

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.  
Petitioner

v.

MAXEL, LTD.  
Patent Owner

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IPR2020-00200  
Patent No. 10,084,991

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**DECLARATION OF DR. ANDREW LIPPMAN**

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I, Dr. Andrew Lippman, hereby declare the following:

**I. BACKGROUND AND QUALIFICATIONS**

1. My name is Andrew Lippman, and I am over 21 years of age and otherwise competent to make this Declaration. I make this Declaration based on facts and matters within my own knowledge and on information provided to me by others, and, if called as a witness, I could and would competently testify to the matters set forth herein.

2. I have been retained as a technical expert witness in this matter by Counsel for the Petitioner, Apple Inc. (“Petitioner”) to provide my independent opinions on certain issues requested by Counsel for Petitioner relating to the accompanying Petition for Inter Partes Review of U.S. Patent No. 10,084,991 (“the ’991 Patent”). I am being compensated at an hourly rate of \$650.00. My compensation in this matter is not based on the substance of my opinions or on the outcome of this matter. I have been informed that Maxell, Ltd. is the purported owners of the ’991 Patent. I note that I have no financial interest in Maxell, Ltd. or Petitioner, and I have no other interest in the outcome of this matter.

3. I have summarized in this section my educational background, career history, and other qualifications relevant to this matter. I have also included a current version of my curriculum vitae, attached as Appendix B.

4. 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.

5. I am currently a Senior Research Scientist at the Massachusetts Institute of Technology (“MIT”) and Associate Director of the MIT Media Laboratory, an approximately \$80 million per year research and teaching facility at MIT, which I helped establish in the early 1980s.

6. At MIT, I have supervised over 50 Masters 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.

7. 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. I served on the editorial board of the Image Communication Journal between 1989 and 2003. I have served as an expert witness in patent cases since 2001, addressing diverse features of interactive television, electronic program guides, and user interaction.

8. I have worked generally on video interaction systems since the 1970s. In the early 1970s, 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.

9. In the 1980s, 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.

10. In 1991, I created the “Media Bank” program at MIT, 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 ensured 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. My colleagues and I created demonstrations of interactive television systems for news that combined the evening newscast with additional data from print sources so the viewer could learn more about the story than was available in the live broadcast.

11. Also in 1991, I created the Television of Tomorrow program at MIT. 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.

12. 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.

13. 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 MIT, I created the “Digital Life” consortium, the purpose of which was to explore and develop ideas relevant to an Internet-connected society.

14. 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 patents in this case. Additionally, I was at least a person having ordinary skill in the art as of the priority date of the ’991 Patent.

15. I am being compensated for my time spent in connection with this case. I have no financial interest in the outcome of this case. The opinions provided in this report are my own and my compensation does not depend in any way on the substance of my opinions.



16. As part of my work and in forming my opinions in connection with this proceeding, I have reviewed the following materials. For any prior art listed below, it is my opinion persons of ordinary skill in my field would reasonably rely upon such prior art in forming opinions regarding the subject matter of this proceeding:

- Petition for *Inter Partes* Review of U.S. Patent No. 10,084,991;
- U.S. Patent No. 10,084,991 (Ex. 1001);
- File History for U.S. Patent 10,084,991 (Ex. 1002);
- U.S. Patent No. 7,565,680 to Asmussen (Ex. 1004);
- U.S. Patent No. 7,548,255 to Bear (Ex. 1005);
- U.S. Patent Application No. 2007/0139514 to Marley (Ex. 1006)
- U.S. Patent No. 5,940,484 to DeFazio (Ex. 1007).
- U.S. Patent Application No. 2004/0031064 to Lindstrom (Ex. 1008)
- U.S. Patent No. 6,493,020 to Stevenson (Ex. 1012)
- U.S. Patent No. 6,134,223 to Burke (Ex. 1013)
- U.S. Patent No. 8,458,756 to Rodriguez (Ex. 1014)
- U.S. Patent No. 7,373,650 to Rodriguez (Ex. 1015)
- Explorer® Digital Video Recorder - Users Guide (Ex. 1016)
- “So far, interactive TV is no match for the mall” - Tampa Bay Times (St. Petersburg, Florida) June 5, 1995 (Ex. 1017); and
- “Comcast rolls out video on demand” - Sunday News (Lancaster, Pennsylvania) Nov. 3, 2002 (Ex. 1018)

## II. LEGAL FRAMEWORK

17. I am a technical expert and do not offer any legal opinions. However, I have been informed about certain legal principles regarding patentability and related matters under United States patent law, which I have applied in performing my analysis and arriving at my technical opinions in this matter.

**A. Analogous Art**

18. I have been informed by counsel that for prior art to be used to establish the unpatentability of a patent based on obviousness, the prior art must be “analogous art” to the claimed invention. I have also been informed by counsel that a prior art reference is analogous art to the claimed invention if: (1) the reference is from the same field of endeavor as the claimed invention, even if it addresses a different problem; or (2) the reference is reasonably pertinent to the problem faced by the invention, even if it is not in the same field of endeavor as the claimed invention.

**B. Obviousness**

19. I have been informed that a person cannot obtain a patent on an invention if the differences between the invention 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 (“POSITA”). I have been informed that a conclusion of obviousness may be founded upon more than a single item of prior art. I have been further informed that obviousness is determined by evaluating the following factors: (1) the scope and content of the prior art, (2) the differences between the prior art and the claim at issue, (3) the level of ordinary skill in the pertinent art, and (4) secondary considerations of non-obviousness. In addition, the obviousness inquiry should not be done in hindsight. Instead, the obviousness inquiry should be done through the eyes of a POSITA at the time of the alleged

invention.

20. In considering whether certain prior art renders a particular patent claim obvious, I have been informed that I can consider the scope and content of the prior art, including the fact that one of skill in the art would regularly look to the disclosures in patents, trade publications, journal articles, conference papers, industry standards, product literature and documentation, texts describing competitive technologies, requests for comment published by standard setting organizations, and materials from industry conferences, as examples. I have been informed that for a prior art reference to be proper for use in an obviousness analysis, the reference must be “analogous art” to the claimed invention. I have been informed that a reference is analogous art to the claimed invention if: (1) the reference is from the same field of endeavor as the claimed invention (even if it addresses a different problem); or (2) the reference is reasonably pertinent to the problem faced by the inventor (even if it is not in the same field of endeavor as the claimed invention). In order for a reference to be “reasonably pertinent” to the problem, it must logically have commended itself to an inventor's attention in considering his problem. In determining whether a reference is reasonably pertinent, one should consider the problem faced by the inventor, as reflected either explicitly or implicitly, in the specification. I believe that all of the references I considered in forming my opinions in this IPR are well within the range of references a POSITA would have consulted

to address the type of problems described in the Challenged Claims.

21. I have been informed that, in order to establish that a claimed invention was obvious based on a combination of prior art elements, a clear articulation of the reason(s) why a claimed invention would have been obvious must be provided. Specifically, I am informed that, under the U.S. Supreme Court's *KSR* decision, a combination of multiple items of prior art renders a patent claim obvious when there was an apparent reason for one of ordinary skill in the art, at the time of the invention, to combine the prior art, which can include, but is not limited to, any of the following rationales: (A) combining prior art methods according to known methods to yield predictable results; (B) substituting one known element for another to obtain predictable results; (C) using a known technique to improve a similar device in the same way; (D) applying a known technique to a known device ready for improvement to yield predictable results; (E) trying a finite number of identified, predictable potential solutions, with a reasonable expectation of success; (F) identifying that known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art; or (G) identifying an explicit teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine the prior art references to arrive at the claimed invention. I am also informed that

where there is a motivation to combine, claims may be rejected as prima facie obvious provided a POSITA would have had a reasonable expectation of success regarding the proposed combination.

22. I am informed that the existence of an explicit teaching, suggestion, or motivation to combine known elements of the prior art is a sufficient, but not a necessary, condition to a finding of obviousness. This so-called “teaching-suggestion-motivation” test is not the exclusive test and is not to be applied rigidly in an obviousness analysis. In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls. Instead, the important consideration is the objective reach of the claim. In other words, if the claim extends to what is obvious, then the claim is invalid. I am further informed that the obviousness analysis often necessitates consideration of the interrelated teachings of multiple patents, the effects of demands known to the technological community or present in the marketplace, and the background knowledge possessed by a person having ordinary skill in the art. All of these issues may be considered to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent.

23. I also am informed that in conducting an obviousness analysis, a precise teaching directed to the specific subject matter of the challenged claim need not be sought out because it is appropriate to take account of the inferences and creative

steps that a POSITA would employ. The prior art considered can be directed to any need or problem known in the field of endeavor at the time of invention and can provide a reason for combining the elements of the prior art in the manner claimed. In other words, the prior art need not be directed towards solving the same specific problem as the problem addressed by the patent. Further, the individual prior art references themselves need not all be directed towards solving the same problem. I am informed that, under the *KSR* obviousness standard, common sense is important and should be considered. Common sense teaches that familiar items may have obvious uses beyond their primary purposes.

24. I also am informed that the fact that a particular combination of prior art elements was “obvious to try” may indicate that the combination was obvious even if no one attempted the combination. If the combination was obvious to try (regardless of whether it was actually tried) or leads to anticipated success, then it is likely the result of ordinary skill and common sense rather than innovation. I am further informed that in many fields it may be that there is little discussion of obvious techniques or combinations, and it often may be the case that market demand, rather than scientific literature or knowledge, will drive the design of an invention. I am informed that an invention that is a combination of prior art must do more than yield predictable results to be non-obvious.

25. I am informed that for a patent claim to be obvious, the claim must be

obvious to a POSITA at the time of the alleged invention. I am informed that the factors to consider in determining the level of ordinary skill in the art include (1) the educational level and experience of people working in the field at the time the invention was made, (2) the types of problems faced in the art and the solutions found to those problems, and (3) the sophistication of the technology in the field.

26. I am informed that it is improper to combine references where the references teach away from their combination. I am informed that a reference may be said to teach away when a POSITA, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the patent applicant. In general, a reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the patentee. I am informed that a reference teaches away, for example, if (1) the combination would produce a seemingly inoperative device, or (2) the references leave the impression that the product would not have the property sought by the patentee. I also am informed, however, that a reference does not teach away if it merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into the invention claimed.

**C. Secondary Considerations of Non-Obviousness**

27. I am informed that even if a *prima facie* case of obviousness is

established, the final determination of obviousness must also consider “secondary considerations” if presented. In most instances, the patentee raises these secondary considerations of non-obviousness. In that context, the patentee argues an invention would not have been obvious in view of these considerations, which include: (a) commercial success of a product due to the merits of the claimed invention; (b) a long-felt, but unsatisfied need for the invention; (c) failure of others to find the solution provided by the claimed invention; (d) deliberate copying of the invention by others; (e) unexpected results achieved by the invention; (f) praise of the invention by others skilled in the art; (g) lack of independent simultaneous invention within a comparatively short space of time; (h) teaching away from the invention in the prior art.

28. I am further informed that secondary-considerations evidence is only relevant if the offering party establishes a connection, or nexus, between the evidence and the claimed invention. The nexus cannot be based on prior art features. The establishment of a nexus is a question of fact. While I understand that the Patent Owner here has not offered any secondary considerations at this time, I will supplement my opinions in the event that the Patent Owner raises secondary considerations during the course of this proceeding.



**D. Claim Construction**

29. I have been informed by counsel that the first step in an unpatentability analysis involves construing the claims, as necessary, to determine their scope. Second, the construed claim language is then compared to the disclosures of the prior art. I am informed that claims are generally given their ordinary and custom meaning as understood by one of ordinary skill in the art at the time of the invention, in light of the patent specification.

30. For purposes of this proceeding, I have applied the claim constructions set forth in the claim construction section of the Petition for *Inter Partes* Review of U.S. Patent No. 10,084,991 (the “Petition”) that this declaration accompanies when analyzing the prior art and the claims. For any claim terms not construed, I have applied the meaning of the claim terms of the ’991 Patent that are generally consistent with the terms’ ordinary and customary meaning, as a person of ordinary skill in the art would have understood them at the time of the invention. I have been instructed to assume for purposes of this proceeding that the time of the invention is September 25, 2008.

**III. OPINION REGARDING LEVEL OF SKILL OF A PERSON HAVING ORDINARY SKILL IN THE ART**

31. I was asked to provide my opinion as to the level of skill of a person having ordinary skill in the art (“POSITA”) of the ’991 Patent at the time of the claimed invention, which I have been instructed to assume is September 25, 2008.

In determining the characteristics of a hypothetical person of ordinary skill in the art of the '991 Patent at the time of the claimed invention, I was told to consider several factors, including the type of problems encountered in the art, the solutions to those problems, the rapidity with which innovations are made in the field, the sophistication of the technology, and the education level of active workers in the field. I also placed myself back in the time frame of the claimed invention and considered the colleagues with whom I had worked at that time.

32. In my opinion, a person having ordinary skill in the art of the '991 Patent at the time of its filing would have been a person having, as of September 25, 2008, a Bachelor's degree in Electrical Engineering, Computer Engineering, or Computer Science, or an equivalent degree with at least two years of experience in digital video systems and networking, human-computer interaction, or related technologies. Additional education may substitute for lesser work experience and vice-versa. Such a person of ordinary skill in the art would have been capable of understanding the '991 Patent and the prior art references discussed herein.

33. Based on my education, training, and professional experience in the field of the claimed invention, I am familiar with the level and abilities of a person of ordinary skill in the art at the time of the claimed invention. Additionally, I met at least these minimum qualifications to be a person having ordinary skill in the art at least as of September 25, 2008. Further, although my qualifications may exceed

those of the hypothetical person having ordinary skill in the art defined above, my analysis and opinions regarding the '991 Patent have been rendered from the perspective of a person having ordinary skill in the art at the time of the invention.

34. My opinions provided in this Declaration are made as of the priority date of the '991 Patent (which counsel has informed me is September 25, 2008), unless expressly stated otherwise. To the extent that any verb tense used in this Declaration or any deposition or testimony provided in this matter is a present tense, e.g., "would reasonably understand," such verb tense should be understood to be my opinion as of the '991 Patent's priority date (again, unless expressly stated otherwise). I merely use the present verb tense for ease of reading.

#### **IV. BACKGROUND OF THE TECHNOLOGY**

35. I was asked to briefly summarize the background of the prior art from the standpoint of a POSITA prior to September 25, 2008.

36. Performing video phone calls over existing communications networks has been part of the consumer market for decades. Specifically, one of the first commercial videophones to hit the public market was the PicturePhone<sup>®</sup> researched and produced by AT&T Bell Labs. The PicturePhone<sup>®</sup> first debuted at the 1964 World's Fair that took place in Queens, NY, and became commercially available in Pittsburgh Pennsylvania with the first call taking place between the then current mayor Pete Flaherty and John Harper, the chairman of a company called Alcoa

(Aluminum Co. of America). However, being primarily aimed at large corporations and due to the exorbitant cost of both the units and placing video calls, the service did not garner the wide spread popularity envisioned by AT&T and eventually the service was discontinued by the late 1970s. AT&T again entered the market in 1992 introducing the VideoPhone 2500™ aimed for use by the general public. This new and improved video phone looked like a standard telephone with a built-in camera and fold-up screen. This unit could call any phone in the world and perform a standard voice only call, but if calling other VideoPhone 2500 units could also transmit video. However, this video phone was still limited in its success due to its cost (roughly \$1500 per unit), and low quality. *See Marley* (Ex. 1006), ¶¶ [0002]-[0003].

37. By the mid 1990s, with the ever increasing use of the Personal Computer (“PC”), Internet-based videophones systems began making an appearance. One of the first internet based systems was called “CU-Seeme” and was developed and distributed for free over the internet by Cornell University. However, even this system was not truly user friendly, due to the fact that in order to use it, the user had to be in the vicinity of their PC, and most PCs were located in less frequently used rooms in a home. Also placing or receiving calls to a particular recipient was inconvenient because a user would have to arrange such a call in advance. *See Stevenson* (Ex. 1012), 1:10–2:22.

38. Additionally, PCs could only provide this functionality if they had the correct network connections and equipment such as a camera, microphone, and necessary hardware and software. *Burke* (Ex. 1013), 1:26–2:43.

39. At this time PC systems were not an overly desirable product to most consumers. Because of these drawbacks, other ways were being developed to implement video phone systems in the home. One solution to this was to use pre-existing networks and devices that were readily available in the home and familiar to a consumer. Such a network was the cable system and the devices were a consumer's television and a set-top box. *See Marley*, ¶¶ [0003]-[0005].

40. One patent from the mid 2000s, such as U.S. Patent No. 8,458,756 to Rodriguez et al. (“*Rodriguez*”) contemplates using existing cable television (CATV) networks to “transport videophone signals to subscribers of the cable television system in an efficient and inexpensive manner.” *Rodriguez*, 1:14-18, 1:67-2:4, *see also* 2:4-9 (disclosing “[m]odern digital cable television (CATV) transmission technology offers many advantages over conventional videophone and video conferencing technology,” and that “much of the existing infrastructure of conventional CATV systems may be reused for videophone”). *Rodriguez* also teaches that “videophone signals are transported over a CATV network to user of the CATV system.” *Rodriguez*, 2:56-58. Rodriguez depicts its CATV system in Fig. 1 shown below.

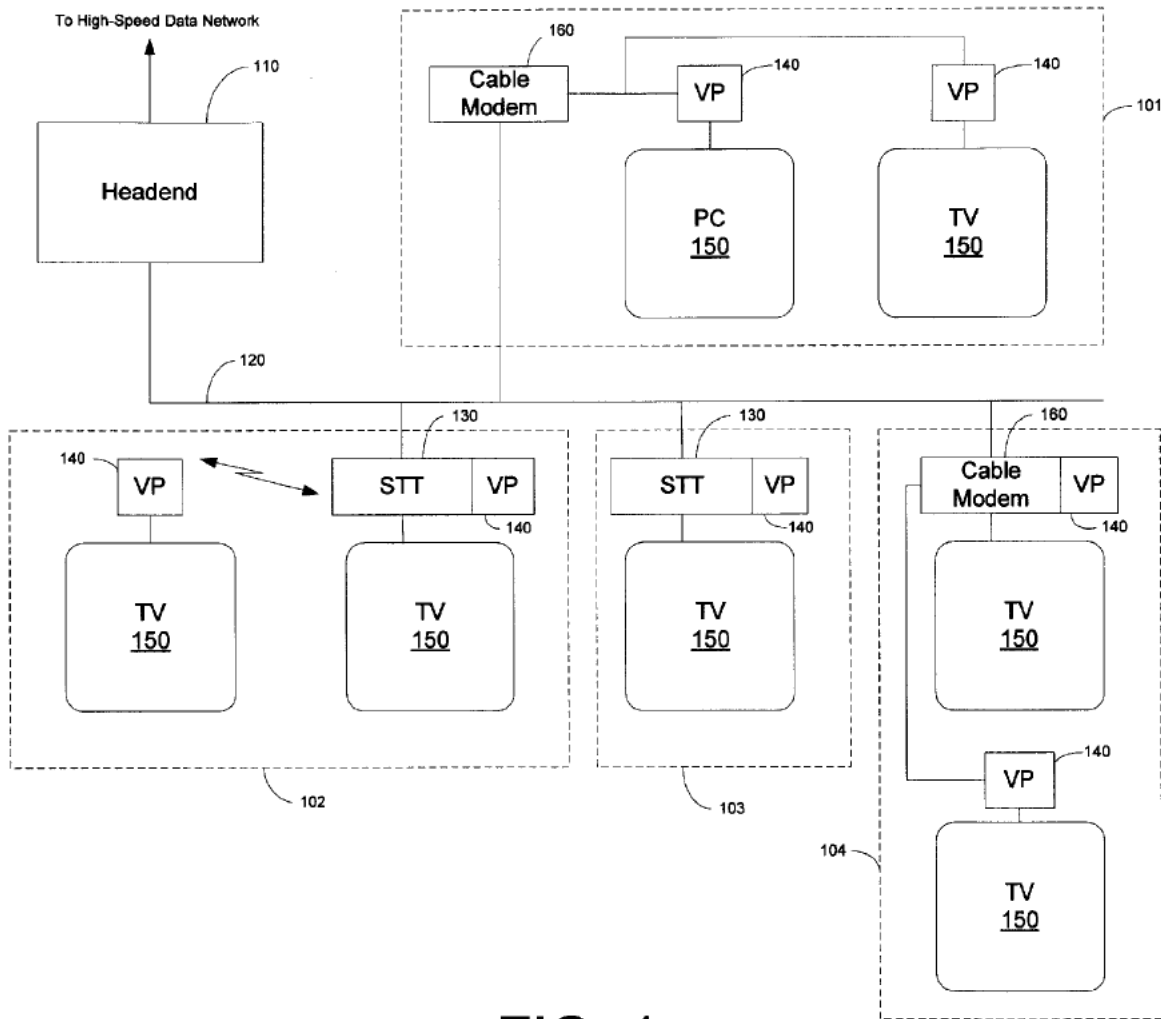


FIG. 1

*Rodriguez*, Fig. 1. Here *Rodriguez* depicts multiple users (101-104) all connected to a headend 110 via a cable 120. *Rodriguez*, 5:22-27. More specifically *Rodriguez* teaches that the cable 120 “may include various media, such as, for example, fiber optic, copper, or hybrid-fiber-coax- (HFC).” *Id.*

41. *Rodriguez* utilizes a set top terminal with an integrated videophone unit that receives videophone data intended for a user and transmits the data to a display device such as the television. *Rodriguez* 3:51-56. *Rodriguez* also teaches that the

videophone unit includes a camera and that together the camera, videophone unit, and set top terminal work together to “produce videophone signals for transport via the CATV network.” *Rodriguez* 5:61–6:8. *Rodriguez* shows that the general concept of using the CATV network to transmit to an in-home set top terminal both video program data and videophone call data was well known. The signals received by the set top terminal were received across the CATV network using the existing cable network infrastructure.

42. It was also well known as of the priority date of the '991 Patent that as cable television providers began to offer broadband content beyond that of television programming (e.g., pay-per-view, video-on-demand, internet access, videophone services), that they began to allocate channels or a portion of the overall bandwidth/frequency available for transmitting signals through their network to transmitting such digital services. U.S. Patent Application Publication No. 2004/0031064 to Lindstrom et al. (“*Lindstrom*”) describes this portion of the cable network’s frequency as the “out-of-band channels,” which were typically located within the 70-130 MHz frequency range. *Lindstrom* (Ex. 1008), ¶ [0017]. Additionally, *Lindstrom* teaches that “in order to support the receipt and display of this multitude of broadband content, the set top box receiver typically includes at least two separate tuners.” *Lindstrom*, ¶ [0003]. These tuners were called an in-band tuner and an out-of-band tuner. The in-band tuner had the primary function of

receiving the cable television channels, while the out-of-band tuner received the broadband content. *Id.*

43. An additional feature that these two tuners provided to set top boxes was the simultaneous reception of both in-band and out-of-band channels, which allowed for the dual display on a television screen of both cable television programming and broadband content (e.g., a television channel and Internet data). *Lindstrom*, ¶¶ [0003], [0016]-[0017].

44. It was also well known that in addition to the out-of-band (OOB) tuner for the reception of broadband content, a transmitter was needed to provide upstream data to the cable television network so that a user could request services, such as pay-per-view and video-on-demand. This is taught in another patent written by *Rodriguez*, U.S. Patent No. 7,373,650 (“*Rodriguez* ’650”). *Rodriguez* ’650, 10:29-46. *Rodriguez* ’650 also teaches that both the out-of-band tuner and the transmitter must be in communication with the cable television network and can either be a single component or two separate components. *Id.* It should be noted that while *Rodriguez* ’650 refers to the network as a Digital Broadband Delivery System (DBDS), it further describes the DBDS as being “composed of interfaces to Content Providers 18, Network Operations Centers (NOC) 22, core networks 30 of headends 26, hubs 34, Hybrid Fiber/Coax (HFC) Access Networks 38, and subscribers’ DHCTs 14.” *Rodriguez* ’650, 5:65-6:2; *see also id.* at 3:16-20



(describing that a “DHCT may be a set-top box in communication with a television display,” or may be “housed within the television display”).

45. Another patent from the early 2000s, U.S. Patent No. 7,565,680 to Asmussen (“*Asmussen*”), also describes cable television set top terminals that contained advanced features for performing video telephone calls through a cable television network. *Asmussen* (Ex. 1004), Abstract. Some of these features included monitoring for any incoming video calls and automatically pausing the current programming being displayed on the television so that a viewer would have time to answer the video call without missing a substantial portion of the current programming and dual displaying of both video programming and videophone calls. *Asmussen*, 46:36-48, 44:20-24, 4:26-28. Other features included caller ID or displaying an indication for incoming video calls, such as a name or graphic on the television for notifying a user of an incoming video call. *Asmussen*, 45:52-63, 47:26-38.

46. A POSITA would have been well aware of the above-described state of the art as of September 2008.

## **V. OPINIONS REGARDING THE '991 PATENT AND ANALAGOUS ART**

47. I have been asked to review and provide my opinion as to unpatentability of at least some of the Challenged Claims based on the combination of *Asmussen*, *Bear*, *Marley*, *DeFazio*, and *Lindstrom*. In my opinion, the below-

discusses combinations of these references teaches or at least renders obvious each of the Challenged Claims of the '991 Patent. A summary of the mappings from each of these references to the claim language of the '991 Patent is provided below for reference as Appendix A.

**A. Description of the Alleged Invention of the '991 Patent**

48. I have reviewed the '991 Patent (Ex. 1001). Descriptions of the '991 Patent that may be pertinent to my analysis are provided herein, and my descriptions of the '991 Patent are intended only as a summary of the '991 Patent and/or intended as being pertinent to the Challenged Claims of the '991 Patent. My opinions provided herein are not intended as a discussion of my entire understanding of the '991 Patent or any other claims in any related patent to the '991 Patent.

49. The '991 Patent describes an improved TV receiver that is capable of receiving both traditional over the air digital television signals and video on demand services as well as providing functionality for making and receiving video telephone calls over a network to other TV receivers. The '991 Patent calls this TV receiver with videophone call handling functionality a “videophone function-added TV receiver.” *'991 Patent*, 2:32-48, 7:52-61, Abstract, Fig. 2.

50. In the background, the '991 Patent describes that existing TV receiver and videophone systems were generally two separate devices. However, a videophone could be connected to a television to display incoming call notifications

from a calling party. In order for a user to actually answer and participate in a video call, they would have to perform the physical operations of starting and ending the call. This resulted in a user having to spend extra time and effort to set up and end the video call. '991 Patent, 2:26-31.

51. The '991 Patent's solution to this is to combine the independent technologies of a videophone and that of a TV receiver in a device that can handle both reception of TV programming and videophone calls. The combination of these two functionalities would improve the user friendliness and reduce the time it takes to perform video calls.

52. I provide additional discussions of the '991 Patent, below, including ¶¶ 87-91.

**B. Opinions Regarding *Asmussen***

53. I have been informed that U.S. Patent No. 7,565,680 to Asmussen ("*Asmussen*" or "Ex. 1004") is prior art to the '991 Patent. I have reviewed *Asmussen* and provide herein my opinions on the teachings of *Asmussen*. The opinions provided herein do not necessarily represent my entire understanding of *Asmussen*.

54. *Asmussen* generally describes an advanced set top terminal for a television program delivery system that is equipped with an integrated camera and microphone and includes the capability to both send and receive video calls through a cable TV network. *Asmussen* at Abstract, 3:21-30, 4:5-9. *Asmussen*'s set top box

also includes features for automatically pausing and buffering the currently viewed video programming in response to receiving a video call so that the video programming may be resumed after ending the video call. *Id.* at 4:10-26, 43:19-22, 43:27-30.

55. Because both *Asmussen* and the '991 Patent are directed to systems for receiving video calls through network while also receiving digital video programming via that same network, *Asmussen* is in the same field of endeavor and is pertinent to the same problem as the claimed invention in the '991 Patent.

***1. Similarities Between the '991 Patent and Asmussen***

56. *Asmussen* and the '991 Patent are very similar systems. In fact, *Asmussen* presents a much more detailed and comprehensive discussion than the '991 Patent of a set top terminal having the functionality of receiving both video program data and videophone call data.

57. Both patents describe a TV receiver system that can receive digital television broadcasts as well as access video from a content provider via a digital network. The '991 Patent discloses that it receives the digital television broadcasts using its antenna, and the video from a video-on-demand server connected to the system via the network. '991 Patent, Fig. 2 (RN 9), 7:52-57, 8:44-9:5, 9:62-67. *Asmussen* teaches that it receives a multitude of video programming, which includes

broadcast television, cable/satellite television, and video streaming via a cable television network. *Asmussen*, 4:20-25, 6:48-7:3, 7:57-8:2, 26:21-29.

58. Both patents describe the ability to initiate and receive video-telephone calls and display them on the television screen. They both also present the idea that the ongoing television program can be automatically or selectively paused when the user is engaged in a video call. *'991 Patent*, 2:56-3:28, 17:39-18:28; *Asmussen*, Abstract, 4:5-16.

59. Both patents employ digital video that is encoded or compressed for transmission through a network; in each system there is a decoder to render incoming compressed video and an encoder to transform a camera signal (and associated audio) into a form that can be communicated over the network. *'991 Patent*, 1:63-2:3, 2:32-48; *Asmussen*, Abstract, 50:18-54.

60. Both describe or point to some remote element on the network that can manage call routing and directory services. *'991 Patent*, 9:67-10:5; *Asmussen*, 52:59-62.

61. Both admit HTML data that can be rendered on the receiver display thereby assuming an Internet browser, since it is well-known the browser is the program that interprets HTML. *'991 Patent*, 12:34-53; *Asmussen*, 44:1-5, 50:62-64.

62. In my opinion, the similarities between the *'991 Patent* and *Asmussen* are so numerous that the distinctions are either engineering choice or the manner of

presentation. For example, disabling the camera, video encoding, or video decoding circuitry when a video call is terminated is common practice in communications. For over a hundred years the microphone of a telephone was disabled when the call was terminated. This is common practice in all point-to-point communications and the opposite is likewise common in broadcasts: an emergency radio is generally always listening, but never transmitting unless the user takes deliberate action to do so. *All* videoconferencing systems for all time leave the camera off when there is no call in progress. Otherwise, leaving the camera on in a videoconferencing system would be tantamount to eavesdropping.

**C. Opinions Regarding *Bear***

63. I have been informed by counsel that U.S. Patent No. 7,548,255 to Bear et al. (“*Bear*” or “Ex. 1005”) is prior art to the ’991 Patent. I have reviewed *Bear* and provide herein my opinions on the teachings of *Bear*. The opinions provided herein do not necessarily represent my entire understanding of *Bear*.

64. *Bear* generally describes a personal computer system that in addition to handling media applications, such as viewing live television, is also capable of performing Voice-over-IP (VOIP) or video calls. *Bear*, 1:49-57. The personal computer is equipped with a camera that includes a microphone and an application program that controls the operation of the camera. *Id.* at 2:16-20, 2:58-3:7, 12:8-25.

65. In my opinion, *Bear* is both within the field of endeavor of and is pertinent to the '991 Patent. *Bear* is within the same field of endeavor as the '991 Patent at least because it teaches a system that allows a user to both initiate and answer incoming phone calls that support video. *Id.* at Abstract, 2:4-10, 6:41-53. *Bear* also explicitly teaches that other types of “well known computing systems, environments, and/or configurations that may be suitable for use with the invention include, but are not limited to: personal computers, server computers, hand-held or laptop devices, tablet devices, headless servers, multiprocessor systems, microprocessor-based systems, *set top boxes*, programable consumer electronics, network PCs, microcomputers, mainframe computers, distributed computing environments that include any of the above systems or devices, and the like.” *Id.* at 4:1-9. Thus, *Bear* is relevant to at least one problem addressed by the '991 Patent, that of controlling a camera. *Id.*; see also '991 Patent at 13:47-55, 16:10-16, 18:36-46.

**D. Opinions Regarding *Marley***

66. I have been informed by counsel that U.S. Patent Application Pub. No. 2007/0139514 to Marley (“*Marley*” or “Ex. 1006”) is prior art to the '991 Patent. I have reviewed *Marley* and provide herein my opinions on the teachings of *Marley*. The opinions provided herein do not necessarily represent my entire understanding of *Marley*.

67. *Marley* relates generally to a set top box system for use with standard cable television that provides for the integration of video telephone functionality. *Marley*, Abstract, ¶¶ [0001], [0005], [0016]. *Marley* teaches a set top box that has a camera and microphone integrated into it and contains processing capabilities for the control and management of said camera/microphone. *Id.* at ¶¶ [0015], [0019], [0022]. In my opinion, *Marley* is both within the field of endeavor of and is pertinent to the '991 Patent because it relates to a system and method of conducting video calls over a network, and the incorporation of telephone functionality into existing TV technology.

**E. Opinions Regarding *DeFazio***

68. I have been informed by counsel that U.S. Patent No. 5,940,484 to DeFazio et al ("*DeFazio*" or "Ex. 0007") is prior art to the '991 Patent. I have reviewed *DeFazio* and provide herein my opinions on the teachings of *DeFazio*. The opinions provided herein do not necessarily represent my entire understanding of *DeFazio*.

69. *DeFazio* relates generally to a method for providing caller identification information to a called party. *DeFazio* contemplates a database that contains names and their associated address data, and will efficiently translate any telephone addresses into a name. *DeFazio* contemplates providing this service for both incoming and outgoing calls, by displaying the caller or called parties



information on a display. *DeFazio*, Abstract, 1:5-10, 1:29-31, 1:55-61, 4:21-26, 5:10-15. *DeFazio* is in at least the same field of endeavor as the '991 Patent at least because it teaches a system that maintains a database of phone numbers and their associated information. *Id.* *DeFazio* also explicitly teaches that “[T]he principles of the invention may be extended to providing name entries for telecommunications related services such as Internet services, **television/video conferencing services** and the like.” *Id.* at 7:67-8:3. Furthermore, *DeFazio* teaches that the names database may be stored locally in a user’s telephone apparatus. *Id.* at 8:7-12. Thus, *DeFazio* is pertinent to at least one problem addressed by the '991 Patent, that of maintaining a list of numbers and their associated information and displaying such information on a screen. *Id.*; see also '991 Patent at 15:40-57.

**F. Opinions Regarding *Lindstrom***

70. I have been informed by counsel that U.S. Patent Application No. Pub. No. 2004/0031064 to Lindstrom et al (“*Lindstrom*” or “Ex. 1008”) is prior art to the '991 Patent. I have reviewed *Lindstrom* and provide herein my opinions on the teachings of *Lindstrom*. The opinions provided herein do not necessarily represent my entire understanding of *Lindstrom*.

71. *Lindstrom* generally relates to a cable television set top box that contains a receiver that comprises both in-band and out-of-band tuners. Both of these tuners are integrated onto a single integrated chip (IC) and allow for the simultaneous

reception and displaying of both in-band and out-of-band signals. *Lindstrom*, ¶¶ [0005], [0006], [0028], Fig. 1. *Lindstrom* explicitly teaches that the out-of-band channels that the out-of-band tuner receives “include, but are not limited to, Internet data, *video-on-demand* and pay-per-view programming, ... and IP telephony and *videophone signals*.” *Lindstrom*, ¶ [0017]. Thus, *Lindstrom* is in the same field of endeavor as and pertinent to at least one problem addressed by the '991 Patent, that of receiving video on demand content from a video on demand server and incoming videophone signals via a network interface. *Id.*; *see also* '991 Patent, 11:62-12:5.

## **VI. OPINIONS REGARDING GROUND 1: COMBINATION OF *ASMUSSEN* AND *BEAR***

72. I provide below a detailed discussion of my opinions regarding the claim mappings presented in the concurrently-filed Petition. I have reviewed the Petition and agree with the discussions provided therein. Also attached to this Declaration as Appendix A is a claims chart listing the claims and identifying the relevant portion from each reference used to, at least in part, establish the reference teaches or suggests the corresponding limitation.

## VII. GROUND 1: THE COMBINATION OF *ASMUSSEN* AND *BEAR*

### A. Claim 1

1. *Claim 1[Preamble]: “A communication apparatus for transmitting and receiving digital information to and from another communication apparatus, comprising:”*

73. *Asmussen* describes its invention as an advanced set top terminal for transmitting and receiving video phone calls to other advanced set top terminals connected to it via a network:

*The present invention is a set top converter box or terminal for a television program delivery system. More specifically, the present invention is an advanced set top converter box that acts as a terminal in the viewer’s home. The set top terminal is a key component of a digital cable television delivery system. The set top terminal is an upgradeable system that provides for the decompression of digital program signals. The preferred set top terminal provides both menu generation capabilities as well as a number of advanced features and functional capabilities.*

*Asmussen*, 3:20-30 (emphasis added).

*Such features include the capability to send and receive video calls through the set top terminal equipped with a camera and microphone. The video call can be communicated through the cable television delivery system or other communications networks.*

*Asmussen*, 4:5-9 (emphasis added). *Asmussen* teaches that multiple set top terminals connected to a network can participate in a video conference call with each other,

and that each set top terminal will broadcast “its audio/video signal(s)” and process and output any received audio/video signals from other set top terminals that are participating in the same video conference call. *Asmussen*, 52:21-26, Fig. 31.

74. Because the *Asmussen* set top terminal is a “television program delivery system” (*id.* at 3:20-30), and because the set top terminal further includes videocall functionality (*id.* at 52:21-26, Abstract, 4:5-9), it is my opinion the *Asmussen* set top terminal is a TV receiver with added videophone functionality, i.e., the “videophone function added-TV receiver” as described in the ’991 Patent.

75. *Asmussen* teaches that the set top terminal “includes a camera input 666 and a microphone jack 667, by which a camera and microphone, respectively, can be connected.” *Asmussen*, 16:34-38. *Asmussen* also teaches that the “camera and microphone can be built into the set top terminal 220.” *Id.*

### **Communication Apparatus**

76. *Asmussen* also teaches that the set top terminal is capable of being connected to a subscriber’s television 222, which contains a video screen/display on which is displayed both video programs and video phone calls.

Functionally, the set top terminal 220 is the last component in the delivery system chain. ***The set top terminal 220 receives compressed program and control signals from the cable television headend 208 (or in some cases, directly from the operations center 202).*** After the set top terminal 220 receives the individually compressed program

and control signals, *the signals are demultiplexed, decompressed, converted to analog signals (if necessary) and* either placed in local storage (from which the menu template may be created, executed immediately, or *sent directly to the television screen*.

*Asmussen*, 11:30-39. (emphasis added) *See also* 4:26-28, 7:12-13.

*In regards to reception, an incoming (i.e., downstream) video conferencing signal is received by a receiver 750, decoded by a channel decoder 755, decrypted by a decryptor 760, and demultiplexed with proper relative timing among video, audio and other data components by a demultiplexer synchronizer 765. Video signals are decompressed by a video source decoder 770 and output for display on a display device 602, which is typically the television 222.*

*Asmussen*, 50:44-51 (emphasis added). *Asmussen* also sometimes refers to the display as “video display 1400” and teaches that “[T]he *video display 1400 may be implemented with a television 222 or any device for displaying a video program, such as a computer monitor or flat screen display.*” *Asmussen* 43:50-53 (emphasis added). Therefore, a POSITA would have understood that the set top terminal was usable with any display device, including display 1400 or television 222.

77. In order to facilitate being connected to television 222, *Asmussen* teaches that the set top terminal includes an “output terminal 650” on the back side for connecting the set top terminal to a television. *Asmussen*, 16:17-24, Fig. 5b. It is my opinion that *Asmussen*’s television 222 with its display in combination with the

set top box 220 and its integrated video calling capability meets the '991 Patent's definition of a "communication apparatus for transmitting and receiving digital information to and from another communication apparatus" at least because *Asmussen* specifically teaches that the set top terminal with video calling capabilities is connected to a television, which includes a display 602 or display 1400, and outputs on said display video signals from a video phone call. Additionally, the set top terminal in combination with the television or other display is operable to communicate with similar set top terminal / television systems. *See generally Asmussen*, Fig. 31, 51:10-15, 52:20-25. In my opinion, it is readily understandable from *Asmussen* that because the set top terminal is connected to and used in conjunction with a television, and the collective set top terminal / television communicate with other similar systems, the set top terminal in combination with the display (e.g., the television) allows the user of *Asmussen*'s invention to be able to conduct a video call and is therefore a "communication apparatus," as claimed.

### **Upgrading the Set Top Terminal**

78. *Asmussen* teaches that the standard set top terminal can be upgraded with various features, such as videophone calling features. In Figures 5a and 5b, *Asmussen* depicts the respective views of both the front and backside of the set top terminal that can be upgraded with the advanced features/functional capabilities and discusses the various components located therein.

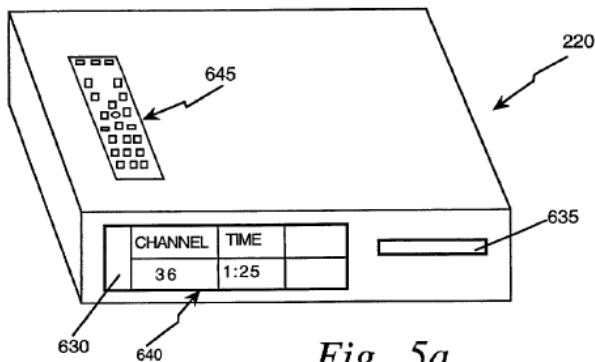


Fig. 5a

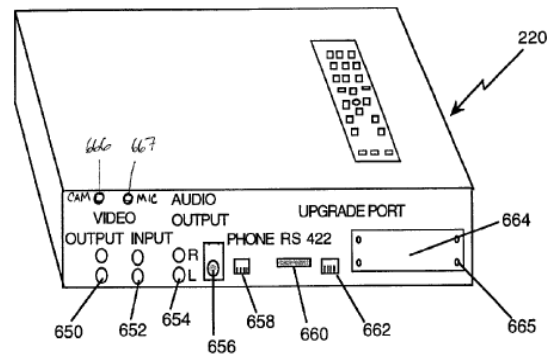


Fig. 5b

With respect to Fig. 5b, *Asmussen* also discloses that “the back of set top terminal 220” includes “an upgrade port 662” and an “expansion card slot 665” that allow for the upgrading of a set top terminals features:

Another *port 662 is used to attach the various hardware upgrades* described below to terminal 220.

*Asmussen*, 16:60-61 (emphasis added); *see also id.* at 16:67–17:2.

In order to provide the greatest flexibility possible and prevent a set top terminal 220 from becoming outdated during the terminal’s useful life, *additional electronic expansion card slots have been built into the preferred embodiment. The expansion slots 665 (depicted in phantom in FIG. 5b) are covered by the metal plate cover 664 as shown in FIG. 5b.*

*Asmussen*, 29:6-11 (emphasis added).

In addition to providing an additional memory capability, *the expansion card slot provides an easy method to upgrade the set top terminal hardware.*

*Asmussen*, 29:15-17 (emphasis added).

79. *Asmussen* explicitly teaches that a preferred form of the set top terminal would provide “video calling capability,” and that “[T]o support video calling, the ***set top terminal 220 is augmented with additional features, as shown in Fig. 30.***” *Asmussen*, 49:43-46. *Asmussen* teaches that these features that provide video calling capability can either “be ***integrated into an enhanced set top terminal 220 or provided as one or more upgrades to a more basic set top terminal 220.***” *Asmussen*, 49:46-48 (emphasis added).

80. Therefore, *Asmussen* discloses upgrading a set top terminal 220 in various ways with various different features or capabilities and that these upgrades would be implemented in the set top terminal by either being integrated into the set top terminal, or by utilizing either the port 662 or expansion card slot 665 to connect the necessary hardware components. It would have been obvious to modify the set top terminal of *Asmussen* with the components needed to implement video calling capabilities due to the teachings that the video calling feature would be integrated into a set top terminal 220 and that the set top terminal would otherwise be augmented or upgraded to include additional features, such as video calling.



2. ***Claim 1(a): “a network interface configured to receive first digital information which is received from a contents server which is coupled to the communication apparatus via the network interface and second digital information from the another communication apparatus;”***

81. In my opinion, *Asmussen* teaches a network interface that is configured to receive both “first digital information” from a contents server and “second digital information” from the another communication apparatus, as recited in claim 1(a). I first note that the ’991 Patent specifically states “first” and “second” digital information is being received via the network interface. ’991 Patent (Ex. 1001), 32:42-46. However, I do not see these two terms (“first digital information” and “second digital information”) used in the ’991 Patent’s Specification. Therefore, an understanding of any difference between the first digital information versus the second digital information must be obtained from reviewing the claims of the ’991 Patent.

82. I note that claim 1(a) has several limitations that each need to be discussed in turn. Therefore, the below chart provides a summary of each of the discussed limitations and where the limitation is taught in *Asmussen*. I only note some of the citations in *Asmussen*, and the below chart is not intended to be exhaustive of all the possible teachings in *Asmussen* for each limitation.

<b>'991 Patent, Claim 1(a)</b>	<b><i>Asmussen</i></b>
“communication apparatus”	set top terminal 220 (or first set top terminal 220a) (11:1-39, 14:4-23, 15:15-23)
“contents server”	operations center 202 (7:56–8:15)
“network interface”	The collective tuner 603 and receiver 750 (15:15-23, 26:1-11, 26:55-63, 28:9-11, 50:4-57, Figs. 4, 5b, 11, 12a-b, 30)
“first digital information”	video programs, including live or prerecorded programs, from a source, such as contents server (4:20-25, 7:34-37)
“second digital information”	video information from a videoconference call (50:18-57, 51:9-23, 58:4-29, 4:5-9, Abstract, Fig. 30)
“another communication apparatus”	second set top terminal (or set top terminals 220b-f) (51:9-23, Fig. 31)

***a) Summary of the '991 Patent Relative to Claim 1(a)***

83. Before I begin a discussion of *Asmussen* and how it teaches the limitations of Claim 1(a), it is helpful to discuss the '991 Patent and what it describes relative to the limitations of Claim 1(a).

84. Claim 1(a) recites “a network interface configured to receive first digital information *which is received from a contents server which is coupled to*

*the communication apparatus via the network interface.*” Therefore, the claimed “first digital information” comes from a “contents server,” and the contents server and the communication apparatus are coupled via a “network interface.”

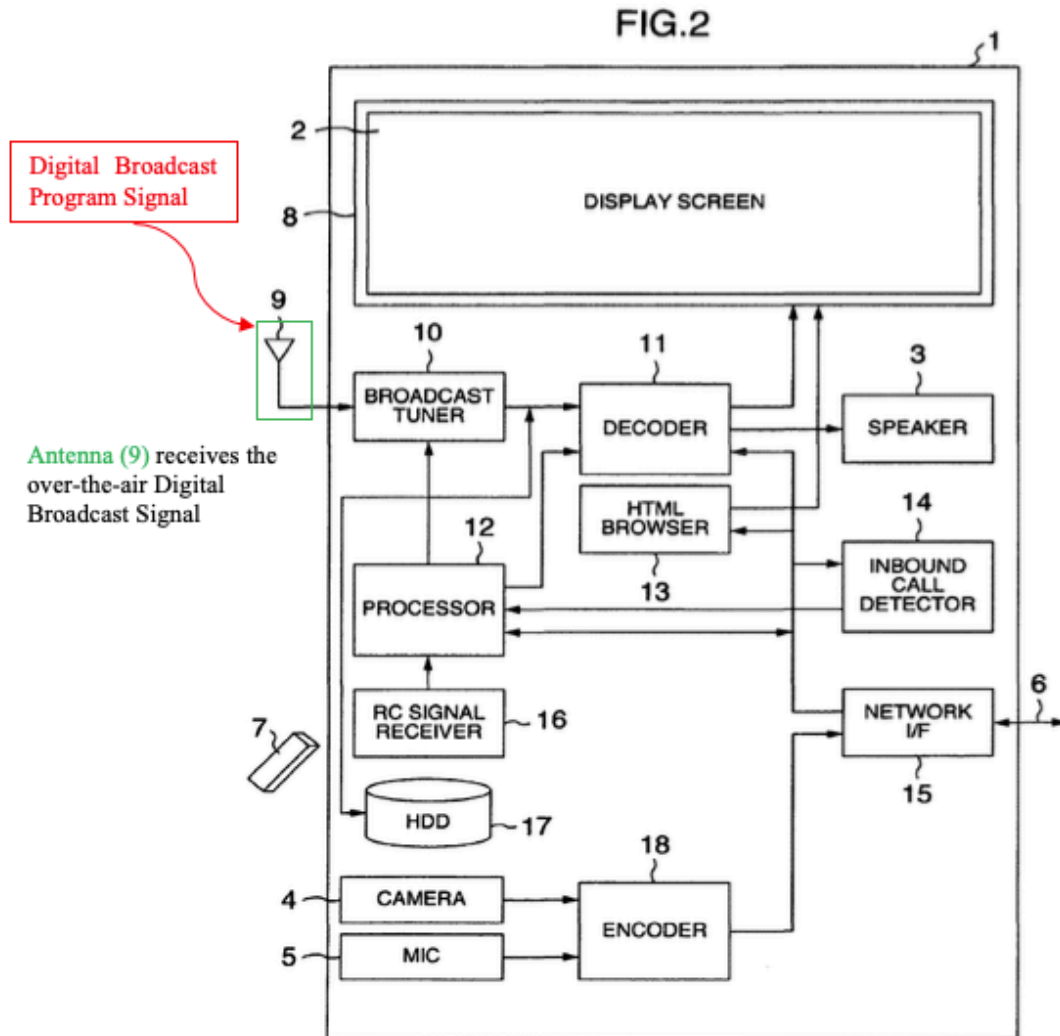
85. Based on my reading of the ’991 Patent, it is my opinion the claimed “contents server” is a server that stores digital content and is accessible via the unclaimed network. I do not see that the ’991 Patent uses the term “contents server,” except for the claims. However, the ’991 Patent does describe a “VOD server 21.” *’991 Patent*, 12:39–13:19, 7:52-61. The VOD server is described as supplying “VOD contents” received at the network interface 15. *Id.* These VOD contents are further described as moving-picture image contents, still image contents, audio contents, and text data. *Id.* at 12:39-53. Additionally, “data of titles of all contents available from the VOD server 21 are provided” via a menu. *Id.* at 12:54–13:19. Because any of moving images, still images, audio, and text data (including, for example, titles and lists of available content) supplied digitally are described as coming from the VOD server and are VOD contents, it is my opinion that the “contents server,” as claimed, is met by a server that stores, at the least, any of these types of digital content and is otherwise accessible via the network.

86. Claim 1(a) also recites “a network interface configured to receive second digital information *from the another communication apparatus which is coupled to the communication apparatus via the network interface.*” Here, the

claimed “second digital information” comes from “the another communication apparatus,” where the “communication apparatus” and “another communication apparatus” are coupled together via the “network interface.” Claim 1(a) thus requires two items of digital information to be received at “the communication apparatus” via its “network interface,” and that the first item of digital information would come from a “contents server,” while the second item of digital information would come from “another communication apparatus.”

87. The '991 Patent generally describes three different modes of operation that the TV receiver can operate in: (1) TV program viewing mode; (2) video-on-demand (“VOD”) mode; and (3) videophone mode. A user can place the TV receiver into any of these modes by manually operating the corresponding buttons on the TV remote control. *'991 Patent*, Abstract, 9:13-24, 9:67-10:5, 10:55-62.

88. When in a TV program viewing mode (also referred to as a “TV broadcast program viewing function mode” at *'991 Patent*, 11:35-38), the videophone function-added TV receiver is “receiving an over the air digital broadcast program signal by the antenna 9.” *'991 Patent*, 8:44-51. Annotated Fig. 2, below, illustrates the videophone function-added TV receiver 1 and antenna 9:



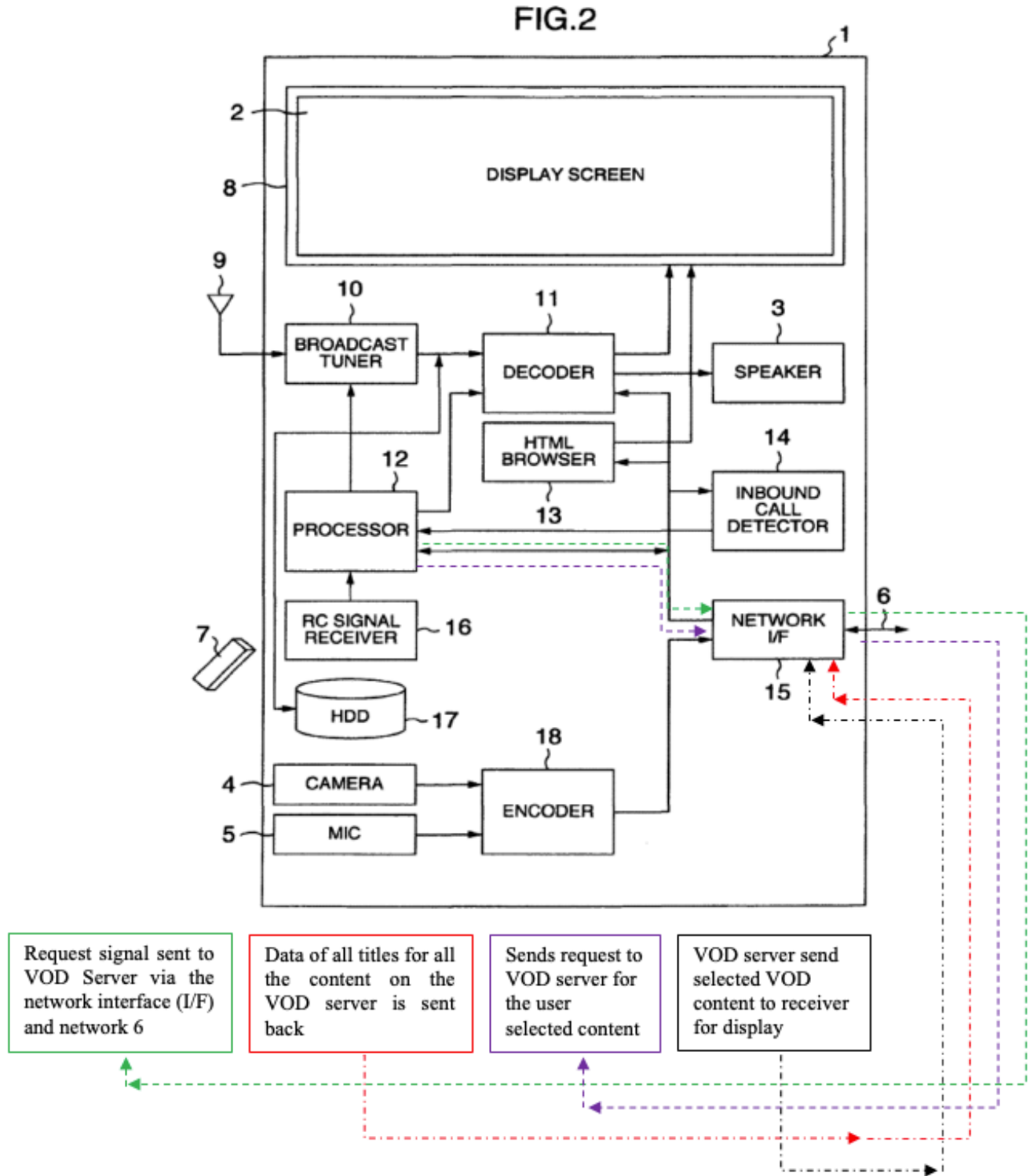
'991 Patent, Fig. 2 (annotated); *see also id.* at Fig. 9, 11:35-48 (stating when the receiver is in the TV broadcast mode, “the processor 12 renders the broadcast tuner 10, decoder 11, display panel 8 and speakers 3 operative, thereby setting up a state for execution of the TV broadcast program signal to be watched.”).

89. When in the video-on-demand (VOD) mode, the videophone function-added TV receiver will receive “contents from the VOD server 21 (FIG. 3) which are received at the network I/F 15.” *Id.* at 12:39-44; *see also id.* at 12:54-58

(“Additionally, when the “VOD” button b7 of the remote control 7 is depressed, a request signal is transmitted from the processor 12 to the VOD server 21 through the network I/F 15 and network 6. In responding thereto, data of titles of all content available from the VOD server 21 are provided.”).<sup>1</sup> After the user selects the content they wish to watch, the “processor 12 issues and sends a request of the contents to the VOD server 21 via the network I/F 15 and network 6. With this procedure the VOD contents requested are provided from the VOD server 21 and are processed in the way stated supra so that the contents are displayed on the display screen 2 of the display panel 8 while letting audio sound thereof be output from speakers 3.” *Id.* at 12:61–13:3. This is visually described below with respect to both Figs. 2 and 3:

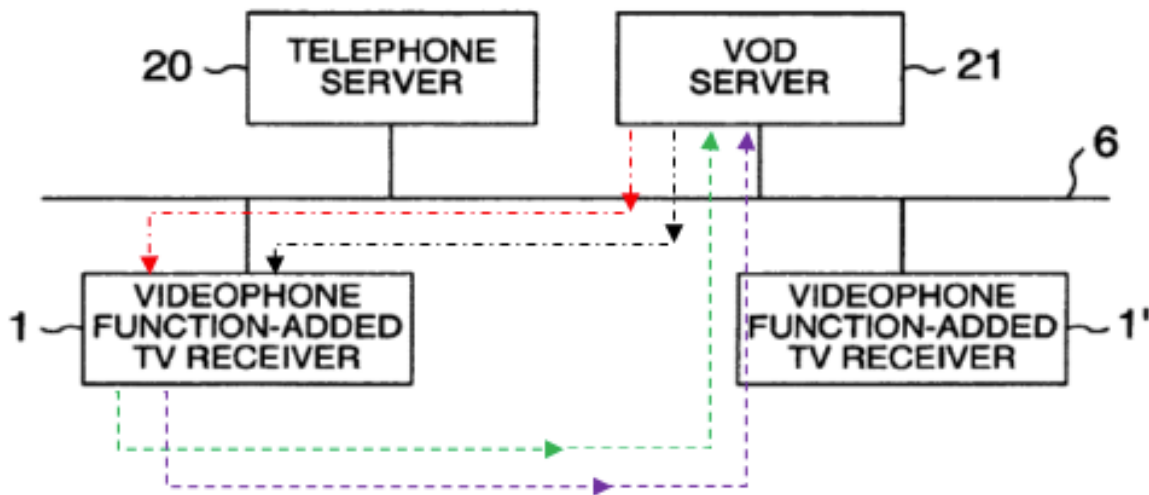
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<sup>1</sup> I note that the color-coded text corresponds to the same color coding in the annotated figures of the '991 Patent.



'991 Patent, Fig. 2 (annotated).

FIG.3



'991 Patent, Fig. 3. (annotated). As can be seen from both Figs. 2 and 3, above, the network 6 connects the videophone function-added TV receiver and the VOD server, and the network I/F 15 receives the VOD content. While the '991 Patent is broad in its use of the term "network," the '991 Patent does disclose an exemplary "network 6" is the "Internet." '991 Patent, 15:58-63 ("...via the network 6, such as the Internet..."). In my opinion, this disclosure in the '991 Patent of a VOD server 21 is an example of the claimed "contents server," and the data the VOD server transmits to the video function-added TV receiver (e.g., the requested VOD content) are examples of "first digital information."

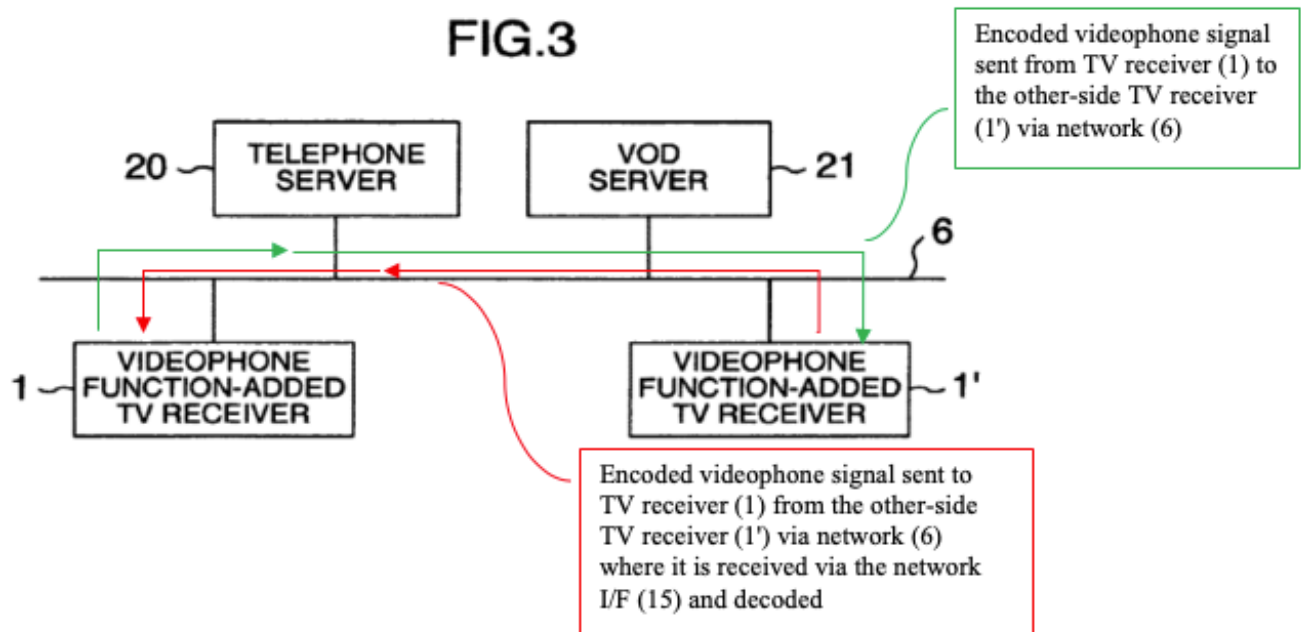
90. The term "video on demand" ("VOD") used in the '991 Patent (*see, e.g., '991 Patent, 7:52-57*) is likewise not specifically defined in the '991 Patent. Cable operators initially used the term to refer to a service they provided,



such as the Time Warner full-service network in 1995, or Comcast's early video on demand introduction in 2002. *See Time Warner Full Service Network* (Ex. 1017) and *Comcast Video on Demand* (Ex. 10018). In this case, they operated a service and provided specific programs upon request from the user, either for free or for a price. The programs were offered through, for example, a private network or the Internet, with the preferred network being determined by expediency and commercial considerations, such as access control, reliability of their service, and rights management. The term "VOD" also refers to any video delivered over a network that provides video upon request to individual users as a dedicated stream or download. YouTube, for example, provided video on demand in 2005 and Netflix in 2007. As described in the '991 Patent, the video is selected, such as by viewing a list of titles of what is available, and then downloaded to the videophone function-added TV receiver. '991 Patent, 14:46–15:17, 13:4-19.

91. When in videophone mode, the videophone function-added TV receiver's "processor 12 renders the camera 4 and microphone 5 plus encoder 18 operative and sets up the videophone function mode." '991 Patent, 13:23-26; *see also id.* at 13:31-44 ("Then, a video signal by means of image pickup of the camera and an audio signal indicative of voice sound as input to the microphone 5 are supplied to the encoder 18 and subjected to compression processing (encoding) which is pursuant to videophone telecommunications so that a [videophone signal](#)

which is obtained thereby is sent from the network I/F 15 via network 6 to the other-  
side videophone function added TV receiver 1' (FIG. 3). A videophone signal from  
the other-side videophone function-added TV receiver 1' is received by the network  
I/F 15 and supplied to the decoder 11 so that a video signal and audio signal thereof  
are subjected to expansion processing (decoding), causing such decoded signals to  
be supplied to display panel 8 and speakers 3.”). See Fig. 3 below:



'991 Patent, Fig. 3 (annotated). Each TV receiver will decode the other side's encoded signal, and a video call will be conducted between the two units. Therefore, this disclosure of a videophone function-added TV receiver 1' is an example of the claimed “another communication apparatus,” and the videophone signal made up of video and audio signals that videophone function-added TV receiver 1' sends to

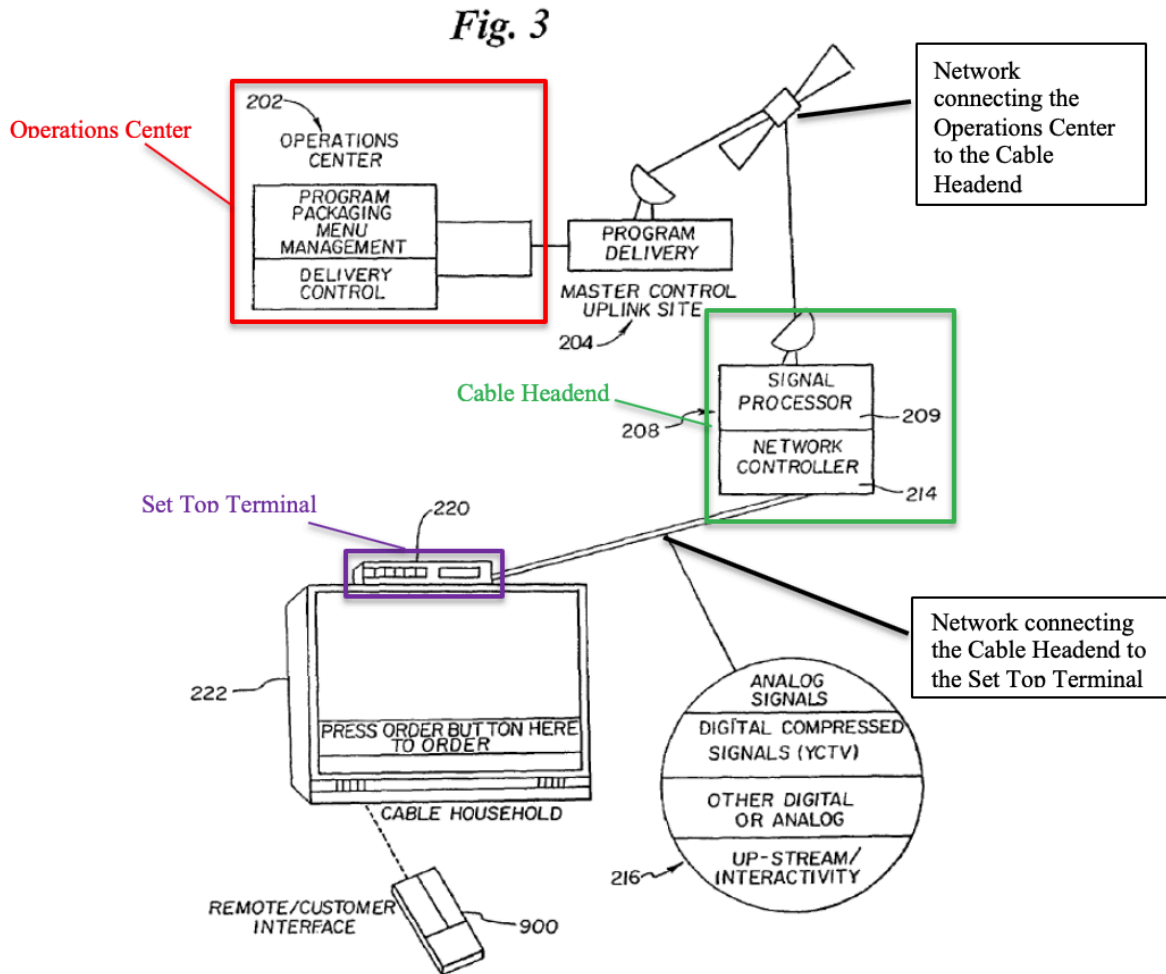
videophone function-added TV receiver 1 is an example of the claimed “second digital information.”

92. The '991 Patent does not provide any description of the structure or type of “network interface” used in the videophone function-added TV receiver. Neither Claim 1(a) nor the '991 Patent Specification recites a specific structure or type of hardware that makes up network interface (I/F 15). Rather, the '991 Patent only describes the types or forms of information that are accessed by the network interface. *See generally '991 Patent*, 14:49–15:17, 13:4-19, 11:62–12:10. Therefore, in my opinion, one or more interfaces that collectively allows the communication apparatus to receive both first and second digital information across a network would meet the claimed limitation of a “network interface.”

***b) Asmussen teaches the claimed “contents server” and “first digital information”***

93. In its most basic form, the program delivery system of *Asmussen* can be broken down into: (1) the “**operations center**” 202 where television programming is “received from external program sources in both analog and digital form” and then digitized, compressed, and packaged for sending (*Asmussen*, 7:59-8:2); (2) the “**cable headend**” 208 where the packaged programming is received and processed (*id.* at 9:30-35); and (3) the “**set top terminal**” 220 that then receives the compressed digital programming from the cable headend and decompresses it for display on a television screen (*id.* at 11:30-39). *See also id.* at 6:47–7:3 (providing an overview

of the program delivery system 200 “[i]n its most basic form”). (The color-coding discussing *Asmussen* corresponds to the same color-coding used above to describe the '991 Patent for ease of reference). The *Asmussen* program delivery system is shown below in annotated Fig. 3:



*Asmussen* also teaches that the set top terminal can receive compressed programs directly from the operations center.

Functionally, the set top terminal 220 is the last component in the delivery system chain. *The set top terminal 220 receives compressed*

***program*** and control signals from the cable headend 208 (or, in some cases, ***directly from the operations center 202***).

*Asmussen*, 11:30-34.

94. *Asmussen* teaches that “[a]t the operations center 202, television programs are received from external program sources in both analog and digital form.” *Asmussen* 7:59-61; *see also id.* at 53:52-64 (discussing functionality of an operations center, including transmitting packaged programs to headends). *Asmussen* also teaches that “[e]xamples of the external program sources” includes “any other program source that can provide audio or visual signals.” *Asmussen* 7:63-66. In addition to receiving programming from external program sources, the operations center contains an internal storage area for the storage of the external programming. *Asmussen*, 8:2-5 (“The operations center 202 may also maintain an internal storage of programs. The internally stored programs may be in analog or digital form and stored on permanent or volatile memory sources, including magnetic tape or RAM.”). Further, *Asmussen* teaches that after receiving and storing the programming in a digital format, the operations center will then categorize and package the programming into menus to present the programming to the subscribers in the most convenient way possible. *Id.* at 8:6-15 (“Subsequent to receiving programming, the operations center 202 packages the programs into groups and categories which provide the optimal marketing of the programs to the subscribers.

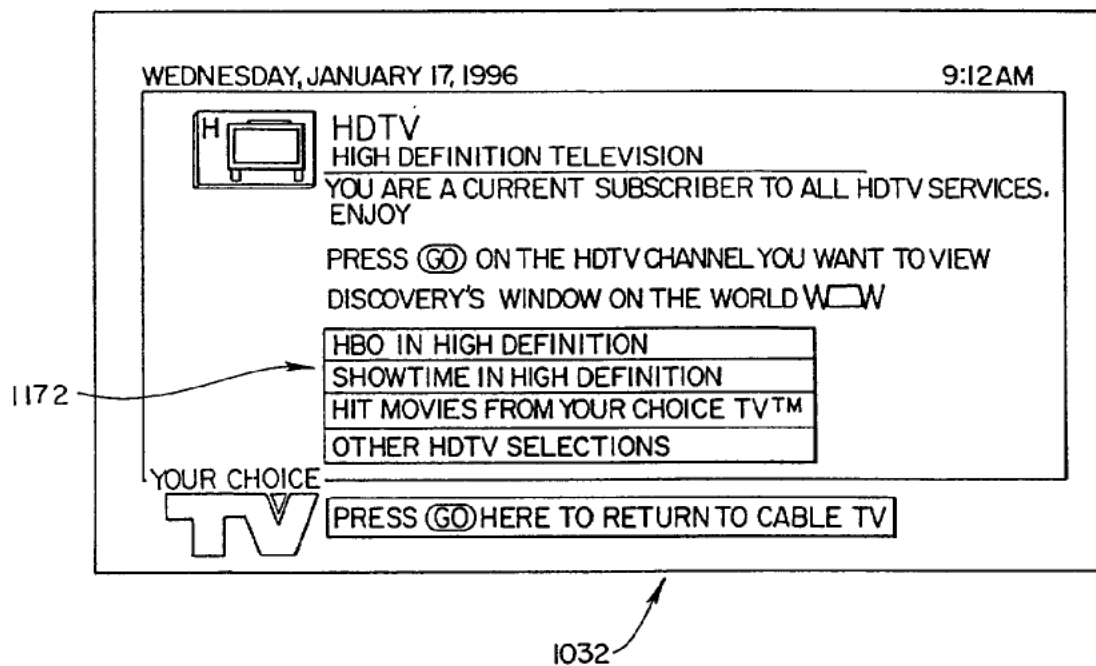
For example, the operations center 202 may package the same programs into different categories and menus for weekday, prime-time viewing and Saturday afternoon viewing. Also, the operations center 202 packages the television programs in a manner that enables both the various menus to easily represent the programs and the subscribers to easily access the programs through the menus.”).

95. *Asmussen* also teaches that the term “video programs” as used by *Asmussen* “***include[s] live or prerecorded programs from any source such as, for example, a broadcast television signal transmission, a cable television signal transmission, satellite television, video streaming over the internet or other network***, a VCR, a computer memory such as a hard disk, CD-ROM, or digital versatile disk (DVD).” *Asmussen*, 4:20-25 (emphasis added).

96. *Asmussen* further teaches that the user of the set top terminal can select the video programming that they want to watch using menus, and the operations center will then send the selected video programming to their terminal. *Asmussen*, 7:34-37 (“The video signals and program control signals received by the set top terminal 220 correspond to specific television programs and menu selections that each subscriber may access through a subscriber interface.”); *see also id.* at 6:32–46 (describing that users are able to view and access video programs via menus), 13:2-4 (stating that the “menu-driven scheme provides the subscriber with one-step access to all major menus, ranging from hit movies to sport specials to specialty

programs”). *Asmussen* depicts one of these menus in Fig. 23, which shows a user can select “Hit Movies from Your Choice TV”:

*Fig. 23*



*Asmussen*, Fig. 23; *see also id.* at Fig. 29 (Step 1480) (describing video program control (see the begin step at the top of the flow chart) and receiving and display video program). *Asmussen* also teaches that the menu 1032 provides a list of the currently available programming to a user. *Id.* at 42:36-42 (“FIG. 23 shows the integration of HDTV services into the menu-driven program delivery system. If the subscriber selects the major menu for HDTV 1032, the subscriber will receive either a description of the services with a suggestion to order the system, or a text note that

the subscription is current and a listing of the currently available program selections in HDTV.”).

97. Based on these teachings in *Asmussen*, it is my opinion the “operations center 202” disclosed in *Asmussen* meets the ’991 Patent’s claimed “contents server,” at least because the operations center 202 provides a multitude of digital content (i.e., video programs) either directly from an external source (e.g., “video streaming over the internet”) or from its internal storage in response to menu selections performed by a user at the set top terminal 220.

98. Additionally, the digital video programs (including associated video, audio, and text data) that the set top terminal receives from the contents server meets the ’991 Patent’s claimed “first digital information,” at least because the video programs that are provided to a user’s set top terminal are sent from the operations center’s internal storage. Therefore, in my opinion, *Asmussen* discloses the claimed “first digital information which is received from a contents server which is coupled to the communication apparatus.”

***c) Asmussen teaches the claimed “another communication apparatus” and the “second digital information”***

99. As previously stated, one of the advanced features of the set top terminal of *Asmussen* is that it can receive video calls from other set top terminals connected to it via a communications network. Figure 31, provided below, shows a “video conferencing network 1000 and various configurations for connecting set top



terminals 220 (or other video conferencing end equipment 1005) to the network 1000.” *Asmussen*, 51:10-13.

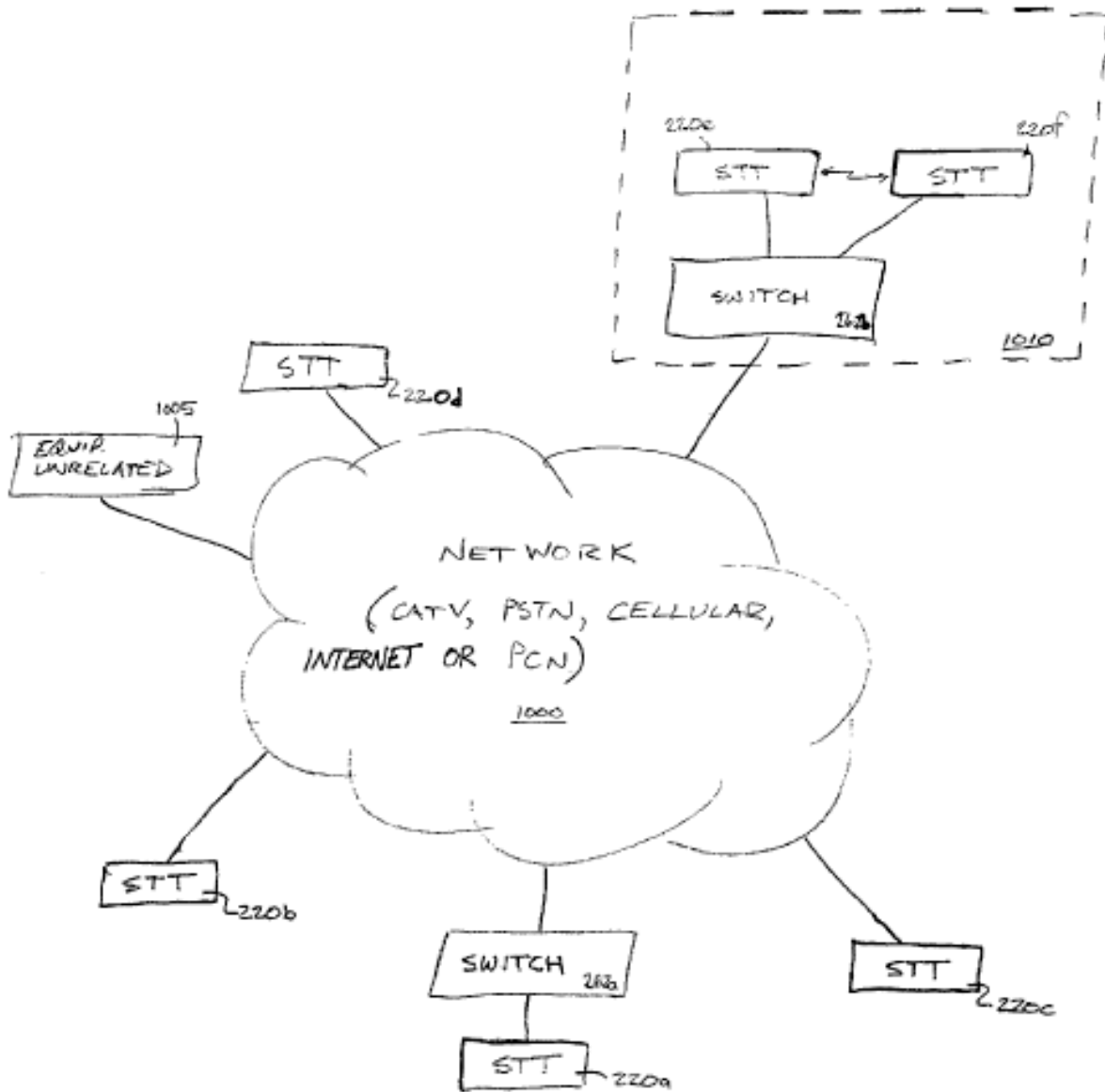


Fig. 31

*Asmussen*, Fig. 31. *Asmussen* teaches the set top terminals can be connected to the network either via a local switch or directly. *Id.* at 51:16-23 (“One typical configuration for connecting a set top terminal 220 to the network 1000 is via a local switch 262, such as shown in the lower central area of FIG. 7, where a set top terminal 220a is connected to a local switch 262a, which in turn is connected to the network 1000. A variation of this configuration is a direct connection between the network 1000 and a set top terminal 220, such as the set top terminals 220b-220d.”). *Asmussen* also teaches that “[t]he network 1000 provides full duplex interconnectivity between set top terminals 220 involved in a given video conference call.” *Asmussen*, 51:13-15.

100. *Asmussen* teaches that “[i]n regards to reception, an incoming (i.e., downstream) video conferencing signal” is received, decoded, decrypted, and demultiplexed. *Asmussen*, 50:44-49. This video conferencing signal includes video signals which are then “output for display on a display device 602, which is typically the television 222,” and audio signals which are “output for playing on the speaker” which “may be the speaker(s) of the television 222.” *Asmussen*, 50:49-54.

101. *Asmussen* also teaches that the video conferencing signal that is sent out by a set top terminal over the video conferencing network to other set top terminals is digitally encoded.

The video source encoder 705, audio source encoder 710 and the synchronizer multiplexer 715 together can function to perform standard audio/visual encoding algorithms such as MPEG (motion picture expert group) or ITU standard H.261 or H.263, which are well known in the art.

*Asmussen*, 50:27-31; *see also id.* at 46:43-44 (describing that these encoded signals are then transmitted out into a video conferencing network). Therefore, it is my opinion the video conferencing signals being sent over the video conferencing network are digital signals, at least because *Asmussen* teaches that the signals are encoded using well known digital encoding techniques before being sent out over the network.

102. *Asmussen* explicitly teaches multiple set top terminals that are all directly connected to a network, and that these set top terminals can be involved in a video conference call with each other. *Asmussen*, 50:18-57, 51:9-23, 58:4-29, 4:5-9, Abstract, Fig. 30. Figure 31, above, illustrates this, and *Asmussen* repeatedly refers to multiple set top terminals 220, such as by referring to terminals 220-b-d. Within a video conference call, a first set top terminal (e.g., 220a) receives video conference signals from another set top terminal (e.g., 220b-d).

103. Therefore, a first of the set top terminals participating in the video call meets the '991 Patent's claimed "communication apparatus," and any second or subsequent set top terminal participating in video call with the first set top terminal

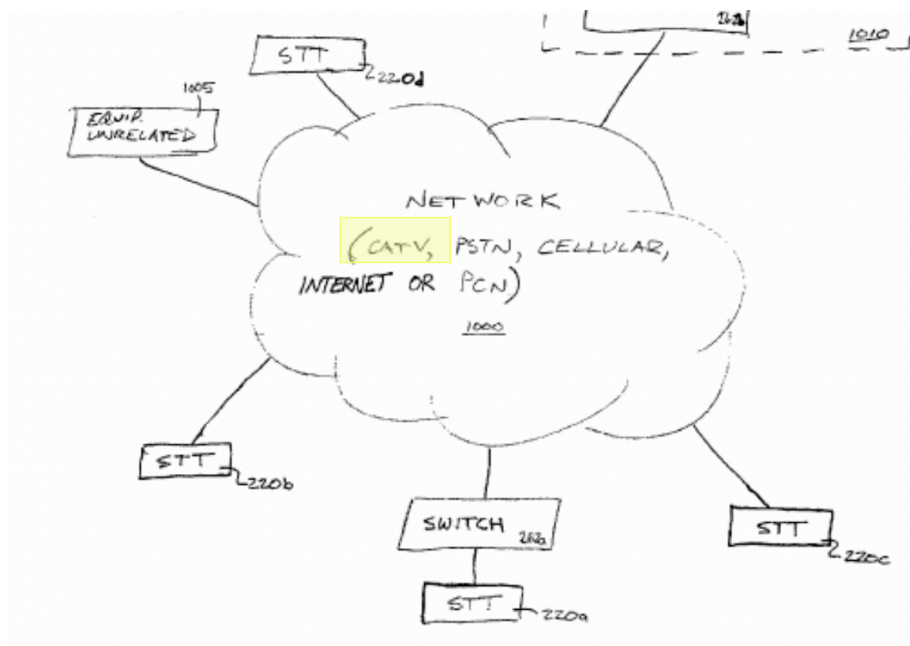
meets the claimed “another communication apparatus,” at least because the second (or subsequent) set top terminal would be transmitting out a digital video conferencing signal across the network to the first set top terminal. Additionally, the digital videoconferencing signal (i.e., the incoming video conferencing signal from the second set top terminal) received by the first set top terminal meets the ’991 Patent’s claimed “second digital information” at least because the received digital video conferencing signal originated from a different set top terminal (i.e., the second set top terminal) connected to the network that was participating in the video call. In my opinion, *Asmussen* thus teaches the claimed “second digital information from the another communication apparatus.”

***d) Asmussen teaches that the set top terminal is connected to the operations center and the other set top terminals via the network***

104. The term “network” is not recited in Claim 1(a), nor is the term “network” defined in the ’991 Patent, other than stating an exemplary network is the Internet. *’991 Patent*, 15:58-61. Generally, a POSITA would define a network as an interconnected set of two or more devices that can communicate. Thus, the cable television system as a whole can be regarded as a network. In fact, *Asmussen* even teaches that one of the functions of the cable headend is to act as a “network controller” for communications between the set top terminals and the operations center. *Asmussen*, 9:44-48, 10:34-48. Additionally, as I pointed out in the

Background of the Technology section, above, it was well known prior to the '991 Patent that cable television systems were called cable television (CATV) networks. It is worth noting that the claim only recites a generic “network interface” and not a specific type of interface for a specific type of network.

105. As previously discussed, *Asmussen* teaches that the set top terminals that participate in video conferencing are connected to each other via network 1000. Specifically, Fig. 31 shows that network 1000 can be a “CATV” network.



*Asmussen*, Fig. 30 (excerpt and annotated). *Asmussen* teaches that the “network 1000” may take various forms, one of which is the “cable television network.” *Asmussen*, 53:14-19. *Asmussen* goes on to teach that “in one embodiment the network 1000 utilizes a cable-television network, as described in section A above.” *Asmussen*, 53:20-22. Looking at section A, *Asmussen* teaches that “[i]n its most

basic form, the system uses a program delivery system 200 in conjunction with a conventional concatenated cable television system 210.” *Asmussen*, 6:48-5. The program delivery system 200, which includes the operations center 202, “transports the digital signals to the cable headend 208” which then transmits the signals “to the set top terminal 220 located in each subscriber’s home over the cable system 210.” *Asmussen*, 6:5-65; *see also id.* at 53:52-56. Based on at least these disclosures, it is my opinion *Asmussen* teaches that the cable television “program delivery system” is a “cable-television network,” and that the same cable television network is used for both video conferencing and program delivery.

106. *Asmussen* teaches that the program delivery system is used “in conjunction with a conventional concatenated cable television system 210” to deliver video programming to a set top terminal. *Asmussen*, 6:48-60. As discussed above, the program delivery system 200 connects the operations center to the headend, and the concatenated cable television system 210 connects the headend to the set top terminal at the subscriber’s home. *Asmussen*, 6:57-65. *Asmussen* also teaches that while the concatenated cable system is the most prevalent type of connection between the headend and the home, multiple other types of networks could be used (e.g., cellular networks, fiberoptic, and personal communication networks). *Asmussen* 6:48–7:3.

107. When discussing transmitting digital video programs to the set top terminal via the cable television network, *Asmussen* teaches “the television program signal may arrive at the subscriber’s home through one or more connections such as coaxial cables, fiber cables, twisted pairs, cellular telephone connections, or personal communications network (PCN) hookups.” *Asmussen*, 14:14-23. When discussing transmitting videocall information to the set top terminal via the cable television network, *Asmussen* teaches that for the network 1000, the “connection between the headend and a subscriber may be metallic coaxial cable,” and that the connection between the operations center and the headend may also be a “fixed terrestrial medium (e.g., cable/fiber).” *Asmussen*, 53:24-26, 53:56-60. This indicates that the transmission medium from the operations center, to the headend, and then to the subscriber’s set top terminal for both video program data and videocall data utilize the same physical transmission medium (i.e., the same physical cable system), such as a metallic coaxial cable. Furthermore, *Asmussen* teaches that “[t]o support conference calling, the cable television network and the home interface to the cable network **must support two-way communications.**” *Asmussen*, 53:29-31(emphasis added). And that the “**link between a headend and an operations center may be bidirectional to support duplex calling between electronic viewers.**” *Asmussen*, 53:60-62 (emphasis added). Therefore, *Asmussen* repeatedly describes a system that allows for bidirectional communication of digital information, including video

program and videocall information, across a network, such as the cable television network.

108. Therefore, the cable television network that connects the operations center, cable headend, and set top terminals together would also transmit video program signals to set top terminals and video conferencing signals between set top terminals, at least because *Asmussen* teaches that network 1000 used for video calls is the same cable television network that is described for connecting the operations center to the headend and the headend to the set top terminal.

*e) Asmussen teaches a network interface for receiving video programming (i.e., first digital information) and incoming video calls (i.e., second digital information)*

109. As I noted above, *Asmussen* includes an extensive discussion of its set top terminal and possible features. Much of *Asmussen* is written from the perspective of adding to the well-known set top terminal. *Asmussen*, 2:63-64 (“What is needed is technology that upgrades the functionality of existing set top converters.”); *see also id.* at 2:49–3:17 (describing various needed functionality, including providing users with “efficient access to hundreds of television programming options,” providing “advanced program delivery systems,” providing “upstream communications capability between the set top converter and cable headend,” and providing selection of a program from a menu). For example, *Asmussen* describes a set top terminal 220 with hardware upgrades “to provide additional advanced



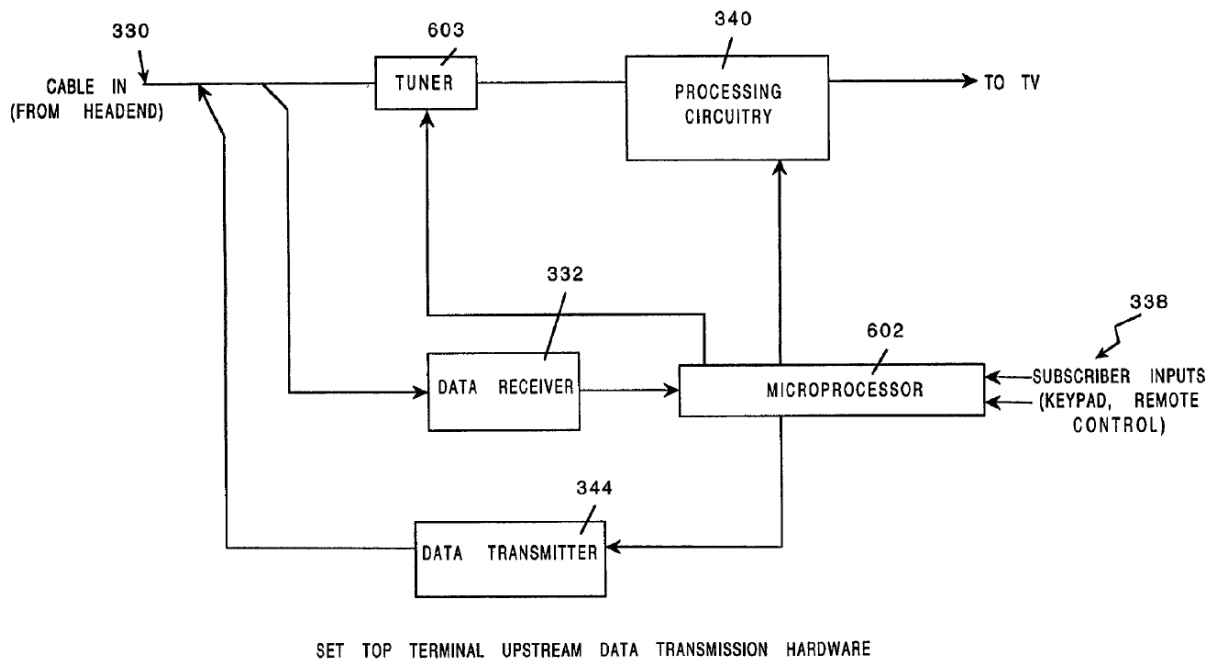
features and functional capabilities.” *Asmussen*, 21:49-60, 15:15-23, 16:44-53, 16:60–17:9. Due to *Asmussen* teaching that existing set top terminals can be upgraded, *Asmussen* describes the features of the set top terminal in multiple sections, such as picture-in-picture capability (32:34), interactive services (37:30), digital audio capability (39:53), automatic program pause (43:18), and video call features (49:42), to name a few. Because of each of the sections described, *Asmussen* builds onto the set top terminal 220 as originally discussed in the description at 14:4–16:43. Because of this, *Asmussen* describes multiple types of network interfaces that serve to receive information across a network. For example, and as discussed below, a tuner 603 is described as receiving RF signals corresponding to all cable signals intended for reception on the subscriber’s TV. *Asmussen*, 26:1-11. Multiple receivers are described, including receiver 332 (26:12-20), receiver components 601 (26:57-63), receiver 750 (50:44-57), cellular receiver (54:31-33), CDMA transceiver (52:12-17), PCS transceivers (54:42-46), and wireless RF transceivers (51:35-50). Any one of these receivers (which includes tuner 603) is a network interface, as the receiver serves as the interface between the set top terminal and the network and receives the incoming digital signals across the network.

110. I discuss below receiver 750, which is specifically discussed by *Asmussen* as receiving the videocall information. It would have been obvious to incorporate one or more of the receivers (including receiver 750) into the set top

terminal based on the desired functionality that is already described in *Asmussen*. For example, in order to receive digital signals across a cellular network, a receiver configured to receive such signals would be used, whereas to receive signals across the cable system network, a receiver configured to receive digital cable signals would be used. *Asmussen* contemplates numerous types of networks, along with various receivers. See *Asmussen*, 53:20-21 (describing cable television transmission network), 54:63–55:3 (describing hybrids of cable television networks, including cellular telephony networks and the Internet). *Asmussen* also recognizes that multiple types or forms of data would be received across a network, such as the cable television network, in describing cable signals, including both video programming and videocall information, being transmitted across the cable television network, which I discuss further below. Therefore, in my opinion, given *Asmussen*'s appreciation that digital data is well known to be transmitted across various types of networks and received at the set top terminal via various types of network interfaces, it would have been obvious to design a set top terminal to include a network interface that receives digital data including video programming and videocall information.

111. As I explain in more detail below, in my opinion, the claimed “network interface” in Claim 1(a) would be met by *Asmussen*'s tuner 603 in combination with receiver 750.

112. Figures 11 and 12a of *Asmussen* illustrate a set top terminal including a tuner 603 and receiver (where Fig. 11 illustrates receive 332, and Fig. 12a illustrates receiver components 601). Both figures also show a cable TV input (i.e., CATV input) to the tuner and receiver. *See also id.* at Fig. 4 (also showing a CATV input to tuner 603), 15:15-20. Fig. 11 illustrates the tuner in combination with a data receiver 332:



*Fig. 11*

*Asmussen*, Fig. 11, 25:55–26:42. And, Fig. 12a illustrates an upgraded set top terminal with tuner 603 and receiver components 601:

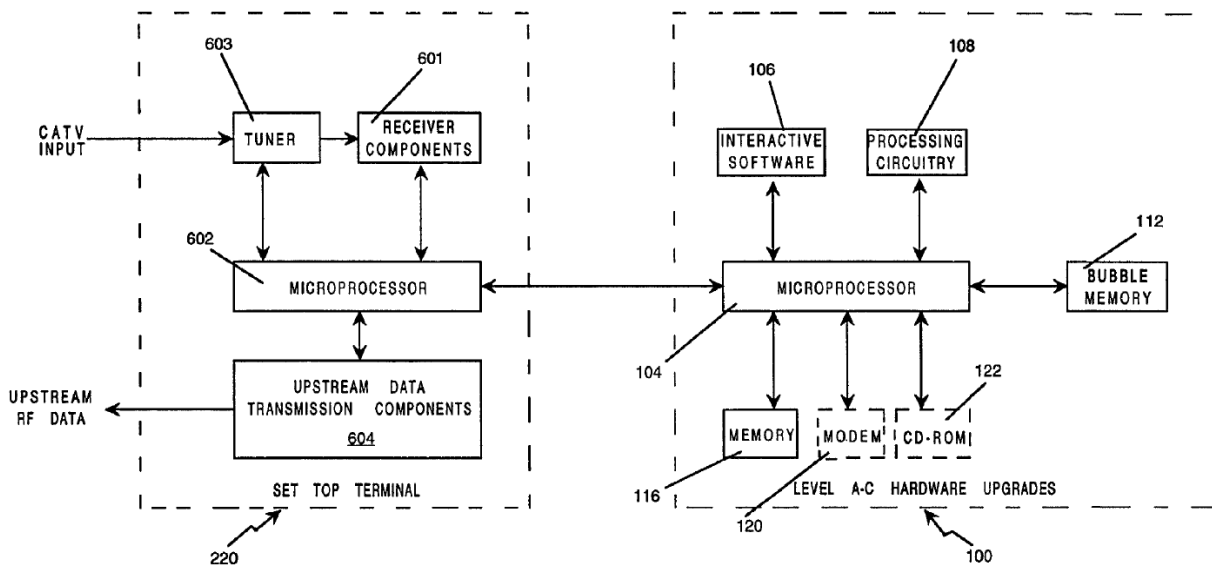


Fig. 12a

*Asmussen*, Fig. 12a, 26:43–27:3.

113. *Asmussen* teaches that “[a]s seen in the figure, CATV input signals are received by the set top terminal 220 using a tuner 603 and various receiver components described above (but denoted generally as 601 in FIGS. 12a and 12b).” *Asmussen*, 26:57-60 (emphasis added), 26:1-11, 28:9-16. The referenced “CATV input signals” would have included whatever signals were sent over the cable television network and received at the set top terminal. *Asmussen* repeatedly discusses video program information being sent over the cable television network. *See, e.g., id.* at 7:4-14, 15:37, 22:44, 23:31, 7:4-55, 4:10-30, 32:35-56, Fig. 29. These CATV signals input to the tuner 603 would include the video program information transmitted from the headend 208 and to the user’s set top terminal 220. *See id.* at

Fig. 3. *Asmussen*, for example, discusses that the set top terminal's microprocessor 602 "instructs the tuner 603 to tune to the proper frequency of the channel or program desired and subsequently instructs the processing circuitry 340 to begin descrambling of this channel or program." *Asmussen*, 26:24-29. These teachings in *Asmussen* indicate the CATV signal input to the tuner includes, at the least, digital video program information. And, as I discussed above in ¶¶ 93-97, the video program information satisfies the claimed "first digital information" in claim 1(a) of the '991 Patent.

114. *Asmussen* also teaches the set top terminal receives videocalls via receiver 750, illustrated in Fig. 30. *Asmussen* teaches that an embodiment of the set top terminal that has video calling capabilities is "***augmented with additional features***, as shown in FIG. 30." *Asmussen*, 49:44-46 (emphasis added), *see also id.* at 49:46-48 (describing that the features are integrated into the set top terminal). Figure 30 depicted below shows the hardware upgrades that are integrated into the existing set top terminal.

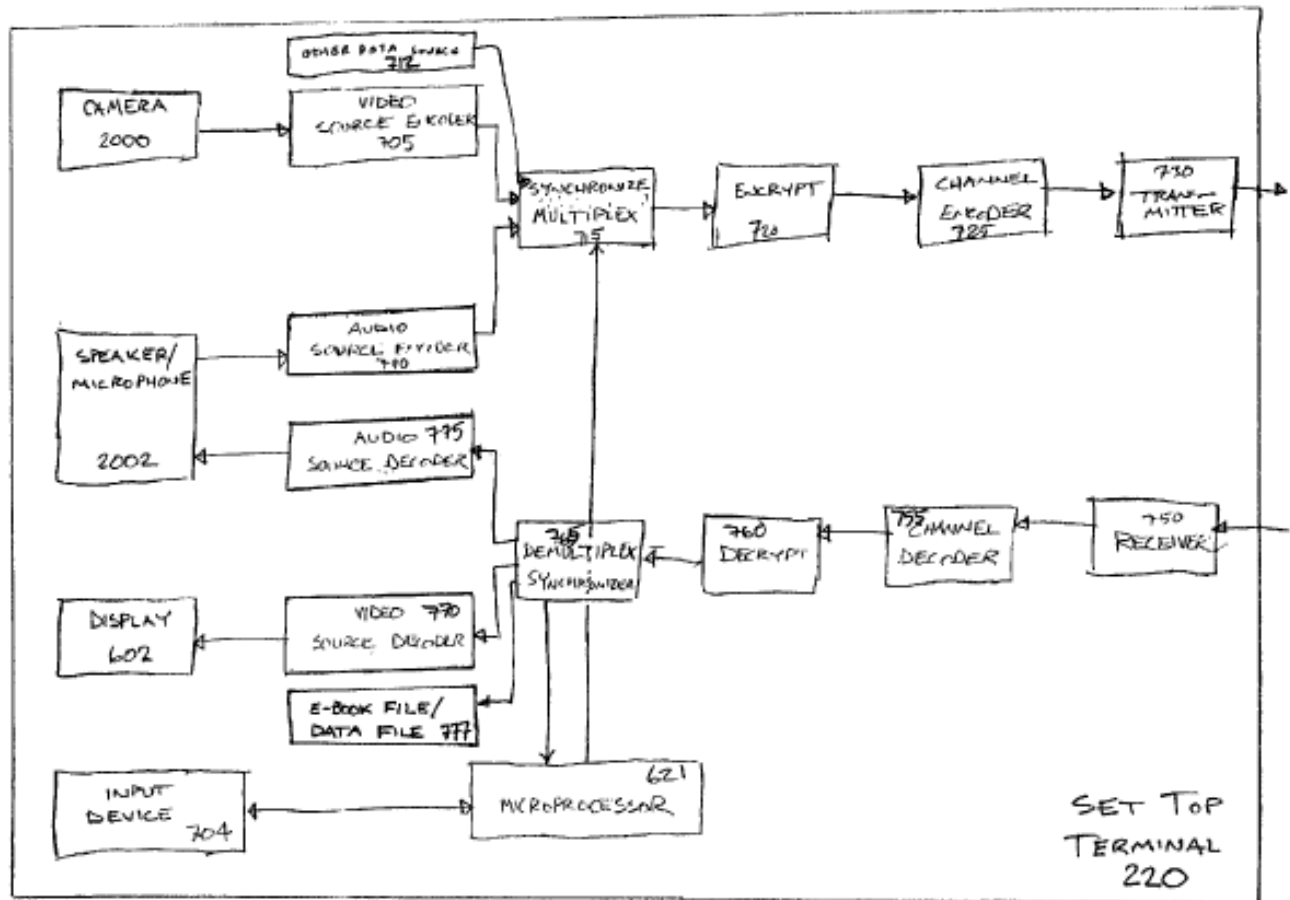


Fig. 30

Asmussen, Fig. 30. Asmussen teaches utilizing an existing set top terminal that is already compatible with a cable television network and modifying it by adding hardware components to support video telephone capabilities. Asmussen, 3:31-41 (“The set top terminal of the present invention may be achieved through a set of hardware upgrades to any of the following embodiments: ... (3) a set top converter box capable of both decompression and menu generation. The hardware upgrades provide additional advanced features and functional capabilities to any of these embodiments.”), 4:5-7 (“Such features include the capability to send and receive

*video calls* through the set top terminal equipped with a camera and microphone.”)  
(emphasis added).

115. These upgraded capabilities include video calling. *Asmussen* teaches that “video calling also requires an upstream (or reverse path or transmission) communication capability” and that this “upstream communication capability for video calling is in addition to the downstream communication capability by which broadcast programming is received.” *Asmussen*, 50:4-8. *Asmussen* teaches that the “transmitter 730” is used for transmitting the upstream transmission of a video call (e.g., the audio/video signal(s) from the camera/microphone) “into a video conferencing connection network,” and that the “receiver 750” is the component that receives “*incoming (i.e., downstream) video conferencing signal[s]*.” *Asmussen*, 50:18-40, 50:44-49 (emphasis added). From these teachings, I understand the receiver 750 and the transmitter 730 are components added to the existing set top terminal, because *Asmussen* teaches the existing set top terminal is *augmented* with the necessary hardware components for video calling.

116. Figure 12a is an exemplary embodiment of how the receiver 750 and the transmitter 730 would be integrated into the set top terminal. Figure 12a is generally referring to the level A, B and C hardware upgrades (*see Asmussen*, 5:24-25), but Fig. 12a’s disclosure of including receiver components 601 indicates to me that *Asmussen* recognizes the set top terminal may be upgraded to include certain

functionality and associated hardware, such as receiver components 601. Thus, Fig. 12a illustrates an exemplary way a receiver 750 and transmitter 730 would be integrated into the STT. *Asmussen* teaches that the receiver components 601 and transmission components 604 are representative of “various” components that perform the same functions. *Asmussen*, 26:57-63. Additionally, Fig. 12a depicts the tuner and receiver components 601 as receiving signals from the CATV network, which includes both video program information and videocall information when the video call information is transmitted to the set top terminal via the cable television network. Additionally, there are other embodiments, such as Fig. 11, that also depict the hardware components of a tuner and receiver as receiving signals from the cable television network.

117. Furthermore, as I discussed in the Background of the Technology section, it was well known at the time that cable television (CATV) networks were used to transport videophone signals between set top terminals as also expressly taught by *Asmussen*. See *Asmussen*, 53:11–54:30 (generally describing bi-directional videophone calls made between set top terminals and via the cable television network). Due to *Asmussen*’s express teachings of augmenting/integrating a receiver into a set top terminal, it would have been obvious to include the receiver 750 in the existing set top terminal as shown in either Fig. 11 or Fig. 12a, to transmit videocall signals across a cable television network.



118. In my opinion, *Asmussen* is expressly recognizing a receiver that receives both video program and videocall data in stating that the “upstream communication capability for video calling ***is in addition to the downstream communication*** capability by which broadcast programming is received.” *Asmussen*, 50:4-8 (emphasis added). Yet further, we know from *Asmussen* that it contemplates receiving both video program and videocall information at the same time, due to the teaching of picture-in-picture functionality, thus indicating that *Asmussen* contemplates a network interface in the set top terminal for receiving both the video program information (i.e., the first digital information) and the videocall information (i.e., the second digital information) at the same time. *See Asmussen*, 59:44-47 (“Picture-in-picture viewing of a video program and a video call together is also possible.”).

119. Therefore, for at least the above reasons, it is my opinion *Asmussen* teaches or renders obvious upgrading the set top terminal of Figs. 11 or 12a to include a receiver 750, as shown in Fig. 30, such that the existing tuner 603 in combination with the receiver 750 would receive both video programming (i.e., the first digital information) and video calls (i.e., the second digital information), thus meeting the claimed “network interface.” *Asmussen* teaches that both video program signals and videoconferencing signals are transmitted to a set top terminal over the same cable television network. In order for the tuner 603 to receive video

programming and the receiver 750 to receive incoming video conferencing signals, both the tuner and receiver would be interfaced with the cable television network, at least for the reason that the cable television network is the network over which both signals are sent.

**3. Claim 1(b): “a camera configured to generate video information which is included in third digital information”**

120. *Asmussen* explicitly discloses that the set terminal 220 contains both a camera and microphone. *Asmussen*, Abstract, 4:5-7. *Asmussen* also teaches that both the camera and microphone “can be built into the set top terminal 220.” *Asmussen* 16:36-38, 49:46-48, Fig. 30. When the set top terminal 220 is participating in a video call, *Asmussen* explicitly teaches that the set top terminal 220 will transmit a multiplexed and encoded signal “upstream into a video conferencing connection network.” *Asmussen*, 50:35-40.

121. This multiplexed and encoded signal includes both digital video and audio signals that are generated by the camera/microphone.

FIG. 30 is a block diagram of video call transmission and reception functions of the set top terminal 220. *In regards to transmission, a video signal from the camera 2000 is subjected to source encoding (i.e., conversion to spectrally efficient or compressed digital form) by a video source encoder 705, and an audio signal from the speaker/microphone 2002 is subjected to source encoding by an audio source encoder 710. The source encoded video and audio signal are*

*synchronized and multiplexed together by a synchronizer multiplexer 715. The video source encoder 705, audio source encoder 710 and the synchronizer multiplexer 715 together can function to perform standard audio/visual encoding algorithms such as MPEG (motion picture expert group) or ITU standard H.261 or H.263, which are well known in the art.* Other media signals, signals containing signaling information or data signals from a data source 712 can also be multiplexed with the audio and video signals, as described in greater detail below. *The multiplexed audio/visual signal output from the synchronizer multiplexer 715 is optionally encrypted by an encryptor 720 and channel encoded (e.g., forward error correction encoding and/or interleaving) by a channel encoder 725 before being transmitted by a transmitter 730 upstream into a video conferencing connection network.* Those skilled in the art will appreciate that the transmission functions illustrated in FIG.30 can be implemented in an order different from that illustrated.

*Asmussen, 50:18-43.* Here, *Asmussen* explicitly teaches that the camera 2000 generates a video signal, which is then encoded using well known algorithms, such as MPEG or H.261, before being further processed and transmitted out over the network. Encoding algorithms using, for example an MPEG or H.261 protocol, would convert the video signal from the camera into a digital format, at least due to the fact that *Asmussen* expressly teaches that the encoding is a “*conversion to spectrally efficient or compressed digital form.*” *Id.*

122. Likewise, the encoded and multiplexed video conferencing signal that is transmitted upstream into the video conferencing network includes video data. As cited above, *Asmussen* explicitly teaches that a “video signal” that “comes from the camera” is a portion of the signal that is being encoded and multiplexed. Therefore, in my opinion, *Asmussen* expressly teaches the camera is “configured to generate video information which is included in third digital information,” as claimed.

**4. *Claim 1(c): “a display configured to display at least the first and the second digital information; and”***

123. As I opined with respect to Claim 1[Preamble], *Asmussen* teaches the set top terminal is capable of being connected to a subscriber’s television 222, which contains a video screen/display sometimes referred to as display 602 or video display 1400 in *Asmussen*. Further, *Asmussen* teaches that on this display both “program signals” (i.e., first digital information) and “incoming (i.e., downstream) video conferencing signal[s]” (i.e., the second digital information) can be displayed. Therefore, *Asmussen* expressly teaches that the display is configured to display both first and second digital information.

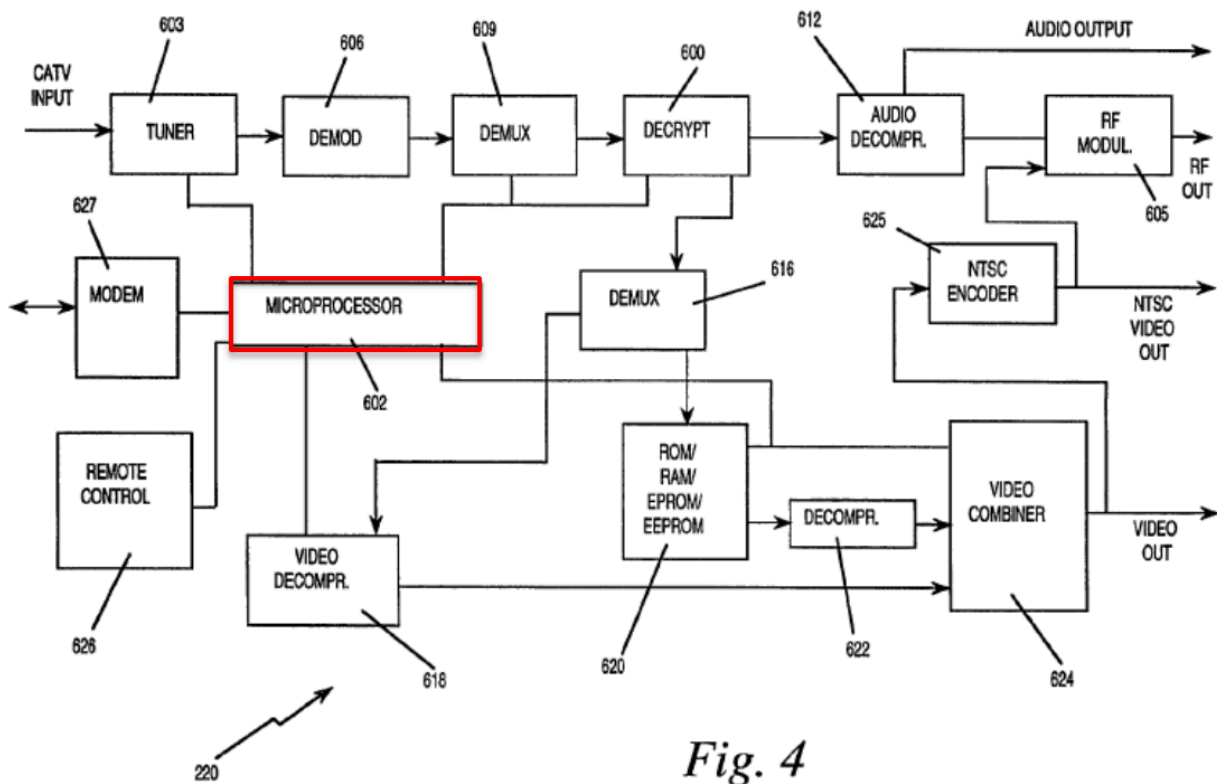
124. In my opinion, Claim 1(c) does not require the display to display both the first and second digital information at the same time. However, I have been asked to opine as to whether *Asmussen* teaches such. In my opinion, *Asmussen* includes an express teaching of displaying both the first and second digital information at the same time using a picture-in-picture function:

***Picture-in-picture viewing of a video program and a video call together is also possible.*** The viewer/call participant can select different orientations of the video components (e.g., call video in program video, vice versa, split screen).

*Asmussen*, 59:44-47. Thus, the *Asmussen* system is designed with the functionality of displaying two different signals on two different portions of the display at the same time, and a POSITA would have understood that *Asmussen* expressly teaches displaying both first and second digital information at the same time at least because *Asmussen* teaches that program video (i.e., first digital information) and call video (i.e., second digital information) are displayed using picture-in-picture. Therefore, a POSITA would have understood that *Asmussen* discloses the claimed “display configured to display at least the first and the second digital information.”

**5. Claim 1(d): “a processor;”**

125. *Asmussen* teaches a processor. In Fig. 4 *Asmussen* shows what comprises the “basic hardware components of the set top terminal 220,” which includes a microprocessor 602. *Asmussen* 15:15-16.



*Fig. 4*

*Asmussen*, Fig. 4 (annotated). *Asmussen* also teaches that “[t]he microprocessor 602 may be a single microprocessor, as shown, or may be several microprocessors, such as a general microprocessor, a camera microprocessor and a microphone processor.” *Asmussen* 15:30-33.

126. Additionally, *Asmussen* teaches that the microprocessor 602 coordinates “all CATV signal reception” and “signal processing to produce a decrypted program signal” as well as “process[ing] video signals from a camera” and “audio signals from a microphone.” *Asmussen*, 26:60-63, 32:63-65, 15:27-30.

6. ***Claim 1(e): “wherein when the processor receives an inbound videophone call notice while displaying the first digital information on the display, the processor pauses the displaying of the first digital information and renders the camera operative;”***

***a) Asmussen Teaches the Limitations of Claim 1(e)***

127. *Asmussen* teaches receiving an inbound videophone call notice. Specifically, the set top terminal’s microprocessor 602 executes the software/firmware monitoring method 1440 for the continual monitoring of incoming videophone calls. *Asmussen*, 46:27-37. This process is best depicted in the flow chart shown in Fig. 28 below.

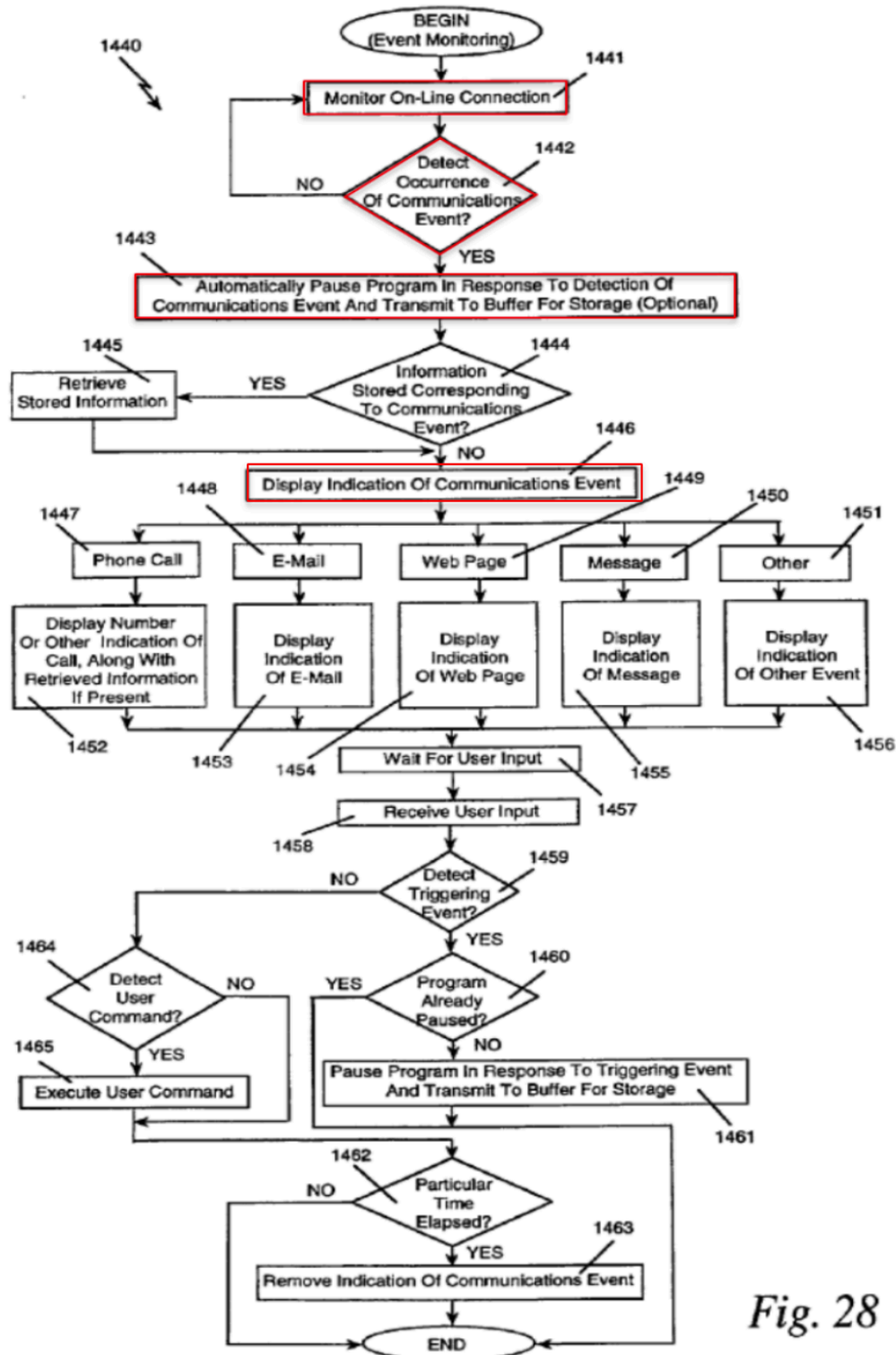


Fig. 28

*Asmussen*, Fig. 28 (annotated), see *also id.* at 46:43-44 (describing that the system continually monitors for communication events, step 1442 of the flow chart in Fig.



28), 44:9-13 (stating that a communication event is “an incoming video call”). Upon detecting a communications event, the microprocessor “automatically pauses the video program” (step 1443) and “displays an indication of the communications event (step 1446)” on the “television or display device which displays the video program.” *Asmussen*, 46:44-48, 46:59-62. When the set top terminal detects an incoming video call, the processor will automatically pause the current video program and display a notification of said video call on the TV/display, at least because *Asmussen* teaches that the event monitoring method 1440 is executed by the microprocessor 602. Therefore, *Asmussen* discloses the claimed “when the processor receives an inbound videophone call notice while displaying the first digital information on the display, the processor pauses displaying of the first digital information.”

128. Additionally, *Asmussen* teaches the microprocessor rendering the camera operating when the processor receives an inbound videophone call notice. *Asmussen* teaches that a user of the set top terminal is able to change certain functionality of the set top terminal to support video calling:

***To support video calling***, a video call options menu 1022 is preferably provided. ***In the video call options menu 1022, the user can set up such things as*** turning caller ID on/off, turning automatic program pausing on/off, ***the default state of the video camera 2000 (on or off)***, time periods when calls shall not be interrupt programming and shall be automatically messaged instead (e.g., during favorite programs),

how video call images are displayed (e.g., picture-in-picture, on a blue screen or on a paused image of the current program).

*Asmussen*, 21:34-42 (emphasis added). I understand from this disclosure that a user may configure how the system operates when a video call occurs, because all the available configurations in the call options menu are used to “support video calling.” Additionally, *Asmussen* teaches the setting for the default state of the camera is selectively enabled as on or off to support video calling (*id.* at 21:34-42), thus indicating that at least in some instances (when the user sets the default state to ‘on’), the camera is rendered on when there is an inbound video call. In my opinion, the “on” state of the camera occurs in response to an inbound video call because *Asmussen* teaches setting the default state “to support video calling.” *Asmussen*, 21:34. Additionally, rendering the camera operative *when the processor receives* an inbound videophone call notice would be the most logical and straightforward design. As I noted above, no reasonable skilled person would design a video calling system to always leave the camera on (regardless of whether an incoming call is detected or is active). A camera that is always “on” has the potential to violate the user’s privacy and also would unnecessarily waste power and computational resources.

129. Therefore, in the circumstances where the user has set the default state to ‘on,’ then upon an inbound call being detected, the camera will be “rendered

operative,” as claimed. That is, when the microprocessor 602 receives an incoming communications event (i.e., video call) and displays the indication of the communications event (i.e., inbound videophone call notice), the processor would render the camera operative by turning the camera “on,” as this is the default state that the user had selected the camera to be in to support video calls. Although not germane to Claim 1(e), I further note that in a default “off” state, it is my opinion the camera would not be rendered operative until the user manually activated the camera.

130. *Asmussen* also teaches that its “microprocessor 602 is capable of executing program instructions stored in memory.” *Asmussen* 15:24-25. In order “[t]o support video calling, these program instructions “enable the microprocessor 602” to both “process video signals from a camera” and “to control a camera and microphone.” *Asmussen* 15:27-30. When the set top terminal of *Asmussen* is performing a video call, the set top terminal is transmitting video signals out to another (second) set top terminal. Because *Asmussen* teaches that the microprocessor can “control” the camera, the microprocessor is performing the step of turning on the camera, thereby rendering the camera operative, as claimed.

131. Additionally, because *Asmussen* does not state that setting these video call options are part of an initial set up process, a user would be able to access the menu 1022 at any point in time after powering the set top box on. Therefore,

*Asmussen* allows for a user to set the default state of the camera to either “on” or “off” at any point while the set top terminal is in use, which includes a time prior to the receipt of an incoming videocall notice.

***b) Bear Teaches “render[ing] the camera operative,” as Recited in Claim 1(e)***

132. *Bear* (Ex. 1005) also teaches rendering the camera operative when the processor receives an inbound videophone call notice. As I discussed above, *Bear* generally describes a personal computer system equipped with a camera/microphone that is capable of performing Voice-over-IP (VOIP) or video calls. *See* ¶ 64. While *Bear* generally describes its invention with respect to a “computing device,” it teaches that “[T]he invention is operational with numerous other general purpose or special purpose computing system environments or configurations.” *Bear*, 3:66-4:1. Listed examples in *Bear* include well known computing systems, such as set top boxes. *Id.* at 4:1-9.

133. I first provide an overview of *Bear*’s teachings. *Bear* teaches “control handling programs” including an A/V capture application (audio/video capture application, *see Bear*, 7:42-45) for use in conducting video calls using the computing device (which, as noted in the preceding paragraph, can be a set top box). The A/V capture application is automatically launched in response to receipt of an inbound video call. Upon launch of the A/V capture application, the application determines if still or video images are to be taken for the call. If video images are to be taken,

the A/V application proceeds to capture a video stream. Because the A/V application is capturing a video stream, the camera is rendered operative.

134. Before discussing the A/V capture application in detail, I note that *Bear* teaches a *processor* that renders the camera operative, at least because *Bear* teaches that the computing system, including the processor of the computing system, executes application programs, such as the A/V capture application. *Bear* teaches that the computer's components "may include, but are not limited to, **a processing unit 120**, a system memory 130, and a system bus 121 that couples various system components including the system memory to the processing unit 120." *Bear*, 4:24-28 (emphasis added). Additionally, *Bear* teaches that the computer 110's system memory that is in communication with the processor contains application programs and/or program modules. *Bear*, Fig. 1 (elements 135-137), *see also id.* at 5:7-10 (describing that "RAM 132 typically contains **data and/or program modules that are immediately accessible to and/or presently being operated on by the processing unit 120**"; 9:34-45 (describing control handling programs such as the operating system 134 or the application program 135 "such as an **A/V capture application program**" are capable of generating hardware or software events "**such as initiating video capture**.")) (emphases added). *Bear* also teaches that "[t]here are many **applications that may use the present invention for capturing video** and still images." *Bear*, 2:58-59 (emphasis added). Based on at least these teachings, *Bear*

teaches a processor that executes an application program, which can be used to capture video, at least because *Bear* teaches the program modules stored in the RAM (which includes the application programs 135) can be operated on by the processing unit 120, which is connected to the RAM via the system bus 121.

135. Regarding the A/V capture application, *Bear* teaches that the A/V application program is launched “when the processor receives an inbound videophone call notice.” Specifically, *Bear* teaches the computer system launches the A/V application in response to receiving an incoming video call:

Those skilled in the art will appreciate that there are other ways of launching the application, such as a user may launch it by pressing the capture button 308 or selecting the application from a menu of graphical user interface, or ***the computer system may launch the application in response to receiving an incoming phone call that supports video***, and so forth. First, the A/V capture application checks if a video stream or still images are to be captured at step 1002.

*Bear*, 11:37-43, Fig. 10 (emphasis added). In my opinion, *Bear*’s computer system launches the application in response to an inbound video call, at least because *Bear* teaches the computer system may launch the application *in response to receiving an incoming phone call that supports video*.

136. After the application is launched, *Bear* teaches that the “first” thing that the application will determine is if the user has selected either video streaming or

still images to be captured by the camera. *Bear*, 11:43-49; *see also id.* at Abstract, 2:47-52, 11:61-65. If a user has not opted to capture still images, then the application will turn the camera indicator light to red and begin capturing video. The user selection of whether to take still images or video streaming is something the user would have selected or chosen prior to receipt of the incoming call because the application is performing this check after being launched due to a video call.

137. *Bear* then teaches that if the user did not select still images, the A/V application will activate the camera and begin capturing video from it:

If the user has not selected still images to be captured in the A/V capture application, ***then the application sets the camera capture indicator light 306 to red at step 1012 to indicate that the A/V capture application is in the mode of capturing a video stream. The camera begins capturing the video stream at step 1014.***

*Bear*, 11:43-45, 11:61-66, Fig. 10 (emphasis added); *see also id.* at 7:50-56 (describing when the camera indicator light is red video capture is taking place). In order for the camera to begin capturing the video stream, the camera is “rendered operative.” Additionally, Figure 9 illustrates various states of operation using the A/V capture application, where one of the states is a Capturing 904 state. *Bear*, 10:27-37, 10:41-44. *Bear* also teaches the A/V capture application may be launched whenever a capture event occurs (11:35-37), and then discloses “launch[ing] the application in response to receiving an incoming phone call that supports video”

(11:37-43). Therefore, when the processing unit receives an inbound video call notice, the following steps happen: (1) processing unit launches the A/V application, (2) which in turn checks for whether the user has selected video to be captured, (3) if so, sets the indicator light to red to indicate the video capture mode, and (4) the camera begins capturing the video stream. *Bear* thus teaches the limitation in claim 1(e) of rendering the camera when the processor receives an inbound videophone call notice.

138. Additionally, it is my opinion that *Bear* teaches the camera is rendered operative without the user having to manually activate the camera and without the need for the user to answer the incoming video call. Because the A/V application is launched in response to the call, and further because the A/V application *first* checks if a video stream is to be captured (11:37-45), and if so, proceeds to capture the video stream (11:61-65), then the video stream is captured (and the camera is thereby rendered operative) without the user having to answer the call.

139. I also note that *Bear* teaches that the user can set a preference so that when a user *answers* a call that supports video, the camera is also automatically enabled. *Bear*, 2:58–3:1, 6:44-46, 12:18-20, Abstract. This embodiment is different from the embodiment as described above because *Bear* explicitly teaches that there are multiple ways to launch the application. *Bear*, 11:37-43. In the embodiment where the user answers the call, the user must answer the call using the “camera



button 308,” which in turn causes the “indicator light 306” to be “a steady red light.”

*Bear* 8:40-45. This teaching is separate from the computer system launching the A/V application and activating the camera.

140. In my opinion, it would have been obvious to combine the automatic launching of the A/V capture application and capturing of a video stream in response to receiving an incoming video call, as taught by *Bear*, in the system of *Asmussen* for the advantages discussed by *Bear* of providing a “simplified system and method for a user to interact with various communications and media applications in a consistent way.” *Bear*, 2:1-10. *Bear* also explicitly teaches that “answering a phone call that supports video” as being a “possible usage scenario[s] that would benefit from improved video communications handling.” *Id.* This combination would have used *Bear*’s techniques of the processor enabling the camera with *Asmussen*’s processor, which was already capable of receiving incoming video call notifications and pausing the current video program, as I discussed above.

141. Modifying *Asmussen*’s system to render the camera operative in response to an inbound videophone call notice, as taught by *Bear*, would have reduced the time it would take the system to begin transmitting video out to a calling party, thereby reducing lag time between the starting of a video call and the reception of the video stream at the calling party’s set top terminal. This would have also ensured that a user’s camera was always active and enabled upon receiving the

inbound videophone call notice, thereby eliminating the need for a user to manually activate the camera. This would have simplified the *Asmussen* system for the user and eliminate the possibility of the user forgetting to activate their camera, having to locate the remote to activate the camera, and having to learn the operations for beginning a videophone call (which is, again, in keeping with *Bear's* stated desired to simplify the user's interactions with the media system). Also, because *Bear* contemplates that its system is useful for answering video calls, there would be a reasonable expectation of success combining *Bear's* process of rendering the camera operative with *Asmussen's* ability to receive inbound video call notifications. Specifically, the modifications to *Asmussen's* set top terminal to activate the camera in response to the notifications would have only required simple programming techniques well within the knowledge of a POSITA at the time. For example, *Asmussen* already teaches a video calling options menu 1022 where the user can set up video calling preferences, including turning a camera on/off. *Asmussen*, 2:34-42. It would have been an easy programming step to provide an option to render the camera operative upon receipt of an inbound videophone call, as the skilled person would need only program such an option in *Asmussen's* options menu 1022.

7. ***Claim 1(f): “wherein the processor outputs the third digital information to the another communication apparatus and displays the second digital information of the videophone call on the display; and”***

142. As discussed above regarding limitation 1(b), *Asmussen* expressly teaches a set top terminal transmits an encoded and multiplexed signal as an upstream transmission into a video conferencing network. *Asmussen*, 50:18-43, 50:35-40. Additionally, *Asmussen* teaches “***each of the set top terminals 220 participating in a video conference call broadcasts its audio/video signal(s), and any set top terminals 220 that receives the signal(s) performs the necessary processing to output the audio and video components*** in combination with those of other received signal(s).” *Asmussen*, 52:20-25 (emphasis added). Furthermore, *Asmussen* teaches that each of the set top terminals that are participating in a video conference call are connected to the video conferencing network and the “network provides ***full duplex interconnectivity between set top terminals 220 involved in a given video conference call.***” *Asmussen* 51:13-15, Fig. 30 (emphasis added).

143. Also, as discussed above regarding limitation 1(d), *Asmussen* expressly teaches that a set top terminal contains a microprocessor 602 which “may be a single microprocessor, as shown, or may be several microprocessors, such as a general microprocessor, ***a camera microprocessor and a microphone processor.***” *Asmussen* 15:30-33 (emphasis added). *Asmussen* also teaches that “[t]o support video calling, the instructions also ***enable the microprocessor 602 to process video signals from***

*a camera*, to process audio signals from a microphone and to control a camera and microphone.” *Asmussen* 15:27-30. Therefore, based on these teachings, including *Asmussen*’s teaching that set top terminal “broadcasts its audio/video signals,” it is my opinion *Asmussen* teaches the microprocessor 602 of the set top terminal outputs video signals from the camera (i.e., the claimed “third digital information”) to other set top terminals participating in the video call.

144. Claim 1(f) only requires that the third digital information be output to the “another communication apparatus.” As I have previously pointed out with respect to claim 1[Preamble], a set top terminal with video calling capabilities in conjunction with a television (which includes a display 602 or display 1400) comprises the “communication apparatus.” Therefore the video signals being broadcast as an upstream transmission to other set top terminals (a component of the communication apparatus) meets the ’991 Patent’s claimed “third digital information.”

145. Regarding the limitation in claim 1(f) that the processor displays the second digital information, as I pointed out above, the set top terminals participating in a video conference call also receive video and audio signals that were broadcast out by other set top terminals and “perform[] the necessary processing to output the audio and video components.” *Asmussen*, 52:20-25. In particular, with regards to the reception of incoming video conferencing signals, *Asmussen* teaches:

*In regards to reception, an incoming (i.e., downstream) video conferencing signal is received by receiver 750, decoded by channel decoder 755, decrypted by decryptor 760, and demultiplexed with proper relative timing among video, audio and other data components by a demultiplexer synchronizer 765. Video signals are decompressed by a video source decoder 770 and output for display on a display device 602, which is typically the television 222.* Audio signals are decompressed by an audio source decoder 775 and output for playing on the speaker/microphone 2002, the speaker portion of which may be the speaker(s) of the television 222.

*Asmussen*, 50:44-54 (emphasis added). Thus, *Asmussen* expressly teaches displaying second digital information of the videophone call on the display, at least because *Asmussen* teaches outputting decompressed video signals received from another participating set top terminal on display 602 or the television 222 connected to the receiving set top terminal.

8. ***Claim 1(g): wherein when the processor receives an input for stopping the videophone call, the processor stops output of the third digital information and stops the camera.***

***a) Asmussen Teaches Claim 1(g)***

146. *Asmussen* teaches that one of the basic hardware components of the set top terminal is a “remote control interface 626 for receiving and processing signals from the remote control unit 900.” *Asmussen*, 15:15-20, Fig. 4. In the embodiment depicted in Fig. 30, which includes the integrated features to support video calling,

*Asmussen* teaches that the set top terminal includes an “input device 704” that accepts “user input to establish and manage a video call,” with one of those user inputs being “hanging up.” *Id.* at 49:57-59, 49:49-50, Fig. 30. More specifically, *Asmussen* teaches that “the input device 704 is the remote control 900,” and that the remote control “preferably includes ... *a hang up button.*” *Id.* at 49:57-50:3, 31:39-43 (emphasis added).

147. Illustrated in Fig. 30 below, *Asmussen* also teaches that the input device (i.e., remote control 900) is in direct communication with the microprocessor, thus indicating that an input to the input device is transmitted to the microprocessor for processing.:

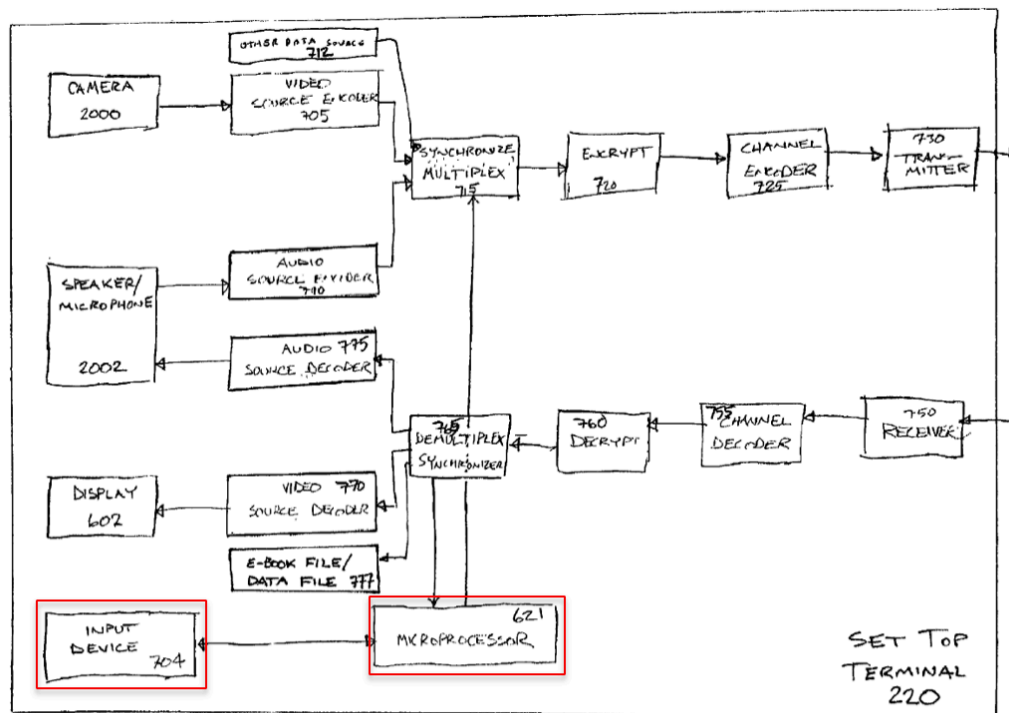


Fig. 30

*Asmussen*, Fig. 30 (annotated). It was readily known at the time of the '991 Patent that remote controls were used to receive user input and transmit control signals to the microprocessor in accordance with the user input. I also note *Asmussen* teaches the set top terminal including infrared sensors 630, and that the remote control 900 transmits IR signals to the set top terminal. *Asmussen*, 15:60-61, 29:49-67 (further describing the remote control as a “standard television remote control” that can be augmented to allow for digital menu access and ordering functionality), 31:31-38 (explicitly teaching the remote control communicates with the set top terminal via IR but may communicate through other means), Fig. 5a. Thus, it is my opinion that *Asmussen* teaches a set top terminal, or more specifically, the microprocessor 602 of the set top terminal, which receives an input from the remote control. A POSITA would have understood that when a user of the set top terminal uses the remote control to manage a video call by pressing the hang up button, the microprocessor of the set top terminal receives an input for stopping the video call.

148. Based on the collective descriptions from these above citations from *Asmussen*, it is my opinion *Asmussen* teaches or otherwise renders obvious that upon the microprocessor receiving input to hang up, the microprocessor would cease outputting video signals and stop the camera. The expected, common-sense, and most desirable result of pressing the “hang up” button on the remote would be the termination of the current videophone call and the stopping of the output of video

signals to the network. Figure 30 shows that the microprocessor is connected to the synchronizer/multiplexer and capable of controlling this piece of hardware. The synchronizer/multiplexer is what receives the encoded video signals from the camera and passes them on to the encrypter for transmission out of the set top terminal. *Asmussen*, 50:18-40. Therefore, it would have been obvious that the microprocessor would command the synchronizer/multiplexer to cease output of the multiplexed video signal upon the user commanding the set top terminal to hang up the video call, thereby stopping output of the video signal (i.e., the third digital information).

149. It also would have been obvious that once the output of the video signal from the set top terminal had ceased, it would no longer be necessary for the camera to remain active. Deactivating the camera would ensure the privacy of the user, reduce the total power consumed by the set top terminal, and reduce the processing load on the microprocessor. Just as in a conventional, non-video phone call where the user hangs up the phone (either by replacing the handpiece of the phone on the cradle or pressing a hang up button), and hanging up the phone terminates the transmission of data to the called party, hanging up a videophone call would also terminate the transmission of data to the called party. In a videophone call, this termination of transmission of data would include both terminating audio and video transmissions. If video transmission is terminated, it is a natural, common-sense, and



expected results that the camera output is stopped. There would be no practical reason to continue operating the camera once the videophone call is stopped.

***b) Bear Teaches Claim 1(g)***

150. It is my opinion that *Bear* also teaches the limitations recited in Claim 1(g). *Bear* like *Asmussen* teaches that the user can provide the input of hanging up:

When the call is over, the system may be configured such that ***the user may hang up by pressing the camera button, which will terminate the call and turn off the camera indicator light.***

*Bear*, 6:50-53 (emphasis added); see also *id.* at 7:50-56 (describing that when indicator light 306 is unlit the camera is off). *Bear* explicitly teaches that in response to input from a user (i.e., pressing the camera button) for hanging up, the processor terminates the video call, and turns the camera off. Specifically, hanging up the videophone call both terminates the call and turns the camera indicator light off, and because the camera is stopped with then camera indicator light is off (7:50-56), *Bear* teaches that hanging up the call by pressing the camera button (the claimed “receives an input for stopping the videophone call) results in stopping the camera.

151. Additionally, if the camera has stopped, then the output of video signals (i.e., the claimed third digital information) to the called party also naturally stops. That is, if there are no video signals being captured by the camera, then there are no

video signals to output to the called party, at least because the camera is off and no longer generating video signals.

152. Even though stopping output of the camera's video signals to the called party is a natural and expected result of stopping the camera, *Bear* also explicitly teaches such. *Bear* teaches that “while the system is in the ... Capturing 904 state” the system will transition to a “Stopped 902 state” if a stop event occurs. *Bear*, 11:19-22, Fig. 9. A “stop event” is generated by pressing the stop button located within the transport controls. *Bear*, 11:28-31, Fig. 7. *Bear* teaches that “[W]hile in the Stopped 902 state, ***the system ceases video capture.***” *Bear*, 11:31-32 (emphasis added). Thus, *Bear* also explicitly teaches that upon the pressing of the “stop” button, the system would stop capturing video—and therefore, outputting video—at least because *Bear* expressly teaches that upon pressing the stop button, the system will enter into a stopped state and cease video capture.

*c) Motivation to Combine Asmussen and Bear for Claim 1(g)*

153. It would have been obvious to combine *Bear*'s teachings of terminating a video call and turning off the camera due to a user pressing a button into *Asmussen*'s set top terminal when the “hang up” button is pressed. Modification of *Asmussen*'s processor to stop outputting video signals and turning off the camera in response to the pressing of the “hang up” button on the remote control would improve *Asmussen*'s set top terminal's functionality in the same way as *Bear*. A

POSITA would have understood that the modification of *Asmussen's* set top terminal to stop output of the video signal from the camera upon a user pressing the “hang up” button would free up system resources by eliminating the need to store or process video signals that were no longer being transmitted out to other communication apparatus. A POSITA would have also recognized that because these communication apparatuses are being used in a user’s home, that the user would expect a certain level of privacy, such as the camera not remaining active and broadcasting out a live video feed. A POSITA would have understood that *Bear* is an example of the common-sense knowledge that a camera is turned off when a video call ends. There would have been a reasonable expectation of success in the proposed combination because it would entail simple programming techniques well known to the skilled person. *Asmussen* also already includes the necessary hardware (computing system embodied in the set top terminal, remote control, and camera) for receiving the user input and instructing the camera to stop and stopping output of the camera’s signals. *See generally, Asmussen*, Fig. 30 (illustrating remote control, microprocessor 602, and camera in communication with each other). Programming the *Asmussen* system to stop the camera and stop output of the camera’s signals would be easily accomplished and predictable.

9. ***Claim 8(d): “upon receiving an inbound videophone call notice while playing the first digital information ... receiving second digital information from the another communication apparatus via the network interface”***

154. I have been asked to opine as to whether the microprocessor 602 in *Asmussen* teaches the step recited in limitation 8(d) of receiving second digital information. In my opinion, *Asmussen* teaches the microprocessor 602 receives the videocall information (i.e., the “second digital information”) in response to receiving an inbound videophone call notice while playing the first digital information. Specifically, *Asmussen* teaches the microprocessor supports the video calling functionality, which indicates to me that *Asmussen*’s microprocessor 602 performs the step of receiving the second digital information, as claimed. *Asmussen*, 15:24-30, 26:60-63.

155. *Asmussen* teaches both “communications events” and “triggering events” that are related. *Asmussen* further teaches that certain events occur responsive to a communication or triggering event:

An apparatus and method consistent with the present invention provides for automatically pausing of a video program in response to detection of an occurrence of a communications event or related triggering event. The term ***“communications event” includes any communication of information through any wireline or wireless medium***, examples of which are provided below. The term ***“triggering event” includes a user's access to a communications event***, examples

of which are provided below. During the pausing, the video program is buffered such that a user may replay portions of it and perform other VCR-type functions of the program. In addition, the apparatus and method ***provide an indication of the communications event to the user by displaying, for example, text or graphics on a video display for the video program.*** For example, ***based upon detection of an incoming telephone call, the apparatus pauses the video program and displays an indication of the call overlayed*** on the paused video program or inset within it. This feature thus permits a user to automatically obtain an indication of a particular event while, at the same time, having the video program buffered such that portions of it are not missed, which is particularly useful for "live" video programs.

*Asmussen*, 43:18-40. Therefore, *Asmussen* teaches receiving an indication of a communications event, which includes an incoming video call, and the indication may be received while playing the video program. *Asmussen*, 43:18-40 (discussing detecting an inbound videophone call and pausing the video program and displaying an indication of the call), 44:9-19, 47:26-29. The *Asmussen* system then waits for user input, and once the user input is received, determines if the user input is a "triggering event." *Asmussen*, 47:26-51. *Asmussen* describes multiple types of triggering events, including expressly teaching that a triggering event is a user answering a call. *Id.* Therefore, when a user answers a call, a triggering event occurs in *Asmussen*. *Asmussen* thus teaches upon receiving an inbound videophone call notice while displaying the video program information (43:33-36), the user answers

the videophone call and the set top terminal begins receiving video information from the calling party, i.e., the claimed “second digital information.”

**VIII. OPINIONS REGARDING GROUND 2: THE COMBINATION OF  
*ASMUSSEN, BEAR, AND MARLEY***

**A. Claim 1(c)**

***“a display configured to display at least the first and the second digital information; and”***

156. I note that the '991 Patent does not expressly require in claim 1(c) that the display along with all the other components found in the communication apparatus to be combined together into a single housing. I have been asked, however, to opine as to whether *Marley* teaches such.

157. *Marley* expressly teaches a set top terminal with video telephony functions as being integrated into a TV or monitor to for a single physical unit.

Furthermore, although the particular described embodiments used the term “video telephone set-top box”, ***it is well understood that in the art that set-top box features and functionality can be integrated into a TV or monitor, so that no separate physical box is needed. The features and functionality disclosed herein may also integrated into a TV and/or monitor in a similar fashion so that there need not be a separate physical set-top box.***

*Marley*, ¶ [0029] (emphasis added). *Marley* explicitly teaches the “video telephone functionality” is incorporated “into existing cable television set-top box/Digital Video Recorder (“DVR”) technology.” *Marley*, ¶ [0005], *see also id.* at ¶ [0015]

(describing that video processing capabilities specifically used for controlling/managing video telephone functions is incorporated into the set-top box). *Marley* also teaches that the set-top box is connected to a “camera 104 and microphone 106” and is also connected to other set-top boxes “via a cable television infrastructure” to other residential locations. *Marley*, ¶ [0016], Fig. 1, Fig. 2, *see also id.* at ¶ [0029] (describing that the camera and microphone can be integrated into the set-top box). Therefore, *Marley* teaches a set-top box with incorporated video telephone functionality integrated into a TV/monitor so that they are combined into a single unit.

158. It would have been obvious to modify *Asmussen’s* set top terminal and TV/display into a single television unit to improve *Asmussen’s* system in the same way as taught by *Marley*. *Marley* provides express teachings that combining these components reduces the total number of components that would be present at a user’s residence. *Marley*, ¶ [0029]. Furthermore, *Marley* teaches that consumers had still not widely accepted videophones due to the fact that “present videophone systems require[ed] consumers to purchase some additional appliance.” *Marley*, ¶ [0003]. A POSITA would have understood that the modification of *Asmussen’s* set top terminal and TV/display into a single user component, such as a television, would provide the benefit of a single user appliance. A POSITA would have also recognized since these communication apparatuses are being used in a user’s home,

that the user would more readily accept a TV with a video phone enabled set-top box integrated into it, since the user would already be familiar with television sets. Additionally, a combination set top receiver and TV would have utilized a telecommunications infrastructure (i.e., cable television network) that a consumer is more than likely to already be using, given how common set top boxes were at the time of the '991 Patent.

**B. Claim 2**

***“The communication apparatus according to claim 1, wherein after the videophone call is finished, the processor restarts the displaying of the first digital information.”***

159. As discussed above for Ground 2, claim 1(c), *Marley* teaches a set-top box with integrated video telephone functionality. *Marley* teaches that the set-top box is connected to other set-top boxes via a cable television network. *Marley*, ¶ [0016]. *Marley* also teaches that each set-top box contains a primary audio/video processor (“PAVP”) processor that “pause[s] any programming presently being viewed on the monitor” when an incoming video telephone call is accepted by a user and stores the paused programming in “DVR memory 116 for viewing after the termination of the video call.” *Marley*, ¶ [0022].

160. *Marley* expressly teaches that either user participating in a video call can terminate the video call by “actuating a button on their remote control,” and that upon this termination the respective primary audio/video processor (“PAVP”) will



“restore normal television viewing, thereby allowing the calling and called parties to *resume real time program viewing, or recall the paused programming from DVR memory (116, 316) for viewing (519).*” *Marley*, ¶ [0022] (emphasis added). Processing step (519) is also shown in Fig. 5, which is a “flow chart diagram of the steps for accepting a video telephone call in real time employing a preferred embodiment of the invention.” *Id.* at ¶ [0011]. Thus, *Marley* teaches the processor restarts displaying of the first digital information after the videocall is finished, as claimed.

161. It would have been obvious to modify *Asmussen*’s processor using *Marley*’s teachings of the processor receiving a user’s input from a remote control for terminating a video call, and in response to such termination, the processor recalling the paused programming from memory and resuming real time program viewing. *Marley* teaches its processor receives user input via a remote to end a video call and as a result, the processor resumes real time program viewing, indicating that there would be a reasonable expectation of success combining *Marley*’s system with the *Asmussen*’s processor, which receives user input via a remote to manage a video call. A modification of this type would only require programming an additional response to user’s command to terminate the call. Such a modification of *Asmussen*’s processor in this way would reduce the steps a user would need to perform in order to resume the program that was paused in response to the incoming video call.

162. Further, *Asmussen* states the basic video call functionality can be “provided as one or more upgrades to a more basic set top terminal.” *Asmussen*, 49:42-48. *Asmussen* also identifies “existing set top converter boxes such as those made by Scientific Atlanta or General Instruments.” *Asmussen*, 17:4-9, 24:21-27. A POSITA would have found it obvious to investigate the specifications and limitations of these existing converter boxes, and they would have found that the boxes made by the disclosed manufacturers only paused live television for approximately 1 hour, and warned their customers that there could be potential damage to their screens if the same image is displayed for extended periods of time (referred to as “ghosting”). See Explorer® Digital Video Recorder - Users Guide (Ex. 1016), at p. 6, 13). Therefore a POSITA would have understood that *Marley’s* restarting of the paused video program addressed known problems and limitations within currently used products.

### C. Claim 3

***“The communication apparatus according to claim 2, further comprising a microphone configured to generate audio information which is included in the third digital information.”***

163. *Asmussen* explicitly teaches that the set top terminal 220 (i.e., one component of the communication apparatus) is equipped with a microphone 2002. *Asmussen*, Abstract. *Asmussen* also teaches that to support video calling the instructions also enable the microprocessor 602 to “process audio signals from a

microphone.” *Id.* at 15:27-29. Further, *Asmussen* teaches that “in regards to transmission, the audio signal sensed by the speaker/microphone 2002 is converted to digital form and compressed.” *Asmussen*, 55:57-60; *see also id.* at 50:18-40, Fig. 30 (describing the audio signal from the speaker/microphone is subject to encoding before being multiplexed with video signals and the resulting signal is then encrypted and transmitted out into a video conferencing network as part of a video call). Thus, it is my opinion that *Asmussen* teaches a microphone configured to generate audio information which is included in a video conferencing signal (i.e., third digital information) that is transmitted out another communication apparatuses participating in a video call.

#### **D. Claim 4**

***“The communication apparatus according to claim 3, wherein when the processor receives the inbound videophone call notice while displaying the first digital information on the display, the processor switches a function of processing video information of the first digital information to a function of processing video information of the second digital information of the videophone call.”***

164. As discussed above regarding limitation 1(e), *Asmussen* teaches the set top terminal (i.e., a component of the communication apparatus) is capable of detecting an incoming video call (i.e., inbound videophone call notice) while displaying a video program (i.e., first digital information) and will automatically pause the displaying of the video program. *Asmussen* teaches that “[a]fter displaying an indication of the communications event, the system waits for user input (step

1457).” *Asmussen*, 47:36-38, Fig. 28. *Asmussen* also teaches that the “remote control unit 900 preferably includes a call answer button (not shown) and a call hang up button (not shown).” *Asmussen*, 31:39-41. If the user answers the call the system will then “determine if it is a triggering event which is a user’s access to a communications event.” *Asmussen* 47:39-41, *see also* Fig. 28 (step 1458), 43:22-27 (describing the terms “triggering event” as being a user’s access to a communications event and the term “communications event” as being any communication of information through a network).

165. *Asmussen* teaches that once the call is accepted the set top terminal will receive an “incoming (i.e., downstream) video conferencing signal” (i.e. the video conferencing signal from the calling party), process said signal, and “output for display on display device 602, which is typically the television 222” video signals, and “output for playing on the speaker/microphone 2002, the speaker portion of which may be the speaker(s) of the television 222” audio signals. *Asmussen*, 50:44-54, *see also* ¶¶ 100-103, above (where I opine that the received incoming video conferencing signal is the claimed “second digital information”).

166. Additionally, *Asmussen* teaches that instructions (which contain programs) are stored in the “memory of the set top terminal 220” and that these programs are what perform “call establishment and management.” *Asmussen*, 50:11-13, *see also id.* at 15:11-13 (describing that the microprocessor 602 is what executes

the “program instructions stored in memory”). Therefore, *Asmussen* teaches the microprocessor 602 switches from processing the video program (i.e., first digital information) to processing the video call information (i.e., second digital information) due to receiving a communications event (i.e., inbound videophone call notice).

167. I have been asked to consider any disclosure in the '991 Patent indicating that a called user answers a videocall before the called user's receiver begins processing videocall information from the calling party (i.e., the second digital information claimed in the '991 Patent). The '991 Patent does include disclosure of such an embodiment. The '991 Patent describes an embodiment where a communication apparatus 1 (the calling party) is performing the operation of calling another communication apparatus 1' (i.e., the called party or the claimed “communication apparatus”). After the first communication apparatus 1 (i.e., the calling party) calls the second communication apparatus 1' (i.e., the called party), the '991 Patent describes the following occurs:

***Upon receipt of a reply from the other-side videophone function-added TV receiver 1' at the network I/F 15 via the network 6, such as the Internet, the processor 12 switches the 60 operation mode of the decoder 11 to a state capable of executing the videophone-use decode function and then causes such operation to start. Whereby, a video telephone signal from the self-side apparatus (i.e., videophone***

*function-added TV receiver 1), which signal is output from the encoder 18, is sent from the network I/F 15 via the network 6 to the other-side videophone function-added TV receiver 1' whereas a videophone signal from the other-side videophone function-added TV receiver 1' is received by the network I/F 15 via network 6 and decoded by the decoder 11, resulting in a video signal being supplied to the display panel 8 and an audio signal being fed to the speakers 3. In this way, videophone telecommunication is performed between the self-apparatus (i.e., videophone function-added TV receiver 1) and the other-side videophone function-added TV receiver 1' (at item #5).*

'991 Patent, 15:49–16:9. I understand from this description in the '991 Patent that the videophone function-added TV receiver 1 (i.e., the calling party) first sends the call notice and only begins outputting a videophone call signal (i.e., the claimed “second digital information”) **after** receiving a reply from the videophone function-added TV receiver 1' (i.e., the called party). Because the calling party does not even begin sending videocall information (the second digital information) until the called party answers the call, then the called party does not begin a function of processing video information of the second digital information until the called party has answered the call.

**E. Claim 5**

***“The communication apparatus according to claim 4, wherein when the processor receives an input for making an outbound videophone call to the another communication apparatus, the processor renders the camera and microphone operative and displays information indicating the outbound videophone call on the display calling message.”***

***1. Marley’s Teachings Regarding Claim 5***

168. *Marley* teaches the processor receives an input for making an outbound videophone call, renders the camera/microphone operative, and displays information indicating the outbound videophone call. *Marley* teaches that the user of the set-top box “initiate[s] a video call to a called party at residential location 202 by effecting a ‘dial’ command using remote control 124.” *Marley*, ¶ [0018]. After actuating the “dial” command, the user may then either manually enter a called party’s telephone number or select the called party’s telephone number from a “phone book” stored in memory and displayed on the display. *Id.* After the called party’s telephone number has been entered or selected from the phone book, the primary audio/video processor (PAVP) sends a request to the called party’s set-top box to connect. *Marley*, ¶ [0019].

169. In more detail, *Marley* teaches that the PAVP and the video telephone processor (VTP) work together to perform the above-discussed functionality. Specifically, *Marley* teaches:

***In response to the “dial” command, PAVP 108 would also communicate with VTP 102 to activate camera 104 and microphone***

*106*, and provide for the encoding of the audio from microphone 106 and images from camera 104 to a format compatible with PAVP 108 (407). *VTP 102, in conjunction with PAVP 108, would also provide a real time image of camera 104's output on a portion of monitor 120 for viewing by the calling party* (409). This type of self-image" feedback is a feature presently found on commercially available video telephones, letting the calling party see the image being transmitted to the called party.

*Marley*, ¶ [0019] (emphasis added). From this disclosure, I understand that *Marley* teaches that the PAVP receives input for making an outbound videophone call, and as a direct result of this input: (1) retrieves the "phone book" from memory and displays it on a portion of the screen, (2) the PAVP along with the VTP activates the camera and microphone (i.e., the claimed "processor renders the camera and microphone operative"), and (3) the PAVP and the VTP provides a real time image from the now operative camera on a portion of the display (i.e., the claimed "displays information indicating the outbound videophone call on the display calling message"). Specifically, activation of the camera and microphone is in response to an input received from the user, namely the "dial" command, for making an outbound videophone call, i.e., the set top terminal 100 at residential location 202). Therefore, *Marley* teaches the claimed "processor renders the camera and microphone operative," at least because *Marley* teaches that the PAVP communicates with the VTP to activate the camera/microphone as a direct response to the "dial" command.



170. In my opinion, the *Marley* primary audio/video *processor* performs the steps of receiving the input and rendering the camera and microphone operative. In particular, *Marley* expressly teaches the processors working “in conjunction” to provide the real time image at the calling party’s monitor. *Marley*, ¶ [0019]. *Marley* teaches the PAVP performs audio and video processing and the PAVP is linked to VTP. *Id.* Therefore, the PAVP instructs operation of the camera and microphone via an instruction to the VTP. It also would have been obvious for the PAVP to directly render operative the camera and microphone or for the PAVP to comprise multiple sub-processors, including the VTP. *Marley* teaches the PAVP processor “may include multiple sub-processors and related systems, well-known in the art, to perform the listed operations.” *Marley*, ¶ [0015]. Therefore, the *processors* perform the control of the camera and microphone.

171. Regarding the claimed processor “displays information indicating the outbound videophone call on the display calling message,” it is my opinion *Marley* teaches the processor displaying two items of information that satisfy the “information indicating the outbound videophone call.” *Marley* teaches in response to a dial button, the processor performs two operations: (1) “***provide[s] a real time image of camera 104’s output on a portion of the monitor 120***”; and (2) retrieves a previously stored “***phone book***” from “***DVR memory 116***” and displays it on “***a portion of monitor 120***.” *Marley*, ¶¶ [0019], [0018]. The calling party is thus

provided with a real time image of what is “being transmitted to the called party.” *Marley*, ¶ [0019]. Additionally, the calling party can either manually enter the called party’s number or select the called party from the phone book retrieved from DVR memory, as I discussed above. Either of these items of information satisfy the information indicating the outbound videophone call, as I discuss in more detail below.

172. Before I discuss *Marley*’s teachings, I note that the ’991 Patent does not describe a format or structure for the claimed information indicating the outbound videophone call on the “display calling message.” *See generally*, ’991 Patent, 15:40-57, Fig. 5. Thus, in my opinion, any information displayed on the display that indicates the outbound videophone call would satisfy the claimed “information indicating the outbound videophone call on the display calling message.”

173. As I previously stated, *Marley* teaches that in response to the “dial” command, the “phone book” is retrieved from memory and displayed on a portion of the screen, and the PAVP in conjunction with the VTP provides a real time image from the camera on a portion of the screen. With respect to the “phone book,” *Marley* teaches that the calling party can “select the called party” from the displayed phone book. *Marley*, ¶ [0018]. Because the phone book is displayed to enable the user to select the phone number, this indicates that the selected number of the called party is displayed on the screen. And, in my opinion, the displayed phone number satisfies

the claimed “information that indicates the outbound videophone call,” at least because it is the selected number of the party being called.

174. With respect to the real time image, *Marley* teaches that the VTP in conjunction with the PAVP provide the real time image (i.e., the output of the camera) on a “portion of the monitor 120 for viewing by the calling party.” *Marley*, ¶ [0019]. *Marley* further teaches that this real time image being displayed allows the calling party to “see the image being transmitted to the called party.” *Id.* The displayed real time image meets the ’991 Patent’s claimed information that indicates the outbound videophone call, at least because it is the image that is being transmitted to the party being called.

175. In my opinion, it would have been obvious to modify *Asmussen*’s processor using *Marley*’s teachings of the processor receiving a single user input from a remote control for making an outbound a video call (i.e., the “dial” command), and in response to said input the processor rendering the camera and microphone active. Additionally, since *Asmussen* teaches that the user can optionally set “the default state of the video camera 2000 (on or off),” a POSITA would have expected a single user input (like that of a dial command) to render both the camera and microphone operative if the default state for the camera had been previously set to “on.” *Asmussen*, 21:34-42. Thus, it would have been obvious to that in response

to the “dial” command of *Marley*, that both the camera and microphone are rendered operative when the default state of *Asmussen*’s camera had been set to “on.”

176. Additionally, it would have been obvious to modify *Asmussen*’s processor to display information indicating the outbound videophone call. *Asmussen*’s set top terminal already contains the necessary components for displaying the called party’s telephone number as taught by *Marley*. *Asmussen*’s set top terminal’s memory contains a list of telephone numbers for the purpose of caller ID, and the processor can cross reference telephone numbers with a “list of names, other textual data, or graphics,” for the purpose of displaying “the corresponding text or graphics ... on the television screen,” thereby providing a caller ID. *Asmussen*, 39:18-32. *Asmussen*’s set top terminal also has the “hardware components necessary to produce a picture-on-picture capability” for the simultaneous displaying of different data on the screen *Asmussen*, 33:53-59. Employing *Marley*’s disclosed functionality would provide for an improved method of allowing the user of *Asmussen*’s set top terminal to select from a list of stored numbers, a number to perform a video call with, and press a single button on the remote to initiate said video call. Such functionality would be an obvious addition to *Asmussen*’s set top terminal, allowing a user to quickly select and initiate a video call without needing to recall a number from memory and reduce the number of buttons that a user would push to initiate such a call.

177. It also would have been obvious to modify *Asmussen*'s set top terminal to display the calling party's video on the calling party's display, as *Marley* explicitly teaches that the displaying of the real time image (e.g., the "self-image" feedback) was a well-known technique that provided the benefit of allowing a user to "see the image being transmitted to the called party." *Marley* ¶ [0019]. Both *Asmussen* and *Marley* are directed to videophone calls, so display of videocall information of the calling party in response to the user dialing the called party is a natural addition to provide the self-image feedback during the videophone call.

178. Success would have been reasonably expected for the combination of *Marley*'s and *Asmussen*'s system for both features (displaying phone numbers or displaying the called party's video), at least because each of *Marley* and *Asmussen* teaches systems for performing video calls and rendering the camera and microphone operative along with displaying the outbound videophone call information. The modification would have only required simple programming to instruct the camera/microphone to activate, begin capturing information, and then display the outbound information in response to a user initiating a video call.

**F. Claim 12**

***“The method according to claim 11, further comprising the steps of: upon receiving an input for making an outbound videophone call to the another communication apparatus, rendering the camera and microphone operative; and displaying information indicating the outbound videophone call on the display at the same time.”***

179. Counsel has informed me that claim 12 depends, indirectly, from claim 8 and that claim 12 recites the same limitations as claim 5, with the addition of one requirement. Claim 12 contains the additional requirement that the camera and microphone be rendered operative and the information indicating the outbound videophone call be displayed ***“at the same time.”*** (emphasis added). As I have discussed above for claim 5, *Marley* explicitly teaches receiving a user input via the remote control (i.e., the “dial” command), which causes the set top terminal to execute the processes of retrieving and displaying a “phone book,” activating the camera and microphone, and displaying the real time image (i.e., the “self-image” feedback). See ¶¶ 168-174. I particularly note that *Marley* teaches the camera and microphone are rendered operative and the self-image feedback of displaying the calling party’s video are performed at the same time. *Marley* teaches:

***In response to the "dial" command, PAVP 108 would also communicate with VTP 102 to activate camera 104 and microphone 106, and provide for the encoding of the audio from microphone 106 and images from camera 104 to a format compatible with PAVP 108 (407). VTP 102, in conjunction with PAVP 108, would also provide a***

*real time image of camera 104's output on a portion of monitor 120 for viewing by the calling party (409).* This type of "self-image" feedback is a feature presently found on commercially available video telephones, letting the calling party see the image being transmitted to the called party.

*Marley*, [0019]. *Marley* teaches both of these functions (rendering camera operative and displaying the real time image) occur in response to the 'dial' command. At Fig. 4 of *Marley*, step 407 of activating calling location camera and microphone is performed, and at step 409, the display of the self-image of calling party at the calling location is performed. Therefore, both steps are performed "at the same time" because the video captured from the operative camera and microphone is being displayed.

180. I have also been asked to consider whether *Marley* teaches or renders obvious the steps of activating the camera/microphone and displaying the real-time, self-image feedback *begin* at the same time. In my opinion, these functions would begin at the same time because they would initiate substantially simultaneously. As soon as the camera is activated, the system begins displaying the captured video on the calling party's display. There is nothing in *Marley* that indicates the system waits to display the calling party's video after the camera is activated. Indeed, *Marley* indicates the desire to activate the camera and display the self-image, real-time

feedback substantially simultaneously in stating that in response to the dial command, the PAVP “would also communicate with VTP 102 to activate camera 104 and microphone 106, and provide for the encoding of the audio from microphone 106 and images from camera 104.” *Id.* This sentence in *Marley* stating both events happen in response to the dial command indicates the events happen at the same time. For example, *Marley* does not state the camera is activated *and then* encoding and display begin, but rather that the camera is activated to provide for encoding and displaying. Moreover, step 411 of Fig. 4 states that upon connection to the called party, transmit calling party image and audio. Therefore, *Marley* expressly envisions capturing the calling party’s video *prior to* connection with the called party, further indicating that the calling party’s video is displayed at the same time the camera is rendered operative and encoding of the audio-video data begins. Because *Marley* expressly teaches that “in response” to the “dial command,” the camera/microphone are activated and the real time image is displayed, it is my opinion these events occur “at the same time,” as claimed. *Marley*, ¶ [0019].

181. It also would have been obvious for the set top terminal of *Marley* to be programmed to perform the steps of activating the camera and displaying the real-time, self-image feedback at the same time because *Marley* expressly teaches that they occur after the set top terminal receives the “dial” command. As soon as the camera is rendered operative, it would have been obvious to also show the calling



party's video on the calling party's display, as taught by *Marley*. It would not make sense for a user to initiate a video call by "effecting a "dial" command using [the] remote control" and then have the set top terminal delay encoding and display of the video signal. If the purpose of displaying the self-image feedback is to display in real time, per *Marley*, ¶ [0019], then it would be obvious to display the self-image feedback at the same time as the camera is rendered operative. Otherwise, there is a situation where the calling party does not see their image but the receiving party does. This would be counter to *Marley*'s expressed desire to "let[] the calling party see the image being transmitted to the called party." *Id.* Thus, to have the steps of rendering the camera and microphone operative and displaying the calling party's image at the same time is not only practical and common sense, but removes any unnecessary delay that may adversely affect the calling party's experience with the video call system.

## **IX. OPINIONS REGARDING GROUND 3: THE COMBINATION OF *ASMUSSEN*, *BEAR*, *MARLEY* AND *DEFAZIO***

### **A. Claim 5**

***"The communication apparatus according to claim 4, wherein when the processor receives an input for making an outbound videophone call to the another communication apparatus, the processor renders the camera and microphone operative and displays information indicating the outbound videophone call on the display calling message."***

182. I discussed in Section VIII my opinion that *Marley* teaches the limitations of claim 5. It is also my opinion the combination of *Marley* and *DeFazio*

teaches the limitations of claim 5. As I discussed above for *Marley*, *Marley* teaches the claimed processor receiving input for making an outbound video call and rendering the camera/microphone operative. *DeFazio* teaches displaying information indicating the outbound videophone call on the display.

183. *DeFazio* generally relates to a system that provides caller identification information. *DeFazio* (Ex. 1007), Abstract. *DeFazio* teaches a database containing names and their associated address data and efficiently translating a telephone address into a name and displaying the name on a display for both incoming and outgoing calls. *DeFazio* teaches that the “database provides an efficient and cost-effective database that translates the calling party’s telephone number to the name of the person listed as the subscriber to that telephone number.” *DeFazio*, 1:57-61. *DeFazio* also teaches that the database “performs a translation from a telephone number or Internet address to a name and forwards fro [for] display on display 4a.” *DeFazio* 3:42-45. (It should be noted here that the word “fro” is misspelled and that I am interpreting it to be the word “for.”). Additionally, *DeFazio* teaches “the principles of the invention may be extended to provide name entries for telecommunications related services, such as Internet services, *television/video conferencing services* and the like.” *DeFazio*, 7:67-8:3

184. *DeFazio* also explicitly teaches that “[o]n an outgoing call, displaying the name of a called party at subscriber display 4a provides feedback that the

*subscriber dialed the correct telephone number by providing the called party's name* (which can supplement a display dialed number arrangement).” *DeFazio*, 5:10-15 (emphasis added). Thus, from this disclosure a POSITA would have understood that *DeFazio* teaches displaying information indicating the outbound videophone call on the display calling message, at least because *DeFazio* teaches displaying on display 4a the name of the called party for an outgoing call.

185. Further, it would have been obvious to combine the express teachings of *DeFazio* regarding the correlation of a telephone number to a name and the displaying of that name on a display for an outgoing call into the set top terminal of *Asmussen*. *Asmussen* already teaches that its system contains a list of telephone numbers and their associated names and that the processor is capable of correlating a telephone number with a name and displaying the name on a television screen for the purpose of performing caller identification. *Asmussen*, 39:18-32. Thus, modification of *Asmussen's* displaying of a name on the television screen as taught by *DeFazio* would only require routine programming and be easily implementable. Also, application of *DeFazio's* known technique of displaying the called party's name on the display would have improved *Asmussen's* set top terminal in the same way by allowing the user to see if they had dialed the correct number. Notably, *Asmussen's* set top terminal and display is a television/video conferencing system that already contains all the elements needed to perform the functionality taught by

*DeFazio*, indicating that there would be a reasonable expectation of success combining *Asmussen*'s system with the displaying of a called party's name as taught by *DeFazio*.

**B. Claim 12**

186. With respect to claim 12's added requirement that the steps be performed "at the same time," the combination of *Marley* and *DeFazio* also teaches this or otherwise renders obvious. Because the called party's information is displayed on an outgoing call, per *DeFazio*, then when combined with *Marley*, the called party name will continue to be displayed with the activation of the camera and microphone, as taught by *Marley*. That is, in the proposed combination, *Marley*'s system will receive the dial command and activate the camera/microphone (per *Marley*, ¶ [0019]) and will also display the called party's number "on an outgoing call."

187. Alternatively, it would have been obvious to display the called party's number at the same time as rendering the camera/microphone operative so that the calling party can see on the display all feedback associated with the outgoing call (e.g., self-image video and called party information). *Marley* recognizes the desire for the calling party to see on their display information regarding the outgoing call, so it would be an obvious extension to also include the name of the called party, which *DeFazio* indicates is desirable. This would be particularly helpful in situations

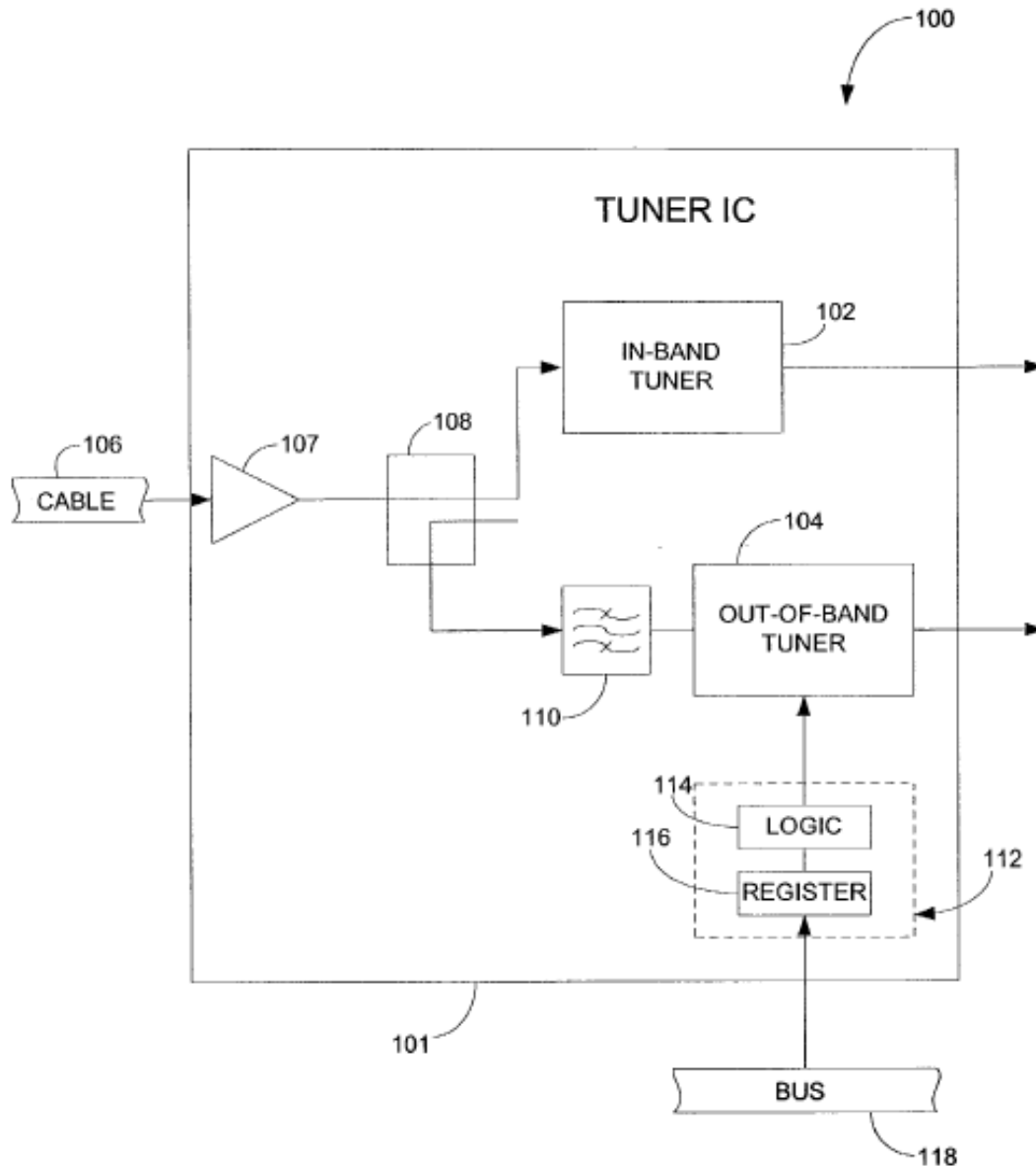
where the calling party calls numerous individuals or there is a videoconference occurring with multiple parties on the call.

**X. OPINIONS REGARDING GROUND 4: THE COMBINATION OF  
*ASMUSSEN, LINDSTROM, AND BEAR***

***Claim 1(a): “a network interface configured to receive first digital information which is received from a contents server which is coupled to the communication apparatus via the network interface and second digital information from the another communication apparatus;”***

188. As I discussed above with respect to claim 1(a), the '991 Patent is generic in its description of the term “network interface,” and describes the term with respect to its function rather than a specific structure or type of hardware. I have been asked to opine as to *Lindstrom*'s teachings of the claimed “network interface.” *Lindstrom* teaches a cable television set top box that includes an out-of-band tuner 104 capable of receiving both video-on-demand and videophone signals. *Lindstrom*, ¶¶ [0006], [0003]. While *Lindstrom* includes an in-band tuner 102 for the reception of broadcast television programming, my following discussion is focused on the out-of-band tuner 104.

189. Figure 1 shown below depicts the “[T]uner integrated circuit (IC) 100” as being “integrated on a single semiconductor chip 101 and comprises an in-band (IB) tuner 102 and an out-of-band (OOB) tuner 104.” *Lindstrom*, ¶ [0015].



**Figure 1**

*Lindstrom*, Fig. 1. *Lindstrom* teaches that “**RF signals received over input cable line 106 are provided to both in-band tuner 102 and out-of-band tuner 104**” using the signal divider 108. *Lindstrom*, ¶ [0018] (emphasis added); see also *id.* at ¶ [0005]

(describing the signal divider divides the received RF signal either symmetrically or asymmetrically to both tuners).

The out-of-band channels received by tuner 104 are typically located in the 70-130 MHz frequency range and within that range, each channel occupies a relatively narrower frequency band of 3 MHz or less.

***Examples of the types of signals that may be carried on the out-of-band channels received by tuner 104 include***, but are not limited to, Internet data, ***video-on-demand*** and pay-per-view programming, interactive programming guides, interactive games and ***IP telephone and videophone signals***.

*Lindstrom*, ¶ [0017] (emphasis added). Furthermore, *Lindstrom* teaches that the out-of-band tuner 104 “is used to receive data and digital content,” and goes on to further define the digital content as including “programming guides, video-on-demand and pay-per-view programming, Internet data and so on.” *Lindstrom*, ¶ [0003]. Thus, *Lindstrom* expressly teaches a set top box that contains an integrated circuit that further contains within it a single out-of-band tuner that receives from a cable television line RF signals. Furthermore, the cable television RF signals received by the out-of-band tuner include ***both*** digital video-on-demand and videophone signals because *Lindstrom* teaches that both of those digital signals are carried on the out-of-band channels received by the out-of-band tuner 104. *Lindstrom*, ¶ [0017]. Video-on-demand signals would satisfy the claimed “first digital information,” and incoming videophone signals would satisfy “second digital information.” Therefore,

*Lindstrom* teaches a single network interface (i.e., the out-of-band tuner 104) that receives both the first and second digital information as claimed.

190. It would have been obvious to modify *Asmussen* to include the out-of-band tuner of *Lindstrom*. Given the extensive discussion in *Asmussen* of various upgrades to the existing set top terminal based on desired functionality, along with the various options for receivers for receiving the video program and videocall information, it is my opinion the skilled person would readily understand how to configure *Asmussen* with the *Lindstrom* tuner and would otherwise find it obvious to add the *Lindstrom* out-of-band tuner 104 for the reasons described in *Lindstrom*.

191. One obvious and predictable configuration for modifying *Asmussen* would have been to substitute *Asmussen*'s tuner 603 and receiver 750 with that of *Lindstrom*'s integrated circuit 100. The integrated circuit 100 includes both the in-band tuner 102 and out-of-band tuner 104. The *Lindstrom* in-band tuner 102 would replace the functionality of *Asmussen*'s tuner 603 of receiving cable signals in a first channel or bandwidth. See *Asmussen*, 26:1-11; *Lindstrom*, ¶ [0016]. *Lindstrom*'s out-of-band tuner 104 would replace the functionality of *Asmussen*'s receiver 750 to receive both video program and videophone information (in a second channel or bandwidth). See *Lindstrom*, ¶¶ [0015-0017]; see also *Asmussen*, 26:24-29 (discussing tuning the tuner 603 to the proper frequency of the channel or program desired). As expressly stated by *Lindstrom*, “[c]ost advantages could be obtained by



combining the in-band and out-of-band tuner functionality on a single integrated chip.” *Lindstrom*, ¶ [0004].

192. The proposed modification would also achieve power saving functionality described in *Lindstrom*. *Lindstrom* teaches that “[t]he incoming signal may be continuously monitored, so that ***the out-of-band tuner 104 may be intermittently powered on and off as need to maximize power conservation.***” *Lindstrom*, ¶ [0028] (emphasis added).

193. *Asmussen* like *Lindstrom* also continually monitors the connection to the cable television network for incoming videophone signals (i.e., out-of-band signals). *Asmussen*, 46:36-44, 47:26-29 (describing that a “communications event” is an incoming video call). Therefore, modifying *Asmussen*’s set top terminal to include an integrated circuit 100 in place of the tuner 603 and receiver 750 would have a reasonable expectation of success, especially since both *Asmussen* and *Lindstrom* teach set top terminals that receive cable television signals and are capable of monitoring incoming signals. This substitution would have been simple, requiring only the simple substitution of the known element of *Lindstrom* (i.e., the integrated circuit 100) for the tuner 603 and receiver 750 of *Asmussen*.

194. *Lindstrom* also expressly discusses a motivation for adding the out-of-band tuner 104 to the *Asmussen* set top terminal. *Lindstrom* describes, in its Background of the Invention, how digital set top boxes have evolved to receive

video-on-demand programming, email services, internet services, and IP telephony and videophone services. *Lindstrom*, ¶ [0002]. To support these services, the set top receiver normally includes two tuners. A first tuner is for receiving in-band signals in a particular channel range, and a second tuner is for receiving out-of-band signals in a second channel range. *Lindstrom*, ¶ [0003]. These channel ranges were well known both at the time of the '991 Patent and at the 2002 filing date of *Lindstrom*. The out-of-band tuner was used to receive digital content, such as VOD and videocall information. *Id.* *Lindstrom* notes that having two separate tuners was costly, and that cost savings would be obtained by combining the two tuners onto a single integrated circuit. *Lindstrom*, ¶ [0004]. *Lindstrom's* invention was therefore to have a single integrated circuit (IC) containing both an in-band and out-of-band tuner, where the out-of-band tuner received both digital content, such as VOD information, and videophone information. *Lindstrom's* motivation for developing the single IC is equally applicable to a motivation to combine with *Asmussen*. That is, it would have been obvious to modify *Asmussen* to include the single IC with two tuners, as taught by *Lindstrom*, to achieve the cost-savings benefit as taught by *Lindstrom*.

195. A second obvious and predictable configuration is to substitute *Asmussen's* receiver 750 with *Lindstrom's* out-of-band tuner for the reception of both video-on-demand and videophone signals. Such a configuration would result

in the *Asmussen* set top terminal having *Asmussen's* tuner 603 and *Lindstrom's* out-of-band tuner 104. *Asmussen* already recognizes the need for two tuners when receiving multiple video program signals. *Asmussen*, Fig. 14, 32:45-56. *Asmussen* contemplates employing two tuners for receiving two cable television signals, such as for picture-in-picture presentations, and *Asmussen* contemplates the set top terminal 220 is capable of containing these two separate tuners, each of which receives signals from a cable television network. *Asmussen*, 32:45-52; see also Fig. 14 below.

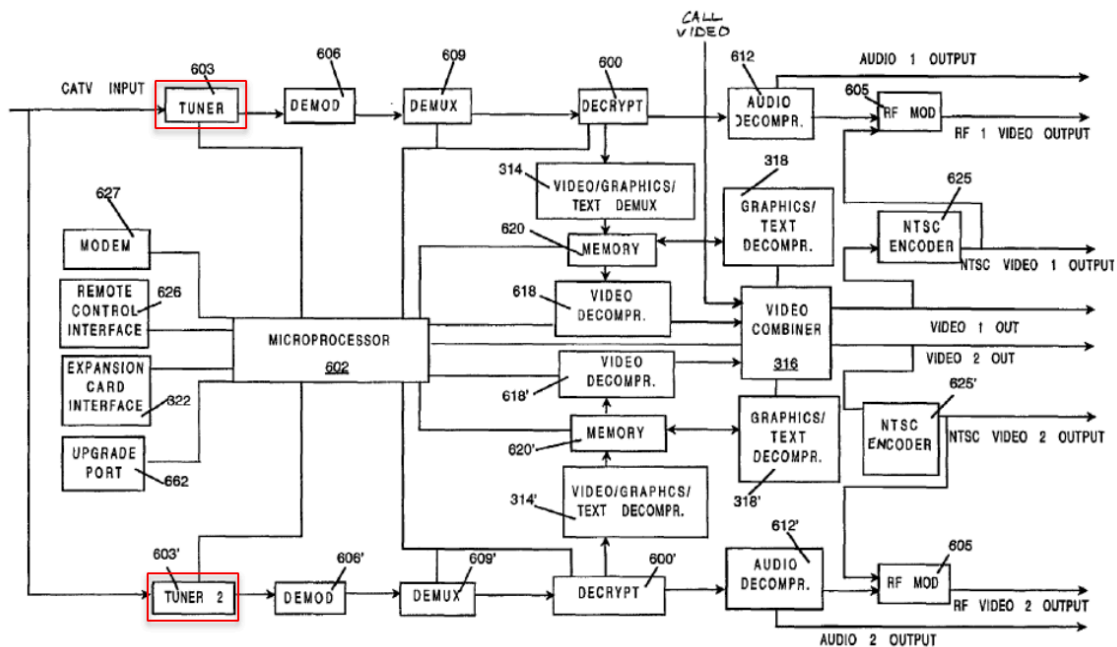


Fig. 14

*Asmussen*, Fig. 14 (annotated); see also, 32:45-56 (teaching that the tuners 603 and 603' both receive CATV signals and tune to two different television programs for the simultaneous display on a subscriber's television). Therefore, *Asmussen* already

contemplates an embodiment where the set top terminal contains two tuners (i.e., 603 and 603') for the simultaneous reception and viewing of two separate video programs. Furthermore, the set top terminal of *Asmussen* with the tuner 603 and out-of-band tuner 104 would allow for the reception of multiple signals over multiple frequency bands and the simultaneous displaying of cable television programming and other content as expressly taught by *Lindstrom*. *Lindstrom*, ¶ [0003].

196. Modifying *Asmussen's* set top terminal to include two tuners (the existing tuner 603 and the added *Lindstrom* out-of-band tuner 104) would be met with a reasonable expectation of success, especially as *Lindstrom* and *Asmussen* each teaches set top terminals for receipt of cable television signals across a cable television network. Incorporating two tuners (i.e., *Asmussen's* tuner 603 and *Lindstrom's* out-of-band tuner 104) into the *Asmussen* set top box would achieve the power saving functionality taught by *Lindstrom* and allow for simultaneous processing of various types of digital data, as taught by both *Asmussen* and *Lindstrom*. *Lindstrom*, ¶¶ [0003], [0007], [0027-0028]; *Asmussen*, 32:45-56. The proposed substitution requires only a simple substitution of one known element (*Lindstrom's* tuner out-of-band 104) for another (*Asmussen's* receiver 750). This substitution would have been well within the capabilities of a POSITA and would have had a reasonable expectation of success

197. Success for either possible configuration would have been reasonably expected because *Asmussen* already contemplates upgrading or otherwise augmenting the set top terminal, as discussed repeatedly throughout. The skilled person would readily know how to incorporate the *Lindstrom* IC or the out-of-band tuner 104 into the set top terminal and program the microprocessor to process signals received by the upgraded terminal, especially in view of *Asmussen*'s recognition of increasing functionality with augmented hardware and software components. Moreover, *Lindstrom*'s IC 100 with out-of-band tuner 104 performs the same function of *Asmussen*'s combined tuner 603 and receiver 750, namely of receiving incoming videophone signals from a cable television network, thus indicating the obviousness and predictability of incorporating the *Lindstrom* tuner into the *Asmussen* set top terminal. *Asmussen*, 50:44-49; *Lindstrom*, ¶ [0017]. And, as I noted above, *Lindstrom* expressly teaches that there are the advantages of “cost savings” and a “reduction in “component count” if the functionality of both the in-band and out-of-band tuners are combined onto a single integrated circuit. *Lindstrom*, ¶¶ [0004], [0015]-[0017].

198. Furthermore, the proposed combination would have been obvious because it would allow the set top terminal of *Asmussen* to conserve power by powering off the out-of-band tuner 104 if video-on-demand and videophone signals were not being received, as expressly taught by *Lindstrom*:

An input RF signal is received and provided to both an in-band and an out-of-band tuner. ***If the input signal is on an out-of-band channel, the out-of-band tuner is powered on and, if the input signal is not on an out-of-band channel, the out-of-band tuner is powered off.***

*Lindstrom*, ¶ [0007] (emphasis added); *see also*, ¶ [0027] (teaching the out-of-band tuner is powered on or off based on if an out-of-band signal is being received). Powering off the out-of-band tuner when not needed would also reduce the amount of heat generated by the circuitry, thereby increasing the efficiency of the set top terminal. Such added functionality would improve *Asmussen's* set top terminal in a predictable manner.

**XI. CONCLUSION**

I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: December 19, 2019

A handwritten signature in black ink, appearing to be 'AL', written over a horizontal line.

By: Andrew Lippman, Ph.D.

APPENDIX A

<b>U.S. Patent No. 10,084,991 Claim Language</b>	<b>Teachings of <i>Asmussen</i>, <i>Bear</i>, <i>Marley</i>, and <i>DeFazio</i></b>
1(Preamble). A communication apparatus for transmitting and receiving digital information to and from another communication apparatus, comprising:	<b><i>Asmussen</i> teaches a set top terminal used in conjunction with a television that has advanced features for sending and receiving video calls, a “communication apparatus” as described by the ’991 Patent.</b>  <i>Asmussen</i> at 3:20-30, 4:5-9, 3:50:44-51; <i>’991 Patent</i> at 2:32-48.
1(a) a network interface configured to receive first digital information which is received from a contents server which is coupled to the communication apparatus via the network interface and second digital information from the another communication apparatus;	<b><i>Asmussen</i> teaches a collective tuner 603 and receiver 750 that comprise a network interface for receiving the first and second digital information.</b>  <i>Asmussen</i> at 15:15-20, 26:6-8, 50:18-49, Fig. 4, Fig. 30.  <b><i>Lindstrom</i> teaches an out-of-band tuner 104 that receives out-of-band channels from a cable television network, where the out-of-band channels include both video-on-demand and videophone signals.</b>  <i>Lindstrom</i> at Fig. 1, ¶ [0017].
1(b) a camera configured to generate video information which is included in third digital information;	<b><i>Asmussen</i> teaches a “camera configured to generate video information” and that the video signals from the camera are included in the upstream video call signal.</b>  <i>Asmussen</i> at Abstract, 4:5-7, 16:36-38, 50:18-43, Fig. 30.
II a display configured to display at least the first and the second digital information; and	<b><i>Asmussen</i> teaches set top terminal connected to a subscriber’s television which contains a video screen/display.</b>  <i>Asmussen</i> at 11:30-39, 43:50-53, 50:44-51.  <b><i>Marley</i> teaches a set top box with video telephone capabilities that is integrated into a television with a</b>



	<b>display.</b>  <i>Marley</i> at ¶ [0005], [0015].
1(d) a processor;	<i>Asmussen</i> teaches a processor.  <i>Asmussen</i> at 15:15-16, 15:30-33, Fig. 4.
1I wherein when the processor receives an inbound videophone call notice while displaying the first digital information on the display, the processor pauses the displaying of the first digital information and renders the camera operative;	<b><i>Asmussen</i> teaches a processor that executes program instructions stored in memory, those instructions in turn monitor for incoming videophone calls and pause the current programming being displayed when an incoming video call is detected.</b>  <i>Asmussen</i> at 46:27-62, Fig. 28.  <b><i>Bear</i> teaches a processor that launches an application in response to an inbound video call which in turn turns the camera on by turning the camera light to red.</b>  <i>Bear</i> at 4:24-28, 9:34-35, 11:37-45, 11:61-66, 7:50-56.
1(f) wherein the processor outputs the third digital information to the another communication apparatus and displays the second digital information of the videophone call on the display; and	<b><i>Asmussen</i> teaches its processor transmitting out a video conferencing signal to other set top terminals participating in a video call, wherein the video conferencing signal includes video signals from the camera.</b>  <i>Asmussen</i> at 52:20-25, 15:27-33.  <b><i>Asmussen</i> teaches receiving incoming video conferencing signals from other set top terminals and displaying the received video signals on the television.</b>  <i>Asmussen</i> at 50:44-54.
1(g) wherein when the processor receives an input for stopping the videophone call, the processor stops output of	<b><i>Asmussen</i> teaches that the processor receives a user command from the remote control (i.e., the pressing of a hang-up button) to end a video call.</b>  <i>Asmussen</i> at 15:15-20, 49:49-50:3, Fig. 30.

the third digital information and stops the camera.	<b><i>Bear</i> teaches a user ending a video call by pressing and the camera button and the system then terminates the call and turns the camera light off indicating that the camera is off.</b>  <b><i>Bear</i> at 6:50-53, 11:19-31, 7:50-56.</b>
2. The communication apparatus according to claim 1, wherein after the videophone call is finished, the processor restarts the displaying of the first digital information.	<b><i>Marley</i> teaches resuming program viewing and recalling paused programming from memory for viewing after the video call has ended.</b>  <b><i>Marley</i> at ¶ [0027], [0011], Fig. 5.</b>
3. The communication apparatus according to claim 2, further comprising a microphone configured to generate audio information which is included in the third digital information.	<b><i>Asmussen</i> teaches that the set top terminal includes an integrated microphone that generated audio signals which are included in the video conferencing signal set out to other set top terminals.</b>  <b><i>Asmussen</i> at Abstract, 15:27-29, 50:18-40, 55:57-60, Fig. 30.</b>
4. The communication apparatus according to claim 3, wherein when the processor receives the inbound videophone call notice while displaying the first digital information on the display, the processor switches a function of processing video information of the first digital information to a function of processing video information of the second digital information of the videophone call.	<b><i>Asmussen</i> teaches that its processor monitors for incoming communications events (i.e., video calls), and if it detects one it will pause the current programming.</b>  <b><i>Asmussen</i> at 44:9-13, 46:27-62, Fig. 28.</b>  <b><i>Asmussen</i> teaches that after pausing the programming in response to an incoming video call, the system waits for the user to answer the call and if the user answers the call the processor then begins to process and display the incoming video call.</b>  <b><i>Asmussen</i> at 47:36-41, Fig. 28, 31:39-41, 50:44-54.</b>

<p>5. The communication apparatus according to claim 4, wherein when the processor receives an input for making an outbound videophone call to the another communication apparatus, the processor renders the camera and microphone operative and displays information indicating the outbound videophone call on the display calling message.</p>	<p><b><i>Asmussen</i> teaches a user can set the default state of the camera to on and teaches that if the user accepts a call the processor will render the camera on and display an indication of the call.</b></p> <p><b><i>Asmussen</i> at 21:34-42, 44:13-19, 47:29-41, 48:1-5, 43:53-55.</b></p> <p><b><i>Marley</i> teaches receiving a dial command to initiate a video call and in response to the dial command displaying a phone book for a user to select a number to call, activating the camera, and displaying a real time image on the display for user feedback.</b></p> <p><b><i>Marley</i> at ¶ [0018], [0019].</b></p> <p><b><i>DeFazio</i> teaches a database for performing caller identification and displaying a name associated with an outgoing call in order to provide feedback to a user.</b></p> <p><b><i>DeFazio</i> at 1:57-61, 3:42-45, 5:10-15.</b></p>
<p>12. The method according to claim 11, further comprising the steps of: upon receiving an input for making an outbound videophone call to the another communication apparatus, rendering the camera and microphone operative; and displaying information indicating the outbound videophone call on the display at the same time.</p>	<p><b><i>Marley</i> teaches receiving a dial command to initiate a video call and in response to the dial command displaying a phone book for a user to select a number to call, activating the camera, and displaying a real time image on the display for user feedback.</b></p> <p><b><i>Marley</i> at ¶ [0018], [0019].</b></p> <p><b><i>See also DeFazio</i> at 1:57-61, 3:42-45, 5:10-15.</b></p>

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*"Video Instrument Control"*, Instrument Society of America (ISA), International Conference and Exhibit, Philadelphia, PA, October 1982.

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*"Semantic Bandwidth Compression: Speechmaker"*, paper for the Picture Coding Symposium, June 1981.

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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  
(1997-Present)  
France Telecom, Google, News Corporation, Nortel Networks,

Director of Media Laboratory consortium of sponsors  
Bertelsmann, Brightstar Corporation, Cisco Systems,  
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

*Video Image Compositing Techniques*, US Patent Number: 5,262,856, filed 11/16/93

*Receiver-Compatible Enhanced Definition Television System*, US Patent No. 5,010,405, filed 4/23/91

*Video Graphic Arthroscopy System*, US Patent No. 5,005,559, filed 4/9/91

*Extended Definition Television Systems*, US Patent No. 5,003,377, filed 3/26/91

*Multiscale Coding of Images*, US Patent No. 4,987,480, filed 1/22/91

*Unrecordable Video Signals*, US Patent No. 4,673,981, filed 6/16/87

### **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	<i>Virtual Private Milieus: Sharing Our Digital Aura through Social and Physical Proximity</i> , MS, September 2008
Matthew Antone	<i>Synthesis of Navigable 3-D Environments from Human-Augmented Image Data</i> , 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
Aggelos Bletsas	<i>Time Keeping in Myriad Networks: Theories, Solutions, and Applications</i> , MS, June 2001
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
V. Michael Bove	<i>A Flexible Integrated Framestore System</i> , BS, May 1983
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 1985
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 1988	<i>A Graphic/Photographic Arthroscopy Simulator</i> , MS, February 1988
Constantine Christakos	<i>Taking Advantage of Distributed Multicast Video to Deliver and Manipulate Television</i> , MA, June 2000
Constantine Christakos	<i>Distributed-in/Distributed-out Sensor Networks: A New Framework to Analyze Distributed Phenomena</i> , PhD, June 2006
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 1982
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>
Iliia 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, May 1983
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 1998
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 1997

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, 16<sup>th</sup> 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 Ratio 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 21<sup>st</sup> 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)**

*RoviGuides, Inc. v. ComcastCorp. et al.*, No. 2:19-cv-03096 (C.D. Cal. 2019) Davis Polk & Wardwell LLP, on behalf of Comcast, June, 2019, deposed, 18 October, 2019

Technical report on streaming, Reed Smith, April, 2019, obo Netflix v Arizona Dept of Revenue, deposed 30 September, 2019

IPR of patent 8,656,431 for Baker Hostetler, on behalf of Comcast, January, 2019

IPR of patent 9,729,891, Erise IP, LLC, on behalf of Unified Patents, Inc., December 2018, deposed 3 October, 2019

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, deposed April 28, 2017

*Certain Digital Television Set-Top Boxes, Remote Control Devices, and Components Thereof, DN 3195, Investigation No. 337-TA-1041*, Keker 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

Reexamination of U.S. Patent Nos. 7,467,218 and 7,890,648, U.S. Patent and Trademark Office, Civ. No. 10-SS-533(W.D. Tex), Kenyon & Kenyon LLP, August 2011 – present, on behalf of Sony Electronics and Sony Entertainment America

Bose Corporation v SGI, Inc et al. D. Mass. Case No. 09-cv-11439-WGY. Foley, Lardner (Boston) on behalf of SGI, et al, Deposition January, 2012

S3G V Apple Computer, Finnegan Henderson et al, Washington, Finnegan, on behalf of plaintiff S3G, ITC 337-TA-724, testified in ITC April 2011

LG v. Vizio, ITC case 337-TA-687, Jones Day, on behalf of Vizo, testified in ITC June 2010

DIRECTV, Inc. v. Gemstar TV-Guide Interactive, Inc. (Commercial Arbitration). Jones Day, on behalf of DirecTV, testified December 2009

MPT and Sony v. Vizio, Jones Day, 2009, in USPatents 6,778,182, 6,111,614, and 5,434,626, no case number. Hired by Jones Day on behalf of Vizio

Superguide v. DirecTV, Jones Day, 2008 -2009, in re USPatent 5,068,734 (Beery). Hired by Jones Day on behalf of DirecTV

Beery – DirecTV, Jones Day, hired by Jones Day, 2008

Guardian v. Toshiba America Consumer Products, Knobbe Martens, 2008 –2009, hired on behalf of Toshiba America

Microsoft '682, Fish and Richardson, on behalf of Microsoft, 2007

United States of America v. American Society of Composers, Authors and Publishers (for determination of reasonable license fees,) arbitration, White Case, 2007, on behalf of ASCAP

Digital Choice of Texas v. Sichuan Changhong Electric Co, Mayer Brown Rowe & Maw, 2006, on behalf of SCE, deposed September, 2006

Acacia v. New Destiny Internet Group et al, Jones Day, 2005 to present, hired on behalf of several of the defendants, deposed August 2005.

Kyocera v. Nokia, Jones Day, September 2005, on behalf of Nokia

Antal Media Corporation v. Apple Computer et al, Weil Gotschal and Manges, 2004 hired on behalf of Microsoft and Real Networks.

Hewlett Packard v. Intergraph, Civil Action 03-2517 (MJJ). McDermott, Will and Emery, November 2003 on behalf of Intergraph

Collaboration Properties v. Polycom, USAOP-23M40533. Kecker and Van Ness, 2003 - 2004, Deposed December 2003 on behalf of Polycom

Gemstar, MDL-1274-WBH, Morrison and Foerster, Banner and Witcoff, September 2002-April 2003, Deposed February 2003, multi-client litigation

Electronic Industries Alliance and Consumer Electronics Association – Technical Consulting, Dickstein, Shapiro, Morin & Oshinsky, April 2002.

Certain Set-top Boxes, 337-TA-454 (Vogel). Kirkland and Ellis, July-December 2001, Deposed October 2001

Pegasus Development v. DirecTV, et al, CA 00-1020 (GMS). Jones, Day, 2001, Idle for >12 months