

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Comcast Cable Communications, LLC,

Petitioner,

v.

WhereverTV, Inc.,

Patent Owner

Patent No. 8,656,431

Filing Date: July 10, 2006

Issue Date: February 18, 2014

Title: GLOBAL INTERACTIVE PROGRAM GUIDE
APPLICATION AND DEVICE

Inter Partes Review No.: IPR2019-01483

PETITION FOR *INTER PARTES* REVIEW

UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. § 42.100 *et seq.*

Exhibit 1106

Declaration of Dr. Andrew Lippman

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I. INTRODUCTION

1. My name is Dr. Andrew Lippman, and I have been retained as a technical expert by counsel for Petitioner Comcast Cable Communications, LLC., to provide assistance in the above captioned *inter partes* review proceeding. Specifically, I have been asked by counsel to opine on the validity of claims 1 and 3-9 of U.S. Patent No. 8,656,431 (“the ‘431 patent”). This declaration contains a statement of my opinions formed in this matter and provides the bases and reasons for those opinions. I make the following statements based on my own personal knowledge and, if called as a witness, I could and would testify to the following.

II. QUALIFICATIONS AND PROFESSIONAL EXPERIENCE

2. I have included as Attachment A a copy of my current *curriculum vitae*, which provides an overview of my qualifications and professional experience in relation to this matter. I earned my undergraduate degree in Electrical Engineering from MIT in 1971. I earned a Master of Science degree in Computer Graphics from MIT in 1978. I earned a Ph.D. in Electrical Engineering from the École Polytechnique Fédérale de Lausanne (Switzerland) in 1995. My thesis was on scalable video, a technique for representing visual data in a fluid and variable networking and processing environment, similar to what we call streaming today.

3. I am currently a Senior Research Scientist at the Massachusetts Institute of Technology (“MIT”) and Associate Director of the MIT Media Laboratory, an approximately \$50 Million per year research and teaching facility at MIT, which I helped establish in the early 1980s. I direct a special interest research group called Ultimate Media that addresses ways to present, select, interact with and view visual media. The program has considered unified access to visual information and also addresses how broadcast news is presented and understood.

4. At MIT, I have supervised over 50 Master’s and Ph.D. theses in the Media Arts and Sciences program and have taught courses such as Digital Video and MIT’s freshman physics seminar. Through the course of my career, I have directed and served as principal investigator of research projects supported by the Defense Advanced Research Projects Agency (DARPA), the Office of Naval Research (ONR), The National Science Foundation (NSF), and over 50 industrial companies. I have never precisely calculated my net research volume, but it is in excess of \$50 Million.

5. I am named as an inventor on six patents in the area of video and digital processing and have served on the advisory boards for technology companies in fields ranging from video conferencing to music analysis. I have authored or co-authored over 65 published papers in the fields of interactivity, communications, video coding, and television.

6. I served on the editorial board of the Image Communication Journal between 1989 and 2003.

7. I have worked generally on video interaction systems since the 1970's. In the early 1970's, I developed font representations that permitted high quality display of text on standard broadcast television receivers. In 1978, I directed a DARPA-funded project called the "Movie-Map" that used computing and optical video and image storage to create an "experiential map" that featured "surrogate travel," the ability to recreate the visual experience of traveling through a real place, a city. This is similar to Google's Street-View and mapping systems. In the 1980's, I was principal investigator of Office of Naval Research funded programs in video and graphics computer systems for interactive learning dedicated to maintenance and repair. I also developed networked video communications systems that included scripting languages for specifying audiovisual content and representing it on various monitoring terminals. In 1991, I created the "Media Bank" program in the Media Lab the purpose of which was to allow a diverse set of networked devices to access appropriate forms of content for which they had the bandwidth and processing power to display. This entailed maintaining state information about terminal devices at a server and using that to determine the best representation of the audiovisual material to deliver to them. In addition, it included and developed cryptographic distribution methods that insured

secure delivery of information on the network. Related to this work, I also supervised Masters theses on networked distribution of video and coding specifically for diverse uses on the Internet. Also in 1991, I created the Television of Tomorrow program at the MIT Media Lab. This program addressed the digital representation and delivery of video at diverse scales and through diverse networks. This program built on work on scalable representations of images that were standards-independent and interactive. In 1993, I was invited to be a member of Robert Kahn's "Cross Industry Working Group" the goal of which was to develop the ideas for a National Information Infrastructure. At DARPA, Kahn had initiated the research to develop the Arpanet and the Internet. Throughout this period, my students and I worked on distributed interactive systems for consumer use (television, electronic newspapers, learning) including the basic technology of the network and the client-server interactions.

8. I was a member of the Motion Picture Experts Groups, an ISO standards committee effort that defined the standards for common distribution of "MP3" music and storage and distribution of "MPEG Video." I co-wrote the paper defining the requirements for the MPEG-2 standard with Okubo and McCann in 1995. MPEG standards remain the predominant encoding for distribution of digital video to this day. I was also the principal investigator on industry-funded programs addressing digital motion pictures — the "Movies of the Future" program at MIT,

and high definition television, “Television of Tomorrow.” At the Media Lab at MIT, I created the “Digital Life” consortium the purpose of which was to explore and develop ideas relevant to an Internet-connected society.

9. Based on my experiences described above, and as indicated in my Curriculum Vitae, I am qualified to provide the following opinions with respect to the ‘431 patent.

III. MATERIALS CONSIDERED IN FORMING MY OPINIONS

10. In preparing this declaration, I have reviewed and relied on various materials, including but not limited to the following exemplary materials: (1) certain prior art, including the prior art cited in this declaration; (2) the ‘431 patent; (3) the ‘431 patent’s prosecution history; and (4) all of the other materials referenced in this declaration.

IV. SUMMARY OF OPINION

11. As described in more detail below, it is my opinion that claims 1 and 3-9 of the ‘431 patent would have been obvious to a person of ordinary skill in the art as of July 10, 2006 (which I understand is the earliest date of the purported invention claimed in the ‘431 patent), or as of any time after January 5, 2005 (which is the date as of which I understand Ramraz qualifies as prior art), based on the following grounds:

(A) Claims 1, 5, and 7-9 are obvious over Ramraz in view of

Bayrakeri;

(B) Dependent claim 3 is obvious over Ramraz in view of Bayrakeri and in further view of Furlong;

(C) Dependent claim 4 is obvious over Ramraz in view of Bayrakeri and in further view of Bednarek;

(D) Dependent claim 6 is obvious over Ramraz in view of Bayrakeri and in further in view of Calderone;

V. UNDERSTANDING OF LEGAL PRINCIPLES

12. I am not a legal expert and offer no legal opinions. I have been informed by counsel, however, of the various legal standards that apply to the pertinent technical issues, and I have applied those standards in arriving at the conclusions expressed in this report. I understand that determining the validity of a patent requires a two-step analysis. First, the meaning and scope of the patent claims are construed and then the construed claims are compared to the prior art.

13. It is my understanding that to prove that a claim is invalid for obviousness under 35 U.S.C. § 103, the challenger of its validity must demonstrate that, for example, two or more prior art references in combination disclose, expressly or inherently, every claim limitation and also that the claim, as a whole, would have been obvious to a person of ordinary skill in the art at the time the invention was made. The relevant standard for obviousness is as follows:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C. § 103.

14. In determining whether or not a patented invention would have been obvious, the following factual inquiries must be made: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the pertinent art at the time the invention was made; and (4) such secondary considerations as commercial success, long felt but unsolved needs, failure of others.

15. I understand that a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Most, if not all, inventions rely on building blocks of prior art. The challenger of the patent's validity must prove that, at the time of the claimed invention, there was a reason that would have prompted a person having ordinary skill in the field of the invention to combine the known elements in a way the claimed invention does, taking into account such factors as: (1) whether the claimed invention was merely the combination of prior art elements according to known methods to yield predictable results; (2) whether the claimed invention

amounted to the simple substitution of one known element for another to obtain predictable results; (3) whether the claimed invention amounted to applying a known technique to a known device, method or product ready for improvement to yield predictable results; (4) whether the prior art teaches or suggests the desirability of combining elements claimed in the invention; and (5) whether the change resulted more from design incentives or other market forces. To find it rendered the invention obvious, the prior art must have provided a reasonable expectation of success.

16. I further understand that it is not permissible to use hindsight in assessing whether a claimed invention is obvious. Rather, I understand that, to assess obviousness, you must place yourself in the shoes of a person having ordinary skill in the relevant field of technology at the time the invention was made who is trying to address the issues or solve the problems faced by the inventor, consider only what was known at the time of the invention and ignore the knowledge you currently now have of the inventions.

17. I understand that certain objective evidence known as “secondary considerations,” such as commercial success, long-felt but unsolved needs, failure of others, and unexpected results, to the extent they exist, may be relevant in determining whether or not an invention would have been obvious. However, I am

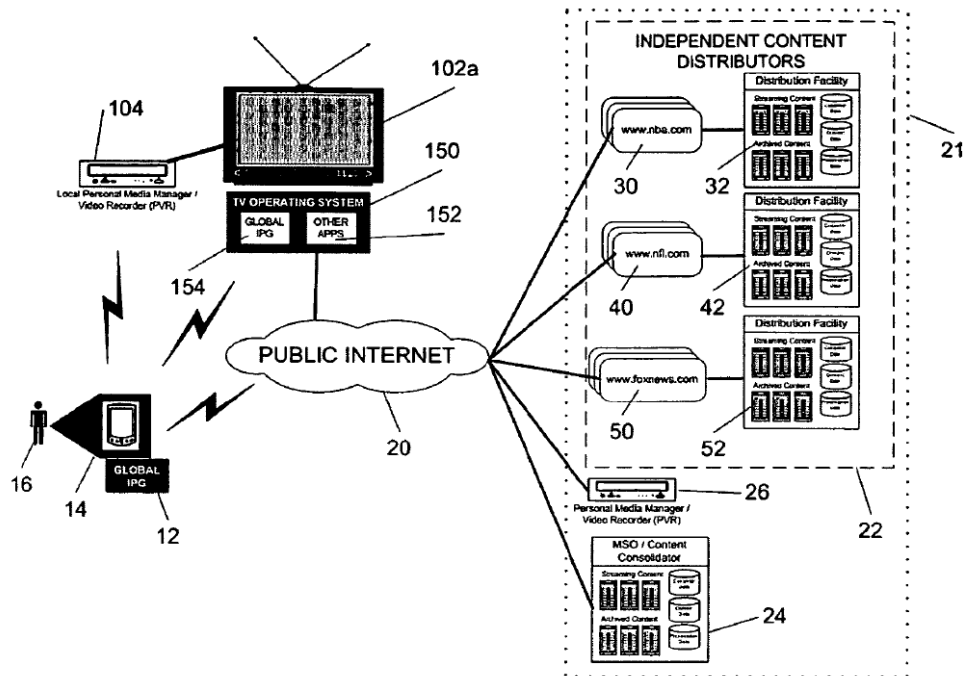
not aware of any such secondary considerations applicable with respect to claims 1 and 3-9 of the '431 patent.

VI. OVERVIEW OF THE '431 PATENT

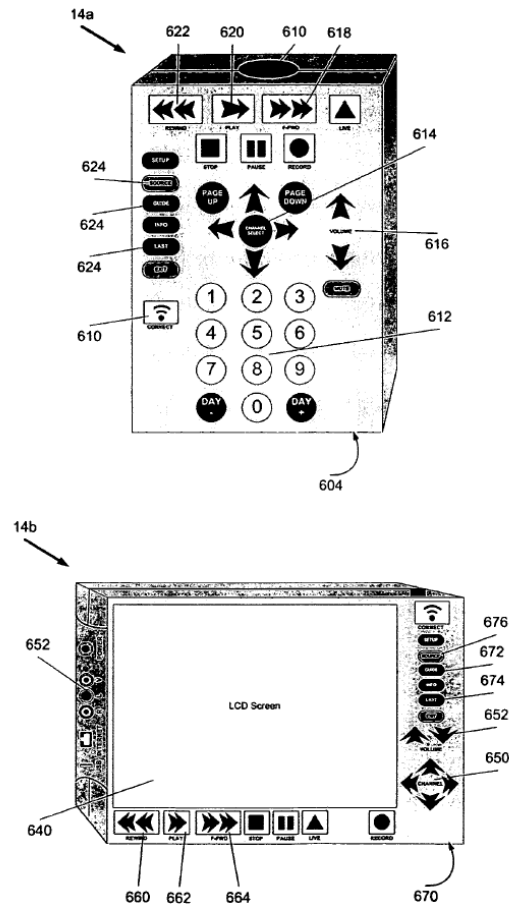
A. Specification

18. The '431 patent presents a system for accessing and viewing television programming that is normally available in one's home from other places. It describes a unified interactive program guide (IPG) for selection of programs that the user can customize to present channels of interest in a familiar arrangement [6:45]. Programs are delivered via the Internet [1:10] and are therefore generally available anywhere. These programs can be the ones normally available from a home provider such as a cable or satellite operator (an "MSO"), or from Internet-based streaming providers.

19. The '431 patent, titled "Global Interactive Program Guide," describes an internet-connected mobile device 14 and an interactive programming guide ("IPG") application 12 that runs on the mobile device 14, as shown in figure 1 reproduced here:



Ex. 1101 ('431 patent) 9:28-10:3. The user 16 can watch video content on the mobile device 14 obtained over the Internet from disparate sources, such as from an “MSO” 24, like Comcast or CableVision, or from “independent content distributors” 22, such as internet-based sources like www.nba.com 30 or www.nfl.com 40. 8:63-9:18; 13:16-26. The mobile device 14 includes a screen to watch video content and alternatively can be used as a remote control when viewing the content on a television, as shown in figure 6:



13:54-14:26.

20. The IPG 12 lists available programming by channel and time. 1:54-62. A user can program the IPG 12 to display, in addition to information about MSO-provided video content, information about video content from independent content distributors and can otherwise “organize, customize, and personalize the organization of content into specific channels based on user preferences.” 6:45, 11:5-8, 11:36-39, 15:21-58, figures 3, 4 & 5.

21. Figure three presents a “conceptual matrix” [10:21] that illustrates the channel lineups of several television programming providers content providers and

shows the lineup that might be presented to a user of this system across the bottom row. The options are presented in familiar locations [10:50].

B. Summary of Prosecution of the '431 Patent

22. As-filed claim 1 that eventually matured into challenged claim 1 appears to have been directed to the described mobile device having the disclosed IPG:

1. A portable content manager device for receiving and viewing content comprising:

an acquisition module that obtains content and data that describes said content from a web server over a communications link; and

an interface module that presents the data that describes said content to a user and receives input from said user.

Ex. 1102 (prosecution history) at 1102.0031.

23. Aside from challenged claim 1's preamble that recites a "content manager device," the issued claim 1 bears no resemblance to as-filed claim 1, having been entirely rewritten over the course of prosecution that involved 10 office/advisory actions. In the end, the examiner suggested that the claims be amended to recite that the IPG application "allows for the IPG to be configured by a user with respect to adding or deleting channels from any of the one or more

MSOs or the one or more MSOs’ [to] place the current application in conditions for allowance.” *Id.* at 735. The applicant followed this suggestion. Ex. 1101 (’431 patent) at claim 1.

C. Priority Date

24. I understand that the patent owner says that the inventor conceived the invention by May 2003 and reduced it to practice in spring 2006. I understand that the patent owner relies on an 11-page document supposedly written by the named inventor. (“WTV 001654-001664”). I have reviewed this confidential document. In my opinion, the two pages that are labeled with May 2003 do not disclose the invention. These pages do not disclose at least the limitations “a server resident on a network containing descriptive program data about video content available from one or more multiple cable system operators (MSOs) and one or more non-MSOs” and “an interactive program guide application installed on the device that provides a user-configurable interactive program guide (IPG) listing at least one channel of video content available from each of the one or more MSOs and each of the one or more non-MSOs and descriptive program data from the server for the video content available on each of the channels” of claim 1.

VII. CLAIM CONSTRUCTION

25. I understand that the claim terms of the ’431 patent are to be construed according to their ordinary and customary meaning as understood by one

of ordinary skill in the art in light of the specification and prosecution history. In my opinion, certain claim terms identified below should be construed as explained below.

A. Construction of “server”

26. In my opinion, the claim term “server” in claim 1 is properly construed as “a computer on a network that supplies information when it receives requests via the network.”

27. Claim language supports this construction in that claim 1 recites a server “resident on a network” that supplies information via the network, namely, “descriptive program data about video content.” Ex. 1101 at claim 1.

28. The specification does not use the word “server” or otherwise implicitly describe any server containing descriptive program data about video content available from MSOs and non-MSOs or that is distinct from MSOs and non-MSOs.

29. I also reviewed the prosecution history, and it provides no description of any server beyond as claimed. The as-filed claims recited a “web server” that the applicant deleted in response to the first office action. Ex. 1102 (prosecution history) 1102.0245 (dated 4/23/2009). A year later, the applicant amended the claims to recite the server of challenged claim 1 but provided no arguments further describing it. *Id.* at 346 (4/22/2010 response).

30. Technical dictionary definitions show that this construction of “server” is correct:

- *McGraw-Hill Dictionary of Scientific and Technical Terms*, 6th ed. (2003) defines “server” as “A computer or software package that sends requested information to a client or clients in a network.” Ex. 1108.
- *Microsoft Press Computer User’s Dictionary* (1998) defines “server” in part as, “2. On the Internet or other network, a computer or program that responds to commands from a client. . . .” Ex. 1109 (italics in original).

B. Construction of “multiple cable system operator (MSO)”

31. In my opinion, the claim phrase “multiple cable system operator (MSO)” should be construed as “an aggregator of video content that provides user access to the video content in more than one community and that exercises control over what video content is made available to the user.”

32. The claim supports that an MSO is an operator that “provides user access to the video content” because it refers to “video content available from one or more multiple cable system operators (MSOs). . . .” 16:33-36, 41-43.

33. The specification describes that an MSO is “an aggregator of video content that provides user access to the video content” and that “exercises control over what video content is made available to the user.”

- “[U]ser 16 can watch a traditional television content available from an

MSO/content consolidator 24, such as Comcast” 3:32-34;

- “The user also has little control over availability of specific content from a cable television MSO. For example, if the MSO chooses not to purchase rights to broadcast a specific content provider’s channel, the user cannot access or integrate that specific content provider’s channel onto the STB’s IPG even if a separate content access relationship has been established.” 3:48-53;
- “There are IPTV providers, which essentially are Internet-based MSO’s, acting as a ‘content aggregation middleman’ between the content owner and the user, but these all follow the traditional cable-television content aggregation model where the MSO, rather than the user, is in control of what content is available.” 2:38-43.

34. The specification supports that an MSO provides user access to video content “in more than one community”: “The formation of the cable television content consolidator, also known as a Multiple System Operator (MSO), in the United States during the 1960s, signaled the birth of a ‘consistent user experience’ television viewing whereby a user could travel from one location to another . . . to access identical programming in distant locations. Ex. 1101 (’431 patent) 1:36-43. Also, Comcast is described as an MSO and that Comcast provided video content in more than one community, namely Philadelphia and Seattle. 6:19-20 & figure 3.

35. During prosecution, the applicant argued that an MSO is “an aggregator of video content that user access to the video content” and that “exercises control over what video content is made available to the user.”

- “A cable company acquires rights to broadcast individual channels from the owners of those channels - i.e. Viacom, NBC Universal, News Corporation, etc. None of these companies are considered MSOs. MSOs are companies like JumpTV, Dish Network, Comcast, Time Warner Cable, etc. MSOs downlink content and then rebroadcast it from their head-end(s).” Ex. 1102 at 1102.0463-0464;
- “An MSO is the equivalent of a cable system that receives and broadcasts channels. An MSO controls content availability, thus if an MSO chooses not to purchase rights to broadcast a specific content provider’s channel the user cannot access that specific content provider’s channel” Ex. 1102 at 1102.0405;
- Jump TV meets the above characteristics of an MSO. Jump TV is the same as a traditional cable multi-service operator (MSO). . . . JumpTV’s system has complete control over what content customers can or cannot access. *Id.*

36. The prosecution history also supports that an MSO provides user access to the video content “in more than one community.” The applicant argued,

“[e]ach cable TV installation serving a community is known as a ‘cable system’, and the operator of the system is called the ‘system operator’. Most system operators run cable systems in more than one community. Therefore, the vast majority of them are Multiple System Operators.” Ex. 1102 at 1102.0463 & 1102.0405.

VIII. FIELD OF INVENTION AND LEVEL OF ORDINARY SKILL IN THE ART

37. The claims relate generally to the field of network devices and applications for sending, receiving, managing, and displaying video content, and specifically to interactive program guides for use in conjunction with video content from one or more sources. Ex. 1101 at Abstract; 1:6-11. A person having ordinary skill in the art at the time of the alleged invention (“POSA”) would have had at least a bachelor’s degree in electrical engineering, computer engineering, computer science, or a similar discipline, and at least two years experience designing or programming computer networks or applications for transmitting or managing video content. Based on my education and experience, including that described above and in my CV, I qualified as a POSA at least as of July 10, 2006 (and even as of May 2003).

IX. TECHNICAL BACKGROUND AND STATE OF THE ART AT TIME OF ALLEGED INVENTION

38. As mentioned, the '431 patent claims relate generally to the field of network devices and applications for sending, receiving, managing, and displaying video content, and specifically to interactive program guides for use in conjunction with video content from one or more sources. I will give an overview of these concepts as known by January 5, 2005, which are as the concepts were known by July 10, 2006.

39. The term electronic program guide (EPG) or interactive program guide refers generally to an on-screen display of available television channels or sources. It is normally laid out as a matrix with channels arranged as rows and broadcast times as columns. Data systems associated with television presented arrays of available programming as early as 1980 (teletext) hence the term EPG. An example of an early IPG is presented by Reiter (U.S. Patent No. 4,751,578, 1988) in which downloaded program schedule information could be perused by time or category (e.g. movies or sports.). United Video Satellite Group demonstrated the first widely distributed program guide that integrated program scheduling as well as parental controls and pay-per-view at an industry show in 1981 and ran pilot programs in Tulsa, Oklahoma in 1981 and Roseville, California in 1985.

40. Systems that allowed selection of which channels to access date from the early 1980's when various inventors built television tuning systems where the user could program broadcast channels into a memory to directly access those channels without scrolling through an entire broadcast band. This is analogous to the pushbuttons on car radios for tuning. Other systems from the era used a variety of means from keys to software to selectively allow access to some channels and deny others. An example is a hospital room where the channels available depended on a payment from the patient.

41. Belisomi (U.S. Patent No. 4,314,375, 1982), and Farina (U.S. Patent No. 4,261,213, 1982) describe systems for presetting preferred channels and for associating a different number for user selection from that which is associated with the broadcaster. Channel arrangements also included the notion of "favorites" and channels grouped by theme as early as 1987 (Young, U.S. Patent No. 4,706,121),. Beery (U.S. Patent No. 5,068,734) also addressed renaming and organizing channels according to use preferences because the cable designation might be different from the over-the-air broadcast channel number. He also created subsets that the user could define a restricted.

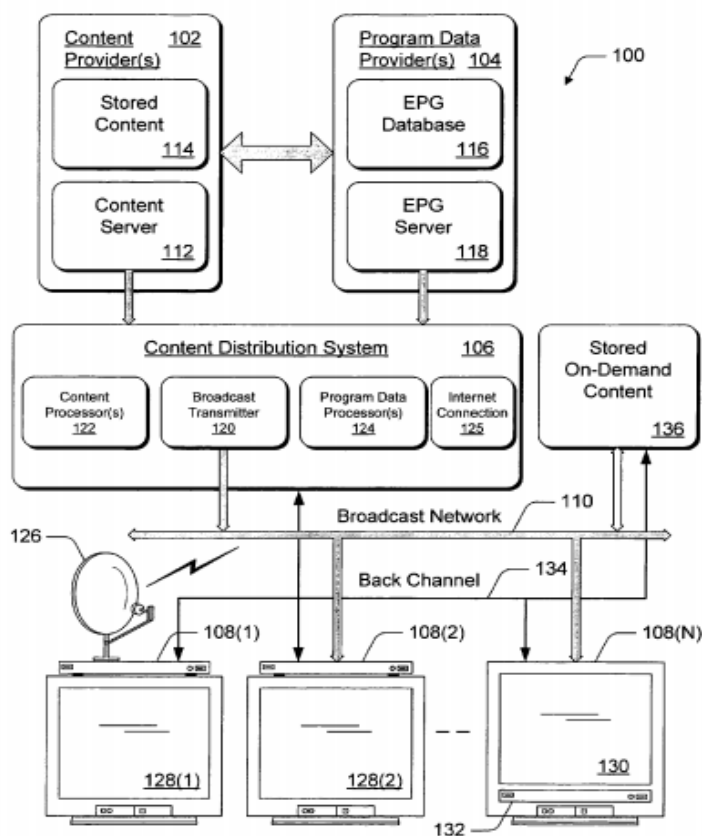
X. OVERVIEW OF SPECIFIC PRIOR ART

A. Ramraz (U.S. Patent No. 7,546,623)

42. Ramraz's title is, "Methods and systems for providing multi-source

content in electronic program guides.” I understand that Ramraz is prior art to the ’431 patent.

43. Ramraz discloses methods and systems for providing multi-source content in electronic program guides. Ramraz (Ex. 1110), Abstract. An exemplary system is depicted in Figure 1 of the patent:



As shown, the system includes multiple content providers 102, which are defined as content sources, such as MSO cable television providers like “Comcast,” as well as other non-MSO sources like “antenna, camcorders, VCRs, and digital camera.” *Id.* at 2:56-60; 3:1-6. The content providers include stored content 114, such as “television programs,” “live” content, and “movies,” and content servers 112 for

delivering the content to a content distribution system 106. *Id.* at 3:48-56.

44. The system also includes program data provider(s) 104, which in turn include an electronic program guide (EPG) database 116 and an EPG server 118. EPG database 116 stores electronic files of program data and is used to generate an EPG. The program data includes “program titles, ratings, characters, descriptions, actor names, station identifiers, channel identifiers, schedule information, and so on.” *Id.* at 3:56-63. The EPG server 118 processes the program data to generate a published version of the program data, which contains programming information for all channels for one or more days. *Id.* at 3:64-67. The EPG server 118 distributes the published version of the program data to the content distribution system 106 over a TCP/IP network (e.g., Internet or an Intranet). *Id.* at 3:64-4:8.

45. Content distribution system 106 can be a network operator that provides EPG data and content to subscribers’ client devices 108. *Id.* at 4:46-48. It includes a broadcast transmitter 120, one or more content processors 122, and one or more program data processors 124. Broadcast transmitter 120 broadcasts signals, such as cable television and antenna signals, across broadcast network 110. *Id.* at 4:20-21.

46. Broadcast network 110 can comprise a data network, such as the Internet. *Id.* at 4:21-31; *see also id.* at 5:14-15: [C]lient devices 108 may receive broadcast signals via the Internet”). A content processor 122 processes the

content received from content provider 102 before transmitting the content across broadcast network 110. *Id.* at 4:32-36. Similarly, a program data processor 124 processes the program data received from program data provider 104 before transmitting the program data across broadcast network 110. *Id.*

47. Figure 12, depicted below, shows an exemplary EPG for use with the disclosed system:

1200

Channel	12:00	12:30	1:00
2 NBC (Ant)			
2 NBC (Sat)			
3 ABC (Ant)			
3 ABC (Sat)			
⋮			
Video 1			
Video 2			

The exemplary grid would be displayed on a subscriber's television screen. *Id.* at 3:15-20; 5:26-34; 10:40-49; Fig. 12. As shown, the grid includes the channel numbers, call signs of the channels (e.g., NBC), a parenthetical indication of the sources (e.g., “(Ant)” for antenna and “Video” for camcorder or other video source), and cells that include other EPG data such as the programs being broadcast at a specific time (e.g., 12:00). *Id.* at 10:41-49. The viewer can access the channels of the guide by either paging up or down through the guide, or by

entering a channel number. *Id.* at 10:56-60. The subscriber can also select a specific channel to view programming on the channel. *Id.* at 8:26-30 (“One way is to navigate within the electronic program guide (e.g. the presented grid), select a specific service and tune to it.”); 11:14-20 (“Assume now that the viewer wishes to select a particular channel for viewing In this case, the viewer might highlight the program and click ‘OK’ on the remote control.”).

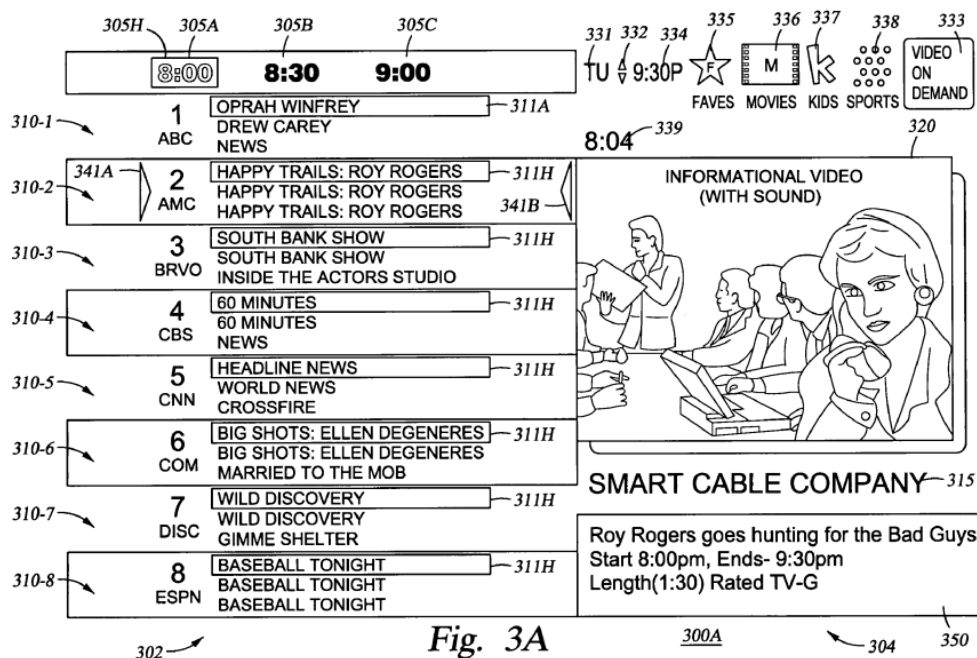
48. A subscriber can configure the guide by deleting channels from it. *Id.* at 14:21-27. Specifically, the patent discloses that “a channel filtering mechanism” is provided to assist viewers in removing channels that are presented in the guide. For example, “if a viewer decides that they do not wish to view guide information associated with channels 2 or 10 or the content on channels 2 or 10, then the viewer can opt to have the channel removed from the guide.” *Id.* at 14:22-27. Although Ramraz does not expressly disclose that the subscriber can “add” channels to the guide, that feature was well known in the prior art by at least the filing of the ‘431 patent, as demonstrated by the following Bayrakeri patent.

B. Bayrakeri (U.S. Patent No. 7,373,652)

49. Bayrakeri’s title is, “Server-centric search function in an interactive program guide.” I understand that Bayrakeri is prior art to the ‘431 patent.

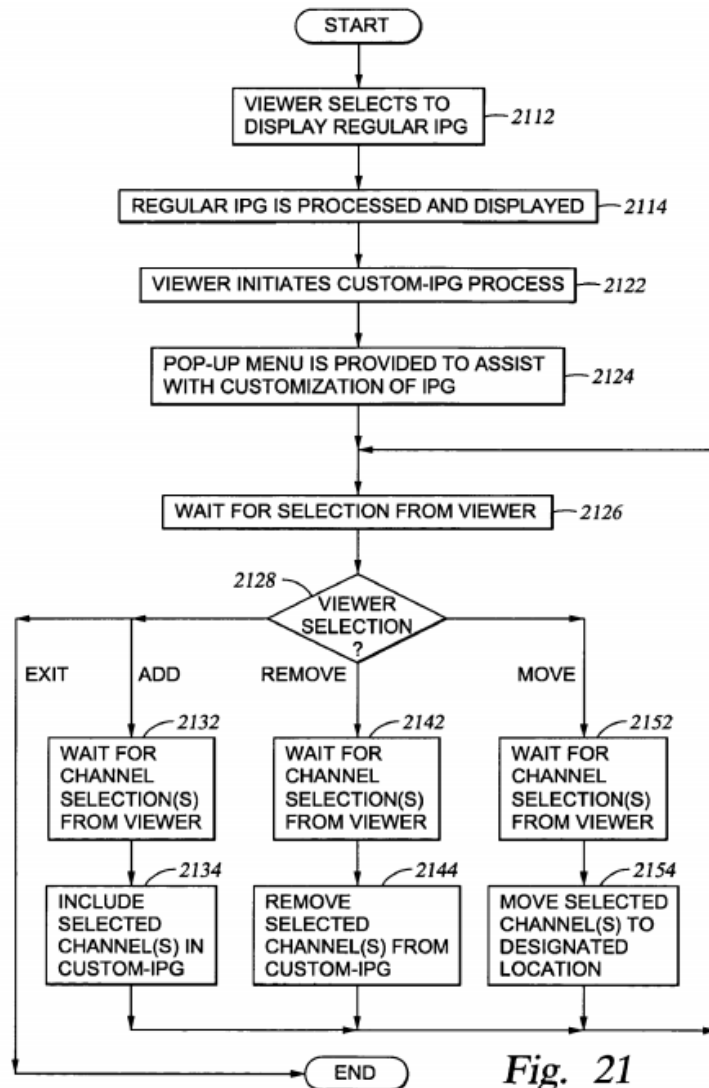
50. Bayrakeri discloses techniques for providing electronic program guides for display on subscribers’ television screens. Bayrakeri (Ex. 1111),

Abstract. Similar to Ramraz, Bayrakeri discloses interactive guides for watching content in the form of grids with times, channels, and program descriptions. An exemplary guide is illustrated in Fig. 3A:



Also like Ramraz, a subscriber using the Bayrakeri system can choose to remove channels from the program guide that he or she does not wish to include. *Id.* at 25:19-26.

51. In addition, the disclosed system allows the subscriber to select channels to add to the program guides. *Id.* The process for doing so is described with respect to Fig. 21:



52. As to steps 2126, 2128, and 2132, the patent teaches that “the viewer can elect to . . . (1) select a desired channel for inclusion in the custom-IPG, [and] (2) remove an undesired channel from the custom-IPG If the viewer’s selection is to *add a channel to the custom-IPG*, the process waits for the viewer’s selection of a particular channel or a set of channels to be included in the custom-IPG” *Id.* (emphasis added). The disclosed system allows the viewer to enter

a channel selection, for example, by “toggling a channel provided on the display . . . , by entering the desired channel (e.g., with the remote control unit), or by some other mechanism.” *Id.* at 25:32-37. The selected channel(s) are then included in the custom-IPG. *Id.* at 25:37-38.

C. Furlong (U.S. Patent Publication No. 2006/0235800)

53. Furlong’s title is “Digital Rights Management for Media Streaming Systems.” Ex. 1114. I understand that Furlong is prior art to the ’431 patent. Furlong discloses a system that provides digital rights management (DRM) for broadcast television programming provided. Ex. 1114 Abstract; ¶¶[0013]-[0015]. A license is used to decrypt and view television-broadcast content, preventing unauthorized use. [0032]; [0038]; [0044]; [0054]-[0058]; Fig. 1. The license terms may limit viewing of a channel for a certain period of time, a maximum number of times, on a specified set-top box (STB), or based on the respective subscription. [0048].

D. Bednarek (U.S. Patent No. 6,009,116)

54. Bednarek’s title is “GPS TV Set Top Box With Regional Restrictions.” Ex. 1115. I understand that Bednarek is prior art to the ’431 patent. Bednarek discloses a set top box that includes a GPS receiver. Abstract. The GPS receiver checks to see if the set top box is at an authorized location and “allows descrambling of video signals only if the location is authorized.” *Id.* The system

includes an antenna 36 that receives video content and GPS data signals that the set top box filters. 9:57-62; figure 2. A processor processes GPS data signals to determine if the box is at an authorized geographic location. 9:63-0:22; 10:22-30; 11:6-11.

E. Calderone (U.S. Patent No. 7,260,538)

55. Calderone's title is "Method and apparatus for voice control of a television control device." Exhibit 1013. I understand that Calderone is prior art to the '431 patent. Calderone discloses a television remote control used to receive voice commands for controlling a television. Abstract; 2:22-23. A user may utter a voice command into a microphone in the remote control, which is then digitized and transmitted to a cable head-end for processing. Abstract; 2:21-33; 5:30-33; 5:52-56.

XI. OPINIONS REGARDING OBVIOUSNESS OF CLAIMS 1 AND 3-9 OF THE '431 PATENT

56. I have been asked to determine whether claims 1 and 3-9 are invalid as obvious in light of the prior art, including the prior art that I mentioned above. In my opinion, a person of ordinary skill in the art as of either January 5, 2005 or July 10, 2006, would have found the claims obvious in light of the prior art. I will address each combination of prior art that I believe renders the claims obvious below.

A. My opinion that claims 1, 5, and 7-9 are obvious over Ramraz in

view of Bayrakeri

57. In my opinion, the combination of Ramraz in view of Bayrakeri renders claims 1, 5, and 7-9 obvious.

1. Claim 1

a) Ramraz discloses claim 1's preamble, "*A content manager device comprising:*"

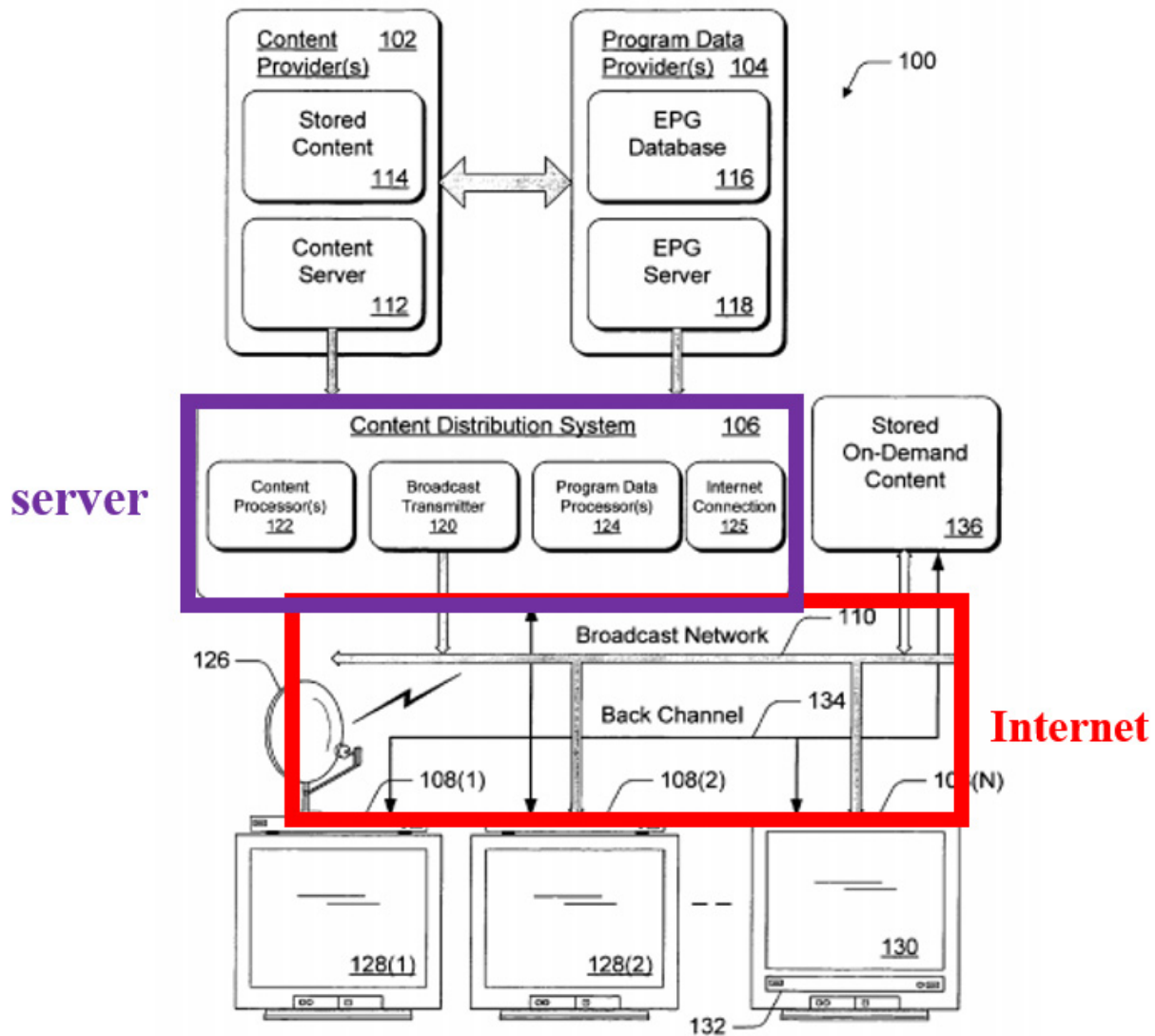
58. I understand that the patent owner has contended that a "content manager device" could be comprised of separate pieces of hardware. Based on that claim application, it is my opinion that Ramraz discloses a "content manager device" as recited in the preamble of claim 1 of the '431 patent. Ramraz discloses a system "for providing multi-source content in electronic program guides (EPGs)" that "can present the viewer with a user interface, such as a grid, that is efficiently and intelligently assembled and managed to foster a desirable user experience." Ramraz, Abstract. As shown in Figure 1 of Ramraz, the disclosed system includes "content distribution system 106," which manages distribution of content from content providers 102 to client devices 108. *Id.* at 4:46-48 ("Content distribution system 106 is representative of a . . . network operator, which provides . . . content, to multiple subscribers."); 4:32-36 ("A content processor 122 [of content distribution system 106] processes the content received from content provider 102 before transmitting the content across broadcast network 110."); 4:20-21 ("Broadcast transmitter 120 [of content distribution system 106] broadcasts

signals, such as cable television signals, across broadcast network 110.”); 5:5-7 (“Client device 108(2) is . . . coupled to receive broadcast content from broadcast network 110 and provide the received content to associated television 128(2)); Fig. 1 (depicting content distribution system 102 and client devices 108).

b) Ramraz discloses “a server resident on a network containing descriptive program data about video content available from one or more multiple cable system operators (MSOs) and one or more non-MSOs”

(1) “a server resident on a network. . . .”

59. In my opinion, Ramraz discloses that content distribution system 106, depicted in a purple box in the annotated version of Figure 1 below, comprises a server that resides on a network (depicted in a red box), such as the Internet:



Specifically, content distribution system 106 may comprise software and hardware, including content processor 122, program data processor 124, broadcast transmitter 120, and an Internet connection 125. *E.g., id.* at 9:29-31, 12:5-7 (“The method can be implemented in connection with any suitable hardware, software, firmware or combination thereof.”). The software and hardware are for receiving and processing EPG data from program data provider 104, as well as video content,

and transmitting it on broadcast network 110. *Id.* at 4:46-48 (“Content distribution system 106 . . . provides EPG data, as well as content, to multiple subscribers.”); 4:32-36 (“Program data processor 124 processes the program data received from program data provider 104 before transmitting the program data across broadcast network 110.”). Furthermore, the hardware/software resides on a network, such as the Internet. *Id.* at 4:20-24 (“Broadcast transmitter 120 broadcasts signals . . . across broadcast network 110. Broadcast network 110 can include a . . . data network, such as the Internet.”); 5:14-15 ([C]lient devices 108 may receive broadcast signals via the Internet”); *see also id.* at 4:4-8 (“The EPG server 118 controls distribution of the . . . program data to the content distribution system 106 using, for example, a file transfer protocol over . . . [the] Internet”).

60. Therefore, content distribution system 106 comprises computer hardware and software on a network (Internet) that supplies information (EPG data or video-on-demand or other video or television content) when it receives requests (e.g., a subscriber selecting to view the guide or a particular channel or video on demand) via the network. *Id.* at 4:3-8; 4:20-21; 4:46-48; 4:54-59; 5:14-15; 5:37-41. In other words, it comprises a “server resident on a network” as in claim 1 of the ‘431 patent.

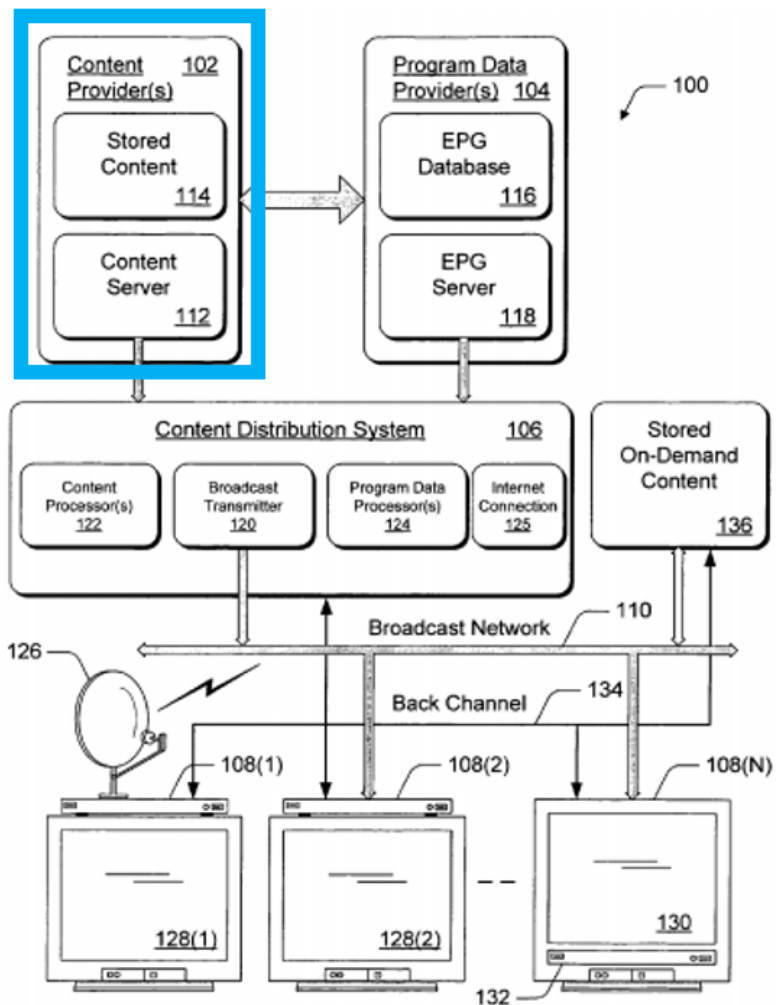
(2) “containing descriptive program data about video content. . .”

61. In my opinion, content distribution system 106 also “contain[s] descriptive program data about video content” as recited in claim 1. According to Ramraz, “[p]rogram data provider 104 includes an electronic program guide (EPG) database 116 [that] stores electronic files of program data and is used to generate an electronic program guide.” *Id.* at 3:56-60. The program data includes “program titles, ratings, characters, descriptions, actor names, station identifiers, channel identifiers, schedule information, and so on.” *Id.* at 3:60-63. The patent further discloses that “program data processor 124 [of content distribution system 106] processes the program data received from program data provider 104. . . .” *Id.* at 4:34-37. Accordingly, content distribution system 106 comprises a server, which includes program data processor 124, that contains descriptive program data about video content for processing.

(3) “[descriptive program data about video content] available from one or more multiple cable system operators (MSOs)”

62. It is my further opinion that Ramraz discloses that the video content, about which the descriptive program data is contained in the content distribution system 106, is “available from one or more multiple cable system operators (MSOs).” For example, the patent discloses that video content distributed by content distribution system 106 may be provided by multiple content providers 102, depicted in the blue box below:

MSO and non-MSO content providers



63. Ramraz describes content providers 102 as “satellite” television providers like “DirectTV,” cable television providers like “Comcast,” as well as other sources like “antenna, camcorders, VCRs, and digital camera.” *Id.* at 2:56-60; 3:1-6. The content that the sources provide include “television programs,” “live” content, “movies,” and “similar video content.” *Id.* at 3:48-56. The content from content providers 102 is delivered to content distribution system 106 for distribution to subscribers. *Id.* at 3:50-53.

64. Ramraz further discloses that the descriptive program data contained in content distribution system 106 is about the video content from content providers 102. For example, before sending the program data to content distribution system 106, EPG server 118 processes the program data to generate a published version of the program data which contains programming information for “all channels.” *Id.* at 3:64-67; *see also id.*, Abstract (the disclosed system pertains to providing “multi-source content in electronic program guides”); 9:35-38 (“[T]here might be four lineups—one from the satellite source, one from the antenna source, and two from the cable source”). For instance, annotated Figure 12 below depicts an exemplary EPG with descriptive program data for video content from multiple content providers (e.g., antenna television sources, “Ant”; satellite television sources, “Sat”; and video sources (“Video”)):

1200

Descriptive program data

Channel	12:00	12:30	1:00
2 NBC (Ant)			
2 NBC (Sat)			
3 ABC (Ant)			
3 ABC (Sat)			
⋮			
Video 1			
Video 2			

Fig. 12

Fig. 12; 10:43-49 (“Each line of the grid is associated with a service and, for each service, all of the programs for the service are listed. . . . [T]he guide application presents . . . the channel numbers associated with a service and the programs offered through the service”).

65. Ramraz also discloses that content providers 102 may include one or more MSOs. Again, although not shown in Figure 12, the content providers may include cable television providers, such as “Comcast,” and satellite television providers like DirecTV.¹ *Id.* at 2:56-60 (“Sources can include . . . analog cable, digital cable, satellite”); 3:1-4 (“[A] content provider refers to a content source. Examples of content sources include, without limitation, Comcast and DirecTV.”). Although Comcast and DirecTV are not expressly shown in Figure 12 above, Ramraz discloses that the sources of channels in its program guide would include the content providers 102, which include Comcast and DirecTV. *Id.* at 3:1-4; 9:35-40 (noting that the exemplary lineups may include channels from cable (Comcast) sources, satellite (DirecTV), and local antenna sources); 10:45-49 (noting that the program guide in general presents the channel numbers associated with a source and the source associated with each particular service). Comcast

¹ The ’431 patent expressly describes satellite operators as a type of MSO. Ex. 1101 at 15:15-17 (“There are three potential options . . . for the new content source that include: a) traditional cable or satellite television services (one or more MSO subscriptions)”).

qualified as an MSO at least as of January 5, 2005, the filing date of the ‘431 patent. It was an aggregator of video content (e.g., from NBC and ABC) that provided user access to the video content in more than one community and that exercised control over what video content is made available to the user. *E.g.*, Ex. 1112 at 6, 8 (Comcast’s Form 10-K 2004 Annual Report) (“We are the largest cable operator in the United States. As of December 31, 2004, our consolidated cable operations served 21.5 million subscribers in thirty-five states Our basic cable service typically consists of 10-20 channels of programming . . . provided by national television networks, local broadcast television stations, locally-originated programming”); ‘431 patent at 6:20 (defining “Comcast Philadelphia” as an MSO). DirectTV also qualified as an MSO, as it was an aggregator of video content that provided user access to the video content throughout the U.S. and that exercised control over what video content was made available to the users. Ex. 1113 at 4, 5 (“We are a leading provider of digital television entertainment in the United States. . . . DIRECTV U.S. currently distributes to its customers more than 1,200 digital video and audio channels. . . .”).

66. Therefore, Ramraz discloses that the video content about which descriptive program data is contained in content distribution system 106 is available from one or more MSOs as recited in claim 1 of the ‘431 patent.

67. In addition, I understand that the patent owner is seeking to construe MSO as “a traditional cable or Internet television content consolidator that receives and rebroadcasts channels of video content.” Although I disagree with that construction, in my opinion, Ramraz disclosed an MSO also under this construction. Specifically, as just explained, Ramraz disclosed at least a traditional cable content consolidator, such as Comcast, that receives and rebroadcasts video content channels.

(4) “[descriptive program data about video content] available from . . . one or more non-MSOs”

68. In my opinion, Ramraz’s server contains data about video content from one or more non-MSOs. For example, Ramraz explains that, in addition to cable, sources of video content include “antenna.” Ramraz at 2:58-60. The disclosed antenna sources are channel 2 NBC, channel 3 ABC, or channel 4 KRON. *See, e.g., id.* at 9:35-38 (“[T]here might be four lineups— [including] one from the antenna source”); Figs. 7, 11, 12 (referring to channel 2 “NBC (Ant),” channel 3 “ABC (Ant),” and channel 4 “KRON (Ant)”). Unlike cable companies and other MSOs, location stations that broadcast television via antenna, such as NBC, ABC, and KRON, do not aggregate content from different sources like cable companies, their antenna broadcasts are limited to local communities, and their broadcasting provides content to users independent of any MSO.

Therefore each is a “non-MSO” as recited in claim 1 of the ‘431 patent.

69. For example, as of Ramraz’s filing date, channel 4 KRON was broadcast locally in San Francisco, CA by an independent television station, KRON-TV. Ex. 1117 (KRON-TV, virtual channel 4 . . . is a . . . television station licensed to San Francisco, California, United States and serving the San Francisco Bay Area.”). KRON-TV and other antenna broadcast stations that broadcast NBC or ABC² are therefore non-MSOs. They are not operators that aggregate rights to video content from owners of the video content (rather, they provide their own local programming content). Ex. 1105 (Cavicchia tr.) at 243:9-11. Nor do they provide access to the video content in more than one community (e.g., KRON-TV provides television broadcasts to the San Francisco Bay Area, Ex. 1118). *Compare* ‘431 patent at 10:31-40 & Fig. 3 (listing local programming, including station KABC,³ in top row in contrast to MSOs in first column); Ex. 1102 (pros. history) at 1102.0463-0464 (“A cable company acquires rights to broadcast individual channels from the owners of those channels - i.e. Viacom, ***NBC Universal***, News

² To further confirm, ABC has been owned by Disney since 2000. Ex. 1119. And the named inventor of the ‘431 patent acknowledged that Disney itself is a non-MSO. Ex. 1105 at 243:9-15.

³ Since 1949, KABC-TV channel 7 has been an ABC, Inc. owned-and-operated television station, Ex. 1120, providing programming to Los Angeles, California residents, Ex. 1121. KABC-TV is not an MSO because it (ABC) owns its content and distributes its content locally. Ex. 1120, 1121.

Corporation, etc. None of these companies are considered MSOs.’’) (emphasis added). Ramraz also discloses other non-MSO sources of video content, including subscribers’ camcorders, VCRs, and digital cameras. Ramraz at 2:56-60; 3:1-6.

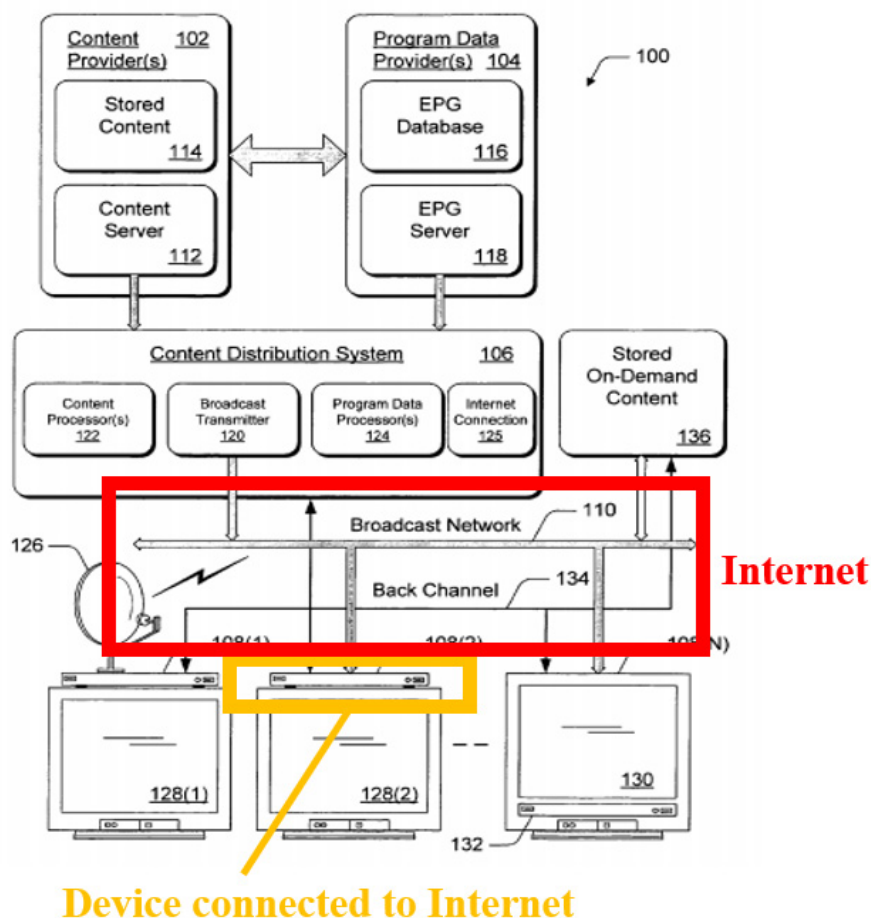
70. As with the MSOs, Ramraz discloses that the descriptive program data contained in content distribution system 106 is about the video content from the non-MSOs. For example, Fig. 12 (shown above) depicts an EPG containing cells that would include descriptive program data about the programs available on channels 2-4 from antenna (“Ant”) sources. *Id.* at 10:43-49 (“Each line of the grid is associated with a service and, for each service, all of the programs for the service are listed. . . . [T]he guide application presents . . . the channel numbers associated with a service and the programs offered through the service . . .”). It also includes descriptive program data for other non-MSO sources of video content, such as camcorders, VCRs, and digital cameras. *Id.* at 2:56-60; 3:1-6 (referring to, e.g., “Video”); 15:23-24.

71. As explained above, the source of the descriptive program data in the EPG is the content distribution system 106, where the data is processed by program data processor 124. Therefore, in my opinion, Ramraz discloses a server (content distribution system 106) resident on a network (Internet) containing descriptive program data about video content available from one or more MSOs (e.g., Comcast and DirecTV) and one or more non-MSOs (e.g., local television

station providers, camcorders, etc.).

c) Ramraz discloses “a device capable of establishing and maintaining a connection with the network via a communications link”

72. In my opinion, Ramraz discloses this limitation. For example, with respect to Figure 1, Ramraz discloses client devices 108, such as device 108(2) depicted in the orange box below:



The client devices also establish and maintain connections with network 110 (depicted in the red box) to receive video content from the content distribution system. For example, according to Ramraz, “[c]lient device 108(2) is . . . coupled

to receive broadcast content from broadcast network 110” *Id.* at 5:5-6; *see also id.* at 3:37-39 (referring to “multiple client devices 108(1), 108(2), . . . , 108(N) coupled to the content distribution system 106 via a broadcast network 110”); 5:62-65 (“Client device 108 receives one or more broadcast signals 210 from one or more broadcast sources, such as from a . . . broadcast network, such as broadcast network 110[.]”). Ramraz also discloses a communications link in the form of software or hardware on the client device for connecting and maintaining the connection to the broadcast network for receiving the broadcast signals. *Id.* at 5:62-67 (“Client device 108 receives one or more broadcast signals 210 from one or more broadcast sources, such as from . . . broadcast network 110 Client device 108 includes hardware and/or software for receiving . . . broadcast signal 210[.]”).

- d) **Ramraz discloses “an interactive program guide application installed on the device that provides a user-configurable interactive program guide (IPG) listing at least one channel of video content available from each of the one or more MSOs and each of the one or more non-MSOs and descriptive program data from the server for the video content available on each of the channels”**

73. In my opinion, Ramraz discloses this limitation too. It discloses an interactive program guide application installed on client devices 108 that provides an interactive program guide (IPG). As stated, “[e]ach client device 108 can run an electronic program guide (EPG) application that utilizes the program data.” *Id.*

at 5:26-27; *see also* 7:5-7 (stating, in reference to Fig. 3, which depicts an exemplary client device 108, that an “EPG application 320 is stored in memory 312 to operate on the EPG data and generate a program guide”). Again, an example of the generated program guide is depicted in Figure 12 of Ramraz.

74. Ramraz discloses that the “EPG application” is installed on the device, regardless of whether the recitation’s reference to “the” device is referring to the device of the preamble (“a content manager device”) or the “device capable of establishing and maintaining a connection with the network. . . .” The “EPG application” is installed on each client device 108, which itself, as explained, is part of the content manager device of the preamble. Additionally, the device of recitation 1.f is also disclosed in Ramraz as the “[c]lient device 108(2)” that is “coupled to receive broadcast content from broadcast network 110” *Id.* at 5:5-6; *see also id.* at 3:37-39 (referring to “multiple client devices 108(1), 108(2), . . . , 108(N) coupled to the content distribution system 106 via a broadcast network 110”); 5:62-65 (“Client device 108 receives one or more broadcast signals 210 from one or more broadcast sources, such as from a . . . broadcast network, such as broadcast network 110[.]”); *id.* at 5:62-67 (“Client device 108 receives one or more broadcast signals 210 from one or more broadcast sources, such as from . . . broadcast network 110 Client device 108 includes hardware and/or software for receiving . . . broadcast signal 210[.]”).

75. The program guide is interactive. It allows the user to scroll through channel listings, select a particular channel to scroll to by entering a channel number, and choose a channel to watch. Ramraz at 10:40-11:13. For example, the program guide application “enables a television viewer to navigate through an onscreen program guide and locate television shows and other broadcast content of interest to the viewer [T]he television viewer can look at schedules of current and future programming, set reminders for upcoming programs, and/or enter instructions to record one or more television shows.” *Id.* at 5:27-34.

76. Furthermore, the user guide disclosed in Ramraz is user configurable. A subscriber can configure the guide by deleting channels from it. Ramraz at 14:22-27. For example, “if a viewer decides that they do not wish to view guide information associated with channels 2 or 10 or the content on channels 2 or 10, then the viewer can opt to have the channel removed from the guide.” *Id.* at 14:22-27.

77. The disclosed program guide also lists at least one channel of video content available from each of the MSOs and non-MSOs and descriptive program data from the server for the video content available on each of the channels.

Figure 12 shows an exemplary listing:

1200 →

Descriptive program data

Channel	12:00	12:30	1:00
2 NBC (Ant)			
2 NBC (Sat)			
3 ABC (Ant)			
3 ABC (Sat)			
⋮			
Video 1			
Video 2			

Fig. 12

As shown, each “Channel” from the MSOs – e.g., satellite and cable sources like DirecTV and Comcast – and non-MSOs – e.g., antenna (“Ant”) broadcast stations that provide local programming – are listed in a first column in the program guide (television channels 2 and 3 and video channels 1 and 2). *See also id.*, Abstract (“Various embodiments pertain to methods and systems for providing **multi-source content in electronic program guides** (EPGs).”); 3:64-67 (“The EPG server 118 processes the program data prior to distribution to generate a published version of the program data which contains programming information **for all channels** for one or more days.”).

78. As also shown, the guide lists descriptive program data for the channels, including information about the service and source of the programming (“NBC,” “Ant,” and “Video”) in the first cell and information about programs

available at specific times in the other cells. *Id.* at 10:43-49 (“[F]or each service, all of the programs for the service are listed [T]he guide application presents . . . the channel numbers associated with a service and the programs offered through the service”).

e) **Ramraz discloses “wherein each of the channels is selectable for receiving only or virtually entirely streaming video programming from its respective MSO or non-MSO source via the communications link and the network”**

(1) **“wherein each of the channels is selectable . . . for receiving video programming. . .”**

79. Ramraz discloses that “each of the channels is selectable. . . for receiving video programming.” It discloses that “each of the channels is selectable.” For example, the patent states that “[a]ssume now that the viewer wishes to select a particular channel for viewing In this case, the viewer might highlight the program and click ‘OK’ on the remote control.” *Id.* at 11:14-20; *see also id.* at 8:26-30 (“One way is to navigate within the electronic program guide (e.g. the presented grid), select a specific service and tune to it.”). Therefore, Ramraz teaches that a user may select one of the MSO or non-MSO channels in the guide as recited in claim 1 of the ‘431 patent.

(2) **Each of the channels is selectable “for receiving only or virtually entirely streaming video programming from its respective MSO or non-MSO”**

80. In my opinion, Ramraz also discloses that, upon selecting a channel, the user receives “only . . . streaming video programming” from its respective MSO or non-MSO source via the communications link and the network. Again, a user may view video programming from one of the MSO or non-MSO channels listed in the guide by selecting an associated channel. *Id.* at 11:14-20; 8:26-30. Upon selecting a channel, the user receives streaming video programming from the source of the selected channel. For example, the patent teaches that the content from content providers 102 is live broadcast television airing at specific time slots as shown in the program guide in Figure 12. The broadcast television is streamed by delivery in data packets over broadcast network 110, which may comprise the Internet. *Id.* at 4:21-23.

81. In other words, the video content from the MSO and non-MSO channels listed in the program guide is streamed at specific times over the Internet. Therefore, the video content is streaming video programming as recited in claim 1. *Compare* Ramraz 5:37-41 (disclosing, in reference to on-demand content, which comprises content delivered over broadcast network 110, that “a viewer can enter instructions to *stream* a particular movie”).

(3) The channels are selectable for receiving video programming “via the communications link and the network . . .”

82. Ramraz further discloses that the channel-selected video content

streamed over the Internet is received by the user “via the communications link and the network” on which the server resides and with which the device is capable of establishing and maintaining a connection as recited in claim 1 of the ‘431 patent. Specifically, the video content is delivered over broadcast network 110. Ramraz at 4:20-21; 4:32-34; 5:5-7. As explained above, broadcast network 110 is the same network that the content distribution 106 (i.e., server) is resident on. *Id.* at 4:20-36; Fig. 1. As explained above, broadcast network 110 is also the same network that the user device is connected to via the communications link that receives the video content. *Id.* at 5:62-67; Fig. 1.

83. In the event that someone argues that that the video content from the various sources is not necessarily sent over the same network because other embodiments, e.g., *id.* at 8:34-38, may involve having multiple tuners or separate inputs for the various sources, that would be incorrect. But Ramraz specifically discloses use of broadcast network 110, which may be the Internet, for transmitting the video content. *Id.* at 2:56-60; 3:1-6; 4:20-24. As such, Ramraz discloses receiving the video content over a network via the same communications link (i.e., the hardware and software in user device 108(2) for receiving broadcast signals). *See also id.*, Fig. 5:62-65 (“Client device 108 receives one or more broadcast signals 210 from one or more broadcast sources, such as from a satellite, antenna, ***or from a broadcast network, such as broadcast network 110[.]***”); 5:14-15

(“client devices 108 may receive broadcast signals via the Internet”); Fig. 2 (showing client device 108 receiving two broadcast signals 210 from a single broadcast network).

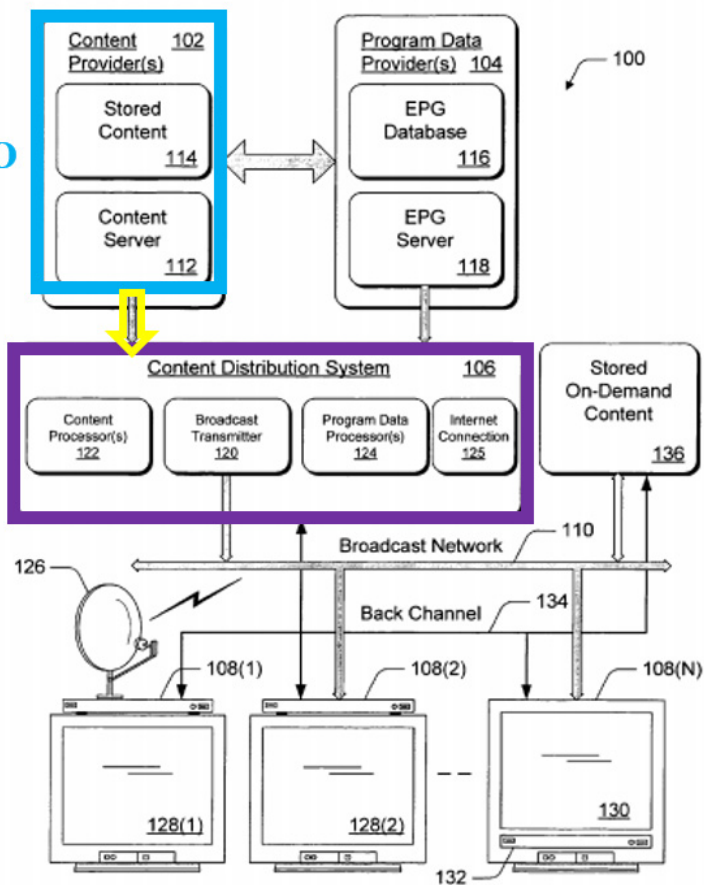
84. Accordingly, in my opinion, Ramraz discloses that each of the IPG channels is selectable for receiving streaming video programming from its respective MSO or non-MSO source via the communications link (on the STB) and the network (Internet) as recited in claim 1.

f) Ramraz discloses “wherein the server is distinct from at least one of the one or more MSOs and one or more non-MSOs”

85. Ramraz discloses this limitation as well. Specifically, the server is identified in the purple box shown in annotated Figure 1 below:

MSO and non-MSO
content providers

server



86. As indicated by annotated Figure 1, the server is distinct from content provider 102 (shown in the blue box), which included both MSOs like DirectTV and Comcast (2:56-60); and the non-MSO content providers, such as KRON, ABC, NBC, and other local television station providers (2:56-60; 3:1-6). The content distribution system is physically separated by a transmission line (arrow) between it and the content providers. The server is also not controlled by the MSOs or the non-MSOs. It is controlled by an entity, such as a network operator, that is separate from the content providers. *Id.* at 4:46-48 (“Content distribution system 106 is representative of a . . . **network operator** . . .”); 4:32-34 (“A content

processor 122 processes the content received from *content provider* 102”)

(emphasis added).

- g) **Ramraz in view of Bayrakeri obviates the limitation reciting “wherein the application allows for the IPG to be configured by a user with respect to adding or deleting channels from any of the one or more MSOs or the one or more non-MSOs.”**

87. In my opinion, the combination of Ramraz and Bayrakeri discloses the final limitation relating to an IPG configurable with respect to adding or deleting channels. Specifically, Ramraz discloses an IPG that contains a listing of both MSO and non-MSO channels as shown in Figure 12. As I explain below, it also discloses that its system allows subscribers to delete channels from the IPG. However, in my opinion, it does not expressly disclose that subscribers can add channels to the IPG. However, Bayrakeri does expressly disclose an IPG application that allows subscribers to add channels to an IPG.

- (1) **“wherein the application allows for the IPG to be configured by a user with respect to adding . . . channels from any of the one or more MSOs or the one or more non-MSOs.”**

88. Ramraz discloses this portion of the last limitation - the “configured by a user” limitation. That is, Ramraz discloses that the application allows for the IPG to be configured by a user with respect to deleting channels from any of the one or more MSOs or the one or more non-MSOs. Ramraz, Fig. 12, 3:64-67, 10:43-49. Specifically, it discloses “a channel filtering mechanism is provided to

assist viewers in removing services that are presented in the guide.” *Id.* at 14:22-27. It explains that, for example, “if a viewer decides that they do not wish to view guide information associated with channels 2 or 10 or the content on channels 2 or 10, then the viewer can opt to have the channel removed from the guide.” *Id.* In other words, it discloses allowing for the IPG to be configured by a user with respect to deleting the channels from the MSOs and non-MSOs.

(2) “wherein the application allows for the IPG to be configured by a user with respect to adding . . . channels from any of the one or more MSOs or the one or more non-MSOs.”

89. In my opinion, the combination of Ramraz and Bayrakeri discloses this portion of the final limitation. Specifically, Ramraz discloses an IPG that contains a listing of both MSO and non-MSO channels. *Id.*, Fig. 12; 3:64-67; 10:43-49. Although it also discloses configuring the IPG with respect to deleting channels from the MSOs and non-MSOs (as explained in the previous subsection), it does not expressly disclose configuring the IPG with respect to adding channels. However, Bayrakeri discloses this aspect in relation to an IPG.

90. For example, Bayrakeri teaches that “the viewer can elect to . . . (1) select a desired channel for inclusion in the custom-IPG” Bayrakeri at 25:19-32. It explains: “If the viewer’s selection is to add a channel to the custom-IPG, the process waits for the viewer’s selection of a particular channel or a set of channels to be included in the custom-IPG” *Id.* The disclosed system allows

the viewer to enter a channel selection, for example, by “toggling a channel provided on the display . . . , by entering the desired channel (e.g., with the remote control unit), or by some other mechanism.” *Id.* at 25:32-37. The selected channel(s) are then added as channels in the custom-IPG. *Id.* at 25:37-38.

91. As such, Bayrakeri discloses an IPG that is configurable by a user with respect to adding channels that are available to the user to the IPG. Ramraz discloses an IPG that includes channels from both MSOs and non-MSOs. Therefore, Ramraz, in combination with Bayrakeri, discloses an IPG application that “allows for the IPG to be configured by a user with respect to adding or deleting channels from any of the one or more MSOs or the one or more non-MSOs.”

92. In addition, in my opinion, a POSA would have had a reason and motivation to combine the functionality disclosed in Bayrakeri that allows users to configure an IPG with respect to adding channels to Ramraz’s user-configurable IPG application as of the time of the alleged invention.

93. First, it is my opinion that Ramraz and Bayrakeri are analogous art from the same field of endeavor as the ‘431 patent (i.e., network devices and applications for sending, receiving, managing, and displaying video content, and specifically interactive program guides). Both references, like the ‘431 patent, also involve problems related to managing transmission of video content for display on

a television, including generating IPGs. Bayrakeri at 1:39-41; Ramraz at 1:6-9. They also involve the same types of video content (e.g., cable and satellite television); similar content distribution networks for transmitting content and other programming-related data; the same content providers (e.g., “Comcast”); the same network devices (e.g., servers for distributing content, STBs, and televisions for displaying video signals); and IPGs that are customizable. Ramraz at 3:1-6, Fig. 1, 12; Bayrakeri at 16:22, 20:15, 22:40, 23:66, Fig. 2, 3A. As such, a POSA faced with the problem to be solved in Ramraz (i.e., managing video content transmission and generating IPGs) would have looked to other references in the same field, involving similar technologies and solutions to the same problem, such as Bayrakeri.

94. Further, in my opinion, the prior art itself provides a motivation to combine. For instance, as Bayrakeri explains, “[w]ith the increase in [network] bandwidth, the number of programming choices has also increased” and [w]ith this increase in the number of programming, it is oftentimes cumbersome for a viewer to find a desired program in a guide” Bayrakeri at 1:54-55, 1:63-65. Therefore, Bayrakeri’s customizable IPG “provide[s] the viewer with quick access to programming . . . to more easily locate a program in an unknown channel at an unknown time period[.]” *Id.* at 2:4-7.

95. Likewise, Ramraz discloses an IPG that could potentially include a

significant number of channels. The IPG includes channels from multiple content sources, including antenna and cable, which would typically have involved numerous channels. Use of Bayrakeri's customizable IPG, including the ability to add specific channels to the guide that the user likes (in combination with the user's ability to delete undesired channels), would allow a user to better manage which channels are viewable and provide easier and quicker access to channels, thereby providing for a more user-friendly program guide, more control over content availability, and an overall better user experience. Since Ramraz already allows deleting channels, a POSA would have been motivated to also include functionality for adding channels because, for example, a user may change his or her mind and want to add a deleted channel back to the guide, or another user of the same IPG may like a channel that another user previously deleted and want to add the channel back to the IPG. Therefore, in my opinion, the combination would have been the mere application of a known technique to a piece of prior art ready for the improvement.

96. A POSA would have also, in my opinion, had reason to combine the references because it would have merely involved incorporating well-known functionality for adding channels via a user interface into an IPG according to known programming methods to obtain the predictable result of an IPG customizable as to adding and deleting channels, and the use of a known technique

(adding the ability to add and delete channels) to improve interactive user guides in the same way. Also, as I indicated above, there was a significant design need and market pressure at the time of the alleged invention for program guides that were interactive and customizable, including allowing adding (and deleting) channels to the guides, which would have led a POSA designing an IPG to include that functionality. This design need and market pressure is also described in detail in Erin Joyce, TV: the Next Portal War, Internet News (August 8, 2003), which is labeled Exhibit 1122.

97. In my opinion, a skilled artisan would have also had a reasonable expectation of success in making the combination. Doing so would have merely involved minor changes to the programming of the IPG disclosed in Ramraz to allow users to add channels into the guide. The resulting combination would not have required any significant hardware changes. The minor programming needed would have been well within the knowledge and skillset, and would have been routine, to a POSA as of the '431 patent's priority date.

2. Claim 5: *The content manager device of claim 1, wherein the streaming video programming, on at least one of the channels, comprises live television.*

98. In my opinion, Ramraz discloses the additional limitation of claim 5. It discloses that the streaming video programming received from content server 112 is live television. Specifically, Ramraz teaches that content server 112

controls distribution of “live content (e.g., content that was not previously stored, such as live feeds)” Ramraz at 3:52-55; *see also* 1:46-49, 2:40-43, & 17:4-6 (“various embodiments can enable a viewer to intelligently browse different channels while watching live television”). For the reasons I provided with respect to claim 1, a POSA would have found it obvious, and would have had reason and motivation, to combine Ramraz and Bayrakeri to arrive at claim 5.

3. Claim 7: *The content manager device of claim 1, further comprising a display device.*

99. In my opinion, Ramraz discloses the additional limitation of claim 7. It discloses that client devices 108 are connected to televisions 128, which are display devices. *E.g.*, Ramraz at 4:67-5:3 (“A particular client device 108 can be coupled to any number of televisions 128 and/or similar devices that can be implemented to display or otherwise render content.”); Fig. 1 (depicting client devices 108 coupled to televisions 128). For the reasons I provided with respect to claim 1, a POSA would have found it obvious, and would have had reason and motivation, to combine Ramraz and Bayrakeri to arrive at claim 7.

4. Claim 8: *The content manager device of claim 1, further comprising a relay module for delivering the IPG and data to a display device.*

100. I understand that I understand that the patent owner contends “relay module” simply means “communications software and hardware components.”

Ex. 1107 (Patent Owner's proposed constructions in Florida action) at 9. If this construction is correct, then Ramraz discloses claim 8.

101. For example, Ramraz discloses client device 108 functionality that includes content processor 322 that processes the video content; functionality for displaying the program guide that contains the descriptive program data after it is generated by EPG application 320; and video output 332 for sending video content and other display content to a television. See, for example, Ramraz at 7:28-30 (“Content processor 322 generates video and/or display content that is formatted for display on display device 128”); 7:5-7 (“An EPG application 320 . . . operate[s] on the EPG data and generate[s] a program guide.”); 10:57 (“the electronic program guide is displayed.”); 7:56-60 (“Client device 108 also includes . . . video output 332 that provides signals to television 128 or to other devices that process and/or display . . . video data.”); 6:15-18; Fig. 3 (depicting STB elements). For the reasons I provided with respect to claim 1, a POSA would have found it obvious, and would have had reason and motivation, to combine Ramraz and Bayrakeri to arrive at claim 8.

5. ***Claim 9: The content manager device of claim 1, wherein the interactive program guide application allows for customization of the IPG by a user with respect to a second, redundant one of the one or more MSOs or the one or more non-MSOs to be linked to each of the channels from which the streaming video programming may be received.***

102. In my opinion, Ramraz discloses the additional limitation of claim 9. Ramraz discloses a “second, redundant one of the one or more MSOs or the one or more non-MSOs to be linked to each of the channels from which the streaming video programming may be received.” Specifically, it discloses a content manager device as explained with respect to claim 1 that merges channel lineups from multiple MSO and non-MSO sources. Ramraz at 10:20-25; Fig. 12. Some of those sources are redundant sources. *Id.* at 10:29-34. For example, NBC broadcasts its programming as channel 2 (Ant) as shown in Figure 12 of Ramraz. *Id.* at 10:20-25; Fig. 12. As also shown in that Figure, another source broadcasts NBC programming as channel 2 (Sat). *Id.* The two different sources of channel 2, which are both linked to the client devices 108 such that they provide linear NBC programming to the television (*id.* at 11:14-17), are redundant. Channel 3 in Figure 12 also has redundant sources, as do channels 2, 3, and 4 in Figure 7.

103. Ramraz further teaches allowing the user to customize the IPG with respect to “a second, redundant one of the one or more MSOs or the one or more non-MSOs to be linked to each of the channels from which the streaming video programming may be received.” Specifically, it discloses that the user may remove one of the redundant sources of channel 2 from the guide if the user does not wish to use it. Alternatively, if the user is experiencing problems in viewing the programming from that source, the user may instead use the other source for

the channel. Ramraz at 14:28-39 (“[A] user may decide that they do not wish to use Channel 2 (Ant) at all and may remove it from the lineup. As such, the system will not attempt to tune to Channel 2 (Ant). In addition, a user may experience problems in attempting to tune to Channel 2 (Ant). In this case, the user can remove Channel 2 (Ant) from the guide.”).

104. For the reasons I provided with respect to claim 1, a POSA would have found it obvious, and would have had reason and motivation, to combine Ramraz and Bayrakeri to arrive at claim 9.

B. My opinion that claim 3 is obvious over Ramraz in view of Bayrakeri and in further view of Furlong.

3. The content manager device of claim 1, further comprising a digital rights management module that obtains viewing rights for at least one of the channels.

105. In my opinion, the combination of Ramraz in view of Bayrakeri and further in view of Furlong renders claim 3 obvious.

106. I understand that the patent owner contends that “digital rights management module” is to be construed as “software and hardware that determines whether a user has the right to access a specific program or channel.” Ex. 1107 (Patent Owner’s proposed constructions in Florida action) at 7. If the patent owner’s construction is correct, then Furlong discloses claim 3’s additional limitations.

107. Furlong describes a “DRM system and method that enables a content provider to deliver digital content securely to a user, and for managing the digital rights to the content so that the content provider can continue to effectively restrict the use of the content subsequent to transferring the content to the user.” [0014]. It discloses a “set-top box’s ST license process 34” that obtains viewing rights (licenses) from a license manager/ or digital rights management server 4 and stores them in local memory 31 of the STB. [0032]; [0038]; [0044]; Fig. 1. The licenses provide the authority need for the set-top box to decrypt protected content for viewing when the subscriber registers for a channel or changes his or her subscription. [0054], [0057], [0058].

108. In my opinion, a POSA would have had a reason and motivation to combine Furlong’s DRM function with the Ramraz- Bayrakeri combined system. The references are analogous art from the same field of endeavor as the ‘431 patent (i.e., network devices and applications for sending, receiving, managing, and displaying video content, and specifically interactive program guides). Ramraz, Fig. 1, 12; Bayrakeri, Fig. 2, 3A; Furlong ¶¶ [0002], [0043], [0045], [0046] (disclosing system involving, e.g., storing and using IPG data and electronic program guides for “playing and accessing broadcast channels”). In addition, those references are similar to the ‘431 patent in that they involve problems related to managing transmission of broadcast television signals for display on a

television. Ramraz & Bayrakeri, Abstracts; Furlong ¶¶ [0002], [0043], [0045], [0046]. They also involve the same type of video content (e.g., broadcast television), Ramraz, Fig. 12 & Bayrakeri, Fig. 3A (listing channels); Furlong ¶ [0015]; the same networks for transmitting content and other programming-related data (e.g., broadband/the Internet), Ramraz at 4:21-31; Bayrakeri at 4:12-21; Furlong ¶ [0032] (broadband IP network 3); and the same network devices, e.g., STBs, displays for displaying video signals, and head-ends or other content providers for distributing video content, Ramraz, Fig. 1, Bayrakeri, Fig. 2, Furlong ¶¶ [0032], [0040]. As such, in my opinion, a POSA faced with the problems in Ramraz (i.e., managing transmission of video content and related data for display on a television) would have looked to other references in the same field, involving similar technologies and solutions to the same problems, such as Furlong.

109. Also, Furlong explains as to television programming, “[t]ypically, a content provider wishes to distribute the digital content to users in exchange for a license fee or some other consideration, and to restrict what the users can do with the distributed digital content.” Furlong ¶ [0004]-[0005]. In addition, “digital content is relatively easy to copy illegally since the distribution channels are insecure. After distribution has occurred, the content provider has very little if any control over the distributed content.” *Id.* ¶ [0006]. As a result, “Digital Rights

Management technology focuses on making difficult, if not practically impossible, illegal use of digital content.” *Id.* ¶ [0008].

110. Ramraz discloses digital cable television programming. At the time of the alleged invention, cable television providers required content protection measures, like DRM. Use of Furlong’s DRM functionality would allow an administrator to enforce content provider DRM restrictions on users of the Ramraz- Bayrakeri combined television system. This would allow administrators to provide a larger variety of video content through the Ramraz-Bayrakeri system, rather than having to exclude content from providers that impose DRM restrictions, which, in my opinion, would make for a more desirable and marketable television system for subscribers.

111. A POSA also would have had reason to combine the references because doing so would have merely involved utilizing a well-known DRM scheme to restrict content usage in a television system as in Furlong according to known methods of programming to obtain predictable results (a DRM compliant television system), and the use of a known technique (employing licenses to decrypt content for consumption) to improve television systems in the same way (allowing enforcement of DRM restrictions to prevent unauthorized usage of content), to achieve the alleged invention. In addition, at the time of the alleged invention, there was a design need and market pressure for providing DRM

restrictions imposed by content providers, which would have driven a skilled artisan to pursue the known solutions, including the DRM scheme described in Furlong. This design need and market pressure is also described in detail in Evaluating DRM: Building a Marketplace for the Convergent World, Center for Democracy and Technology (Sept. 2006), which is labeled Exhibit 1123. It explains that DRM has as of 2006, and is likely to continue to, play a major role in the media marketplace.

112. A POSA would have also had a reasonable expectation of success in making the combinations. It would have merely involved minor changes to the client device 108 disclosed in Ramraz as part of the Ramraz-Bayrakeri combination. The Ramraz-Bayrakeri system would merely need to be adapted such that, for example, its client device 108 included an ST license process and license memory for storing licenses for decrypting secure content. The minor adaptations needed would have been well within the knowledge and skillset, and would have been routine, to a POSA as of the '431 patent's priority date.

C. My opinion that claim 4 is obvious over Ramraz in view of Bayrakeri and in further view of Bednarek

4. The content manager device of claim 1, further comprising a GPS receiver and a filtering module that blocks content according to jurisdiction.

113. In my opinion, the combination of Ramraz in view of Bayrakeri and further in view of Bednarek renders claim 4 obvious.

114. I understand that in the Florida action, the patent owner construes “filtering module” as “software that blocks access to content based on geographical location.” Ex. 1107 (Patent Owner’s proposed constructions in Florida action) at 8. If the patent owner’s construction is correct, then Bednarek discloses claim 4’s additional limitations. Bednarek discloses “a set-top box . . . has a global positioning system (GPS) receiver.” Abstract. The GPS receiver checks to see if the set-top box is at an “authorized location” and “allows descrambling of video signals only if the location is authorized.” *Id.* Figure 2 shows that signals received by antenna 36 are sent to set-top box 37 and are “filtered.” 9:57-62. Direct GPS signals 38 are received by the GPS signal receiver 42 and communications signals 40 are received by the communications satellite receiver/decoder 44. *Id.*; Fig. 2. The communications signals 40 include video content. They are descrambled using a key that is released only if the STB is located in an authorized geographic location (a particular jurisdiction). 9:63-10:22; Fig. 2. A GPS data processor 54 figures out if the set-top box is at an authorized location based on the GPS signals. 10:22-25; Fig. 2. Processor 54 provides a position authorized signal to the STB so that video content can be descrambled and displayed. Or it withholds the signal if the set-top box location is not an authorized location. 10:25-30; 11:6-11.

115. Based on this, Bednarek shows a GPS receiver and filtering functionality (the hardware or software that filters the signals from antenna 36) that blocks content according to jurisdiction (using GPS data processor 54).

116. In my opinion, a POSA would have also had a reason and motivation to combine the GPS receiver and filtering functionality disclosed in Bednarek with the Ramraz-Bayrakeri combined system. Ramraz, Bayrakeri, and Bednarek are analogous art from the same field of endeavor as the '431 patent (i.e., network devices and applications for sending, receiving, managing, and displaying video content). Ramraz & Bayrakeri, Abstracts; Bednarek, Abstract, 1:15-22; 8:46-61 (system for receiving video and other signals from satellite television provider for descrambling and displaying on television). In addition, those references are similar to the '431 patent in that they involve problems related to managing transmission of video content and related data over a network. Ramraz at 4:21-31; Bayrakeri at 4:12-21; Bednarek, Abstract, 1:15-22; 3:23-26; 8:46-61. They also involve the same type of video content (e.g., broadcast television), Bednarek at 4:33-36; the same networks for transmitting content and other programming-related data (e.g., satellite television broadcasts), *id.*; and the same network devices, e.g., STBs, television sets, and satellites and other devices for distributing video content. Ramraz, 4:21-31, Fig. 1; Bayrakeri, 4:12-21, Fig. 3A; Bednarek, Abstract, 1:15-33; 4:33-36; 16:28-32. As such, in my opinion, a POSA faced with

the problem to be solved in Ramraz and Bayrakeri (i.e., managing transmission of video content and related data for display on a television) would have looked to other references in the same field, particularly those involving similar technologies and solutions to the same problem such as Bednarek.

117. In my further opinion, the prior art also provides a motivation to combine. Bednarek explains for example:

Many [video] programs are authorized for distribution and reception only in certain geographic regions, particularly certain countries, where program rights have been obtained for their transmission and reception. Additionally, a set-top box may be authorized only for non-commercial personal use by consumers and not by hotels, theaters or other commercial activities. It is therefore useful for the operators of a video distribution system . . . that their set-top boxes are operable only at authorized locations and that the boxes inhibit authorization of program descrambling of the boxes at unauthorized locations.

Bednarek at 1:38-49. Ramraz and Bayrakeri also involve broadcast television for which, as of the '431 patent's priority date, there was typically geographic use restrictions. Ramraz, Fig. 12 & Bayrakeri, Fig. 3A (listing broadcast channels and content); Bednarek at 4:40-44 ("As an example of programming which can cover only a specific geographic area, television networks authorize each of their network affiliated stations use of the network material only in a specific

geographic area, usually a region around a specific city.”). Therefore, allowing blocking of content based on jurisdiction using GPS receiver and filtering functionality as in Bednarek would allow Ramraz-Bayrakeri network administrators to enforce content provider restrictions on content consumption based on physical location of users. This would allow administrators to provide a larger variety of video content, rather than having to exclude content from providers that require such limitations on accessing their content, which would make for a more desirable and marketable television system for subscribers.

118. A POSA would have also had reason to combine the references because it would have merely involved utilizing a well-known GPS system for tracking user devices to determine access rights and restrict content in a television system according to known methods of implementing GPS-based hardware and software to obtain predictable results (e.g., an enhanced client device 108 that allows for filtering content based on GPS location), and the use of a known technique (filtering content consumption based on user location) to improve television systems in the same way (allowing enforcement of location restrictions), to achieve the alleged invention. Further, at the time of the alleged invention, there was a design need and market pressure for providing content restrictions based on user location imposed by content providers, which would have driven a skilled artisan to pursue the known solutions, including those described in Bednarek.

119. A POSA would have also had a reasonable expectation of success in making the combinations. It would have merely involved minor changes to the hardware and software disclosed in the Ramraz-Bayrakeri combination. The Ramraz system (combined with Bayrakeri) would merely need to be adapted such that, for example, its client device 108 included an antenna for receiving GPS data that could be filtered and processed to block access to content that has location-based restrictions as needed. Such minor adaptations would have been well within the knowledge and skillset, and would have been routine, to a POSA as of the ‘431 patent’s priority date.

D. My opinion that claim 6 is obvious over Ramraz in view of Bayrakeri and in further view of Calderone.

6. The content manager device of claim 1, further comprising a voice recognition module that accepts verbal commands and converts them to digital form.

120. In my opinion, the combination of Ramraz in view of Bayrakeri and further in view of Calderone renders claim 6 obvious.

121. I understand that in the Florida action, the patent owner construes “voice recognition module that accepts verbal commands and converts them to digital form” as carrying its plain and ordinary meaning. Ex. 1107 (Patent Owner’s proposed constructions in Florida action) at 9. If the patent owner’s construction is correct, then Calderone discloses claim 6’s additional limitations.

122. Calderone describes that a user may utter a voice command into a microphone contained in a remote control. Abstract; 2:22-25. The commands are converted to digital form using an “analog to digital converter.” Abstract; 2:26-30; 5:30-33. The voice signal is transmitted to a cable head-end unit for “voice and word recognition processing” by a “speech recognition processor 670 where it [is] analyzed for voice command recognition, and a command function is derived.” Abstract; 2:32-36; 5:52-56. Once the command function is determined, it is sent back to the STB where the command is carried out. Abstract; 2:34-38. The analog-to-digital converter and speech recognition processor comprise a voice recognition module under the patent owner’s interpretation of claim 6.

123. In addition, in my opinion, a POSA would have had a reason and motivation to combine the voice recognition system that accepts verbal commands and converts them to digital form disclosed in Calderone to the combined system disclosed in Ramraz and Bayrakeri. Ramraz/Bayrakeri and Calderone are analogous art from the same field of endeavor as the ‘431 patent (i.e., involving television remotes, STBs, and other network devices for sending, receiving, managing, and displaying video content). Ramraz, Abstract, Fig. 1, 12; Bayrakeri, Abstract, Fig. 2, 3A; Calderone, Abstract, 2:21-22; 2:35-40; 4:24-29; Fig. 1 (disclosing system for controlling a television, including changing channels, that receives video content from a head end over a network using a remote). In

addition, the references are similar to the '431 patent in that they involve problems regarding managing transmission and receipt of video content from a head end over a network. Ramraz at 4:21-31; Bayrakeri at 4:12-21; Calderone, Abstract, 2:21-22; 2:35-40; 4:24-29; Fig. 1 (managing television using commands transmitted over network). They also involve the same type of video content (e.g., cable television); and the same network devices, e.g., STBs, television sets, head ends for distributing video content and processing commands, and television remotes. Ramraz at 4:21-31, Fig. 1; Bayrakeri at 4:12-21, Fig. 2; Calderone, Abstract, Fig. 1, 4:18-20. As such, it is my opinion that a POSA faced with the problem to be solved in Ramraz combined with Bayrakeri (i.e., managing transmission of video content and related data for display on a television) would have looked to other references in the same field, particularly those involving similar technologies and solutions to the same problem such as Calderone.

124. Also, in my opinion, allowing voice commands for directing an interactive television system as in Ramraz combined with Bayrakeri would make such a system more convenient to use, marketable, user friendly, and more appealing to users. A POSA would have also had reason to combine the relevant disclosures because it would have merely involved incorporating a well-known voice recognition system into, for example, a remote control, client device 108, or content distribution system 106 for commanding a television set according to

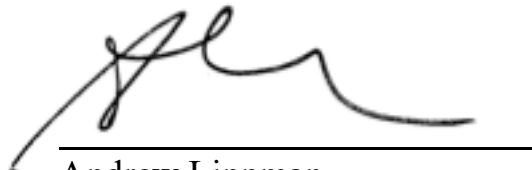
known methods of programming voice recognition and control to obtain predictable results (e.g., an enhanced voice-controlled television system), and the use of a known technique (providing voice recognition for controlling a television) to improve prior art television systems in the same way by allowing automated voice recognition and control. Furthermore, at the time of the alleged invention, there was a design need and market pressure for making television systems easier to use and with less effort, including providing voice recognition for issuing commands, which would have driven a skilled artisan to pursue the known solutions, including those described in Calderone.

125. A skilled artisan would have also had a reasonable expectation of success in making the combinations disclosed. It would have merely involved minor changes to the hardware and software disclosed in Ramraz. The Ramraz-Bayrakeri combined system would merely need to be adapted such that, for example, remote control 204 included a microphone for receiving voice commands and an analog-to-digital converter for converting the commands for digital transmission to content distribution system 106 for processing. Such minor adaptations would have been well within the knowledge and skillset, and would have been routine, to a POSA as of the '431 patent's priority date.

126. I declare, under penalty of perjury, that all statements herein made of my knowledge are true and that all statements made on information and belief are

believed to be true. Also, all statements made herein were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment or both under Section 1101 of Title 18 of the United States Code.

Executed on this 20th day of August 2019, in Cambridge, Massachusetts.



Andrew Lippman

ATTACHMENT A

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MIT, Master of Science, Computer Graphics, 1978

MIT, Bachelor of Science, Electrical Engineering, 1971

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Media Laboratory, Associate Director, 1987-2000

Massachusetts Institute of Technology, Senior Research Scientist, 2000-present

Media Laboratory, Graduate Officer, Media Arts and Sciences, 2002-2007

Massachusetts Institute of Technology, Principal Research Scientist, 1995-2000

Media Laboratory, Associate Director and Lecturer, 1987-2000

Media Laboratory, NEC Career Development Professor of Computers and Communications,
1985-1986

Architecture Machine Group, Associate Professor, 1983-1987

Architecture Machine Group, Assistant Professor, 1980-83

Architecture Machine Group, Research Associate, 1977-80

Architecture Machine Group, Research Assistant, 1976-77

Architecture Machine Group, Technical Instructor, 1975-76

Architecture Machine Group, Technical Assistant, 1971-75

Other Professional Experience

Frontiers in Blockchain, Associate Editor, 2018-present

IEEE Blockchain Newsletter Editorial Board, 2018-present

Dell EMC Technology Advisory Board, 2013-present

Member, Nokia Siemens Networks, now Nokia, Customer Advisory Board, 2013-2015

Diamond Management & Technology Consultants (PwC since 2012) Fellow, 1999-present

Nortel Visiting Fellow, 2007-2008

École Polytechnique Fédérale de Lausanne, Switzerland,
Visiting Professor of Electrical Engineering, 1995

Publications

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MIT Research Programs

Robert Wood Johnson Foundation
(2017-2018)

One-year grant for MedRec, a prototype system to provide patient-centered control and authentication of personal medical records

NSF Grant CNS-0434816
NeTS for research on Viral Radio
(2004-2007)

Three-year grant from National Science Foundation

Communications Futures Program
along with David Reed, Media Lab;
(2003-2018)

Principal Investigator of cross-MIT research venture

Charles Fine, MIT Sloan School of Management; and
David Clark, MIT Computer Science and Artificial
Intelligence Laboratory

Digital Life Consortium

Director of Media Laboratory consortium of sponsors

(1997-Present)	Bertelsmann, Brightstar Corporation, Cisco Systems, France Telecom, Google, News Corporation, Nortel Networks, NTT Comware, Panasonic Technologies Company, Philip Morris USA, Qualcomm Incorporated, Rodale, Inc., and Stan Winston Studio, Inc.
TV of Tomorrow Program (1991 - 1996)	Principal Investigator, unincorporated venture between Bertelsmann, Bell-Northern Research, Deutsche Telekom, Hughes Aircraft Company, Eastman Kodak Company, Intel Corporation, Intel Corporation, Philips International, Sony Corporation, Televisa, Toppan Printing Company and Viacom International
Media Bank Board, Singapore (1994 - 1998)	Principal Investigator, funded by National Computer
Movies of the Future Program (1985 - 1991)	Principal Investigator, unincorporated venture between Paramount, Warner Brothers and Viacom, International, later others
Synthetic Teleportation	DARPA, 1985-1987

Patents

A Quasi-Passive Wakeup Function to Reduce Power Consumption of Electronic Devices, US Patent No 7864051
Realistic Audio Communication in a Three-Dimensional Computer-Generated Virtual Environment, US Patent Application 12/344,542, filed 12/28/2008
Method for Automatic Signal Routing In Ad Hoc Networks, US Patent pending, filed 11/19/02
Tag Interrogation With Observable Response Signal, US Patent No. 7,109,865, filed 9/26/02
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Multiscale Coding of Images, US Patent No. 4,987,480, filed 1/22/91
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Other

Advisory board, Applause, 2014

Customer Board, Nokia Siemens Networks (now Nokia Networks), 2013 – present

Technical Advisory Board, EMC, 2013 -- present

Director, Beonten, 2012 – 2013

Advisory Panel, Terrarium, 2012 - 2014

Advisory Board, Echonest, 2008 - 2014

Advisory Board, Damaka, Inc., 2006-2010

Advisory Board, MiND (Media Independence), 2006-2008

Science Advisor, Public Radio International's *PRI at Night*, 2006

Investor/advisor, Ember, 2001-2012

Board Member, Wave Systems, c2000 – c2003

Chairman, Presto Technologies, 1998-2000

Member of Advisory Board to Board of Directors, MaMaMedia, Inc., 1997-2003

Member of Scientific Advisory Board, Centre for User Oriented IT Design, Stockholm, Sweden, 1997-2004

Member of Technical Advisory Board, VTEL (Austin), 1992-2000

Member of International Steering Committee, International Workshop on Coding Techniques for Very Low Bit-rate Video, 1995

Member of the Science Council of the Cross Industry Working Team (XIWT), Corporation for National Research Initiatives (CNRI), 1993-present

Founding Member of the Editorial Board for Multimedia Systems Journal, 1992

Member of the International Organizing Committee for the Picture Coding Symposium, 1989-1993

Chairman, International Organizing Committee, Picture Coding Symposium, 1990

Member of Strategic Advisory Council of the Research and Demonstration Center on Remote Medical Consultation Via High-Definition Television, Texas Children's Hospital, 1990-91

Member of Editorial Board of Image Communication Journal, 1989-2003

Member of the Steering Committee for International Workshop on Advanced Techniques for Transmission of Video at 64 kbit/s or less, Hannover, West Germany, 1988-90

Board Member of Technology Broadcasting Corporation (WMBR), 1983-1989

FCC Advisory Committee Member of Advanced Television Service, 1989-90

Member of the US CCIR Study Group 11 (Television), 1990

Member of Editorial Board of ACM TOIS (Transactions on Information Systems), 1989-1990

Chairman of the Board of Advisors, Medical Simulation Foundation, 1987-1988

Medical Simulation Foundation: Principal Investigator for "The Video-Graphic Arthroscope" Project, 1987-88

Graduate Student Council (GSC) Teaching Award for the Architecture Department, 1986

1983 Nebraska Interactive Videodisc Award for Best Technical Achievement, Lincoln, NE, September 15, 1983

MIT Committee member of the Computing Environment, 1983-84

Member of Project Athena Technical Committee, 1983-84

Review Board, NSF, Applications of Interactive Videodisc to Science Education, 1977-1979, 1981

Member of the School Committee, City of Salem, MA. 1987-1993

Memberships

ACM; IEEE; IEEE Computer Society

Theses Supervised

Nadav Aharony

Virtual Private Milieus: Sharing Our Digital Aura through Social and Physical Proximity, MS, September 2008

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Synthesis of Navigable 3-D Environments from Human-Augmented Image Data, ME EECS, September 1996

Barry Arons	<i>The Audio-Graphical Interface to a Personal Integrated Telecommunications System</i> , MS, September 1984
Derek Atkins	<i>Access and Access Control</i> , MS, June 1995
Dave Backer	<i>Structure and Interactivity in Media: A Prototype for the Electronic Book</i> , PhD,
Alex Benenson	<i>VideoLogo: Synthetic Movies in a Learning Environment</i> , MS, June 1990
Matthew Blackshaw	<i>The broadcast marketplace : Designing a more efficient local marketplace for goods and services</i> , MS, June 2012
Aggelos Bletsas	<i>IntelligentAntenna Sharing in Cooperative Diversity Wireless Networks</i> , PhD, August 2005
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Matthew Blackshaw	<i>Opportunistic, Collaborative and Synchronized, Proximal Device Ecology</i> , MA, June 2012
Katherine Blocher	<i>Affective Social Quest (ASQ) Teaching Emotion Recognition with Interactive Media and Wireless Expressive Toys</i> , MS, June 1998
Guillaume Boissiere	<i>Personalized Multicast</i> , SM MAS, June 1988
V. Michael Bove	<i>Synthetic Movies Derived from Multi-Dimensional Image Sensors</i> , PhD, June 1989
V. Michael Bove <i>Television Programming</i> , MS,	<i>Personalcasting: Interactive Local Augmentation of</i> September 1985
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Eric Brown	<i>Optical Publishing</i> , MS, February 1983
William Butera	<i>Multiscale Coding of Images</i> , MS, July 1988
Mark Callahan June 1983	<i>A 3-D Display Head-set for Personalized Computing</i> , MS,
Ken Carson <i>Varifocal Mirror</i> , MS,	<i>A Color Spatial Display Based on a Raster Framebuffer and</i> September 1984
William Capolongo 1985	<i>Color Spatial Animation Using a Varifocal Mirror Display</i> , BS, May
Sailabala Challapalli	<i>Modeling the Temporal Components of Video Structure</i> , MS, May 2001
Xiang Chen <i>Vector Quantization</i> ,	<i>Adaptive Bit Allocation for Spatiotemporal Subband Coding Using</i> MS, June 1990
Pascal Chesnais February 1988	<i>A Graphic/Photographic Arthroscopy Simulator</i> , MS,
Constantine Christakos	<i>Taking Advantage of Distributed Multicast Video to Deliver and Manipulate Television</i> , MA, June 2000
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Lawrence N. Claman	<i>A Two Channel Spatio-Temporal Encoder</i> , BS, May 1988
James Cooley	<i>A Day in the Life of the RF Spectrum</i> , MS, September 2005
Vivian Diep	<i>Me.TV : A Visual Programming Language and Interface for Dynamic Media Programming</i> , MS, June 2015
Judith Donath	<i>Inhabiting the Virtual City: The Design of Social Environments for Electronic Communities</i> , PhD, June 1996
Judith Donath	<i>The Electronic Newsstand: Design of an Intelligent Interface to Variety of News Sources in Several Media</i> , MS, September 1986
Chen-Koung Dong <i>Halftoning</i> , MS, May 1992	<i>Measurement of Printer Parameters for Model-Based</i>
Daniel Dreilinger	<i>Scale Free Information Retrieval</i> , EECS, Meng, June 1998
Ariel Ekblaw	<i>MedRec : Blockchain for Medical Data Access, Permission Management and Trend Analysis</i> , MS, June 2017
Steve Gano	<i>Forms for Electronic Books</i> , MS, June 1983
William Gardner 1982	<i>Machine-Aided Visualization of Molecular Vibration</i> , BS, June
David Gauthier	<i>Distributed, Mobile and Pervasive Systems Design</i> , MS, September 2009
Carol Ginsberg <i>Display</i> , MS, June 1983	<i>Human Body Motion as Input to an Animated Graphical</i>
Jeffrey Halbig	<i>Construction and Analysis of a Wireless Antenna-Sharing Scheme</i> , MS, June 2004
Walid Hamdy <i>Computers</i> , BS, May 1986	<i>Hardware Implementation of Dynamic Video on Personal</i>
Michael J. Hawley	<i>Structure out of Sound</i> , PhD (Committee), September 1993
Mohamed Atef Hendawi <i>Attendance</i> , MS, June 1995	<i>Multimedia Capture of Events to Support Passive Virtual</i>
Henry N. Holtzman	<i>Three-Dimensional Representations of Video using Knowledge Based Estimation</i> , MS, September 1991
Leonard Hourvitz <i>Computer</i> , MS, August 1984	<i>Stills from Movies: Personal Photography and the Personal</i>
Giridharan Iyengar	<i>Video Retrieval for Reuse</i> , PhD, June 1998
Giridharan Iyengar September 1995	<i>Information Theoretic Measures for Encoding Video</i> , MS,
Frank Kao	<i>Parallel Processing Interfaces to Television</i> , MS, June 1995
Karrie Karahalios	<i>Salient Movies</i> , MEng, June 1995
Karrie Karahalios <i>Timeline</i> , SM, February 1998	<i>Merging Static and Dynamic Visual Media Along an Event</i>
Jeffrey Keast <i>System</i> , MS, June 1985	<i>The Design and Application of a Personal Printer/Scanner</i>

Roger Kermode	<i>Smart Network Caches: Content and Application Mediated Delivery of Multimedia Over the Internet</i> , PhD, March 1998
Roger G. Kermode MS, June 1994	<i>Building the Big Picture: Enhanced Coding from Resolution</i> ,
Boris Kizelshteyn	<i>REACH: The Local Social Favor Exchange</i> , MS, June 2012
Shyam Krishnamoorthy	<i>Minerva: A Smart Video Assistant for the Kitchen</i> , MS, June 2001
Amir Lazarovich	<i>Invisible Ink : Blockchain for Data Privacy</i> , MS, June 2015
Gene S. Lee <i>Images</i> , BS, June 1989	<i>Progressive Transmission of Digitally Compressed Color</i>
Kwan Lee	<i>The Influences of the Just-in-time Social Cloud on Real World Decisions</i> , PhD, February, 2012
Sung Hyuck Lee	<i>XCast: A Personalized and Groupwise Broadcasting System for Social Event Networking</i> , MS, September 2008
Fulu Li	<i>Community Storage</i> , PhD, June 2009
Fulu Li	<i>Cooperative Multicast in Wireless Networks</i> , MS, June 2005
Inna Lobel Koyrakh	<i>Increasing the Bandwidth of Social Navigation during the Prototyping Process</i> , MS, February 2011
Julia Ma	<i>Interest networks : understanding the influence of interesting people in an organization</i> , MS, June 2012
Bruce McHenry June 1984	<i>Multi-Modal Communication in the Computer Medium</i> , BS,
Patrick Campbell McLean	<i>Structured Video Coding</i> , MS, June 1991
Christopher Metcalfe <i>Communications System</i> , MS, June 1999	<i>Media Jacket: An Integrated Clothing Based Personal</i>
Ilia Mirkin	<i>Reliable Real-time Stream Distribution Using an Internet Multicast Overlay</i> , MS, February 2006
Robert Charles Mollitor May 1988	<i>Image Sequence Compression via Code Encyclopedias</i> , BS,
Paul Thomas Monaghan	<i>Codebook Replenishment of Vector Quantized Movies by use of a Megatable</i> , BS, May 1989
Casey R. Muller	<i>Design and Performance of a Viral Network</i> , MS, June 2003
Eugene N. Opsasnick 1988	<i>Color Correction for the Eikonix Digitizing Scanner</i> , BS, May
Durga Pandey	<i>UniPlug: A Framework For Ad-hoc Invention Sharing Over A Campus Network</i> , MS, September 2007
Peter Pathe	<i>A Virtual Vocabulary Speech Recognizer</i> , MS, June 1983
Manuela Pereira 1993	<i>Video Coding in a Broadcast Environment</i> , MS, September
Travis Rich	<i>Encoding Data into Physical Objects with Digitally Fabricated Textures</i> , MS, June 2013

Travis Rich	<i>Collaborative Scientific Publishing: A New Research Ecosystem</i> , PhD, June 2017
Steven L. Rohall May 1988	<i>A Graphical Interface for Cooperative Problem Solving</i> , MS,
Pasquale Romano MS, February 1990	<i>Vector Quantization for Spatiotemporal Sub-band Coding</i> ,
Yasmine Rubinovitz	<i>News Matter - Embedding Human Intuition in Machine Intelligence through Interactive Data Visualizations</i> , MS, June 2017
James B. Salem system, BS, June 1984	<i>Computers in the Audio Domain; creating an audio news</i>
Gitta Salomon Magazine, MS, June 1986	<i>Design and Implementation of an Electronic Special Interest</i>
Dan Sawada	<i>Recast: An Interactive Platform for Personal Media Curation and Distribution</i> , MS, June 2014
Robert Schaeffer May 1983	<i>Audio Augmentation of Video Disc Training Systems</i> , BS/SM,
Dawei Shen	<i>Co-channel Digital Signal Separation: Application and Practice</i> , MS, February 2008
Dawei Shen	<i>Design of A Market-Incented Wisdom Exchange for Organizations and Communities</i> , PhD, June 2012
Thariq Shihpar	<i>Video in PubPub: Moving Images in Context</i> , MS, June 2016
Jeremy Silber	<i>A Cooperative Communication Protocol for Wireless Ad-Hoc Networks</i> , ME, June 2002
Abha Singh	<i>Variable Resolution Video</i> , MS, June 1991
Scott T. Smith: 1998	<i>Scalable Distributed Resource Location</i> , ME EECS, May
Marc Spehlmann	<i>A Speech Peripheral for an IBM Personal Computer</i> , MS
Joseph B. Stampleman	<i>Multiscale Codebooks</i> , BS, May 1989
Joseph B. Stampleman	<i>Scalable Video Compression</i> , MS, June 1992
Brian Tice	<i>Sonic Artifacts</i> , MS, June 2017
Eyal Toledano	<i>Opportunistic, Collaborative and Synchronized, Proximal Device Ecology</i> , June 2014
Dang Van Tran Video DialTone ATM	<i>Multimedia Applications and Network Management Support in Network</i> , MS/BS, May 1994
Edison Thomaz Services	<i>Developing Distributed Contextualized Communication</i> MS, September 2002
Tri D. Tran 1997	<i>Low Delay MPEG2 Video Encoding</i> , BS /MEng EECS, June
Nuno Vasconcelos	<i>A Bayesian Framework for Content Characterization, Summarization, Indexing, and Retrieval</i> , PhD, November 1997

Nuno Vasconcelos	<i>Library-based Image Coding using Vector Quantization of the Prediction Space</i> , MS, September 1993
Dimitrios Vyzovitis	<i>An Active Protocol Architecture for Collaborative Media Distribution</i> , MS, June 2002
Anders Richard Wallgren	<i>Movies on the Workstation</i> , BS, May 1989
John A Watlington	<i>Synthetic Movies</i> , MS, September 1989
John A. Watlington <i>Sequences</i> , BS, May 1987	<i>A Decoder for Vector Coded Color Motion Picture</i>
Tomer Weller	<i>This is How: Story Centric Distributed Brainstorming and Collaboration</i> , MS, June 2017
Grace Woo	<i>Demonstration and Evaluation of Co-channel DBPSK Source Separation</i> , MS, June 2007
Grace Woo	<i>VRCodes : embedding unobtrusive data for new devices in visible light</i> , PhD, June 2012
Steven Yelick June 1982	<i>The Authoring of Optical Videodiscs with Digital Data</i> , MS,
Steven Yelick	<i>Anamorphic Image Processing</i> , BS, June 1980
Polychronis Ypodimatopoulos	<i>Cerebro: Forming Parallel Internets and Enabling Ultra-Local Economies</i> , MS, September 2008
Polychronis Ypodimatopoulos	<i>An Open Application Framework For Social Discovery</i> , PhD, June 2012
Hector Yuen 2006	<i>An Ad-Hoc Wireless Communication System</i> , MS, August

Panels and Presentations

Keynote Speaker, CDW Enabling the Workforce Summit, Austin, April 2018

Keynote Speaker, Tencent Media Summit, Shanghai, November 2017

Comms Vision Chair and Speaker, Gleneagles, Scotland, November 2017

Keynote Speaker, UBTech, Orlando, June 2017

Future Media panel, National Institute of Standards and Technology (NIST), Named Data Networking Workshop, Gaithersburg, MD, June 2016

Keynote Speaker, Comms Vision, Gleneagles, Scotland, November 2015

Speaker, CDW Collaboration and Mobility Summit, San Francisco, September 2015

Speaker, Outdoor Advertising Association of America, San Diego, May 2015

Speaker, MIT Information and Communication Technologies Conference, Cambridge, MA, April 2015

Keynote Speaker, RDV Media: Transformation, Montreal, Canada, September 2014

Speaker, 61st Cannes Lions International Festival of Creativity, Cannes, France, June, 2014

Keynote Speaker, Ernst & Young Global Media & Entertainment Industry Meeting, Orlando, Florida, December, 2012

Keynote Speaker, AT&T Technical Leaders Forum, Orlando, Florida, November, 2012

Keynote Speaker, AT&T Technical Leaders Forum, San Juan, Puerto Rico, February, 2012

Panel Speaker, PWC Global Communications Forum, London, June, 2011

Keynote Speaker, Fidelity Executive Forum, Orlando, May 2011

Keynote Speaker, AT&T Technical Leaders Forum, Los Angeles, November 2010

Keynote Speaker, HSM World Marketing & Sales Forum, Lisbon, November 2009

Keynote Speaker, 16th CLSA Investors' Forum, Hong Kong, September 2009

Keynote Speaker, HSM World Marketing & Sales Forum, Mexico City, July 2009

Keynote Speaker, Gartner Wireless and Mobile Summit, Chicago, February 2009

Keynote Speaker, TelephonyLIVE, Chicago, September, 2008

Keynote Speaker, The Future of Computing, Dell Mexico, Monterey, Mexico, September, 2008

Keynote Speaker, Product Development & Management Association's International Conference, Orlando, September, 2008

Keynote Speaker, Wainhouse Research, Cambridge, MA, July 2008

Keynote Speaker, Gartner Group Future of Technology, Orlando, June 2008

Keynote Speaker, HSM World Marketing & Sales Forum, São Paulo, Brazil, June 2008

Keynote Speaker, Photo Marketing Association International, Las Vegas, February 2008

Speaker, eg07, Los Angeles, December 2007

Speaker, Gartner Networking Summit, Nashville, December 2007

Keynote Speaker, SSPA Services Leadership Conference, New Orleans, October 2007

Keynote Speaker, SonyBMG Music Entertainment Worldwide Information Technology Conference, Miami, April 2007

Panelist, NSF Cognitive Radio and Cooperative Communication, Washington, DC, April 2007

Keynote Speaker, IEEE/CTIA Portable'07 Conference, Orlando, March 2007

Panelist, The New New Media, Realscreen Summit, Washington, DC, January 2007

Keynote Speaker, World Science Forum, New York, NY, November 2006

Keynote Speaker, Playback Mobile Forum, Toronto, Canada, May 2006

Keynote Speaker, Media Summit/Digital Hollywood, New York NY, February 2006

Panelist, Telecoms Transitions, Lisbon, Portugal, June 2005

Keynote Speaker, IT MIDIA, Sao Paulo, Brazil, June 2005

Speaker, IDG Communications Meeting, Cadiz, Spain, May 2004

Speaker, Samsung Tech Fair 2003, Seoul, Korea, July 2003

Workshop Co-Director: United Nations: The Wireless Internet Opportunity for Developing Nations, New York, June 2003

Keynote speaker, Worldcom Customer Summit, Orlando, FL, February 2003

Keynote speaker, Nextel Indirect Conference, Las Vegas, January 2003

Presentation before Congressional Internet Caucus, Washington, DC, July 2002

"Not Your Victorian Internet," speaker, MIT On the Road, The Association of Alumni and Alumnae of MIT, West Palm Beach, FL, January 2001.

"Digital Extremism," speaker, The Leadership Center, Atlanta, GA, November 2000

"Digital Entertainment," speaker, Minnesota TEKNE Awards, Minneapolis, MN, November 2000
"Digital Life: Clearing the Cobwebs from the Net," speaker, New York State Annual Meeting, Lake Placid, NY, June 2000

"The Future is Now," keynote speaker, South Dakota Governor's Economic Development Conference, Pierre, SD, April 2000

"Always On," keynote speaker, Canadian Music Week conference, Toronto, March 2000

"Accessible Computers for All," speaker, INET'2000, Sao Paulo, Brazil, July 2000

"Taking the Lead – Issues of the Future," keynote speaker, Canadian Association of Broadcasters, Montreal, Canada, November 1999.

"The New Technology Changing the World," keynote speaker, Mgate New-Biz Forum, Athens, Greece, January 1999.

"The Developing Relation Between Digital Broadcasting and the Internet," workshop speaker, Conference on the Hong Kong TV Broadcasting Industry: Towards the 21st Century, Hong Kong, November 1998

"Transparent Technology," Keynote speaker, CUE Telecon XVII, Anaheim, CA, October 1998.

"The New World for Technology," invited speaker, Federation of European Direct Marketing, Brussels, Belgium, April 1998.

"Future of TV Networks," invited panelist, Aspen Comedy Festival, Aspen, CO, March 1998.

"The Future of Media Technology," invited speaker, Fischer, Justus Communicacao Total, Sao Paulo, Brazil, January 1998.

"The New Multimedia Environment," invited panelist, United Nations World Television Forum, New York, NY, November 1997.

TED6, Technology, Entertainment & Design, invited speaker, New York, NY, September 1997.

"The Future of Technology," Technology Forum, California State University, Hayward, CA, May 1997.

"The Future of the Newspaper in the Digital Age," International Seminar on the Future of the Daily Newspaper, Belo Horizonte, Brazil, April 1997.

"How Future Communications Impact You," Meetings & Exhibitions Technology Conference, Rosemont, IL, April 1997.

"Digital Life: Media & Community in a Connected World," ECON Zukunftstag, Dusseldorf, Germany, April 1997.

"The Future of Technology," Technology Forum, California State University, Hayward, CA, May 1997.

"QoS & Mobile Multimedia," Nomadic 97, panel member, Santa Clara, CA, August 1997.

"Nomadicity, Wearability & The Technologies of Community," Arthur Andersen High Tech Advanced Industry Seminar, keynote speaker, San Jose, CA, September 1997.

Speaker, TED6, Technology, Entertainment & Design, New York, NY, September 1997..

"The New Multimedia Environment," invited panelist, United Nations World Television Forum, New York, NY, November 1997.

"The Impact of Future Communications on the Printing Industry," keynote speaker at Tech Alert 96 Conference, Graphics Arts Technical Foundation, Pittsburgh, PA, January 1996

"Internet Entertainment," Singapore Digital Media Consortium Symposium, speaker, Singapore, February 1996.

"How Future Communications Impacts You," First Swiss Telecom Symposium, speaker, Lugano, Switzerland, May 1996.

"Telecommunications, Telematics & Social Change," ARTIS Seminar, speaker, Firenze, Italy, June 1996.

"The Future of Television," Medientage Munchen '96, speaker, Munich, Germany.

"The Future of Video Coding: What Will Be New," International Symposium on Circuits & Systems, panel member, Atlanta, May 1996.

"Emerging Architecture," invited panel participant at NII 2000 Forum of the Computer Science and Telecommunications Board, Washington, DC, May 23, 1995.

"Multimedia Revolutions: past, present and future," speaker at Management Circle Conference on Datenautobahn und Multimedia, Frankfurt, Germany, June 19-21, 1994.

"Coding Content instead of Pixels," keynote speaker at the VLBV 94 conference, Colchester, Essex, UK, April 6-8, 1994.

"Technology Day Panel," invited panel participant at the 1994 MTV Networks Management Retreat, San Juan, PR, February 8, 1994.

"Selling Value in the New Media 90s," Guest Speaker at Advanstar Communications 1994 International Sales Meeting, Cleveland, OH, January 14, 1994.

"The 5 Year Prospective for Digital Television," Panel Moderator, IEEE Digital Video Workshop, Cambridge, MA, October 1993.

"Television of Tomorrow," Interactive Panel session at the World Economic Forum Industrial Summit, MIT/Harvard, Cambridge, MA, September 10, 1993.

"Life After HDTV," panel speaker at session on "MIT in the 21st Century", Enterprise '93 Conference, Boston, MA, June 17, 1993.

"Digital Television," invited speaker at Advanced Seminar on "Desktop Video Communications: The Final Step in the Merger of Computers and Video", sponsored by Applied Business telecommunications, Atlanta, GA, May 3, 1993.

"Jumping Into the Frame: Past Interaction, Into Participation," invited speaker for AECT 1993 National Convention, New Orleans, LA, January 14, 1993.

"Telecommunications Future," panel speaker at the PLI Telecommunications Policy and Regulation Conference, Washington DC, December 3, 1992.

"Television of Tomorrow: HDTV or Video home computer? ", seminar speaker at the Association Descartes Conference on "Images, Screens, Networks", Paris, France, November 27, 1992.

"Variable Resolution Video on Demand," panel speaker at the EIA Digital Video Workshop, Boston, MA, October 1, 1992.

"The Communication Revolution Now: The Atlantic Connection," panel speaker at the 41st Annual IPI General Assembly, Budapest, Hungary, May 19, 1992.

"Workstations of the Future: A User's Perspective", presenter for the IEEE Satellite Videoconference, April 30, 1992.

"Television of Tomorrow/How Now PTV", presentation and panel speaker at Pacific Mountain Network Conference "Making the Most of Multichannel", La Jolla, CA, April 14, 1992.

Television of Tomorrow", speaker at the 22nd T&M Seminar "The Digital Challenge: Future Tools for Film & TV Makers", Stockholm, Sweden, February 20, 1992.

"The Potential of All-digital High Definition Television Systems", panel speaker at the Financial Times Cable Television and Satellite Broadcasting Conference, London, UK, February 19, 1992.

"How Technology will Reshape Communication", and *"Consumers — Taking Command of their Media Flow"*, speaker at the World Communication Summit, Crans-Montana, Switzerland, October 6, 1991.

"Advanced Television Systems: Anything but HDTV", invited banquet speaker at IEEE Multidimensional Signal Processing Conference, Lake Placid, NY, September 24, 1991.

"Inventing the Future at MIT's Media Lab", presentation to the CCIA Board of Director's meeting, Boston, MA, September 12, 1991.

"Movies of the Future", speaker at the CRAI Multimedia Systems: From Technologies to Applications, Capri, Italy, June 2-7, 1991.

"Television of Tomorrow: Signals with a Sense of Themselves", keynote speaker, 36th Annual IEEE International Computer Conference, COMPCON '91, San Francisco, CA, February 27, 1991.

"Digital Television", banquet speaker at the 1991 SPIE Symposium on Electronic Imaging: Science and Technology, San Jose, PR, February 26, 1991.

"The Future Path for Broadband", plenary session speaker at the 1990 ComForum Conference "Broadband: Converging on the Future", Orlando, FL, December 10-14, 1990.

"Digital Video Terminals", speaker and round table participant, EIA/IEEE 2nd International Workshop on Digital Video Communications, Cambridge, MA, November 27, 1990.

"Computing with Feeling: Directions for the Human Interface to Personal Computing in the Coming Years", invited speaker at SOFTWORLD '90 Conference, Chiba, Tokyo, Japan, August 3, 1990.

"Perspectives on Media Technology", guest speaker at the James Martin World Seminar, (TTI), Cambridge, MA, May 2, 1990.

"Information Technology Seminars", a series of talks presented at the Institute of Systems Science, National University of Singapore, Singapore, April 23-27, 1990

"HDTV Update: Current Status, Issues and Trends", NCGA '90 Tutorial speaker, Anaheim, CA, March 19, 1990.

"Electronic Document Delivery", keynote speaker at the first Bellcore/BCC Conference on Electronic Document Delivery, New Brunswick, NJ, March 12, 1990.

"Communications and Information in the Next Millenium", keynote speaker at the 1990 HIMSS Conference, New Orleans, LA, February 20, 1990.

"Focusing on the Future of the Media", keynote speaker at the Digital Photography Conference, Washington DC, February 8-10, 1990.

"Communications in the Year 2001", keynote speaker at the Dallas Communications Council conference "Communications: The Economic Wave of the Future", Dallas, TX, October 16, 1989.

"Movies of the Future: Computing in your Television, and Television in your Computers", CCISP Seminar Series, University of Pennsylvania, Philadelphia, PA, October 11, 1989.

"Video Technologies of the Future", panelist at National Communications Forum, Chicago, IL, October 3, 1989.

"Inventing the Future", keynote speaker, "Interchange '89 Conference organised by Monsanto, St. Louis, MS, September 21, 1989.

"Advances in Media Technology: The Innovations at MIT's Media Laboratory", pre-conference workshop at HCI International '89 Conference, Boston, MA, September 18, 1989.

"HDTV and the Future of Home Communications", speaker at SEMI conference "HDTV: The Impact of New Age Electronics", San Francisco, CA, June 29, 1989.

"Information in the Next Millenium", speaker at the International Thomson Professional Publishing Conference, Boston, MA, June 28, 1989.

"Media Technology", keynote address, IEEE International Workshop on Microelectronics and Photonics in Communications, New Seabury, MA, June 7, 1989.

"The Face of Communications in the Year 2001", keynote address, Video 9 Conference and Exhibition, Quinnipiac College, CT, May 25, 1989.

"Open Architecture Television", speaker at University of North Carolina/IBM Technical Symposium, Chapel Hill, NC, May 17, 1989.

"Movies of the Future", speaker at the Image and Sound Film Festival, Den Haag, The Netherlands, April 27-28, 1989.

"The Way We Like It: Concurrent, Redundant and Plural", speaker at OCRI MultiMedia '89 Conference, Ottawa, Canada, April 21, 1989.

"Human Interfaces for Multimedia Systems", speaker at Open Software Foundation University Symposium, Cambridge, MA, April 18, 1989.

"The Face of Communications in the Year 2001", keynote speaker for "Advanced Communications Technologies in Pennsylvania and the Public Interest" seminar, sponsored by PPTN, Hershey, PA, April 6, 1989.

"The Future of Television", invited speaker, 99th meeting of the National Council of the Arts, Washington DC, February 3, 1989.

"Opportunities in Communications: The Technology View", speaker for the San Diego Communications Council Conference on Technology, November 15, 1988, San Diego, CA.

"Computing and Communications in the Year 2001", speaker for Hewlett Packard Seminar, Cupertino, CA, November 15, 1988.

"The Future: Home Communications", speaker for Intel Technology Seminar, Sedona, AZ, November 2, 1988.

"The Future: Home Communications", speaker for Ameritech Presidents Conference, Pheonix AZ, November 2, 1988.

"The Face of Communications in the Year 2001", speaker for Ameritech Corporate Strategy Conference, Chicago, IL, October 26, 1988.

"Media Technology", Chairman of SIGGRAPH panel, Atlanta, GA, August 4, 1988.

"The 135 Mb Living Room", speaker for ITS Seventh International Conference, MIT Cambridge, MA, June 29, 1988.

"HDTV...The Systems Under Development", panelist at NAB Broadcast Engineering Conference, Las Vegas, NV, April 10, 1988.

"News and Movies in the 135 Megabit Living Room", speaker for Bellcore/MIT Conference "Towards a Universal Broadband Infrastructure for the US", Salt Lake City, UT, April 7, 1988.

"HDTV: Benefits, Costs and Issues", Tutorial Instructor, NCGA '88, Anaheim, CA, March 21, 1988.

"The Future Impact of HDTV Standards and Digital Television Technologies on Computer Graphics", Technical Speaker for NCGA '88, Anaheim, CA, March 2, 1988.

"Adaptive Vector Quantization of Moving Images", speaker at seminar in "Visual Communications", Columbia University, New York, NY, November 13, 1987.

"New Publishing Technologies: The Day after Tomorrow", speaker at the American Association of University Presses' Northeastern Regional meeting, Cambridge, MA, October 18, 1987.

"Electronic Futures: Technology Directions for Publishing", speaker at the Corporate Electronic Publishing Systems Conference, Boston, MA, October 28, 1987.

"Where Do User Interfaces Come From?", panelist at SIGGRAPH Conference, Anaheim, CA, July 1987.

"Digital Television: An Overview", IEEE International Symposium on Circuits and Systems, speaker, Philadelphia, PA, May 4, 1987.

"Interactive 3-D Imaging for Remote Presence and Simulation", speaker at The Institute for Graphic Communication Conference "Real-Time Stereoscopic Video Display System", Bedford, MA, March 24, 1987.

"Computing with Television", invited speaker for Images, Information, & Interfaces: Directions for the 1990s, New York Telephone, New York, NY, November 19, 1986

Workshop on Interactive 3-D Graphics, University of North Carolina, Chapel Hill NC, October 1986.

"Advanced Television Concepts", ICCE panelist for Consumer Electronics Conference, Chicago, IL, June 5, 1986.

"Unproven Guidelines for the Human Interface", invited Tutorial at Eurographics, Nice, France, September 1985.

"The Advanced Television Research Program at MIT", HDTV Conference, invitational conference of young researchers in television, Rennes, France, September 1985.

"Computer Graphics & the Media Technology" Invited Speech for Texas A&M Symposium, April 1985.

"Optical Videodiscs and Electronic Publishing", speaker for Continuing Education Institute, Los Angeles, June 1984.

"Optical Storage in the House", presentation for Technical Opportunity Conference, San Francisco, CA, December 1983.

"Exploring the Future", invited speaker for the American Press Institute, Reston, VA, November 1983.

"Interactive Three-Dimensional Computer Graphics", speaker for the Institute for Graphic Communication Conference on 3-D Display Techniques Andover, MA, November 1983.

"The Human Interface to Personal Computers", Federal Computer Conference, Washington, DC, September 1983.

"Audio-visual Communications: Tomorrow's World", speaker for the International Institute of Communications Conference, Aruba, Spain, September 1983.

"Artists Interfacing with Technology", panelist for SIGGRAPH Conference, Detroit, MI, July 1983.

"Media Technology - Past, Present, Future", speaker for the Biological Photographic Association, Dallas, TX, July 1983.

Computer & Communications Industry Association Conference, presentation, Calsbad, CA, November 5, 1982.

"Computer Graphics and the Man/Machine Interface", speaker for the First Annual Pacific Northwest Computer Graphics Conference, Eugene, OR, October 1982.

"A Conversational Model for the Human Interface to Graphics", speaker for the NCGA, Anaheim, CA, June 1982.

"Computational Video", invited speaker for the Whitney Symposium on Science and Technology, Rochester, NY, May 1982.

"Picture Archiving & Communications Systems for Medical Imaging", speaker for the First International Conference and Workshop on Picture Archiving and Communication Systems for Medical Applications Paper, Newport Beach, CA, January 17, 1982.

Advanced Research in Computer Graphics Conference, NCGA, speaker, June 1981.

"NTSC Compatible Text and Graphics", speaker for the IEEE 21st Annual Chicago Spring Conference on Consumer Electronics, June 1981.

"Computational Video: Television as a Human Interface", Canadian Man-Machine Society, June 1981.

"Video at the Learning Interface", Society for Applied Learning Technology Symposium, February 1981.

"Introduction to Dataland", speaker for the Association of Educational Communication and Technology Convention, April 1980.

"Computers in Everyday Life", Session Chairman of Technical Committee, International Federation of Information Processing (IFIP) 8th World Congress, 1980.

"Personalized Movies, Society for Applied Learning Technology", speaker for Third International Congress, January 1980.

"The Case for TV Compatibility in Computer-Aided Design", speaker for the Detroit Engineering Society, April 1979.

"Videodiscs in Cataloging", speaker for the Art Libraries Society of North America (ARLIS) Conference, March 1979.

"Interactive Computing", panelist for SIGGRAPH Conference, 1976.

Law Cases (none omitted for confidentiality or other reason)

Technical report on streaming, Reed Smith, April, 2019, obo Netflix v Arizona Dept of Revenue

IPR for Baker Hostetler, on behalf of Comcast, January, 2019

IPR of patent 9,729,891 on behalf of Unified Patents, Inc., December 2018, Erise IP, LLC

Consulting for IBM v Expedia et al, August, 2018 (Research a student's thesis), Baker Botts, Austin.

Princeton Digital Image Corporation v. Office Depot Inc., No. 1:13-cv-00239-LPS (D. Del.), and Related Cases, WilmerHale, Feb, 2017, deposited April 28, 2017

Certain Digital Television Set-Top Boxes, Remote Control Devices, and Components Thereof, DN 3195, Investigation No. 337-TA-1041, Keeker and Van Nest, obo Comcast, March, 2017

IPR of 6,725,281 and 9,172,987 by Banner and Witcoff, Oct, 2016, deposition July, 2018

IPR, Connex, obo Apple et al, Cooley LLP, August, 2016. No report or deposition.

FastVDO LLC v. AT&T Mobility LLC et al., 2:15-cv-921 (E.D. Tex.), obo Morrison and Foerster representing Apple, Mar-June 2016, IPR declaration filed, deposition, March 20, 2017

OpenTV v Apple, IPR 2015-0131, obo O'Melveny & Myers, representing Apple. Feb-Mar, 2016, no report or deposition, deferred.

PMC v. Amazon, Civil Action No. 1:13-cv- 1608-RGA, obo Knobbe, Martens, Olson & Bear, L.L.P./Amazon, Oct 2014 – open. On hiatus

OpenTV v. Netflix, Civil Action 14-cv-1622, obo O'Melveny & Myers/Apple. June, 2014 – open

OpenTV v. Netflix, Civil Action 1:12-cv-01733-GMS, obo Durie Tangri/Netflix. March, 2014 – November, 2014

Varghese v Amazon, inc. et al, No.12-2-39303-6 (King County Superior Court, KL Gates, on behalf of Amazon, December 2013 – December, 2014, settled

EON Corp IP Holdings v FLO TV et al, C.A. No 10-812 (RGA), on behalf of Sprint Spectrum LP and Simplexity, Morris Nichols, Arsht and Tunnell, LLP, and on behalf of USCellular, Sidney Austin LLP, July, 2013 – October, 2013

Bose Corporation v SDI, Inc., IPR2013-00465, declaration, Foley, Lardner (Boston) on behalf of SGI, June 2013-Mar 2014, deposition, 10 March, 2014

TiVo, Inc., v Cisco Systems et al, No 2:12-cv-00311-JRG, on behalf of Cisco et al, April 2013 – June 2013, case settled

Jongerius Panoramic Technologies v Google and Apple, Norther District of California, 4:12-cv-03797, Greenberg Traurig on behalf of Google, and Ropes and Gray obo Apple, 2013 – 2014, patent invalidated

Rovi v Amazon et al, CIV-1:11-cv-00003, US dist court, Delaware. Boies Schiller on behalf of Amazon. 2012 Case dropped.

Rovi v Vizio, ITC 337-TA-820 and ITC-TA-845, Akin Gump, on behalf of Vizio. Both actions dropped. 2012.

Patent Harbor, LLC v. The Walt Disney Co. & Buena Vista Home Entertainment, Eastern District, Texas, 6:10-cv-00607-LED, Rothwell Figg, on behalf of Disney, 2011 – June, 2012

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