

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DISH NETWORK L.L.C.,

Petitioner

vs.

MULTIMEDIA CONTENT MANAGEMENT LLC

Patent Owner

Case IPR2019-01014

U.S. Patent No. 9,465,925

DECLARATION OF DR. EDWIN A. HERNANDEZ-MONDRAGON

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I. INTRODUCTION

[01] My name is Dr. Edwin A. Hernandez-Mondragon. I understand that I am submitting a declaration for Multimedia Content Management LLC (“MCM”). I am offering technical opinions in connection with the *Inter Partes* Review (“IPR”) proceeding in the United States Patent and Trademark Office for U.S. Patent No. 9,465,925 (“the ’925 Patent”). I have reviewed the references listed in Petitioner’s Exhibit List. I make this declaration based on my personal knowledge, experience, and any noted research. I am over the age of 21 and am competent to make this declaration.

[02] The statements herein include my opinions and the bases for those opinions. These relate to at least the following documents and references of the pending IPR Petition, which I have reviewed and considered:

- U.S. Patent No. 8,799,468 (Ex. 1001)
- U.S. Patent No. 9,465,925 (Ex. 1002)
- Prosecution History of Application No. 13/369,174, resulting in U.S. Patent No. 8,799,468 (Ex. 1003)
- Prosecution History of Application No. 14/338,240, resulting in U.S. Patent No. 9,465,925 (Ex. 1005)

- Prosecution History of Application No. 10/989,023, resulting in U.S. Patent No. 8,122,128 (Ex. 1004)
- Declaration of Anthony Wechselberger (Ex. 1006)
- *Curriculum Vitae* of Anthony Wechselberger (Ex. 1007)
- U.S. Published Application No. 2002/0049980 by Hoang (“Hoang ’980”) (Ex. 1008)
- U.S. Patent No. 7,725,267 by Hoang (“Hoang ’267”) (Ex. 1009)
- U.S. Published Application No. 2003/0208561 to Hoang (“Hoang ’561”) (Ex. 1010)
- Michael Adams, OpenCable™ Architecture (2000) (“OpenCable”) (Ex. 1011)
- Canadian Patent 2,321,462 to Cameron (“Cameron”) (Ex. 1013)
- U.S. Published Application No. 2002/0162109 to Shteyn (“Shteyn”) (Ex. 1014)
- U.S. Patent No. 5,945,503 by Venkatesh (“Venkatesh”) (Ex. 1015)

- Unified Patents, Inc. v. Multimedia Content Management LLC, IPR2017-01934, Paper 9, Patent Owner Preliminary Response (PTAB Dec. 14, 2017) (Ex. 1016)
- Excerpts from Newton's Telecom Dictionary (15th Edition 1999) (Ex. 1017)
- Unified Patents, Inc. v. Multimedia Content Management LLC, IPR2017-01934, Paper 10 (Institution decision) (PTAB Mar. 5, 2018) (Ex. 1018)
- Unified Patents, Inc. v. Multimedia Content Management LLC, IPR2017-01934, Paper 1 (Petition) (PTAB Aug. 11, 2017) (Ex. 2002)
- Excerpts from Microsoft Press Computer Dictionary (3rd Edition 1997) (Ex. 1019)
- U.S. Published Application No. 2003/0172375 to Coffin III ("Coffin") (Ex. 1022)
- Declaration of Anthony J. Wechselberger In Support of Defendant's Opening Claim Construction Brief (Ex. 1030)

- Markman Order issued June 17, 2019 in *Multimedia Content Management LLC v. DISH Network L.L.C.*, Case No. 6:18-cv-00207-ADA (W.D. Tx), Docket No. 81 (Ex. 2003)
- Information Technology – Generic coding of moving pictures and associated audio information: Systems, ISO/IEC 13818-1:2000(E), 2nd Edition, December 1, 2012 (Ex. 2004).
- Digital Video Broadcasting (DVB); DVB interaction channel for Cable TV distribution systems (CATV), ETSI ES 200 800, version 1.3.1, October 2001 (Ex. 2005).

[03] I am being compensated for my work on this matter at my normal and regular hourly rate for this type of consulting activity. The opinions herein are my own, and I have no stake in the outcome of the IPR or any related proceedings. My compensation does not depend in any way on the outcome of the Petitioner's petition or any other proceeding.

[04] To the best of my knowledge, I have no financial interest in Patent Owner. To the best of my knowledge, I have no financial interest in Petitioner. To the best of my knowledge, I have no financial interest in the '925 Patent. To the extent any mutual funds or other investments I own have a financial interest in the Patent Owner

or the '925 Patent, I am not aware of, nor do I have control over, any financial interest that would affect or bias my judgment.

II. QUALIFICATIONS

[05] I received a B.S. from Costa Rica Institute of Technology in computer engineering, a M.S. from the University of Florida with an emphasis in electrical and computer engineering, and a Ph.D. from the University of Florida with an emphasis on computer engineering. A copy of my *curriculum vitae*, which includes a more detailed summary of my background, experience, patents, and publications, is attached as Appendix A.

[06] I have been retained as an independent expert consultant in the fields of cable television systems and broadcasting, multimedia streaming, mobile devices and systems, air-interface and Long-Term Evolution (LTE), cloud storage and data synchronization, wireless communications, block-chain technology, power management, personal area networking, and smart phones and wireless embedded software development.

[07] I founded COMPUNET in 1997 and was its lead engineer from 1997 to 2009. While at COMPUNET, I was a lead developer for authentication services, security services, web services, and networking configuration services.

[08] I worked for Microsoft from 2001 to 2003 as a Technical Program Manager.

In that position, I was responsible for driving architecture, design, test automation, and security analysis for Bluetooth Personal Area Networking (PAN). I also drove testing over networking protocols, such as IPv4 networks and IPv6 networks.

[09] I worked for Motorola, Inc. from 2003 to 2010 as a Principal Staff Software Engineer. In that position, I was responsible for application development for Google and Android platforms. I participated in kernel-level prototyping, data support, and digital rights management (DRM).

[10] Starting in 2010, I founded EGLA Communications. There, I created MEVIA applications, such as Clout to Cable. MEVIA is a “software-as-a service” and a cloud-based platform that enables “MEVIA Music,” which is currently in operation in several countries including Brazil, Honduras, and the United States. Cloud to Cable is a patented platform that merges cloud and cable television systems and simplifies music and video distribution to different platforms. Cloud to Cable is servicing operators, such as CABLE COLOR in Honduras.

[11] As part of my experience in EGLA, I have worked for cable TV systems in multiple operators: CABLEVISION Mexico, Axtel TV, CLARO, Direct TV, SKY Brazil, and many others. Hence, my technical experience and training covers cable TV systems, STBs, video-on-demand (VOD) systems, and several broadcasting methodologies.

[12] Additionally, over my career, my research has involved aspects of network security, wireless communications, network and communications reliability, artificial intelligence, multimedia streaming, and software engineering.

[13] I am a named inventor on eleven patents issued by the United States Patent and Trademark Office, including the following:

- U.S. Patent No. 7,564,810 – Method and System for Managing Power Consumption of a Network Interface Module in a Wireless Computing Device
- U.S. Patent No. 7,231,330 – Rapid Mobility Network Emulator Method and System
- U.S. Patent No. 7,697,508 – System, Apparatus, and Method for Proactive Allocation of Wireless Communication Resources
- U.S. Patent No. 8,213,417 – System, Apparatus, and Method for Proactive Allocation of Wireless Communication Resources
- U.S. Patent No. 7,269,388 – Bluetooth PAN Driver
- U.S. Patent No. 8,788,715 – Rules-based Network Selection Across Multiple Media

- U.S. Patent No. 7,996,505 – Rules-based Network Selection Across Multiple Media
- U.S. Patent No. 8,024,487 – Smart Scan for Bluetooth PAN Services
- U.S. Patent No. 8,707,337 – Java-based Push to Talk
- U.S. Patent No. 7,331,793 – Magnetic Connector
- U.S. Patent No. 10,123,074 – Method, System, and Apparatus for Multimedia Content Delivery to Cable TV and Satellite Operators

[14] I am not an attorney and offer no legal opinions, but in my work, I have had experience studying and analyzing patents and patent claims from the perspective of a person skilled in the art.

III. LEGAL UNDERSTANDING

[15] My understanding of the law regarding patent validity is based on my prior work on various patent related matters and other identified information. In formulating my opinions and conclusions in this case, I have been provided with an understanding of the prevailing principles of U.S. patent law that govern the issues of patent claim interpretation and validity based upon obviousness and anticipation. I have applied these principles in analyzing the allegations of invalidity of the claims presented in the IPR Petition and in forming my opinions.

[16] I understand that it is a basic principle of patent law that assessing the validity of a patent claim involves a two-step analysis. In the first step, the claim language must be properly construed to determine its scope and meaning. In the second step, the claim as properly construed must be compared to the alleged prior art to determine whether the claim is valid.

[17] As explained herein, my analysis of the validity of the '925 Patent will be undertaken from the perspective of what would have been known or understood by one of ordinary skill in the art of that patent when the inventors thereof conceived of and reduced the claimed inventions to practice. Whether any of the claims of the '925 Patent is anticipated or rendered obvious by systems and/or methods alleged by Petitioner to have been publicly disclosed, invented by another and/or in public use prior to the invention date is thus determined based on an understanding of a person of ordinary skill in the relevant art.

Level of Ordinary Skill in the Art

[18] The level of ordinary skill in the art is based on factors such as the educational level of the inventor, the educational level of those who work in the industry, and the sophistication of technology involved, in addition to the type of problems encountered in the art, prior art solutions to those problems, and the rapidity with which innovations are made in the particular technology should also be considered.

Anticipation

[19] I understand that to anticipate a patent Claim under 35 U.S.C. § 102, a single asserted prior art reference must disclose each and every element of the claimed invention, either explicitly or inherently to a person of ordinary skill in the art. There must be no difference between the claimed invention and the disclosure of the alleged prior art reference as viewed from the perspective of the person of ordinary skill in the art.

[20] Furthermore, it is my understanding that a reference must clearly and unequivocally disclose the claimed invention or direct those skilled in the art to the claimed invention without any need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference.

[21] I understand that for a reference to be anticipating, it must describe the claimed subject matter with sufficient clarity to establish that the subject matter existed and that its existence was recognized by persons of ordinary skill in the field of the invention.

Inherency

[22] I understand that in order to establish that an element of a claim is “inherent” in the disclosure of an asserted prior art reference, the extrinsic evidence (or the evidence outside the four corners of the asserted prior art reference) must make clear

that the missing element is the inevitable outcome of the process and/or thing that is explicitly described in the asserted prior art reference and that it would be recognized as necessarily present by persons of ordinary skill in the relevant field. I understand inherency may not be established by mere probabilities or possibilities. In other words, the mere fact that a certain thing may result from a given set of circumstances is not sufficient.

Obviousness

[23] I understand that even though a prior art reference does not fully anticipate a claim of a patent, a claim may, nonetheless, be rendered obvious to one of ordinary skill in the art if the differences between the subject matter set forth in the patent claim and the prior art are such that the claimed subject matter as a whole would have been obvious at the time the claimed invention was made. In addition, I understand that obviousness is a determination of law based on various underlying determinations of fact. In particular, these underlying factual determinations include: (1) the scope and content of the prior art; (2) the level of ordinary skill in the art at the time the claimed invention was made; (3) the differences between the claimed invention and the prior art; and (4) the extent of any secondary conditions of non-obviousness. I understand that if a claim element is completely missing from each of reference of a combination and/or the knowledge base of the skilled artisan, the claim is not obvious in view of that combination.

[24] I understand that secondary consideration evidence such as the following, can also be considered in assessing obviousness:

- **Commercial success**: An invention that is commercially successful is unlikely to have been obvious because it otherwise would have been invented by others earlier.
- **Copying**: Copying a solution, rather than inventing a different solution, shows that the patented solution would not have been obvious.
- **Long-standing problem or need**: A persistent problem or need in the art that went unresolved clearly implies that the solution could not have been obvious.
- **Prior failure**: The failure of others to come up with a solution shows that the solution could not have been obvious.
- **Licensing**: When industry players would rather take a license than try to come up with an alternative solution, those players acknowledge that the solution was not obvious.
- **Praise by others**: When those of ordinary skill, aficionados, and the defendants themselves praise the claimed invention on the merits of the invention it could not have been obvious.

- **Teaching away**: When those of ordinary skill in the art facing the same problem as the inventor looked in different directions than the inventor, and when following their lead would lead further away from the patented solution, that is a significant indication of non-obviousness. By the same token, when the charge in the “wrong” direction is led by those who are well-resourced, well placed, or of higher-than-average skill, it is an even stronger indication of non-obviousness when their teachings lead away.
- **Unexpected Results or Industry Skepticism**: When experts, aficionados, and the defendants themselves expressly or implicitly acknowledge that the claimed technology was unexpected or expressed skepticism in it, that is strong evidence that the improvements could not have been obvious.

[25] To ascertain the scope and content of the prior art, it is necessary to first examine the field of the inventor’s endeavor and the particular problem with which the inventor was involved at the time the invention was made. Moreover, a determination of obviousness cannot be based on the hindsight combination of components selectively culled from the prior art to fit the parameters of the claimed invention. Instead, I understand that in order to render a patent claim invalid as being

obvious from a combination of references, there must be some evidence within the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination in a way that would produce the claimed invention. In addition, I understand that in order to find a patent claim invalid for obviousness, there must be a finding that each element in each limitation of the patent claim is disclosed or taught by the asserted combination of prior art references or elsewhere in the relevant prior art. I further understand that in making a combination, the principle of operation of a reference should not be changed and that the prior art cannot be rendered unsuitable for its intended purpose.

[26] I understand that a patent claim composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. This is so because inventions in most, if not all, instances rely upon building blocks long since discovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known. I further understand that most inventions arise from a combination of old elements and each element may often be found in the prior art. Thus, to establish a case of obviousness based on a combination of elements disclosed in the prior art, an articulation must be made on the basis by which it would have been obvious to make the claimed invention.

[27] I understand that in making combinations of references, it is important to avoid hindsight and it can be important to find a reason to make a particular combination. Care must be taken to avoid the temptation to read into the prior art the teachings of the invention at issue and one must guard against slipping into the use of hindsight when considering the issue of obviousness. Particularly, one must avoid simply taking the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability – this is the essence of hindsight.

[28] I understand that when the prior art teaches away from combining certain known elements, the discovery of a successful means of combining them is more likely to be nonobvious, and evidence rebutting a case of obviousness can include evidence that the prior art teaches away from the claimed invention in any material respect. I understand a reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the inventor. I understand that general skepticism of those in the art – not amounting to teaching away – is also relevant and persuasive evidence of nonobviousness. In effect, teaching away is a more pointed and probative form of skepticism expressed in the prior art. In either case, the presence of either of these indications gives insight into the question of obviousness.

[29] I understand a reference qualifies as prior art for an obviousness determination under §103 only when it is analogous to the claimed invention. Two separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved.

IV. SUMMARY OF OPINION

[30] The Petition sets forth seven grounds of invalidity, summarized below:

Ground	'925 Patent Claims	Basis for Challenge
1	1, 25, 29, 36	Unpatentable under 35 U.S.C. § 103 by Hoang '980 (Ex. 1008)
2	38	Unpatentable under 35 U.S.C. § 103 by Hoang '980 in view of OpenCable (Ex. 1011)
3	40	Unpatentable under 35 U.S.C. § 103 by Hoang '980 in view of Hoang '267 (Ex. 1009)
4	41	Unpatentable under 35 U.S.C. § 103 by Hoang '980 in view of Coffin (Ex. 1022)

[31] Claims 1 and 29 are the challenged independent claims, and all the other claims depend from them. Only Ground 1, which relies exclusively on Hoang '980, addresses claims 1 and 29.

[32] In my opinion, Ground 1 should fail, as Hoang '980 fails to render claims 1 and 29 of the '925 Patent obvious, for at least the following reasons:

- Hoang '980 does not disclose or fairly suggest “a first processor to generate controller instructions,” as in claim 1, and does not disclose or fairly suggest “generating . . . controller instructions,” as in claim 29.
- Hoang '980 does not disclose or fairly suggest that a second processor “is to selectively transmit the content requests to the service provider network in accordance with the controller instructions,” as in claim 1, and does not disclose or fairly suggest “selectively transmitting, by the plurality of gateway units, the content requests to the service provider network in accordance with the controller instructions,” as in claim 29.
- A person of ordinary skill in the art (“POSITA”) would not have combined the unidirectional and bi-directional aspects of Hoang '980 in the manner Petitioner suggests, meaning there can be no obviousness of these claims.

[33] In my opinion, each of the remaining Grounds 2-4 fail because they rely on Ground 1 for the elements of independent claims 1 and 29.

V. PERSON OF ORDINARY SKILL IN THE ART

[34] I agree with Patent Owner’s statements from a previous IPR that a POSITA with respect to the '468 Patent (which is a parent of the '925 Patent) would have education, experience and training commensurate with a person having a bachelor’s

degree in electrical engineering or computer science, and would have knowledge of access controls, network protocols, and communications, including TCP/IP-based standards, software design, distributed systems and network equipment configuration. Of relevance to this IPR, I have worked with networking technologies since 1995, including owning and managing an “Internet Service Provider,” a venture that ended in 2009. I was also a member of Microsoft’s Wireless Windows Networking group and have participated as a technical reviewer for several journals and conferences, including “Journal of Networks and Systems Management,” as a judge at the “Mobile World Congress 2019,” and “EEE Local Computer Networks 2007-2008.” Based on my experience, education and training, I have an understanding and knowledge of these capabilities and have been involved with these technologies myself during the relevant time period.

VI. OVERVIEW OF THE '925 PATENT

[35] The '925 Patent describes a system and method for managing and regulating access from a local subscriber site to content available for distribution from a remote service provider network. Ex. 1002, Abstract.

[36] The subscriber site includes one or more subscriber terminals and communications gateways (“CGs”). Ex. 1002, 3:50-53. The described system further includes Internet Control Points (“ICPs”) (located remote from the subscriber site) that generate and issue instructions to the CGs. Ex. 1002, 3:55-60; 5:38-41.

These instructions control the operation of the CGs and the Patent identifies several control operations and associated controller instructions the ICPs may send to the CGs (e.g., “Active and Inactive CG Processing Control,” “Conditional Denial,” and “Packet Inspection,” etc.). Ex. 1002, 7:57-8:57. The system and method of the ’925 Patent regulates access by the subscriber to content available from the subscriber network in a secure manner.

VII. CLAIM CONSTRUCTION

[37] I understand that claim construction begins with the language of the claims, and the words of a claim are generally given their ordinary and customary meaning. I understand that to be the meaning the term would have to a POSITA at the time of the invention. I understand that although the prosecution history often lacks the clarity of the specification and thus is less useful for claim construction purposes, it is a source of intrinsic evidence that can inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be. I understand that while extrinsic evidence, such as expert testimony and dictionaries, may be useful in educating regarding the field of the invention or helping determine what a POSITA would understand claim terms to mean, extrinsic evidence in general is viewed as less reliable than intrinsic evidence.

A. “to generate[ing ...] controller instructions”

[38] I have been informed that a District Court has construed this term as “to create[ing] or bring[ing] into being computer executable instructions that determine whether to transmit or not transmit a content request from a user to the service provider network.” I apply the District Court’s construction in this opinion.

[39] I note that the District Court’s claim construction, which I apply, requires that the instructions be computer executable. A POSITA would understand a computer executable instruction to be encoded (likely in binary format), for each instruction to fit a specified length (e.g. 16-bits), and each series of instructions to manage memory and direct a “Central Processing Unit” or CPU to perform certain task. Generally, an instruction-set is defined with basic memory access functions, arithmetic processes, Input/output, and others. Therefore, this construction would, by definition, exclude the generation of mere data, as such is not to a POSITA ever considered to be “computer executable.”

B. “selectively transmit[ting, by the plurality of network elements,] the content requests to the service provider network in accordance with the controller instructions”

[40] I have been informed that a District court has construed this term, which I alternatively refer to as the “selectively transmit[ting]” element, as “transmitting all selected requests through the service provider network in response to the controller

instructions' decisions to transmit the content requests." I apply the District Court's construction in this opinion.

[41] I note that Petitioner offers a different construction for this term than the one adopted by the District Court. In particular, the Petitioner proposes that the "selectively transmit[ing]" term be construed to mean "transmitting all content requests to take place within the service provider network in response to the controller instructions' decision to transmit the content requests." Pet. at 17. In my opinion, Petitioner's construction is incorrect for at least two reasons. First, construing the term as "transmitting all content requests" appears to read out the term "selectively," which the District Court's construction does not do ("transmitting all selected content requests. . ."). Second, construing the term as requiring the transmission to take place within the service provider network seems to be directly opposite to what is shown in FIG. 1 of the '925 Patent (reproduced below), where the CGs 58 and the ICP 50 **are not** within the service provider network (SPA Network Elements 54).

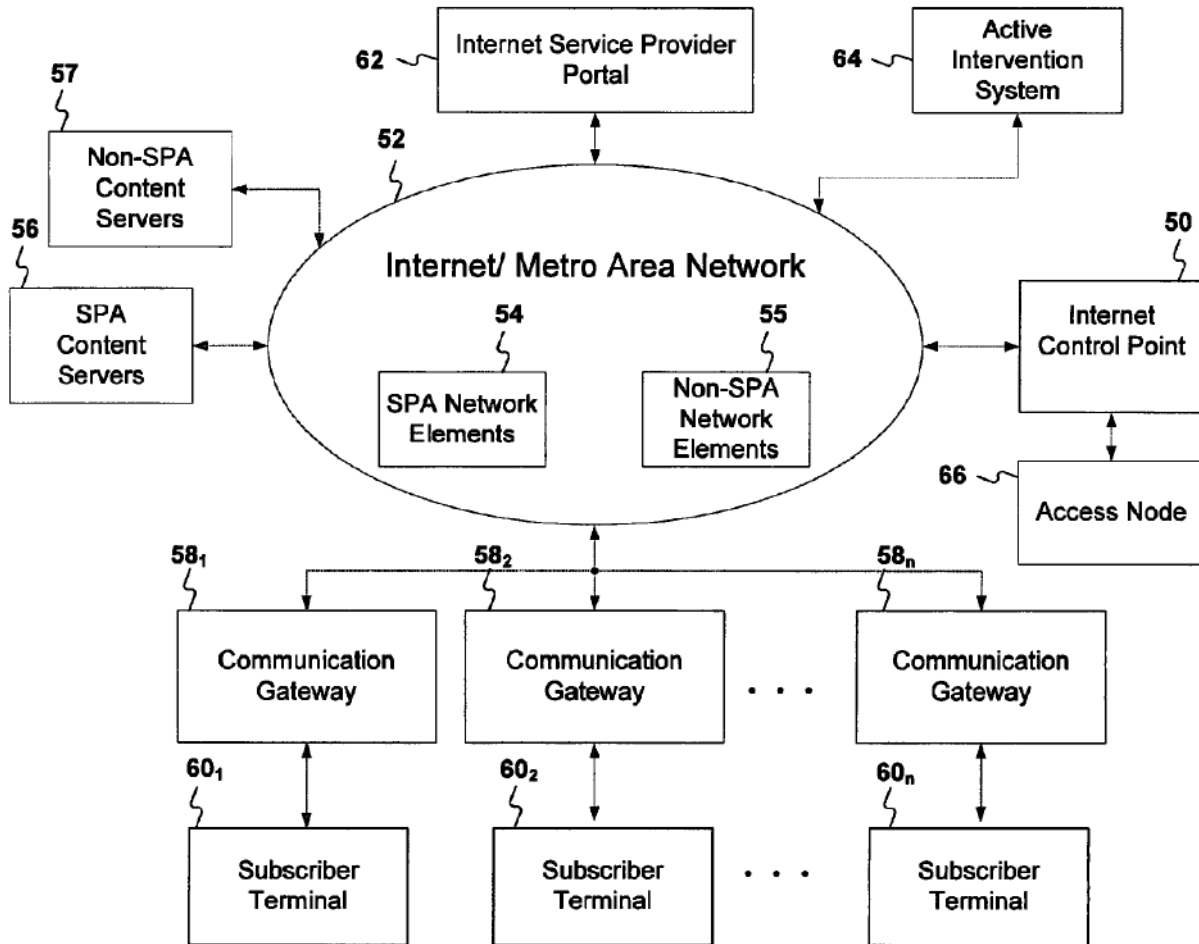


Figure 1

C. “controller node”

[42] I have been informed that the District construed this term to mean “a single network device that controls the operation of the gateway units.” I apply the District Court’s construction in this opinion.

D. “service provider network”

[43] I have been informed that the District Court construed this term as “a network between the controller node and the plurality of gateway units that is not the public

internet and only includes those network elements operated or controlled by the service provider.” I apply the District Court’s construction in this opinion.

E. “gateway units”

[44] I have been informed that the District Court construed this term as “computer devices that are remote from the controller node and interface with the service provider network and a subscriber terminal.” I apply the District Court’s construction in this opinion.

F. “network elements”

[45] I have been informed that the District Court construed this term as “computer devices within the service provider network.” I apply the District Court’s construction in this opinion.

VIII. PATENTABILITY ANALYSIS—CHALLENGED CLAIMS

[46] It is my opinion that the references cited by Petitioner fail to disclose each element recited in the challenged claims and therefore fail to render obvious the challenged claims. It is further my opinion that it would not be obvious to a POSITA to modify the references relied upon by Petitioner with the missing elements in such a way that would result in the claimed systems and methods. Accordingly, it is my opinion that the presented grounds in the Petition do not demonstrate any likelihood that any of the challenged claims are unpatentable.

[47] Only Ground 1 of the Petition challenges independent claims 1 and 29.

Ground 1 asserts that Hoang '980 renders claims 1 and 29 (in addition to several other claims) obvious. I disagree.

[48] I begin my analysis with a review of claim 1:

1. A system for regulating access to a service provider network, the system comprising:
a controller node coupled to the service provider network, the controller node comprising:
a first processor to generate controller instructions, and
first one or more network interface to transmit the controller instructions over the service provider network to a plurality of network elements; and
the plurality of network elements, each of the plurality of network elements comprising:
second one or more network interfaces coupled to the service provider network to receive the controller instructions from the controller node through the service provider network; and
at least a second processor coupled to the second one or more network interfaces, wherein the second processor is to selectively transmit content requests to the service provider network in accordance with the controller instructions, and transfer received content data responsive to the transmitted content requests from the service provider network via the second one or more network interfaces.

1. Hoang '980 Does not Disclose or Fairly Suggest Generating Controller Instructions

[49] Claim 1 recites “a first processor to generate controller instructions.” Claim 29, which includes similar elements to those found in claim 1, recites “generating . . . controller instructions.” I apply the District Court’s construction for this term, i.e.

“to generate[ing ...] controller instructions” is properly construed to mean “create[ing] or bring[ing] into being computer executable instructions that determine whether to transmit or not transmit a content request from a user to the service provider network.” It is my opinion that Hoang ’980 fails to disclose or suggest this claim element.

[50] In Hoang ’980, a central controlling server 502 is connected to a network. *See* Hoang ’980, paragraph [0051]. Petitioner argues that the central controlling server 502 creates subscription data packets. *Pet.* at 30. As shown in FIG. 9 and described in paragraph [0061], a subscription data packet 630 includes a version identifier 632 followed by a list where each item in the list has a client identification code 634, a client subscription code 636, a subscription service code 638, and warning codes 640. Paragraph [0061] in Hoang ’980 states that when a client changes subscription level or services, a new subscription data packet 630 is created with codes reflecting the change(s).

[51] Petitioner maps the EPG programs and subscription data packets of Hoang ’980 to the claimed “controller instructions.” *Pet.* at 34-35, 45. In my opinion, Petitioner’s mapping is incorrect. The EPG programs and the subscription data packet 630 are not, and do not include, any computer executable instructions, which is required by the proper construction of the claim term. The items in the

subscription data packet 630 are **non-executable data**. In fact, EPG information is typically just a list of programs available for an end user's STB.

[52] A POSITA would not interpret the EPG programs or the subscription data packet 630 as instructions executable by the set top box (STB). Rather, a POSITA would understand that program instructions already exist at the STB, and, during operation at the STB, the program instructions that already existed at the STB evaluate the data that is included in the subscription data packet 630.

[53] Petitioner argues, based on paragraph [0071] of Hoang '980, that the subscription data packet 630 is used to update the STB, which can require updating the STB's software. Pet. at 34-35. Petitioner appears to misunderstand Hoang '980. Even if the codes in the subscription data packet 632 can cause an update of the STB's software, the codes themselves are not computer executable instructions. The MPEG-2 standard recites several types of data packets and none is described as "executable instructions," as shown:

Table 2-65 – ISO/IEC defined options for carriage of an ISO/IEC 14496 scene and associated streams in ITU-T Rec. H.222.0 | ISO/IEC 13818-1

ISO/IEC 14496-1 object descriptor streams	Encapsulation in SL packets	Carriage in PES packets	Stream_type = 0x12	Stream_id = '1111 1010'
		Carriage in ISO_IEC_ 14496_sections	Stream_type = 0x13	Table_id = 0x05
	Encapsulation in SL packets followed by Multiplex into FlexMux packets	Carriage in PES packets	Stream_type = 0x12	Stream_id = '1111 1011'
		Carriage in ISO_IEC_ 14496_sections	Stream_type = 0x13	Table_id = 0x05
ISO/IEC 14496-1 scene description streams	Encapsulation in SL packets	Carriage in PES packets	Stream_type = 0x12	Stream_id = '1111 1010'
		Carriage in ISO_IEC_ 14496_sections	Stream_type = 0x13	Table_id = 0x04
	Encapsulation in SL packets followed by Multiplex into FlexMux packets	Carriage in PES packets	Stream_type = 0x12	Stream_id = '1111 1011'
		Carriage in ISO_IEC_ 14496_sections	Stream_type = 0x13	Table_id = 0x04
All other ISO/IEC 14496 streams	Encapsulation in SL packets	Carriage in PES packets	Stream_type = 0x12	Stream_id = '1111 1010'
	Encapsulation in SL packets followed by Multiplex into FlexMux packets	Carriage in PES packets	Stream_type = 0x12	Stream_id = '1111 1011'

ISO 13818-1:2000(E), Ex. 2004 at 94. Furthermore, a POSITA would know that programming or “flashing” a STB remotely is not possible, or at least would be impractical, as bit error rates (BERs) are substantially unpredictable.

[54] Hoang '980 makes clear that what is being transmitted is not executable instructions. Hoang '980 states in paragraph [0068] that the subscription data packet 630 is transmitted via different channels randomly, interspersed with regularly transmitted data files. A POSITA would understand this to mean that the

subscription data packet 630 does not carry executable instructions to perform an update to the STB's software, because a POSITA would readily recognize that there is no need to repeatedly transmit a software update routine to STBs, and doing so would occupy a very large amount of available bandwidth. Bandwidth is limited in Cable TV broadcasting systems, and it is important to ensure that all allocated bandwidth is dedicated to real-time delivery of video and audio without glitches for end-users. Bandwidth is reserved to accommodate several variables: (a) Hardware limitations on encoders and modulators, (b) Real-time delivery of multicasting streams, and (c) the decrease of quality due to increase of "Signal-to-Noise" ratio in coaxial-cables due to attenuation, In other words, a Cable TV Operator will reserve bandwidth primarily to deliver TV Channels in SD & HD and other audio-only streams. There is no quality-of-service for firmware or software upgrades and transmitting dedicated software routines would require a higher standard and guaranteed delivery of all bytes transmitted.

[55] This is not a situation in which Hoang '980 used the term "code" or "identifier" in place of the term "instruction." Rather, Hoang '980 uses the term "instructions" elsewhere in the specification, demonstrating to a POSITA the inventors knew how to indicate when they wanted to send "instructions" and they were not interested in transmitting executable instructions to the STB. In paragraph [0051], Hoang '980 states that "channel servers 411 provide data files that are

retrieved from the central storage 504 in accordance with instructions from the central controlling server 502” (emphasis added). Based on Hoang ’980 describing a server that communicates instructions to another server (and not to the STB 600), a POSITA would have to logically conclude that the EPG programs and identifier/codes in the subscription data packet are not executable instructions.

[56] For at least the foregoing reasons, it is my opinion that Hoang ’980 does not disclose or suggest “a first processor to generate controller instructions,” as in claim 1 or “generating . . . controller instructions” as in claim 29. These elements are completely missing from Hoang ’980. Petitioner has not shown that Hoang ’980 renders claim 1 or claim 29 obvious.

**2. Hoang ’980 Does not Disclose or Fairly Suggest the
“selectively transmit[ting]” element and Petitioner’s
Combination of Unidirectional and Bi-directional
Disclosures is Flawed**

[57] Claim 1 recites that a second processor “is to selectively transmit the content requests to the service provider network in accordance with the controller instructions.” Claim 29 recites “selectively transmitting, by the plurality of network elements, content requests to the service provider network in accordance with the controller instructions.” I apply the District Court’s construction for these terms, i.e., “transmitting all selected requests through the service provider network in response to the controller instructions’ decisions to transmit the content requests.”

It is my opinion that Hoang '980 fails to disclose or fairly suggest this claim element.

Further, it is my opinion that the manner in which Petitioner attempts to combine different aspects of Hoang '980 to try and arrive at this claim element is fundamentally flawed.

[58] In Hoang '980, a STB 600 includes a CPU 604, a user interface 618, and a QAM demodulator 602. See Hoang '980, paragraph [0056] and FIG. 8. The QAM demodulator 602 can include a transmitter module and a receiver module, but no further details are provided regarding the transmitter module. See Hoang '980, paragraph [0057]. Rather, Hoang '980 merely states that “the QAM demodulator receives modulated IF signals, [and] samples and demodulates the signals to restore data.” (Emphasis added). Hoang '980 is completely silent regarding any transmission operations by the QAM demodulator 602, let alone transmission of any requests in response to controller instructions' decisions to transmit a request. As we shall now see, the demodulator of Hoang '980 must be unidirectional and it cannot operate as a bi-directional transmission device as Petitioner has incorrectly suggested.

[59] Hoang '980 is fundamentally a unidirectional communication system. Petitioner therefore tries to argue that “gaining access via transmission of a content request is obvious over the combination of Hoang '980's preferred embodiment system in Figs. 7 and 8, with the bi-directional on-demand systems of Hoang '980's

Figs. 3 and 4.” Pet. at 50-51. Petitioner asserts that “Hoang ’980 . . . teaches the claimed ‘content requests’ with the highlighted block 370 ‘demand that server provide requested client specific data.’” Pet. at 52. Petitioner provides a version of FIG. 6 with the block 370 highlighted as shown below:

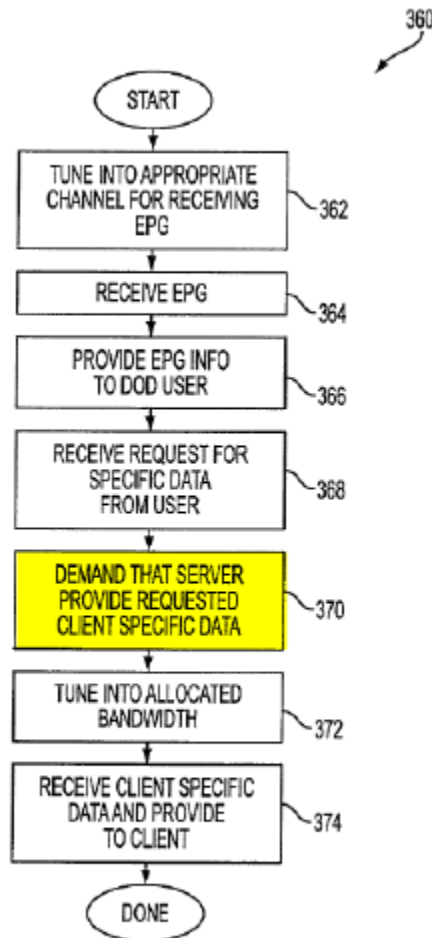


FIG. 6
(PRIOR ART)

[60] However, FIG. 6 of Hoang ’980, like Petitioner’s rejected claim construction (in the District Court), reads “selectively” right out of the claimed “selectively transmitting” element. There are no **conditional** decisions in the flowchart in FIG. 6. The user quite simply makes a request (368), after which there is always a demand

to the server for data, after which the client always tunes to allocated bandwidth in anticipation of receiving the demanded data. Paragraph [0024] of Hoang '980 makes clear that there is no selection of content requests in block 370: "In a next step 366, the DOD client provides the EPG information to a DOD user and in a step 368, receives a request for specific data from the DOD user. Then in a step 370, the DOD client demands that the DOD server provide the requested client specific data. In a step 372, in anticipation of the requested client specific data, the DOD client tunes into the allocated bandwidth. Then in a step 374, the DOD client receives via allocated bandwidth the requested client specific data in a readably usable format and provides it to the DOD user."

[61] In paragraph [0005], Hoang '980 states that "[u]sing bi-directional communications . . . would use significant processing and bandwidth resources and would not work in unidirectional systems." Hoang '980 states that the bi-directional teachings are provided to point out "inherent defects" in the bi-directional system. *Id.* Further, Hoang '980 states in paragraphs [0018], [0019], and [0025] that its objectives include to "provide a method for preventing delinquent clients from accessing data from a data-on-demand (DOD) system without relying on bi-directional communication," to "provide a method for altering a DOD clients subscription level without bi-directional communication or altering the clients STB," and to communicate "a client's DOD account status to a client using

unidirectional communications.” Hoang ’980 also describes that the “inherent problems” included having to divide available bandwidth to achieve per-client allocations and true bi-directional infrastructures being uncommon. *Id.* These teachings in Hoang ’980 would naturally lead a POSITA away from combining the unidirectional and bi-directional aspects of Hoang ’980 in the manner suggested by Petitioner. Petitioner recognizes this problem and tries to argue that a POSITA would implement block 706 of FIG. 11 (a unidirectional method) with block 370 of FIG. 6. Pet. at 52. I disagree.

[62] Hoang ’980’s description of bi-directional systems is to describe the problems that its unidirectional system solves. According to Hoang ’980, a problem for “Data-on-Demand” (DOD) is controlling the access to programs (TV Series, shows, etc.) accessed using a STB, and how those programs could be accessed without proper authorization, which in turn will impose a tax on more bandwidth and resources utilized by a service provided. Hoang ’980 at [0005]. Hoang ’980 then reveals a Cable TV system broadcast where MPEG-2 Transport Streams are constructed using “PES” or Packet Elementary Streams. *Id.* at [0006].

[63] Hoang makes no reference to any Digital Video Broadcasting standard, and does not cite any broadcasting standard. Hoang simply makes reference to “CATV.” *Id.* at [0010], [0012]. A POSITA would interpret such general references to mean that the MPEG-2 Transport Stream standard was used, and this technology is taught

in Ex. 2004 (ISO/IEC 13818-1:2000(E)). MPEG Transport Streams are small packets of 188 bytes that are used to encode video and audio signals and have been used for multimedia streaming at the time of the invention and today are still in use for Satellite and Cable TV operators as part of “CATV” standards or “Digital Video Broadcasting” (DVB) Systems. Most recently, HTTP Live Streaming (HLS) uses “MPEG TS” encoding formats to transport and stream video content to mobile, web, and other connected devices. FIG. 2 of Hoang '980 presents a “TRANSPORT STREAM MUX” in block 214 linked via 224 to a “TRANSPORT STREAM DEMUX” 220 also linked to the “packetizer” device 220.

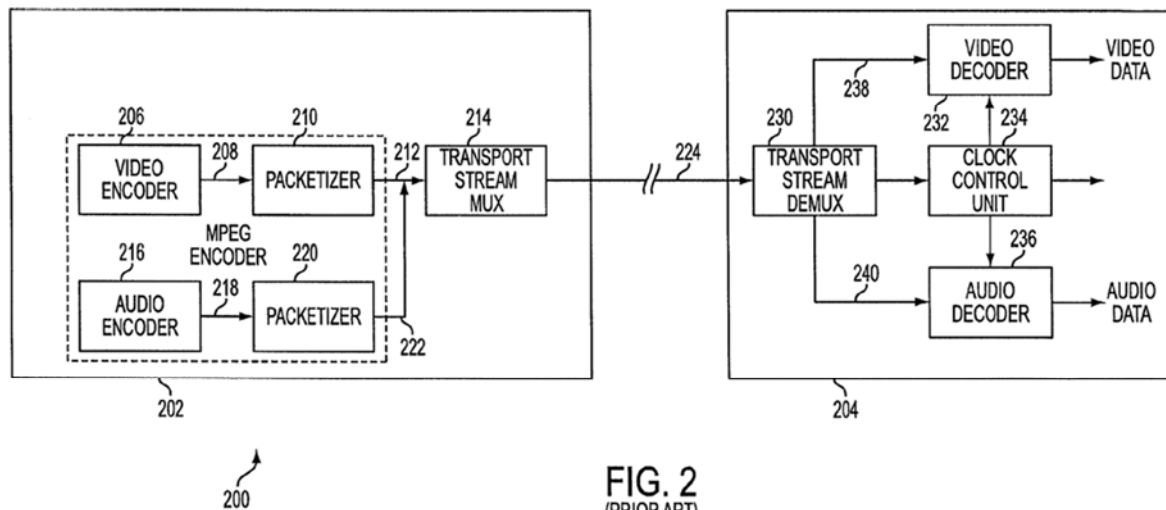


FIG. 2
(PRIOR ART)

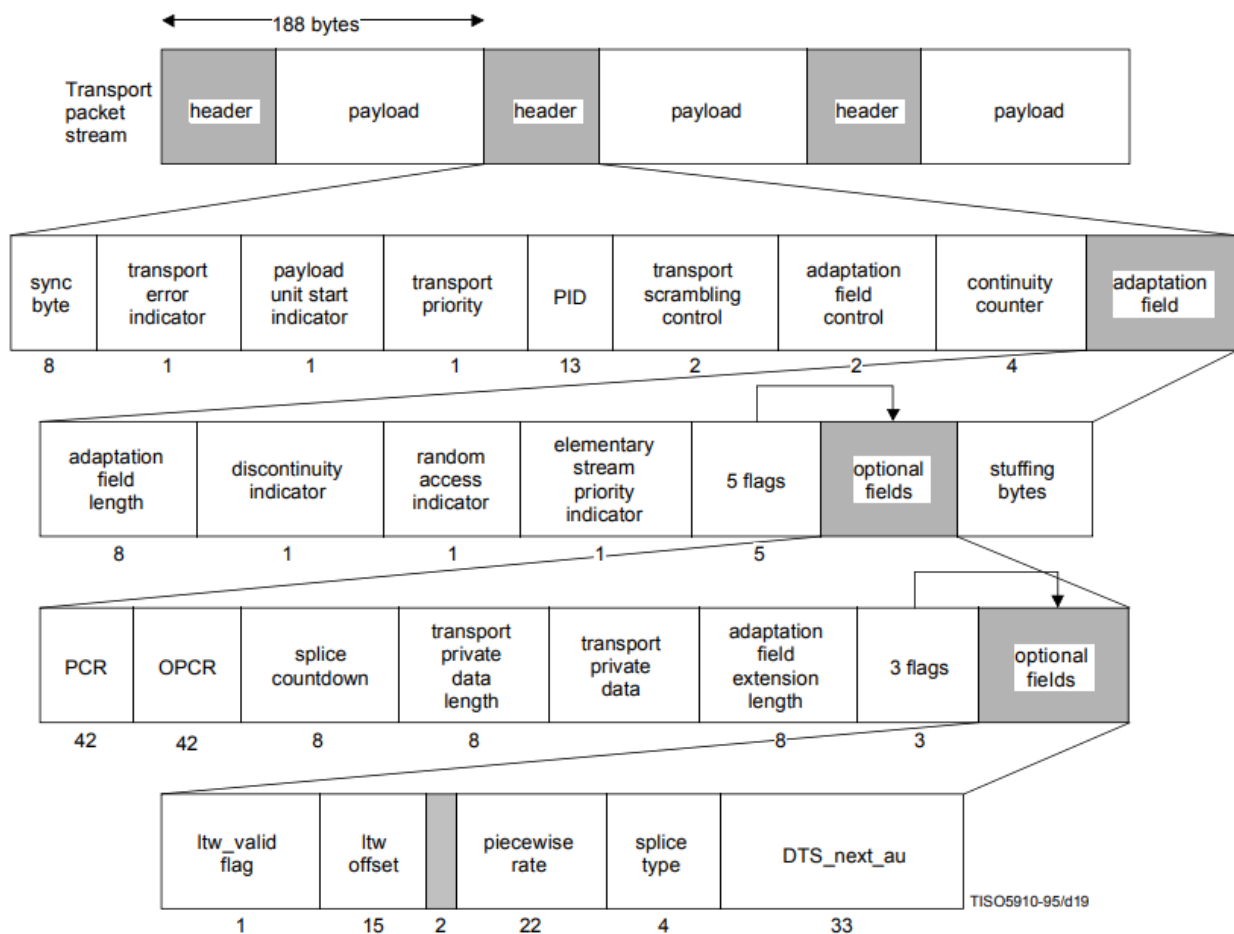
[64] A POSITA will understand that Hoang '980 is referring to MPEG-2 Transport Stream packets that are 184 bytes long for payload, with 4 bytes of header, for a total of 188 bytes.

“The Transport Stream combines one or more programs with one or more independent time bases into a single stream. PES packets made up of elementary streams that form a program share a common timebase. The Transport Stream is designed for use in environments where errors are likely, such as storage or transmission in lossy or noisy media. Transport Stream packets are 188 bytes in length.”

Ex. 2004 at xi (emphasis removed).

F.0.1 Transport Stream syntax

See Figure F.1.

**Figure F.1 – Transport Stream syntax diagram***Id.* at 125 (FIG. F-1).

[65] Therefore, the process shown in FIG. 2 of Hoang '980 must produce a sequence of packets 188 bytes long, which will include corresponding headers that map "Program Identifiers" or PID, including other fields for timing, sequencing, etc. The PID value is then used in the demultiplexing process to decode each packet.

Transport Stream packets begin with a 4-byte prefix, which contains a 13-bit Packet ID (PID), defined in Table 2-2. The PID identifies, via the Program Specific Information (PSI) tables, the contents of the data contained in the Transport Stream packet. Transport Stream packets of one PID value carry data of one and only one elementary stream.

The PSI tables are carried in the Transport Stream. There are four PSI tables:

- Program Association Table;
- Program Map Table;
- Conditional Access Table;
- Network Information Table.

These tables contain the necessary and sufficient information to demultiplex and present programs. The Program Map Table, in Table 2-28, specifies, among other information, which PIDs, and therefore which elementary streams are associated to form each program. This table also indicates the PID of the Transport Stream packets which carry the PCR for each program. The Conditional Access Table shall be present if scrambling is employed. The Network Information Table is optional and its contents are not specified by this Recommendation | International Standard.

Id. at 8.

[66] This explains how element 224 in FIG. 2 of Hoang '980 is defined as a distribution infrastructure: “distribution infrastructure 224 may be, for example, a telephone network and/or a cable TV (CATV) system, employing optical fiber and implementing asynchronous transfer mode (ATM) transmission protocols.” Hoang '980 at [0010].

[67] In view of the foregoing, a POSITA would not, indeed they properly could not, interpret FIG. 3 of Hoang '980 as disclosing the sort of bi-directional communication argued by the Petitioner (as being combined with the unidirectional teachings of Hoang '980) for at least the following three reasons:

- a) Element 314 refers to distribution infrastructure as described herein that does not disclose QAM

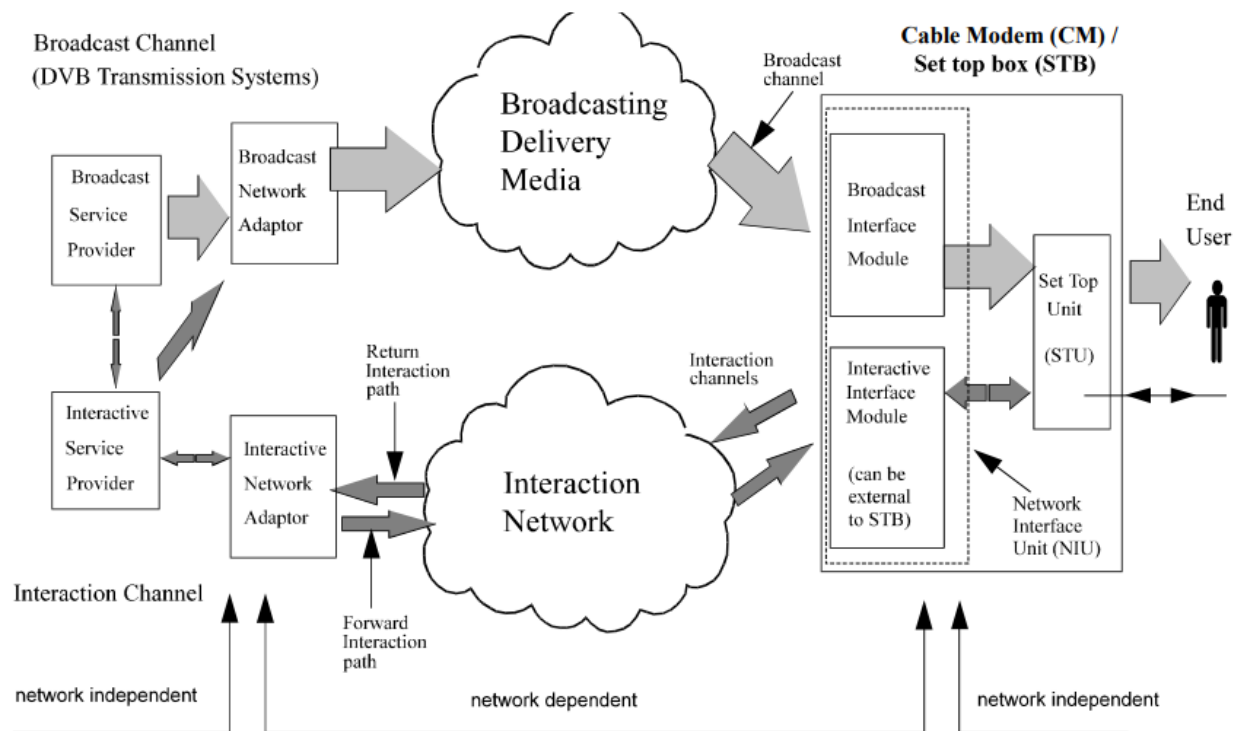
- b) Element 314 cannot describe a bi-directional communication as the routing information provided by the video server 210
- c) The STB element 304 is not described to meet any bi-directional standards, whereas elements 324 in FIG. 4, called “CLIENT,” show bi-directional communication.

[68] At the time of Hoang '980 in 2001, and as Hoang '980 itself admits in paragraph [0019], bi-directional communications were “uncommon.” In fact, what elements 326/328 in FIG. 4 depict are two physical technologies or mediums used to create an interaction with the video server. “Instead, typical implementations today cobble together existing infrastructure, such as fiber optic cabling and telephone lines to implement the necessary bi-directional communications. For example, the fiber optic cable may be used for server transmission of client specific data, while an existing telephone line may be used for client transmission of requests.” Hoang '980 at paragraph [0019].

[69] What Hoang '980 at FIG. 4 depicts, based on the knowledge and skills of a POSITA during the relevant time period, is a user or client placing a phone call to a service provider, with that action in turn directing the video server to broadcast a certain program on a certain channel to a subscriber's STB.

[70] Another relevant industry standard at the time of Hoang '980 is found in Ex. 2005 and called “DVB Interaction Channel for cable TV Distribution Systems

ETSI ES 200 800.” This standard specifies the architecture for bi-directional communications in connection with cable TV head ends. As shown at page 12, for proper bi-directional communications in DVB Transmission Systems or CATV systems, the reference requires that a STB handle two channels: a Broadcast channel in MPEG Transport Stream format, and a STB Channel to handle the interactive network.



Ex. 2005 at 12, Figure 2.

[71] The STB depicted in the above figure also requires supporting “Downstream” and “Upstream” links using two different modulation techniques: DVB-C QAM for downstream and QPSK for upstream.

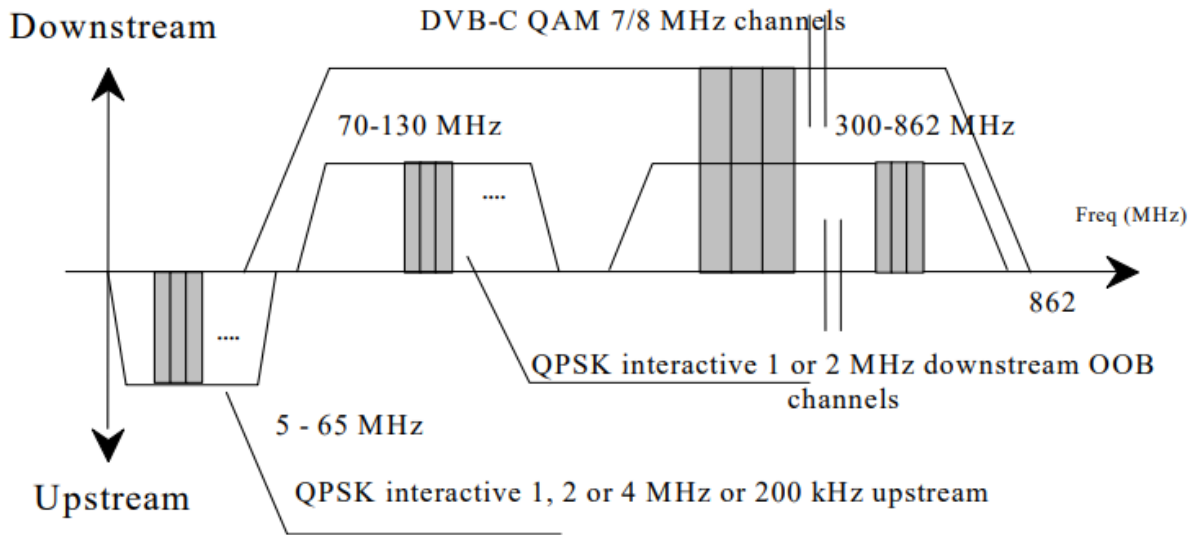


Figure 3: DVB preferred frequency ranges for CATV interactive systems

Id. at 14, Figure 3.

[72] Hoang '980 makes no mention of QPSK modulation and does not introduce a modulator at the STB 600, even though these components are required for an interactive session and to create an upstream link. Nowhere in Hoang '980 is it mentioned or suggested that the STB 600 use a “modulator,” instead only a “demodulator” is shown, but that demodulator would not transmit upstream, it would only be used to decode the video signal received in the downstream direction.

[73] Therefore, the Hoang '980 Patent at FIG. 4 does not disclose features required to create a bi-directional communication as was then known in the art and used in TCP/IP networks. Instead, what Hoang '980 describes is upstream communication protocols from a “Client” (e.g. subscriber) using a phone line.

[74] In view of the foregoing, I completely disagree with Petitioner's interpretation of paragraph [0053] of Hoang '980 as disclosing that in both unidirectional and bi-directional systems, servers and clients communicate using the data-over-cable-systems-interface specification (DOCSIS) standard. Pet. at 23, 32. The exemplary STB that is shown in FIG. 8 and that is used for the DOD system does not have a QAM modulator, which would be required for Petitioners position to be correct. A QPSK modulator is also not shown or described, making Petitioner's position truly illogical.

[75] Paragraph [0053] of Hoang '980 states:

Each channel server 411 is assigned to a channel and is coupled to an up-converter 412. The output of each channel server 411 is a quadrature amplitude modulation (QAM) modulated intermediate frequency (IF) signal having a Suitable frequency for the corresponding up-converter 412. The QAM-modulated IF signals are dependent upon adopted Standards. The current adopted Standard in the United States is the data-Over-cable-systems-interface specification (DOCSIS) standard, which requires an approximately 43.75 MHz IF frequency.

A POSITA reading paragraph [0053] would interpret the above description as simply stating the intermediate frequency could be 43.75 MHz as defined by DOCSIS.

[76] As a consequence, FIG. 5 of Hoang '980 does not disclose the necessary bi-directional communications either. Rather, what it discloses is receiving a request from a first medium, a phone line for instance, and broadcasting to a specific

subscriber on a second medium. I believe Petitioner agrees with this conclusion when it states that Hoang '980 uses unidirectional communications, as the preferred embodiment between the DOD server shown 450 and the universal STB 600. Pet. at 23.

[77] While I note that Hoang '980 presents in paragraph [0049] that “even more features can be provided to the digital broadcast and DOD user when a bi-directional communication link is available,” it is my opinion that the DOD control that Hoang '980 discloses cannot be implemented with what Hoang provides for bi-directional infrastructure. I do not find foundation in the specification of Hoang '980 to support Petitioner's assertion to the contrary. A POSITA armed with Hoang '980, as a whole, would not find it obvious to arrive at the teaching that Petitioner insists is presented. A POSITA would not add a modulator to the STB to create an upstream signal path to the CATV operator. A POSITA also would not modify the CATV operator, which I believe is depicted by a “horizontal line” in FIG. 2 (element 224) and replace it with a set of components (decoders, converters, etc.) to establish an “interactive path” with the DOD Server. A POSITA would need to define what kind of modulation technique to use, and at what frequency. A POSITA would also have to define an interactive MPEG transport stream set of tags to support interactive applications. And all of these things would need to be done before even attempting to “bi-directionalize” the unidirectional teachings of Hoang '980.

[78] In my opinion, a POSITA could not take the technology explained in the Hoang '980 (CATV delivery and phone lines) and find it obvious to arrive at the system and method of the challenged claims.

[79] Regarding Petitioner's reliance on FIG. 6, I note that, once again, Hoang '980 uses the word "Client" and discloses a dual system, where CATV is used for broadcasting and a different mechanism (e.g., telephone lines) is used for requesting DOD Content. What Hoang '980 teaches in FIG. 6 is a method to regularly tune to an EPG and tuning into requested DOD data or to a TV channel. Detecting illegal subscribers requesting content is a primary objective of Hoang '980. The "Client," such as the STB 600, is connected to a communications link 620 (e.g., Ethernet, USB, or Firewire). The process described by FIG. 6 and the STB shown in FIG. 8 could be implemented using a computer coupled to a module, e.g. a MODEM, further confirming the use of dial-up lines or telephone lines.

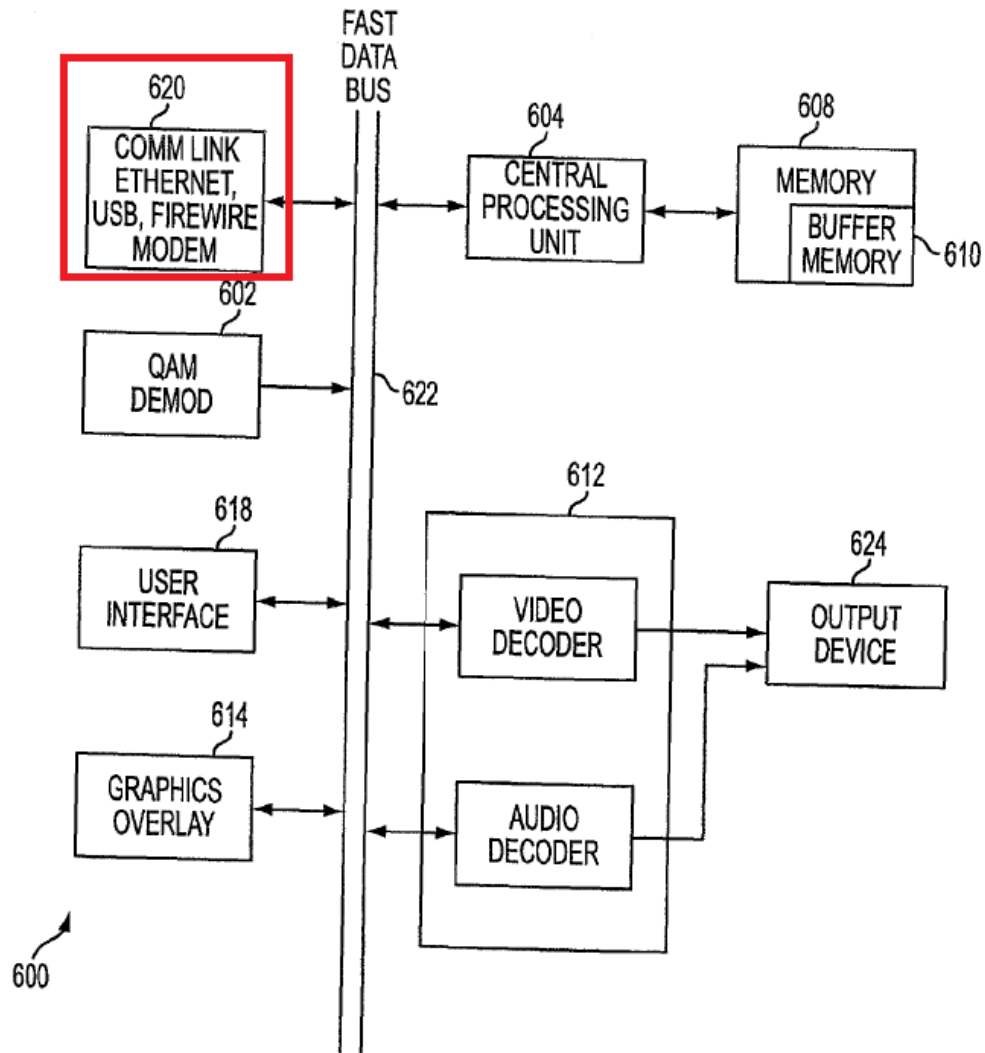


FIG. 8

[80] Regarding Petitioner's reliance on FIGS. 7 and 11 of Hoang '980, I note that FIG. 7 only shows a standard converter and combiner used in CATV distribution systems, no bi-directional communication is presented.

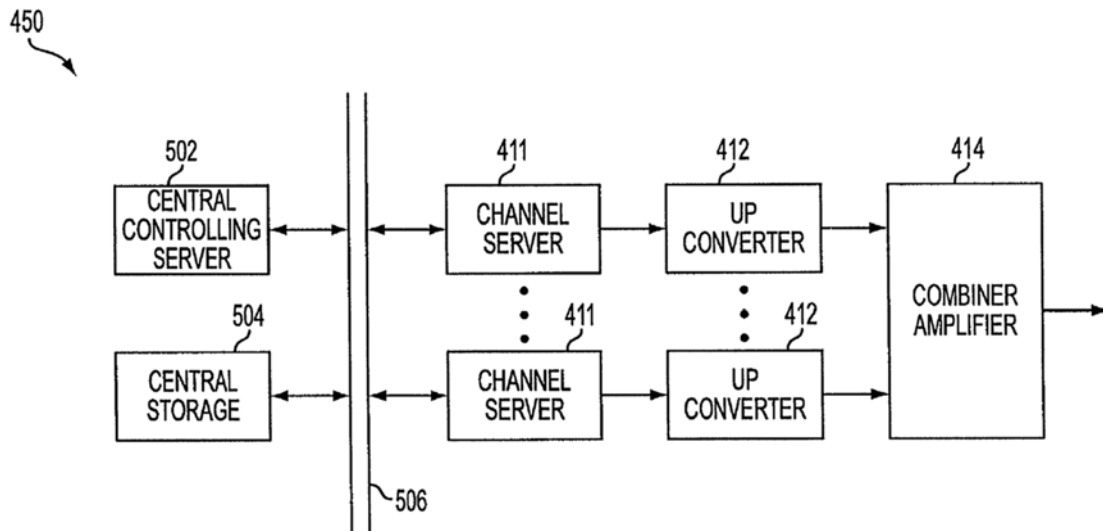


FIG. 7

FIG. 11 of Hoang '980 merely presents a filter that is based on the EPG, which itself is based on the subscription information known by the STB but does not present any bi-directional communications.

[81] It is my opinion that Hoang '980 fails to disclose or suggest a bi-directional system. It is my further opinion that Hoang '980's unidirectional teachings cannot be modified by what Hoang '980 discloses to produce a bi-directional system. It is my opinion that, contrary to Petitioner's suggestion, a POSITA would not, and could not, simply use block 370 in the bi-directional system and method described by Hoang '980 to implement the block 706 in the unidirectional system and method

described by Hoang '980. Petitioner's suggested combination is fundamentally flawed.

[82] For at least the foregoing reasons, it is my opinion that Hoang '980 fails to disclose or suggest the selectively transmit[ing] element of claims 1 and 29, and these elements are completely missing from Hoang '980. Therefore, it is my opinion that for at least this reason as well then, Petitioner has not shown that Hoang '980 renders claim 1 or claim 29 obvious.

IX. CONCLUSION

[83] I may modify or supplement my opinions, if necessary, based on further review and analysis of evidence in this case, including review and analysis of any information that may be provided to me subsequent to the filing of this Declaration.

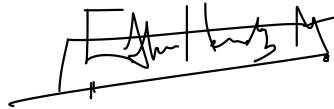
I am prepared to testify about these opinions.

X. CERTIFICATION

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

Dated: August 15, 2019

Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'Edwin A. Hernandez', is written over a horizontal line.

Edwin A. Hernandez. Ph.D.

APPENDIX A

Edwin A. Hernandez-Mondragon, PhD

Technologist, Expert Witness & Entrepreneur

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Expertise Areas

- **Cable TV Systems and Broadcasting:** Cable TV Multicasting, DVB-C/T/S, “Cloud to Cable TV,” Set Top Boxes, MPEG Encoding, Streaming, Multiplexing, HFC, Docsis Standards.
- **Multimedia Streaming:** OTT Platforms, TV distribution, Music & Video Platforms and automated playlist creation, real-time encoding, CDN, and cloud storage systems
- **Mobile Devices and Systems:** User Interfaces in mobile, mobile operating systems, Expert in mobility and wireless roaming 2G-3G-4G-5G systems
- **AirInterface and LTE Source:** Experience with SDRs, OpenAirInterface project, reviewing code for handover, RRC Channels, KPI, and X2/S1AP/XN handoff parameters
- **Cloud Storage and Data Synchronization:** GlusterFS, File Systems, Dropbox/S3 integration. Cloud computing, Load balancing, AWS.
- **Wireless Communications:** 5G, 4G, 3G, LTE signaling, WLAN, Software-defined Networks, and RF emulation with a patent in wireless emulation/dissertation on this field.
- **Blockchain:** Bitcoin, Litecoin, Consensus Algorithms, Gossip Protocols
- **Power Management:** Wireless Power Management Issued Patent for Microsoft Wireless Service and Wireless Charging Patent with over 80+ references
- **Personal Area Networking:** Expertise in Personal Area Networks and Wearable Systems. Issued Patent for Windows PAN Driver.
- **Smart phones and wireless embedded software development:** Personal Area Networking, Virtual Machines and Operating Systems, Bluetooth

Academic Background

Ph.D., **University of Florida**, Gainesville, FL

Major: Computer Engineering,

Research Areas: Mobile Computing, Wireless Networks, Handoff Optimization, and Adaptable Network Protocols, Linear Prediction, Network Emulation

Dissertation: An Adaptive Networking Protocol for Rapid Mobility Environments

Advisor: Dr. Sumi Helal, August 2002

M.Sc., **University of Florida**, Gainesville, FL

Major: Electrical and Computer Engineering

Research Areas: Computer Networks and Intelligent and Information Systems (Artificial Intelligence).

Thesis: Adaptive Sampling for Network Management

Advisor: Dr. Alan D. George December 1999

B.Sc. **Costa Rica Institute of Technology**, Costa Rica

Major: Electronics Engineering

Thesis: Monitoring system for a packet-based data network, RACSAPAQ

Advisor: Dipl-Ing. Luis P. Mendez July 1995

Industry Experience

EGLA COMMUNICATIONS / SOFTWARE Development / MEVIA – Owner – (10/10 – Present)

Experience: Created MEVIA Apps & Cloud to Cable TV. **CloudtoCable** is a patented platform that merges cloud and Cable TV systems and simplifies music and video distribution to web, mobile and Cable TV. Cloud to Cable is servicing operators like CABLE COLOR in Honduras. MEVIA¹ is a "Software as a Service" and a cloud-based platform that enables "MEVIA Music" currently in operation in several countries including Brazil, Honduras, and United States. Supplied and maintained REST/SOAP/JSON APIs to handle more than 500K subscribers with SKY TUNES application. Our technologies powered DMX Media before its **\$16M** acquisition by Stingray Digital mediamplify.com, mevia.co and www.eqlacomm.net

EGLAVATOR, Boca Raton, FL. (3/17 – Present)

Experience: Founder of technology incubator and accelerator with 8 startups in Cloud, 4G, Prototyping and development of mechanical, electrical, and software products. www.eqlavator.com Consulting for DEMOLIZER, HydraFlush, and others.

MEVIA STUDIOS – Co-host –Boca Raton, FL (3/18 to Present).

Experience: As part of EGLAVATOR's TV, Media studio. I host and produce TV shows in technology and business: ASK ALICE, TECH ED TV, and others with over 15 shows/podcasts.

EGLA COMMUNICATIONS / Expert Witness Services, Boca Raton, FL (3/16 to Present)

Experience: Expert witness services for patent and trade secret cases in Federal court, filing expert reports, consultant, software auditing. <https://eqlacomm.net/expert-witness-services/>

MOBILITY WORKX, LLC. Principal, Boca Raton, FL (7/2016 to present)

Experience: Patent commercialization of MobileCAD (Patent 7,231,330) a mobile emulation environment for **3G, UMTS, 4G LTE, & 5G** networks, mobility, PCRF, Diameter routing, RRC Signaling, propagation models simulation, virtual drive testing and RF scenarios and MobileIPP (Patent 7,697,508 / 8,213,417) for seamless mobility LTE, Self-Organizing Networks, S1 Handover, X2 handover, Xn Handover, etc.

Motorola Inc, Principal Staff Software Engineer, Mobile Devices, Plantation, FL (11/07-5/10)

Experience: Google Android Platform/Application Development, Kernel-level prototyping, Data support, implemented HTTP Push/MMS, DRM content management, Webkit and Opera- based browsers, Lead discussions with customer Sprint/Nextel and Nextel International. I defined Android architecture and the concept of iDEN+5, which seeded Android in Plantation. Assisted in licensing negotiations for Motorola as part of the licensing team.

Motorola, Inc Sr. Software Staff Engineer, Mobile Devices, Plantation, FL (11/03 -10/07)

Experience: Feature lead for Java Virtual Machine for Dual-mode devices, J2ME Expert, JSR implementation on BREW architectures, and iDEN/CDMA software interactions. As a feature lead, program management interactions, customer interactions, and 3rd party vendor relationships including licensing (ie Qualcomm). Platform design and development for Windows CE devices and Microsoft Smartphone Platforms, i930 mobile phone.

Microsoft, Technical Program Manager, Windows Networking, Redmond, WA (8/02 - 9/03)

Experience: Feature lead for Bluetooth Personal Area Networking. Responsibilities driving Architecture, Design, Test Automation, security analysis for PAN, and drive testing over networking protocols such as IPv4 and IPv6 networks.

¹ Previously marketed under MEDIAMPLIFY®

Microsoft, Program Manager Intern, Windows Networking, Redmond, WA (5/01-8/01)

Experience: Wireless Zero-Configuration (WZC) for Windows XP Service Pack, Power Management algorithm using self-similar traffic modeling, and adaptive adjustment of the duty cycle. IEEE 802.11b/g/a services could be optimized to reduce power consumption from 0 to 80% depending upon network traffic characterization.

COMPUNET, Entrepreneur/Lead Engineer Honduras (4/1997-11/09)

Experience: Owner and founder. Cisco/Linux administrator, Webmaster and senior system engineer and owner. Lead developer for: authentication services, security, web, and networking configuration.

Expert Witness for Intellectual Property and Patent Cases

- **University of Florida Research Foundation, Inc. et. al. vs. Motorola Mobility LLC.** Filed in U.S. District Court for the Southern District of Florida – Case settled
- **Virtela Technology Services vs. Andrew Funk**, File in the US District Court of Denver, Colorado, Representing Andrew Funk – Case Settled
- **Del Castillo vs. Bank of America** – Representing Bank of America – Case settled.
- **Seven Networks vs. Google** - Representing Seven Networks
- **Blue Radios vs. Kopin** - Representing Blue Radios – Colorado
- **Mobility Workx vs. T-Mobile** – Case Settled
- **Mobility Workx vs. Verizon Wireless**, Representing Mobility Workx, LLC in E.D. Texas
- **Mobile Manufacturer vs. Carrier**, Eastern District of Texas, Representing Mobile Manufacturer (Confidential)
- **Talent Mobile Development vs. Headios Group** (California Federal Court, Trademark/Mobile Software) – Jury trial testimonial with 700k award to my client.
- **Key West Golf Club vs. Cable Provider** – Preliminary study – Key West, FL
- **Express Mobile vs. DreamHost, LLC** – Expert Witness – US District Court of Delaware.
- **Stone vs. AT&T, Velocity** – Expert Witness – Representing AT&T and Velocity – US District of San Diego
- **Express Mobile vs. Magento, BigCommerce, others** – Representing Express Mobile, US District of Texas.
- **Workspot vs. Citrix** – Expert Witness IPR – Representing CITRIX - PTAB
- **Advising** - Pre-trial / 4 Confidential Defendants/Plaintiffs

Software Audits

- Honduran Government, “National Institute of Properties,” Multi-million dollar platform transferred from the World Bank to the Honduran Government
- Auditing of Honduran Elections, fraud detection and analysis (Pro-Bono)

Publications

- J. Zablah, E. Hernandez, et.al “Enhance Honduras Development with Technology Transfer of High Performance Computing,” World Development Journal, Jan 2016.
- E. Hernandez , "War of Mobile Browsers," IEEE Pervasive Computing, vol. 8, no. 1, pp. 82-85,

Jan.-Mar. 2009

- E. Hernandez, A. Ayyagari, "Heavily-tailed Network Traffic Modeling for Power Management", IEEE Workshop on Performance and Management of Wireless and Mobile Networks Australia, November 2005
- E. Hernandez, M. Chideste, and A. George, "Adaptive sampling for network management," Journal of Networks and System Management (JNSM), Vol. 9, No. 4, Dec 2001.
- E. Hernandez, A. Helal, "Predictive Mobile IP for Rapid Mobility," IEEE Conf. Wireless Local Networks 2004, Tampa, FL
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- E. Hernandez, A. Helal, "Examining Mobile-IP Performance in Rapidly Mobile Environments: The Case of a Commuter Train," IEEE Conf. Local Computer Networks 2001, Tampa, FL, Nov 14-16, 2001.
- Helal, S. Shah, E. Hernandez, "Mobility Benchmarking In Ad-Hoc Networks," The IPSJ Journal, Vol.43, No.11, June 2002. Approx. 15 pp.
- S. Shah, E. Hernandez, A. Helal, "CAD-HOC: A CAD Like Tool For Generating Mobility Benchmarks In Ad-Hoc Networks," SAINT 2002, Japan, January 2002

Thesis and Dissertation

- E. Hernandez "**An adaptive protocol for rapid mobile environments**," Ph.D Dissertation, University of Florida, August 2002
- E. Hernandez. "**Adaptive sampling for network management**," M.Sc. Thesis, University of Florida, Dec 1999
- E. Hernandez, Y. Lee. "**Monitoring system of a packet data network**," B.Sc. Thesis. ITCR, report, July 1995

Technical Reports and Prior to publications

- E. Hernandez "Mediamplify: A Multimedia Platform for MPEG TV Systems, " Dec 2015
- E. Hernandez, A. Helal, "RAMON: A network emulation environment," CISE Department, University of Florida, 2005
- E. Hernandez, A. Helal, "Ghost Mobile IP," CISE Department, University of Florida, 2005.
- E. Hernandez, "DMTF: Authentication for Mobile Phones," Motorola, defensive Publication, 2004

Patents and Innovations (11 Issued, 4 Pending)

- E. Hernandez, A. Ayyagari, et al. "Method and system for managing power consumption of a network interface module in a wireless computing device," Microsoft Corporation. **Issued US Pat. 7,564,810**
- E. Hernandez, A. Helal, RAMON, "Rapid Mobility Network Emulator Method and System," University of Florida. **Issued US Pat. 7,231,330**
- E. Hernandez, A. Helal, "System, Apparatus, and Method for Proactive Allocation of Wireless Communication Resources," University of Florida, **Issued US Pat. 7,697,508 and US Pat. 8,213,417**
- S. Poursabahian, E. Hernandez, et al, "Bluetooth PAN Driver," Microsoft Corporation, **Issued US Pat. 7,269,388**

- Krantz, E. Hernandez, et al "Rules-based Network Selection Across Multiple Media," Microsoft Corporation, **Issued US Pat 8,788,715, and 7,996,505**
- V. Bhanu, E. Hernandez, et al, "Smart Scan for Bluetooth PAN Services, "Microsoft Corporation." **Issued US Pat. 8,024,487**
- E. Hernandez, K. Ardizzone. "Thumb-based User Interface for Camera Phones," Motorola, Inc, submitted 2005
- E. Hernandez, et al. "Java-based Push to Talk, " **Issued Pat 8,707,337**
- E. Hernandez, "Secure USB Drive," Motorola, Inc, submitted 2005
- E. Hernandez, J. Tracy "Magnetic Connector", Motorola, Inc, **Issued US Pat: 7,331,793**
- E. Hernandez, – **Issued US Pat: 10,123,074**
 - Pending additional patent continuations in USPTO and European Patent Office (PCT)
- E. Hernandez – Anemometer with Augmented Reality – April 2018 – Patent Application
- E. Hernandez - System, Method, and Apparatus For Virtualized Operations for Biohazard Waste Destruction with Augmented Reality and Voice Commands – October 2018 – Patent Application (PCT & USPTO)

Blogs & Podcasts

- FM Radio & Podcast – **Ask Alice** Show – May thru August 2018
- Founder of TECHED TV. <http://teched.tv>
- Technical articles at medium.com/@edwinhm and edwinhernandez.com

Skills

Platform Experience: Linux Operating Systems (*Expert Level*), Windows Platforms, AWS, Google Cloud, Microsoft Azure

Mobile Programming: Android Development, Mobile to TV, IOS Development for iPad/iPhone/TV, Embedded with Raspberry PI, Android, Legacy: Windows CE, J2ME, Blackberry RIM SDK, Motorola SDKs, Samsung SDK BREW, AMSS/DMSS.

Software Development languages: Python (Django), PHP, Javascript (jQuery, NodeJS, AngularJS), Objective-C, Swift, Java, Java/Android, GNU C/C++, C#, VB.NET, Platform Builder, Java Micro-Edition, J2SE, and MySQL.

Multimedia Systems: Cable TV, DVB-C, DVB-S, IP Multicasting, Streaming Platforms, Encoding, Transcoding, Metadata, MPEG TS, Cable & Satellite Systems..

Wireless Protocols: UMTS, 4G LTE Handoff, 5G XN, and NFV Platforms. Experience with Wearables, Bluetooth LE, and many PAN systems. Wide experience with GSM, GPRS, and other legacy wireless standards such as CDMA 2000, iDEN, and others. Extensive experience with mobility protocols in UMTS, LTE, GSM, Mobile IP, MIH, to older systems like Cellular IP, HAWAII, , AODV, and other systems. Wearables with BNEP and PAN, WIFI and IEEE 802.11 standards.

Software Defined Radios and Networks: GNU Radio, RF and Software-based Emulation, Wireless Emulation, Fading, Modulation, & others

Internet Networking: In-depth knowledge of IPv4 and IPv6 protocols, IP tunnels, TCP/IP, Web Sockets. NDIS driver design in Windows platforms, Experience managing and securing Cisco IOS routers networks & firewalls and SNMP management. Fiber optics, IP Tunnels, VPN, Switching, Redundancy.

Process Management: Github, JIRA, TFS & SCRUM

Data Center: Power management, APC, Management, A/C, Distribution, Networking,

Cloud Computing: AWS, Google Cloud, Azure, VmWare & XenServer, Docker Containers & Kubernetes. Cloud storage and platform development of multimedia delivery systems.

Scientific and Engineering Tools: MATLAB, pSPICE, OrCAD, Network Simulator (*ns-2*), wide

experience in electronic circuit design, digital design, and low-level debugging tools, including PC-104 and circuit design.

Legacy Programming Languages: LISP, PROLOG, FOXPRO, Pascal, Embedded design, Intel assembly code (i8051, x86), and TCL/TK.

Technology Licensed

- The US patents 7231330, 7697508, and 8213417 are licensed by a major internet and wireless communications companies and are in use to manufacture millions of cellular devices

Honors and Awards

- Judge for the **Mobile World Congress** in Barcelona, Spain, 2019
- Founding member of **Honduras Global** dedicated to Entrepreneurship, Science & Technology
- **Fulbright-Scholar:** 1997-1999 – US State Department Program.
- 2018 Innovation Awards, City of Coral Springs, FL
- Nov 2018 - 3rd Place Hackathon with “*Eye of the Storm*” at Office Depot, Boca Raton, FL
- Top projects in Emerge Americas 2018 Hackathon with Video Anemometer, Miami, FL
- Fifth Place in Bitcoin Hackathon 2018 with Bitcoin Caster, Miami, FL
https://github.com/win2013/bitcoin_alex
- Winner of Kinect/Gesture-controlled Hackathon in Boca Raton, FL
<https://github.com/win2013/airthenticate>
- Finalist and presenting EGLA COMMUNICATIONS at Florida Venture Forum in Coral Gables, FL 2015
- Finalist at “Emerge America’s” Conference with Mediampify/MEVIA in 2014, Miami Convention Center
- Finalist with Mediampify “Music Sparks” in LAB Miami, FL.
- Mention of honor in the Honduran National Science Contest, May 1997.
- Ranked 1st in undergraduate studies, Costa Rica Institute of Technology, July 1995.
 - Four consecutive academic scholarships undergraduate work at Costa Rica Institute of Technology (ITCR), 1991-1995.
- Winner Business Plan Competition in **University of Florida** 2002 and Runner-up in 2001
- *High-Performance Computing and Simulation Lab* student award, spring 1999.
- In March 2001, as a co-founder of E-melodies, runner-up during the *2001 UF Business Plan Competition* at the University of Florida and winner of the *2002 UF Business Plan Competition in Information Technology*.

Entrepreneurship

EGLA COMMUNICATIONS: Founder and Chief Technology Officer, Startup/Boca Raton FL: Mediampify Platform (Cloud to Cable TV), Expert Witness Services, Software/Cloud hosting, Multimedia Delivery Services, HuluDrive. www.eqlacomm.com | www.eqlacorp.com

EGLAVATOR: Founder of a Technology incubator in Boca Raton, FL www.eqlavator.com

Mobility Workx, LLC: Principal, 3G/4G Emulation and Mobile Independent Handoffs under patents 7,231,330, and 7,697,508 also known as MobileCAD and MobileIPP. www.mobilityworkx.co

UBIWIRELESS, LLC: Founder, A company dedicated to developing mobile and wireless technologies,

including products as RxProfile™ (<http://rxprofile.net>), FUTMOB, and Ad2Fone, among others (Mobile Applications)

COMPUNET S. de R. L. Founder and CTO, Honduras pioneer Internet Service Provider founded in 1997 completed operations in November 2009.

Personal Information

Hobbies: Guitar playing, running, soccer, volunteering, option and derivatives trading.

Citizenship: Honduran/US Citizen

Religion: Catholic - Salesian Alumni – Instituto Salesiano San Miguel

Services and Memberships

- Member of Industry Advisory Board for Florida Atlantic University, Electrical and Computer Engineering Department, 2017-present
- **GSMA - 2019 Mobile World Congress**, Judge, Barcelona, Spain
- Emerge Broward and Leadership Broward Member 2014-2016
- Organizing Committee, Mobile Mondays Miami, 2009-2013
- Organizer “Startup Weekend Boca,” October 2013
- Hispanic Graduate Student Association, Finance chair, 2001-2002
- Hurricane Mitch Volunteer, Gainesville, FL. October 1998
- ACM, IEEE member, dancing, soccer, and Tae Kwon Do, black belt
- St. Andrew’s Catholic church, Life Teen, Coral Springs, FL, 2004-2005
- Member of Lovebags.org, 2007-2009
- Member of Society of Hispanic Professional Engineers, 2009-2010

Technical Program Committees/Reviewer for International Conferences

- 2019 International Symposium on Electrical and Electronics Engineering, ISEE2019.
- 2019 IEEE Asia-Pacific Conference on Applied Electromagnetics (APACE2019)
- 2019 1st International Conference on Cybernetics and Intelligent System (ICORIS) 2019.
- 2019 IEEE Game Entertainment and Media – Ireland
- **Editorial Board Member and Reviewer**, Journal for Networks and Systems Management, from 2004-present
- 2018 Journal of Simulation: Transactions of the Society for Modeling and Simulation International
- 2018 International Conference on Information and Communications Technology (ICOIACT)
- 2017 2nd International conferences on Information Technology, Information Systems and Electrical Engineering (ICITEE)
- 2016 Global Summit on Computer and Information Technology
- 2016 International Conference on Information Technology, Information Systems, and Electrical Engineering
- Recent Advances in Communications and Networking Technology
- WCI 2015 – Women in Computing and Informatics
- **Editorial Board** of the Intl. Journal of Networks and Systems 2009-2016
- 2012 (2012 IEEE Symposium on Wireless Technology & Applications).
- IEEE International Consumer Networks, 2011

- IEEE Broadnets - 2008
- IEEE Wireless Networks Magazine, 2002-2003
- IEEE Transactions on Mobile Computing 2007
- IEEE Wireless Local Networks 2005-2007
- IEEE Local Computer Networks 2007-2008
- IEEE GLOBECOM 2005
- IEEE SOUTHEAST CONFERENCE 2005
- IEEE Conferences in 2014-2015
- 2004-2009 - Panelist at 4G Wireless (Miami Beach, FL), several “Mobile Monday” events, and Mobile Commerce Latin America (2009).

Tutorials

- WEBCONF Latino 2010, Tegucigalpa, Honduras.
- Mobile Computing Platforms, Tegucigalpa, Honduras.
- IEEE SOUTHEAST CONF 2005. “Windows Cryptographic API,” A Session Keys Paradigm.
- *Keynote speaker* at “First Tuesday” Tegucigalpa, Honduras, and San Salvador, El Salvador

Training

- **Tucks Schools of Business – Dartmouth University**, Digital Strategies for Entrepreneurs, Google Campus, Seattle, WA, and December 2016.
- **Management Skills and Business Strategies**, FAU Campus, Boca Raton, FL, January 2014

Languages

Fluent in Spanish and English. Basic knowledge of German and French

Teaching Experience

Teaching Assistant for Mobile Computing, University of Florida, (Spring - Fall 2001)

Experience: Mobile Computing is level-6000 graduate class. The class involves the discussion of research papers and a practical section where different wireless technologies are covered. In addition to my job duties, an automated examination tool was developed as additional class aid for grading. The class required J2ME/JSEE knowledge and the ability to support the class with Motorola smart phone development, plus all additional aid required to run the killer application competition sponsored by Motorola.

Teaching Assistant for Software Engineering, University of Florida (Fall 2000)

Experience: The class was targeted to computer engineering seniors as an introduction to the software development cycle. Students carry-on a web-based project and deliver specific documents and specifications (architectural, design, UI), develop a prototype, schedule different tasks, and manage the project to be delivered on time. The TA assists technically and supervises their work, grades quizzes and exams

Teaching Assistant for Introduction to CIS/Java, University of Florida (Summer 2000)

Experience: I taught an introductory lab session, graded quizzes, exams, and assignments. As an assistant I held different tutorial sessions on object oriented concepts and problem-solving skills.

Teaching Assistant for C++, University of Florida (Spring 2000)

Experience: Grading and preparing assignments for the class.

Instructor at the Central American Internetworking Conference, (9'1998)

Experience: During the conference, I taught a 3-day intensive hands-on class on network security. I covered topics from: network intrusion detection, privacy, and authentication mechanisms

Instructor, Central American Telecommunication Videoconferencing (Summer 1996)

Experience: Teaching Linux (Operating Systems), C++, and Networking seminars to engineers all over Central America (Remote teaching)

Central American Telecommunication Commission, Engineer, Honduras, (8/1995 – 5/1997)

Experience: Network Engineer, Videoconference systems (VTEL and H.323), software development for telecommunications and traffic management

United Nations Development Program (UNDP), IT Consultant, Honduras, (11/1996 – 5/1997)

Experience: Network security and consultant for the United Nations program in Honduras. Software auditing and network configuration

Research Experience

Research Assistant, University of Florida, Gainesville, FL (Jan '00 – Aug '02)

Experience: I investigated the effects of handoff and network mobility at different vehicular speeds. I used Mobile network simulation and emulation were important tools to study Mobile-IP and Layer-2/3 mobility protocols. I developed RAMON, Rapid Mobile Network Emulator, a device that emulates network layer mobility and programmatically replicates mobility conditions varying from signal strength, packet delay, BER, and speeds. RAMON uses real 802.11b Access Points, Omni-directional antennas, embedded computers (e.g. PC-104) and custom-build control circuitry. RAMON also used a .NET interface to automatically create network topologies to be emulated. In depth routing protocols explored, IP tunnels, and low-level network device driver adjustments. I conducted extensive simulation work on ns-2

Research Assistant, University of Florida, Gainesville, FL (Sep '97 - Dec '99)

Experience: I joined the High-performance Computing and Simulation Research Lab. During my thesis work, I applied Fuzzy Logic in Network Management, focusing on how adaptive sampling could reduce captured statistics without losing important network behavior. Additionally, I researched ATM networks, SNMP (Simple Network Management Protocol), Virtual Interface Architecture (VIA) over Myrinet, CORBA, and High-performance Cluster Computing topics.

Program Manager Intern, Microsoft Corporation, Redmond, WA (May – Sep '01)

Experience: As an intern, I investigated self-similarity and power management algorithms for Wireless Networks. I modeled the method how service time per packet could be estimated and used for QoS in ad-hoc and infrastructure networks.

Network Engineer, Radiografica Costarricense, R&D, Costa Rica. (Jan - Jul'95)

Experience: I developed a microcontroller-based (x8051 and RUP1-51 micro-controllers) system to measure X.25 and PBX data traffic, Windows-based GUI, and X.25 frame captures

References

Dr. Sumi Helal, Full Professor

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