UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

MAXELL, LTD.,
Patent Owner

Case: IPR2020-00200

U.S. Patent No. 10,084,991

EXPERT DECLARATION OF MAJA BYSTROM, PH.D. CONCERNING PATENTABILITY OF U.S. PATENT NO. 10,084,991

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Patent Trial and Appeal Board
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I. INTRODUCTION

1. My name is Maja Bystrom. I have been asked by Patent Owner in this IPR (Maxell, Ltd.) to respond to the Declaration of Dr. Andrew Lippman (the "Lippman Decl.") and to provide my opinion as to the patentability of U.S. Patent No. 10,084,991 (the "'991 Patent") in view of the opinions in the Lippman Decl.

2. Although I am being compensated at my usual consulting rate of $500 per hour for my time reviewing materials and preparing this declaration, my opinions expressed here are my own. My compensation is in no way dependent on the outcome of this case or upon the Court or jury accepting my opinions. I have no other financial interest in this matter or the parties thereto.

3. Depending on new information learned during discovery or positions taken throughout the IPR by Apple or its experts, I may edit, add to, or otherwise refine the topics and expected testimony described here. I reserve the right to supplement my opinions based on new information.

II. BACKGROUND AND QUALIFICATIONS

4. My qualifications to testify about the '991 Patent and the relevant technology are set forth in my curriculum vitae ("CV"), which I have attached here as Appendix A. My CV includes a list of all my publications within at least the past ten years. The matters in which I have testified (either at trial or by deposition) in the past four years are attached as Appendix B.

5. I will briefly summarize my qualifications to render opinions regarding this technology in the following paragraphs.

6. My technical expertise is in the fields of communications and signal processing.

7. I received a Doctor of Philosophy degree in Electrical Engineering from Rensselaer Polytechnic Institute in 1997. The subject of my doctoral studies was rate allocation for joint source/channel coding with applications to video transmission over wired and wireless networks.

8. I received a Master's Degree in Electrical Engineering from Rensselaer Polytechnic Institute in 1994, specializing in image processing, specifically recovery of frame quality following transmission over noisy channels.

9. I received a Bachelor's Degree in Computer Science from Rensselaer Polytechnic Institute in 1991, with a concentration in Electrical and Computer Engineering. I have significant experience in computer programming in languages including C, C++, and Objective-C, Java, as well as lower-level languages and hardware languages.

10. I have also received a Master's Degree in Mathematics and a Bachelor's Degree in Communications from Rensselaer Polytechnic Institute.

11. From 1991 to 1992, I served as a Computer Engineer in the Mission Operations and Data Systems Directorate at NASA - Goddard Space Flight Center.

My projects during this time included system verification and development. I have served as a technical consultant in data compression and communication system design for F&H Applied Science Associates, Inc. Additionally, I have held a position as a Visiting Scholar at the Deutsche Forschungsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen, Germany for which I contributed to the study and development of simulators for communication of multimedia.

12. Between 2002 and 2009, I was an Associate Professor in the Electrical and Computer Engineering Department at Boston University, and taught courses in signal processing, communication systems, and pattern recognition. In addition, I performed research in the fields of communication systems and signal processing. I have published over 80 books, book chapters, journal articles, and conference articles in these fields.

13. Prior to 2002, I was an Assistant Professor in the Electrical and Computer Engineering Department at Drexel University. I have taught classes at the undergraduate and graduate level in topics such as hardware design, stochastic processes, communication systems, and engineering design.

14. I co-founded, and served as a Director of, the company OneCodec Ltd., incorporated in Aberdeen, Scotland with U.S. office located in Belmont, MA. OneCodec Ltd. specialized in video coding and transmission.

15. In 2013 I founded the company Bevara Technologies, which designs and develops systems for data preservation. I currently serve as CEO of Bevara Technologies and work on the software development team. I am a named inventor on thirteen US and World patents or patent applications developed while at OneCodec and Bevara.

16. Among other awards, I have received a National Science Foundation CAREER Award and a Fulbright Award for work in rate allocation for wireless transmission of compressed video.

III. UNDERSTANDING OF LEGAL STANDARDS

17. I am not a lawyer, but I have been informed by Maxell's counsel of the legal principles necessary to my validity analysis. In this section, I set forth my understanding of these legal principles as they have been explained to me.

18. I understand that a validity analysis of a patent claim consists of two steps. The first step is the construction (or interpretation) of any disputed claim terms. The second step is a comparison of the properly construed claims to the prior art.

A. Obviousness

19. I understand that a patent claim can be invalid under 35 U.S.C. § 103 if the claimed subject matter would have been "obvious" to a person of ordinary skill in the art as of the priority date of the patent based upon one or more prior art

references. I understand that an obviousness analysis should consider each of the following so-called "*Graham* factors": (1) the scope and content of the prior art; (2) the differences between the claims and the prior art; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations, if any (such as unexpected results, commercial success, longfelt but unsolved needs, failure of others, copying by others, licensing, and skepticism of experts).

20. I understand that a conclusion of obviousness may be based upon either a single prior art reference or a combination of prior art references, particularly if the combination of elements does no more than yield predictable results. However, I understand that merely demonstrating that each of the claim elements was, independently, known in the prior art does not prove that a patent composed of several claim elements is obvious.

21. Moreover, I understand that it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in a way the claimed new invention does.

22. I further understand that, to determine obviousness, courts look to the interrelated teachings of multiple patents or other prior art references, the effects of demands known to the design community or present in the marketplace, and the background knowledge possessed by a person having ordinary skill in the art.

23. I also understand that, in determining whether a combination of prior art references renders a claim obvious, it may be helpful to consider whether there is some teaching, suggestion, or motivation to combine the references and a reasonable expectation of success in doing so. I understand, however, that the teaching, suggestion, or motivation to combine inquiry is not required and may not be relied upon in lieu of the obviousness analysis outlined above.

24. I understand that the following exemplary rationales may lead to a conclusion of obviousness: the combination of prior art elements according to known methods to yield predictable results; the substitution of one known element for another to obtain predictable results; and the use of known techniques to improve similar devices in the same way.

25. However, a claim is not obvious if the improvement is more than the predictable use of prior art elements according to their established functions. Similarly, a claim is not obvious if the application of a known technique is beyond the level of ordinary skill in the art.

26. Further, when the prior art teaches away from combining certain known elements, discovery of successful means of combining them is not obvious. I understand that similar subject matter may not be sufficient motivation for a person of skill in the art to combine references if the references have conflicting elements.

27. I understand that, in order to be used in an obviousness combination, a prior art reference must be "analogous." I understand that a prior art reference may be analogous if it is in the same field of endeavor as the other references with which it is combined, or if the reference is reasonably pertinent to the solving the problems the inventors of the patent-at-issue sought to solve.

28. I understand that obviousness of a patent claim cannot properly be established through hindsight, and that elements from different prior art references, or different embodiments of a single prior art reference, cannot be selected to create the claimed invention using the invention itself as a roadmap. I understand that the claimed invention as a whole must be compared to the prior art as a whole, and courts must avoid aggregating pieces of prior art through hindsight that would not have been combined absent the inventors' insight.

29. I understand that obviousness is not established by simply combining previously known elements from the prior art. A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. An invention is unpatentable as obvious if the differences between the patented subject matter and the prior art would have been obvious at the time of invention to a person of ordinary skill in the art.

30. I understand that obviousness of a patent cannot properly be established by mere conclusory statements. Instead, there must be some articulated reasoning

with some rational underpinning to support the legal conclusion of obviousness. When an expert opines that all the elements of a claim disparately exist in the prior art, the expert should provide the rationale to combine the disparate references. A reason for combining disparate prior art references is a critical component of an obviousness analysis. The obviousness analysis should be made explicit and needs to provide an articulated reasoning with some rational underpinning to identify the reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.

31. I also understand that inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known. This is another reason why merely pointing to the elements being known in the art in separate locations is not the end of the obviousness inquiry.

32. I understand that technical experts may testify to matters like the level of skill in the art at the time of the invention and what a skilled artisan might find obvious in light of the prior art without addressing objective indicia of non-obviousness. However, where an expert purports to testify not just to certain factual components underlying the obviousness inquiry, but to the ultimate question of obviousness, the expert must consider all factors relevant to that ultimate question, including all objective evidence of nonobviousness.

B. Secondary Considerations

33. I understand that one of the so-called *Graham* factors that must be considered in determining obviousness is the existence of any secondary considerations, which tend to show that a patent claim is not obvious. Such secondary considerations of nonobviousness of a patent include (1) long-felt and unmet need in the art that was satisfied by the claimed invention of the patent; (2) failure of others to achieve the results of the claimed invention; (3) commercial success or lack thereof of the products and processes covered by the claimed invention; (4) deliberate copying of the claimed invention by others in the field; (5) taking of licenses under the patent by others; (6) whether the claimed invention was contrary to the accepted wisdom of the prior art; (7) expression of disbelief or skepticism by those skilled in the art upon learning of the claimed invention; (8) unexpected results achieved by the claimed invention; (9) praise of the claimed invention by others skilled in the art; and (10) lack of contemporaneous and independent invention by others.

34. I understand that each of these considerations may form an independent basis for nonobviousness of a patent. I also understand that the fact that another person simultaneously and independently created the same invention claimed in an asserted patent can serve as an indication that the invention was obvious

35. I also have been informed by counsel that there must be a nexus between any such secondary considerations and the claimed invention.

C. Claim Construction

36. I understand that the claim construction exercise begins with the language of the claims themselves, and that the general rule is that claim terms are given their plain and ordinary meaning to a person of ordinary skill in the art, in view of the specification of the patent, at the time of the invention. I also understand that the intrinsic evidence (i.e., the claims, written description, and prosecution history) are the primary sources used in interpreting claim language.

37. I understand that the PTAB determined that none of the claim terms of the ’991 Patent require express construction. Institution Decision, at 33.

38. I have applied the ordinary and customary meaning that the terms would have had to a person of ordinary skill in the art at the time of the invention (around September 2008) in view of the patent’s specification. In other words, I have interpreted the remaining terms in accordance with their “plain and ordinary” meaning.

D. Level of Ordinary Skill in the Art

39. I understand that claims are to be interpreted from the viewpoint of one of ordinary skill in the relevant art. To determine the level of skill that would be “ordinary,” I understand that a person of ordinary skill must generally have the

capability of understanding the general principles that are applicable to the pertinent art.

40. In the case of the ’991 Patent, these general principles include the concepts of video processing and communication systems. A person of ordinary skill in the art should be familiar with these principles.

41. In my opinion, “a person of ordinary skill in the art” in the field of the ’991 Patent would be a person with an undergraduate Bachelor of Science degree in Electrical Engineering, Computer Engineering, Computer Science or an equivalent degree plus at least two years of experience in the fields of video processing and/or communication systems. I based this opinion on my review of the ’991 Patent and my knowledge of those who were working in the field at the time of the invention.

42. I understand the PTAB found that “a person of ordinary skill in the art is a person having 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, networking, or a related field.” Institution Decision, at 31.

43. I do not believe that my definition of a person of ordinary skill is materially different. Accordingly, my opinions here would not change under my or the PTAB’s definition of a POSITA.

IV. MATERIALS CONSIDERED

44. I've attached as Appendix C to this declaration a list of the materials I considered at the time I formed my opinions regarding the patentability of the '991 Patent.

45. In addition to these materials, I relied upon my decades of experience and expertise in computer science and electrical engineering, particularly in system design, video processing, and communications. I have also taken into account the knowledge and background principles that a person of ordinary skill in the art would be familiar with at the time of Patent Owner's invention (no later than September 25, 2008).

V. THE '991 PATENT

A. Background of the '991 Patent

46. Before discussing my specific opinions on patentability, I will first review the '991 Patent's disclosures as they would have been viewed by a person of ordinary skill in the art. My discussion describes only certain examples of the inventions discussed in the '991 Patent, and my description here is in no way meant to suggest that the claimed inventions are limited to these examples. The inventions are limited only by the claims.

47. The '991 Patent is titled "Communication Apparatus and Method for Receiving an Inbound Videophone Call Notice While Displaying Digital Information on The Display" and is issued to inventors Kazenuori Iwabuchi, Hiroki

Mizosoe, Mutsumi Shimoda, Setiawan Bondan, and Manabu Sasamoto on September 25, 2018. This patent is a Continuation of U.S. application Ser. No. 15/631,298, filed Jun. 23, 2017, which is a Continuation of U.S. application Ser. No. 15/215,839, filed Jul. 21, 2016, now U.S. Pat. No. 9,723,268 which is a Continuation of U.S. application Ser. No. 14/811,048, filed Jul. 28, 2015, now U.S. Pat. No. 9,432,618, which is a Continuation of U.S. application Ser. No. 13/723,312, filed Dec. 21, 2012, now U.S. Pat. No. 9,124,758, which is a Continuation of U.S. application Ser. No. 12/457,257, filed Jun. 4, 2009, now U.S. Pat. No. 8,363,087. The '991 Patent claims priority to a Japanese patent application filed on September 25, 2008. The priority date of this patent is no later than this date.

48. The '991 Patent relates to an apparatus that allows a user to seamlessly and automatically switch between watching video content and participating in a video call in the same device. *See, e.g.,* '991 Patent, 2:32-48.

B. Problems the Inventors Set Out to Solve

49. At the time of the '991 Patent, conventional systems included a separate television for watching broadcast programming content or video content and a separate videophone for making video calls. *Id.,* 2:5-31. The '991 Patent provides an example of a conventional system explaining:

> Upon receipt of an incoming telephone call at the videophone during watching a TV broadcast program by the TV receiver, a message which notifies arrival of such phone call is displayed on

> the TV receiver's display screen so that a user easily knows that there is an incoming phone call. In this event, the user must walk to a place at which this videophone is put and perform manual operations for startup of talking with a caller on the videophone. This is a time-consuming and troublesome work for the user who is watching his or her preferred TV broadcast program.
>
> In the case of not only starting a telephone call but also ending the phone call, the user is required to perform a manual operation for the phone call completion (e.g., putting a transceiver handset on a base unit or "cradle"). This operation also is performed at the location in which the videophone is placed.

Id., 2:7-25.

50. The inventors of the '991 Patent overcame this problem by providing a system that integrates the videophone and the device for watching digital content that further allows the user to switch between watching the digital content and having a videophone call with another user. This is all done without the requirement of having to move between separate devices or perform manual operations. *Id.*, 2:26-55.

51. For example, the '991 Patent explains that the inventors developed an apparatus where "it is possible for a user to start a phone call and finish the call without having to move from a place at which s/he is enjoying a digital TV broadcast program." *Id.*, 6:25-32. In addition, when a call comes in, the programming content

the user was watching is automatically paused. *Id.*, 18:21-28. And, after ending the call, the apparatus restarts the paused video content. *See Id.*, 18:47-57. The inventors arrived at these solutions no later than September 25, 2008.

C. Response to Dr. Lippman's "BACKGROUND OF THE TECHNOLOGY" Discussion

52. In Section IV of the Lippman Decl. (Ex. 1003), Dr. Lippman provides his opinions with respect to an overview of the technology. While I disagree with Dr. Lippman's generalizations and characterizations of the patented technology, I have not addressed each of Dr. Lippman's statements in this section because they are not relevant to the grounds he presents in his declaration. Where applicable, I have addressed Dr. Lippman's characterization of the patented technology while rebutting these grounds specifically. The fact that additional videophone call systems or related components existed at the time of the '991 Patent is irrelevant, as Dr. Lippman has provided no opinions on how these devices relate to the claimed inventions as a whole.

D. Challenged Claims

53. The challenged Claims are 1-5 and 8-12. The language of these claims is as follows:

’991 Patent Claim Element Number	Claim Text
[1.pre]	A communication apparatus for transmitting and receiving digital information to and from another communication apparatus, comprising:
[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;
[1.b]	a camera configured to generate video information which is included in third digital information;
[1.c]	a display configured to display at least the first and the second digital information; and
[1.d]	a processor;
[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;
[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
[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.
[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.
[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.
[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.

’991 Patent Claim Element Number	Claim Text
[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.
[8.pre]	A method for transmitting and receiving digital information for a communication apparatus, wherein the communication apparatus comprises a camera, a network interface, a display and a processor; and wherein the method is executed by the processor, the method comprising the steps of:
[8.a]	displaying first digital information which is received from a contents server which is coupled to the communication apparatus via the network interface;
[8.b]	upon receiving an inbound videophone call notice while playing the first digital information, pausing the displaying of the first digital information;
[8.c]	rendering the camera operative;
[8.d]	receiving second digital information from the another communication apparatus via the network interface;
[8.e]	generating video information which is included in third digital information by the camera;
[8.f]	displaying the second digital information on the display; and
[8.g]	outputting the third digital information to an another communication apparatus;
[8.h]	upon receiving an input for stopping the videophone call, stopping output of the third digital information; and
[8.i]	stopping the camera.
[9]	The method according to claim 8, further comprising the step of: restarting the displaying of the first digital information after the videophone call is finished.
[10]	The method according to claim 9, wherein the communication apparatus further comprises a microphone, and

’991 Patent Claim Element Number	Claim Text
	the method further comprising the step of: generating audio information which is included in the third digital information by the microphone.
[11]	The method according to claim 10, further comprising the step of: upon receiving the inbound videophone call notice while displaying the first digital information, switching 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.
[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.

VI. SUMMARY OF MY OPINIONS

54. After considering the material available to me in this case in view of my experience in the fields of computer science and electrical engineering, particularly in system design, video processing, and communications, it is my opinion that the challenged claims of the ’991 Patent are patentable over the cited prior art. Specifically, it is my opinion that Dr. Lippman has not shown that the challenged claims are rendered obvious either by *Asmussen* alone or *Asmussen* in

view of *Bear*. Furthermore, Dr. Lippman has not shown that there is motivation to combine *Asmussen* with any of *Bear*, *Lindstrom*, *Marley* or *DeFazio*.

55. For example, while videophone systems may have included cameras, none of the prior art references or products referenced by Dr. Lippman include a processor that pauses a displaying of digital information and renders a camera operative upon receipt of an inbound videophone call notice while displaying the digital information, as is required by Claim 1 of the ’991 Patent. In other words, Dr. Lippman does not tie any of the hardware and/or software components discussed to the actual claim language of the ’991 Patent. Moreover, it is my understanding that, even if the claimed elements of the’991 Patent independently existed in the prior art references (which they do not), such disclosure is not enough to demonstrate that the challenged claims are unpatentable.

56. Accordingly, and as I will explain in greater detail in the following sections, it is my opinion that Claims 1-5 and 8-12 of the ’991 Patent are patentable over the art and arguments that Petitioner and Dr. Lippman have presented. I discuss the bases for my opinions in the following sections.

VII. THE PRIOR ART

57. Here, I will provide a brief overview of each of the references used in Dr. Lippman’s obviousness combinations.

a) Description of Asmussen

58. *Asmussen* discloses "a set top converter box or terminal for a television program delivery system" that "provides both a menu generation capability as well as a number of advanced features and functional capabilities." Ex. 1004, 3:21-30. The set top terminal is "achieved through a set of hardware upgrades" which "[provide] additional advanced features and functional capabilities." *Id.*, 3:31-41. These advanced features and capabilities include: a picture-on-picture capability; a TV guide service; the capability of querying viewers; allowing subscribers to view promotional menus; enabling on-line question and answer sessions; providing digital audio via a digital tuner; providing control of video tape machines; supporting high definition television and backyard satellite systems; sending and receiving video calls; automatically pausing a video program on detection of a video call event or triggering event; caller identification of video calls; and, dual display of video programs and calls. *Id.*, 3:42-4:30.

59. The objects of the invention are directed primarily toward menus and interfaces allowing users to efficiently access television programs and program options. *Id.*, 4:31-54.

60. Dr. Lippman provides a general summary of the set top terminal apparatus in *Asmussen.* Ex. 1003, ¶¶53-55. While I agree with Dr. Lippman that "*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" (Ex. 1003, ¶54, Ex. 1004, Abstract), I note that the television program delivery system with expanded capabilities is focused on menus for accessing programs created and assembled by an operations center and transported to the set top terminal through the cable headend. Ex. 1004, 6:32-35, 6:50-53, 6:57-65. The cable headend in turn relays the program signal to the set-top terminal, potentially allocating different programs to different subscribers, and may receive information from the set top terminal, serving as "an intermediary between the set top terminals **220** and the operations center **202** (or other remote site)." *Id.*, 9:30-35, 9:39-48, 9:64-67. Thus, *Asmussen* does not discuss any video-on-demand capability, but rather focuses on a television program delivery system.

61. *Asmussen* does disclose some interactive services, such as quizzes, home shopping, airline reservations, and VCR control. *Id.*, 27:30-32, 27:44-48, 27:59-62, 41:20-42:25, Figures 16b-d, 20a-d, 21. However, the set top terminal apparatus of *Asmussen* does not permit a user to choose the programs delivered, rather just the programs viewed.

62. I further note that these advanced capabilities are provided by hardware upgrades such as expansion cards (*Id.*, 16:40-43, 16:60-67); the "set top terminal of the present invention may be achieved through a set of hardware upgrades" where

the "hardware upgrades provide additional advanced features and functional capabilities." *Id.*, 3:31-32, 3:39-41.

63. The "capability to both send and receive video calls through a cable TV network" noted by Dr. Lippman (Ex. 1003, ¶54) is achieved through a hardware upgrade ("A hardware upgrade for adding video call functionality to a set top terminal is also disclosed." Ex.1004, Abstract). The Turbo Card "provides functionality to perform video calls using the set top terminal." *Id.*, 17:25-26. I note that Dr. Lippman does not rely on the Turbo Card.

64. Figure 30 shows the additional components that are used to support video calling including: an input device, such as a remote control, a microprocessor, a camera, a display, a transmitter, and a receiver. *Id.*, Figure 30.

65. *Asmussen* further discusses the remote control, while used primarily for menu navigation and selection, in order to "support video calling capabilities" and "video calling with outgoing video" the remote control "preferably includes a call answer button" and "a camera activation button" with "buttons or other controls for pointing the camera." *Id.*, 31:39-46.

66. The camera "may be electronically controllable (e.g., electronically steerable, focusing, zoom, pan, etc.) locally or remotely", that is, other call participants can "command these electronically controllable aspects of the camera."

Id., 49:55-56, 56:34-38. However, as explained in detail below, the system described in *Asmussen* is different than that disclosed and claimed in the ’991 Patent.

67. Dr. Lippman further states that “*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.” Ex. 1003, ¶54. I agree with Dr. Lippman in that *Asmussen* discloses optionally enabling automatically pausing of a video program “in response to detection of an occurrence of a communications event or related triggering event.” Ex. 1004, 43:19-22. This process is illustrated in Figure 28 shown below.

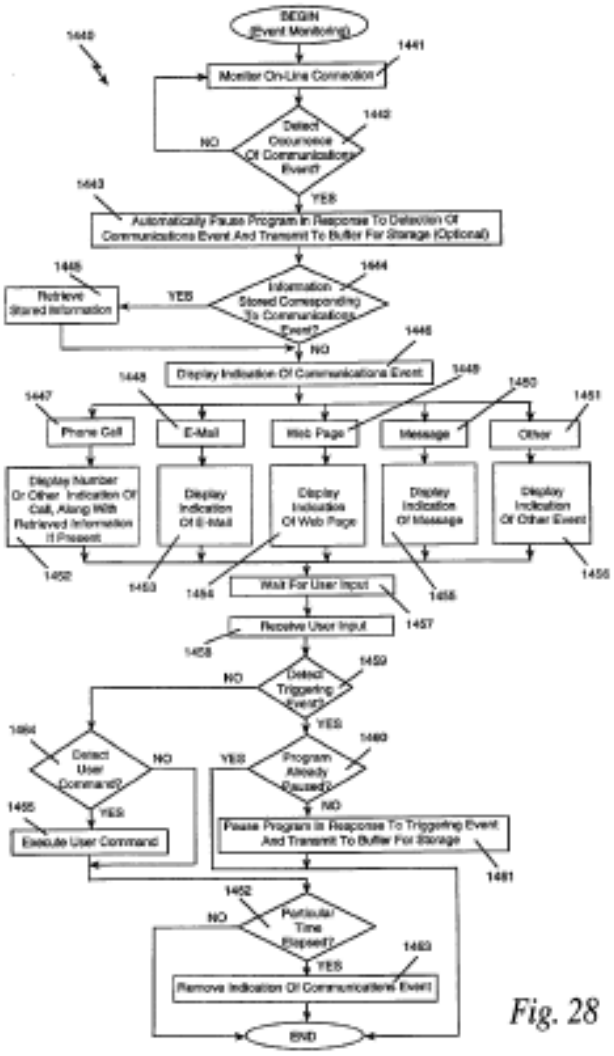


Fig. 28

68. The "system continually monitors the connection for an occurrence of a communications event" and upon detection of a communications event "the system optionally automatically pauses the video program." *Id.*, 46:43-46, Figure 30. The communications event can range from a phone call to an incoming email, a fax, a page to a pager number, a web page, a message or other event such as an incoming video call. *Id.*, Figure 30, 46:65-66, 47:12, 47:21, 47:26-27, 44:9-13.

69. The system displays an indication of the communications event such as text or an icon. *Id.*, 46:59-60, 47:26-33. Depending on whether automatic pausing is enabled, the indication can be "displayed as an overlayed image on the displayed or paused video program or an inset image within the displayed or paused video program." *Id.*, 46:62-64.

70. Once the indication is displayed, the system waits for user input such as answering the call (a "triggering event"). *Id.*, 47:36-37, 47:41-42, Figure 28. If the video program was not previously paused, it is then paused and transmitted to a buffer. *Id.*, Figure 28. This gives users the option to continue viewing the video program while a call comes in, and only pause should they choose to accept the call ("instead of having the video program automatically paused in response to the communications event, a user can continue to view the video program upon viewing an indication of a communications and have the video program paused if the user decides to access the communications event"). *Id.*, 47:44-49.

71. To support video call control, I note that *Asmussen* discloses a "video call options menu." *Id.*, 21:34-35. Via this menu the user can control video-call-related features such as "turning automatic program pausing on/off", setting the default state of the camera to on or off, and "how video calls are displayed (e.g., picture-in-picture, on a blue screen or on a paused image of the current program)." *Id.*, 21:34-42.

b) Description of Bear

72. *Bear* discloses "[a] system and method for improved video capture on a personal computer."Ex.1005, Abstract. More specifically, it "provides a system and method for capturing and otherwise working with video on a personal computer." *Id.*, 2:14-16.

73. Figure 2 of *Bear* is a "general representation of a computer system arranged with integrated communications-related devices including a camera and video controls, in accordance with an aspect of the present invention." *Id.*, 3:20-23. The camera may include components such as a lens cover, actuator, camera indicator light, and a video capture button. *Id.*, 7:35-38, Figure 3.

74. *Bear* primarily describes a system with video controls to allow the user to capture a video stream or still images. The system is focused on safeguarding a camera lens from damage and safeguarding the user from "inadvertent video recording." *Id.*,7:61-62. *Bear* achieves this by keeping the lens cover closed when the camera is not in use in order to provide "visual reassurance to the user that the user is not being viewed or recorded." *Id.*,7:61-65. The camera can include an indicator light to make the state of the camera apparent to the user. *Id.*, 2:43-46, 7:46-49.

75. The user must manually open the lens cover or press a button (e.g., a capture button) to "[prepare] the camera for capture" (*Id.*, 10:38-40, 2:28-30, 8:18-

19) or potentially to "[trigger] an image or video stream capture." *Id.*, 7:38-45. On an incoming video call, the user may answer the call by pressing the camera button or set a system preference to automatically enable the camera once the call is answered. *Id.*, 2:59-3:1, 6:41-46, 12:12-20.

76. For the case of a video call, the user may again use the controls to "hang up by pressing the camera button which will terminate the call and turn off the camera indicator light." *Id.*, 3:5-7.

c) Description of Marley

77. *Marley* is generally directed to a set top box that integrates videophone call functions, that is, "initiating, receiving, and storing video telephony calls." Ex.1006, Abstract, [0015]-[0016].

78. *Marley* discloses two processors, a primary audio/video processor (PAVP) and a video telephone processor (VTP). *Id.*, [0015]. The VTP is responsible for video processing "specifically directed to controlling and managing video telephone functions" while the PVAP "performs the types of audio and video processing typically associated with DVR-capable set-top appliances, including: routing incoming signals to/from a Multiple System Operator ('MSO')." *Id.*, [0015].

79. When a caller makes a call, the PVAP handles the outgoing call and pauses the video being viewed by the caller while the VTP activates the caller's

camera and microphone and handles video call encoding. *Id.*, Figure 4, [0018]-[0019],

80. However, *Marley* only discloses pausing the callee's (called party's) video content and activating the callee's camera after the call is accepted, not upon receiving an inbound call:

> Acceptance of the call causes PAVP **308** to mute and/or pause any programming presently being viewed on monitor **320 (503),** and store the paused programming in DVR memory **316** for viewing after the termination of the video call **(505)**. VTP **302** activates camera **104** and microphone **106**, and in conjunction with PAVP **308** transmits the video image and audio from camera **304** and microphone **306** for reception by set-top box **100** (**507**), and provides a real time "self-image" of camera **304**'s output on a portion of monitor **320** for viewing by the called party (**509**).
>
> *Id.*, Figures 4, 5, [0022].

81. Thus, although *Marley* may generally disclose a resumption of viewing of programming presenting being viewed on a monitor after the video call is terminated, *Marley* does not disclose that the processor paused the programming and rendered the camera operative when receiving an inbound videophone call.

d) Description of Lindstrom

82. *Lindstrom* addresses the challenge of cost-effectively supporting receipt and display of a wide variety of broadband content noting that "[modern]

subscriber home terminals employ separate out-of-band and in-band tuners." Ex.1008, [0003]-[0004].

83. *Lindstrom* discloses "a receiver having an in-band tuner and an out-of-band tuner integrated on a single IC." *Id.*, Figure 1, [0005]. The features disclosed include controlling the power of and the signal strength to the out-of-band tuner (*Id.*, Abstract) where the in-band tuner receives cable television channels and the out-of-band tuner receives content such as video-on-demand, pay-per-view channels, and videophone signals. *Id.*, [0003], [0016]-[0017].

e) Description of DeFazio

84. *DeFazio* is generally directed toward database management for caller ID provisioning. Ex.1007, Abstract.

85. More specifically, *DeFazio* discloses populating and de-populating a caller ID database so that the caller name can be displayed. *Id.*, 2:47-50, 3:42-45.

VIII. DETAILED RESPONSE TO DR. LIPPMAN'S INVALIDITY OPINIONS

86. It is my opinion that Dr. Lippman and Petitioner failed to show that the challenged claims of the '991 Patent are obvious. Note that my decision not to discuss a particular limitation in detail here is not an indication that I agree that limitation is met by the prior art. Rather, I have elected to focus my opinions on the most glaring deficiencies in Dr. Lippman's obviousness analysis.

87. I will first discuss how *Asmussen* alone does not render the challenged claims obvious. I will then address how there is a lack of motivation to combine the cited secondary prior art references with *Asmussen* because the references are directed to different systems and solving different problems than *Asmussen*. Furthermore, as discussed below, when the secondary references are taken as a whole, there is no motivation to combine them with *Asmussen* because they teach away from the '991 Patent. I will address each of Grounds 1-6 below in view of the disclosures Petitioner and Dr. Lippman rely on in view of *Asmussen* and *Bear*. I will also address Grounds 1-6 in view of the lack of motivation to combine the secondary references with *Asmussen*.

A. Petitioner and Dr. Lippman Failed to Show that Asmussen Renders the Challenged Claims Obvious

88. Neither the Petitioner nor Dr. Lippman contend that *Asmussen* alone renders the challenged claims obvious. Petition, at 8; Ex. 1003.

1. Asmussen Does Not Disclose the Limitation [1.a] of Claim 1

89. In my opinion *Asmussen* does not disclose the claimed "network interface." Claim element [1.a] recites "a network interface configured to receive first digital information" and "second digital information."

90. Dr. Lippman points to the required "network interface" as "The collective tuner 603 and receiver 750" with support at "15:15-23, 26:1-11, 26:55-63, 28:9-11, 50:4-57, Figs. 4, 5b, 11, 12a-b, 30." Ex. 1003, ¶82.

91. In the embodiment shown in Figure 11, *Asmussen* indeed provides significant discussion of tuner 603, which is primarily used to access cable signals intended for reception on the subscriber's TV, e.g., the user instructing the tuner to tune to the proper frequency of the channel or desired program. *See* Ex. 1004, 26:1-29; Fig. 11. While *Asmussen* discloses upgrades to the set top terminal that can provide additional features (*Id.*, 3:39-41), there is no explicit disclosure that the combination of the tuner 603 and receiver 750 satisfies the claimed network interface receiving first and second digital information.

92. The receiver 750 is only mentioned a single time in the specification (*Id.*, 50:45) and in Figure 30. While the discussion surrounding the receiver 750 mentions it receiving "an incoming (i.e., downstream) video conferencing signal" (*Id.*, 50:44-45) *Asmussen* does not explicitly mention it working in conjunction with the tuner 603 or it being included as part of the receiver components 601.

93. Dr. Lippman's opinions are based on both a misunderstanding of the '991 Patent and *Asmussen*. First, as described in the '991 Patent, the network interface ("network I/F") serves as both a receiver and sender of information, e.g., "a request signal is transmitted from the processor **12** to the VOD server **21** through the network I/F **15** and network **6**" and "The title data is passed to the HTML browser **13** through the network I/F **15**." Ex. 1001, 12:55-57, 12:59-60, 11:67-12:5, Figure 2.

94. However, as shown in the *Asmussen* Figures 4, 11, and 12a, which Dr. Lippman cites, the tuner 603 serves only as a receiver of CATV input, while correspondingly, in Figure 30 the receiver 750 is only shown by the arrow to receive an input. Further, an optional modem would be required for communication to the cable headend, that is, sending of information or a "data transmitter **344** provides upstream data communications." *See, e.g.*, Ex. 1004, 15:20-23, 25:57-60. Dr. Lippman recognizes this deficiency when he notes that "*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,'" but he does not include transmitter 730 as part of the network interface element for claim element 1(a). Ex. 1003, ¶115.

95. Additionally, Dr. Lippman incorrectly attempts to combine receiver 750 with the receiver components block 601 by pointing to *Asmussen*'s Figure 12a. Ex. 1003, ¶116. Figure 12a illustrates the set top terminal with the additional level A-C hardware upgrades. Ex. 1004, Figure 12a.

96. I first note that video call functionality is provided by the Turbo Card shown in Figure 6 ("Optionally, the Turbo Card **700** provides functionality to perform video calls using the set top terminal **220**."). Ex. 1004, 17:25-26. Dr. Lippman has not shown that the Turbo Card is one of the aforementioned hardware upgrades A-C, and, thus, incorrectly states that receiver 750 is part of Figure 12a.

97. Second, Dr. Lippman points to receiver components block 601 of Fig. 12a. I note that receiver components block 601 is associated in *Asmussen* with "various receiver components described above" in column 26, that is, well before the description of receiver 750 in column 50. *Id.*, 26:57-60, 50:44-45. In fact, receiver components block 601 refers to such components as a demodulator and demuxer.

98. Further, claim element [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." This claim element requires that the contents server be coupled to the communications apparatus via the network interface.

99. As shown in the '991 specification a video on demand server ("VOD server") is the "contents server" required by claim element [1.a]. Ex. 1001, Figure 3, 11:67-12:5, 12:39-44. There is no evidence that *Asmussen*'s tuner 603 and receiver 750 are coupled to a contents server, particularly one that receives video-on-demand. *See* Figure 1 of *Asmussen* as below:

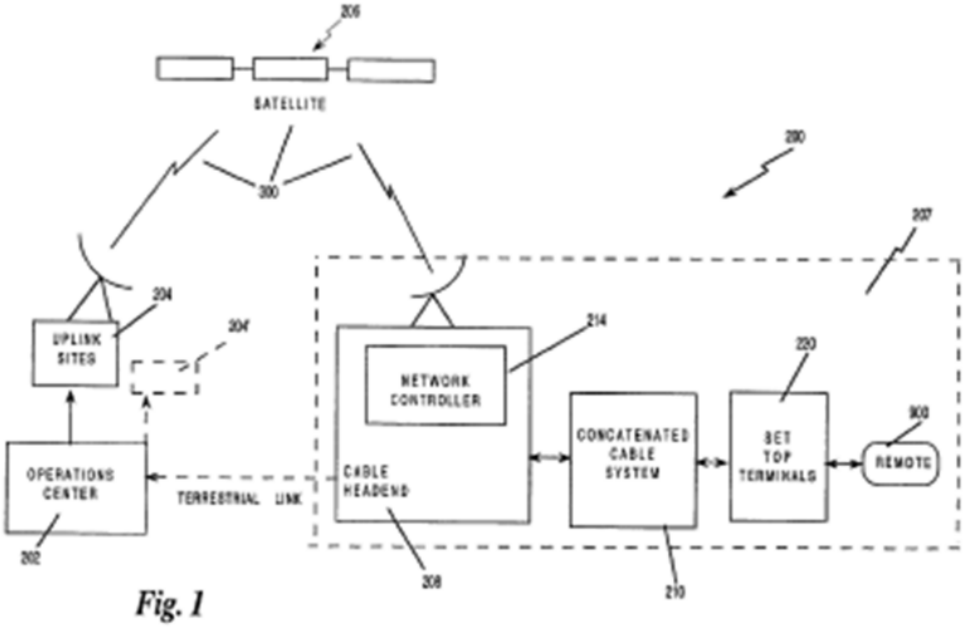


Fig. 1

100. Figure 1 of *Asmussen* shows that the operations center 202 is coupled to cable headend 208 via a terrestrial link and there is no explanation that operations center 202 includes a contents server that is coupled to a communication apparatus (*i.e.*, set top terminals 220) and that the tuner 603 and receiver 750 of set top terminal 200 receives first digital information from a contents server in operations center 202. Further, the terrestrial link between cable headend 200 and operations center 202 shows a one-directional communication going in the uplink direction, not that operations center 202 is providing first digital information from a contents server to set top terminals 220. Thus, in conclusion, Dr. Lippman has not shown that *Asmussen* discloses "a network interface configured to receive first digital information" and "second digital information."

101. Finally, *Asmussen* as a whole demonstrates that it does not disclose the claimed network interface. *Asmussen* already accounts for hardware upgrades in its system which, do not include adding the receiver 750 into its upgrades with respect to Figs. 12a and 12b. As such, I would not take a "collective tuner 603 and receiver 750" and add it into the system of *Assmussen* to attempt to arrive at the claimed network interface where *Asmussen* already contemplates extensive upgrades to its system, particularly where *Asmussen*'s objects of the invention are directed primarily toward menus and interfaces allowing users to efficiently access television programs and program options. *Id.* at 4:31-54.

2. Asmussen Does Not Disclose the Limitation [1.e] of Claim 1.

102. *Asmussen* does not disclose a processor "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." Specifically, *Asmussen* does not disclose at least a processor that renders the camera operative upon receipt of an incoming videophone call.

103. In his declaration, Dr. Lippman focuses on the following passage, produced in full, to demonstrate that *Asmussen* allegedly includes a processor that renders the camera operative upon receipt of an incoming videophone call:

> 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 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).

Ex. 1004, 21:34-42.

104. Dr. Lippman then provides the following opinion as to how a POSITA would allegedly understand this passage:

> 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.

Ex. 1003, ¶128.

105. Dr. Lippman incorrectly attempts to draw a parallel between the "automatic pause program feature" in *Asmussen* (e.g., Ex. 1004, 43:18-48:28) and the processor rendering the camera operative upon receipt of an incoming video call as required by element [1.e] in the '991 Patent, creating a matrix of four alleged scenarios (automatic pausing on/off and default camera state being on/off).

106. As I noted above in Section VII.a, *Asmussen* distinguishes between pausing the video program in response to a "communications event" (i.e., automatically pausing the video) and a "triggering event" (i.e., pausing the video only upon user input). Further, *Asmussen* notes that an incoming video call could be a communications event that could automatically pause the video program. Ex. 1004, 44:9-13.

107. However, *Asmussen* does not disclose that the automatic pausing feature's treatment of incoming video calls—discussed in detail over numerous columns (e.g., Ex. 1004, 43:18-48:28)—can simply be applied to the operation of the camera. Rather, Dr. Lippman's opinions as to a POSITA's various "understandings" of *Asmussen* on this false equivalence is nothing of the sort—they are unsupported statements that attempt to inject subject matter that is not in

Asmussen. As discussed previously, *Asmussen* envisions a variety of options, including turning automatic pausing off and allowing pausing on either a communications event or a triggering event, continuing to display a video portion of a program, or even ignoring a notification entirely. Ex. 1004, 47:44-67. Dr. Lippman ignores these options when trying to establish equivalence.

108. Further, nowhere in the "Basic Video Call Functionality" section (Ex. 1004, 49:42-51:8), which refers to Figure 30 and provides functionality information, does *Asmussen* state that the camera 2000 is rendered operative upon receipt of an incoming video call.

109. Leaving a camera "on" at all times would not necessarily waste the same resources in the apparatus described in *Asmussen*, which includes a television and set top box which could derive power from an AC outlet versus, for example, draining a mobile phone battery[1]. Furthermore, there is no indication that leaving a

[1] In fact, Lippman later appears to contradict this position, by claiming it is necessary to render a camera operative early in order to reduce the "lag time between the starting of a video call and the reception of the video stream at the calling party's set top terminal." Ex. 1003, ¶141.

camera "on" would also require that images/video be broadcast.[2] A POSITA would certainly have understood that a camera could remain on and minimal operations, such as simply storing a few frames, could be performed; this would simultaneously preserve a user's privacy, since no video would be broadcast, and require minimal resources, since no extensive compression or other processing would be required.

110. Moreover, *Asmussen* itself provides support that the camera is not rendered operative until the user accepts the video call in order to safeguard the user's privacy.

111. First, *Asmussen* discloses that "the video conferencing system can support more sophisticated remote participant controls of video and camera functions. For example, the camera **2000** may be electronically controllable (e.g., electronically steerable, focusing, zoom, pan, etc.) locally or remotely, and one or more other participating viewers **266** can command these electronically controllable aspects of the camera **2000** to customize and dynamically alter the characteristics of the video image sensed by the camera **2000**." Ex. 1004, 56:32-40. Although this passage does not explicitly say when such control by remote parties could occur, a

[2] This is further contradicted by Dr. Lippman's own patent U.S. 7,864,051, which proposes a technique for leaving electronic devices on, albeit in a low-power state, until needed.

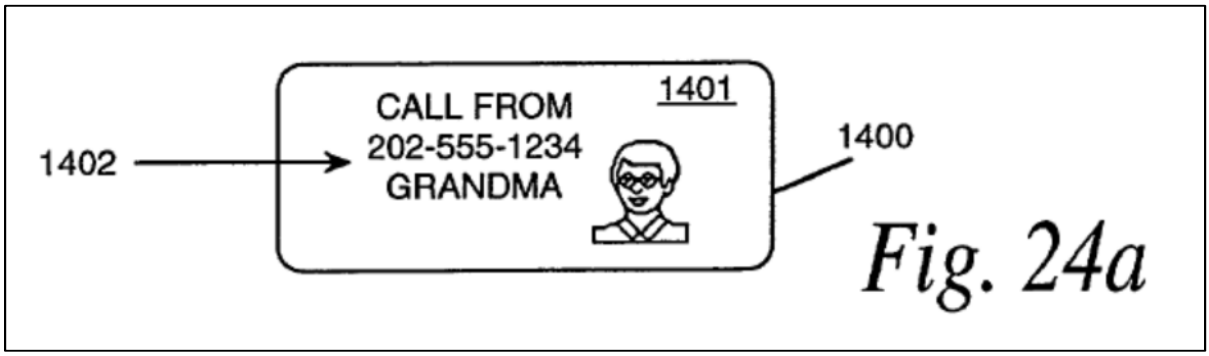
POSITA would understand such control to occur only after the video call was accepted/established. Otherwise, a remote party could substantially invade a user's privacy by simply initiating a video call to gain control of the user's camera 2000.

112. Second, nowhere in *Asmussen* is there any figure or image showing that a camera is rendered operative upon receipt of an incoming video call. For example, there is no disclosure that, upon receipt of an incoming video call, the camera is rendered operative and the user's face is visible in a small box on the display prior to answering the video call.

113. Rather, *Asmussen* states that "the caller identification techniques described in section C(4)(g), above, are applicable" to video calls. *See* Ex. 1004, 59:23-26. Section C(4)(g) refers to a discussion of "Caller ID" (under the sub-section "Advanced Features and Functional Capabilities") for incoming telephone calls. For example, *Asmussen* states:

> Upon receiving the telephone number from which the call was initiated, the preferred embodiment of the caller ID compares the telephone number with a list of telephone numbers stored in memory. The list of telephone numbers stored in memory is cross referenced to a list of names, other textual data or graphics. When the set top terminal finds a match between the telephone number and a number stored in memory, the corresponding text or graphics are displayed on the television screen. For example, "GRANDMA" and a "smiley face" graphic can be flashed across the television screen using an overlay menu.

Ex. 1004, 39:18-28. This example is shown in Figure 24(a):



Ex. 1004, Fig. 24(a); *see also id.*, 43:43-50 ("As shown in FIG. 24 *a*, a video display **1400** displays a video program **1401**. Based upon detection of a telephone call, the system displays a message **1402**, which may include the incoming telephone number as well as any text or graphics the user has previously associated with that number. For example, as shown, a user may associate a name with a particular number and potentially also associate an icon with it such as a 'smiley face.'").

114. In other words, *Asmussen* states that the disclosure relating to caller ID for telephone calls is applicable to video calls. Thus, it is my opinion that a user would see a similar "Grandma" text and icon as in Figure 24a when an incoming video call from Grandma similarly occurs.

115. Indeed, *Asmussen* confirms my understanding regarding what a user would see upon receiving an incoming video call in discussing Figure 28:

> If another type of communications event occurred (step **1451**), such as receipt of an incoming video call, the system may display an indication of that type of communications event (step **1456**). For any of the

communications events, the system may alternatively display an icon, such as a telephone icon for a phone call or an envelope icon for an e-mail message, or display textual or other information providing an indication of the communications event. This display may be in the form of an overlay menu or a hidden menu. Alternatively, techniques such as picture-in-picture, split screen, or side-by-side screen displays may be used. After displaying an indication of the communications event, the system waits for user input (step **1457**).

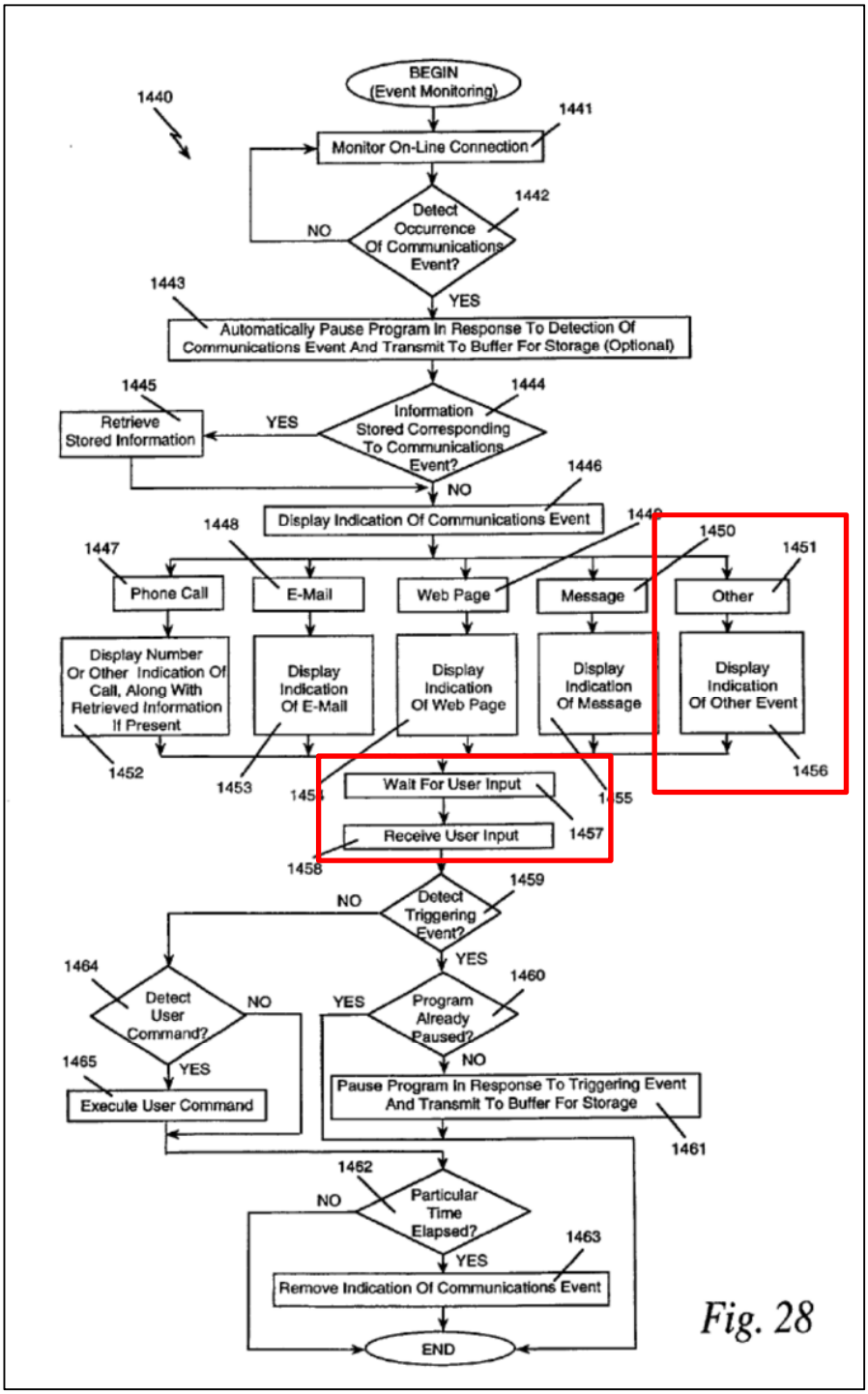


Fig. 28

Ex. 1004, 47:26-38, Fig. 28 (annotated).

116. As described previously, this section involves optionally pausing video or audio in response to certain events and displaying an indication of the

communications event; however, again, nowhere in the discussion of the display of another type of communication event, such as an incoming video call, or even in the entire description of the event monitoring method does *Asmussen* disclose that the camera is rendered operative upon receipt of the video call.

117. At most, Dr. Lippman's citations to *Asmussen*, reproduced in full below, relate generally to receiving video calls, optionally pausing the video program upon receipt of the video call, caller ID of video calls, or the microprocessor executing programs, including those relating to the camera:

a. Ex. 1004, Abstract:

> A set top terminal equipped with a camera and microphone includes the capability to send and receive video calls through a cable television delivery system or other communications networks. In response to detection of the occurrence of a video call event or triggering event, a video program is automatically paused. In response to an incoming video phone call, message, web page, or other video communications information, the system pauses the video program and displays an indication of the occurrence of the communications event. The system also buffers the video program while paused, permitting a user to replay missed portions of it. Alternatively, the system waits for a triggering event, which includes the user's access to the communications event, in order to pause the video program. The set top terminal also includes features for caller identification of video calls and dual display of video programs and video calls, such as picture in picture. A hardware

upgrade for adding video call functionality to a set top terminal is also disclosed.

b. Ex. 1004, 4:5-30:

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.

Other such features include a system for automatically pausing a video program in response to detection of the occurrence of a video call event or triggering event. In response to an incoming video phone call, message, web page, or other video information, the system pauses the video program and displays an indication of the occurrence of the video call event. Alternatively, the system pauses the video program in response to a triggering event, which includes a user's access to a video call event. The system also buffers the video program while paused, permitting a user to replay missed portions of it. As used herein, “video programs” include 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).

Still other such features include caller identification of video calls and dual display of video programs and video calls, such as picture in

picture. The video call functionality can be built into a set top terminal or provided as a hardware upgrade to a set top terminal.

c. Ex. 1004, 15:15-33:

FIG. 4 shows the basic hardware components of the set top terminal **220**. The set top terminal **220** has a tuner **603**, digital demodulator **606**, decryptor **600**, and demultiplexers **609**, **616** as well as audio equipment **612** and a remote control interface **626** for receiving and processing signals from the remote control unit **900**. An optional modem **627** allows communication between a microprocessor **602** and the cable headend **208**. An NTSC encoder **625** provides a standard NTSC video output.

The microprocessor **602** is capable of executing program instructions stored in memory. These instructions allow a user to access various menus by making selections on the remote control **900**. To 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. The 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.

d. Ex. 1004, 31:39-48:

To support video calling capabilities, the remote control unit **900** preferably includes a call answer button (not shown) and a call hang up button (not shown). The call answer button and the call hang up button

may be separate buttons or the same button. To support video calling with outgoing video, the remote control unit **900** preferably includes a camera activation button (not shown) and buttons or other controls for pointing the camera **2000**. The cursor movement buttons **370**, a joystick, a trackball or something similar can be used for camera pointing in a camera control mode.

e. Ex. 1004, 43:18-44:37:

l. Automatic Program Pause Feature

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.

FIGS. **24***a*-**24** *d* provide examples of indications of various communications events **111** which may be used to pause a video program. As shown in FIG. **24***a*, a video display **1400** displays a video program **1401**. Based upon detection of a telephone call, the system displays a message **1402**, which may include the incoming telephone number as well as any text or graphics the user has previously associated with that number. For example, as shown, a user may associate a name with a particular number and potentially also associate an icon with it such as a "smiley face." The 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. Also, the indication of the communications event may be presented on the same display device as the paused video program, or on an associated display device.

As shown in FIG. **24***b*, detection of an incoming e-mail message may result in a text message **1403** providing an indication of the incoming e-mail message. This indication can include the message itself or other identifying information, such as a graphic or an identification of the sender of the message.

As shown in FIG. **24***c*, detection of a message from program control may result in display of a message **1404**. Program control refers to a particular content provider. For example, program control includes a

cable television operator, a set top terminal manufacturer, or a cable television network programmer.

As shown in FIG. **24***d*, detection of an incoming web page may result in display of a web page **1405**. Web pages includes pages formatted, for example, in HyperText Markup Language (HTML) for transmission over the Internet using web browsers. Also, a user's access to the web page may constitute a triggering event, resulting in pausing and buffering of the video program. Many other types of triggering events are possible, involving a user's access to other types of communications events. Examples of other communications events include, but are not limited to, the following: a page to a pager number; an incoming cell phone call; an incoming facsimile transmission; an indication of a voice mail; or an incoming video call. Likewise, examples of other triggering events include, but are not limited to, the following: a user's access to a page to a pager number; a user answering an incoming cell phone call; a user accessing or otherwise requesting to view an incoming facsimile transmission; a user's access to a pending voice mail message; a user's access to his or her personal web page; or a user's initiation of a video call.

This program pause feature provides the user with an indication of a particular communications event, while buffering the paused video program. The user can thus take a particular action in response to the communications event without missing any substantial portion of the video program. For example, in response to display of an indication of an incoming telephone call, the user may choose to answer the telephone call while the video program is buffered. The system can

buffer the video program either, for example, in response to the telephone call or in response to an off-hook condition indicating the user has answered the call. Likewise, in response to an e-mail message or message from program control, the user may choose to view the message while the paused video program continues to be buffered. The incoming e-mail and web pages may be related to user options; for example, a particular stock price may be used to automatically trigger an e-mail or web page transmission to the user's display device.

f. Ex. 1004, 46:27-48:28:

FIG. 28 is a flow chart of an event monitoring method **1440** for monitoring communications events and pausing a video program in response to detection of an occurrence of a communications event or triggering event. Event monitoring method **1440** may be implemented in software or firmware, including modules, for execution by microprocessor **602** in set top terminal **220**; alternatively, it may be implemented with other processor-controlled devices for use in displaying a video program on an associated display device.

In event monitoring method **1440**, the system monitors an on-line connection (step **1441**). This typically occurs at set top terminal **220**, which may include a connection with a phone line through telephone jack **658** in addition to a connection to a source of a cable television signal, a satellite television signal, or other sources of video programs such as those described above or in the related applications identified above. The system continually monitors the connection for an occurrence of a communications event (step **1442**). Upon detecting the

occurrence of a communications event, the system optionally automatically pauses the video program in response to the communications event and continues to transmit it to the buffer for storage (step **1443**). Step **1443** is optional in that a user may choose to have the video program paused in response to a triggering event, explained below, rather than in response to a communications event.

The system also determines if stored information exists corresponding to the communications event (step **1444**). For example, the user may have stored text information corresponding to particular phone numbers using program caller ID method **1430**. If information corresponding to the communications event exists, the system retrieves the stored information (step **1445**).

The system then displays an indication of the communications event (step **1446**). This indication is typically displayed on the same television or display device which displays the video program. It may be displayed as an overlayed image on the displayed or paused video program or an inset image within the displayed or paused video program, as shown in FIGS. **24***a*-**24** *d*. If the communications event was a telephone call (step **1447**), the system displays the number of the incoming telephone call or another indication of the call along with any retrieved information, if present (step **1452**). The system may, for example, detect occurrence of a telephone call through monitoring a phone line through telephone jack **658** and detecting a signal corresponding to a phone call.

If the event was an incoming e-mail message (step **1448**), the system displays an indication of the e-mail message such as the name of the sender (step **1453**). The system may detect an e-mail message through use ofe-mail communications software detecting an incoming e-mail on a phone line through telephone jack **658**. Software packages for sending and receiving e-mail messages are known in the art.

If the communications event was an incoming web page (step **1449**), the system displays an indication of the web page such as the page itself (step **1454**). The system may detect an incoming web page, for example, through use of a web browser in set top terminal **220** detecting receipt of a web page on a phone line through telephone jack **658**. Web browsers are known in art and include, for example, the MICROSOFT INTERNET EXPLORER™ program and the NETSCAPE NAVIGATOR™ program.

If the communications event was an incoming message (step **1450**), the system displays an indication of the message such as an identification of the sender of the message (step **1455**). The system may detect an incoming message in the same manner as detection of an e-mail message.

If another type of communications event occurred (step **1451**), such as receipt of an incoming video call, the system may display an indication of that type of communications event (step **1456**). For any of the communications events, the system may alternatively display an icon, such as a telephone icon for a phone call or an envelope icon for an e-mail message, or display textual or other information providing an

indication of the communications event. This display may be in the form of an overlay menu or a hidden menu. Alternatively, techniques such as picture-in-picture, split screen, or side-by-side screen displays may be used. After displaying an indication of the communications event, the system waits for user input (step **1457**).

The system receives a particular user input (step **1458**) and determines if it is a triggering event, which is a user's access to a communications event. For example, triggering events include a user answering a phone call, opening or selecting a displayed indication of an e-mail or web page, or one of the other examples provided above. Therefore, instead of having the video program automatically paused in response to the communications event, a user can continue to view the video program upon viewing an indication of a communications event and have the video program paused if the user decides to access the communications event. The indications of the communications events may be displayed overlayed on the video program, or inset within it, for that purpose. In addition, if no triggering event occurs within a particular time, the system can be programmed to automatically remove the indication of the **1** communications event. Therefore, if the user does not access the communications event within a particular time frame, the system does not continue to display the indication of a communications event over the video program. The system may also be programmed for other types of options and examples include, but are not limited to, the following actions by the system based upon detection of a communications event or a triggering event: muting an audio portion of a video program, continue displaying a video portion of the video program, and buffering

both the video and audio portions for future replay; or pausing a video portion of a video program, continue presenting an audio portion of the video program, and buffering both the video and audio portions for future replay.

The system determines if the user input is a triggering event (step **1459**). For example, it may detect a phone off-hook condition, a user's initiation of a video call or a user's selection of an e-mail or web page through, for example, use of remote control **900**. Alternatively, the television system may be equipped to allow the user to answer the phone using the remote control **900**. If the user input is a triggering event, the system determines if the program is already paused (step **1460**); if not, the system automatically pauses the program in response to the triggering event and transmits the video program to the buffer for storage (step **1461**). As explained above, the pausing may include pausing both the video and audio portions of a video program, pausing only the audio portion, or pausing only the video portion. Typically, both the audio and video portions are buffered during the pausing.

If the user input was not a triggering event, the system determines if it was a user command (step **1464**); if so, the system executes the user command (**1465**), as described in video program control method **1470** shown in FIG. **29**. As indicated, the system may also be programmed to remove the indication of the communications event if it does not detect a triggering event within a particular time frame. Therefore, the system may determine if a particular time has elapsed without receiving a triggering event (step **1462**) and, if so, it removes

the indication of the corresponding communications event (step **1463**). For example, any overlayed items or text may be removed.

g. Ex. 1004, 50:11-17:

> To support video calling, an instruction memory of the set top terminal **220** preferably contains programs for call establishment and management. The programs provide menus and a graphical user interface for call initiation, adding a party to a conference call, accepting an incoming call, terminating a call, and setting up call characteristics as well as display and other output characteristics.

h. Ex. 1004, 59:37-41

v. Program Pausing for Video Calls

> The automatic program pause feature described in section C(4)(l), above, can be used without modification when the communications event is a video call event, which is a communication event involving video in any way.

118. It is not enough that a camera is rendered operative at some point during the video call. Rather, the camera must be rendered operative by the processor upon receipt of an inbound videophone call notice, while displaying the first digital information, and then pausing that first digital information.

119. Dr. Lippman admits that *Asmussen* discloses detecting an inbound videophone call, pausing the video program, and 'then waits for user input, and once the user input is received, determines if the user input is a 'triggering event.'" Ex.

1003, ¶155. In other words, the processor does not cause the camera to be rendered operative after receiving a videophone call as Claim 1(e) requires. At most, the processor pauses the program and waits for further instruction ***from the user.*** Ex. 1004, Fig. 28 (step 1457). The claim requires that the camera is rendered operative upon receipt of the video call, not when the call is answered.

120. *Asmussen* further discloses that "[t]o support video calling with outgoing video, the remote control unit **900** preferably includes a camera activation button (not shown) and buttons or other controls for pointing the camera **2000**. The cursor movement buttons **370**, a joystick, a trackball or something similar can be used for camera pointing in a camera control mode." Ex. 1004, 31:43-48. Although this passage discusses outgoing video calls, the passage further underscores the user's ability to control and render the camera operative—not the processor on receipt of a video call as required by Claim 1(e)—consistent with the remainder of the *Asmussen* disclosure.

121. The instructions "allow a user to access various menus by making selections on the remote control **900**" and an example of a menu is the "video call operations menu **1022**" that Petitioner relies on with respect to the default state (on/off) of the video camera. *See Id.* at 15:25-27, 21:34-42. Thus, even if the user chooses the default camera setting to "on" via a remote control prior to receiving an

inbound video call (as Petitioner's expert concedes, Ex. 1003, ¶131), it is my opinion that there is nothing in *Asmussen* that discloses that that the camera is rendered operative by the processor ***when*** the inbound video call is received.

122. In summary, it is my opinion that Dr. Lippman has not shown that *Asmussen* discloses element [1.e] nor provided evidence that a POSITA would have found it obvious to modify *Asmussen* to disclose this information—specifically, a processor rendering the camera operative upon receipt of an inbound videophone call notice, while displaying the first digital information, and then pausing that first digital information.

a) Bear Does Not Teach the Limitation [1.e] of Claim 1 Missing in Asmussen

123. *Bear* does not teach "rendering the camera operative" on an inbound videophone call notice as recited in claim limitation [1.e]. In fact, as described in Section VII.b, the focus of *Bear* is on safeguarding the camera lens from damage and the user from inadvertent transmission or recording; the camera is enabled on for an incoming call when the user answers the call by pressing the camera button or if the user has set system preference to automatically enable the camera on call answer. Ex. 1005, 2:59-3:1, 6:41-46, 12:12-20.

124. As support to his opinion, Dr. Lippman cites to the A/V capture application which can be launched "in response to receiving an incoming phone call that supports video." Ex. 1003, ¶135, Ex. 1005, 11:37-43. However, Dr. Lippman

neglects the statement "While an audio/video (A/V) capture application is executing, pressing the capture button 308 usually triggers an image or video stream capture depending on the mode setting" which indicates that a user should still manually press a button even if application software has been triggered by an incoming call. Ex. 1005, 7:42-45.

125. Further, even if an A/V capture application were to operate as Dr. Lippman summarizes:

> 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.

After the application is lunched, *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.

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.

Ex. 1003, ¶¶135-137.

Bear instructs that "If the user has pressed the capture button **308** or otherwise has made an indication to stop, the application then displays a dialog box for the user to confirm that the image is to be saved at step **1018**" (Ex. 1005, 12:2-6), referring to Figure 10 as shown below:

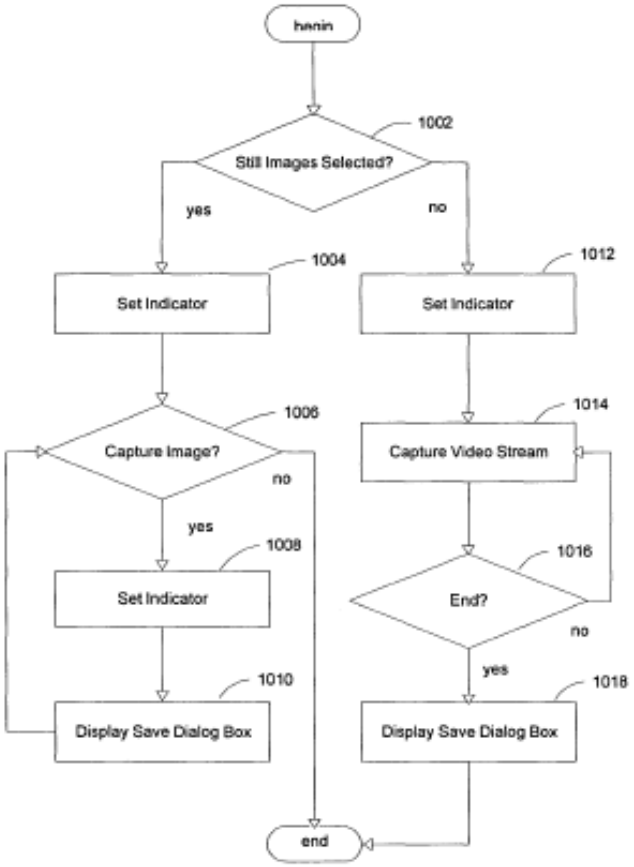


FIG. 10

Ex. 1005, Fig. 10.

126. This addition of the question of whether to save the captured video indicates that this A/V application is for the purposes of recording a video call. If combined with *Asmussen*, the A/V application of *Bear* that automatically records each videophone call and then gives the user the option of saving the recording would add a layer of unneeded processing and complexity to each video call, which is counter to the teaching of the '991 patent.

3. Asmussen Does Not Disclose the Limitation [8.c] of Claim 8

127. For the same reasons that Petitioner and Dr. Lippman failed to show the disclosure of Claim 1(e) in *Asmussen* and *Bear* discussed above, Petitioner and Dr. Lippman have equally failed to show the disclosure in claim 8(c).

B. Petitioner and Dr. Lippman Failed to Show That It Would Have Been Obvious to Combine Asmussen with Other Prior Art

128. In order to correct for the deficiencies of *Asmussen*, Petitioner and Dr. Lippman attempt to combine them with other prior art including *Bear* and *Marley*. However, the Petitioner and Dr. Lippman have failed to show that it would have been obvious to combine *Asmussen* with either of these references, and, furthermore, *Marley* teaches away from some of the conclusions Dr. Lippman and Petitioner draw.

1. Grounds 1-6: Petitioner and Dr. Lippman Failed to Show That It Would Have Been Obvious to Combine Asmussen and Bear

129. For all grounds, the Petitioner relies on the combination of *Asmussen* with *Bear*. It is my opinion that Dr. Lippman and Petitioner failed to show that the challenged claims of the ’991 Patent are obvious over the combination of *Asmussen* and *Bear*.

130. Dr. Lippman fails to show why and how a POSITA would combine *Asmussen* with *Bear*. He fails to explain why a POSITA would be motivated to rely on *Bear* to include automatically launching an A/V capture application to begin capture of a video stream in *Asmussen*.

131. It is my opinion that the design requirements for *Asmussen* and *Bear* are substantially different. In addition, a POSITA would not be motivated to combine the teachings of *Asmussen* and *Bear* because they are directed to solving different problems and use different structures to solve these problems. Dr. Lippman has not considered the two references as a whole and has not accounted for these differences. Instead, Dr. Lippman selected portions of each reference and used hindsight to assemble a new system without accounting for the different objectives and goals of the systems in *Asmussen* and *Bear*.

132. A POSITA would not be motivated to modify *Asmussen*, a set top box system, to include an A/V capture application designed for use in a personal computer as described in *Bear*. While *Bear* states that its "invention is operational with numerous other general purpose or special computing system environments," *Bear* also merely states that it "**may be** suitable for use with . . . set top boxes" without providing any further detail. Ex. 1005, 3:66-4:9.

133. Dr. Lippman also does not explain how a POSITA would implement the personal computer-based application of *Bear* in a set top box system like *Asmussen*. Dr. Lippman describes some benefits in generalities ("improve the functionality" and "simplified"), and claims that "the modification requires only simple programming techniques." But describing potential improvements that are accomplished by the claims of the '991 Patent is the definition of hindsight. Neither

Petitioner nor its expert attempts to quantify such "simple programming techniques." Incorporating an entirely different function into a processor is hardly the result of "simple programming techniques."

134. *Bear* was not solving the same problem as *Asmussen*. *Asmussen's* focus is a set top converter box or terminal for a television program delivery system that provides both a menu generation capability as well as a number of advanced features and functional capabilities including video calling and pausing video programs automatically. Ex.1004, Abstract. On the other hand, as described above, *Bear* is focused on safeguarding measures that require manual operation of a lens cover. *Bear* is completely silent on rendering the camera operative in the full context of Claims 1 and 8 (i.e., rendering the camera operative when a processor receives an inbound videophone call notice while displaying the first digital information on the display and pauses the first digital information); the Petitioner improperly focuses on *Bear's* teachings in isolation.

135. For all of the foregoing reasons, it is my opinion that a POSITA would not combine *Asmussen* and *Bear*.

136. However, even if one were to improperly combine *Asmussen* and *Bear*, the combination does not correct for the deficiencies of either in isolation. I've reviewed the Institution Decision and noted that the PTAB states the following:

> Based on the present record, we disagree with Patent Owner. As Dr. Lippman testifies, "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.'" Ex. 1003, ¶ 140 (quoting Ex. 1005, 2:1–10). Dr. Lippman explains, "[t]his 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." Ex. 1003 ¶ 140.

Institution Decision, 71-72.

137. As described above in Section VII.b, *Bear* is focused on the manual operation of the camera. *Bear*'s system is focused on safeguarding a camera lens from damage and safeguarding the user from "inadvertent video recording" while keeping the lens cover closed when not in use in order to provide "visual reassurance to the user that the user is not being viewed or recorded." Ex. 1005, 7:61-65.

138. *Bear* discloses that in order to answer and activate the camera on an incoming video call, the user may answer the call by pressing the camera button or, alternatively, the user may set a system preference to automatically enable the camera on call answer. *Id.*, 2:59-3:1, 6:41-46, 12:12-20.

139. Nevertheless, Dr. Lippman cites to *Bear*'s A/V capture application which can be launched "in response to receiving an incoming phone call that supports video." Ex. 1003, ¶135, Ex. 1005, 11:37-43. When in video capture mode, the A/V capture application, as disclosed in *Bear*, "begins capturing the video stream." Ex. 1005, 11:65-66, Figure 10. However, Dr. Lippman neglects the fact that the A/V capture application requires a step of "[displaying] a dialog box for the user to confirm that the image is to be saved at step **1018**." Ex. 1005, 12:2-6, Figure 10. A POSITA would understand that adding a dialog box step, that is, a mandatory question/answer process to every video call would be burdensome to a user.

140. Further, *Bear* notes manual operation in conjunction with the A/V capture application cited by Dr. Lippman and described in Figures 9 and 10. ("Opening the lens cover prepares the camera for capture, and may stream preview video to the A/V capture application") Ex. 1005, 8:18-20; *see also* 10:33-40.

141. The PTAB also states the following:

> Dr. Lippman also explains that "[m]odifying 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." *Id.*¶ 141.
>
> Dr. Lippman testifies that "[t]his 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)." *Id.* Dr. Lippman explains that "[i]t 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." *Id.*

Institution Decision, 72.

142. Although neither *Bear* nor *Asmussen* teaches rendering a camera operative on receipt of an inbound video call, as required by claim element [1.e], both *Bear* and *Asmussen* teach a user must answer a call. For instance, *Bear* discloses "For example, whenever there is an incoming phone call that supports video, the camera indicator light **306** may slowly blink red to alert the user. The user may then answer the call immediately in that mode by pressing the camera button **308**. If the user presses the camera button, the system opens the video monitor, lights the camera indicator, and starts streaming video. Optionally, the user can set a preference so that the camera is automatically enabled whenever answering a call that supports video." Ex.1005, 12:12-20. Thus, the user in *Bear* necessarily must have the camera or other hardware at hand to answer the call and then activate the camera.

143. Similarly, *Asmussen*, while silent on rendering the camera active, discloses a remote control for both call answer and camera activation. Ex. 1004, 31:39-46.

144. Further, a POSITA would have understood that at the processing speeds available in hardware at the time of the invention, reduction in lag time would not be a concern.[3]

2. Grounds 2, 3, 5, and 6: Petitioner and Dr. Lippman Failed to Show That It Would Have Been Obvious to Combine Asmussen and Marley

145. For certain grounds the Petitioner additionally relies on the combination of *Asmussen* with *Marley* for purposes of illustrating stopping the call and restarting.

146. However, I note that there is no reasonable basis for combining *Asmussen* with *Marley* since *Marley* teaches away from certain elements of Claim 1.

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[3] For instance, a popular processor available before 2008 was the Intel Core Duo T2400 (https://ark.intel.com/content/www/us/en/ark/products/27235/intel-core-duo-processor-t2400-2m-cache-1-83-ghz-667-mhz-fsb.html) which advertised a speed of 1.83 GHz.

147. First, claim elements [1.d]-[1.g] require a single processor for handling of the video program and the video call. A discussed above in Section VII.c, *Marley* instructs that there should be two processors, a primary audio/video processor (PAVP) and a video telephone processor (VTP). Ex.1006, [0015].

148. Second, claim element [1.e] requires that a camera be rendered operative on receipt of an inbound videophone call notice. *Marley* instructs that the programming be paused and the camera be made active only ***after*** a call is accepted ("Acceptance of the call causes PAVP **308** to mute and/or pause any programming presently being viewed on monitor **320 (503),** and store the paused programming in DVR memory **316** for viewing after the termination of the video call **(505)**. VTP **302** activates camera **104** and microphone **106**, and in conjunction with PAVP **308** transmits the video image and audio from camera **304** and microphone **306** for reception by set-top box **100** (**507**), and provides a real time "self-image" of camera **304**'s output on a portion of monitor **320** for viewing by the called party (**509**)"). *Id.*, Figure 5, [0022].

149. In addition, the design requirements for the combination of *Asmussen* and *Bear* (per Ground 2) are substantially different than the system in *Marley*.

150. It is my opinion that a POSITA would not be motivated to combine the teachings of the combination of *Asmussen* and *Bear* with *Marley* because they

are directed to solving different problems and use different structures to solve these problems; *see* Sections VII.a-c.

151. In my opinion, as described previously, a POSITA would not be motivated to modify *Asmussen*, a set top box system, to include an A/V capture application designed for use in a personal computer as described in *Bear*. The systems of *Asmussen* and *Bear* are different and were solving different problems, and Petitioner provide only hindsight-based reasoning for combining the two references.

152. Similarly, a POSITA would not be motivated to modify *Asmussen*, which discloses an independent hardware upgrade to provide video call functionality to an existing set top box, to the integrated system of *Marley*. Further, Dr. Lippman never explains how a POSITA would implement another set-top box system as discussed in *Marley* to the now hybrid set-top box/personal computer combination of *Asmussen* and *Bear*.

153. The PTAB notes:

> We credit Dr. Lippman's testimony, which supports Petitioner's position. For example, with respect to claim 1, we agree that modifying Asmussen to use Marley's teaching of incorporating all of its components into a single housing would be a relatively straightforward application of a known technique for a person of ordinary skill in the art and would provide several benefits to consumers, such as reducing

> the number of appliances a consumer would need to purchase in order to have videophone capabilities and provide videophone capabilities in familiar format to consumers.
>
> Institution Decision, 89.

154. As discussed above, it is my opinion that *Marley* teaches away from the '991 patent, thus, there is no motivation to combine *Asmussen* with *Marley*. Further, as discussed in Section VII.a, the focus of *Asmussen* is on providing advanced features and functional capabilities through hardware upgrades.

155. *Asmussen*'s set top terminal is "achieved through a set of hardware upgrades" which "provide additional advanced features and functional capabilities." Ex.1004, 3:31-41. *Asmussen* further notes that a "hardware upgrade for adding video call functionality to a set top terminal is also disclosed." *Id.*, Abstract. The Turbo Card "provides functionality to perform video calls using the set top terminal" *Id.*, 17:25-26.

156. Thus, it is my opinion that incorporating *Marley*'s integrated components in a single housing runs counter to *Asmussen*'s teaching of using hardware upgrades to achieve advanced features such as video calling.

157. The PTAB further notes:

> Similarly, with respect to claim 5, we agree that it would have been relatively straightforward for a person of ordinary skill in the art to modify Asmussen's processor using Marley's teachings of having a processor receive a single user input from a remote control for making

> an outbound a video call (i.e., a "dial" command), and in response having the processor render the camera and microphone active. We also agree that it would have been a relatively straightforward modification to have Asmussen's processor display information indicating an outbound videophone call on the display, as Asmussen's set top terminal already contains the necessary components for displaying the called party's telephone number as taught by Marley.

Institution Decision, 89.

158. Dr. Lippman has not shown that *Marley* contains a single processor as required by Claim 1 (elements [1.d]-[1.g]) upon which Claim 5 depends. In fact, *Marley* instructs that there should be two processors, a primary audio/video processor (PAVP) and a video telephone processor (VTP). Ex.1006, [0015]. The VTP is responsible for video processing "specifically directed to controlling and managing video telephone functions" while the PVAP "performs the types of audio and video processing typically associated with DVR-capable set-top appliances, including: routing incoming signals to/from a Multiple System Operator ('MSO')." *Id.*, [0015].

159. In his discussion of Claim 5, Dr. Lippman notes that "Marley teaches that the PAVP and the video telephone processor (VTP) work together to perform the above-discussed functionality" Ex. 1003, ¶169 referring to ¶168. Dr. Lippman then points to the PAVP as the processor that "performs the step of receiving the input and rendering the camera and microphone operative" (*Id.*, ¶170) and notes that

"*Marley* expressly teaches the processors working 'in conjunction' to provide the real time image at the calling party's monitor." *Id.*, ¶170. However, it is not made clear that either of the processors satisfies the requirements of Claim 5 and the claims on which it depends, since the two processors are responsible for entirely different functionalities Ex.1006, [0015],[0019]-[0022].

160. Thus, it is my opinion that Petitioner and Dr. Lippman have not shown that a POSITA would be motivated to combine *Asmussen* and *Bear* with *Marley*.

3. Grounds 3 and 6: Petitioner and Dr. Lippman Failed to Show That It Would Have Been Obvious to Combine Asmussen with DeFazio

161. For certain grounds the Petitioner additionally relies on the combination of *Asmussen* with *DeFazio*.

162. Dr. Lippman's contends that the proposed obviousness combination—*Asmussen* in view of *Bear* and *Marley* and *DeFazio*—renders Claims 5 and 12 of the '991 Patent obvious. I disagree for the reasons set forth below.

163. A POSITA would not be motivated to combine the teachings of *Asmussen*, *Bear*, and *Marley* with *DeFazio* because they are directed to solving different problems and use different structures to solve these problems; *see* Sections VII.a-c and VII.e.

164. A POSITA would not be motivated to modify *Asmussen*, a set top box system, to include both an A/V capture application designed for use in a personal

computer as described in *Bear* and another set top box system in *Marley*; *see* Section VIII.B.2

4. Grounds 4-6: Petitioner and Dr. Lippman Failed to Show That It Would Have Been Obvious to Combine Asmussen with Lindstrom

165. For certain grounds the Petitioner additionally relies on the combination of *Asmussen* with *Lindstrom*, namely, including *Lindstrom* to satisfy the "network interface" of claim element [1.a]. Petition, 69, 73-74.

166. The Petitioner and Dr. Lippman fail to provide any explanation as to why a POSITA would have been motivated to include a single out-of-band tuner for receiving video-on-demand and videophone information in the combination of *Asmussen* and *Bear* by relying on the teachings of *Lindstrom* given the particular design requirements of each system.

167. In my opinion, the design requirements for the combination of *Asmussen* and *Bear* are substantially different than the system in *Lindstrom*.

168. In addition, a POSITA would not be motivated to combine the teachings of the combination of *Asmussen* and *Bear* with *Lindstrom* because they are directed to solving different problems and use different structures to solve these problems; *see* Sections VII.a-b and VII.d.

169. In particular, *Lindstrom* discloses "a receiver having an in-band tuner and an out-of-band tuner integrated on a single IC." Ex.1008, Figure 1, [0005]. The features disclosed include controlling the power of and the signal strength to the out-

of-band tuner (*Id.*, 1008, Abstract) where the in-band tuner receives cable television channels and the out-of-band tuner receives content such as video-on-demand, pay-per-view channels and videophone signals. *Id.*, [0003], [0016]-[0017].

170. Dr. Lippman never explains how a POSITA would implement a single out-of-band tuner for receiving video-on-demand and videophone information as discussed in *Lindstrom* to the now hybrid set-top box/personal computer combination of *Asmussen* and *Bear*.

171. For all of the foregoing reasons, it is my opinion that a POSITA would not combine *Asmussen* and *Lindstrom*.

172. Just as it is inappropriate to combine *Asmussen* and *Marley*, it is also inappropriate to combine *Asmussen* with *Lindstrom*. Dr. Lippman states "*Lindstrom* expressly teaches a set top box that contains an integrated circuit that further contains within it a single out-of-band tuner" (Ex.1003, ¶189) and "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." Ex.1003, ¶191.

173. However, *Asmussen*'s set top terminal is "achieved through a set of hardware upgrades" which "provide additional advanced features and functional capabilities." Ex.1004, 3:31-41. *Asmussen* further notes that a "hardware upgrade for adding video call functionality to a set top terminal is also disclosed." *Id.*,

Abstract. The Turbo Card "provides functionality to perform video calls using the set top terminal." *Id.*, 17:25-26. Thus, it is my opinion that incorporating *Lindstrom*'s IC in a single housing runs counter to *Asmussen*'s teaching of using hardware upgrades to achieve advanced features and functionality.

IX. RESERVATION OF RIGHTS

174. In addition to the opinions and evidence expressed herein, I reserve the right to rebut any arguments made or evidence presented in response to this report. I also reserve the right to supplement this report based on further investigation or analysis.

175. I hereby declare that all statements made herein of my own knowledge are true and that all statements made herein on information and belief are believed to be true. Further, these statements were made with the knowledge that willful false statements and the like so made are punishable by fine, imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the above-identified patent.

Dated: October 7, 2020

Maja Bystrom, Ph.D.

APPENDIX A

Maja E. Bystrom

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Qualifications

Ph.D., Electrical Engineering, Rensselaer Polytechnic Institute, Troy, NY	1997
M.S., Mathematics, Rensselaer Polytechnic Institute, Troy, NY	1996
M.S., Electrical Engineering, Rensselaer Polytechnic Institute, Troy, NY	1994
B.S., Communication, Rensselaer Polytechnic Institute, Troy, NY	1991
B.S., Computer Science, Rensselaer Polytechnic Institute, Troy, NY	1991

Employment

Founder & CEO Bevara Technologies, Watertown, MA	2013 - present
Director Styrka Consulting, Watertown, MA	2009 - present
Co-Founder and Co-Director OneCodec, Ltd., Aberdeen, U.K.	2009 - 2013
Associate Professor, ECE Department Boston University, Boston, MA	2002 - 2009
Assistant Professor, ECE Department Drexel University, Philadelphia, PA	1997 - 2002
Visiting Scholar German Aerospace Research Corp., Oberpfaffenhofen, Germany	Fall 1995
Computer Engineer NASA - Goddard Space Flight Center, Greenbelt, MD	1991 - 1992

Non-Confidential Consulting Experience

Mayer Brown Retained by Mayer Brown on behalf of Maxell Ltd. in Case No. 5:19-cv-00036-RWS (E.D. TX)	2019-present
Fish & Richarson Retained Fish & Richardson on behalf of EchoStar Corp. and Hughes Network Systems in No. 6:17-CV-084-JDL (E.D. TX)	2017-2019
Baker Botts Retained by Baker Botts on behalf of Hughes Network Systems in No.: 2-15-cv-37-RWS-RSP (E.D. TX)	2016-2017
Winston and Strawn Retained on behalf of Ericsson in ITC Investigation No. 337-TA-952.	2015
Leydig, Voit & Mayer Retained on behalf of EveryScape, Inc. as an expert witness in the area of image processing. Case 10-11597-RGS (District of Massachusetts)	2013-2015
Finnegan, Henderson, Farabow, Garrett & Dunner Retained on behalf of Ericsson in ITC Investigation No. 337-TA-871 to provide technical analysis.	2013
Oblon, Spivak, McClelland, Maier & Neustadt Served as a consultant in the re-examination of S3 Graphics, Inc. patents: 6,658,146; 6,683,978; 6,775,417; and, 7,043,087.	2011
Finnegan, Henderson, Farabow, Garrett & Dunner Retained on behalf of S3 Graphics, Inc. in ITC Investigation No. 337-TA-724.	2010-2011
Quinn Emanuel Urquhardt & Sullivan Retained on behalf of Multimedia Patent Trust to provide technical analysis. Case No. 12-cv-2731-H-KSC (S.D. Cal.).	2010-2014
Herron Law APC Retained on behalf of Multimedia Patent Trust to provide advice concerning technical issues.	2012
Cooley LLP Retained on behalf of Multimedia Patent Trust to provide advice concerning technical issues.	2009-2012
Day, Casebeer, Madrid & Batchelder	2006 - 2007

Retained on behalf of Qualcomm Incorporated, in
case QUALCOMM INC. v. BROADCOM CORP., No. 05-cv-1958-B (S.D. Cal.)

Perkins, Smith & Cohen 2004-2005
Drafted expert opinions in response to office actions by the USPTO

Honors and Awards

IEEE, Senior Member, 2009

Royal Society of Edinburgh, Travel Award, 2005

ECE Department, Boston University, Award for Teaching Excellence, 2005

Fulbright Award, 2001

NSF CAREER Award, 1999

GE Foundation ``Faculty for the Future'' Junior Faculty Coupon, 1998

HKN, Drexel University, ``Best Professor'', 1998

Charles M. Close Doctoral Prize, 1998

GE Foundation ``Faculty for the Future'' Graduate Fellowship, 1997

Patents and Applications

U.S. Patent 8,995,534 SYSTEMS AND METHODS FOR ENCODING AND DECODING

CA Patent No. 2,816,284 ENCODING AND DECODING A MULTIMEDIA SIGNAL USING SYNTAX TO GENERATE A DYNAMICALLY CONFIGURED DECODER

U.S. Patent 9,154,797; SYSTEMS AND METHODS FOR ENCODING AND DECODING; WO 2012/040232 A1 SYSTEMS AND METHODS FOR ENCODING AND DECODING

U.S. Patent 9,578,078 (formerly 9,363,518); SYSTEMS AND METHODS FOR ENCODING AND DECODING

U.S. Patent 9,369,717 SYSTEMS AND METHODS FOR ENCODING, TRANSMITTING AND DECODING

U.S. Patent 9,667,685 SYSTEMS AND METHODS FOR ENCODING AND DECODING

U.S. Application 13/750638 SYSTEMS AND METHODS FOR ENCODING, SHARING, AND DECODING OF MULTIMEDIA; PCT/US2013/023019 SYSTEMS AND METHODS FOR ENCODING, SHARING, AND DECODING OF MULTIMEDIA

U.S. Patent 10,025,787 SYSTEMS AND METHODS FOR SELECTING DIGITAL DATA FOR ARCHIVAL

PCT/US2015/031199 SYSTEMS AND METHODS FOR SELECTING DIGITAL DATA FOR ARCHIVAL

U.S. Patent 10,129,556 SYSTEMS AND METHODS FOR ACCESSING DIGITAL DATA

U.S. Application 15/807407 SYSTEMS AND METHODS FOR ENCODING AND DECODING

U.S. Application 16/027,565 SYSTEMS AND METHODS FOR SELECTING DIGITAL DATA FOR ARCHIVAL

U.S. Provisional Application 62/419,206 SYSTEMS AND METHODS FOR ENCODING AND DECODING

National/International Honors and Awards for Supervised Students

First Prize (Illustration Category), 2003 Science and Engineering Visualization Challenge, *Science* Magazine and NSF, Adam Miezianko, Kristopher Rambish, Karen Fung, and Zavnura Pingkan, Senior Design Project, *Innolab 3D File Manager*

European Microwave Association Young Scientist Prize, Yifei Li, for ``Hybrid Optical-Digital Processing of Microwave Signals'' by Y. Li, P. Herczfeld, A. Rosen, M. Bystrom, and W. Jemison.

Books/Book Chapters

M. Bystrom and B. Eisenstein, *Practical Engineering Design*, CRC Press/Taylor and Francis, 2005. Co-editor and author/co-author of two chapters.

M. Bystrom, ``Image Processing'', *Encyclopedia of Telecommunications*, J. Proakis (ed.), New York: Wiley, 2002.

M. Bystrom, ``Wireless Communications'', in *Engineering Horizons*, R. Mutharson and E. Fromm (eds.), Drexel University, 2001.

Journal Articles

Z. He and M. Bystrom, ``The Chordlet Transform with Applications'', *Signal Processing: Image Communication*, doi:10.1016/j.image.2011.09.001, October 2011.

C.S. Kannangara, J. Philp, I. Richardson, M. Bystrom, and M. de-Frutos-Lopez, ``A Syntax for Defining, Communicating, and Implementing Video Decoder Function and Structure'', *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 20, no. 9, pp 1176-1186, 2010.

M. Bystrom, I. Richardson, S. Kannangara, and M. de-Frutos-Lopez, ``Dynamic Replacement of Video Coding Elements'', *Signal Processing: Image Communication*, vol. 25, no. 4, pp. 303-313, April 2010.

C.S. Kannangara, I.E. Richardson, M. Bystrom, and Y. Zhao, ``Complexity Control of H.264/AVC Based on Mode-Conditional Cost Probability Distributions'', *IEEE Transactions on Multimedia*, vol. 11, no. 3, pp. 433-442, April 2009.

Y. Li, P. Herczfeld, A. Rosen, M. Bystrom, and W. Jemison, ``Optical Down-Conversion and Digital Processing of Microwave Signals'', *Proceedings of the European Microwave Association*, vol. 4, no. 3, pp. 226-234, September 2008.

Z. He and M. Bystrom, ``Improved Conversion from DCT Blocks to Integer Cosine Transform Blocks'', *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 18, no. 6, pp. 851-857, June 2008.

M. Bystrom, I.E.G. Richardson, and Y. Zhao, ``Efficient Mode Selection for H.264 Complexity Reduction in a Bayesian Framework'', *Signal Processing: Image Communication*, vol. 23, no. 2, pp. 71-86, February 2008.

A. Kopansky and M. Bystrom, ``Detection of Aperiodically Embedded Synchronization Patterns on Rayleigh Fading Channels'', *IEEE Transactions on Communications*, vol. 54, no. 11, pp. 1928-1932, November 2006.

C.S. Kannangara, I.E.G. Richardson, M. Bystrom, J. Solera, Y. Zhao, A. MacLennan, and R. Cooney, ``Low Complexity Skip Prediction for H.264 through Lagrangian Cost Estimation'', *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 16, no. 2, pp 202-208, February 2006.

Y. Li, M. Bystrom, D. Yoo, S.M. Goldwasser, and P. Herczfeld, ``Coherent Optical Vector Modulation for Fiber Radio Using Electro-Optic Microchip Lasers'', *IEEE Transactions on Microwave Theory and Techniques*, vol. 53, no. 10, pp. 3121-3129, October 2005.

Z. He, M. Bystrom, and S. H. Nawab, ``Bidirectional Conversion Between DCT Coefficients of Blocks and their Sub-blocks'', *IEEE Transactions on Signal Processing*, vol. 53, no. 8, pp. 2835-2841, August 2005.

M. Bystrom and R.A. Coury, ``Rate Allocation for Serial Concatenated Block Codes'', *IEEE Transactions on Wireless Communications*, vol. 4, no. 3, pp. 830-834, May 2005.

A. Kopansky and M. Bystrom, ``Detection of Aperiodically Embedded Synchronization Patterns'', *IEEE Transactions on Wireless Communications*, vol. 3, no. 5, pp. 1386-1392, September 2004.

M. Bystrom and T. Stockhammer, ``Dependent Source and Channel Rate Allocation for Video Transmission'', *IEEE Transactions on Wireless Communications*, vol. 3, no. 1, pp. 258-268, January 2004.

M. Bystrom, S. Kaiser, and A. Kopansky, ``Soft Source Decoding with Applications'', *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 11, no. 10, pp. 1108-1120, October 2001.

M. Bystrom and J.W. Modestino, ``A General Scheme for Spectral Efficiency Evaluation of Direct-Sequence Spread-Spectrum Systems'', *IEEE Transactions on Communications*, vol. 49, no. 7, pp. 1142-1144, July 2001.

M. Bystrom and J.W. Modestino, ``Combined Source-Channel Coding Schemes for Video Transmission over an Additive White Gaussian Noise Channel'', *IEEE Journal on Selected Areas in Communications*}, vol. 18, no. 6, pp. 880-890, June 2000.

M. Bystrom, V. Parthasarathy, and J.W. Modestino, ``Hybrid Error Concealment Schemes for Broadcast Video Transmission over ATM Networks'', *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 9, no. 6, pp. 868-881, September 1999.

Conference Articles

C.S. Kannagara, J. Philp, M. Bystrom, and I.E. Richardson, ``A Universal Video Decoder for Fully Configurable Video Coding'', *International Conference on Consumer Electronics*, (Las Vegas, NV), January 2010.

I. Richardson, S. Kannangara, M. Bystrom, J. Philp, and M. de Frutos Lopez, ``Implementing Fully Configurable Video Coding'', *International Conference on Image Processing*, (Cairo, Egypt), November 2009.

J.M. Philp, C.S. Kannangara, M. Bystrom, M. de Frutos Lopez, and I.E. Richardson, ``Decoder Description Syntax for Fully Configurable Video Coding'', *International Conference on Image Processing*, (Cairo, Egypt), November 2009.

Y. Zhao, M.Bystrom, C.S. Kannangara, I.E. Richardson, and J. Philp, ``A Random Access Protocol for Configurable Video Coding'', ISO/IEC JTC1/SC29/WG11 MPEG2009/M16927, (Beijing, China), October 2009.

M. Bystrom, S. Kannangara, I. Richardson, J. Philp, and M. de Frutos Lopez, ``A Fully Re-configurable Universal Video Decoder'', *Conference on Design and Architectures for Signal and Image Processing*, (Sophia Antipolis, France), September 2009.

I. Richardson, C.S. Kannangara, M.Bystrom, and J. Philp, ``Fully Configurable Video Coding - Part 1: Overview of FCVC'', ISO/IEC JTC1/SC29/WG11 MPEG2009/M16751, (London, UK), July 2009.

I. Richardson, C.S. Kannangara, M.Bystrom, and J. Philp, ``Fully Configurable Video Coding - Part 2: A Proposed Platform for Reconfigurable Video'', ISO/IEC JTC1/SC29/WG11 MPEG2009/M16752, (London, UK), July 2009.

I. Richardson, S. Kannangara, M. Bystrom, J. Philp, and M. de Frutos, ``A Framework for Fully Configurable Video Coding'', *Picture Coding Symposium*, (Chicago, IL), May 2009.

I. Richardson, M. Bystrom, M. de Frutos, and S. Kannangara, ``Dynamic Transform Replacement in an H.264 Codec'', *IEEE International Conference on Image Processing*, (San Diego, CA), October 2008.

S. Kannangara, I. Richardson, M. Bystrom, and M. de Frutos, ``Fast, Dynamic Configuration of Transforms for Video Coding", *IEEE International Conference on Image Processing*, (San Diego, CA), October 2008.

I. Richardson, M. Bystrom, S. Kannangara, and M. de Frutos Lopez, ``Dynamic Reconfiguration: Beyond Video Coding Standards", *IEEE System on Chip Conference*, (Newport Beach, CA), September 2008.

K. Griffis and M. Bystrom, ``Modeling and Clustering Techniques for Multi-band Change Detection'', *IEEE Geoscience and Remote Sensing Symposium*, (Boston, MA), July 2008.

K. Griffis and M. Bystrom, ``Object-Level Semantic Change Interpretation for Multi-band Remotely Sensed Imagery'', *IEEE Geoscience and Remote Sensing Symposium*, (Boston, MA), July 2008.

C.S. Kannangara, Y. Zhao, I.E. Richardson, and M. Bystrom, ``Complexity Control of H.264 Based on a Bayesian Framework", *Picture Coding Symposium*, (Lisbon, Portugal), 2007.

M. Bystrom, Y. Li, N. Vacirca, P. Herczfeld and W. Jemison, ``A Coherent Fiber-Optic Link with Optical-Domain Down-Conversion and Digital Demodulation'', *Microwave Photonics*, (Victoria, Canada), 2007.

Z. He and M. Bystrom, ``Low-Rate Shape Compression via an Extension to the Beamlet Transform'', *European Signal Processing Conference*, (Poznan, Poland), 2007.

K. Griffis and M. Bystrom, ``Automatic Object-Level Change Interpretation for Multispectral Remote Sensing Imagery'', *European Signal Processing Conference*, (Poznan, Poland), 2007.

Y. Li, P. Herczfeld, A. Rosen, M. Bystrom and W. Jemison, ``Hybrid Optical-Digital Processing of Microwave Signals'', *MICROCOLL*, (Budapest, Hungary), 2007.

Y. Li, P. Herczfeld, A. Rosen, M. Bystrom, and T. Berceli, ``Optical Domain Down-Conversion of Microwave Signals for High Dynamic Range Microwave Fiber Optic Links'', *International Topical Meeting on Microwave Photonics*, (Grenoble, France), October 2006.

Z. He and M. Bystrom, ``A Fast Algorithm for Conversion from DCT Blocks to Integer Cosine Transform Blocks'', *IEEE International Conference on Image Processing*, (Atlanta, GA), October 2006.

Y. Zhao, M. Bystrom, and I.E.G. Richardson, ``A MAP Framework for Efficient Skip/Code Mode Decision in H.264'', *IEEE International Conference on Image Processing*, (Atlanta, GA), October 2006.

I.E.G. Richardson, M. Bystrom, and Y. Zhao, ``Fast H.264 Skip Mode Selection Using an Estimation Framework'', *Picture Coding Symposium*, (Beijing, China), April 2006.

K. Griffis and M. Bystrom, ``Improved Video Decoding Through Synchronization Code Detection'', *Conference on Information Sciences and Systems*, (Princeton, NJ), March 2006.

Z. He and M. Bystrom, ``Color Texture Retrieval Through Contourlet-Based Hidden Markov Model'', *IEEE International Conference on Image Processing*, (Genoa, Italy), September 2005.

Z. He, M. Bystrom and S.H. Nawab, ``Conversion Between DCT Coefficients of Blocks and their Sub-blocks'', *Visual Communications and Image Processing*, (Beijing, China), July 2005.

Z. He and M. Bystrom, ``Reduced Feature Texture Retrieval Using Contourlet Decomposition of Luminance Image Component'', *International Conference on Communications, Circuits and Systems* (Hong Kong, China), May 2005.

C.S. Kannangara, I.E.G.Richardson, M. Bystrom, J.Solera, Y. Zhao, A. MacLennan, and R. Cooney, ``Complexity Reduction of H.264 Using Lagrange Multiplier Methods'', *IEE International Conference on Visual Information Engineering*, (Glasgow, UK), April 2005.

Z. He and M. Bystrom, ``Texture Retrieval Through Contourlet-Based Directional Hidden Markov Model'', *Conference on Information Sciences and Systems*, (Baltimore, MD), March 2005.

Z. He and M. Bystrom, ``A Sketch Image Retrieval System Using Directional Projection: DPSIR'', *IEEE International Conference on Acoustics, Speech and Signal Processing*, (Philadelphia, PA), March 2005.

T. Stockhammer and M. Bystrom, ``H.264/AVC Data Partitioning for Mobile Video Communication'', *IEEE International Conference on Image Processing*, (Singapore), October 2004.

Y. Lu and M. Bystrom, ``An Operational Method for Layered Watermark Allocation'', *Proceedings of the Conference on Information Sciences and Systems,* (Princeton, NJ), March 2004.

Z. He and M. Bystrom, ``An Objective Measure for Image Quality Evaluation'', *Conference on Information Sciences and Systems*, (Princeton, NJ), March 2004.

M. Bystrom, ``Adaptive Resource Allocation for Microwave Mobile Networks'',(Invited Paper), *MICROCOLL '03*, (Budapest, Hungary), September 2003.

K. Miu, K. Scoles, and M. Bystrom, ``Senior Design Projects at Drexel University - Focus on Power Engineering'', *IEEE Power Engineering Society General Meetings*, (Toronto, Canada), July 2003.

M. Bystrom and T. Stockhammer, ``Rate Allocation for Video Sequences Using Performance Models'', (Invited Paper), *Picture Coding Symposium*, (St. Malo, France), April 2003.

A. Kopansky and M. Bystrom, ``Extending Source Codes for Error Resilience'', *Data Compression Conference*, (Snowbird, UT), March 2003.

Z. He, A. Kopansky, M. Bystrom, and V. Strela, ``Block-Coded Image Reconstruction Through the Haar Transform'', *Conference on Information Sciences and Systems*, (Baltimore, MD), March 2003.

M. Bystrom and R.A. Coury, ``Inner Code Rate Selection for Serial Concatenated Block Codes'', *IEEE International Symposium on Information Theory*, (Lausanne, Switzerland), June 2002.

J. Adams, D.W. Smith, W. Rosen, and M. Bystrom, ``Performance Limitations of IEEE 802.11b and Bluetooth in Varied Environments'', (Invited Paper) *2002 IEEE Sarnoff Symposium on Advances in Wired and Wireless Communications*, (Princeton, NJ), March 2002.

Y. Li, S.M. Goldwasser, M. Bystrom, and P. Herczfeld, ``Generation of MSK Modulated Millimeter Wave Subcarrier for Radio Over Fiber Applications'', *International Topical Meeting on Microwave Photonics*, (Long Beach, CA), January 2002.

W.D. Jemison, I. Fridyes, M. Bystrom, E. Funk, P.R. Herczfeld, and T. Berceli, ``Fiber Radio: From Links to Networks'', *International Topical Meeting on Microwave Photonics*, (Long Beach, CA), January 2002.

E.E. Funk, P.R. Herczfeld, W.D. Jemison, and M. Bystrom, ``Performance Limits of a Hybrid Fiber/Millimeter-Wave Wireless System'', *International Microwave and Optoelectronics Conference*, (Belem, Brazil), August 2001.

A. Kopansky and M. Bystrom, ``Detection of Aperiodically Embedded Synchronization Patterns'', *IEEE International Symposium on Information Theory*, (Washington, DC), June 2001.

A. Kopansky and M. Bystrom, ``Detection of Aperiodically Embedded Synchronization Patterns in Rayleigh Fading'', *Conference on Information Sciences and Systems*, (Baltimore, MD), March 2001.

M. Bystrom, A. Kopansky, and S. Kaiser, ``Soft Decoding for Robust Video Transmission'', *IEEE Wireless Communications and Networking Conference*, (Chicago, IL), September 2000.

M. Bystrom and T. Stockhammer, ``Modeling of Operational Distortion-Rate Characteristics for Joint Source-Channel Coding of Video'', *IEEE International Conference on Image Processing*, (Vancouver, Canada), September 2000.

S. Kaiser and M. Bystrom, ``Soft Decoding of Variable-Length Codes'', *IEEE International Conference on Communications*, (New Orleans, LA), June 2000.

A. Kopansky and M. Bystrom, ``Frame Synchronization for Noncoherent Demodulation on Flat Fading Channels'', *IEEE International Conference on Communications*, (New Orleans, LA), June 2000.

M. Bystrom and J.W. Modestino, ``Evaluation of the Spectral Efficiency of Spread-Spectrum Multiple-Access Systems'', *IEEE International Symposium on Information Theory*, (Sorrento, Italy), June 2000.

J.S. Popovics and M. Bystrom, ``Effective Use of Surface Waves for NDE of Concrete'', *Proceedings of the ASCE 14th Engineering Mechanics Conference*, (Austin, TX), May 2000.

Y. Zhang and M. Bystrom, ``Inner Code Rate Selection for a Concatenated Coding System on a Binary Symmetric Channel'', *Conference on Information Sciences and Systems*, (Princeton, NJ), March 2000.

A. Kopansky and M. Bystrom, ``Detection of a Known Number of Aperiodically Embedded Synchronization Patterns'', Conference on Information Sciences and Systems, (Princeton, NJ), March 2000.

R.A. Coury, M. Bystrom, M.D. Collins, and W.L. Siegmann, ``Three-Dimensional Effects on Acoustic Propagation in Waveguides of Variable Thickness'', *Fourth International Conference on Theoretical and Computational Acoustics*, (Trieste, Italy), May 1999.

A. Kopansky and M. Bystrom, ``Sequential Decoding of MPEG-4 Coded Bitstreams for Error Resilience'', *Conference on Information Sciences and Systems*, (Baltimore, MD), March 1999.

M. Bystrom, J.W. Modestino, and Y. Pei, ``Combined Source-Channel Coding for Wireless Transmission of H.263 Coded Video'', *UCSD Conf. Wireless Communications*, (San Diego, CA), February 1999.

M. Bystrom and J.W. Modestino, ``Combined Source-Channel Coding for Transmission of Video over a Slow-Fading Rician Channel'', *IEEE International Conference on Image Processing*, (Chicago, IL), September 1998.

M. Bystrom and J.W. Modestino, ``Recent Advances in Joint Source-Channel Coding of Video'', *URSI International Symposium on Signals, Systems, and Electronics*, (Pisa, Italy), September 1998.

M. Bystrom and J.W. Modestino, ``Combined Source-Channel Coding for Transmission of H.263 Coded Video with Trellis-Coded Modulation over a Slow-Fading Rician Channel'', *IEEE International Symposium on Information Theory*, (Cambridge, MA), August 1998.

A. Kopansky and M. Bystrom, ``Reconstruction of Block Errors in MPEG-4 Coded Video'', *Conference on Information Sciences and Systems*, (Princeton, NJ), March 1998.

J.W. Modestino and M. Bystrom, ``Combined Source-Channel Coding for Wireless Transmission of H.263 Coded Video'', *9th Tyrrhanian International Workshop on Digital Communications*, (Lerici, Italy), September 1997.

M. Bystrom, V. Parthasarathy, and J.W. Modestino, ``Hybrid Error Concealment Schemes for Broadcast Video Transmission over ATM Networks'', *Conference on Information Sciences and Systems*, (Baltimore, MD), March 1997.

Software

Bevara Access open-source software. Available through www.bevara.com.

Innolab 3D File Manager (3dfm), Boston University Senior Design Project. Available from sourceforge.net/projects/innolab/. Over 17,000 downloads as of March 2016. This project was also incorporated in Gentoo Portage, the package management system for Gentoo Linux, in 2004. See also http://nnc3.com/LinuxMag/Magazine/Archive/2007/77/042-044_3DBrowser /article.html for a review in Linux Magazine.

Universal Video Decoder. Available from www.openvideocoding.org. A framework and toolset for dynamic re-configuration of receiver software.

Courses Taught

Boston University

- Wireless Communications - A graduate course in wireless communication system design and analysis.
- Statistical Pattern Recognition - A graduate course in data classification and inference.

- Digital Signal Processing - A graduate course in filter design and signal processing.
- Introduction to Digital Signal Processing - A senior-level course in filter design and signal analysis.
- Signals and Systems - A junior-level course in transform methods and system analysis.

Drexel University

- Advanced Telecommunications Engineering III - A graduate course in network theory including queueing theory and network design issues.
- Advanced Telecommunications Engineering II - A graduate course in wireless and mobile communications systems, channel modeling, and system design.
- Stochastic Systems II - A graduate course in random processes and their applications.
- Reliable Communication and Coding II - A graduate course in channel coding.
- Reliable Communication and Coding I - A graduate course in information theory.
- Senior Project Design - A full-year capstone design course for seniors.
- Introduction to Modulation and Coding - A junior-level course on analog and digital modulation with a brief overview of source and channel coding techniques.
- Intelligent Systems - A sophomore-level course in logic design.
- Freshman Project Design - A two-term first-year course in engineering design and technical communication.

Rensselaer Polytechnic Institute

- Introduction to Probability - A senior-level course in probability and random processes.

Professional Service

Chair, IEEE EAB Continuing Education Committee	2016
Chair, IEEE EAB Content Acquisition Sub Committee	2016
Chair, IEEE EAB Products and Services Committee	2014-2015
Member, IEEE Public Visibility Committee	2013-2015
Associate Editor, IEEE Transactions on Signal Processing	2009-2014
Member, IEEE EAB Products and Services Committee	2013-2014
Editor-in-Chief, IEEE eLearning Library	2010-2012
Member, IEEE Publication Services and Product Board	2010-2012
Member, IEEE Educational Activities Board	2010-2012
Member, Editorial Board of IEEE Expert Now	2006-2009
Associate Editor, IEEE Signal Processing Letters	2004-2008
Syracuse University ECE Doctoral Program Review Panel	2008

Head of evaluation team Fulbright Austria/Germany Peer Review Committee 2004-2006

Reviewed between 110 and 130 applications per year for recommendation to the Fulbright Commission

NSF Panel Member

Panels included Undergraduate Education, CAREER, Information Technology Research, Computing and Communication Foundations, Major Research Instrumentation, Graduate Research Fellowship Program

Signal Processing Symposium Co-Chair, International Conference on 2010

Communications, Circuits and Systems

Publications Chair, 2005 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)

Workshop Committee, 2003 IEEE International Microwave Symposium

Moderator, Federal Communications Commission (FCC) Panel 2003

Technical Program Committee Participation

- 2015 IEEE International Conference on Image Processing
- 2014 IEEE International Conference on Image Processing
- 2010 SPIE Visual Communication and Image Processing
- 2009 International Conference on Communications, Circuits and Systems
- 2009 Chinacom Multimedia Communications Symposium
- 2008 Chinacom Multimedia Communications Symposium
- 2008 SPIE Visual Communication and Image Processing
- 2008 International Conference on Communications, Circuits and Systems
- 2008 IEEE Consumer Communications and Networking Conference, Multimedia Networking
- 2007 IEEE Consumer Communications and Networking Conference, Multimedia Networking
- 2006 IEEE GLOBECOM, Information and Wireless Security Symposium
- 2005 IEEE International Conference on Image Processing
- 2004 IEEE International Conference on Image Processing
- 2004 IEEE Sarnoff Symposium
- 2003 IEEE International Conference on Communications, Symposium on Global Services and Infrastructure for Next Generation Networks
- 2003 IEEE Sarnoff Symposium
- 2002 Fall IEEE Vehicular Technology Conference

Conference Session Organizer or Chairperson

- 2002 IEEE Sarnoff Symposium on Advances in Wired and Wireless Communications, ``High Speed Signal Processing''
- 2001 IEEE International Conference on Communications, ``Detection and Estimation''
- 2001 Conference on Information Sciences and Systems, ``Detection and Equalization''

Reviewer for

- McGraw-Hill
- CRC Press
- European Transactions on Telecommunications
- IEE Proceedings - Communications
- IEEE Communication Letters
- IEEE Journal on Selected Areas in Communications
- IEEE Signal Processing Letters
- IEEE Transactions on Circuits and Systems for Video Technology
- IEEE Transactions on Communications
- IEEE Transactions on Image Processing
- IEEE Transactions on Multimedia
- IEEE Transactions on Signal Processing
- IEEE Transactions on Vehicular Technology
- IEEE Transactions on Wireless Communications
- Journal of Communications and Networks
- Journal of Electronic Imaging
- European Signal Processing Conference
- IEEE Consumer Communications and Networking Conference
- IEEE GLOBECOM
- IEEE INFOCOM
- IEEE International Conference on Acoustics, Speech and Signal Processing
- IEEE International Conference on Communications
- IEEE International Conference on Image Processing
- IEEE International Symposium on Information Theory
- IEEE Sarnoff Symposium
- IEEE Vehicular Technology Conference

APPENDIX B

Prior Deposition and/or Trial Testimony:

- 2019-present: Retained by Mayer Brown on behalf of Maxell Ltd. in Case No. 5:19-cv-00036-RWS (E.D.TX)
- 2018: Retained by Fish & Richardson on behalf of EchoStar Corp. and Hughes Network Systems in No. 6:17-CV-084-JDL (E.D.TX)
- 2017: Retained by Baker Botts on behalf of Hughes Network Systems in No.: 2-15-cv-37-RWS-RSP (E.D. TX)
- 2015: Retained by Winston and Strawn on behalf of Ericsson in ITC Investigation No. 337-TA-952.
- 2013-2015: Retained by Leydig, Voit & Mayer on behalf of EveryScape in Civil Action No.: 10-cv-11597-RGS (District of MA, Boston Division)
- 2010-2011: Retained by Finnegan, Henderson, Farabow, Garrett & Dunner as an expert witness on behalf of S3 Graphics, Inc. in ITC Investigation No. 337-TA-724.
- 2006-2007: Retained by Day, Casebeer, Madrid & Batchelder as an expert witness on behalf of Qualcomm Inc., in *Qualcomm Inc. v. Broadcom Corp.*, No. 05-cv-1958-B (S.D. Cal.).

APPENDIX C

List of Materials Considered

1. Petition and Exhibits 1001-1018
2. Patent Owner Preliminary Response
3. Institution Decision
4. Deposition of Dr. Lippman
5. U.S. Patent No. 7,864,051