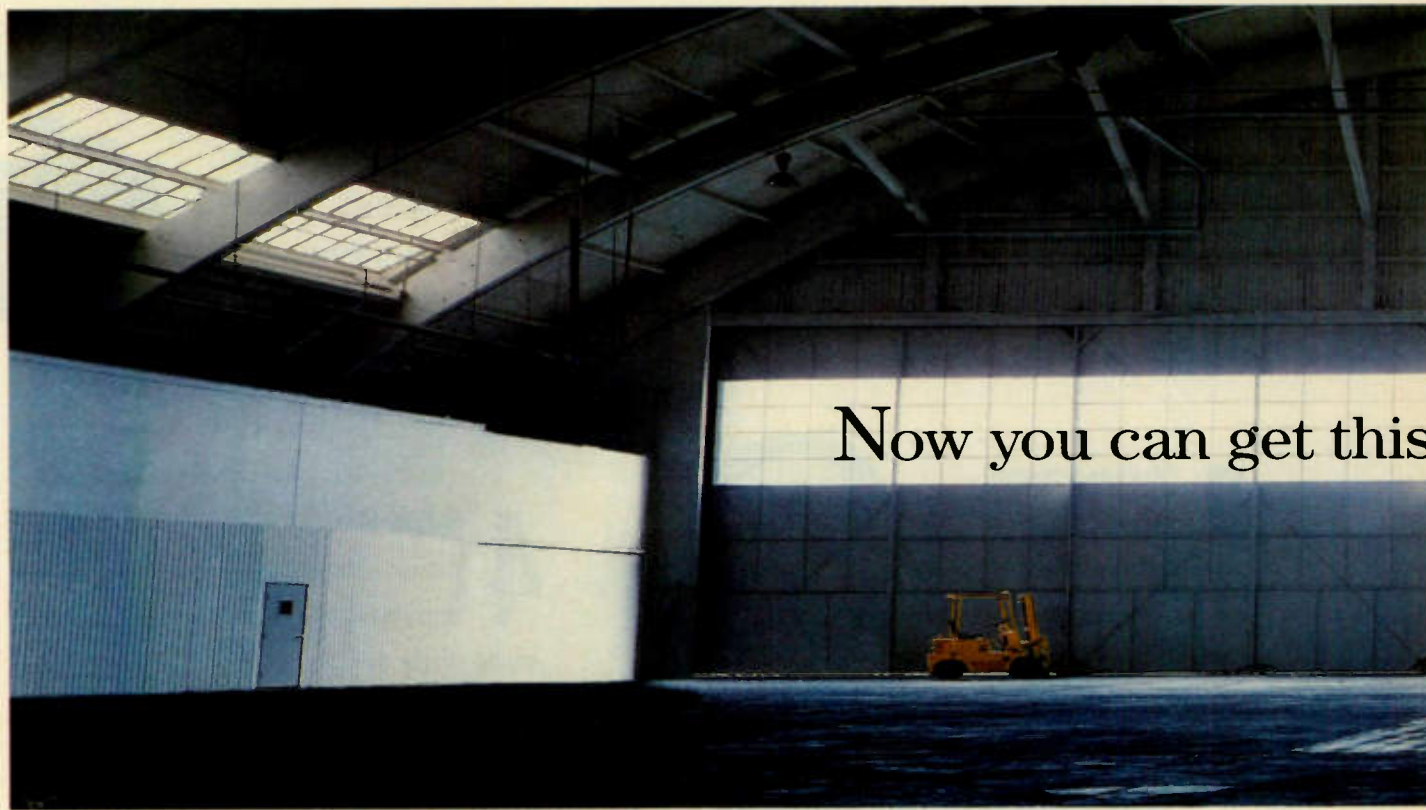
transmitter manufacturers have no great claims on history and antiquity, so maybe they try harder. And it is this desire to succeed — first in high-volume markets for low-power FM, and now in low-volume, high-power markets — that is carrying the industry to greater successes.

Itelco was founded in 1961 with a fairly typical beginning of that era; the new age of electronics leading to the manufacture of low-power HF transceivers. By the time deregulation of Italian broadcasting arrived in the 1970s, the company was well-placed to build low-power VHF FM transmitters. Within the next 10 years, the company had become a supplier of high-power transmitters to RAI, the state-owned broadcaster.

EXPORT GOALS

From becoming a supplier to RAI, which sets for itself some of the highest transmission standards, Itelco secured its next goal: to supply broadcast equipment to other state-owned broadcasters. Evidence of the good relationship that exists between Itelco and RAI is that I experienced excellent cooperation when I requested a visit to RAI's highest powered UHF TV and FM transmitter station on top of Monte Peglia, one of the highest peaks between Florence and Rome. Here the company installed four 10 kW high-power transmitters in a 3 + 1 passive standby configuration in the mid-1980s.

Itelco is located outside the walled city of Orvieto. In 1992, the company won a major



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turnkey project against formidable opposition. This was the project to equip the whole of Portugal with a fourth TV channel "Televisora Independente Do Portugal (la Quatro)." Itelco was the prime contractor with responsibility over a number of major contractors active in professional broadcasting and communications.

That project was handed over on schedule at the same time that Itelco engineers were working on the development of a 40 kW IOT transmitter, the first in Europe. In 1993 Itelco won its first international tender for six T674K 40 kW IOT transmitters to be supplied to Teracom of Sweden. All were to be installed at remote and isolated sites in the uppermost region of Sweden, well inside the Arctic Circle. This location, one of the most hostile environments in the world, proved a good testing ground for the six T674Ks.

The T674K, which was one of the reasons for my visit to Itelco, is an impressive piece of transmitter architecture that meets all the advanced technical standards. It provides an excellent performance with common vision and sound amplification, is suitable for NICAM dual sounds, and the IOT as a tube device is now more or less the preferred universal choice for transmission of HDTV. It may ultimately become the standard tube for high-power HDTV transmission, with the tetrode finding favor at up to 20-30 kW peak sync.

The T674K uses an EEV IOT tube type 7360, which is mounted on its own trolley for easy replacement, though this should arise very seldom. One of the advantages of the IOT over the tetrode is its longer life. Itelco executives had high praise for EEV

IOT tubes, as well as the cooperation EEV provided during the design of the T674K. At present there are no other suppliers for IOT socket replacement.

ATTENTION TO DETAIL

Good transmitters by themselves cannot command success. In my opinion, Itelco's success comes from two more factors. The company's attitude to quality control is uncompromising, with virtually every part of a transmitter fabricated and assembled at Itelco's plant. The second factor is the com-

... the well-established electrical giants in Western Europe failed to see the changes that were quietly taking place in the broadcast transmission industry.

pany structure. Itelco is almost unique in that its president, Professor Fumi, is a scientist and an engineer. In the 1960s, that would have been common. But in the business world of today, it is a rarity.

Where average companies that are run by accountants tend to chase growth and profit, one gets the impression from Itelco that it is in pursuit of technical excellence. I remember learning from an old managing director of mine some 30 years ago, "Build for quality because customers remember quality long after the purchase price has been forgotten."

A yardstick I use in assessing company performance is its reference lists. These tell you all you cannot see; records of every sale

and every customer and, more important, the caliber of customers. Companies do not like to issue such intelligence to the media, though I personally have never been refused. But when a company makes this data available promptly, then it is a sure sign that company has an excellent track record.

Itelco's reference list is more than 99 pages long, plus an additional 50 sheets of updates. An analysis of this data pointed out some spectacular successes. The company exports to more than 60 countries, including 13 in Europe, with customers like

the German Bundespost where type approval is not easily gained.

A more detailed examination revealed 927 pieces of equipment sold to France. For the established manufacturers in France, Germany and the United Kingdom, the bad news is that Itelco is not the only Italian company making inroads into business that two decades ago would have gone to the big manufacturers.

In addition, the company has achieved strong sales in Asia, the Pacific Rim, New Zealand, Australia and Latin America. The company's immediate target is to increase its share of markets in Latin America and has recently set up Itelco USA Inc. with its office in Miami.

Sales to the U.S. have been few in number, but I got the impression that this may be a deliberate policy of not trying too hard to compete with U.S. manufacturers until it has built up a good base of sales in Latin American territories. However, in the rather special case of its IOT transmitters — with which it is the first European manufacturer to compete with Comark, Harris and TTC and the United States — I got the impression that the company would welcome an opportunity to compete. The main stumbling block seems to be the differing standards between Europe and those laid down by the FCC in Washington, D.C.

EFFICIENCY RATING

Itelco is without doubt a highly efficient company with a total staff of 140 and a ratio between engineering (R&D and design) and production of one to four. That is a high investment in skilled engineers, scientists and technicians.

The turnover for last year was 30 billion lire — about US\$30 million. It is the only Italian company with a high-power IOT transmitter. Its other products include solid state and tubed VHF FM and solid state and tubed UHF/VHF up to 30 kW.

In terms of technology rating, the company is generally rated as the top Italian company. Yet there are another half dozen top-caliber companies that make up this galaxy of talent, and they continue to increase the range and depth of their transmission products. ■

James Wood is a consulting engineer and a writer in Berkshire, U.K. Contact him at telephone +44-344-54938.

kind of storage space in a video disk recorder.

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larger amounts of video when editing, layering or creating special effects. So you don't have to use VTRs as your source. Which will save them a lot of wear and tear. And save you a lot of money. Not to mention hassles.

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Motion is the Key to Field Rates

By Accurately Displaying Moving Objects, Flicker Problems Should Take Care of Themselves

by John Watkinson

VIDEO WATCH

Today's PAL, SECAM and NTSC transmission systems use different modulation schemes to convey color information. But as far as the portrayal of the moving image is concerned, they are virtually identical, as all three use a 2:1 interlaced raster scan at 25 or 30 frames per second.

These frequencies were chosen using flicker elimination as the criterion. 50 Hz is marginal and the flicker is obvious to a visitor from 60 Hz countries, although you get used to it. In my view, neither field rate is good enough because flicker elimination is the wrong criterion upon which to select a picture rate. Instead, picture rate should be selected for motion portrayal accuracy, and if this is done correctly, the flicker will look after itself.

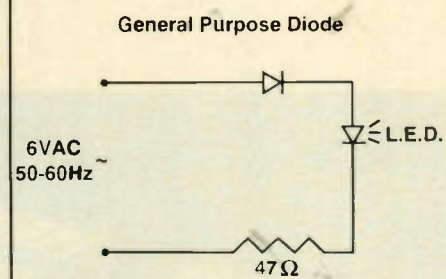
OBJECTS IN MOTION

On still pictures, the only criterion is flicker, but as soon as there is motion, temporarily sampled systems such as film and video reproduce a series of images in different places. If these are too far apart, they are seen as multiple images rather than as motion, an effect we call judder. Judder is worse on motion picture film because the sampling rate on the time axis is only 24 Hz, but it is still pretty bad at 50 or even 60 Hz.

It is quite simple to perform your own motion portrayal experiment. Figure 1 shows that if a low voltage at 50 or 60 Hz AC is available from a transformer, you can half-wave rectify it with a diode and then drive an LED so it flashes at supply frequency. When it is still, the flashing is invisible and the LED appears to give out a steady light. However, if the LED is moved progressively faster across your field of view, a point will be reached at which the individual flashes can be detected. This is the speed at which the frequency is no longer adequate for motion portrayal, and it is surprisingly slow.

The use of interlace produces a strange vertical/temporal sampling spectrum. In order to return to the baseband, a triangular

Figure 1. — Simple flashing LED appears continuous when stationary, but when moved with respect to the retina the flashes are visible.



Strength in Numbers.

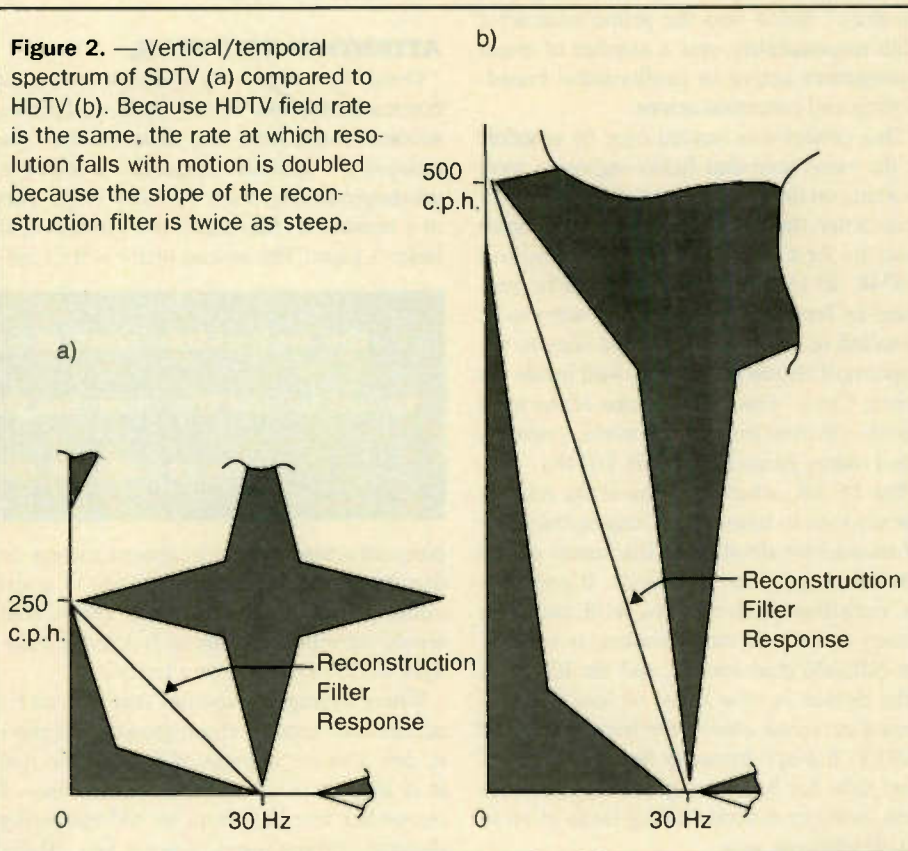
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Figure 2. — Vertical/temporal spectrum of SDTV (a) compared to HDTV (b). Because HDTV field rate is the same, the rate at which resolution falls with motion is doubled because the slope of the reconstruction filter is twice as steep.



lar filter is required (as shown in Figure 2a). In the top left corner of the triangle, you can have high vertical resolution if nothing moves, whereas in the bottom right corner, you can have portrayal of rapid motion if vertical detail is discarded.

This is one reason why television pictures are so unrealistic. Although they claim to display moving pictures, there is only reasonable resolution on still scenes. As soon as anything moves, the resolution drops like a stone.

This is not the case in real life. True, the eye cannot resolve fine detail in an image moving relative to the retina, but it overcomes the problem by tracking. When the eye tracks a moving object, the image is made stationary on the retina and the resolution returns. In real life you can read the

license plate of an automobile traveling at quite a high speed in this way. Trying to do the same via a television system is impossible. Returning to our flashing LED experiment, if you stare at the LED and follow it as it moves, the flicker is invisible because it is stationary with respect to the retina.

QUANTUM LEAPS

In my view, any future television system ought to be a significant improvement over what went before. In audio we are in the fourth generation. Cylinders, 78 rpm disks, microgroove disks and then compact discs were each a significant improvement on what went before, and there is no doubt that the state of the art in audio reproduction is extremely realistic. By comparison, television is still first-generation and is primitive and unrealistic.

The improvements in audio reproduction came about because a careful analysis was made of human hearing and steps were taken to remove any detectable impairment. It is indeed strange that although we are well-served with studies of psychoptics, the conclusions are largely ignored in advanced television proposals.

No one would disagree that existing Standard Definition Television (SDTV) is imperfect and can be improved. However, the change to a better system will require an enormous investment in equipment by program makers, broadcasters and viewers alike. Such changes cost a great deal more than is realized because of the practical difficulties of switching from one way of working to another. It seems to me that unless a new system delivers a quantum leap in picture quality, it is not worth bearing the conversion cost, and we will be better off continuing to use what exists.

The high definition systems I have seen do not deliver that quantum leap and barely count as a second-generation of television systems. If we wish to design a true second-generation television system, the areas in which it should be judged include: color fidelity, motion portrayal, dynamic resolution and visibility of artifacts.

Dynamic resolution is defined as the

apparent resolution with which a moving image is portrayed. As television is supposed to be about moving pictures, this is surely reasonable. When the human eye tracks a moving image, it is brought to rest on the retina and the sharpness we perceive is the dynamic resolution. Of course, if the dynamic resolution is good enough, the static resolution will automatically be acceptable.

When experimental high definition television systems were first built, two changes were made in comparison with SDTV. First, the aspect ratio of the picture was changed to 16:9. Second, the number of lines in the picture was approximately doubled. But strangely, the field rate remained the same.

UP CLOSE

The accompanying publicity suggested that new widescreen TV sets would be viewed from much closer distances than conventional sets. Thus the subtended angle of the screen width would increase by a large factor — once because of closer viewing, once because the aspect ratio is wider.

My first reservation about such systems is that the increase in subtended angle moves areas of the picture into the peripheral viewing field, which is more sensitive to flicker.

My second reservation is illustrated in Figure 2b. This is the vertical temporal spectrum of an interlaced HDTV system. If Figure 2b is compared to Figure 2a, it will be seen that the static resolution is potentially doubled by the increased number of lines. However, the ability to portray motion has not increased at all. Even worse, the rate at which dynamic resolution falls with motion is twice as bad. This is unfortunate, as the wider screen gives the eye longer to track motion and observe how poor the resolution is.

Thus in practice, HDTV systems using the same field rate as SDTV systems have a dynamic resolution that is no better. The only improvement I can see is that the raster scan is rendered invisible. Motion artifacts and judder are worse because of the closer viewing distance.

This is hardly the quantum leap we are looking for in a future television system. The raster can be rendered invisible on existing television systems simply by installing a display upconverter. Subjectively, upconverted 16:9 SDTV and real HDTV are the same.

DESIGN CRITERIA

HDTV systems that simply increase the number of picture lines without increasing the picture rate are unsatisfactory. Increasing the aspect ratio and reducing the viewing distance without improving flicker and motion portrayal performance is not good enough. Established theory predicts this and it is borne out in practical observations. Any future television standard should be designed using the firm basis of psycho-optics rather than ad hoc or empirical approaches that have so far given poor results.

Tests with downconverters and upconverters show that HDTV material passed through an SDTV channel are almost indistinguishable from the original. This illustrates that increasing the number of lines in the channel is probably not a priority.

The improvement needed is not in static resolution but in dynamic resolution. Dynamic resolution is improved by increasing the picture rate. If the existing static resolution is kept, no increase in the number of lines is needed, so there is

tum leap into formally designed realistic television, then we would be better off keeping what we have and making it work properly. In my experience with NTSC in the U.S., the picture seen on a monitor from D-2 or D-3 tape is quite good but becomes unrecognizable by the time it reaches the screen of a domestic receiver.

Comparing PAL pictures between studio and home in Europe does not reveal such a serious quality loss. And off-air SECAM in Moscow can be nearly as good as the studio picture.

The U.S. could bring about a dramatic

increase in picture quality by enforcing signal quality standards in transmission and building (or importing) better receivers. ■

John Watkinson is an independent consultant in digital audio, video and data technology and is the author of seven books on the subject, including The Art of Digital Audio and The Art of Digital Video; acclaimed as definitive works. He is a Fellow of the Audio Engineering Society and is listed in Who's Who in the World. He regularly presents papers at conventions of learned societies and has presented training courses for students, broadcasters and facilities around the world. He is currently writing a book on video and audio data reduction.

... HDTV systems using the same field rate as SDTV systems have a dynamic resolution that is no better.

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Forging Ahead to a Component World

SOMEWHERE OUT THERE You might not have noticed that the Nasograph and the Breathometer are two completely different instruments. They are both fake, but they are different kinds of fakes. Bear with me. At some point, this month's column will get around to talking about color encoding.

Remember the Golden Age of pseudo-scientific TV commercials? If memory serves

(but you cannot get good service these days), there was a headache remedy that showed how its formula got rid of the hammer clanging on the anvil in the front part of your brain. Then there was one about sending your sinuses to Arizona, which probably would have left your face pretty caved-in if you did not already live in the Grand Canyon State.

My two personal favorites have got to be



by Mario Orazio

the Nasograph and the Breathometer. I remember the Voice of Authority booming:

"This Nasograph shows no air coming through the victim's left nostril," when the screen showed a piece of glass getting fogged by one nose hole and not the other. The Breathometer was even more scientific. A volunteer ate an onion, sending the needle into the danger zone; then he tried some breath freshener, and the needle retreated.

Did any rhinologist ever own a Nasograph? I think not. There is not a lot to be learned from holding a piece of glass up to someone's nostrils, except maybe whether the patient has a bad case of death or not. Also, on account of people almost invariably breathing more through one nostril than the other, such a result does not mean you're a victim of anything.

But what am I complaining about? The Nasograph worked. Stick a cool piece of glass in front of someone's breath, and you get fog. The Breathometer was something else entirely. A bad breath detector? Give me a break.

This might seem about as ridiculous as a ring-around-the-collar commercial, but when I learned that Snell & Wilcox was going to introduce a BBC-developed composite compatible component encoder into the NTSC market, I suddenly remembered the Nasograph and the Breathometer. I hope I am wrong, but I figure the PAL version of that encoder to be like the Nasograph and the NTSC version like the Breathometer.

I guess I should start by defining some terms. NTSC, as we all know, stands for Never Twice the Same Color; SECAM is Something Essentially Contrary to the American Method; and PAL was supposed to be Peace At Last. I am not making this up; I just hope I have quoted the late Joe Roizen correctly.

THE COLOR OCHRE

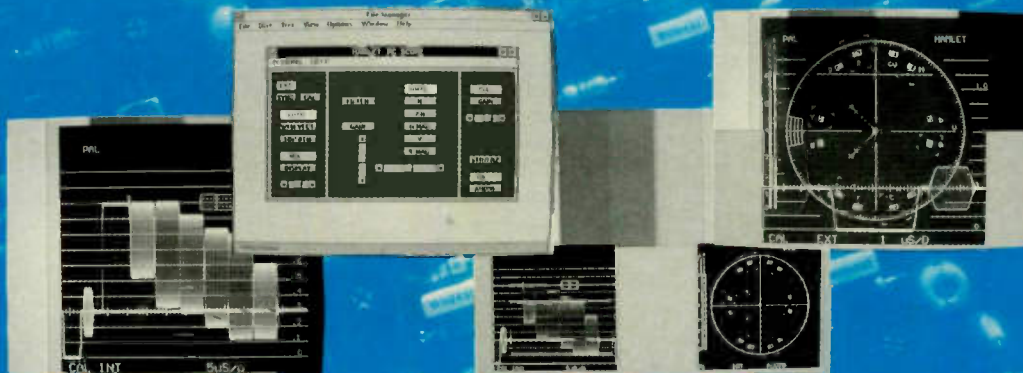
Personally, I wish his color system, NUT-SEQUAMIR — which, according to my flawed biochemical database, used as its tertiary colors heliotrope, ochre and vermilion (HOV) — had won the color wars. Again, I am not making this up; there was an article about it in IEEE Spectrum.

Anyhow, whether you prefer RGB or HOV, the function of the color encoding systems was to allow three different video signals (the color primaries) to be transmitted in the space of one channel — the first video compression systems (or the second, if you include interlace). Like many other people, I have a few complaints for the NTSC experts (mostly on the sound carrier interleaving that left us with a field rate of 29.97), but, all-in-all, encoded color broadcasting has done a good job for more than 40 years.

When it comes to PAL, there are many different versions. In the Azores, there is PAL-B. In China, PAL-D. Whatever PAL they broadcast in Monaco is PAL-G. In Belgium, you can watch PAL-H. In Ireland, appropriately, they transmit only in PAL-I; in Guinea, less appropriately, they use only

(continued on page 19)

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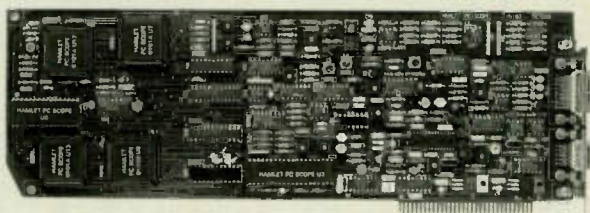
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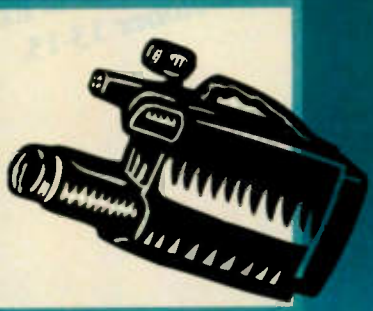
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For more information, contact the company in Australia at +61-2-906-4563; FAX: +61-2-437-4884, or circle **Reader Service 9**.

DECODER BOARD

The DRT1 PC add-on board from Vitec Multimedia decodes MPEG 1 video and audio digital signals for professional production applications in accordance with ISO standard IS 1172.

One minute of full-screen digital color video at 30 Hz can be stored on only 8 MB of hard disk memory or CD-ROM. The board supports three simultaneous video output formats: RGB synchronous, S-Video (Y/C) and dual in PAL/NTSC.

For more information, contact David Askey at MIE Systems in the U.S. at telephone +1-404-921-6167; FAX: +1-404-921-4302, or circle **Reader Service 82**.

MASTER CONTROL SWITCHER

The Saturn master control switcher from BTS uses individual processors for analog video, analog audio, serial digital video (composite or component), and AES/EBU audio, without need to change the processor as a user upgrades from composite digital to component digital.

Saturn can be upgraded as a facility's needs change. Up to 15 channels, analog or digital and/or a combination of both, can be controlled from one or more control consoles.

For more information, contact the company in Germany at +49-6151-808539; FAX:

+49-6151-808359, or circle **Reader Service 73**.

WEATHER GRAPHICS SYSTEM

Accu-Weather has introduced the UltraGraphix-32 Weather System. This high-resolution weather graphics system combines Pentium 586 processing, a Windows operating system and the multimedia technology of CD-ROM.



With the UltraGraphix -32 System, television stations can take advantage of Accu-Weather's complete line of 32-bit graphics, including national, regional and local weather maps; 4-D and standard projection satellite images and loops; NEXRAD Doppler radar images and loops; temperature band maps and daily features.

For more information, contact Sheldon Levine in the U.S. at +1-814-234-9601; FAX: +1-814-238-1339, or circle **Reader Service 100**.

AMPLIFIERS

ATI has added three IHF-to-PRO amplifiers to their Nanoamp series: the BI100 stereo bi-directional, the BU400 four-channel balanced to unbalanced, and the UB400 four-channel unbalanced to balanced.



These amplifiers provide a choice of configurations for connection and use of semi-pro mixers, cassette or R-DAT decks, equalizers, VCRs, ENG recorders, CDs and power amplifiers.

Gold-plated RCA-type phono jacks connect to the IHF world and rear-mounted XLR-type connector interface with the PRO side.

For more information, contact the company in the U.S. at +1-215-443-0330; FAX: +1-215-443-0394, or circle **Reader Service 25**.

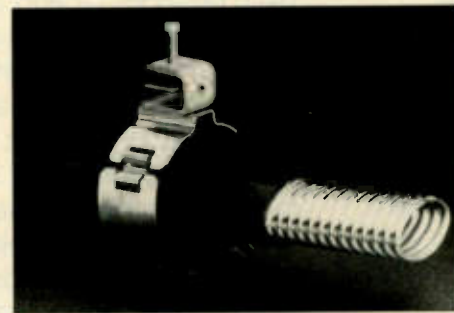
CCD CAMERA

The portable TTV 1657 CCD camera from Thomson Broadcast offers users both 4:3 and 16:9 formats. The TTV 1657 also features new special digital pixel correction, two filter wheels (local and remote control), and advanced exposure control.

For more information, contact the company in France at +33-3420-7000; FAX: +33-3420-7328, or circle **Reader Service 7**.

BROADBAND WAVEGUIDE

Radio Frequency Systems Hannover has added the E 58 broadband waveguide to its line of Flexwell waveguides.



The operating frequency leading to the range of 4.4-6.2 GHz covers both the 4.4-5.0 GHz and the 5.6-6.2 GHz bands. Together with the microwave broadband antenna, this system feeds two frequency bands to one single waveguide, supplying one single microwave antenna.

Only one antenna has to be mounted to the mast and only one waveguide has to be installed instead of two of each.

For more information, contact Rolf Kopke in Germany at +49-511-6761; FAX: +49-511-676-3583, or circle **Reader Service 27**.

CAMCORDERS

Sony has made available two camcorders that feature digital signal processing (DSP) to enhance the quality and performance of field acquisition.

The DVW-700 is a digital Betacam camcorder, while the BVW-D600 is an analog Betacam SP camcorder that incorporates

full DSP capabilities in the camera head.

The DVW-700 was designed for high-end EFP applications to provide the digital post production suite with 4:2:2 component digital images.

The BVW-D600 features digital signal processing, automatic set-up capabilities, memory card programming, menu control and CCU capability.

For more information, contact your nearest Sony representative.

MONITOR DE FORMA

Diseñado para el técnico consciente de costos, el monitor MM-400 de Magni Systems Inc. brinda un método simple y acertado de ajustar los niveles de cámaras antes de empezar una toma, comprobar los correctores de base de tiempo y la fidelidad de los colores al editar. El MM-400 convierte a la información de forma de onda o indicación de fuerza a una señal de video estándar que a su vez puede ser presentada en una pantalla de video o encaminada a cualquier parte de a instalación de video. También incorpora un indicador avanzado de fase SC/H y marco de color.

El MM-400 dispone de tres conexiones derivadas de entrada que aceptan tres señales compuestas, o una señal Betacam, M-II o RGB. Un desfile único de forma de onda de una señal analógica componente contiene toda la información necesaria para verificar las amplitudes y el tiempo entre pistas en las tres pistas.



No es necesario tener indicadores complejos ni pruebas especializadas para el monitoreo de video analógico componente. En cualquier tipo de instalación, sea grande o pequeña, se puede usarel MM-400 para vigilar el movimiento de las señales.

Para más información, comuníquese con MAGNI Systems Inc. en los E.E.U.U. al 503-626-8400; facsímile: 503-626-6225; o marque el **Reader Service 38**.

TRANSMISORES

I.A. Electrónica ofrece una línea completa de equipos para televisión por aire, aptos para estaciones no atendidas, desde 2 W hasta 10 kW en VHF y UHF, bajo normas internacionales (FCC y CCIR) y para sistemas de codificación color NTSC y PAL.

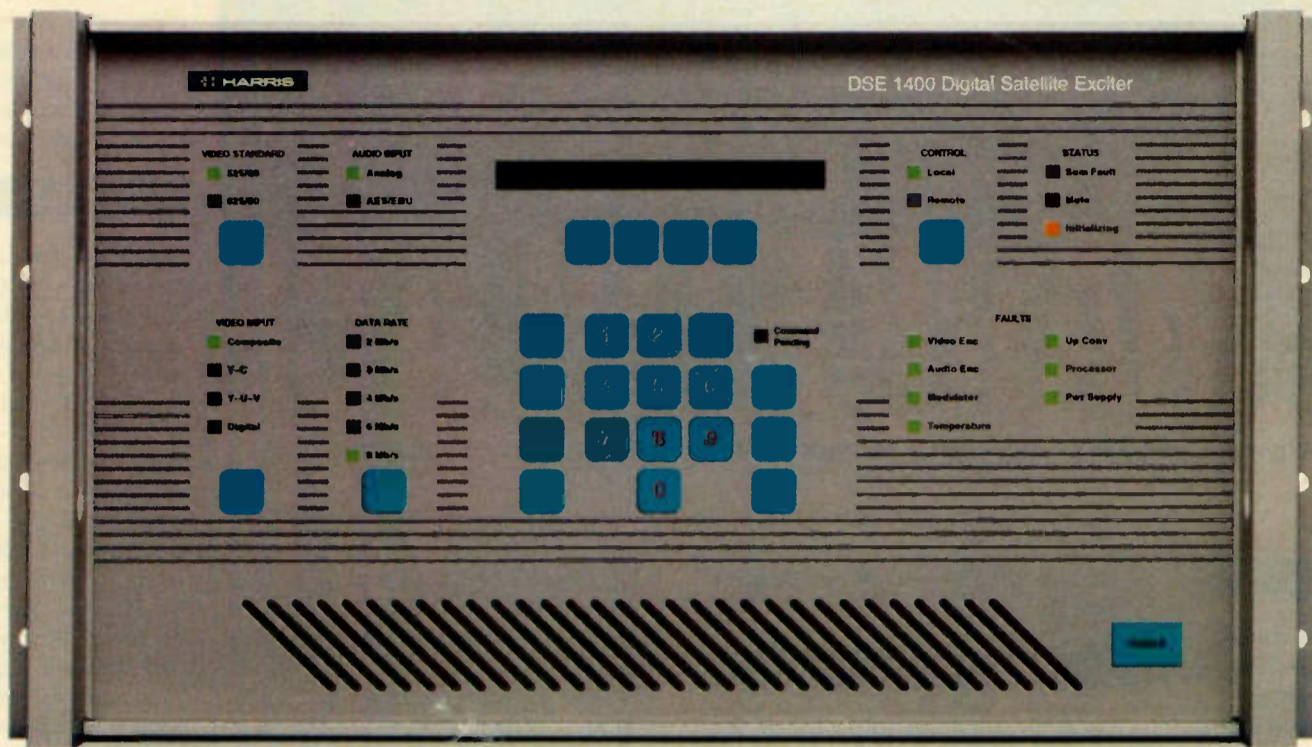
Los equipos están configurados con una etapa básica: modulador o conversor, etapas amplificadores de estado sólido hasta 1 kW, y etapa válvula de salida para mayores potencias.

Además de tener un diseño compacto, los transmisores de I.A. Electrónica incluyen: facilidades para telecontrol y telemedición, construcción modular en unidades enchufables, control automático de ganancia de amplio rango dinámico, filtro SAW, doble conversión con FI normalizado (repetidor), modulador en FI (transmisor), 10 kW válvula cerámica, y 1.000 vatios estado sólido.

Para más información, comuníquese con I.A. Electrónica en Córdoba, Argentina, al teléfono: 51-559651; facsímile: 51-559651; o marque el **Reader Service 130**.

Send new product press releases along with black and white photographs to: Marketplace Editor, P.O. Box 1214, Falls Church, VA 22041 USA

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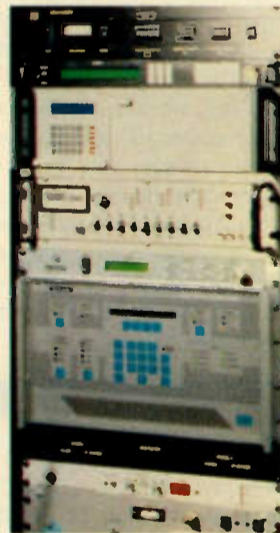
With this integrated Digital Satellite News Gathering (DSNG) system, you can access a wider range of transponder channels, achieve lower transponder costs, use less transponder bandwidth and less HPA power, get improved signal quality, and have simpler, more reliable operation. You can also save space and money by using a smaller antenna. The innovative design of the DSE 1400 Satellite Exciter provides the latest MPEG-2 video and audio compression standards with advanced motion compensation and digital coding algorithms in a compact video encoder, combined with QPSK modulation and



frequency conversion in a single, rugged, 6RU high unit. The DSR 1400 Integrated Receiver Decoder (IRD) provides L-band downconversion, demodulation and decoding. These single units require less space than separate 3-unit configurations, and are easily installed or retrofitted in SNG vehicles or fly-away terminals.

Each part of this Harris Digital Satellite TV System is designed for simple, error-free operation. All commands are entered from a single, user-friendly keypad, and are confirmed by colored LEDs. Routine set up requires no subsystem adjustment. The MPEG-2 encoder with I, P and B frames, modulator and frequency converter automatically establishes, maintains, and displays the required operating status.

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tional savings, which then continue, year after year.

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CONTINUED FROM PAGE 16

Post's Future is Component

PAL-K. Brazil is the classic PAL-M country, and Argentina is PAL-N. Clear to you? If it is, that makes one of us.

Maybe some other month I will get around to ranting about international transmission systems. This month I want to concentrate on color encoding. So let me try to simplify the above. Argentina does not produce or post in PAL-N, so that is one we do not have to worry about. PAL-M is the only PAL with 525 scanning lines per frame. All the others (and just about everyone in the world transmitting SECAM) use the same PAL encoding system for production and post: 625-line PAL. (Actually, there is a true PAL and a fake PAL, but the same thing happens in NTSC, and I do not feel like discoursing on the famed 25 Hz offset just now.)

The 625-line PAL has a color subcarrier frequency of 4.43361875 MHz, give or take a hertz. NTSC, except for some bizarre concoction Tektronix rigged up for Barbados once, has a color subcarrier of 3.579545 MHz.

I know it is now painfully obvious to some of you why I equated PAL with the Nasograph and NTSC with the Breathometer, but for those who are still lost, allow me to proceed.

FSC-AL ANALYSIS

In the beginning, there was NTSC, and it was good. Actually, it was pretty rotten, but it was the only thing available. Then came recording, the other encoding systems, color recording and digital TBCs, in roughly that order. In the designs of TBCs, a unit of frequency called the fsc was developed. An fsc was the frequency of the color subcarrier: 3.58 MHz for NTSC, 4.43 for PAL.

Four times those numbers had some interesting characteristics, and maybe someday I will verbally drool over them. For now, I just want you to remember the numbers: 14.3 for NTSC, 17.7 for PAL. And for those of you who have been living in a space-time singularity until now, I would like to offer Harry Nyquist's (actually John Shannon's) sampling limit: The highest frequency that can be carried without aliases in a digital system must be less than half the sampling frequency.

For more information on color encoding, I highly recommend Snell & Wilcox's own book, "The Engineer's Guide to Decoding & Encoding," by John Watkinson, who has probably forgotten more about the subject than the rest of us combined ever knew. Said tome is supposed to cost \$20 in the U.S. or 12.50 Sterling in the U.K., but I imagine it can also be had for a show of interest at Snell.

Return with me now to those thrilling days of yesteryear, the 1980s. The Reagan/Thatcher decade began with the introduction of a mess of devices designed to replace 16mm film for newsgathering. They had names like Betacam and CV-1 and Hawkeye and Quartercam and Recam. What seemed important at the time was that they were camcorders. What is important today is that they were component color recorders.

Up until that moment, video recording was

either direct color or heterodyne color. The less said about the latter the better, but direct color had its flaws, too. The color encoding process had three big problems (not counting recording moire), as shown in Table 1.

Cross color made wearing striped shirts an instant indication of being a video novice. When the stripes fell into the frequency range of the color subcarrier, TV sets interpreted them as color. A decade earlier, in the swinging '70s, the flashing colorful patterns might have been "like far out, man," but in Ron's and Maggie's '80s they were just plain ugly.

Cross luminance was the opposite: color being interpreted as detail. Edges between saturated colors got dotted — crawling dots, hanging dots. It was a mess.

As for the reduced chroma bandwidth, tests conducted in the 1950s indicated we could not see that. Of course, there we were in the 1980s relying on tests conducted in the 1950s. It was a lot like today, the 1990s, when we are relying on a Kell factor based on subjective testing in the 1930s.

CLEANING UP COMPOSITE

At the beginning of the '80s, we got analog component recorders, and by the second half we had digital component recorders. The great unwashed video masses finally got to see what unmessed-up pictures looked like. So Yves Faroudja showed us that we did not really have to mess them up all that badly in composite encoding, either.

The digital component recorder that came out in the second half of the '80s was the

Table 1. -
The Three Big Problems Of Color Encoding

Problem #1 - Cross Color
Problem #2 - Cross Luminance
Problem #3 - Reduced Chroma Bandwidth

D-1, and it recorded CCIR-601 signals sampled, by global agreement, at 13.5 MHz. Everyone in the world was supposed to switch to D-1, but they did not because it was too expensive. And so D-2 came out. Remember our old friend 4fsc? That is what D-2 records.

I will not get into explaining how D-1 was too expensive because the people who did not buy it insisted on the bells and whistles that made it too expensive. No, sir. You will not hear a peep about that out of me. You also will not find me complaining about how we had a glorious chance to switch to a global component standard, but we let it pass by. The only thing I want to comment on in the next paragraph is a comparison of sampling rates.

D-1 is 13.5 MHz, whether it operates in 525-line or 625-line modes. D-2 (and, later, D-3) are 4fsc. That is 14.3 MHz in NTSC-land and 17.7 where there is PAL. Now, in real terms, there is not much difference between 14.3 and 13.5. Remember, the Nyquist limit cuts those numbers in half, so I am talking about differences between 7.2 and 6.8, not counting filter slopes — 400 kHz, or about 30 lines worth of horizontal resolution in 525-land.

But the difference between 17.7 and 13.5 in 625-land is rather significant. Component color may offer freedom from artifacts, but a PAL D-2 or D-3 machine

can, in the grand scheme of things, offer another 2 MHz of bandwidth plus.

Nature abhors a vacuum, and video engineers cannot stand to leave well enough alone, so those eggheads in Kingswood Warren (the BBC's home in the country for the hands-off-impaired) came up with a nifty concept.

Using 4fsc equipment, they encoded a component color signal in a way that allows it to be compatible with conventional encoded equipment, but with additional chrominance and luminance information

encoded into the extra bandwidth between 4fsc and D-1 so that the signal can be converted back to the component domain with minimal loss. Snell & Wilcox sells the product as com3 — composite compatible component. I call it a Nasograph.

Please do not think I am ungrateful. I think the BBC did a great job. They have developed a best-of-both-worlds system. It lets you carry component characteristics through a composite plant, to which I say, why? Why are we building new composite plants? ■

Mario Orazio is the pseudonym of a well-known television engineer who wishes to remain anonymous. Send your questions or comments to him care of TV Technology or drop him a note on e-mail 581-6729@MCIMail.com.

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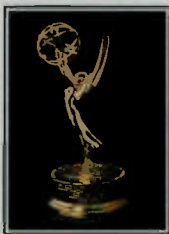
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USER REPORT

JVC Scores in World Cup Games

by Lawrence Frost
President

Kaleidoscope Camera Control

SHEPPERTON, England

More than 32 billion people throughout the world tuned in to the World Cup soccer games this past summer, and for the first time many countries got to see and hear the excitement at home through their country's own familiar television commentator. Kaleidoscope Camera Control collaborated to make this happen with one of the smallest high performance cameras by JVC.

Held in the United States for the first time, the 1994 World Cup games attracted cumulative television viewers numbering in the billions. In addition, there were 3.5 million spectators — including 1.5 million from outside the United States.

The tournament included 52 games between 24 participating countries in nine cities across the United States. Always looking for innovative ways to broadcast sports, Kaleidoscope developed a distinct system that delivered a new perspective for the television audience for these games and future sport events.

CAMERA RIGS

Working closely with Fletcher Chicago's head of sports, Dan Grainge, we rigged more than 80 remote-control systems featuring for the first time the "COM-CAM," a combination of Kaleidoscope's "MICROSHOT," a small professional remote-control camera

head, and JVC's new KY-F55U 3 CCD mini-camera with zoom lens.

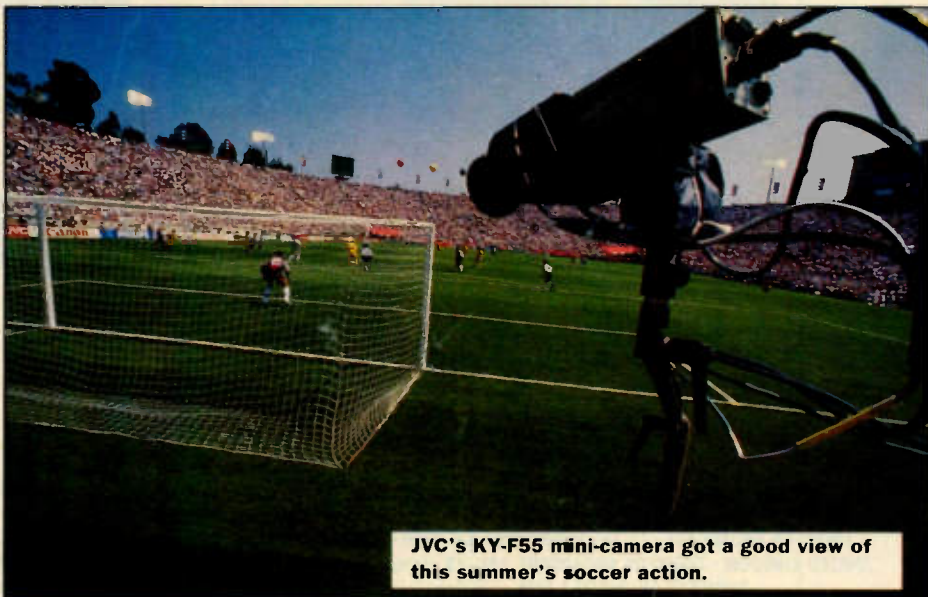
Mounted on a sportscaster's desk, the "COM-CAM" allows broadcasters to shoot the commentators and then pan around to capture the action on the field. Commentators have become personalities in many countries and have developed a rapport with their respective audiences.

It is not enough for television viewers to just hear their voices; they want to see them and their guests. However, the problem has been that there is just not enough space in the broadcaster's booth for a camera crew.

For example, the French had a basic 4-

foot x 6-foot television area that was obviously too small for a conventional camera. With our remote pan and tilt system and JVC's compact camera set up on a desk, the French broadcaster was able to give the viewers both shots of himself and the "on field" action. The system was set up so that any non-technical person could learn to use it easily. The camera could also be controlled by an operator in a truck, which in some cases was more than 3,000 feet away.

In addition to the "COM-CAM," the "MICROSHOT" was mounted in each goal with the KY-F55 to catch all the exciting goal-mouth action. For both of these unique uses,



JVC's KY-F55 mini-camera got a good view of this summer's soccer action.

we needed a camera that was small and unobtrusive, yet provided high-quality pictures. We felt the JVC KY-F55 cameras offered the best level of quality to achieve this.

While attending this year's NAB convention in Las Vegas, we met with JVC and were not only impressed with the KY-F55, but also with the enthusiasm and helpfulness of the JVC personnel. The employees worked closely with us from conception to completion to ensure that everything worked well.

FUTURE HAPPENINGS

The overwhelming response received from the broadcasters at all of the venues demonstrated that the new "COM-CAM" system is the wave of the future in sports coverage. While each venue was rigged with the system, not all the broadcasters had one; but when they saw its capabilities, they wanted it for their respective countries. Unfortunately, it was too late for us to supply them with systems for World Cup, but future events will no doubt see greater use of the "COM-CAM."

The compact camera, weighing in at 1.1 pounds, helped to capture on video the critical moments that only a camera of this size and flexibility can capture. The KY-F55 offers 750 lines of horizontal resolution and a 60 dB signal-to-noise ratio.

It delivered outstanding image quality because of its three high-density, 1/3-inch micro-lens interline transfer (IT) CCDs. A host of automatic features, such as built-in, full-time auto white balance and auto level control with extended electronic iris, assure perfect-tracking, real-time white balance and gain over a wide range of changing lighting conditions.

These features allowed the KY-F55 to pan from the ultra bright playing field to the

(continued on next page)



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USER REPORT

NJN Taps Frezzi Solar Charger

by Curtis W. Fissel II
Chief News Photographer
New Jersey News

SIBERIA, Russia

New Jersey Network (NJN) is the primary source for news, public affairs and Public

CONTINUED FROM PAGE 24

JVC At World Cup

darker commentator's booth without changing neutral density or color correction filters.

The "COM-CAM" was a big hit at World Cup '94. By working closely with JVC and Fletcher Chicago, we were able to provide the best in service and equipment to broadcasters from all over the world. Based on its performance and the great response from broadcasters, it will certainly be seen in additional applications at other sporting extravaganzas. ■

Editor's note: Lawrence Frost is president of Kaleidoscope Camera Control, a British company that designs and builds remote control camera systems.

The opinions expressed above are the author's alone. For further information, contact JVC in Japan (telephone: +81-426-60-7560; FAX: +81-426-60-7569), or circle Reader Service 71.

Broadcasting Service programming for the state of New Jersey in the U.S. NJN's documentary unit focuses on topics nationally and worldwide that relate to the "Garden State."

One of these programs recently brought me to Siberia for a documentary on the Muraviovka nature preserve.

When preparing for a documentary shoot, I put together a basic shooting package (Betacam, microphones, lights, etc.). Specific equipment is added or deleted after discussions with the producer and engineering staff.

CHARGE OPTIONS

Having traveled to Russia and the former Soviet Union before, my primary concern was having several different options for charging camera batteries (NJN uses NP-1s and equivalents, as well as Anton Bauer Pro-Pac 14s). Power outages, fluctuating voltages and power surges are situations that have to be taken into consideration.

For this assignment, Siberia conjured up images of frozen tundra and forced exile. What I found was vastly different — a beautiful country with acres of land as far as the eye can see. It is very similar to the vast prairies of the United States and contains an extraordinary variety of flora and fauna.

The documentary was about several groups of New Jersey teachers who were invited to Muraviovka, Russia's only private nature reserve. The teachers went there

to learn about endangered species of Oriental White Storks and Red-Crowned and White-Naped Cranes. These birds, as well as other rare species, breed and nest in the Amur River basin on the border between Russia and China.

Additionally, we documented the teachers' interaction with Russian educators and students, and the efforts that went into bringing a broader awareness of this fragile ecosystem to its human inhabitants.

After the first planning session, it was clear that electrical power was not going to be readily available. We would be camping for eight days at Muraviovka with the nearest town located several miles away. Arranging transportation and finding a place to charge batteries in such a remote area could have been an anxiety attack in the making.

During the planning stage, a representative of Frezzolini Electronics, a camera and lighting products manufacturer in the U.S., introduced us to the company's 16 V/1.8 amp Solar Cell Panel.

SOLAR POWER

Siberian winters are legendary, but in the summer temperatures are warm and the days are long. These were ideal conditions for using the "Frezzi" panel to charge the 13 NP-1s and two Pro-Pac 14s I had brought. It should be noted that I also brought several trickle chargers and an Anton/Bauer Quad charger. Out of all the chargers on this shoot, the Frezzi Solar Panel was the

most valuable.

The panel, with the NP-1 and Pro-Pac 14 cables, weighed less than 51 pounds and folded up to the size of a thin notebook. We took enough batteries to initially let us shoot and then set up a charging cycle.

The panel was simple to use. The most important element for the panel's successful use is direct sunlight. I placed the panel on a set of Super-stix tripod legs, with an O'Connor fluid head. As the sun would track across the sky, the panel could be moved and then locked down for ideal exposure. It took two-and-a-half hours to fully charge the NP-1 types and around six hours to charge the Pro-Pac 14s.

The only area of improvement is that the panel does a direct feed to the battery, and overcharging could be a problem if the unit is not monitored. An in-line protector would be helpful.

We spent 10 days shooting in Siberia, and we used the solar panel on all but three days. Pound for pound, it was the most useful accessory for charging that I carried. For remote shooting, where use of a generator or other electrical power sources is not practical, the Frezzi panel is the answer. ■

Editor's note: Curtis W. Fissel II is a graduate of the Art Institute of Pittsburgh. He has been New Jersey Network's chief news photographer since 1982. He is a ANAS member and was recently nominated for a New York Emmy for his role as producer/cinematographer on a documentary about the Battleship USS New Jersey.

The opinions expressed above are the author's alone. For further information on the Frezzi Solar Panel, contact the company (telephone: +1-201-427-1160; FAX: +1-201-427-0934), or circle Reader Service 74.

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Video sync gen kit, will unscramble any analog video signal if color burst in present, must be assembled, \$100 + shpg. G Dunn, No Cal News, 5383 Willow Lake Ct, Byron CA 94514. 510-516-0299.

JVC X1 3-chip camcorder, new in box, \$3500. E Stevens, Malvern PA. 610-889-9676.

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Sony VO-5850 3 years old, 3/4", 200 hours total, \$3200/BO. G Allen, Rainbow Video, 314-894-5536.

Sony BVW-35 SP port Beta SP deck, excellent condition, lw hrs, soft case, 26-pin cable, \$7500. D Watson, 5215 Sepulveda Blvd #23E, Culver City CA 90230. 310-390-4246.

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Sony VO-6800 3/4" port field deck with PortaBrace, low hours, \$1100; Sony BVU-50 3/4" record only port with PortaBrace & TC, \$375. H Goren, Newsvision, 2929 Garona Dr, Hacienda Hts CA 91745. 818-968-1237.

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Box 35657, Houston TX 77235. 713-728-1020.

JVC BRS-378U industrial S-VHS recorder with basic edit controls, color processor, HiFi sound, manual, original box, \$825. T Kramer, 5228 Carmen Blvd, Las Vegas NV 89108. 702-648-0526.

Sony BVU-820 with Microtime T-120D, slo-mo & Sony BVU-800, 3/4" recorders for sale separately or as edit package with CMX, separate AMTEL time code read/generator/character generator available, vgc, low hours on heads, including manuals & cables, BO. L Chatman, 609-753-0142.

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Sony VO 9800 3/4" source deck with time code; Sony VO 9850 3/4" SP edit deck with time code; Sony RM 450 edit controller, 900 approximate hours, 573 actual edit time, all 3 in excellent condition, \$13500. Mike or Grace, 616-344-1323.

Sony 5600, 5800 3/4" record/players, excellent condition, VO 5600, \$900; VO 5800, \$1300; Ampex VPR2/TBC2 1" type C VTR, AST slo-mo, excellent, \$6000/BO. G Larson, POB 8600, Pahrump NV 89041. 702-264-7065.

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Sony VO5850 edit units, \$1950. J Kesler, WOBZ, POB 644, Livingston KY 40445. 606-843-9999.

Panasonic AGDS850 S-VHS edit VCR, digital slo-mo, TBC, time code generator/reader, Best Offer. 607-687-0545.

Hitachi S-8200A S-VHS camcorder, \$800; Hitachi S-751 S-VCR, \$800, both for \$1500, including all access. 517-356-9376.

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TRANSMITTERS
BANDS I - III - UHF
2 Watts - 5 K.W.

LINKS

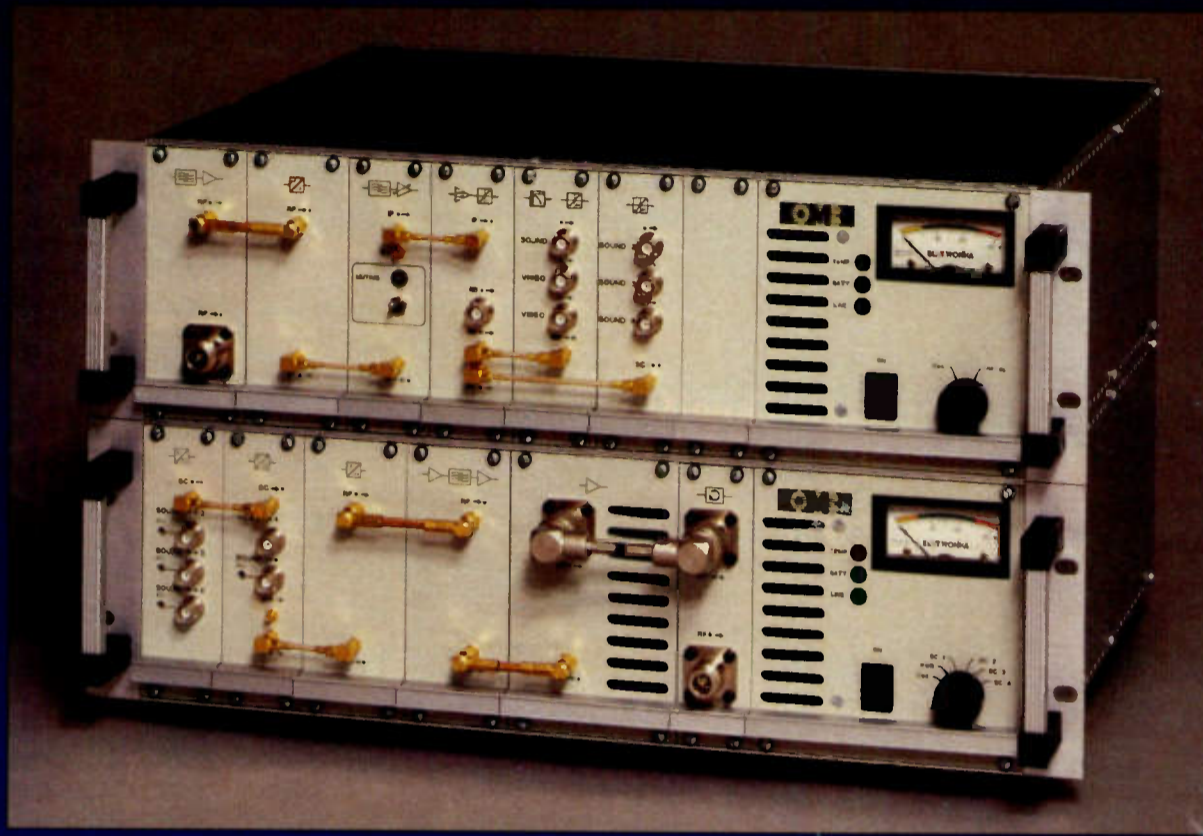
MICROWAVE
LINKS
2 - 14 Ghz.

REPEATERS

REPEATERS

PORTABLES

PORTABLES



MIC-5-2N

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