Strategic Appliances:

The Impact of the Digital Home on

The Communications Industries

By David Keeble

A report from the
1999 Las Vegas Consumer Electronics Show

The Seminars and Sessions

This section of the report consists of précis reporting of what was said in a number of interesting conference sessions. The words and opinions expressed are those of the participants, although I may interpolate a note in square brackets [like these] from time to time. Participants' presentations are summarized in my words, which draw on but are not identical to the participants' words for the sake of brevity. Actual quotes, where used, are indicated with quotation marks.

As in all other parts of this document, product performance is "as described" by the participants. I have not attempted to verify their claims. All prices are in US dollars and the market is the U.S. market unless otherwise specified.

David Keeble

Views on the Digital Home – The TV Hub, Computer Hub, Telecommunications Hub

Panelists:
John Todd, V.P. Research, Wedbush Morgan Securities
Jim Schraith, President and CEO, Sharewave
Mark Carpenter, Director of Internet and Home Networking, Compaq
Paul Chapple, Business Development Manager, Spyglass
Alec Saunders, Product Manager, Microsoft

CES intro: The Digital Hollywood conference kicks off with an all-day workshop which will address the key concepts in establishing the home as a media center - focusing on three primary technologies as the core hubs: telecommunications, the computer and the television. These are the concepts behind the mantra-of-the-moment known as "convergence." While each technology will not move forward along a completely distinct road or even make irrelevant the other, there are fundamentally different mind-sets and market strategies at work.

John Todd

Foresees a growing market in home networks, developing in parallel with the market for high-speed Internet access. In fact these two markets are closely linked, as one of the primary user needs driving home networking is the desire to share access to the Net among several computers and other digital devices.

He cited projections that had the high speed access market growing to 22% of Internet households by 2001, the bulk of which (2.9M households) was through cable modems, with 760K HH using DSL technologies. He foresaw a new kind of ISP, which would be pipe-agnostic, using whatever worked best as they grew to understand how the market segmented, and cited AT&T/MCI as a possible forerunner.

His own projections of the home network market were close to others' estimates of the market for high speed access, which he regarded as reasonable since the two markets are so closely linked.

	1998	1999	2000	2001
Market size in $M	**15**	**256**	**1,100**	**2,300**
In Households	**22,000**	**400,000**	**2,100,000**	**4,600,000**
North American Internet Households				
	25,000,000	**29,000,000**	**32,000,000**	**35,000,000**
% of North American Internet Households with a home network				
	.09%	**1.4%**	**6.6%**	**13.1%**

The current driver for this market is the need to share resources and information in the home. In the future the driver will be the proliferation of other information devices.

Prerequisites to develop the market were lower equipment prices – down to the home consumer level – and "no new wires", meant both literally and as a metaphor for simplicity of operation.

The key piece of equipment is the **home digital network hub**, which will tie all appliances together, integrate the various pipes into the house from outside (cable, telco, satellite) and supply the user control interface. He saw several possible models for the hub: a PC, a set-top box, or even an off-premises control point. 1999 will be a watershed year, as the two markets become integrated by the availability of hubs to serve as the residential gateway.

Jim Schraith, Sharewave

Sharewave is an ingredient technology supplier of wireless networking solutions, whose technology will be incorporated in various suppliers' devices.

Under the banner of "no new wires", he sees their technology playing an important part in home networking, but believes that other kinds of connection will be needed in the home. While he sees the Internet PC driving the need for connectivity, he believes that other information devices - handhelds, "kitchen pads", etc. - being equally important. He cited an IDC projection that showed 50 million information appliance units (with the potential for connectivity) being sold by 2001, a growth rate exceeding PCs.

In addition to ease of use and affordability as prerequisites for the growth of this market, he added versatility and reconfigurability. Since furniture moves, connected devices must also be able to easily move. The user may even need to move the whole network to another home. [This by contrast to others who suggested that the network should be considered an asset belonging to the home.] Security, so that one's neighbours could not know what you were accessing inside or outside the house, was also a major concern.

The Sharewave solution can now deliver 4Mbps of connectivity at $100 per connected node. By late 99 they hope to deliver 11 Mbps. It uses a wavelet-based compression scheme with a claimed 300 Mbps of effective throughput, and can thus handle the movement of video and audio signals - several at a time - through the house.

Mark Carpenter, Compaq

Compaq itself had just announced the shipping of a Wintel computer with built-in networking abilities for the home user, but this presentation was concerned with the work of HomePNA, (HomePNA.org) a 38-member industry consortium "**to ensure the adoption of a single unified phone-line networking standard** and to facilitate a range of interoperable home networking standards."

Again, "no new wires": this scheme uses existing house phone wiring, so that devices can be networked by hooking them up to the phone jacks, without disrupting telephone traffic. [All speakers in this panel agreed on the necessity of hiding the technology from the consumer, and all were optimistic about the prospects of achieving this aim with new equipment. Off-line conversations with people who actually install home networks now were less optimistic.]

The HomePNA solution now achieved operates at 1 Mbps over existing phone wires within the home, at a cost that is only $15 more per node than an Ethernet solution. They hope to announce a 10/1 Mbps solution (i.e. capable of 10 but able to integrate slower devices) in 1999. At the current rate, moving video around the house will not be possible, but their focus will move there in 1999. Several consortium members have already announced product.

Alec Saunders, Intelligent Appliances Division, Microsoft

He saw home network adoption being driven by basic human needs: quality of life, personal security, community, privacy. The second of these focussed on the home security aspect of these networks, which appears to be quite important. Both are current security applications: alarm systems, fire systems, intercoms, or more futuristic ideas like being able to "see" into the house while at work. This seems to be a driver of the need for home connectivity.

He sees Internet connectivity, in the form of a minimum IP capability, as well within the reach of most portable intelligent devices at low cost.

Paul Chapple, Spyglass

Spyglass concentrates on non-PC Internet products. With a marketing background, Chapple challenged the panel to think harder about the actual consumer demand that might be met by home networks. He suggested that the need for low-cost might be exaggerated, but the need for versatility, so that the home hub actually did a lot of things for a lot of different people, was key. He cited an example of a home security system marketed several years ago that was good, but came in at too low a cost for the consumer who really cared about home security to believe it would be effective.

[Notes on the Session - DK]

These panelists see a future in which the functionality of the PC fragments into other appliances, some of which are dispersed around the home or move with the user. These appliances also have new functions - they are better appliances - based on their new smarts. The existence of these multiple appliances creates a need to share information between them.

They did not speak about the trend to home offices and working at home, which is certainly one driver of a demand for higher connectivity and for higher end solutions, as people are willing to spend more for work-related equipment than for entertainment.

Even without that factor, the panel agreed that the increasing number of digital devices in the home drives connectivity, as people want them to share scarce resources in order to avoid duplication or eliminate contention. The primary example was the connection into the home, whether high bandwidth or 56K, printers, satellite connections, files that are on one of several computers etc. So the home needs to be digitally networked in order to share resources and data among various devices that people use.

John Todd's view was that the broadband market was the driver, linked to the home net market and the need to share this link would drive the need for home networks and a gateway hub.

The part that wasn't at all clear was where video and audio signals fit into the networks. The TV or a set-top box is connected in all the diagrams, but Marc Carpenter (Compaq) made the point that the greatest initiatives right now - the ones they see having the greatest consumer penetration – are doing so under the "no new wires" scenario. He's not proposing to move video and audio around the house. And yet some people feel this is important. Others don't.

The panel had little discussion of the IEE-1394 Firewire connection standard which is hot in the consumer A/V industry. When asked, Schrait said that Sharewave's equipment could be made to interface with 1394, and Carpenter suggested that the use of 1394 would be limited to hooking up AV devices within a room. So there may be a divergence of vision on what means will be employed for connectivity.

Strategies for Broadband and Narrowband Entertainment

Panelists:
Host: Keith Kocho, Digital Renaissance
Kevin Wall, Vice-Chairman, iXL Worldwide
Allan MacLennan, SVP of Strategic Development, Media Station
Ross Rubin, Group Director Telecom and Technology, Jupiter Communications
Kevin Lynch, VP and GM Web Publishing, Macromedia
Joey Hougham, Technology Manager Broadcast Products Group, Intel

CES intro: The entertainment industry is in the enviable position of having a multitude of mediums through which to reach its audience and because of the enormous success of the Internet - even in its narrowband form. The wait for 500 channels and unlimited-bandwidth becomes a secondary question while evolving an aggressive marketing and programming position in the current space. While some companies may view narrowband options as an extension of their marketing department - chat sessions with the stars of TV shows or Internet treasure hunts to promote the opening of a film - the fact is that every media entity, from news shows to comedies, dramatic series and feature films must find their appropriate compliment in the multi-million user narrowband environment as well as secure a firm understanding and strategy for its role in the emerging broadband world. In this workshop, experts will examine exactly how these options are evolving. The intent is to better understand how to address the massive narrowband audience while at the same time tight-rope the leading edge of broadband.

General Notes:

This panel had an approach that suggested that convergence of program material would be limited in the near future. That is, TV and the Web would continue to be very different media. High-quality, full-motion video on the Internet was not a fundamental factor for them – based on their mutual understanding that the spread of high-speed connections to the home would be quite slow [There are many competing projections].

They urged the audience to implement an approach for content on different platforms that was scalable - designed to the capabilities of the receiving appliance and the bandwidth connectivity it typically has – and they saw the 56K bottleneck continuing for a long time for Web based delivery.

There was some discussion of the nature of the future economic model: eCommerce based, subscription and/or ads. They acknowledged lots of disagreement, but most panelists felt that TV would be based primarily on advertising with an eCommerce component, and on subscription revenue.

Ross Rubin, Jupiter Communications

He noted that the Web audience was becoming more mainstream as online access spreads. But these consumers are unsatisfied with the quality and speed of the Web experience. He

felt that ISPs were overperforming on bundled pricing - beyond what the consumer wants - and underperforming on high-bandwidth solutions.

High-bandwidth solutions will be dominated, in Jupiter's projections, by cable modems (2:1 over DSL) but all high-bandwidth solutions will be only 20% of US households by 2002.

When they come, digital TV and broadband access will provide two fat pipes into the home. Digital TV will give program providers the chance to enhance the TV experience in ways that are different from the Web. A "Utilivision" strategy is recommended in which the enhancements are those that consumers say they will find most useful. These include sharper picture, better sound, etc. but high on their list are program guides, email, ticker information on sports and stocks, etc.

Scalable interactivity will be needed for the new audience, which will not be couch potatoes. ECommerce will be different for the TV model, since TV viewers are still prospects for the impulse buy, [as with home shopping channels] while Web surfers' buying behaviour is more deliberate.

Dedicated Web developers should not wait for video to be possible but use the vector animation tools available to enrich the experience today, like Flash.

Kevin Lynch, Macromedia

He addressed his advice to Web developers, recommending that they use tools to enhance experiences that are scalable to different devices including handhelds, TVs, and display telephones, so that the broadest numbers of users are reached with the minimum amount of programming time. While clearly the low-end devices would see much less, he felt that the tool should provide "graceful degradation" of the images, rather than simple failure. [Macromedia makes Flash, which fits these criteria.]

He then demonstrated a number of interesting sites and technologies, including Eye4U, Beatnik (a kind of superior midi, or "vector audio"), and the "You Don't Know Jack" online game, a good example of a rich experience through a narrow pipe.

Kevin Wall, iXL

He spoke at length about digital (enhanced) television and what its tendencies and capabilities would be. He believed that the industry would move through a period of great chaos toward an economic model that could be successful in the marketplace, warning that the current free spending on the Web could not last since investors would eventually close down this period of speculative investment.

His model posited a situation in which cable and program providers, operating through the set-top box, would provide enhanced television with interactive capabilities, many of which would be used to enhance the eCommerce potential of interactive advertising within a linear program.

For programmers, the economic model will require many compromises in the non-linear content to make it fit with the linear content. Specifically, he spoke about trying hard to limit the user's time to interact with ads so that it would not interfere with the reception of the next commercial. In general, cable, the controller of the set top box, would be doing its best to keep the user inside their walled garden of services and content, and away from general web-surfing. He went so far as to predict a decline in channel surfing as attractive, interactive enhancements keep the user tuned to the channel.

The program providers would also have an interest in keeping the user attached to the program, but in a more general sense would have serious conflicts with cable over who should share in the revenue from the user's behaviour, whether it's using the interactive ads or actually buying something. It's the broadcaster's program, but cableco's technology that provides the interactivity. [He did not speak about the possibility of a standardized "retail" set-top box, and the implications this would have for cable's control.]

In any case, the period of making the model work would be a period of great opportunity for some, and a "high bodycount" among those who fail to adapt to the new reality as a "dysfunctional" industry goes through a major transition,.

He demonstrated a set-top box interface that IXL had been prototyping, and showed some of its possible uses for advertising:

- Selling tickets to a concert based on a Janet Jackson tour ad - in which the cable company's server used its knowledge of where the user lived to offer the closest local concert on the tour;
- an NFL game in which the user was offered a chance to subscribe to a sports "ticker" based on the cableco knowing that he regularly watched sports, and
- a VISA ad in which the user received a card application, sent to his/her TV on demand.

The interface allowed the user to "bookmark" interesting interactive content whereupon it was stored in a virtual channel for later access. In this model, web sites and regular TV stations are all assigned numbered channels so they can be accessed easily through the remote. "Grabbing" the content was needed to keep the user moving at the speed of the linear program so they would not miss the next ad.

[Other technology shown at CES (TiVo, Replay) allows the TV set to store some minutes of incoming TV so that the user can pause or do something else without missing anything, but that functionality was not part of this model, based on current set-top box features.]

[All of this assumes that the cableco will be able to collect user behaviour information and use it for its own commercial purposes. The panel did not discuss the privacy and possible regulatory issues.]

Joey Hougham, Intel

He sees a period in which TV watching becomes less a family event and more personal, in which the viewer has more control, can use the available interactivity to create a more immersive experience.

The Internet is not yet suited for mass audiences - it can't handle the loads, so the broadcast pipe will continue to be the appropriate delivery medium for mass experiences. However, broadcast interactivity, in spite of some good work, hasn't taken off because of a lack of standards. ATVEF (Advanced TV Enhancement Forum) is trying to set standards for interactive content. The first specification is about to come out.

Web developers shouldn't bite off the high-bandwidth challenge yet.

Alan MacLennan, Media Station

There will be step-by-step migration of behaviour towards convergence of Web and TV, but both will survive as independent media. The needs for information, entertainment and relaxation are different and enduring. They don't necessarily converge on one device because technology makes it possible.

He made the comment [intriguing but not followed up in discussion] that "Studies show that interactivity does not enhance the experience when the user enjoys what they are watching", but also cited heavy response to interactive ads during the Super Bowl. [This may not have been a contradiction.]

50% of those with both TVs and PCs have them both in the same room and have them both on at the same time. [Several people quoted this statistic without sourcing it - or discussing its meaning very much.]

There are opportunities to get rich this time around. One is real narrowcasting. It's what consumers want.

Advertising: must be sales generating, eCommerce engaged, and provide real brand enhancement. He showed a Suzuki ad in which the viewer could choose a model of bike and "ride it" – see its front panel in front of them while moving down a road (still graphic over video).

If you want to get rich this time, he said, look at the ideas of companies that went bankrupt in interactive video in the last few years. Many good ideas were just too early for the market.

Questions:

The panel was asked, how long until there are standards for interactive broadband programming. Kevin Wall replied that the opportunities are now, before that happens. Rob Rubin of Jupiter said it won't ever happen, that the world moves too fast. Kevin Lynch of Macromedia agreed - with a software receiver that just keeps on changing.

Entertainment, News, Sports and Finance - The TV/Internet Hybrid Champs

CES Intro: All roads point toward a home entertainment environment with a combined television and Internet presence, call it a TV/PC, a TV with Internet/Computer capabilities - whether the box is in the den, the bedroom or the family room - the major TV programmers are already putting their muscle to work. They are establishing themselves in the narrowband programming world while setting the stage for the roll-out of broadband. Each of our panelists come from a company with both a broadcast television and Internet presence. With millions of viewers to please on each front, their experience is like an-experiment-in-progress and will determine much of how their industry will proceed into the future.

Patricia E. Vance, Senior Vice President and General Manager, ABC Internet Group
Merrill Brown, Editor-in-Chief, MSNBC on the Internet
Mike Levy, CEO, CBS Sportsline
Miguel Garcia, CNN Interactive
Jeremy Verba, President, E! Online
Matt Farber, Senior Vice President Programming, MTV Networks
Alex Alben, Vice President Entertainment, RealNetworks, Moderator

General comments

The moderator attempted, early on, to push on the "video on the Internet" question, probing to see how much of a hybrid really exists at this time, and what part video plays in their strategic plans. The panelists described practical approaches in keeping with organizations that are trying to fill a need and produce economic returns; for the most part, they deferred all futuristic questions and dealt with current realities, in which video has a significant but somewhat limited role.

Somewhat surprisingly, many of these organizations described their audience as using the Web and TV simultaneously. [That is, the integration of the two media is being done, not by the technology, but by the user, who puts them both in the same room and uses them together. Is this a continuing viable model? He suggests that the need to deliver video over the Net may not be strong for media companies that have a video channel into the home through other means.]

The session was conducted as a Q&A.

Q. How does video fit into your strategic plans?

E!Online: showed promo videos for several video-related parts of their site, including live coverage of the "red carpet" entrance to the Oscars, and a site where they promote movies and even allow the user to buy a ticket. Video is important but our users are in the 28-56k realm, so its use is limited.

MSNBC: moving toward greater integration with TV. They will bring NBC nightly news into the site using Win98 video delivery platform.

ABC Online: Described a strategy in which video on the site itself was unimportant compared to linking the use of the computer to a TV program, with the user using both appliances simultaneously. Ten million people have the computer in the same room as the TV and use both together. The result is much cross-promotion in an ordinary way but also a huge chat room during the Academy awards, etc.

CBS Sportsline has 5,000 video clips on site. But they also have many users who are watching TV simultaneously. They follow other games' play-by-play (in text) and get real-time updates on their teams in the fantasy leagues. The goal is to make Sportsline a "have-to" component of sports viewing. They see a large future role for video:

- People will use it to watch games that are not on TV, not to replace TV viewing. Olympic preliminaries, etc.
- Highlights on demand
- Custom sports shows
- Extra features not on-air: press conferences etc.
- Extra data: follow play-by-play of games in text form while watch something else
- Sports tickers as a crawl on enhanced TV

He noted that CBS did not get the Internet broadcast rights for NFL games - in spite of a $4B price tag for their part of the deal. The League reserved them. [Others also raised rights as a crucial issue in use of video.]

MTV sees audio/video as crucial. Their goal this year is to produce the first real hybrid live/online live show, in which being online is an integral part of the show, without which it isn't a complete experience. It's risky, but again, they have an audience of simultaneous TV/Internet users.

CNN Online has been "too successful" in drawing online users to their site with event video. "Maxed out too often." Their goal is to reduce the cost of online video production in order to create profit margins, by driving integration back up into the content chain with better content management. Part of the effort is involvement in ATVEF, to create standards that will reduce the cost of using many formats for video - Realplayer, netshow, etc.

Q. Looking at figures like two million people using Realplayer in a 24-hour period, is there a danger in being event-driven in content terms? Many big events "spike" usage and overload servers.

E!Online: It's just a function of current technology. The spikes help attract sponsors but can hurt the steady business until technology improves.
MSNBC: Video usage is miniscule compared to overall site usage. Not significant.
ABC: We're getting better at managing spikes but still get caught sometimes.
MTV: News is spiky, but other genres aren't.

Sportsline: Sports can be very spiky. The first two days of the NCAA basketball tournament are huge (25M pages views compared to usual 3M) because of the number of teams involved. But that's what drives revenue.

Q. Will IP Multicasting (a technology that reduces the load of video/audio on the Net) make big strides in 1999?

CNN: It would be very helpful but it takes many parties co-operating to make it work.
Sportsline: Nothing much we can do about it, but the parent companies are making the investment.

Q. What are the challenges in making a traditional media brand viable on the InterNet?

MTV: You need a good understanding - separate expertise - in the meaning of the brand on traditional media and the expectations of Internet users - and then you need to put those two together to understand the differences that will occur in the Internet brand. You need permission from the parent brand to make the changes needed to meet the Internet needs.
Sportsline had a brand before it made its deal with CBS. It's worked out well for both, and they're duplicating the success with Marketwatch.
ABC Online has many brands: ABC, Infoseek/Go and many unique Web brands. We reach a higher demo than ABC TV so it expands the base for ABC which benefits in the long run. Each of the sub-brands must keep its identity but be part of the larger network. We're on Palmpilot, Alta Vista too - you have to be everywhere to win.
MSNBC: There are lots of different approaches. Sometimes I don't see the parent companies attitude at all in successful online operations. We had to evolve a different style because more was available to us on the Web. Sub-brands and personalities will emerge over the next few years within web services.
E!Online started as a separate organization. The content has to make sense online and the parent company's stuff doesn't always.

Q. Will cable and telcos be able to restrict their subscribers to a limited choice of content?

MSNBC: Some subscribers may choose that option - the "walled garden" of content for lower cost. It's like the current cable "gatekeeper" model and it's a legitimate economic model, but it presents a danger to content providers.
CNN: There is a lot of work going on to standardize the set-top and make it available at the retail level from many manufacturers. So there will be a spectrum of consumer choice, technologically.

Q. What are you doing to exploit global markets?

MTV: Although it's technically easy, there are problems around the content. Even our parent, MTV, is regionally subdivided. So how do you take advantage of that? The rights/content challenge will be the greatest, because the music industry itself is regionally divided, in terms of who they promote, the release dates of recorded product, rights, etc.

Broadcast Television Roundtable - A DTV Programming Strategic Understanding

CES: The broadcast industry, from the station operator and broadcast network to the television set manufacturer and the television programmer faces the enormous task of transitioning into a DTV world. Each has a different set of problems and challenges and each will be delivering product and services on a unique and individually determined schedule. In this roundtable, our representatives, who come from the different segments of the industry will share their perspectives on the implementation of DTV, its scope and capabilities and on the timeline of deployment.

Lisa Wiersma, Director of Development, Tribune Companies
Nat Ostroff, V.P. for New Technology, Sinclair Broadcast Group
Jerry Butler, Director for DTV, PBS Public Broadcasting Service
M. Michael D'Amore, VP Business & Technology Development, Philips Digital Video Systems
Robert M. (Bob) Zitter, Senior Vice President, Technology Operations, HBO
David Rosen, President, Praxis, Moderator

In this session, the moderator asked the panelists to assume it was the year 2007, after the second terrestrial channel has been released, and, from that future perspective, comment on how their business has changed since 1999. What is the nature of programming? What hurdles have they overcome?

Tribune:

We will still be in local broadcasting and publishing but we will have expanded. Our programming will be high-definition, but we will also add multiplex services because compression will be better: classified advertising, local news, weather, and entertainment. We'll have enhanced content and new targeted advertising. We'll have to develop a new attitude to television with high-definition. Partnerships will be key. We will have to develop a completely digital news gathering operation.

PBS:

High-definition will be an integral part of our mission to educate, entertain and inform. Our concerts, performances and science programming will all be high-definition. Multi-casting will also be important, and datacasting will be integral.

Sinclair:

In 2006, the consumer electronics industry has pushed for high margin high-definition receivers, while broadcasters have paid $70 billion to build the high-definition infrastructure but without a business case to pay for it.

There are two possible futures. In the first, the technology for adaptive equalization has not improved. **Consequently over the air reception of DTV signals using 8VSB has not been accepted by consumers, because it is very subject to multipath interference without a directional antenna.** If we can't reach them with simple non-directional antennas, we don't have an HDTV broadcasting system. So, by 2006, the analog channels have not been turned off, there is no cable carriage, there is very slow takeup of HDTV, and no good OTA reception. As a result, broadcasters have made few investments in the absence of the business model. The 200 markets outside the top 25 remain uneconomic for HDTV.

In the second future, improvements in adaptive equalization have enabled good over the air reception. This, in turn, has forced cable to carry HDTV. DTV consumer products have started to take off due to low-cost receivers from the computer industry, and standard definition wide screen sets using multiplexing. Some simple portable digital devices use the enhanced signal to distribute business and consumer data.

What this means is that if adaptive equalization doesn't improve, we're telling the consumers to get a rotating antenna. They won't do it. So we may have to revisit the choice of 8VSB and look again at COFDM.

HBO:

By 2007 large screen HDTV sets will cost what analog large screen sets cost today, but with much better picture and sound. 70% to 80% of the population will not pay to get more choices of programming: they'll buy for high-definition. HBO will have been digital for 16 years. The near-VOD approach that we take now will be closer to real video on demand because there will be more storage capacity close to the home. By then we'll have found the right way to integrate the Internet and television and will have easy ways for the consumer to receive enhanced programming. **The Internet will be able to carry high-quality full motion video, but cable and satellite will continue to be more economic for long form content like movies and television shows.**

Hurdles: We'll need to bring the price of storage and bandwidth down. We'll have to make signals secure so copyright can be protected.

Philips:

If broadcasters need COFDM, we'll supply it. By 2007, we'll have two-way networking that will give us narrowcasting and real television enhancements. The Internet will be able to handle video entertainment. Currently the bandwidth can't handle television bit rates. Extrapolating 10 years, we'll get full video interactivity to the home as municipalities get involved in installing high bandwidth networks.

We will probably see large flat panel displays in the home, accessing video from servers on demand over the Internet. **Operators will be able to tell what the viewer is watching. Philips is focusing on developing the Internet into a broadcasting channel** with a group inside the Philips Digital Video Services business unit. Our vision is “television anywhere.” People will get their hometown programming over the Internet from anywhere in the world.

The Computer and Internet Home Appliance: the Entertainment, Information and Communications Tool.

CES intro: The model of the computer industry being in direct competition with the television manufacturer for the "Digital Home" market is not precisely the economic model which has emerged. This is not a zero-sum equation. For a number of reasons, the universe of the enhanced TV/set-top box will likely explode just as the home computer keeps on increasing its power and reach. In this session we hear from computer industry representatives as they project the home computer into a "home appliance" playing its role on the entertainment, information and communications front along with a wide variety of home office and mobile functions.

Bill Keating, Web TV Networks
David Lind, Network Computer Inc.
Bud Tribble, Sun Microsystems,
Mary Walker, IBM personal systems group
Jim Louderback, ZDTV (moderator)

WebTV: Just announced a deal with Echostar that brings together WebTV in a satellite receiver with an 8.6 GB hard drive, (Replay) CD audio etc. We also have a deal with Scientific Atlanta to be on their Explorer 2000.

Network Computer Inc.: Our service is similar to WebTV. We're dedicated to standards (HTML, Java) Our service is in Japan now. We have seen a logjam in US cable. In six months, we'll see US cable operators pick their technology and service options; using Explorer 2000 at first, and next year GI will be in the market as well.

Sun: We play in this space through manufacturing Java and network servers for the Internet. We're taking Java to set-tops, to Web phones, to pagers, and automobiles. Java runs on Explorer 2000, running Intertainer, a video-on-demand application. Expect to see Java as a programming platform on all kinds of devices, whatever operating system they're running. This will allow developers to port their software and content to many platforms and devices.

IBM: the home infrastructure doesn't exist yet. The wire could be anything, in our view. IBM Home Director Professional allows the user to move services throughout the house. We're trying to make it easy; information appliances will be hampered otherwise. New information appliances are needed to drive the market. They will eventually communicate to the Internet through the home gateway, possibly a cable modem.

Question: Do people want to use the Internet from their television sets?

WebTV: Yes. Our subscribers use WebTV to enhance TV but they also surf the Internet twice as much as PC users. There are two groups: active Internet users watch very little TV anymore, unless it relates to their community; the other group uses email and more television. The first group use Web TV for the Internet not for better TV. Even though we promote the new appliance, Web Plus, and its interactivity many people still buy the Web

classic.
Network computer: Our sample size is a bit smaller, but our users go after particular applications: mail, program guides, messaging.

Question: Is it better to enhance TV or sell the Internet?

Network computer: Enhancing the essence of the appliance is the way to go.
Web TV: We're not shifting from Internet to enhanced TV. There is space for an Internet-only device for a long time. We've only recently launched the Better TV campaign so it's a little early to gauge response to enhanced TV.
IBM: People will not use TV to surf the Web. The explosion in Net usage will be through other dedicated devices throughout the home.

Question: I develop interactive advertising using all these technologies, but I find clients are not interested because no one is watching.

Network Computer: It's a chicken and egg problem but people will come. WebTV has to be sold under cost. The services will go to people who fund the interactivity.
WebTV: It will be hard to see it until we are in a world of bandwidth abundance.

Question: how long until we reach 15 million high bandwidth households?
IBM: 5-10 years.
Sun: 2-3 years.
Network Computer: 3-4 years.
Web TV: 2-3 years.

Question: Will people watch television on their PCs?

Sun: No, but they will listen to music.
Web TV: At first I said no, but now I think people will do that.
IBM: That's not the right division. We'll have one screen, with different appliances connected to it.
Network computer: That vision is a long way off.
Sun: We will see disaggregation of appliances into bits that are connected around the home. The question is how will people administer that: Genie is our product for plus and play networking.

Question: Are applications compliant to the Advanced Television Enhancement Forum on the air now?
WebTV: Just trials.
Network Computer: ATVEF is useful in the short term - Java is long term.

Question: Why doesn't Web TV support Java?
Sun: Both of us are working with TCI in set-top box content development. We can integrate Java.

Question: When will WebTV support Java?
WebTV: We have been seeing a trend toward it, but it's too big for our RAM. We will be moving it up the priority list.

Question: Do you anticipate that every room in the house will be Internet accessible?

IBM: Yes. In the future, people will assume that whatever appliance they bring home should be able to plug into the Internet in some way.
NCI: The home, the car, wearable appliances. The ubiquitous network will go outside the house. We'll need solid back-end stuff to make this reliable.
Sun: Yes, but there will be a need for a hub somewhere in the house. It could be an existing device like the PC or the set-top box, or a new device.

Question: How can you develop applications so they look good on every appliance?

IBM: There is no easy way today. Our home director application puts the user interface on the TV. But that took a lot of work.
Web TV: We have done a lot of style work, and use intelligent filtering. Some sites look good on the TV and the PC, but the smaller devices are harder.
Network Computer: We have made progress in three years. 95% of sites look good, using XML, style sheets, etc..
Sun: We have developed pluggable user interfaces, so that programs change to match the device. It's interesting that this work also applies to accessibility for the disabled.

Question: What will the big winner applications be?

IBM: Internet sharing, distribution of entertainment in the house.
Sun: AOL.
WebTV: Community-based applications, like the buddy list on television.

Question: Will you be supporting non-screen based applications?
IBM: We do it now. Security, lighting, appliances and so on. Unfortunately, all current systems are proprietary, so we built a box that would talk to them all.

CES Plenary Keynote, John Chambers, President and CEO, Cisco Systems

Our vision: Internet networks are rolling out so fast that they will create revolutionary social change. Currencies will disappear, education will change dramatically, and we will see the death of time and distance as everything will be connected.

The Internet is rolling out six times faster than the telephone, and four times faster than the PC. Change on the Internet should be measured in "dog years": seven years of change for every normal year of human time.

Ecommerce will go to $1.1 trillion by 2002. Devices will go in two directions: some will get a lot of functions, others will become very simple. Internet shopping has moved from PCs to clothes and this Christmas to toys. Business Week projects that by 2002, 30% of cars will be sold over the Internet. The Internet is a much better shopping experience, much faster.

(He demonstrated a connected living room in which the phone, the television, computer, cable modem, the air conditioning, the lighting, the blinds, the security system, a player piano and a player violin were all connected and controlled through commands coming over the Internet.)

Business strategies: Do not compete with your partners. Most partnerships do not work. You need to do multiple transactions, with short-term wins and long-term wins, with enough transactions to add up to the 50: 50 balance. We are closely integrated with our partners: we run our systems inside their plants to raise and lower supply to meet our demand.

We must get high-speed connections to the home. We must work together on common standards if we are to move the technology to levels where consumers can use and understand it. Time-to-market on innovation is a key advantage. If you miss the market by one quarter, it costs you 20% share; miss the market by two quarters and you shouldn't bother to go into it.

Technology will bring about personal and social changes. These interconnected devices can be used to

- locate children
- see your children over video in the day-care center
- keep your photographs and other mementos secure
- pull down music from the Internet
- monitor devices like heart monitors so your doctor knows if you are in trouble
- provide global positioning on many appliances like telephones and pagers

Education will change as well. Some countries are connecting every home, not just every school, to obtain a competitive advantage in education. This is a good example of business working with government. We believe the advantage will go to countries that give Internet access to everyone.

Webcasting - Audio and Video Broadcasting on the Internet

CES Intro: The Internet may not be TV or radio, but don't tell that to millions of computer users who every day are listening to their favorite talk show, football game, news show and health report. For people who think that the Internet is static and just not ready for prime time, the information which will be discussed in this workshop will set them straight. Audio on the Internet is already excellent at 28.8 and the technology that delivers audio on the Internet is improving all the time. In this session, the entire concept of audio and video on the Internet will be broken down; including the types of programming on-the-air now and how that is expected to grow, as well as focusing in on the types of technology needed for delivery of live and archived shows. Our speakers are the companies responsible for making audio and video possible.

RealNetworks, speaker did not identify himself (this session from audiotape)
Brad Porteus, Vice President of Marketing and Business Development, Imagine Radio
Martin Tobias, Minister of Order and Reason, encoding.com
Mellie Price, Vice President, Business to Business Div., Human Code
Richard Titus, Managing Director, Razorfish Los Angeles
Michael Weiss, Vice President, Webradio.com, a division of Geo Interactive

RealNetworks:

Up to 75% of our audience may still be on slow connections up to 2002 - a real world limitation of about 20k. This gets us fairly good audio and video in a reduced size. Audiences are growing, but we'll still have to work on quality, and how to work within the limits. Using a technique called SMILE, we can some different things down the pipe, and get a little bit more of it. He demo'ed CMP Techweb Today, their daily presentation using streaming JPGs, postage stamp video, bits of text coming down the streaming channel.

The questions: How do we make money on this and how do we keep people coming back so that we establish the business models?

Porteus, Imagine Radio:

Radio on the Internet is repurposed traditional content. Radio for the Internet is creating audio content specifically to leveraging the Internet's unique capabilities:

- International reach
- no spectrum limitations - unlimited choice and diversity, niche content has a real opportunity
- One-to-one distribution. Multicasting is 3-5 years away, with a one-to-many connection

With the ability to deliver specific content to individual listeners based on their preferences, Imagine Radio delivers tools to help listeners build their own virtual radio stations and share them with other people around the world. It's still meant still to be a background medium, so you have to leave 8kbps on the connection free for people to do other things. It's prohibitively expensive to create content for every taste, so we let the listener do it.

Broadcast companies have discovered a limited number of successful formats, and there's a myth that people have no other interests. Lots of available music, so there's no content shortage and we're trying to fuel that by letting people build their own.

We can compare your preferences with others and suggest music you might like. We also have a set of streams that we build. But we find that people who create their own are more likely to listen longer and come back more often. Since people can skip ahead to the next song, people are doing more risk-taking.

How does this make money?

Audio advertising. Synchronized multimedia audience contact ; SMAC. Since people train themselves to ignore repeated ads, we immerse ads into the programming in such a way that listeners only hear the ads a limited number of times, rather than endless repeats. Our ads are also a call to action - people can buy right away.

You need a windows mediaplayer plug-in - 42 million people have one.

Weiss: webradio.com (of Geo Interactive)

Geo's core is expertise in compression algorithms. We've offered low-price web development tools that allow everyone to put video and audio on the website. We now have java-based technology, announcing it under the Webradio name.

The Home Front Study by Odyssey Research reports that only 25% of Internet users at home have actually used Real Network's player in the last six months and only 7% have used Netshow. Since our technology is based on Java, like the browsers, we'll be able to deliver 3x to 12x the audience reach. The next step in web broadcasting is reach, and forcing them to download a player limits the reach. For consumers, the Internet is about choice and control.

Current streaming technology seems to be aimed at radio stations. Arbitron (US radio measurement bureau) will soon be including the Net audience in station ratings. 6% of all Americans, 19% of on-line users, are using radio on the internet. **Arbitron says that we will see a huge shift in radio due to new media – they think every radio station in North America will be webcasting in two or three years.**

Richard Titus, Razorfish

We are a facilitator and an enabler in this area, rather than a content provider.

Webcasting is a bigger item than we see now. Convergence - AOL/CBS are partnering; and so on. Don't know where it will end up, but bandwidth, processors, and cost of storage are quickly becoming commoditized, and getting faster, cheaper and quicker.
[He then went into a long ad for Razorfish, which is an Internet consulting company that helps companies re-invent themselves digitally. Clients include the brokerage Charles Schwab which now does 60% of their business on the Net.]

Razorfish has built some interesting technology, including the "Sniffer". This operates on a web page - it looks at the user's machine at first login, sees what plug-ins are installed, and custom-tailors the video and audio to match their machine's abilities.

Their CBS project uses dynamic HTML generation to create pages that show the affiliate as well as providing network branding. TVN has many customers for a range of movie content, directly or through cable and satellite providers. They built a system that allows consumers to look into their content and preview it over the Internet and place an order which then is fulfilled through the provider they use. The next stage will be to deliver the movie over the Internet - not possible now.

Price, Human Code

They have worked in transitioning business and education content to the Internet. My job is to figure out how to make money on this. Human Code is a 130-employee company, with 3+ divisions: consumer products - CD-Roms; business solution consulting division; and a learning technology division + production units that feed all three. They've developed many things, distance learning, an Ecatalog network, many-to-many gaming for Shockwave etc.

Our approach is to build the infrastructure in a company to make the media product. Places we can make this work: talking book over the Internet, business training - e.g. java training for employees can be done for hundreds per employee rather than thousands.

Models for Profits? We say the "consumer will drive the market." But there's no advertising driving the consumer. The business model right now - which people don't want to hear - is loss centre. That is, reduce expense – it's more effective to use media streaming in the marketing, PR and training spaces than in streaming something to the consumer that has no dollar amounts behind it.

Ecommerce is one workable model. Subscriptions do work for some business content - white papers etc. Tuition for education. [He demo'ed an eCommerce site based on a mall model. The user populates their own mall - and they stream ads to them based on their stores. They can click to the buy, etc.] Seems to work well and be popular with consumers.

Tobias, Encoding.com

Until recently there weren't any service houses to encode large quantities of analog content to many formats - when you know what you want but want the site built. We do that, and we also supply software to fix the problems that arise. Blurb: latest technology, can create any kind of compressed video or audio you want. Seattle, San Francisco, San Diego the usual marquee clients.

How are people paying for webcasting? Advertising.
What is it? Mostly repurposed audio and video - "shovelcasting".

Forrester Research says there are three things wrong with webcasting. It's a cost centre, it's difficult to find and enjoy, and the business model is banner advertising.

In 1999, we'll see an increase in the quality of experience in Webcasting. With the G2 technology from RealNetworks, the number of bits required is going down, while the connection speed is up. A richer experience. Content owners will have to support content for the highest bit rates as well as for the low. Will make it more difficult to provide content.

A new inventory of ad vehicles will also arrive - audio ads on Imagine Radio, text crawls on webcast video. Ads will shift from banners to platform specific sponsorship opportunities. Webcasting has increased the average length of stay on a site; so we'll see more tie-ins in 1999 that convert that length of stay into some kind of revenue.

Companies that may have hundreds of thousands of hours of content see a big problem in putting it on the Net. Not just the encoding but the tracking of usage, getting payment, etc. How do I support syndication through a third parties? I may have different rules for different syndicators - not supported today but we'll be doing something in that area.

In 1999, we'll see easy ways to share audio and video with other people on the Web. That will drive technology improvements, more than CNN on the Net will. In 1999, neither multicasting or broadband will come to save the day. There will be another 500,000 @Home subs but there will be hordes of dialups.

Service houses will do well, including rights clearance houses. Hotmail will do well. Advertisers will get new tools and do well, and the networks will get some new revenue streams.

Question & Answer

Q: Is streaming media just irrelevant because of the size of the audiences?
Weiss: It is becoming easier to get.
Porteus: We're all here on a promise. Internet advertising is actually coming up to projections made three years ago. It will be over $5 billion in 2000. Small innovative companies can be seen in the same space as monster companies. AOL has a market cap higher than all three TV networks. This is an exciting place to be.
Price: You might not make money right now but there's certainly models for saving it. It will take time. Right now the expertise is too limited - when it's more cost-effective to acquire a company than to recruit then there's an imbalance. But it is moving forward.
Martin: If they are looking the other way, that's great. But the independents won't last; once the studios and the majors wake up to there being money there, watch out.
Razorfish: The portal play of CBS and AOL indicates that they are aware and in the game, which is why Broadcast.com's stock is so high.

Q. Inaudible:
Porteus, Imagine radio: We've had over 100,000 people come to our website and build their own radio stations. Whether you're an individual or a corporation that wants to create an audio accompaniment to your own webpage.

Weiss, Webradio. We're not going to be content providers, but we'll syndicate and provide turnkey solutions. We'll compete with Broadcast.com.

Q. Are we moving toward narrowcasting or broadcasting?
Razorfish: Both. We did a major campaign to drive viewers toward Psi Factor during sweeps week, which showed a 1.2 increase in ratings.
Price: Narrowcast is here now, but it will be an evolutionary process, both will stick around.
Weiss: It's like home video in the seventies and eighties: the flyfishing tapes are still out there but the big winners have been the studios with the movies that people want to watch.
Price: There are niches where people want to lead themselves and there are niches where they want to be led.
Weiss: The CD-Rom industry didn't live up to its hype because not many people wanted to go home and kill aliens on a screen.
Porteus: The lines will blur as people personalize television.

Q. Will digital television have an impact?
Razorfish: Yes, the TV is the most ubiquitous appliance.
Martin Tobias, encoding.com: You have three lines coming into your house, telephone, cable and power. You'll get two experiences from the two platforms, TV and PC. When I sit to be entertained I don't want interactivity even if I can get it. If the TV can get data from the PC, I may do that, but I'm in a different network. You'll never get the interactivity and the one-to-one over a broadcast network.

Q. Talking about the platforms, one of the problems with IP Multicast is that you can't monitor how many people are watching like you can with straight IP. The cable boxes, on the other hand, never turn off and are always monitoring everything you watch - which is kind of a pernicious thing in itself. AOL is kind of the Internet, but it's really a walled garden of content. With the cable modems, are you worried that it might be hard to find Imagine Radio?
Imagine Radio: No. I think we'll have wireless IP technolgoy so everyone will be able to get Imagine Radio in your car or any car. Right now people are hearing us at work on a T1 line.

Q. I'm worried that the unsophisticated person will buy a cable modem and never see the Internet, only the walled garden.
Imagine Radio: The web is too big now - AOL users are starting to find it. You can't shut people out.
Razorfish: But whoever owns the connectivity device will have an incentive to control the content, especially since they are being sold at a loss in order to sell services. Even Gateway has an ISP that you get when you buy a gateway PC. If all those people are smart they will allow connectivity outside. Also people like Imagine Radio will try to make deals with the people who own the gateway.
Price: There's a dogfight that has yet to play out around exclusivity of content.
Imagine: I'm seeing a more sophisticated user. For a while no one knew how to change their default homepage and Netscape had a lot of visits, But consumers are getting smarter.
Razorfish: People do "real estate" deals [deals with portals] because it gives you location and convenience. On the Net, once you know the retailer, you don't need the portal that gave you the first exposure.

Q. One of the advantages to streaming over other web applications is that it doesn't get lost when you surf - you can keep it with you in the background and keep the listener connected.
Imagine Radio. Yes, but research shows that people rarely listen to a site for more than ten minutes at a time. We do concerts on one site that may keep people hooked up for hours at a time, but the bands won't let us advertise on those streams. Forester says we have to hook them for longer, or create a richer more immersive advertising experience - an oxymoron. It's one of the things we will work on this year.

Q. When you create a rich experience, people are there for the duration. Even in TV they don't surf away for the commercials.
Razorfish: How do you create a rich immersive interactive experience? Doesn't exist right now.
Price: With gaming, people will stay on forever. Trapping someone in front of a computer to listen to music is different. They have much more choice and distraction than in a car.

Q. Do you think the form of the content needs to change in the future?
Razorfish: Yes, like the sharing of personal videos. It's economically unfeasible to electronically distribute that content today. But Seinfeld is so well distributed you don't need the Web.
Imagine Radio: Yes, like the press conference after the game. It's interesting but not going to be on the TV. But Internet webcasting will not survive as a "cool thing", it must be a stepping stone to something else.
Price: The broadcasting model of trapping eyeballs etc. is not welcomed by the Internet audience. Do consumers want to be trapped? We're having to answer that question.
Razorfish: TV didn't kill radio, Internet will not kill radio. The power is to do something that hasn't been done before. In terms of advertising, people are not taking advantage of the one-to-one capabilities of the Internet. And when they do, it yields huge results. Urban Decay was the most successful cosmetic company on the net last year because it is a product you can't go to Macy's to buy.
A: The problem with the Internet is that people want to be active: they've had their coffee and their hand is on the mouse and they won't sit still. What we have to figure out is how to keep them clicking within our experience.

Q: Inaudible.
Price: The consumer is willing to accept marketing materials over the Net if they are relevant to that consumer. It doesn't matter what box delivers it.
Razorfish: We're building most of the browsers for these set-top boxes and I can tell you that streaming media has little to do with why they are there. It's to do something that you can't do with television. Viewers can't buy anything while they're watching, but that's the capability that people are focussed on. A hotel chain is building a browser into its movie box and making deals with Amazon so that people can buy at night and get books delivered to their hotel room the next day.

Satellite TV: The Year Ahead

Moderator: Bob Scherman, Satellite Business News
Eddy Hartenstein, DirectTV
Karl Vogel, PrimeStar
Stan Hubbard, USSB
Charlie Jurgen, Echostar Communications

CES Intro: 1998 was one of best years in the short history of DBS. This panel of executives will examine the factors surrounding sales in 1998, discuss the role DBS will play in the launch of HDTV and see how the local broadcast issue will impact 1999 sales.

Overview of Statistics:
Current Market Share:
Echostar 18%; C band 18%; PrimeStar 21%; DirecTV 42%

Market share within DBS
DirecTV 51.6%; PrimeStar 26.1%; Echostar 22.3%

Projections for 1999:
PrimeStar: 200,000 net new homes in medium power business
DirecTV: 1,300,000 new homes
Echostar: 1,000,000 million net new homes

New Factors: Sales for this year will be impacted by a shutdown of local signals as a result of the injunction in the court case in Miami. That has the potential to impact sales on an ongoing basis. Also, the Echostar and News Corp. deal to acquire the 110 degree satellite frequencies, and DirecTV and U.S.S.B. consolidation with be complete by the second quarter.

In December 1998 more satellite receivers were sold on gross basis than any other month in history: 500,000 new sales. A very strong 1998 in terms of new sales: a record year.

Comments:

Hubbard: these projections are quite low.
PrimeStar: we'll beat that 200,000 number.
DirecTV: we can do that number.

Issues:
DirecTV: Our leadership role in interactive products will keep us up to the challenge of competing with cable.
EchoStar: Digital cable hasn't had a significant impact on the satellite business yet. If the price points are right it will have an impact in the future.
Hubbard: DBS continues to be driven by choice and quality. People are becoming aware that it is the true cable alternative.

PrimeStar: A strong economy is the biggest factor. Legislation allowing satellite to compete local-local with cable is imperative. And after those, it's the innovations that we're seeing at the show where we give consumers something beyond what they get with cable today. Our venture with WebTV to put equipment in a satellite receiver like a VCR will bring new people into the marketplace. High-definition television, later in the year, will bring people to satellite. People who spend $10,000 for HDTV are all going to want a satellite dish. The one negative is the impending cutoff by the end of February of many of our subscribers. The impact will be bad, but we will work to minimize it.

Q: What will the impact of the cutoff be?

DirecTV: I don't know what the impact will be. We'll do our best in the face of an uninformed situation. We've always thought the best solution is a national one. There has to be a comprehensive look at the Satellite Viewers Act to get rid of the ridiculous provisions in there today. We want a simple, "Give me your address and I will tell you if you qualify for distant signal" approach but it's got to be on a reasonable basis. Not one where the Grade B contour is the definition

Echostar: The best solution is a local antenna, obviously, but that only works for half the homes in America. We have to provide a solution for every customer so they can get the channels they watch: an off-air antenna is still the best but if they can't use one we need an alternative.

Hubbard: I think the " white area" of the nation is about 8% to 12%. None of us believe that cable will pass the digital signals from local (DTV) stations. Consumers will need antennas. We will have more local programming: antennas will be more important. Delivering local by satellite is not very feasible.

Primestar: Providing local signals is a market share play. If there are better uses for the capacity (extra signals) than local, it won't work.

DirecTV: If the local broadcasters multiply their signals with DTV, there won't be any satellite solution. That's why the off-air antenna is the best solution.

Echostar: If it's what the consumer wants that's what we will do. Lots of them don't get good local signals.

Hubbard: We haven't argued against satellite carriage of local signals, as USSB, but as Hubbard we have been very clear that this is a copyright issue. We own the ABC copyright in our market and we should be able to say when someone else can bring the programming into our market. Fifteen years ago HBO and Showtime put scrambling on the signals to protect their copyright and we think it's the same thing.

Question: Does anyone want to talk about the discussion that there is an impending deal between PrimeStar and DirecTV? [date of discussion Jan 10]
PrimeStar: We're far from dead with a billion and a half dollars worth of revenue. We want to maximize our assets. We're looking to recapitalize the company and we're looking at

alternatives. (PrimeStar is owned by consortium of cable companies, TCI, Cox, US West, Compcats and US West.) No one is making money in the satellite industry yet so there are capital issues throughout the industry.

Question: Can the satellite industry support three separate DBS services?

DirecTV: we've done very well so far. We're knocking on the door of actually making money: EBITDA and cash flow positive in the second quarter of this year. The USSB transaction does not affect the cash flow for the earnings break even points for us. In the long run, it adds $900 million of revenue to our top line. In the first year, there may be $100 million of savings so it's a good proposition.

Echostar: We were EBITDA positive in the first three quarters of this year. We have made a tender offer on all outstanding debt of billion of half dollars, if the bondholders tender they'll make a good return if not will have to refinance that debt, hopefully at lower interest rates.

Hubbard: I think there is room for three companies. We'll beat each other up as much as we can, but the real target is cable customers.

PrimeStar: There is clearly room for three: price points for cable and other factors play in. As an industry, we've beaten the projections, we are reinvesting our cash flow in our companies, the consumer markets and the financial markets have supported three: there's no reason to think it can't continue.

Q: But the general trend is in consolidation. Do you see more ahead?

DirecTV: We have no plans right now, but we're always looking at ways to increase penetration.

Q: Stan, why did you decide to move ahead with the deal now?

Hubbard: In a perfect world we would have stayed independent. But the business is now so mainstream that we had to create a position where the consumer coming in the store could see a clear alternative to cable. Financially, it was a good time for the deal, and we're determined, and so are all our employees, to turn over the company to DirecTV in better shape than they bought it. Once we've done that and our employees are taken care of I'll sit down to see where we can go in terms of building new businesses.

Echostar: I'm sorry to see the Hubbards leave the industry. The deal looks to be good for both companies. DirecTV will be a tougher competitor.

Q: What about interactive channels?

DirecTV: We have the 7.5% deal with Thomson on multimedia, we've announced a deal with Philips, TIVO and Wink on interactive; there will be a lot more to come.

Echostar: We have an interactive deal with WebTV. [and Replay]

Q: Will DirecTV offer HBO in high-definition?

DirecTV: We have a channel of high-definition now and HBO will be our second. As we go forward and the sets roll out, we'll come to other agreements. If we have a million HD sets out there by the end of the year, you'll see more channels sooner.

Q: What's the one thing people should look for in satellite TV in 1999?

Echostar: New legislation, white areas are the first thing
Hubbard: New consumer understanding.
PrimeStar: Positive cash flow.
DirecTV: World peace.

Digital TV Meets the Internet Summit

CES Intro: For the first time, it is becoming clear that the Internet is about to become a significant part of the consumer electronics industry. At its heart it is becoming part of TV, music, radio, photography and telephone. The key is digital and mass accessibility. This session will focus on the way this will all come together and take shape.

Panel:
Steve Perlman, WebTV
John Taplin, Intertainer
Thom Kozik, Wavetop
Allison Dawlor, Alan Brody co-hosts

Alan Brody:

When it started the Internet was a practical version of what interactive TV will become. It's like El Nino: we heard about it for years but now it's happening. eTV is enhanced TV, set-top boxes. This convergence won't drive off the brick and mortar companies but enhance them if the retailers understand it.

This will be driven by broadband. We don't know what appliances and devices will work but if we bring Internet together with television, it will create the biggest market of this century. Imagine the explosiveness of Internet share values applied to the biggest entertainment medium in the world.

Stephen Perlman, Web TV:

We've learned some things by being the first providers to bring the Internet into the living room. Viewing distance, about five feet in the living room, is good for entertainment but not for spreadsheets. A different audience joins the Web from five feet away. We have about 700,000 subscribers, 1.5 million Americans using Web TV (because 2.2 people use each set). We grew 500,000 subs in 1998, and are in 11,000 retail locations including Wal-Mart and Kmart.

Web TV users are like TV users, not PC users, with an average age of 43, about 50/50 male and female, and they use Web TV very heavily - once a day on average.

Despite the predictions, people do like to interact with their TVs, so it's a matter of having good content. One very positive development is the creation of ATVEF, the Advanced Television Enhancement Forum, which is creating a standard for interactive TV based on HTML. Everyone can build their applications on the standard. WebTV plus is the first appliance built on it.

We also have a new system working through Echostar based on ATVEF. The model 7100 Echostar receiver is the first Internet receiver with a satellite connection, fully integrated with added features, available spring 1999. It includes an 8.6 GB disk drive [Replay] that gives

you to features like pausing live TV, seeing replays, recording shows, and recording speculatively.

We can also download video games onto the disk in a few seconds and play them. In 2008 the smallest drive you can buy will be a terabyte drive costing about $60, which will let you record a lot of television. It's all integrated to your VCR as well.

As we develop, we will be doing things like downloading our home page from the satellite every night, and over time, certain large objects like video files on an allied news page coming down at 500 K. We also cycle and pre-load sports ticker, TV listings, and stock ticker information so users have it all the time, whether they are logged in or not. There is also a chat room attached to each program where viewers can discuss what they are seeing.

The possibilities are endless. The whole notion of prime time will change when we have thousands of hours of recording capability and shows can be down-loaded in advance. TiVo and Replay are doing very similar things.

John Taplin, Intertainer:

Intertainer is a broadband service delivered over high-speed modems and now the SA Explorer 2000 cable set-top box. The company is funded by Sony, Intel, NBC, Comcast and US West. We're into market trials now.

We believe in a Java-based standard delivered over any device. It has an intelligent agent, profiled separately to each member of the family, that suggests content you might like. You can see movie trailers, rate them, and when you buy, you have a 24-hour licence to watch it: allowing you to pause, rewind etc.

Interactivity also covers advertising: as in the Gap ad we created where the viewer can click on and buy any of the clothing. This encourages impulse buying. Bringing advertising and interactivity together are crucial part of the future.

In the music section you can scroll up and down a hundred different formats. You can check pricing information and buy the album directly. If someone goes into any commerce section of the service we'll aim commercials at them depending on their choice of area. When icons pop-up they can check out the product, put it in the shopping cart, and make their final purchase decision at the end of the session. In a cooking show they can pause at any point, check the recipe, and buy something.

Producers don't want you to go off on the Web while their program continues, so we arrange to pause the program while you use the interactive tools. There's many ways to use these tools and we hope people will develop the interactivity and deeper content possible.

Brody:

PC users want convergence too and what's out there, like Broadcast.com, is not very effective. The audio suppliers have done a good job, and perhaps we're going to see video also created to accompany people while they work.

Thom Kozik, Wavetop (from Wavephore Corporation)

We carry any kind of content through any kind of network. We use 14 FM sideband stations, a big satellite footprint carrying Skytel paging. We also datacast on the VBI in analog TV signals with PBS across the US.

We can rent space on our data carriage platform. We broadcast content continuously on the VBI into the cache on the PC. Wavetop is embedded in Windows 98; Intel's Intercast is also built on our product. If you purchase a computer from Sony, Dell, Compaq or Gateway with the TV tuner card our software is in the box.

Our model works because broadband will take time to roll out. ADSL will be slow getting there and cable modem subscribers experience slowdowns as soon as they become popular in a neighbourhood. There will also be many users still on dial-up, so to use broadcast signals to get into those systems makes a lot of sense.

Jupiter will tell you that there are two million broadcast-ready PCs out there now, ramping up to 20 million by 2000, due to reductions in the price of the card. We'll see every PC being able to receive this information. [DTV-ready PC cards have already been announced.] So lots of Internet information can be sent directly to devices, both PCs and hand-held, from broadcast towers.

As a service, Wavetop is an advertising supported product, targeted at home PC users. One of the interesting features of our network is that we can select and sell regional areas, unlike the Internet where regional selection is very difficult. That also applies to program content where we can supersede the national broadcast with local information.

We download tons of information into your PC. We'll broadcast a gigabyte a day by the end of 1999: you can choose to keep it or delete it. We have a broadcast schedule: every Thursday receive the latest games, every Monday you receive the latest Windows utilities.

In the normal Internet experience there are many delays in watching a video segment. Getting it instantly changes the user's perspective. Most Internet eCommerce experiences are limited too. All of the merchandising used carefully in mail-order catalogs is thrown away on Internet with these tiny thumbnails to the lowest common denominator of 28.8 connections. WaveTop changes that: the consumer gets a full-screen detailed shopping experience.

Question: The mobile devices and applications issue?

WaveTop: It's important for us to reach these devices with our information. We would filter, scale down on hand-held devices.

Question: Will Web TV have an Internet like phone service?

Web TV: There's no reason why not. We haven't focused on it because of household connection issues. An infrared handset would be helpful.

Question: Where do you see your products in the context of high bandwidth satellite connections?

Intertainer: If anyone can provide 1.5 Mbps we are fine with it.

WaveTop: Consumers can never get enough bandwidth. If they get more they demand more, so if we see widespread high bandwidth connections consumers will want video chat rooms, and so on. Our approach is to broadcast all the essential data that lots of people will want, which frees up capacity for interactivity.

Web TV: If it works we'd like to use it. We would tailor our product to work with that means of transport.

Question: Will the pause feature of Web TV play havoc with the advertising?

Web TV: The interactive commercial that can lead directly to purchase is much more attractive. When you can target the audience it will work well.

Intertainer: We're seeing glimpses of the future. Advertising will change. Targeting is more efficient and less annoying to the consumer. But people are sensitive to their privacy. They don't like information about them being tracked, so you have to be careful to get permission and if you don't get it, send them a generic ad.

Supersession: The DTV Report

Moderator(s): **Gary Shapiro, CEMA;**
Joel Brinkley, The New York Times
Susan Ness, Commissioner, FCC

CES Intro: Two months following the initial roll-out of digital television, manufacturers, retailers and broadcast executives will provide an update on consumer acceptance, broadcaster and program status and set availability

Tom Campbell, Dow Stereo/Video
Joe Flaherty, Senior VP Technology, CBS
Stanley Hubbard, USSB
Saul Shapiro, VP Technology, ABC
Terry Shockley, Shockley Communications
Peter Smith, VP technology, NBC

[This session contained little new information, so what follows are highlights.]

- Over 40 stations, not the 24 expected , are on-air. Satellite is providing high-definition aggressively. The CBS / Time Warner agreement shows some hope for cable carriage. Nonetheless DTV transition is expected to be a slow and lengthy process. Issues of carriage, copy protection, and interconnection must all be solved.

- The networks did not describe aggressive plans for high-definition, and as far as I could tell, nothing beyond what had already been announced.

- Tom Campbell, the retailer on the panel was excited about high-definition. He has been moving sets rapidly. CEMA reported that 13,176 sets have been shipped to dealers so far. [At that rate, they should make their projection of 150,000 sets in 1999.]

- Campbell also reported concerns about the amount of high-definition programming available, and customers' questions about pay-per-view. He was nonetheless confident that HDTV would sell as the ultimate statement of affluence.

<u>Susan Ness of the FCC</u>

- She repeated the support she had stated a year earlier for the broadcasters position rate cable**. She insists that we complete digital signal and all of its features should get through to the consumer, unaltered by the cable operator.**

- While she still sees issues, such as copy protection solutions and affordability, she has been encouraged by the work on the 1394 agreement and on the specifications for cable ready sets.

[Ness's statement is significant. If the FCC rules that cable operators must carry the whole

digital signal of the television operator, then they will be able to do less gatekeeping on digital enhancements to television, such as interactive advertising. If they can strip data out and replace it, then all interactive ads are under their control. Interactive advertising is only effective if they are also providing a return path for the users' responses … an issue that has not been fully joined. Presumably, retail cable boxes will pass through responses under the broadcasters' control with no interference from the carrier.]

Manufacturers panel:

Frank DeMartin, Sharp
Peter Fannon, Panasonic
Jeffrey Gannon, Zenith
Robert Minkhorst, Phillips
Steve Nickerson, Toshiba
Mark Knox, Samsung
Jim Palumbo, Sony
Gilbert Ravelette, Thomson

- Shapiro asked the manufacturer panelists what percentage of **digital** sets sold in 1999 would be standard definition v. high definition. Their response was that at least two thirds of all digital sets sold would be HDTV sets. [This reflects the high-end early adopter market.]

- Optimism was the keynote of this panel. Each manufacturer confirmed that they were meeting demands that they considered quite strong.

- HBO's offering of a high-definition signal in two months time was the most positive programming step they could see. However Sharp noted that cable was still crucial for the long-term. Panasonic agreed and noted that they were all ready for a more rapid production schedule once cable was clearly committed. Toshiba noted that not all cable was uncooperative. Others noted that the success of over the air was the basis of the whole system since 98 million households are reached by over the air networks.

- The manufacturers were reticent to define success in terms of HDTV sales in 1999. They cited other objectives, such as maintaining total set sales including analog, eliminating customer confusion and improving awareness, and resolving the 1394 conditional access issue.

- All were skeptical that analog would be turned off in 2006. They are advising their customers and dealers that this is not an issue they should be overly concerned with.

- The session ended on a positive note from Panasonic's Fannon, who believed that HDTV rollout will surprise people by being faster than they think. He cited advertiser interest in HDTV as a new driver.

Mass E-Commerce: When Every TV is Online

CES Intro: E-Commerce has already become the most promising area of the Internet in the business-to-business and technology product buying. What happens when major brand names meet with the convenience of universal Internet shopping? How will consumers really respond? What are the business models to launch? Come to this session to find out the answers to these questions.

Panel:

Alison Dawlor,
Alan Brody co-hosts:
Gary Arlen, Arlen Communications
Phillip Swann, TV Online
Mike Ramsay, TIVO

Brody:

ECommerce has had a huge effect on the valuations of websites. But the experience is not what we anticipated. We learned early that once people went online they expected huge choice in one place - you had to have a warehouse to succeed, like Amazon.com did with books.

Onsale and Ebay show how expectations are upset. Who ever thought that auctioning would be a big deal? Internet users want to be active; they are having a huge impact on the stock market. [because they behave differently from "brokered" transactions.] When every TV is online that demand for involvement will bring up even greater differences.

Gary Arlen:

Says we're entering an era of electronic everything. Email, emalls, ebilling, etailing, epayments. But cybershopping is still shopping - we're trying to improve on the store experience. Partly by developing communities of interest, getting advice. Shopping is entertainment - a social process. How do we maintain that? Can we get the same product mix as a mall?

ECommerce requires many new models: new approaches to presentation and to customer support. Advertisers changed their attitudes too, at first seeing it as a cost-per-thousnad model, then moving to a percentage of transaction.

Reality check: we had a big Xmas online season, and online may reach $13 billion for the entire year, but overall annual US retail sales reach $2.6 trillion. Walmart alone sells $118 billion a year.

What do customers want: convenience, bargains, shopbots to get best price. So what's the killer ecommerce app? Our goal is to make it easy to fill the "must-do" rather than the

discretionary activities. Price-based commodity shopping will be a problem because it lowers margins. And we have to keep choice up.

The 5 Ds have replaced the three Cs of teleshopping: control, convenience and cost are now distribution, display (how we show it) databases, delivery (fulfillment, returns) dollars (how do you handle the back room, credit, payments etc.)

How to succeed: Be there with something really new. Create a conducive environment for your product - use affinity groups. Reinvent distribution channels. Who will win? Brands, specialist products in a good category, certain media products that can bring audiences, be eye-catching.

Mike Ramsay, TIVO.

Describes TIVO (pronounced TEE-voh, and described in the "Some Booths on the Show Floor" section of this report)

TIVO is a digital video recorder with some interesting applications. It records and plays back simultaneously, so the user can "pause" live television and pick up where they left off or fast forward to come back to real time. It also records programs for you, based on their match to your expressed preferences - which you describe by giving programs a "thumbs up" on the remote button. Consequently it can potentially target commercials based on expressed preferences, but it also allows one to fast forward through commercials.

TIVO has preferential deals with some suppliers based on which they create "network showcases". These provide more in depth information on some programs. [At the moment they have no Canadian showcase partners.]

Philip Swann, publisher of TV Online, formerly published Satellite Direct magazine.

#1 thing that people are looking for in an Internet interactive TV device is more choices. In our first issue we talk a lot about how you can purchase on-line; we believe that entertainment will drive interactive TV. If you can bridge the well-known TV model you will have a winner - "Entertainment is going to be the bridge to eCommerce and it's going to be the bridge to the Internet on television."

Panels' Favourite eCommerce applications: Amazon, auctions, Waiters on wheels.

Q: What does it cost networks to be a TIVO showcase?

TIVO: No monetary exchange; the networks pay to create the additional information needed for the showcase. We could do a deal based on percentage of sales where that's applicable. Excited by the possibilities of eCommerce on TIVO platform - it's a more passive buying experience.

Brody: Not about entertainment. I say it's about providing bandwidth and product. The best that's out there, and TIVO has manipulated the TV experience to improve it without changing it.

On the Internet, products that empower people succeed. Ebay enables people to sell stuff to each pother. It's got collectibles, computer products, etc. They also sell books on how to sell products on eBay, which makes people think they can make money on it. Will people move from Coke ads to buying Coke shares on the TV?

Dawlor: The product goes along with the cult of celebrity, draws in famous people in every range.

Swann: TIVO will succeed because it's based on entertainment. Ebay is entertainment in the "shopping as entertainment" sense. If you link entertainment to interactive or Internet it will be a big winner.

Arlen: Buying shares of Coke is a business for eTrade, or Schwab or Merrill-Lynch, not for Coke. We're inventing a new business, but we have to put it in terms of business we know but that will change. The real convergence is in applications - advertising embedded in the program.

Philip Swann: It triggers the impulse buy - like moving from a music video to clicking and buying it.

TIVO: Right now the download is too complicated. Creates the gap between online and TV.

Swann: You could do that now with Wink etc.

Brody: Using MP3 you can do that now and capture it on the equivalent of the Walkman - a product that is a child of this environment. Could be extended to other media as well - movies, TV etc.

Q. TIVO is giving us the opportunity to skip all commercials, which attacks the whole basis of TV economics. You have to extend the eCommerce model to stay alive, by embedding advertising in the program itself.

Swann: Gets very complicated to regulate truth in advertising when editorial and ads are combined. Can't touch it under first amendment rights.

Dawlor: The National Infomerical Marketing Association was formed in response to that federal pressure. Now they're renamed the National Electronic Retailing Association.

Arlen: Remember the "puffy shirt" episode of Seinfeld? They could have sold a bunch of those with this capability.

TIVO: We've been sensitive to the possibility of skipping commercials and haven't made it easy but it's possible. The advertisers understand that this is going to happen. They will

respond with more attractive ads, and ads that are targeted to each viewer's interests. They will change the experience to give the user the choice of ads and how deep they go into them. They'll find a way to spend their ad budgets creatively in the TV environment.

Dawlor: There will also be a progression down the product chain, especially with children's programming. We've seen M&M and Pillsbury doughboy dolls just like we've seen the Power Rangers go through dolls all the way to Broadway.

Brody: Commercial skipping is not a big problem, because people like ads. In the early 80s the ad business was terrified of the channel changer, of people zapping away from commercials, but it never happened. And ads changed. More creative and entertaining now than they used to be. Half the Madison Ave. agencies are owned by British companies because they were used to the entertainment based ads.

Swann: The Superbowl ads are a good lesson - often more entertaining than the game.

Q. What kind of eCommerce software would you recommend for people who want to sell online?

Brody: Icat sells a catalog package that allows you to create an instant online catalog. ISPs offer authentication and credit card processing. Interworld is used by Cybershop.

Dawlor: Egobox is really good.

Q: Will we see eCommerce pricing models vary based on demand management?

A: Yes. We see that even now on infomercials , where the price drops during the program.

Future Trends and Market Forecasts in Wireless

Moderator(s): **Peter Nighswander, The Strategis Group**
Rhona Jobe, Geoworks
Roger Snyder, Unwired Planet

CES Intro: This session will cover the necessary and vital scope of information analyzing the present and future market trends of the wireless industry. Statistics and future opportunities including challenges also will be discussed, such as multiple services, pricing points and re-defining the service end of the industry. The Carrier/Operators are trying to go beyond traditional voice and move toward wireless email and Internet applications. Find out where the capability and potential for wireless is heading.

Peter Nighswander, the Strategis Group

- Subscriber growth for wireless email is promising, rising from 8.4 million subscribers in 1998 to a projected 47.3 million in 2003 (US only).
- Wireless Internet growth is still a few years away. He projects growth from 200,000 subscribers in 1998 to ramp up slowly to 600,000 in 2001 and then rise steeply to 2.2 million by 2003.
- The wireless industry as a whole is projected to grow from 55 million users now to 133 million by 2003. He sees 1999 to 2003 as an industry consolidation and growth period.

Rhona Jobe, Geoworks:

(Geoworks supplies platforms, services and consulting to wireless OS manufacturers and carriers. Their real-time operating system is in the Nokia 9000 handset and their services include Interface plus, news, sports, and weather, for carriers' services.)

Enhanced mobile phones are in the middle range between standard cell phones and wireless PIMs. They can use bitmapped screens to provide value-added Internet services, such as email, paging, and data services, as well as voice. She estimates the growth in the enhanced services market to go from the current 32.5 million users to 206.5 million by 2003; from $3 billion to $25 billion in services over that time.

She attributed low take rates of existing services to complicated user interfaces: while 21% of cell phone users take call waiting, 14-19% take voice mail, and only 2-5% take short message services.

Enhanced services are vital for carriers, however, because they increase customer loyalty in a market where replacement purchases will soon exceed new purchases of cell phones. Replacement purchasers are more demanding and sophisticated but will be less inclined to switch carriers if they have invested in data services.

She projected replacement purchases to grow from 42.3 million in 1998 to 150 million in 2003, while new purchases grow from 76 million in 1998 to only 81 million in 2003.

To drive the enhanced services market, phones need a compelling user interface: flexible, graphical, intuitive and engaging. These interfaces will also provide opportunities for branding as well as the data that the consumer seeks.

Roger Snyder, Unwired Planet:

He outlined four trends in the wireless market:
- prices are low enough that cell phones are consumer devices
- the demographics of cell phone ownership are changing
- basic service is becoming a commodity
- the revenue per user is lower, so wireless companies need new services to sell

This places new demands on the provider:
- pre-paid service to expand the market
- making the product simpler to deal with the consumer not the business user

Both consumer problems and carrier problems must be addressed:
- consumers have too many devices: palm pilots, pagers, cell phones etc.
- features other than voice are difficult to use
- carriers find customers expensive to care for
- there is heavy churn among customers
- every handset is a different experience

In the future, every handset will contain a micro-browser to receive timely information: traffic, voice notification, email, pager messages, etc. The customer will be able to look up their own billing and rate information. These features will increase loyalty because the customers email, address book, and calendar are in the phone. These capabilities will create new vertical applications such as real estate listings, dispatch applications, transportation information, and the ability to act on messages receive.

WAP (Wireless Application Protocol) is working to create new browser standards. Unwired Planet's business is to provide the server at the carrier network, with intelligent filters to extract the relevant data from existing Web pages and send that to these small devices. If the content provider uses WML, the standard markup language designed by WAP, then their pages will display well on small devices. 3 x 12 character displays with two soft keys are the minimum specifications for WML. 20 handset manufacturers and 3,500 developers are part of WAP, including Ericsson, Motorola, Nokia and Unwired Planet. Over 70 companies are now pledged to use WML.

For this market to develop we must have phones with good screens at price points below $150. The existence of the standard will allow carriers to differentiate and innovate.

Question: If the price to the consumer must be driven down, who will pay for all the new services?
Answer: Costs for customer service will also go down as a result of automation. In banks, the transaction with a teller costs $1.27, while and ATM machine transaction costs 15 cents. Similar economies will work here.

In addition, customers are willing to pay for new services if they are valuable. And finally, the developing business models for the Internet can also apply here, such as taking a split on any transaction.

The "Walled Garden" model may also apply. Wireless Knowledge is another solution: but it is just a pipe to the Internet; it doesn't help the carrier build affinity to the customer. AT&T Wireless follows the cable model, by providing customers with collected content: airline schedules, Bloomberg financial, etc.

Question: When will we see color interfaces on small devices?

The battery is the limitation. They are getting better but color demands much more juice. The handheld form factor is also a limit, as is bandwidth.

Phone manufacturers will want to tailor their user interface for themselves. Windows CE is too heavy and expensive for these $150 phones. 3G will create the next generation of high-speed wireless IP applications, but not anytime soon.

Accessing New Profits: Set-Top Converter Boxes Hit Retail

Moderator: **Matthew York, SmarTV**
Panelist(s):
Don Dulchinos, CableLabs
Ken Klaer, Scientific-Atlanta
Tim Lindenfeber, Broadcom Inc
Jack Chaney, Samsung

CES Intro: In 1998, the FCC gave retailers the opportunity to sell cable converter boxes for the first time, providing consumer electronics dealers a new profit vehicle. How does this product fit into the retail mix? How should it be demonstrated and merchandized? This session will introduce retailers to this exciting new category and offer tips on how to sell a product most consumers traditionally rent.

CableLabs:

The first part of his presentation dealt with decisions and standards developed by CableLabs. These included Data Over Cable Service Interface Specification (DOCSIS), packet cable, and various open cable decisions, including POD, the point of deployment module which will allow security features to move onto a smart card, enabling cable converter boxes to become retail devices; decisions on multiple operating systems which will allow software to be written easily for cable boxes; and aspects of the 1394 specification.

We now have the situation where cable and consumer electronics are in peaceful coexistence. We have interoperability, now we will move into certification of cable modems.

The clear theme of this show is home networking with non-traditional devices. We are interested in enabling every service over cable, and we believe that lots of media functionality will migrate to other devices in the house.

We have now deployed digital video in over one million homes.

Scientific Atlanta:

Scientific Atlanta is a $1.2 billion a year company providing equipment to the satellite business, the transmission business, and the cable subscriber. In the future, we will focus on service, not technology. **There will be no more proprietary boxes in the cable industry**. The current consolidated networks are becoming interconnected and two-way. Now they can provide voice and data as well.

Phases of service arrival from set-top boxes:
1. More channels
2. Video on demand
3. Email and chat

- Internet browsing
- electronic commerce

- high speed data to the PC
- addressable advertising

4. IP telephony

By July 1999, you have to be able to separate conditional access as a function in order to allow retail boxes. This is underway: we are in development of this module. We'll now have competition. How soon? It depends on network improvements and other factors but July 2000 is the retail deadline.

Broadcom Inc:

Broadcom is a developer of integrated circuits to enable broadband communication over cable, phone line, and wireless. We sell to General Instruments, Scientific Atlanta, 3Com, Motorola, Cisco Systems, Nortel etc. formation is to be the leading supplier of silicone for broadband digital transmission. We're involved in XDSL, cable modems, DBS, MMDS etc. We can now deliver 52 Mbps over telephone wire. [he did not indicate over what distance.]

We're trying to put the entire system on chip. We are well on the way to a single chip cable modem (except RF tuner), and the same for the set-top box.

Samsung:

We are the fifth largest TV supplier in the world. We plan to be selling a cable box next year.

The cable modem is one of the most significant precursors to digital service delivery, but it requires networks. Samsung is pushing on home networking, developing a "home-wide web". Lexmark, Motorola, and Visa are involved.

Question: What prices will retail boxes be introduced at?

Broadcom: The low end set-top box, like an analog box, could be between $100 and $200. The high-end box, including the cable modem and advanced graphics to allow program guides and enhanced television, could be at the $300 level. The box may have to be subsidized by services, as is the case with DBS. Bank of America is expected to subsidize the TCI box in return for having their logo on the screen when the box turns on.