- Networks & Computers & Other I/O are lowest level

- Key new element is the MIDDLEWARE!

- ARCHITECTURE Depends ~~entirely~~ Karmacly on Process for Mgmt of Nil Evol

- STANDARD interfaces (servers particularly)
  STANDARD objects
  Degrees of Active Agent Behavior

- Organic Evolution
  Models economic developments & Activity

- Information Marketplace

SETTING THE CONTEXT

Needs BACKGROUND & RATIONALE
CURRENTLY STATED

ISSUES TO DISCUSS

- How to interpret Modularity
- What is & what is not Scalable within the Architecture
- Scope of Presentations & Environments
- Architectural vs Efficiency Considerations
- Internal vs External Capabilities (including internal visibility)
- Sequential, Non-Seq, Best Effort transmission, Delivery, Presentation
- Burst Management for Catch-up
- Public & Private & Dedicated Channel

→ What can over-air receiver do

How to Incorporate

1. Last Mile as "General purpose" distribution mechanism (as well as special purpose)

2. Relation of proposed approach (apprs to NII and Info. Marketplace

3. International developments (somewhat gracefully)

4. Storage & Retrieval of Multi-Media works (wrt specific formats and contents)

5. Knowledge Attachments

6. Rights Management in Network Environment (Automated or Semi-Auto)

7. Role of Internet

October 6, 1993

To: Joint Experts Group on Interoperability
Advisory Committee on Advanced Television

From: Mike Liebhold
Apple Computer, Inc.

Re: ATV in the Context of the National Information Infrastructure (NII)

Recently, President Clinton, and Vice President Gore announced a series of initiatives supporting a National Information Infrastructure (NII). The NII will ultimately enable all Americans improved communications, collaboration, access to libraries of multimedia information and educational resources, thereby improving national learning and productivity.

Lifelong learning is a necessity, not a luxury for America. There is a direct link between the skills of the nation's workforce and the resultant standard of living of that nation. Education is the foundation for the quality of life and the proper functioning of the social and political process.

The NII is a major national issue that demands an unprecedented level of collective commitment and cooperation of all stakeholders -- students, parents, teachers, doctors, administrators, local communities, hospitals,, business labor, and many agencies of state local federal government.

Advanced Television and HDTV offer great promise to serve as a catalyst for interoperable image communications thereby enabling telecommuting, extension of the formal education into homes and communities extensionof the informal lifelong learning process and enabling the delivery a wide range of new electronic information services including public health information.

As we review the Grand Alliance proposal, we must answer two critical questions:

- How will digital HDTV accelerate information and media services?

- How would an interlaced-HDTV inhibit market formation for electronic education and publishing? (There is no disagreement that interlace is not suitable for text and fine graphics, maps and diagrams.)

Currently the Grand Alliance proposal includes interlace transmission formats. If approved by the FCC, the first generation low-end interlace-only HDTVs will not be able to enjoy the benefits of the NII. Unfortunately, those elements of our society that most need the benefits of the NII, can least afford more than one high resolution display.

There is, in fact, no migration strategy that will permit these first generation interlace-only receivers to EVER display NII services. Further, once these receivers are in place, broadcasters will become captive to the installed base of low-end TVs and will therefore be unable to move from an interim interlace standard to a standard that will enable all Americans to enjoy the benefits of the NII.

Computer Systems Policy Project

John Sculley Apple

Robert E. Allen AT&T

Eckhard Pfeiffer Compaq

James E. Gustey Control Data Systems

John F. Carlson Gray Research

Ronald L. Skates Data General

Robert B. Palmer Digital Equipment

Louis E. Platt Hewlett-Packard

Louis V. Gerstner IBM

Edward R. McCracken Silicon Graphics

Scott G. McNealy Sun Microsystems

James G. Treybig Tandem

James A. Unruh Unisys

KENNETH R. KAY, Executive Director
1735 New York Avenue, NW Suite 500
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202 628-1700 (Fax) 202 331-1024

May 20, 1993

The Honorable James H. Quello
Chairman, Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Dear Chairman Quello:

As the Federal Communications Commission approaches a critical crossroads in its Advanced Television System (ATV) standards process, the Computer Systems Policy Project (CSPP) urges you to establish a technical framework for ATV based on maximum interoperability. Such a decision will accelerate U.S. leadership in information technologies and stimulate the deployment of an enhanced National Information Infrastructure (NII).

CSPP described its vision of the NII, potential applications in healthcare, education, manufacturing, and access to information, and key policy principles for achieving the NII in its January 1993 report, Perspectives on the National Information Infrastructure, which I am enclosing. In that report, we noted that interoperability of applications and technologies across sectors is the key to successful implementation of the NII. A well designed ATV standard that will allow interactive information to be easily conveyed, viewed, and manipulated across a variety of consumer and professional settings and applications is essential to the development and wide deployment of the applications that will bring the benefits of the NII to people and businesses.

I am attaching a brief description of the key technical requirements for an interoperable ATV standard that will support the applications described in CSPP's paper and accelerate the development of a wide range of new information-based products and services. In brief, we believe that progressive scan transmission and square pixels are two of the critical factors necessary to achieve a fully interoperable ATV.

The Commission has an opportunity to select an interoperable ATV standard that all sectors can embrace. If a non-interoperable standard is selected, even on an interim basis, this may delay the widespread adoption of ATV by initiating a process to develop a

second standard that all industries would be able to use. It is quite possible that many broadcasters would wait for the completion of this second, superior and more useful standard.

The Computer Systems Policy Project urges you to support maximum interoperability for ATV by adopting a standard based on progressive scan transmission and square pixels.

Thank you for your consideration.

John Sculley
Chairman
Computer Systems Policy Project

Enclosures

cc: Representative Ed Markey
Representative George Brown
Representative John Dingell
Senator Ernest Hollings
Senator Daniel Inouye

KEY REQUIREMENTS FOR AN INTEROPERABLE ATV STANDARD
The Computer Systems Policy Project
May 20, 1993

The findings from the interoperability review conducted by the Federal Communications Commission's Advanced Television Advisory Committee point out that progressive scan and square pixels are critical factors to achieve a fully interoperable ATV.

Progressive Scan (non-interlace)

The computer industry tried to use interlace scan years ago, but found that the display flicker produced on fine text, lines, and graphics rendered it unusable. We learned that ergonomically acceptable information displays require progressive scan. Interoperability will be made unnecessarily difficult and expensive -- and less effective -- if interlaced ATV images have to go through a scan conversion process whenever they are used outside the entertainment domain. Likewise, flicker problems on interlaced ATV receivers connected to future information highways will severely compromise their ability to display text, line, or graphics information. For these reasons, progressive scan transmission is essential for interoperability.

The use of interlace in advanced television systems, as some propose, could cause a serious dilution of the renaissance of a new U.S. digital video communications industry. On the other hand, a system based on progressive scan would stimulate a new array of products and services.

An interoperable, long-lived standard at a minimum requires the transmission signal to be progressive scan -- regardless of whether in the short term the two extreme ends of the delivery chain (cameras and displays) remain interlace with de-interlacing occurring in or near the camera before transmission and with scan reduction occurring at the display.

Square Pixels

The computer and information industries have standardized on square pixels. Square pixels allow lines and shapes to appear smooth and well formed when manipulated by digital circuitry. The conversion process for square/non-square pixel representations is inexact and inefficient and degrades image quality. Any ATV system that uses non-square pixels will seriously compromise interoperability.

Other Factors

We recognize that the development of ATV continues to make progress and that all proponents continue to improve their systems. The proposed standards are all digital, and all remaining proponents have committed to a flexible packetized data transport structure and universal headers/descriptors. This approach is necessary for the long term success of the standard. Only a digital ATV solution that is flexible, with open interfaces, will provide benefits to both the computer and television industries. There must be no obstacles in the form of proprietary components in the standard.

Because ATV systems consist of several components, considering these components separately will make it easier for the U.S. to influence worldwide standardization. Five components that must be defined with open interfaces are: 1) audio/video capture; 2) audio/video data compression; 3) signal distribution; 4) audio/video data decompression; and 5) displays.

In addition, there are other interoperability and extensibility issues, identified in the Advisory Committee's interoperability review, which the Commission should address in conjunction with the computer industry in the near future.

Interoperability Is Important to Stimulate Wide Adoption

The computer industry and other imaging industries -- including suppliers to the healthcare industry and the education community -- are willing and able to invest immediately in progressive scan technologies. Many of these communities are already using or adopting high resolution systems well in advance of the television industry. The wide application of such systems will generate economies of scale that will reduce or eliminate the high cost of converting signals across disparate environments. Such wide adoption will make its application more affordable for broadcasters in the future. If the Commission establishes a standard broadcast image framework that will allow many industries to share the economies of scale of sub-component systems, such a system will be widely adopted. If a broadcast standard is chosen that is not interoperable, most certainly another process will have to be initiated to develop a harmonious architecture.

Summary

By taking the above considerations into account when selecting an ATV standard, including an interim standard, the Commission will ensure the adoption of a forward-looking standard that will be broadly extensible to many industry sectors and applications and will accommodate future technology trends that we cannot predict today.

Jack Fuhrer
Hitachi America, Ltd.
HDTV Receiver and VCR Manufacturer

Grand Alliance and MPEG2

The Grand Alliance proposal is moving towards a position of incompatibility with the MPEG2 standard. Currently the GA proposal for transport is a constrained set of the MPEG2 systems layer. These constraints exist partly as a limit of parameters to make MPEG2 systems an implementable design and partly to identify those features of the systems layer which are not needed by the Grand Alliance. Thus it will be possible to construct a system decoder for GA HDTV which will not necessarily recognize all the functionality of the MPEG2 systems layer, however, any GA bit stream should be compliant to MPEG2 systems standard and thus be processed by any MPEG2 systems decoder.

In video coding the GA proposal has syntax features which where deemed unnecessary by the MPEG video group (AC leak). Thus any GA video bit stream is potentially undecodable by a standard MPEG2 main profile decoder. It is reasonable and logical to constrain the GA proposal to be a valid subset of MPEG2. This will insure that any GA bit streams are decodable on any MPEG2 main profile high level equipment. This will lead to interoperability between GA bit streams and any future equipment which makes use of the international standard. The current roadblock to this interoperability is the AC leak syntax.

FAX TRANSMITTAL SHEET

HITACHI AMERICA, LTD.
Advanced Television and Systems Laboratory
307 College Road East
Princeton, NJ 08540
Tel Number: 609-520-0071 Fax Number: 609-520-8953

Date: OCTOBER 18, 1993

To: Robert Sanderson, Chairman

COMPANY: ACATS Joint Experts Group on Interoperability

FAX #: 716/253-6284

From: Jack S. Fuhrer

Number of pages including cover: Two

RESPONSE TO: Interoperability Review Panel Document

Please don't weaken the strong case for MPEG compliance by incorrectly implying trick play problems with AC-leak.

I am making reference to your fax, Page #4:-
Summary Results of the Review include:
-- MPEG compatability needs to be resolved without compromising US ATV-burden on GA to conform to MPEG-2 ,or demonstrate benefits of AC-leak, in which case GA would coordinate with US national body, a new request to amend MPEG standard and propose resolution of VCR trick mode issue

AND

Fax, Page #11:-
Recurring Issues:
--Video -- AC Leak:
(In view of the high degree of compatibility that the GA HDTV system has achieved with the emerging MPEG-2 standard, the remaining divergence

OCT-18-93 10:37 FROM: HITACHI ASL ID: 609 520 8953 PAGE 1
6095208953

appears an undesirable obstacle to interoperability. Burden of proof is on the GA to demonstrate significant and consistent improvements with AC-leak over solutions compliant with MPEG-2. Experiments should take into account realistic conditions of random access of compressed data stream and critical source material. Should the experiment be favorable to AC-leak, the GA will coordinate with the US national body on a new request to include the technique in an amendment to the standard to be produced in time for HDTV deployment).

The connection you have drawn between the MPEG compatibility problem of AC-leak, and AC-leak's supposed problem with VCR trick play is incorrect and therefore inappropriate.

Background.... My lab has demonstrated and published a trick play technique for MPEG-compressed data streams. We are acknowledged experts on the VCR trick play of compressed bit streams. (This is new since the 1992 meeting of the Interoperability Panel)

Hitachi is strongly opposed to AC-leak as long as it remains outside the MPEG-2 umbrella. *(We also believe it was correctly excluded from the MPEG umbrella)*
I did not correct the incorrect statement that was made at the meeting about AC-leak's inability to be trick played because I thought that the wrong statement about the trick play of AC-leak was of minor importance. Your summary, however, attaches major importance to the VCR trick play of AC-leak, so I feel I must speak up. Hitachi's trick play technique is equally as applicable to AC-leak compression as it is to MPEG. While it is true that the other announced trick play technique would not work well with AC-leak, I think the case against AC-leak due to incompatibility with MPEG is more correct without reference to trick play, and certainly not in the executive summary.

Perhaps the confusion leading to the wrong statement arose because the Zenith/AT&T system that was tested had DC-leak as well as AC-leak. In that case, it was not possible to trick play the bitstream with satisfactory image quality. The change from total signal leak to only AC-leak has greatly ameliorated the trick play problem.

Once again I strongly urge you not to weaken the strong case for MPEG compliance by incorrectly implying trick play problems with AC-leak.

OCT-18-93 10:38 FROM: HITACHI ASL ID: 609 520 8953 PAGE 2

CableLabs

Cable Television Laboratories, Inc.
1050 Walnut Street, Suite 500
Boulder, CO 80302

To: Robert Sanderson
Chair, Interoperability Expert Group
FCC Advisory Committee on ATV Service

From: Craig K. Tanner
Cable Television Laboratories, Inc.
Chairman, Transport Expert Group
and Member, Technical Sub-Group
FCC Advisory Committee on ATV Service

Date: October 5, 1993

Subject: Interoperability Concerns of the Cable Television Industry

The cable television industry has some vital interests in the interoperability of the advanced television system currently under development. This letter reviews these topics for the consideration of the Joint Expert Group on Interoperability which you chair.

Cable Modulation Mode

In its presentation to the Advisory Committee's Technical Sub-Group, The Grand Alliance has committed to developing an extension of the expected broadcast modulation mode that will allow the transmission of two ATV programs in a single six megahertz channel on cable television systems. Before formation of the Grand Alliance, CableLabs tested the 16-VSB transmission system designed and built by Zenith Electronics Corporation, with good results. The Grand Alliance has since indicated that it is considering an alternate QAM-based modulation technique that will achieve a similar bit rate in a 6 MHz cable channel, namely 256-QAM.

There may be some wisdom in choosing a cable modulation mode that is a natural extension of the still undetermined broadcast modulation mode, but what is most important

is that the ATV standard incorporate this cable mode and require agile digital receivers to be incorporated in all ATV receivers. In this way, all consumer receivers will automatically identify either "broadcast mode" or "cable mode" transmissions, and provide seamless reception in either case.

More than 62 percent of U.S. homes receive their television signals from cable systems. Cable systems are also planning to become providers of a wide range of broadband, interactive digital services to consumers. Inclusion of the cable modulation mode is essential to optimizing the use of cable system bandwidth and thus making bandwidth available for other information-age services.

Conditional Access System

The cable television industry is a major supplier of subscription pay and pay-per-view television services. As cable systems migrate to digital transmission and interactive network capabilities, these programming services will grow in popularity, thus improving program choice for viewers.

An essential element in the health of this supply of programming is the ability to provide access to those who are interested in paying for premium services, while denying access to those who do not wish to do so. While digital transmission provides an excellent platform for an effective conditional access system, its many elements must be carefully planned. The FCC Advisory Committee's Expert Group on Transport will be examining the Grand Alliance Proposal to be sure it allows the functionality required to implement successful conditional access sub-systems, and we urge the Interoperability Expert Group to do the same.

Viewer-Transparent Data Reallocation

Current plans for a packetized digital data transport scheme will allow great flexibility in devoting portions of the data stream to information other than the compressed video and audio data. At times, it will be desirable to convert the majority of the data capacity of the channel to this other data, if only for a short time (some number of seconds), as in software downloading, or addressing of subscribers for conditional access.

This feature will be useful for a range of services, but only if the data stream can be allocated in a "viewer-transparent" manner. In other words, the broadcaster or cable operator must be able to continue to provide meaningful picture and sound while the data transmission is taking place, thus providing continuity of service to viewers.

This will require careful specification of techniques, perhaps to be implemented largely on the receiver side, that will devote the preponderance of the data capacity to this other data, while maintaining for the viewer a display of either a still picture, or a small window with motion video surrounded by a graphic. Audio should accompany both. This simplified display will require only a fraction of the full data capacity, thus freeing most of the channel's data capacity for the transmission of the other data.

This "viewer-transparent data reallocation" capability should be a documented part of the ATV standard that is required in all ATV receivers, lest it not be able to be used for fear of disruption to receivers without the proper functionality.

Interlace vs. Progressive Scan

CableLabs supports the Technical Sub-Group's proposal for an ATV service which would launch with a 1,080-line interlaced raster format with the necessary "hooks" in the transport systems and in all receviers to allow a transition some years later to a progressively scanned image. Achieving a credible plan for such a migration will be challenging, but it offers the best scenario for highest picture performance and a proper fit with real-world economics, while positioning the North American ATV system as a central component in the coming National Information Infrastructure.

Conclusion

CableLabs and its member companies look forward to reviewing the details of these aspects of the ATV system proposed for standardization, andwill perform laboratory and field testing as required.

MARL

October 4, 1993

INTEROPERABILITY ISSUES.

1. Do we require square pixels for transmission standard?

In case the answer is yes, and we expect that the production standard has higher resolution horizontally than the transmission, then the production standard must have higher resolution vertically (more lines) as well to maintain square pixels.

2. Why do we insist that the horizontal resolution for the production has to be better than for the transmission, but are satisfied with vertical resolution being the same for production and transmission?

3. How many times the HDTV signal can be compressed and decompressed. This becomes an important issue for editing on lower level (for computers and many consumer applications).

4. For home VCR format, could it be considered practical and economical to drop the header and descriptors and to reorganize the packets for optimum shuttle performance. This must be an industry standard for interchangeability reasons. (Encryption etc., could be a problem). In general how flexible is the transport coding.

5. Migration to higher quality.

- *Is it realistic to consider to transmit terrestrial HDTV at regular quality, and to reserve the augmentation for satellite and cable transmissions.*
- *I see some major problems (S/N) for higher level QAM or assigning a second RF channel for enhancement data.*
- *How does the receiver identify where the enhancement channel is (channel coded into the header, or channels allocated in pairs?)*
- *How can the home VCR handle this?*

6. International interoperability.

- *Our main objective is to create a US terrestrial transmission standard. 18 Mbps in a 6 MHz channel.*
- *The 625 line countries have typically an 8 MHz terrestrial channel, with different frame rate and a different compression requirement. This, in case any of the transmissions will be terrestrial, the plan has been to transmit HDTV via satellite with possibly even wider bandwidth.*
- *We have already a new proposal from Europe for a 1152 x 1440 standard, which is not related to any of the present format proposals.*
- *The best way toward international standardization might be to create a US standard as soon as possible, with maximum flexibility (interoperability) and a system that is easy to convert to other standards.*

Jukka Hamalainen

PANASONIC TECHNOLOGIES Inc.

Matsushita Applied Research Laboratory

95D Connecticut Drive, Burlington, NJ 08016 USA

Telephone 609-386 5995 Fax 609-386 4999

TO: MR. R. SANDERSON
CHAIRMAN INTEROPERABILITY REVIEW PANEL

FROM: JUKKA HAMALAINEN / MARL

SUBJ: INTEROPERABILITY SUMMARY REPORT

PAGES:

Dear Bob,

I feel that a couple of issues have not been expressed clearly enough.

1. The main issue is the transmission standard, and the situation must be seen in this light. Many comments tend to reflect production standard.

2. 1080 x 1920 format is a production format, in analog terms it means that we must have at least 1125 TV lines to create vertical interval, perhaps even more because 45 TV lines total for vertical deflection in CTR's or charge transition in CCD's has not been shown to be practical yet.

3. Square pixels, I feel that we must specify or recommend whether this requirement is for transmission or production standard. Or we must specify that production and transmission standards must have the same number of TV lines and pixels per line.

4. In considering the flexibility of the transmission standard, in addition to being able to insert data, we must specify the number of Codec's possible. I feel that at least three compress/decompress cycles should be established as specification or guideline.

5. This in general brings the robustness issue. Until now the 1280 x 720 system is the highest data rate system tested by ATTC. We have no proof yet that any of the new higher data rate systems can be successfully compressed. This is a very important interoperability issue.

6. Finally the NII, I am very much for including NII data in the transmission scheme. However, this again has to be specified clearer, especially in the executive summary.
   a) NII is an interactive network.
   b) Over the terrestrial transmission network, it can be transmitted to the viewer only under the control of the distributor.
   c) The format has to be decided upon.
   d) Distribution over other channels that can be interactive (cable, or fiber optics highway) has to be clarified better.

Sincerely,

Jukka Hamalainen

JKH/jay

CHANGE:
Consolidate GA/MPEG2 to 100% MPEG2
(HP/ML -no AC leak)

WHY?

* MPEG does not yet support AC leak

* Multimedia PC's 5M+/yr & rising:
  MPEG enabled

* IBM actively supports MPEG2

BENEFITS?:

* Gain in cross-platform compatibility

  -- transparent exchange of video
  from computer sources

  -- support for exchange with
  international MPEG community

  -- broadest customer base will be
  most successful & extensible

[illegible]
IBM MICROELECTRONICS

Before the

Advisory Committee on Advanced Television
Joint Experts Group in Interoperability

October 6, 1993

Electronic Frontier Foundation, Inc.
1001 G Street, NW
Suite 950 East
Washington, DC 20001

Phone: (202)347-5400
Fax: (202)393-5509
Internet: eff@eff.org

HDTV and the National Information Infrastructure

Affordable Information Appliances Are Critical For the NII:

- The promise of the NII for delivering critical services such as education, healthcare, and federal, state, and local government information will only be realized if citizens have affordable information appliances.

- Affordable information appliances are necessary to avoid the creation of information haves and information havenots.

HDTV Can Play A Critical Role In Promoting Access to the NII for All:

- The ACATS should promote a standard which supports the convergence of information and entertainment services. The goal is what Microsoft's Bill Gates has called the PC/TV.

- The Administration's Information Infrastructure Task Force has stressed the need for interoperability:

  "To assure interoperability and openness of the many components of an efficient, high-capacity NII, standards for voice, video, data, and multi-media services must be developed."

Avoid Unnecessary Expense to Consumers:

- Since consumers will be investing significant resources based on the new standard. the ACATS process should seek a standard which promotes both high-quality entertainment and expanded information access.

- If HDTV standards meet the needs of both business users and consumers, the leading edge business uses can help drive down the eventual cost to residential users.

• • • • •

Electronic Frontier Foundation: EFF is a non-profit, public interest organization, founded in 1990 by Mitchell Kapor and John Perry Barlow. EFF's public policy mission is to insure that the new electronic highways emerging from the convergence of telephone, cable, broadcast, and other communications technologies enhance free speech and privacy rights, and are open and accessible to all segments of society.

Received: from Kodak.COM (kodakr.kodak.com) by mailroom.itc.kodak.com with SMTP id AA10117
(5.65c/IDA-1.4.4 for <roberts@itc.Kodak.COM>); Fri, 15 Oct 1993 19:17:36 -0400
Received: from relay.tek.com by Kodak.COM (5.61+/2.1-Eastman Kodak)
id AA18313; Fri, 15 Oct 93 19:18:23 -0400
Received: by relay.tek.com id <AA07598@relay.tek.com>; Fri, 15 Oct 93 16:02:12 -0700
Received: from gvgpsa.gvg.tek.com by tektronix.TEK.COM (4.1/8.0)
id AA01899; Fri, 15 Oct 93 15:58:44 PDT
Received: from gvg47.gvg.tek.com by gvgpsa.gvg.tek.com (5.65/DEC-Ultrix/4.3)
id AA19126; Fri, 15 Oct 1993 16:01:18 -0700
Received: from MR.GVG.TEK.COM by gvg47.gvg.tek.com (PMDF V4.2-12 #4050) id
<01H45B8AINCWMXC4OO@gvg47.gvg.tek.com>; Fri, 15 Oct 1993 16:01:26 PDT
Received: with PMDF-MR; Fri, 15 Oct 1993 15:48:09 PDT
Mr-Received: by mta GVG49.MUAS; Relayed; Fri, 15 Oct 1993 15:48:09 -0700 (PDT)
Mr-Received: by mta GVG47; Relayed; Fri, 15 Oct 1993 15:48:18 -0700 (PDT)
Alternate-Recipient: prohibited
Disclose-Recipients: prohibited
Content-Return: prohibited
Date: Fri, 15 Oct 1993 15:48:09 -0700 (PDT)
From: "Peter Symes (916) 478-3437" <symes@am.gvg.tek.com>
Subject: FWD: How to Kill ATV and the NII
To: Robert Sanderson <roberts@itc.kodak.com>
Message-Id: <5409481515101993/A05113/GVG47/117A7BF00100*@MHS>
X-Envelope-To: roberts@itc.kodak.com
Autoforwarded: false
Mime-Version: 1.0
Content-Type: MULTIPART/MIXED; BOUNDARY="Boundary (ID zHEZnLI6t47N+zN8SxNzYw)"
Importance: normal
Priority: normal
Ua-Content-Id: 117A7BF00100
X400-Mts-Identifier: [;5409481515101993/A05113/GVG47]
Hop-Count: 0
Status: R

--Boundary (ID zHEZnLI6t47N+zN8SxNzYw)
Content-type: TEXT/PLAIN; CHARSET=US-ASCII

Bob:

I don't know if you saw this. It seems that you are getting a great deal of e-mail input, much of it addressing the question of the relationship between ATV and the NII. I feel that some of the comments made at the workshop were unrealistic, so I'd like my comments to be taken into account also!

Thanks: Peter

* * * * * *

--Boundary (ID zHEZnLI6t47N+zN8SxNzYw)
Content-type: MESSAGE/RFC822

Subject: How to Kill ATV and the NII
Sender: "Peter Symes (916) 478-3437" <symes@am.gvg.tek.com>
To: HIERARCHY <hierarchy@farnsworth.mit.edu>
Message-id: <4145351108101993/A00577/GVG47/117A42E32600*@MHS>
Autoforwarded: false
Content-type: TEXT/PLAIN; CHARSET=US-ASCII
Importance: normal

I feel I must offer some strictly personal comments on statements made at the Interoperability workshop this week concerning interoperability of ATV and the NII.

First, things I believe in:

1) I am an advocate of progressive scan. I regard it as essential that the ATV system deployed support a progressive scan system from day 1. I personally believe that it would be preferable to go progressive only, rather than incorporating an interlaced mode, but I recognize this as a judgement call, and that many people whose opinions I respect highly disagree with me.

2) I believe strongly in the NII. I think it is vital to the interests of the United States in many, many fields. It is important that it be accessible not only to industry, health professional etc., but also that it support all aspects of education and be accessible to the man in the street, including the inner cities.

3) I believe it is essential that NII and ATV interoperate flexibly and smoothly. I accept that NII will be square pixels and progressive, and would not even suggest any other approach.

HOWEVER:

Statements were made that for the NII to meet its goals it was essential that all domestic TV receivers have progressive displays, and that this should be legislated if necessary. The general tone of the statements was that a 1280x720 progressive display would be the minimum requirement for NII use.

MY COMMENTS:

a) The cost of a display system is closely tied to the scan rate. A requirement that only progressive display was allowed would substantially increase the cost of an entry level ATV receiver. It's going to be difficult enough to get ATV off the ground. If entry level receivers are not affordable, there will be very low penetration, little incentive to expand programming and a much lower chance of achieving a critical mass within a reasonable period of time. This could kill ATV.

b) There was no suggestion that the 1280x720 display was the maximum that would be useful or supported by the NII. Clearly this would be nonsense. So, what we are really talking about is the minimum requirement to access NII.

c) Making the minimum requirement for NII access a 1280x720 progressive display inhibits rather than enhances access to NII by the general public. It certainly is not the way to bring NII to the inner cities. This would kill NII as a truly public system.

d) There are millions of 640x480 computer displays in the field. Are these to be regarded as unsuitable for minimum level NII access?

e) A suggestion was made that reasonable test of ATV/NII interoperability (and a reasonable requirement) was to ensure that all ATV transmission modes be capable of carrying 640x480 text and graphics. The expectation here was that, although a progressive display would be preferable, the information content would be fully accessible on an interlaced display. This approach was not regarded as acceptable by the advocates of progressive-only displays.

f) Although I believe that NII should be accessible via an ATV display, I don't believe we should look upon this a the primary means of access even by the general public. Provide a suitable data connection, and I can get a perfectly adequate personal computer with a 640x480 color display for around $500-$600.
(i) It will be cheaper to buy an ATV receiver with an interlaced "entertainment quality" display "plus" this computer, than to buy just an ATV receiver with a progressive "workstation quality" display.
(ii) It is even cheaper to buy an NTSC receiver plus the computer.
(iii) Either of these scenarios allows access to NII "plus" simultaneous viewing of television programming by another family member.

As information access becomes more a part of our daily lives we will have to get away from the attitude that only the elite and yuppies will have more than one display in the home.

g) Clearly some NII applications will require more than 640x480. However, if the NII is to be truly accessible I do not believe that the entry level requirement can be set any higher than this. This would also be a reasonable minimum requirement for NII via ATV.

h) BUT if we are really serious about making NII accessible in the inner cities - make the minimum display requirement be 320x240. Make a really cheap adapter and provide access via the 10**8 plus NTSC receivers out there.

DirecTv

DAVE BAYLOR
VICE PRESIDENT
OPERATIONS

15 October 1993

In response refer to:
DBSO-93-1054

Mr. Robert Sanderson
Chairman
ACATS Joint Experts Group on Interoperability

Dear Robert:

I have reviewed the Executive Summary of our meeting of October 6th and 7th and find it to generally capture the content and major issues of our discussions. I did submit an input (copy attached) which should be included as part of the record. I will also take this opportunity to reiterate my feeling that the availability of low cost consumer hardware is vital to the success of HDTV and that decisions that are counter to that endanger the likelihood of widespread acceptance by consumers.

I look forward to our next meeting.

Sincerely,

David A. Baylor

DAB/lml

Attachment

2230 E. IMPERIAL HWY., EL SEGUNDO, CA 90245 PHONE: (310) 535-5000
A subsidiary of Hughes Communications, Inc.

DirecTv Comments on Interoperability Aspects
of the Grand Alliance Proposal
October 6, 1993

DirecTv generally supports the technical proposals of the Grand Alliance and commends the group for their excellent work.

We believe that the availability of low-cost consumer equipment, and professional equipment priced approximately 20% above current levels will accelerate the availability of HDTV.

The use of B-Frames makes a significant enough improvement to warrant their inclusion in the format.

Universal headers/descriptors provide needed flexibility in the use of the data for numerous formats.

Musicam audio coding is our preferred implementation of audio.

Packetized data in the MPEG-2 format offers the best economic and performance trade-offs to insure ready acceptance and availability of chip sets.

David Baylor

MEMO.

October 15, 1993

TO: Interoperability Panel Members
Joint Experts Group on Interoperability

FROM: Martin Schenker
Managing Editor, Dow Jones & Co.
Multimedia Development Group

SUBJECT: Position on Advanced Television Standards

It is our position that the convergence of entertainment, information, computers and consumer electronics creates a compelling need for an advanced TV standard that allows for the most robust environment to transmit a variety of media types.

Dow Jones, publisher of The Wall Street Journal, Barron's, The Dow Jones News Service and other electronic wire services, is developing a number of new applications to provide business information beyond our traditional text-based franchise. Among other things, we are now testing a computer-based, on-line multimedia news service that incorporates text, graphics, video and audio designed for large institutional investors. These multimedia documents use a non-interlaced square pixel computer display (VGA resolution). This service will be deployed at five customer sites in the next month. We are convinced that this application can be expanded to consumer use, which relates directly to the goal of ATV Interoperability in areas beyond terrestrial broadcast and cable television transmission.

News services Dow Jones produces now and has under development require that consumer platforms be able to support relatively complex documents that include graphics and text along with video and audio. HDTV Progressive Scan and square pixels are clearly a minimum standard for allowing these Dow Jones services -- and those of other publishers -- to migrate from the office to the home.

ATV standards should also allow for interworkability of applications, data types and information service providers. Header/Descripters should allow for mixed services over a switched network fabric, reducing overall network costs. We urge, too, that varying compression methods and data formats be facilitated.

In addition, we would hope HDTV would allow for interactive services of the type Dow Jones has under development. Requirements would include:
-encryption and authorizations for controlled access to services or product classes.
-prioritization of streams (allowing for alerts).
-support of Inquiry/Response (in two-way network environment).
-minimum encode/decode latency (and support for single frame advance/rewind).
-distribution over high-speed switching fabric or LANs at multi-user site.
-streams recordable to disk for "on-demand" playback.
-scalability (bandwidth on demand) supports varying network delivery capacities and display resolutions.
-audio/video format transcoding.
-control over in-stream subchannels of media (text, graphics, A/V; quote data, metadata, scene indexing and document presentation listing).
-subchannel coding hierarchy.
-downloadable execution code for local application functionality.
-in-band multimedia data (not A/V) of at least 256 kb (with 768kb or greater preferred).
-display resolution of 2kx2k, for document imaging for The Wall Street Journal, for example.
-I/R return bandwidth of 64kb.

We urge that we set our sights at maximum level of functionality and interoperability so that all content providers can gravitate their products to the widest possible audience.

Martin Schenker
Dow Jones & Co.

ELECTRONIC INDUSTRIES ASSOCIATION
[redacted]
2001 Pennsylvania Avenue, NW • Washington, DC 20006-1813, USA
Phone: (202) 457-4919 • FAX: (202) 457-4985

October 15, 1993

		FAX
TO:	Bob Sanderson, Eastman Kodak	716 253-6284
FROM:	George Hanover, EIA	202 457-4985
RE:	Interoperability Review Draft Document (FAX dated 10/14)	

Bob:

Most of the draft seems to reflect the sense of the meeting, and much of the draft uses verbage that was wordsmithed at the meeting. However, I have two points which were discussed at the meeting, but are not mentioned in the draft:

1) New Criteria, item 13, add "Receiver graphics are being addressed, in whole or in part, by the EIA Television Data Services Subcommittee."

2) Context (for ATV --- NII considerations), fourth bullet, after "design of ATV should not inhibit earliest access to NII services," add "NII should not restrict the range of choice of consumer electronic products."

Received: from Kodak.COM (kodakr.kodak.com) by mailroom.itc.kodak.com with SMTP id AA12325
(5.65c/IDA-1.4.4 for <roberts@itc.Kodak.COM>); Sat, 16 Oct 1993 14:12:41 -0400
Received: from IMAGE.MIT.EDU by Kodak.COM (5.61+/2.1-Eastman Kodak)
id AA28757; Sat, 16 Oct 93 14:14:27 -0400
Received: by image.mit.edu (4.1/SMI-4.0)
id AA17894; Sat, 16 Oct 93 14:11:42 EDT
Date: Sat, 16 Oct 93 14:11:42 EDT
From: wfs@image.mit.edu (William Schreiber)
Message-Id: <9310161811.AA17894@image.mit.edu>
To: mnl@apple.com, roberts@itc.kodak.com
Subject: A contribution to the discussion
Cc: wfs@image.mit.edu
Status: R

Here are two short excerpts from my European Commission report that I hope will be helpful in the current discussion.

.This is a troff source file. '.ul' means underline the next n lines
Interoperability

The three current ''buzz words'' in this area are interoperability, scalability, and extensibility. The latter two terms refer to the ability to design systems of different performance based on the same basic algorithms and to upgrade systems in a compatible manner. I prefer to define the single word, interoperability, to include all three concepts, as follows:
.ul 2
Easy interchange of video information between systems of different spatiotemporal resolution, different applications, and different epochs. With respect to this last point, the FCC has already called for nondisruptive improvement over time for the broadcasting system to be selected. This is a property that NTSC and PAL do not have. (The four digital systems tested by ATTC likewise were noninteroperable. All required complete decoding to baseband before converting to any other format.) The only improvement made to NTSC since its adoption is stereo audio. Improvements in picture quality since 1953 are entirely due to improved cameras and receivers, and not to any modification of the signal format.

>From the technical point of view, it is easy to see that it is transcoding that is under discussion.
.ul 4
We would like to have a family of transmission standards with different levels of
performance, and we would like all of these to be usable by any receiver designed to deal with any one of them.
Clearly, this ability must be designed into the system from the start; it cannot be added later. Any doubt on this point is easily dispelled by considering NTSC\(emPAL transcoding. After nearly forty years, this problem is not really solved. The most recent example of the difficulties was presented at the Barcelona Summer Olympics in 1992, in which NBC used PAL for production, transcoding everything to NTSC for broadcast in the US. The film\(emNTSC conversion process is another example, and while film\(emPAL is much easier, it is far from perfect.

Generally speaking, broadcasters are willing to pay lip service to interoperability, but are unwilling to burden the future broadcasting system with what they believe would be the excess cost associated with accommodating what they see as primarily the computer industry's needs. On the other hand, the computer industry has greatly weakened its case by its failure to spend any significant amount of money to develop a system that would be economical and would meet everyone's needs. This is especially damaging since the computer industry has far more resources that might be applied to such an endeavor than do the broadcasters and domestic consumer-electronics manufacturers.

.ul
Need for Interoperability in the Broadcasting System Itself

Actually, a very good argument can be made for incorporating all the elements of interoperability into the broadcasting system, even without considering any other applications. First and foremost is the requirement for a variety of receivers of different price and performance, including inexpensive small-screen
portable receivers. Associated with this is the need for inexpensive set-top converters to permit using existing NTSC receivers with ATV signals. These capabilities would substantially ease the transition to ATV and the abandonment of NTSC broadcasting. In fact, they may be essential to the success of the transition.**
.(f
**NTSC receivers and VTRs will be used for many years after the demise of NTSC broadcasting because of the immense quantity of videotapes and camcorders in the hands of the public. For the same reason, ATV receivers must be able to accept NTSC signals for the foreseeable future.
.)f

Another reason for making the broadcast system interoperable is that ATV signals will reach the home by several routes, including terrestrial transmission, cable, DBS (satellite transmission), VCRs, and, perhaps, optical fiber. Some naive individuals have called for a common standard for all these media. It is much more likely that a series of related standards will be used in order to achieve the most efficient use of each, which have quite different physical characteristics. It is absolutely essential that these various formats be readily interchangeable, or else extra expense and loss of quality will be inflicted on everyone.

Not the least of the reasons for making the broadcast system interoperable is the important step this would make towards a universal world-wide system. The idea of a single world standard was never realistic, and recent advances in compression technology have not changed this situation. However, a hierarchy of standards featuring easy transcodability would be just as useful. The experiments at the MIT Media Laboratory, mentioned in the section on open architecture, show that this is not a dream.

Interlace

.ps 12
.vs 14
Aside from the compatibility question, there is no more troublesome aspect of TV system design than whether to use interlace or progressive scanning. Not only is there widespread misunderstanding of the technical aspects of interlace, there are political and economic
considerations that have further confused the situation.

Exactly how interlace works is not well
understood, even by most TV professionals. The computer
industry has abandoned it because of intolerable interline flicker on computer monitors. The TV industry is much less bothered by this
problem because TV cameras
characteristically have low vertical resolution. Discussion on the issue is confounded in part because many TV personnel still believe that interlace is an effective way to halve the bandwidth requirement. Another complicating factor is the wish of companies that make 1125/60 equipment to have this equipment used as is for HDTV production.

.ul
The ATTC Test Results

Since the ATTC tests, there has been
a heated discussion, partly by e-mail, about
the desirability of using interlace in the new ATV system. A meeting on this subject was held in Chatham, Mass. in May, 1993. The pro-interlace group included personnel of the Hitachi, Sony, [14] and NHK as well as Rennville McMann, consultant to CBS. The progressive-scan group included virtually all representatives of computer companies, who are influenced primarily by interoperability considerations. It is conceded by everyone that progressive scan is superior from the standpoint of interoperability, but the interlace advocates think that that is not their problem and, since progressive scan takes twice the bandwidth, that it is not practical.

C.K.P.Clarke of the BBC Research Department has done a study indicating that progressive scanning has an important role to play in future systems.