

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMMSCOPE TECHNOLOGIES LLC,
Petitioner,

v.

BELDEN CANADA ULC,
Patent Owner.

Case No. IPR2024-01382
Patent 11,740,423 B2

**DECLARATION OF DR. CHARLES A. ELDERING IN SUPPORT OF
PATENT OWNER' MOTION TO AMEND**

CommScope v. Belden
IPR2024-01382
Belden Ex. 2005

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I. INTRODUCTION

1. I, Dr. Charles A. Eldering, submit this declaration to state my opinions on the matters described below.

2. I have been retained on behalf of Patent Owner, Belden Canada ULC (“Belden”), as an independent expert for the above-identified *inter partes review* (“IPR”) proceeding involving U.S. Patent 11,740,423 B2 (“’423 Patent”).

3. Petitioner, CommScope Technologies LLC (“CommScope”), filed a Petition (Paper 1) challenging claims 1-30 (the “Challenged Claims”) of the ’423 Patent. The Patent Trial and Appeal Board instituted review (Paper 9) of the Challenged Claims. In its Motion to Amend, Belden requests that the Board cancel the Challenged Claims and issue substitute claims 31-51 (“Substitute Claims”).

4. I have been asked by Belden to analyze and set forth my opinions on whether the Substitute Claims (attached as Appendix A) are supported by the disclosures of the patent applications from which the ’423 Patent issued. This Declaration sets forth my opinions and the bases, reasons, and evidence relied upon in forming those opinions.

5. Although I am being compensated at a rate of \$475 per hour and reimbursed for reasonable out-of-pocket expenses, no part of my compensation depends on the outcome of these proceedings, and I have no other interest in these

proceedings.

II. QUALIFICATIONS AND BACKGROUND

6. I believe that I am well qualified to serve as a technical expert in this matter based upon my educational and work experience.

7. I have extensive experience in the telecommunications industries, having worked for Alcatel in the development of Fiber to the Curb (FTTC) products and subsequently at General Instrument Corporation and Next Level Communications, where I worked on Hybrid Fiber Coax (HFC) and FTTC systems. During this timeframe I was involved in the interfaces between FTTC equipment and the transport network including the use of Add-Drop Multiplexors (ADM), which contained insertable cassettes which created interfaces from optical transport systems such as a Synchronous Optical Network (SONET) to other optical or electrical formats.

8. Subsequent to my employment in the telecommunications industry and through my company, Technology, Patents, and Licensing, Inc., I gained further experience in the area of fiber optic communications and in particular interchangeable modules in SONET add-drop multiplexors. In this work, I developed a patent portfolio for Cerent Corporation regarding their Cerent 454 ADM which was based on a pioneering “any card, any slot” concept. Cerent Corporation

was purchased by Cisco Systems in 1999 for \$7.2 billion and became the foundation of Cisco's Optical Transport Business Unit.

9. A copy of my curriculum vitae is attached to this declaration as Appendix B. Of particular relevance to my role in this case is that (a) I am registered patent agent at the United States Patent and Trademark Office and have prosecuted many patents (including my own); and (b) I have been qualified to testify as an expert witness in numerous contested legal proceedings.

III. MATERIALS CONSIDERED

10. In preparing this Declaration, I reviewed, among other materials, the materials discussed in this Declaration. My opinions are also based on my education, training, research, knowledge, and my professional experience and expertise.

11. I have considered the following Exhibits provided to me by Belden's counsel ("counsel"):

EXHIBIT	DESCRIPTION
1001	U.S. Patent No. 11,740,423 B2 ("the '423 Patent")
1039	File history of the '423 Patent (U.S. Patent Application No. 18/105,639) ("the '639 Application")
2006	U.S. Provisional Patent Application No. 62/567,339 ("the Provisional Application")
2007	U.S. Patent Application No. 16/143,831 ("the '831 Application")

IV. LEVEL OF ORDINARY SKILL IN THE ART

12. I have been informed by counsel and understand that factors that may be considered in determining the level of ordinary skill in the art include: (1) the educational level of the inventor; (2) the type of problems encountered in the art; (3) prior art solutions to these problems; (4) the rapidity with which innovations are made; (5) the sophistication of the technology; and (6) educational level of active workers in the field. A person of ordinary skill in the art is also a person of ordinary creativity.

13. I understand that I must evaluate the question of whether the Substitute Claims are supported by the disclosures of the patent applications from which the '423 Patent issued from the perspective of a person of ordinary skill in the art at the time of the invention (2017) ("POSITA").

14. In my view, a POSITA would have had at least a B.S. degree or equivalent in mechanical or electrical engineering or similar fields, in addition to a minimum of two years of professional experience with design, development, and/or utilization of communication products, including optical communication systems. I note that these qualifications of a POSITA are nearly identical to the qualifications proposed by Petitioner and adopted by the Board in the Institution Decision. Paper 9 at 12-13.

15. Under that definition, I consider myself to be at least POSITA with respect to the '423 Patent, and I was at least a POSITA in 2017. My opinions in this Declaration are based on the perspective of a POSITA in the 2017 timeframe. This is true even if the testimony is stated in the present tense.

V. THE PROVISIONAL APPLICATION AND THE '831 PATENT APPLICATION SUPPORT THE SUBSTITUTE CLAIMS.

16. The '423 Patent eventually issued from a non-provisional application (U.S. Patent Application No. 18/105,639) (“the '639 Application”) (Ex. 1039 pp. 122-134, 140-169), which claims priority to U.S. Provisional Patent Application No. 62/567,339) (“the Provisional Application”) (Ex. 2006), filed October 3, 2017, which is the earliest claimed priority date, and the originally filed non-provisional application (U.S. Patent Application No. 16/143,831) (“the '831 Application”) (Ex. 2007), filed September 27, 2018. The specification and figures of the '639 Application are nearly identical to the specifications and figures of the Provisional Application and the parent '831 Application. *Compare, e.g.*, Ex. 1039 pp 122-134, 140-156, ¶¶ [0020]-[0039], FIGS. 1-7B; Ex. 2006 ¶¶ [0004]-[0023], FIGS. 1-7B; and Ex. 2007 ¶¶ [0006]-[0025], FIGS. 1-7B.

17. In the chart below, I cite support for the Substitute Claims from both the Provisional Application (Ex. 2006) and the '831 Application (Ex. 2007). I have provided exemplary citations to the portions of these applications that provide

written description support for the Substitute Claims. The cited support is provided for all limitations in the Substitute Claims (*i.e.*, the limitations added by amendment and the originally issued claims).

Claim/ Element ¹	Limitations Added By Amendment	Support In Provisional Application (Ex. 2002)	Support In '831 Application (Ex. 2003)
31pre	-	<i>See, e.g.</i> , Title, ¶¶ [0001], [0003], [0011], [0014], [0017]-[0020], Claim 1, FIGS. 1, 3-5C.	<i>See, e.g.</i> , Title, Abstract, ¶¶ [0001], [0003], [0013], [0016], [0019]-[0022], Claim 1, FIGS. 1, 3-5C.
31A		<i>See, e.g.</i> , ¶¶ [0003], [0011], [0014], Claim 1, FIGS. 1, 3-5C.	<i>See, e.g.</i> , Abstract, [0003], [0013], [0016], Claim 1, FIGS. 1, 3-5C.
31B	wherein the tray width portion <u>is configured to fit at least twelve standard one width (1 W) units side by side and to fit[s] within a standard U-space width dimension</u>	<i>See, e.g.</i> , ¶¶ [0003], [0011], [0014], [0017], Claim 1, FIGS. 1, 3-5C.	<i>See, e.g.</i> , Abstract, ¶¶ [0003], [0013], [0016], [0019], Claims 1, 2, FIGS. 1, 3-5C.

¹ Claim element designations for the substitute independent claims are identified in the claim listing in Appendix A and are based on the designations used in the Petition for the original claims. Paper 1 (Pet.) at 155-165.

Claim/ Element ¹	Limitations Added By Amendment	Support In Provisional Application (Ex. 2002)	Support In '831 Application (Ex. 2003)
31C	-	<i>See, e.g.</i> , Title, ¶¶ [0001], [0003], [0011], [0014], [0017]-[0020], Claim 1, FIGS. 1, 3-5C.	<i>See, e.g.</i> , Title, Abstract, ¶¶ [0001], [0003], [0013], [0016], [0019]-[0022], Claim 1, FIGS. 1, 3-5C.
31D	-	<i>See, e.g.</i> , ¶¶ [0003], [0013]-[0014], Claim 1, FIGS. 1-4D.	<i>See, e.g.</i> , ¶¶ [0015]-[0016], Claim 4, FIGS. 1-4D.
31E	-	<i>See, e.g.</i> , ¶¶ [0003], [0013]-[0014], Claim 1, FIGS. 1-4D.	<i>See, e.g.</i> , ¶¶ [0015]-[0016], Claim 4, FIGS. 1-4D.
31F	-	<i>See, e.g.</i> , ¶¶ [0003], [0014], [0017]-[0020], Claim 1, FIGS. 1, 3, 5A-5C.	<i>See, e.g.</i> , Abstract, ¶¶ [0003], [0016], [0019]-[0022], Claim 1, FIGS. 1, 3, 5A-5C.
31G	wherein the [receptable] <u>receptacle</u> module is configured to [fit at least] <u>consist of</u> <u>only</u> four fiber optic plug receiving receptacle portions in a standard one width (1 W) unit	<i>See, e.g.</i> , ¶¶ [0003], [0013]-[0014], Claim 1, FIGS. 1-4D.	<i>See, e.g.</i> , ¶¶ [0015]-[0016], Claim 4, FIGS. 1-4D.
31H	-	<i>See, e.g.</i> , ¶¶ [0014], [0017]-[0020], FIGS. 1, 3-5C.	<i>See, e.g.</i> , ¶¶ [0016], [0019]-[0022], Claim 11, FIGS. 1, 3-5C.
31I	-	<i>See, e.g.</i> , ¶¶ [0014], [0017]-[0020], FIGS. 1, 3-5C.	<i>See, e.g.</i> , ¶¶ [0016], [0019]-[0022], Claim 11, FIGS. 1, 3-5C.

Claim/ Element ¹	Limitations Added By Amendment	Support In Provisional Application (Ex. 2002)	Support In '831 Application (Ex. 2003)
31J	-	<i>See, e.g.</i> , ¶¶ [0003], [0012], Claim 1, FIGS. 1-2B.	<i>See, e.g.</i> , Abstract, ¶¶ [0003], [0014], Claim 1, FIGS. 1-2B.
31J1	<u>wherein each of the modular fiber optic cassettes includes a cassette releasing tab configured to extend from a rear portion of each of the cassettes and above the tray and allow each of the cassettes to be selectively released from the tray</u>	<i>See, e.g.</i> , ¶ [0012], FIGS. 1-2B.	<i>See, e.g.</i> , ¶ [0014], FIGS. 1-2B.
31K	-	<i>See, e.g.</i> , [0003], [0012], Claim 1, FIGS. 1-2B.	<i>See, e.g.</i> , [0003], [0014], Claim 1, FIGS. 1-2B.
32	-	<i>See, e.g.</i> , [0013], [0015], FIGS. 1-2B.	<i>See, e.g.</i> , [0015], [0017], FIGS. 1-2B.
33	-	<i>See, e.g.</i> , [0012], [0017], FIGS. 1-2B.	<i>See, e.g.</i> , [0014], [0019], FIGS. 1-2B.
34	-	<i>See, e.g.</i> , ¶¶ [0003], [0011], [0014], Claim 1, FIGS. 1, 3-5C.	<i>See, e.g.</i> , Abstract, [0003], [0013], [0016], Claim 1, FIGS. 1, 3-5C.
35	-	<i>See, e.g.</i> , ¶¶ [0003], [0011], [0012], [0014], [0017]-[0020], Claim 1, FIGS. 1, 3-5C.	<i>See, e.g.</i> , Abstract, ¶¶ [0003], [0013], [0014], [0016], [0019]-[0022], Claim 1, FIGS. 1, 3-5C.

Claim/ Element ¹	Limitations Added By Amendment	Support In Provisional Application (Ex. 2002)	Support In '831 Application (Ex. 2003)
36	-	<i>See, e.g.</i> , ¶¶ [0003], [0011], [0012], [0014], [0017]-[0020], Claim 1, FIGS. 1, 3-5C.	<i>See, e.g.</i> , Abstract, ¶¶ [0003], [0013], [0014], [0016], [0019]-[0022], Claim 1, FIGS. 1, 3-5C.
37pre	-	<i>See</i> Element 31pre.	<i>See</i> Element 31pre.
37A	a tray <u>configured to fit at least twelve standard one width (1 W) units side by side</u> and configured to fit in a standard U-space and support a plurality of different modular fiber optic cassette configurations in the standard U-space	<i>See</i> Element 31B.	<i>See</i> Element 31B.
37B	-	<i>See</i> Element 31C.	<i>See</i> Element 31C.
37C	-	<i>See</i> Element 31E.	<i>See</i> Element 31E.
37D	-	<i>See</i> Element 31F.	<i>See</i> Element 31F.
37D1	<u>wherein the receptacle module is configured to consist of only four fiber optic plug receiving receptacle portions in a standard one width (1 W) unit</u>	<i>See</i> Element 31G.	<i>See</i> Element 31G.
37E	-	<i>See</i> Element 31H.	<i>See</i> Element 31H.
37F	-	<i>See</i> Element 31J.	<i>See</i> Element 31J.

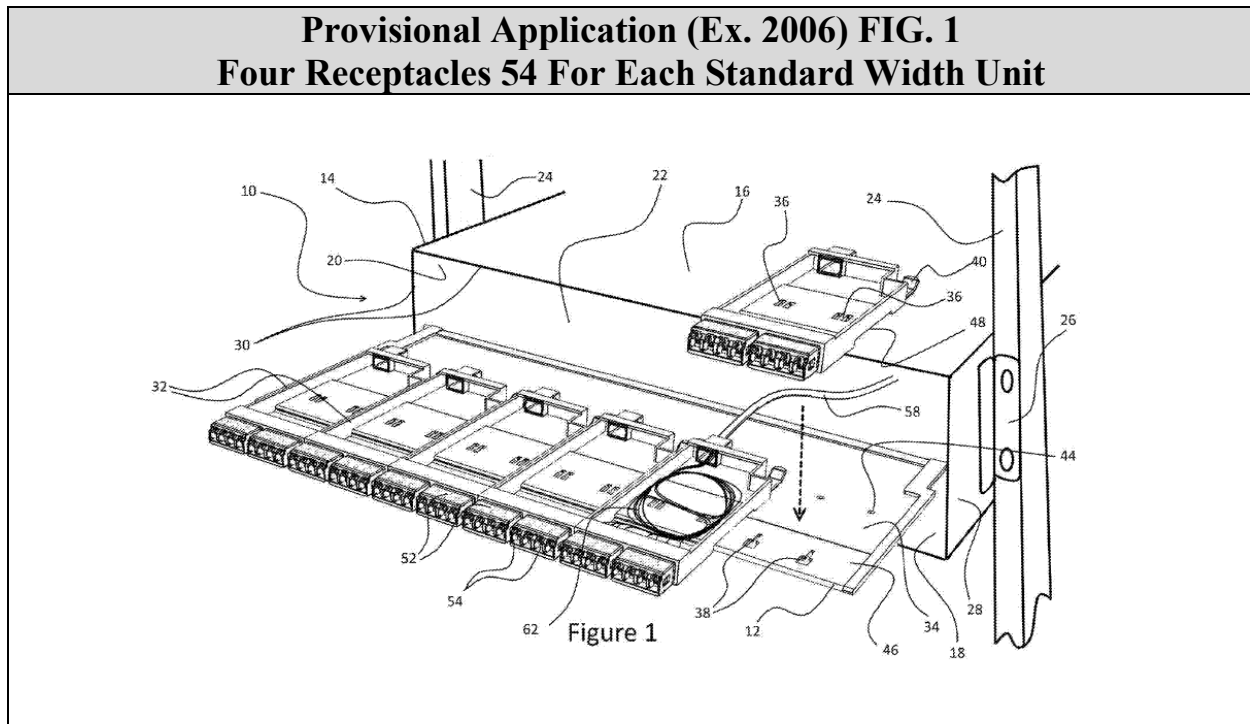
Claim/ Element ¹	Limitations Added By Amendment	Support In Provisional Application (Ex. 2002)	Support In '831 Application (Ex. 2003)
37F1	<u>wherein each of the modular fiber optic cassettes includes a cassette releasing tab configured to extend from a rear portion of each of the cassettes and above the tray and allow each of the cassettes to be selectively released from the tray</u>	<i>See Element 31J1.</i>	<i>See Element 31J1.</i>
37G	-	<i>See Element 31K.</i>	<i>See Element 31K.</i>
38	-	<i>See Claim 32.</i>	<i>See Claim 32.</i>
39	-	<i>See Claim 33.</i>	<i>See Claim 33.</i>
40	-	<i>See Claim 34.</i>	<i>See Claim 34.</i>
41	-	<i>See Claim 35.</i>	<i>See Claim 35.</i>
42	-	<i>See Claim 36.</i>	<i>See Claim 36.</i>
43pre	-	<i>See Element 31pre.</i>	<i>See Element 31pre.</i>
43A	a tray member <u>configured to fit at least twelve standard one width (1 W) units side by side and configured to support a plurality of different modular fiber optic cassette configurations in a standard U-space width</u>	<i>See Element 31B.</i>	<i>See Element 31B.</i>
43B	-	<i>See Element 31C.</i>	<i>See Element 31C.</i>
43C	-	<i>See Element 31E.</i>	<i>See Element 31E.</i>

Claim/ Element ¹	Limitations Added By Amendment	Support In Provisional Application (Ex. 2002)	Support In '831 Application (Ex. 2003)
43D	-	See Element 31F.	See Element 31F.
43D1	<u>wherein each of the modular fiber optic cassettes consists of only four fiber optic plug receiving receptacle portions for each standard width (1 W) unit that are configured to be arranged side by side in a row along a front portion thereof</u>	See Element 31G.	See Element 31G.
43E	-	See Element 31H.	See Element 31H.
43E1	<u>wherein the tray member comprises a cassette fastening portion that is configured to removably secure the tray member to each modular fiber optic cassette</u>	See, e.g., ¶¶ [0003], [0012], Claim 1, FIGS. 1-2B.	See, e.g., Abstract, ¶¶ [0003], [0014], Claim 1, FIGS. 1-2B.

Claim/ Element¹	Limitations Added By Amendment	Support In Provisional Application (Ex. 2002)	Support In '831 Application (Ex. 2003)
43E2	<u>wherein each of the modular fiber optic cassettes includes a tab portion configured to extend from a rear portion of each of the cassettes and above the tray and selectively release each of the cassettes from the tray</u>	<i>See Element 31J1.</i>	<i>See Element 31J1.</i>
43F	-	<i>See Element 31K.</i>	<i>See Element 31K.</i>
44	-	<i>See Claim 32.</i>	<i>See Claim 32.</i>
45	-	<i>See Claim 33.</i>	<i>See Claim 33.</i>
46	-	<i>See, e.g., ¶ [0012], FIGS. 1-2B.</i>	<i>See, e.g., ¶ [0014], FIGS. 1-2B.</i>
47	-	<i>See, e.g., ¶ [0012], FIGS. 1-2B.</i>	<i>See, e.g., ¶ [0014], FIGS. 1-2B.</i>
48	-	<i>See Claim 34.</i>	<i>See Claim 34.</i>
49	-	<i>See Claim 35.</i>	<i>See Claim 35.</i>
50	-	<i>See Claim 36.</i>	<i>See Claim 36.</i>
51	-	<i>See, e.g., ¶ [0013], FIGS. 1, 2A-2B.</i>	<i>See, e.g., ¶¶ [0005], [0015], Claim 3, FIGS. 1, 2A-2B.</i>

18. Based on the disclosures of the Provisional Application and the '831 Application, it is my opinion that the inventors possessed the subject matter of the Substitute Claims, including the limitations added by amendment, as of the filing dates of those applications.

19. The claim amendment requiring that each of the cassettes consists of only four fiber optic plug receiving receptacles for each standard width unit arranged side by side in a row along a front thereof (claim elements 31G, 37D1, and 43D1) is disclosed in at least paragraph [0003] (“each of the cassettes comprising four fiber optic plug receiving receptacles arranged side by side in a row along a front thereof for each standard width unit”) and FIG. 1 of the Provisional Application shown below (Ex. 2006) (four receptacles 54 per receiving module 52).



20. The claim amendment requiring a tab portion extending from a rear portion of each cassette and above the tray for releasing cassettes (claim elements 31J1, 37F1, and 43E2) is disclosed in at least paragraph [0012] (“A flexible tab 40

is also provided which comprises a boss 42 that engages a respective aperture 44 machined or otherwise formed in the tray 12 when the tabs 36 are engaged within their respective slots 38, thereby releasably securing the cassette 32 to the tray 12.”) and FIGS. 2A and 2B of the Provisional Application (Ex. 2006) shown below (tab 40).

**Provisional Application (Ex. 2006) FIGS. 2A And 2B
Tab 40 Extending From Rear Portion Of Cassette 32**

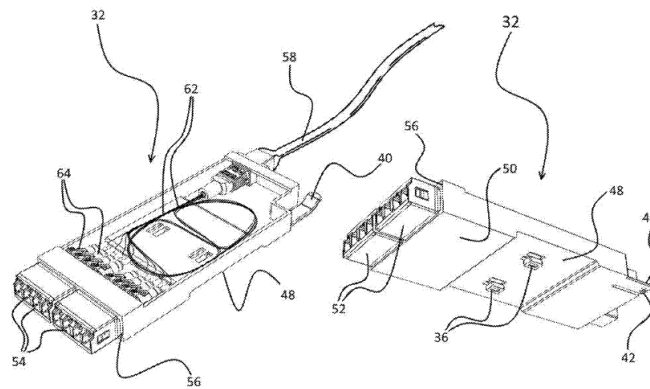
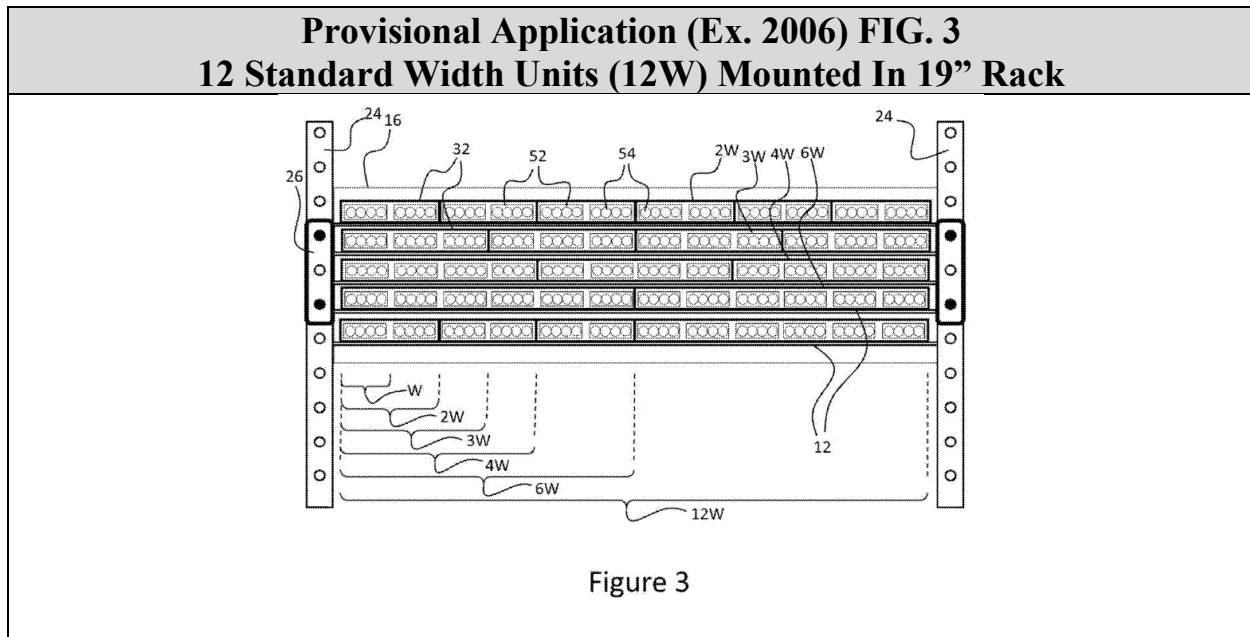


Figure 2A

Figure 2B

21. The claim amendment requiring a tray width dimensioned to receive at least twelve standard width units side by side and to be mounted in a standard U-space width dimension (claim elements 31B, 37A, and 43A) is disclosed in at least paragraph [0011] (“In a particular illustrated embodiment the system 10 is shown for mounting in a 19” rack”), paragraph [0014] (“The 2W, 3W, 4W and 6W cassettes 32 are typically used only with like cassettes 32 as illustrated and such

that respectively six (6), four (4), three (3) and two (2) cassettes fit snugly side by side on the 12W tray”), and FIG. 3 of the Provisional Application (Ex. 2006) shown below (“12W”).



22. It is also my opinion that a POSITA would understand that the written descriptions of the Provisional Application and the '831 Application are sufficient to inform a POSITA how to make and use the inventions recited in the Substitute Claims the without undue experimentation as of the filing dates of those applications. I understand that the factors to consider when determining whether a disclosure would require undue experimentation include: (1) the quantity of experimentation necessary; (2) the amount of direction or guidance presented; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the

state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. Given the table of exemplary citations provided above for the limitations found in the Substitute Claims, it is my opinion that a POSITA would have enough information to make and use the full scope of the proposed Substitute Claims without undue experimentation.

23. In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in this case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

24. I 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 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: May 21, 2025

By: 

Charles A. Eldering, Ph.D.

APPENDIX

A

APPENDIX A

CLAIM LISTING – '423 PATENT

1.-30. (Cancelled)

31. (substitute for original claim 1) *[31pre]*¹ A tray for providing a plurality of different modular fiber optic cassette configurations in a standard U-space fiber optic management system comprising:

[31A] a tray having a first tray side end portion and a second tray side end portion defining a tray width portion that extends between the first tray side end portion and the second tray side end portion;

[31B] wherein the tray width portion is configured to fit at least twelve standard one width (1 W) units side by side and to fit[s] within a standard U-space width dimension;

[31C] wherein the tray is configured to fit a plurality of different modular fiber optic cassette configurations in the tray width portion in a standard U-space fiber management system;

[31D] wherein each of the plurality of different modular fiber optic cassette configurations include a modular fiber optic cassette that is configured

¹ Bracketed designations of independent claim elements are based on the designations used in the Petition for the original claims. Paper 1 (Pet.) at 155-165.

to support a [receptable] receptacle module having a first module side end portion and a second module side end portion defining a module width portion that extends between the first tray side end portion and second tray side end portion;

[31E] wherein the module width portion is configured to fit in a standard one width (1 W) unit;

[31F] wherein each of the modular fiber optic cassettes includes a first cassette side end portion and a second cassette side end portion defining a standard cassette width unit extending between the first cassette side end portion and the second cassette side end portion that comprises a standard two width (2 W) unit, a standard three width (3 W) unit, a standard four width (4 W) unit, or a standard a standard six width (6 W) unit relative to the standard one width (1 W) unit;

[31G] wherein the [receptable] receptacle module is configured to [fit at least] consist of only four fiber optic plug receiving receptacle portions in a standard one width (1 W) unit;

[31H] wherein the plurality of different modular fiber optic cassette configurations comprise:

a first modular fiber optic cassette configuration that includes six modular two standard width unit (2 W) cassettes that are each

arranged side by side of each other along the tray such that a cassette side end portion of each modular two standard width (2 W) cassette adjacently faces a cassette side end portion of at least one other modular two standard width (2 W) cassette;

a second modular fiber optic cassette configuration that includes four modular three standard width unit (3 W) cassettes that are each arranged side by side of each other in a row along the tray such that a cassette side end portion of each modular three standard width (3 W) cassette adjacently faces a cassette side end portion of at least one other modular three standard width (3 W) cassette;

a third modular fiber optic cassette configuration that includes three modular four standard width unit (4 W) cassettes that are each arranged side by side of each other in a row along the tray such that a cassette side end portion of each modular four standard width (4 W) cassette adjacently faces a cassette side end portion of at least one other modular four standard width (4 W) cassette;

a fourth modular fiber optic cassette configuration that includes two modular six standard width unit (6 W) cassettes that are each arranged side by side of each other in a row along the tray such that a cassette side end portion of one of the two modular six

standard width (6 W) cassettes adjacently faces a cassette side end portion of the other modular six standard width (6 W) cassette; and

a fifth modular fiber optic cassette configuration that includes three modular two standard width unit (2 W) cassettes, which are each arranged side by side of each other in a row along the tray such that a cassette side end portion of one of the three modular two standard width (2 W) cassettes adjacently faces a cassette side end portion of one of the other modular two standard width (2 W) cassette, and one modular six standard width unit (6 W) cassette that is arranged side by side in a row along the tray with one of the three modular two standard width unit (2 W) cassettes, such that a cassette side end portion of the one modular six standard width unit (6 W) cassette adjacently faces a cassette side end portion of one of the other three modular two standard width unit (2 W) cassettes;

[311] wherein each modular two standard width (2 W) cassette is configured to fit two receptacle modules;

wherein each modular three standard width (3 W) cassette is configured to fit three receptacle modules;

wherein each modular four standard width (4 W) cassette is configured to fit
four receptacle modules;

wherein each modular six standard width (6 W) cassette is configured to fit
six receptacle modules;

[31J] wherein the tray is configured to be removably secured to each modular
fiber optic cassette when the tray fits the plurality of different modular
fiber optic cassette configurations within the tray width portion in the
standard U-space fiber management system; [and]

[31J1] wherein each of the modular fiber optic cassettes includes a cassette
releasing tab configured to extend from a rear portion of each of the
cassettes and above the tray and allow each of the cassettes to be
selectively released from the tray; and

[31K] wherein the tray includes a plurality of cassette engaging portions that
are configured to conform to the standard one width (1 W) so as to
support the modular two standard width (2 W) cassette, the modular
three standard width (3 W) cassette, the modular four standard width (4
W) cassette, and the modular six standard width (6 W) cassette.

32. (substitute for original claim 2) The tray of claim [1] 31, wherein the standard one width (1 W) unit is based on a standard SC Duplex width unit that is configured to fit a plurality of different type of LC, SC, and MPO connectors.

33. (substitute for original claim 3) The tray of claim [1] 31, wherein the plurality of cassette engaging portions of the tray are spaced apart from one another so as to conform to the standard one width (1 W) and support the modular two standard width (2 W) cassette, the modular three standard width (3 W) cassette, the modular four standard width (4 W) cassette, and the modular six standard width (6 W) cassette.

34. (substitute for original claim 4) The tray of claim [1] 31, wherein the tray is configured to be slidably received in at least a portion of a tray receiving space of a case of a fiber optic management system.

35. (substitute for original claim 6) The tray of claim [1] 31, wherein each of the modular fiber optic cassettes includes a cassette side end portion that is adjacent to a cassette side end portion of another [module] modular optic cassette when each of the modular fiber optic cassettes are in the plurality of the plurality of different modular fiber optic cassette configurations.

36. (substitute for original claim 7) The tray of claim [1] 31, wherein each of the modular fiber optic cassettes includes a cassette side end portion that touches a cassette side end portion of another [module] modular optic cassette when each of the modular fiber optic cassettes are in the plurality of the plurality of different modular fiber optic cassette configurations.

37. (substitute for original claim 9) *[37pre]* A tray for providing a plurality of different modular fiber optic cassette configurations in a standard U-space fiber optic management system comprising:

[37A] a tray configured to fit at least twelve standard one width (1 W) units side by side and configured to fit in a standard U-space and support a plurality of different modular fiber optic cassette configurations in the standard U-space;

[37B] wherein each of the plurality of different modular fiber optic cassette configurations includes a plurality of different sizes of modular fiber optic cassettes;

[37C] wherein each of the plurality of different sizes of modular fiber optic cassettes is configured to support a fiber optic [receptable] receptacle module that is configured to fit in a standard one width (1 W) unit;

[37D] wherein the plurality of different sizes of modular fiber optic cassettes include a 2 W cassette size that is configured to fit a standard two width (2 W) unit relative to the standard one width (1 W) unit, a 3 W cassette size that is configured to fit a standard three width (3 W) unit relative to the standard one width (1 W) unit, a 4 W cassette size that is configured to fit a standard four width (4 W) unit relative to the standard one width (1 W) unit, and a 6 W cassette size that is configured to fit a standard six width (6 W) unit relative to the standard one width (1 W) unit;

[37D1] wherein the receptacle module is configured to consist of only four fiber optic plug receiving receptacle portions in a standard one width (1 W) unit;

[37E] wherein the plurality of different modular fiber optic cassette configurations comprise:

a first modular fiber optic cassette configuration that includes six modular 2 standard width unit size cassettes that are each arranged side by side of each other along the tray such that a cassette side end portion of each modular 2 W standard width unit size cassette adjacently faces a cassette side end portion of at least one other modular 2 W standard width size cassette;

- a second modular fiber optic cassette configuration that includes four modular 3 W standard width unit size cassettes that are each arranged side by side of each other in a row along the tray such that a cassette side end portion of each modular 3 W standard width size cassette adjacently faces a cassette side end portion of at least one other modular 3 W standard width size cassette;
- a third modular fiber optic cassette configuration that includes three modular 4 W standard width unit size cassettes that are each arranged side by side of each other in a row along the tray such that a cassette side end portion of each modular 4 W standard width size cassette adjacently faces a cassette side end portion of at least one other modular 4 W standard width size cassette;
- a fourth modular fiber optic cassette configuration that includes two modular 6 W standard width unit size cassettes that are each arranged side by side of each other in a row along the tray such that a cassette side end portion of one of the two modular 6 W standard width size cassettes adjacently faces a cassette side end portion of the other modular 6 W standard width size cassette;
- and

a fifth modular fiber optic cassette configuration that includes three modular 2 W standard width unit size cassettes, which are each arranged side by side of each other in a row along the tray such that a cassette side end portion of one of the three modular 2 W standard width size cassettes adjacently faces a cassette side end portion of one of the other modular 2 W standard width size cassette, and one modular 6 W standard width unit size cassette that is arranged side by side in a row along the tray with one of the three modular 2 W standard width unit size cassettes, such that a cassette side end portion of the one modular 6 W standard width unit size cassette adjacently faces a cassette side end portion of one of the other three modular 2 W standard width unit size cassettes;

[37F] wherein the tray is configured to be removably secured to each modular fiber optic cassette when the tray fits the plurality of different modular fiber optic cassette configurations within a tray width portion in the standard U-space fiber management system; [and]

[37F1] wherein each of the modular fiber optic cassettes includes a cassette releasing tab configured to extend from a rear portion of each of the

cassettes and above the tray and allow each of the cassettes to be selectively released from the tray; and

[37G] wherein the tray includes a plurality of cassette engaging portions that are configured to conform to the standard one width (1 W) so as to support the modular 2 W standard width unit size cassette, the modular 3 W standard width unit size cassette, the modular 4 W standard width unit size cassette, and the modular 6 W standard width unit size cassette.

38. (substitute for original claim 10) The tray of claim [9] 37, wherein the standard one width (1 W) unit is based on a standard SC Duplex width unit that is configured to fit a plurality of different type of LC, SC, and MPO connectors.

39. (substitute for original claim 11) The tray of claim [9] 37, wherein the plurality of cassette engaging portions of the tray are spaced apart from one another so as to conform to the standard one width (1 W) and support the modular 2 W standard width unit size cassette, the modular 3 W standard width unit size cassette, the modular 4 W standard width unit size cassette, and the modular 6 W standard width unit size cassette.

40. (substitute for original claim 12) The tray of claim [9] 37, wherein the tray is configured to be slidably received in at least portion of a tray receiving space of a case of a fiber optic management system.

41. (substitute for original claim 14) The tray of claim [9] 37, wherein each of the modular fiber optic cassettes includes a cassette side end portion that is adjacent to a cassette side end portion of another [module] modular optic cassette when each of the modular fiber optic cassettes are in the plurality of the plurality of different modular fiber optic cassette configurations.

42. (substitute for original claim 15) The tray of claim [9] 37, wherein each of the modular fiber optic cassettes includes a cassette side end portion that touches a cassette side end portion of another [module] modular optic cassette when each of the modular fiber optic cassettes are in the plurality of the plurality of different modular fiber optic cassette configurations.

43. (substitute for original claim 17) *[43pre]* A tray for providing a plurality of different modular fiber optic cassette configurations in a fiber optic management system comprising:

- [43A] a tray member configured to fit at least twelve standard one width (1 W) units side by side and configured to support a plurality of different modular fiber optic cassette configurations in a standard U-space width;
- [43B] wherein the plurality of different modular fiber optic cassette configurations include different sizes of modular fiber optic cassettes;
- [43C] wherein each of the different sizes of modular fiber optic cassettes is configured to support a fiber optic [receptable] receptacle module that is configured to fit in a standard one width (1 W) unit;
- [43D] wherein the plurality of different sizes of modular fiber optic cassettes include a 2 W cassette size that is configured to fit a standard two width (2 W) unit relative to the standard one width (1 W) unit, a 3 W cassette size that is configured to fit a standard three width (3 W) unit relative to the standard one width (1 W) unit, a 4 W cassette size that is configured to fit a standard four width (4 W) unit relative to the standard one width (1 W) unit, and a 6 W cassette size that is configured to fit a standard six width (6 W) unit relative to the standard one width (1 W) unit;
- [43D1] wherein each of the modular fiber optic cassettes consists of only four fiber optic plug receiving receptacle portions for each standard width

(1 W) unit that are configured to be arranged side by side in a row along a front portion thereof;

[43E] wherein the plurality of different modular fiber optic cassette configurations comprise:

a first modular fiber optic cassette configuration that includes six modular 2 W standard width unit size cassettes that are each arranged side by side of each other along the tray member such that a cassette side end portion of each modular 2 W standard width unit size cassette adjacently faces a cassette side end portion of at least one other modular 2 W standard width size cassette;

a second modular fiber optic cassette configuration that includes four modular 3 W standard width unit size cassettes that are each arranged side by side of each other in a row along the tray member such that a cassette side end portion of each modular 3 W standard width size cassette adjacently faces a cassette side end portion of at least one other modular 3 W standard width size cassette;

a third modular fiber optic cassette configuration that includes three modular 4 W standard width unit size cassettes that are each

arranged side by side of each other in a row along the tray member such that a cassette side end portion of each modular 4 W standard width size cassette adjacently faces a cassette side end portion of at least one other modular 4 W standard width size cassette; and

a fourth modular fiber optic cassette configuration that includes two modular 6 W standard width unit size cassettes that are each arranged side by side of each other in a row along the tray member such that a cassette side end portion of one of the two modular 6 W standard width size cassettes adjacently faces a cassette side end portion of the other modular 6 W standard width size cassette; [and]

[43E1] wherein the tray member comprises a cassette fastening portion that is configured to removably secure the tray member to each modular fiber optic cassette;

[43E2] wherein each of the modular fiber optic cassettes includes a tab portion configured to extend from a rear portion of each of the cassettes and above the tray and selectively release each of the cassettes from the tray; and

[43F] wherein the tray member is configured to conform to the standard one width (1 W) so as to support the modular 2 W standard width unit size cassette, the modular 3 W standard width unit size cassette, the modular 4 W standard width unit size cassette, and the modular 6 W standard width unit size cassette.

44. (substitute for original claim 18) The tray member of claim [17] 43, wherein the standard one width (1 W) unit is based on a standard SC Duplex width unit that is configured to fit a plurality of different type of LC, SC, and MPO connectors.

45. (substitute for original claim 19) The tray member of claim [17] 43, wherein the tray member includes a row of cassette engaging portions that are spaced apart from one another so as to conform to the standard one width (1 W) and support the modular 2 W standard width unit size cassette, the modular 3 W standard width unit size cassette, the modular 4 W standard width unit size cassette, and the modular 6 W standard width unit size cassette.

46. (substitute for original claim 20) The tray member of claim [17] 43, wherein the row of cassette engaging portions comprises a first row of cassette

engaging portions, and the tray includes a second row of cassette engaging portions that is spaced away from the first row of cassette engaging portions.

47. (substitute for original claim 21) The tray member of claim [20] 46, wherein the first row of cassette engaging portion comprises a first row of slot portions that are each configured to engage a tab portion of each modular cassette.

48. (substitute for original claim 22) The tray member of claim [17] 43, wherein the tray member is configured to be slidably received in at least portion of a tray member receiving space of a case of a fiber optic management system.

49. (substitute for original claim 24) The tray member of claim [17] 43, wherein each of the modular fiber optic cassettes includes a cassette side end portion that is adjacent to a cassette side end portion of another [module] modular optic cassette when each of the modular fiber optic cassettes are in the plurality of the plurality of different modular fiber optic cassette configurations.

50. (substitute for original claim 25) The tray member of claim [17] 43, wherein each of the modular fiber optic cassettes includes a cassette side end portion that touches a cassette side end portion of another [module] modular optic cassette when each of the modular fiber optic cassettes are in the plurality of the plurality of different modular fiber optic cassette configurations.

51. (substitute for original claim 28) The tray member of claim [17] 43, wherein each of the modular fiber optic cassettes comprises a multi-fiber connector receiving receptacle portion arranged on a rear portion thereof.

APPENDIX

B

Curriculum Vitae
Dr. Charles A. Eldering

CAsE Analysis, Inc.
620 Wilson Ave, PMB 101
Brooklyn, NY 11207

215.913.7214
cae@caseanalysisgroup.com

AREAS OF SPECIALIZATION: Extensive technical and market expertise in the areas of telecommunications, microelectronics, consumer electronics, targeted advertising, location-based services, data mining, and bioinformatics, with over 30 years of industrial experience. Highly skilled in the management and utilization of patents including infringement analysis and documentation of use of claimed technology.

EDUCATION:

- 1989 University of California; Davis, California
Ph.D. Electrical Engineering
- 1985 Syracuse University; Syracuse, New York
M.S. Solid State Science and Technology
- 1981 Carnegie Mellon University; Pittsburgh, Pennsylvania
B.S. Physics

OTHER QUALIFICATIONS:

Registered U.S. Patent Agent. Registration No. 39,180
FCC Licensed General Class Amateur Radio Operator, N3YRB

EMPLOYMENT HISTORY:

December 2013 to present:

CAsE Analysis, Inc.
Founder & President

September 2022 to present

SitNet LLC
Founder and Managing Member

May 2000 to December 2021

Expanse Networks/Expanse Bioinformatics
Founder and President

December 1997 to December 2013:

Technology, Patents & Licensing, Inc. (now TechPats)
Founder and President

October 1995 to November 1997:

Next Level Communications, Rohnert Park, CA
Director, Advanced Systems Engineering

September 1993 to September 1995:

General Instrument Corporation, Hatboro, PA
Manager, Fiber-to-the-Curb/Switched Digital Video Systems; March 1995 to September 1995
Manager, Broadband Systems Engineering; January 1994 to March 1995
Senior Project Engineer, Systems Engineering; September 1993 to December 1993

January 1990 to August 1993:

Alcatel, Madrid, Spain
Senior Engineer/Manager, Fiber in the Loop R&D; October 1990 to August 1993
Consultant; January 1990 to September 1990

June 1986 to August 1990:

University of California, Davis, CA
Researcher, Department of Electrical and Computer Engineering

October 1981 to May 1986:
United States Air Force, Rome Laboratory, Rome, NY
 Officer

EXPERT WITNESSING (party represented in bold, cases that proceeded to trial and trial type noted):

1. *CommScope Technologies LLC v. **Belden Inc., Opterna AM, Inc. and PPC Broadband, Inc.***, District of Delaware (Case No. 1:24-cv-00411-RGA).
2. *CommScope Technologies LLC v. **Belden Inc., and PPC Broadband, Inc.***, District of Delaware (Case No. 1:24-cv-00427-RGA).
3. *CommScope Technologies LLC v. **Belden Inc., Opterna AM, Inc. and PPC Broadband, Inc.***, District of Delaware, (Case No. 1:24-cv-00440-RGA).
4. ***BizLink Technology, Inc.** v. Anderson Power Products, Inc.*, PTAB (Case No. IPR2024-00687).
5. ***PPC Broadband, Inc.** v. Amphenol Corporation*, PTAB (Case No. 2023-01363).
6. *CommScope Technologies LLC v. **Belden Inc.***, PTAB (Case Nos. IPR2023-01056, -01058, -01061, -01062).
7. ***PPC Broadband Inc.** v. Perfect Vision Manufacturing, Inc.*, Eastern District of Arkansas (Case No. 4:22-cv-204).
8. ***PPC Broadband Inc.** v. Perfect Vision Manufacturing, Inc.*, Eastern District of Arkansas (Case No. 4:22-cv-163).
9. ***PPC Broadband Inc.** v. CommScope Technologies, LLC*, District of Delaware (Case No. 1:22-cv-00783-RGA).
10. ***PPC Broadband Inc.** v. Charles Industries, LLC and Amphenol Corporation*, District of Delaware (Case No. 1:22-cv-01517).
11. ***Belden Inc.** v. CommScope Technologies LLC*, District of Delaware (Case No. 1:22-cv-00782-RGA).
12. *Amphenol Corporation v. **PPC Broadband, Inc.***, PTAB, (Case Nos. IPR2022-00718, -00719, -00720 and -00721).
13. ***PPC Broadband, Inc.** v. Amphenol Corporation*, PTAB (Case Nos. IPR2022, -00830, -00831, -00946, -00947, -01087, -01088).
14. ***Sony Corporation and Sony Electronics Inc.** v. ARRIS International plc, ARRIS Group, Inc., ARRIS Technology, Inc., ARRIS Enterprises LLC, ARRIS Solutions, Inc, and ARRIS Global Ltd. (formerly Pace Ltd.), In the Matter of Certain Digital Cable and Satellite Products, Set-Top Boxes, Gateways, and Components Thereof*, United States International Trade Commission, Washington, D.C. (Investigation No. 337-TA-1049).
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16. ***Unified Patents Inc.** v. Hybrid Audio, LLC*, PTAB (Case No. IPR2016-01265).
17. ***Unified Patents Inc.** v. Qurio Holdings, Inc.*, PTAB (Case No. IPR2015-01991).
18. ***Unified Patents Inc.** v. Rothschild Connected Devices Innovations, LLC*, PTAB (Case No. IPR2016-00535).
19. ***Unified Patents Inc.** v. FO2GO LLC*, PTAB (Case No. IPR2016-00454).

20. **Unified Patents Inc.** v. *Nonend Inventions, NV*, PTAB (Case No. IPR2016-00174).
21. **Unified Patents Inc.** v. *iMTX Strategic, LLC*, PTAB (Case No. IPR2015-01061).
22. **Unified Patents Inc.** v. *TransVideo Electronics, Ltd.*, PTAB (Case No. IPR2015-01519).
23. **PPC Broadband, Inc. d/b/a PPC** v. *Times Fiber Communications, Inc.*, Northern District of New York (Case No. 5:13-cv-460-TJM-DEP).
24. **PPC Broadband, Inc. d/b/a PPC** v. *Corning Gilbert, Inc.*, Northern District of New York (Case No. 5:13-cv-00538-GLS-DEP).
25. **PPC Broadband, Inc.** v. *Corning Optical Communications RF, LLC, In the Matter of Certain Coaxial Cable Connectors and Components Thereof and Products Containing Same*, United States International Trade Commission, DC (Investigation No. 337-TA-938).
26. **BroadSoft, Inc.** v. *CallWave Communications, LLC*, District of Delaware (Case No. DED-1-13-cv-00711-RGA).
27. *Netflix, Inc.*, v. **OpenTV, Inc.**, PTAB (Case No. IPR2014-00252).
28. **Mediatube Corp and Northvu Inc.** v. *Bell Canada and Bell Aliant Regional Communications, Limited Partnership*, Canadian Federal Court (C.A. T-705-13, bench trial held).
29. **John Mezzalingua Associates, Inc. d/b/a PPC** v. *Corning Gilbert Inc.*, District of Arizona (Case No. 2: 12-cv-12-02208-SMM).
30. *Corning Gilbert Inc.*, v. **PPC Broadband, Inc.**, PTAB (Case No. IPR2013-00345).
31. *Corning Gilbert Inc.*, v. **PPC Broadband, Inc.**, PTAB (Case No. IPR2013-00340).
32. *Corning Gilbert Inc.*, v. **PPC Broadband, Inc.**, PTAB (Case No. IPR2013-00342).
33. *Corning Gilbert Inc.*, v. **PPC Broadband, Inc.**, PTAB (Case No. IPR2013-00346).
34. *Corning Gilbert Inc.*, v. **PPC Broadband, Inc.**, PTAB (Case No. IPR2013-00347).
35. **PPC Broadband, Inc.** v. *Corning Gilbert Inc.*, Northern District of New York (Case No. 5:13-cv-1310).
36. **PPC Broadband, Inc. d/b/a PPC** v. *Corning Gilbert, Inc.*, Northern District of New York (Civil Action No. 11-cv-00761-GLS-DEP, jury trial held).
37. *Corning Gilbert, Inc.* v. **The United States of America, et al.**, United States Court of International Trade (Case No. 11-00511).
38. **Parus Holdings, Inc.** v. *National Airtran Airways, Inc., Airtran Holdings, Inc., Airtran Holdings, LLC* Middle District of Florida, Tampa Division (Case No. 8:11-cv-01685-EAK-TBM).
39. **John Mezzalingua Associates, Inc. d/b/a PPC** v. *International Communications Manufacturing Corporation, Randall A. Holliday, and Belden Inc.*, Western District of Wisconsin (Case No. 3:11-cv-00424-bbc).
40. **eTool Development, Inc., and eTool Patent Holdings Corp.** v. *National Semiconductor Corporation* in the Eastern District of Texas, Marshall Division (Case No. 2:08-cv-196).
41. **John Mezzalingua Associates, Inc. d/b/a PPC, Inc.** v. *PCT International, Inc.*, Western District of Texas, San Antonio Division (Case No. 5:09-cv-00410-RF).

42. **John Mezzalingua Associates, Inc. d/b/a PPC, Inc. v. PACE Electronics, Inc. (d/b/a PACE International) and Perfect 10 Antenna Company**, Western District of Minnesota (Case No. 0:10-cv-00064 MJD/JJG).
43. **John Mezzalingua Associates, Inc. d/b/a PPC, Inc., v. Hanjiang Fei Yu Electronics Equipment Factory, Zhongguang Electronics, Yangzhou Zhongguang Electronics Co., Ltd., and Yangzhou Zhongguang Foreign Trade Co., Ltd.** in Certain Coaxial Cable Connectors and Components Thereof and Products Containing Same, United States International Trade Commission, Washington, D.C. (Investigation No. 377-TA-650, proceeded to trial at the ITC).
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45. **Agrizap Inc. v. Woodstream Corporation**, Eastern District of Pennsylvania (Case No. 04-CV-03925-RK, jury trial held).
46. **John Mezzalingua Associates, Inc. d/b/a PPC, Inc. v. Corning Gilbert, Inc.** Western District of Wisconsin (Case No. 03-C-0354-S, jury trial held).
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7. C.A. Eldering, G. Van der Plas, and J. De Groote, "Burst and Bit Synchronization Methods for Passive Optical Networks," *Proceedings of the Fourth IEEE Workshop on Local Optical Networks* (Versailles, France, September 1992).
8. C.A. Eldering and A. Martín, "System Specification and Requirements for Fiber in the Loop Systems," *Proceedings of SPIE Symposium on Opto-Electronics/Fibers* (Boston, MA, September 1992).
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13. D. Yankelevich, A. Knoesen, C.A. Eldering and S.T. Kowel, "Reflection-Mode Polymeric Interference Modulators," *Proceedings of the SPIE Symposium on Optical Applied Science and Engineering* (San Diego, CA, August 1991).
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18. N. Matloff, S.T. Kowel and C.A. Eldering, "OPTIMUL: An Optical Interconnect for Multiprocessor Systems," *Proceedings of the 1988 ACM International Conference on Supercomputing*, (St- Malo, France, 1988).
19. D.J. Burns, M.T. Pronobis, C.A. Eldering and R.J. Hillman, "Reliability/Design Assessment by Internal Node Timing Margin Analysis Using Laser Photocurrent Injection," *Proceedings of the IEEE International Reliability Physics Symposium*, pp. 76-82 (Las Vegas, NV, 1984).
20. M.J. Walter, C.A. Eldering, K.M. Krevis and J.R. Haberer, "Internal Node Testing by Tester Aided Voltage Contrast," *Proceedings of the International Symposium for Testing and Failure Analysis*, pp. 156-161 (San Jose, CA, 1982).

PRESENTATIONS:

1. Eldering, C.A., Moderator, Panel on A Framework for Strategic Patenting, 8th Annual IP Dealmakers Forum (New York, 2021).
2. Eldering, C.A., Chair of Inaugural 2018 LF Dealmakers Forum (New York, NY, 2018).
3. Eldering, C.A., Moderator, Panel on Leveraging Data to Identify Valuable Patents, 5th Annual IP Dealmakers Forum (New York, NY, 2018).
4. Eldering, C.A., Moderator, Panel on Trade Secrets – What IP Investors Need to Know, 6th Annual IP Dealmakers Forum (New York, NY, 2016)
5. Eldering, C.A. and de Wit, S., IP Under the Microscope: Using Patent Valuation Wisely. Presentation to CIP Forum 2011 (Gothenburg, Sweden, 2011).
6. Eldering, C.A. What's a patent worth? Presentation to Princeton Chapter of American Society of Appraisers, Princeton, NJ (May 18, 2009).
7. Eldering, C.A. Patent Purchasing: What makes a patent transaction possible? 10th Annual Intellectual Property Institute – WSBA Continuing Legal Education, (March 11, 2005).
8. Eldering, C. A. and Paratore, B. Video Technology-Past, Present & Future. *United States Patent and Trademark Office Technology Fair*, (June 10, 2004).
9. Eldering, C.A. Testimony before the PA House Committee. *House Bill 1516*, (January 27, 2000).
10. Eisenach, J., R. May and Eldering, C.A. *Regulatory Overkill: Pennsylvania's Proposal to Breakup Bell Atlantic*, (December 16, 1999).
11. Eldering, C.A. Comments before the Federal Communications Commission. *Regulating Cable Internet Services*, (May 25, 1999).
12. Eldering, C.A. Panel participant in The ADSL Forum. *Washington DC Summit*, (March, 1999).
13. Eldering, C.A. Panel participant in Online Advertising: What It Is, Where It Is Going. *Speech in the Digital World: The First Amendment and Advertising*, sponsored by the Progress and Freedom Foundation, (November, 1998).
14. Eldering, C.A. Panel participant in Deregulating Digital Transport: The Bandwidth Crisis and the Role of Government. *Progress & Freedom Foundation's 5th Annual Cyberspace and the American Dream Aspen Summit 1998*, (August, 1998), broadcast on C-SPAN.
15. Eldering, C.A. Evolution of Broadband Access Technologies and Systems. *Networld + Interop '97; The 4th Annual Engineer Conference*, (May, 1997).
16. Eldering, C.A. An Overview of Wired Broadband Access Systems. *IEEE Sarnoff Symposium on Advances on Wired and Wireless Communications*, (March, 1997).
17. Eldering, C.A. Technology: Past and Present – The Impact of Network Competitors. Communications Media Center at New York Law School, *Seminar on Cable TV Franchise Renewals: Business as Usual or A Time for New Priorities?*, (November, 1996).
18. Eldering, C.A. Broadband Access Technologies. *The 8th Annual Digital Audio/Video Workshop*, (October, 1996).
19. Eldering, C.A. Burst Mode Receivers for Fiber Optic Networks. *1995 IEEE/LEOS Summer Topical Meetings on IC's for New Age Lightwave Communications*, (August, 1995).
20. Eldering, C.A. Performance Comparison of Multiple-Access Techniques in Hybrid Fiber-Coax Return Systems. *1995 Optical Fiber Conference*, (February, 1995).
21. Eldering, C.A. Characteristics of Hybrid Fiber-Coax Return Systems. *1995 SCTE Conference on Emerging Technologies*, (January, 1995).
22. Eldering, C.A. Engineering Requirements for Hybrid Fiber-Coax Telephony Systems. *NCTA Engineering Committees 1994 Technical Program*, (May, 1994).

23. Eldering, C.A. Burst and Bit Synchronization Methods for Passive Optical Networks. *Fourth IEEE Workshop in Local Optical Networks*, (September, 1992).
24. Eldering, C.A. Transmitter and Receiver Requirements for Time Division Multiple Access Passive Optical Networks. *Third IEEE Workshop on Local Optical Networks*, (September, 1991).
25. Eldering, C.A. Subscriber Loop Optical Distribution Architecture (SODA): A Cost Effective TDM/TDMA Fiber System. *Fiber Networks for Telephony and CATV*, (September, 1991).
26. Eldering, C.A. Fixed Optical Interconnects for Concurrent Computing Systems. *Optical Information Processing Systems and Architectures*, (August, 1989).

TEACHING APPOINTMENTS:

- University of California at Davis. Lecturer, Electronics Laboratory, (1987-88).
- State University of New York, Utica/Rome. Adjunct Professor, Electronics, (1985-86).

REPORTS, THESES, OTHER PUBLICATIONS:

1. Charles Eldering and Juan Gisone. Claims-based patent valuation. *Intellectual Asset Management Magazine*, (Issue 50 November/December 2011).
2. Charles A. Eldering, Technology, Patents & Licensing, Inc. and Expanse Networks, Inc., Amici Curiae Supporting MercExchange L.L.C., *eBay Inc. v. MercExchange L.L.C.*, on Writ of Certiorari to the United States Court of Appeals for the Federal Circuit (2006).
3. Keeler, P. and C.A. Eldering, S. Weiswasser, A. Weixel and H. Feld. *Reply Comments of Next Level Communications*, CC Docket No. 98-147. FCC Proceedings on Deployment of Wireline Services Offering Advanced Telecommunications Capability. (October 16, 1998).
4. Eisenach, J. and C.A. Eldering. *Comments of the Progress and Freedom Foundation*, CC Docket No. 98-146. FCC Proceedings on Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996. (September 14, 1998).
5. Eames, T., C.A. Eldering and J. Bernstein. *Reply Comments of Next Level Communications*, RM no. 9244, file no. CCB/CPD 98-15. FCC Proceedings on Petition of Alliance for Public Technology Requesting Issuance of Notice of Inquiry and Notice of Proposed Rulemaking to Implement Section 706 of the 1996 Telecommunications Act. (May 4, 1998).
6. Eames, T., C.A. Eldering and J. Bernstein. *Comments of Next Level Communications*, CC Docket No. 98-11. FCC Proceedings on Petition of Bell Atlantic Corporation for Relief from Barriers to Deployment of Advanced Telecommunications Services. (April 6, 1998).
7. Bernstein, J., T. Eames and C.A. Eldering. *Comments of Next Level Communications*, CC Docket No. 98-32. FCC Proceedings on Petition of Ameritech Corporation to Remove Barriers to Invest in Advanced Telecommunications Capacity. (April 6, 1998).
8. Eldering, C.A. and J. Bernstein. *Comments of Next Level Communications*, CC Docket No. 98-26. Petition of US West Communications, Inc. for Relief from Barriers to Deployment of Advanced Telecommunications Services. (April 6, 1998).
9. Eames, T. and C.A. Eldering. Going All-Digital. *Telephony*, (August 18, 1997).
10. Blasko, J.P., C.A. Eldering and A. Brown. Provisional Applications Offer Patentees Priority. *National Law Journal*, (June 16, 1997).
11. Eames, T., B. Weeks and C.A. Eldering. A Winning Solution. *Telephony*, (June 2, 1997): 150-162.

12. Eldering, C.A. Analysis of Fiber to the Curb and Fiber to the Home Architectures. Internal Report prepared for *Telettra España*. (August, 1990).
13. Eldering, C.A. Electro-Optic Polymeric Thin Films and Device. *Ph.D. Dissertation*, University of California, Davis, (1997).
14. Eldering, C.A., B.J. Walker, S.P. Ilitzki and D.J. Holtzhauer. Temperature Measurements Using Infrared Techniques. *Internal Government Report*, Rome Air Development Center (March, 1986).
15. Eldering, C.A. Evaluation of the Use of p-n Structures as Photodetectors in Silicon Integrated Circuits. *Master's Thesis*, (June, 1985), also published as a Government technical report, RADC-TR-85-123.

ISSUED US PATENTS:

1. U.S. Patent 12,243,654 Computer implemented identification of genetic similarity
2. U.S. Patent 12,113,720 Systems and methods for creating situational networks
3. U.S. Patent 12,106,862 Determination and display of likelihoods over time of developing age-related disease
4. U.S. Patent 12,043,411 Systems and methods for tethered drones
5. U.S. Patent 11,956,515 Creating customized programming content
6. U.S. Patent 11,791,054 Comparison and identification of attribute similarity based on genetic markers
7. U.S. Patent 11,741,499 Methods and systems using a multi-platform targeted advertising system to select advertisements within a target geographic area
8. U.S. Patent 11,735,323 Computer implemented identification of genetic similarity
9. U.S. Patent 11,678,026 Creating customized programming content
10. U.S. Patent 11,621,089 Attribute combination discovery for predisposition determination of health conditions
11. U.S. Patent 11,600,393 Computer implemented modeling and prediction of phenotypes
12. U.S. Patent 11,581,096 Attribute identification based on seeded learning
13. U.S. Patent 11,581,098 Computer implemented predisposition prediction in a genetics platform
14. U.S. Patent 11,545,269 Computer implemented identification of genetic similarity
15. U.S. Patent 11,514,085 Learning system for pangenetic-based recommendations
16. U.S. Patent 11,515,046 Treatment determination and impact analysis
17. U.S. Patent 11,515,047 Computer implemented identification of modifiable attributes associated with phenotypic predispositions in a genetics platform
18. U.S. Patent 11,495,360 Computer implemented identification of treatments for predicted predispositions with clinician assistance
19. U.S. Patent 11,482,340 Attribute combination discovery for predisposition determination of health conditions
20. U.S. Patent 11,363,347 Creating customized programming content
21. U.S. Patent 11,348,691 Computer implemented predisposition prediction in a genetics platform
22. U.S. Patent 11,348,692 Computer implemented identification of modifiable attributes associated with phenotypic predispositions in a genetics platform
23. U.S. Patent 11,166,074 Creating customized programming content
24. U.S. Patent 11,003,694 Learning systems for pangenetic-based recommendations

25. U.S. Patent 10,667,009 Profiling and identification of television viewers
26. U.S. Patent 10,438,240 Methods and systems using a multi-platform targeted advertising system to select advertisements within a target geographic area
27. U.S. Patent 10,379,812 Treatment determination and impact analysis
28. U.S. Patent 10,231,031 Queue based advertisement scheduling and sales
29. U.S. Patent 10,206,012 Queue based head-end advertisement scheduling method and apparatus
30. U.S. Patent 10,116,983 System and method for managing advertising in program streams
31. U.S. Patent 10,182,258 Profiling and identification of television viewers
32. U.S. Patent 10,104,414 Method and system for targeted advertisement filtering and storage
33. U.S. Patent 9,918,117 System and method for managing advertising in program streams
34. U.S. Patent 9,906,819 Advertisement management system for digital video streams
35. U.S. Patent 9,888,297 Queue based advertisement scheduling and sales
36. U.S. Patent 9,602,884 Customizing programming content
37. U.S. Patent 9,582,647 Attribute combination discovery for predisposition determination
38. U.S. Patent 9,544,631 Queue-based head-end advertisement scheduling method and apparatus
39. U.S. Patent 9,524,194 Performing services on behalf of physical devices
40. U.S. Patent 9,479,803 Alternative advertising in prerecorded media
41. U.S. Patent 9,473,814 Profiling and identification of television users
42. U.S. Patent 9,426,315 Grouping advertisement subavails
43. U.S. Patent 9,432,733 Queue based advertisement scheduling and sales
44. U.S. Patent 9,390,423 Methods and systems for verifying advertisements in a multi-platform targeted advertising system
45. U.S. Patent 9,232,252 Queue-based head-end advertisement scheduling method and apparatus
46. U.S. Patent 9,170,992 Treatment determination and impact analysis
47. U.S. Patent 9,165,604 Alternative advertising in prerecorded media
48. U.S. Patent 9,147,112 Advertisement Detection
49. U.S. Patent 9,124,949 Grouping advertisement subavails
50. U.S. Patent 9,043,827 Method and system for providing conditional access to encrypted content
51. U.S. Patent 9,031,870 Pangenetic Web User Behavior Prediction System
52. U.S. Patent 8,934,843 Weighting factor adjustment in adaptive antenna arrays
53. U.S. Patent 8,930,204 Determining lifestyle recommendations using aggregated personal information
54. U.S. Patent 8,837,920 Alternative Advertising in prerecorded media
55. U.S. Patent 8,813,126 Advertisement Filtering and Storage for Targeted Advertisement Systems
56. U.S. Patent 8,789,091 Queue based advertisement scheduling and sales
57. U.S. Patent 8,788,286 Side effects prediction using co-associating bioattributes
58. U.S. Patent 8,788,283 Modifiable attribute identification
59. U.S. Patent 8,776,111 Methods and systems for generating subscriber usage profiles in a multi-platform targeted advertising system

- 60. U.S. Patent 8,775,287 Method and system for determining insurance needs
- 61. U.S. Patent 8,677,401 Grouping advertisement subavails
- 62. U.S. Patent 8,667,536 Profiling and identification of television viewers
- 63. U.S. Patent 8,655,915 Pangenetic web item recommendation system
- 64. U.S. Patent 8,655,908 Predisposition modification
- 65. U.S. Patent 8,655,899 Attribute method and system
- 66. U.S. Patent 8,635,087 Aggregating personal information
- 67. U.S. Patent 8,634,652 Video entity recognition in compressed digital video streams
- 68. U.S. Patent 8,606,761 Lifestyle optimization and behavior modification
- 69. U.S. Patent 8,581,873 Elastomeric wave tactile Interface
- 70. U.S. Patent 8,577,296 Weighting factor adjustment in adaptive antenna arrays
- 71. U.S. Patent 8,570,938 Method and system for adaptive antenna array pairing
- 72. U.S. Patent 8,484,677 Advertisement monitoring system
- 73. U.S. Patent 8,473,457 Method of distributing contact and calendar records
- 74. U.S. Patent 8,458,121 Predisposition prediction using attribute combinations
- 75. U.S. Patent 8,458,097 System, method and software for healthcare selection based on pangenetic data
- 76. U.S. Patent 8,452,619 Masked data record access
- 77. U.S. Patent 8,424,043 Method and system for detecting unscheduled events and recording programming streams
- 78. U.S. Patent 8,417,675 Method of distributing contact and calendar records
- 79. U.S. Patent 8,386,519 Pangenetic web item recommendation system
- 80. U.S. Patent 8,374,387 Video entity recognition in compressed digital video streams
- 81. U.S. Patent 8,365,216 Video stream modification to defeat detection
- 82. U.S. Patent 8,358,204 Dynamic tactile interface
- 83. U.S. Patent 8,346,307 Method of displaying contact information
- 84. U.S. Patent 8,335,854 Performing services on behalf of low-power devices
- 85. U.S. Patent 8,326,648 System for secure mobile healthcare selection
- 86. U.S. Patent 8,306,975 Expanded interest recommendation engine and variable personalization
- 87. U.S. Patent 8,290,351 Alternative advertising in prerecorded media
- 88. U.S. Patent 8,280,633 Weather risk estimation system and method
- 89. U.S. Patent 8,273,425 Nanotube assisted self-cleaning material
- 90. U.S. Patent 8,266,256 Virtualization for low-power networks
- 91. U.S. Patent 8,258,956 RFID tag filtering and monitoring
- 92. U.S. Patent 8,255,403 Pangenetic web satisfaction prediction system
- 93. U.S. Patent 8,253,703 Elastomeric wave tactile interface
- 94. U.S. Patent 8,234,244 Method of distributing contact and calendar records
- 95. U.S. Patent 8,225,347 Advertisement filtering and storage for targeted advertisement systems
- 96. U.S. Patent 8,224,835 Expanding attribute profiles

- 97. U.S. Patent 8,209,319 Compiling co-associating bioattributes
- 98. U.S. Patent 8,200,509 Masked data record access
- 99. U.S. Patent 8,185,597 Providing notifications to an individual in a multi-dimensional personal information network
- 100.U.S. Patent 8,185,461 Longevity analysis and modifiable attribute identification
- 101.U.S. Patent 8,180,675 System and method for automatically managing avail inventory data and avail pricing
- 102.U.S. Patent 8,151,295 Queue based advertisement scheduling and sales
- 103.U.S. Patent 8,150,422 Method of displaying contact information
- 104.U.S. Patent 8,126,486 Adaptive antenna weighting system for wireless local area and personal area networks
- 105.U.S. Patent 8,121,915 Generating financial plans using a personal information aggregator
- 106.U.S. Patent 8,116,616 Alternative advertising in prerecorded media
- 107.U.S. Patent 8,108,406 Pangenetic web user behavior prediction system
- 108.U.S. Patent 8,099,424 Treatment determination and impact analysis
- 109.U.S. Patent 8,087,045 Grouping advertisement subavails
- 110.U.S. Patent 8,077,021 Dynamic tactile interface
- 111.U.S. Patent 8,075,980 Diffraction grating assisted self-cleaning material
- 112.U.S. Patent 8,073,708 Aggregating personal healthcare information
- 113.U.S. Patent 8,073,194 Video entity recognition in compressed digital video streams
- 114.U.S. Patent 8,072,314 Secondary card reader
- 115.U.S. Patent 8,065,324 Weight and diet attribute combination discovery
- 116.U.S. Patent 8,055,643 Predisposition modification
- 117.U.S. Patent 8,051,033 Predisposition prediction using attribute combinations
- 118.U.S. Patent 8,046,798 Profiling and identification of television viewers
- 119.U.S. Patent 8,024,348 Expanding attribute profiles
- 120.U.S. Patent 7,984,466 Advertising management system for digital video streams
- 121.U.S. Patent 7,970,827 Providing notifications to an individual in a multi-dimensional personal information network
- 122.U.S. Patent 7,962,934 Advertising monitoring system
- 123.U.S. Patent 7,952,480 RFID tag filtering and monitoring
- 124.U.S. Patent 7,949,565 Privacy-protected advertising system
- 125.U.S. Patent 7,941,434 Efficiently compiling co-associating bioattributes
- 126.U.S. Patent 7,941,329 Insurance optimization and longevity analysis
- 127.U.S. Patent 7,933,912 Compiling co-associating bioattributes using expanded bioattribute profiles
- 128.U.S. Patent 7,930,714 Video detection and insertion
- 129.U.S. Patent 7,917,438 System for secure mobile healthcare selection
- 130.U.S. Patent 7,870,576 Targeted advertising through electronic program guide
- 131.U.S. Patent 7,844,609 Attribute combination discovery

132.U.S. Patent 7,818,310	Predisposition modification
133.U.S. Patent 7,810,114	Advertisement filtering and storage for targeted advertisement systems
134.U.S. Patent 7,809,154	Video entity recognition in compressed digital video streams
135.U.S. Patent 7,801,956	Providing notifications to an individual in a multi-dimensional personal information network
136.U.S. Patent 7,797,302	Compiling co-associating bioattributes
137.U.S. Patent 7,694,318	Video detection and insertion
138.U.S. Patent 7,690,013	Advertisement monitoring system
139.U.S. Patent 7,690,011	Video stream modification to defeat detection
140.U.S. Patent 7,689,682	Obtaining lists of nodes of a multi-dimensional network
141.U.S. Patent 7,500,258	Advertisement subgroups for digital streams
142.U.S. Patent 7,440,674	Alternative advertising in prerecorded media
143.U.S. Patent 7,432,811	RFID tag filtering and monitoring
144.U.S. Patent 7,420,458	Secondary card reader
145.U.S. Patent 7,331,057	Grouping advertisement subavails
146.U.S. Patent 7,328,448	Advertisement distribution system for distributing targeted advertisements in television systems
147.U.S. Patent 7,313,811	Optical conversion device
148.U.S. Patent 7,298,264	RFID tag filtering and monitoring
149.U.S. Patent 7,260,823	Profiling and identification of television viewers
150.U.S. Patent 7,240,355	Subscriber characterization system with filters
151.U.S. Patent 7,177,844	Apparatus and method for activation of a security module in a set-top retail environment
152.U.S. Patent 7,152,237	Delivering advertisements to the set-top-box
153.U.S. Patent 7,150,030	Subscriber characterization system
154.U.S. Patent 7,062,510	Consumer profiling and advertisement selection system
155.U.S. Patent 7,039,932	Queue-based head-end advertisement scheduling method and apparatus
156.U.S. Patent 6,915,530	Ingress detection and characterization by time/frequency map
157.U.S. Patent 6,882,709	Enhanced broadband telephony services
158.U.S. Patent 6,880,170	Ingress detection and attenuation
159.U.S. Patent 6,820,277	Advertising management system for digital video streams
160.U.S. Patent 6,714,917	Subscriber identification based on electronic program guide data
161.U.S. Patent 6,704,930	Advertisement insertion techniques for digital video streams
162.U.S. Patent 6,684,194	Subscriber identification system
163.U.S. Patent 6,615,039	Advertisement subgroups for digital streams
164.U.S. Patent 6,560,578	Advertisement selection system supporting discretionary target market characteristics
165.U.S. Patent 6,457,010	Client-server based subscriber characterization system
166.U.S. Patent 6,324,519	Advertisement auction system

167.U.S. Patent 6,321,384	Noise reduction in cable return paths
168.U.S. Patent 6,317,884	Video, data, and telephony gateway
169.U.S. Patent 6,298,348	Consumer profiling system
170.U.S. Patent 6,216,129	Advertisement selection system supporting discretionary target market characteristics
171.U.S. Patent 6,078,593	Method and apparatus for reliable operation of universal voice grade cards
172.U.S. Patent 5,881,362	Method of ingress noise reduction in cable return paths
173.U.S. Patent 5,742,591	Interference cancellation system for CATV return transmissions
174.U.S. Patent 5,479,451	Method and device for data recovery in burst mode systems
175.U.S. Patent 5,408,525	Diverter interface between two telecommunication lines and a station set
176.U.S. Patent 5,357,588	Opto-electronic transducer device for optical link termination equipment and application thereof to various types of optical link
177.U.S. Patent 4,813,772	Electro-optical interface
178.U.S. Patent 4,698,587	Method of characterizing critical timing paths and analyzing timing related failure modes in very large scale integrated circuits

FUNDED RESEARCH PROPOSALS:

- Raised \$3.6 million in capital (December 1999 through April 2000) for Expanse Networks, Inc. for development of systems and intellectual property in the area of targeted advertising.
- Kowel, S.T., A. Knoesen (principal investigators) and C.A. Eldering (proposal co-author), *Polymeric Ultrathin Film Multilayered Modulators*, funded by NSF Quantum Electronics, Waves and Beams Program for approximately \$300,000 over 3 years.

PROFESSIONAL ACTIVITIES AND PUBLIC RECOGNITION:

- Recognized in *IAM Strategy 250 – The World's Leading IP Strategists* published by *Intellectual Asset Management (IAM) Magazine* (2009-2011). *IAM Strategy 300* (2012-2013).
- Certified Passive Home Consultant, *Passive Home Institute*.
- Guest Editor. Feature topic: Patents and Telecommunications. *IEEE Communications Magazine* (July, 2000).
- Cited in "Who Owns the Knowledge Economy? Patent Wars." *The Economist*, (April 8-14, 2000).
- Cited in "Access: Not a Rocket Science" *Cable World*, (February, 2000).
- Cited in "Patents Considered Vital to Thrive on the Internet." *New York Times Outlook 2000*, (December, 1999).
- Guest Editor for Feature topic: Broadband Technologies and Trials. *IEEE Communications Magazine* (October, 1999).
- Guest Editor for Feature topic: Broadband Deployment in a Deregulated Environment. *IEEE Communications Magazine* (July, 1998).
- Member of *Network Reliability and Interoperability Council* and contributor to NRIC reports to FCC on interoperability and telecommunications deregulation.
- Senior Member, *IEEE*.
- Chair, *Access Subcommittee of IEEE Communications Society*.
- Member, Technical Program Committee and Session Chair, *IEEE Communications Society Broadband '96 Conference*.

- Invited speaker, 1995 *IEEE/LEOS Summer Topical Meeting*.
- Co-chair, 1991 *SPIE Fibers '91 Conference*.
- Chair, 1993 *SPIE Conference on LANs and MANS*.
- Invited participant, 1990 *Gordon Conference on Organic Thin Films*.

LANGUAGES:

- English: native language
- Spanish: speak, read, and write
- Portuguese: speak, read and write
- German: working knowledge
- Italian: working knowledge