

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

YEALINK (USA) NETWORK TECHNOLOGY CO., LTD., and
YEALINK NETWORK TECHNOLOGY CO., LTD.
Petitioners,

v.

BARCO N.V.
Patent Owner

U.S. Patent No. 10,684,972
IPR2025-00491

**DECLARATION OF KEVIN C. ALMEROTH, PH.D.
IN SUPPORT OF PETITIONER'S REPLY FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,684,972**

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MATERIALS CONSIDERED

EXHIBIT	DESCRIPTION
Ex-1001	U.S. Patent No. 10,684,972 (“’972 patent”)
Ex-1002	Declaration of Kevin C. Almeroth, Ph.D.
Ex-1003	Curriculum Vitae of Kevin C. Almeroth, Ph.D.
Ex-1004	File History of U.S. Patent No. 10,684,972
Ex-1005	U.S. Publication No. 2015/0169477 (“Beel”)
Ex-1006	U.S. Patent No. 8,369,498 (“Dinka”)
Ex-1007	U.S. Publication No. 2016/0014172 (“Van de Laar”)
Ex-1008	U.S. Publication No. 2010/0295994 (“Kaplan”)
Ex-1009	Skype Webpage (Archived Sept. 14, 2012) (https://web.archive.org/web/20120914232239/http://www.skype.com/intl/en-us/home)
Ex-1010	USB Endpoints and Their Pipes - Windows drivers _ Microsoft Learn.pdf (https://learn.microsoft.com/en-us/windows-hardware/drivers/usbcon/usb-endpoints-and-their-pipes) (accessed November 8, 2024)
Ex-1011	U.S. Patent No. 7,761,627 (“Christison”)
Ex-1012	EP3732827B1 (“Renard”)
Ex-1013	Skype Webpage (Archived Nov. 28, 2015) (https://web.archive.org/web/20151128100316/http://www.skype.com/en/) (accessed Jan. 11, 2025)
Ex-1014	U.S. Patent Application Publication No. 2002/0196378 (“Slobodin”)
Ex-1015	U.S. Patent Application Publication No. 2008/0074560 (“Ichieda”)
Ex-1016	English Translation of JP Patent Application Publication No. 2007-208606 (“Maeda”)
Ex-1017	JP Patent Application Publication No. 2007-208606

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Ex-1018	Certification for English Translation of JP Patent Application Publication No. 2007-208606
Ex-1019	U.S. Patent Application Publication No. 2002/0174254 (“Kita”)
Ex-1020	U.S. Patent Application Publication No. 2005/0210390 (“Ono”)
Ex-1021	EP Patent Application Publication No. 2107463 (“Deforche”)
Ex-1022	U.S. Patent Application Publication No. 2009/0172219 (“Mardiks”)
Ex-1023	English Translation of Japanese Patent Application Publication No. 2008-165007 (“Uchida”)
Ex-1024	JP Patent Application Publication No. 2008-165007
Ex-1025	Certification for English Translation of Japanese Patent Application Publication No. 2008-165007
Ex-1026	Imation Wireless Projection Link User Guide
Ex-1027	EZAir Press Release, “EZAir Wireless PC to TV Solutions Now Available Across Europe,” March 16, 2011
Ex-1028	Warpia Product Brief, “Wireless USB PC to TV Audio/Video Display Adapter,” 2009
Ex-1029	Q-Waves Product Overview, “Quicklink TV,” November 2010
Ex-1030	IOGear Installation Guide, “Wireless USB to VGA Kit,” 2008
Ex-1031	Dictionary definition of “Communication Protocol”
Ex-1032	WIPO Publication No. WO 2012/128972 (“Scragg”)
Ex-1033	Wi-Fi Security Webpage (Archived Aug. 16, 2017) (https://web.archive.org/web/20170816134219/http://www.wi-fi.org/discover-wi-fi/security) (accessed Jan. 16, 2025)
Ex-1034	Dr. Michael Brogioli Deposition Transcript
Ex-1035	Second Declaration of Dr. Kevin Almeroth
Ex-1036	IPR2025-00597, Paper 11
Ex-1037	USB Specification
Ex-1038	ClickShare C-5 Base Unit Datasheet

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Ex-1039	https://www.barco.com/en/inspiration/news-insights/2019-05-03-different-ways-to-share-your-content-with-clickshare (accessed Jan. 15, 2026)
Ex-1040	Excerpts from trial in <i>Barco, Inc. et al. v. Yealink (USA) Network Tech. Co., Ltd.</i> , Case No. 2:23-cv-00521-JRG (E.D. Tex.)
Ex-1041	https://www.barco.com/en/product/clickshare-app (accessed Jan. 15, 2026)
Ex-1042	District Court deposition transcript of Andrew Ludke, Crestron
Ex-1043	District Court deposition transcript of Dr. Brogioli
Ex-1044	U.S. Patent No. 10,762,002
Ex-1045	U.S. Patent No. 11,258,676
Ex-1046	U.S. Patent No. 11,966,346
Ex-1047	District Court deposition transcript of Erwin Six
Ex-1048	Yealink Press Release (https://www.yealink.com/en/product-detail/wireless-presentation-wpp30-eol)
Ex-1049	District Court deposition transcript of William Scally, Barco's damages expert

I, Kevin C. Almeroth Ph.D., declare as follows:

I. INTRODUCTION

1. I have been retained by Yealink (USA) Network Technology Co., Ltd. and Yealink Network Technology Co., Ltd. (collectively, “Petitioners”) as an independent expert consultant in this proceeding before the United States Patent and Trademark Office (“PTO”) regarding U.S. Patent No. 10,684,972 (“the ’972 patent”) (Ex-1001).

2. My name is Kevin C. Almeroth and I am a Professor Emeritus of Computer Science at the University of California, Santa Barbara. I have prepared this declaration as an expert witness on behalf of Petitioners. In this declaration, I will give my opinion as to whether claims 1-5 of the ’972 patent are unpatentable. I also provide herein the technical bases for these opinions, as appropriate.

3. For my efforts in connection with the preparation of this declaration, I have been compensated at my usual and customary rate for this type of consulting activity. My compensation is in no way contingent on the outcome of these or any other proceedings.

4. I have been asked to consider whether certain references disclose or suggest the features recited in claims 1-18 of the ’972 patent. My opinions are set forth below.

II. GROUND 1: BEEL IN VIEW OF DINKA AND OPTIONALLY CHRISTISON.

A. Barco improperly limits the prior art to specific embodiments and argues incorrectly that any deviation is a teaching away.

5. In my opinion, Barco is incorrect that Beel is focused on systems of personal computers and that Dinka is limited to embedded systems. First, Dinka does disclose a system of personal computers or “plurality of computer terminals 102.” Ex-1006, FIG. 1, 5:45-46. In testimony, Dr. Brogioli would not concede that Dinka literally says “plurality of computer terminals 102” even though this is the case. See Ex-1006, 5:45-46; Ex-1034, 85:8-20; *see also, id.*, 84:10-86:19.

6. As I previously testified, a POSA would have understood Dinka to teach inter-computer communication despite any alleged concerns expressed by Dinka. The concerns Dinka raises about personal computers, such as user competence or comfort (Ex-1006, 2:4-12) are framed as disadvantages or barriers to adoption, not as technical barriers that would teach away from using them. A POSA would merely recognize these as motivations to improve the user experience on PCs or provide alternatives, not as a directive to abandon PC-based systems entirely. In my opinion, the mere description of embodiments that use embedded systems instead of a personal computer does not teach away from using a personal computer.

7. Finally, it is also my understanding that the Board already rejected the same argument in a related IPR. Ex-1036, 19. I agree with this finding that this teaching away argument is unpersuasive.

B. Beel expressly discloses bi-directional communication.

8. Beel expressly states that *transceivers* in both the base unit and the peripheral device provide for bi-directional communication, and a POSA would have understood that this bi-directional communication is a standard feature of WiFi interfaces like those used in Beel. For the base unit, Beel discloses, “The base node 36 for communicating with the connection unit 47 has a receiver 63.... The receiver is preferably a transceiver.” Ex-1005, ¶129. For the peripheral device (connection unit 47), Beel discloses, “The connection unit 47 for communicating with said base node 36 has a network interface e.g. comprising a transmitter 62. The transmitter 62 is preferably a transceiver.” *Id.*, ¶128; see also *id.* ¶71 (describing the peripheral device receiving media content from the network and displaying the received media content). It is my opinion that a POSA would understand that a transceiver is a device that can both transmit and receive signals, such that there is no questions that the communication is bi-directional. The word “transceiver” is a portmanteau indicating a transceiver combines the functionality of *transmitter* and a *receiver*.

9. Beel also describes bi-directional communication because it describes microphones 38 transmitting audio data to processing devices 31, indicating a clear

path for data to be sent from a peripheral device to a processing device. Ex-1005, ¶120. Further, Beel discloses that the bi-directional communication can be through the peripheral device. For example, Figs. 5 and 11 disclose the computer and peripheral device, but do not disclose a means for communicating with the network other than the WiFi interface (3) located on the dongle and the USB interface (2) on the computer. *See* Ex-1005, FIGS. 5 & 11. Beel further discloses that the peripheral device can act as a composite device, like a virtual audio speaker, channeling audio over the communications network. *Id.*, ¶317. This allows for the bi-directional transfer of audio/visual data between endpoints connected to the base unit and the processing device via the peripheral device. *Id.*, ¶¶43, 120, 317, 323. Dinka also describes multiple endpoints, including microphones and cameras, which communicate bi-directionally with processing devices 102 and other networked components through standard protocols, allowing for both transmission and reception of media and control of data across the network. *See* Ex-1006, ¶¶61, 83, 92, 158, 169. These teachings of Beel and Dinka make obvious the use of bi-directional communications for electronic meetings, as both references describe architectures in which peripheral and processing devices can send and receive data across the network, allowing robust and flexible system interaction.

C. The combination of Beel and Dinka discloses that an endpoint that is a data source or a data sink is “able to store or emit data, of the functional device exposed or made available on the first peripheral device.”

10. Based on my review, Dr. Brogioli’s testimony concerning what constitutes an “*endpoint*” did not extend beyond whether the word “endpoint” itself appeared in certain documents. This testimony appeared inconsistent and technically inaccurate, particularly when considered in light of the fundamental information provided in Revision 2.0 of the Universal Serial Bus Specification (Ex-1037, the “USB Specification”). The USB Specification would be well-known to a POSA and clearly defines an endpoint as a uniquely addressable portion of a USB device that is the source or sink of data. *See* Ex-1037, p. 33-34; §5.3.1. Endpoints are fundamental to USB device architecture, and every USB device must have at least one endpoint for communication, typically including control, bulk, interrupt, or isochronous endpoints. *Id.* As such, the shared components of FIG. 4 of the ’972 patent and FIG. 11 of Beel include identical endpoints, including “mass storage 12,” “USB audio device 14,” and “USB HID device 13.”

11. In my opinion, Dr. Brogioli’s refusal to identify endpoints in FIG. 4 of the ’972 patent on the basis that the word “endpoint” does not appear in the figure is not only evasive but also demonstrates an apparent misunderstanding of the USB protocol and the patent’s disclosure. The absence of the literal term “endpoint” in a

block diagram does not negate the presence of endpoints, as the USB Specification and the '972 patent both make clear that endpoints are inherent in the operation of USB devices such as mass storage devices, audio devices, and HID devices. Ex-1001, 7:64-8:27; Ex-1037, §5.3.1. In my opinion, Dr. Brogioli attempts to create ambiguity around the presence of an endpoint where none exists.

III. GROUND 2: KAPLAN IN VIEW OF VAN DE LAAR AND OPTIONALLY CHRISTISON

A. Only ordinary skill would have been required to combine Kaplan, Van de Laar, and Christison.

1. A POSA would not be limited to example embodiments.

12. It is my opinion that Kaplan's so-called "walled garden" approach is only one embodiment of Kaplan's approach. Ex-1008, ¶21. These embodiments allow the transceiver 350 (receiver 110) to communicate with the transceiver 450 (transmitter 120) without requiring further configuration. Ex-1008, ¶45. Kaplan continues to describe the walled garden embodiment as follows:

Since, in a particular embodiment, the receiver and the transmitter are pre-paired to only work with each other in performing two-way communications, some device functionality is traded-off for greatly improved ease of setup and use. No programming of the device(s) by the end-user or purchaser of the wireless communications system is needed, opening up the use of the system to users with limited technical skills.

Id., ¶ 54 (emphasis added). Similar to the '972 patent (Ex-1008, ¶45), while the “walled garden” can provide benefits, this configuration is not required. Kaplan even specifically includes embodiments using “commercially available wireless communications standards.” Ex-1008, ¶¶21, 31, 65. Kaplan also describes the “walled garden” as one “particular embodiment”, such that it is clear the Kaplan contemplates other embodiments that are not in a “walled garden”. *Id.*, ¶ 54.

13. Kaplan's pairing process, as illustrated in FIG. 5, further demonstrates that the “walled garden” is not a required configuration. This figure describes a series of pairing steps performed during manufacturing, but importantly states that “steps may be added or removed depending on the particular applications.” Ex. 1008, ¶56. Based on this explicit teaching of flexibility, a POSA would have understood that the pairing process could be modified or even performed by the end-user, moving away from the particular pre-paired “walled garden” embodiment. Thus, in my opinion, a POSA would recognize that Kaplan’s disclosure encompasses systems beyond the particular “walled garden” embodiment.

14. Similarly, Van de Laar is not limited to embodiments that use a “WiFi direct” protocol. Instead, Van de Laar also teaches other standards, such as Wi-Fi Serial Bus and Wi-Fi Miracast, can be used. Ex-1007, ¶73. It is my understanding that it is improper to strictly limit a disclosure to its preferred embodiments, as a reference teaches more than just its most desirable combination.

15. Van de Laar also does not require the dockee communication unit to be internal to the dockee. Van de Laar explains that the communication unit can be, for example, a “WiFi unit” and that there may be multiple communication units for that purpose. *Id.*, ¶¶74-75. Moreover, the proposed combination includes Kaplan, which expressly discloses a WiFi peripheral device. *Pet.*, 51-52. Therefore, in my opinion, Van de Laar should not be limited to a particular embodiment and is combinable with Kaplan. Further, Van de Laar teaches why the combination of Kaplan and Van de Laar would have benefits:

The benefit of doing this is that it allows primary dockees to be able to present content using the peripherals connected to a WDH, such as a large screen and a USB presentation remote control, and that other people in the meeting/lecture room can connect to the presenter and to each other for all kinds of collobaration [*sic*] and interaction purposes

Ex-1007, ¶94; see also, ¶128 (discussing the benefit of using Skype with a system like Kaplan).

2. Industry Motivation: Convergence Toward Interoperable AV Systems

16. In my opinion, the assertion that Kaplan and Van de Laar teach “incompatible communication methods” is incorrect. In my experience, the field of Audio/Video (A/V) technology relies heavily on components being flexible and interoperable. For example, a POSA would know that by 2015, wireless AV systems

were rapidly evolving to support seamless integration of diverse hardware and protocols. Thus, a POSA would be motivated to combine Kaplan's streamlined architecture with Van de Laar's multi-user capabilities to create an AV system that allows multiple users to easily access shared AV peripherals.

3. Technical Compatibility and Predictability of Combination

17. In my opinion, Patent Owner's argument that Kaplan's "walled garden" approach is incompatible with Van de Laar's Wi-Fi Direct system is technically unfounded. As explained previously, Kaplan does not require a "walled garden" system but instead teaches that other pairing mechanisms are possible. In my opinion, a POSA would find it predictable to combine Kaplan's architecture with Van de Laar's multi-user capabilities, as both systems utilize standard protocols like USB and Wi-Fi. The different pairing methods are merely implementation details, not fundamental technical barriers to a successful combination. In my opinion, a POSA would find that the underlying hardware and software are compatible and the combination would be predictable engineering task.

4. Example implementation details do not prohibit a combination of Kaplan and Van de Laar.

18. Kaplan's "walled garden" model, while streamlining the user experience, is confined to one-to-one transmitter/receiver pairings. Conversely, Van de Laar's system supports multiple users and shared peripherals but does not offer the same plug-and-play simplicity as Kaplan. In my opinion, a POSA would

recognize that combining features of these two systems offers a clear functional synergy. Integrating Van de Laar's multi-user docking with Kaplan's transmitter/receiver architecture would predictably yield a scalable, user-friendly conferencing system suitable for both individual and group applications. This is the type of enhancement that, in my opinion, would motivate a POSA to combine references in the AV field.

5. Prior Art and POSA's Reasonable Expectation of Success

19. In my opinion, a POSA would have a reasonable expectation of success in combining these systems. Both references operate within the same technological domain and share common protocols, making their combination straightforward for someone skilled in the art. I have not identified any significant technical obstacles. Instead, the references appear to complement each other by addressing the respective limitations of single-user and multi-user AV environments.

6. Christison reinforces a motivation to combine Kaplan and Van de Laar

20. In my opinion, Christison's teaching of presenting remote devices as native endpoints provides a clear rationale for combining Kaplan and Van de Laar. A POSA would find it natural to incorporate Christison's technique to enhance the flexibility and usability of the combined system, especially since exposing remote peripherals as native devices is a well-known concept in the field. For example, it was common practice for wireless printers to appear as local printer ports; network-

attached storage (NAS) devices to appear as local drives; and Bluetooth audio devices to be recognized as standard system audio inputs/outputs. This principle of virtualizing remote hardware as a local resource was and is fundamental to modern networked systems.

B. The combination of Kaplan and Van de Laar discloses “the first peripheral device being adapted to transmit and receive data ... from the functional device,” i.e., “the claimed communication path”¹

1. Kaplan and Van de Laar Teach Bi-Directional Data Communication

21. Kaplan provides hardware for two-way communication through its receiver 110, which includes a transceiver 110. Ex-1008, FIG. 3. In my opinion, Van de Laar teaches a similar concept, describing dockees like laptops that are capable of both sharing their own content and receiving and monitoring content from other devices: “all dockees (primary and secondary) [can] monitor the merged display output and/or audio output and follow the presentation on their own screen and/or headphones.” Ex-1007, ¶103.

2. Kaplan Discloses a Transceiver Capable of Bi-Directional Communication

22. In my opinion, Kaplan teaches bi-directional communication. Kaplan explicitly discloses a transceiver, which, as explained above, is a device capable of

¹ POR, 33.

both transmitting and receiving data. Ex-1008, ¶¶6, 16, 17, 42, 45, 56. Kaplan also states that its receiver and transmitter are operable to perform two-way wireless communication. *Id.* ¶¶6, 16, 17, 39, 42. This inherent capability allows for the transmission of data from the computer to the display, as well as for control signals or feedback to be sent in the reverse direction.

23. Kaplan provides an example of this bi-directional functionality:

As an example use case, a user uses remote control 130 to control the receiver 110. The user interface is displayed on the display device 210 and two-way communication is established between the receiver 110 and the transmitter 120. Requests from the user may pass from the remote control 130 to the receiver 110, through the wireless connection to the transmitter 120, and then from the transmitter 120 to the computer 220.

Id., ¶28. The inclusion of a remote control to manage the system further supports its ability to handle two-way communication, as control signals must be sent from the display side back to the computer or transmitter.

3. Van de Laar teaches primary dockees that share content and simultaneously receive content, acting as a secondary dockee.

24. In Van de Laar, the primary dockees are not limited to a single, unidirectional role. Instead, multiple primary dockees can simultaneously transmit their own content to shared peripherals and receive content from other dockees. This dual capability means that, while acting as a primary dockee (with control privileges

and the ability to send data), a device can also receive data streams from other dockees—acting as a secondary dockee with respect to those particular data streams. This effectively means that a primary dockee can also function as a secondary dockee at the same time.

25. Van de Laar also allows multiple primary dockees to connect to the wireless docking host (WDH) simultaneously. In this setup, each primary dockee can both send and receive AV data, including data from other dockees. *See* Ex-1007, ¶¶59-60, 93, 96. Further, Van de Laar describes how in multi-primary scenarios, each primary dockee can monitor (receive) the output from other dockees, further demonstrating the embodiments of simultaneous operation as a primary and a secondary dockee. *Id.* at ¶56, 78, 82. This enables a collaborative environment where participants can both contribute and monitor content.

26. Therefore, it is my opinion that Van de Laar teaches that primary dockees can both transmit data to peripherals and receive data in collaborative scenarios. This demonstrates that the system is designed for flexible, bi-directional communication where devices can share roles.

4. Industry Practice and POSA's Understanding

27. Kaplan and Van de Laar describe wireless AV systems, a field where bi-directional communication is a standard practice. In my experience, a POSA

would have known that using transceivers and wireless docking protocols obviously includes the ability to both transmit and receive data.

28. Kaplan's transceiver and system architecture support bi-directional data communication. Similarly, Van de Laar explicitly teaches bi-directional wireless communication. Therefore, in my opinion, combining these references makes the claimed bi-directional communication path obvious to a POSA.

C. The combination of Kaplan and Van de Laar discloses a peripheral device endpoint able to store or emit data of the functional device.²

29. It is my opinion that the combination of Kaplan and Van de Laar, as combined according to the Petition, uses Kaplan's USB transmitter as a sink/source to store/emit data using the bi-directional transceiver 450. Ex-1008, FIG. 4. As described above, USB devices inherently or at least obviously have endpoints. *See* Ex-1037, p. 33-34, § 5.3.1. The USB Specification further explains that a USB logical device is "a collection of independent endpoints" and that all USB devices have at least one endpoint to support at least a default control pipe for initialization and device management. *Id.* Thus, endpoints are a fundamental and required component of any USB device, including Kaplan's USB transmitter. Van de Laar describes a similar implementation and refers to endpoints as sinks or sources. Ex-1007, FIG. 3, ¶¶124-126. For example, Van de Laar's primary dockees can operate

² POR, 34-37

as sinks and sources by both transmitting content and receiving other shared content. *Id.*, ¶¶59-60, 93. Since the '972 patent states that “endpoints should be interpreted broadly as data sources or sinks” (Ex-1001, 7:64-67), both Kaplan and Van de Laar describe endpoints.

IV. CONCLUSION

30. My opinions are based upon the information that I have considered to date. I am unaware of any evidence of secondary considerations with respect to the '972 patent that would render any of the asserted claims non-obvious. I reserve the right, however, to supplement my opinions in the future to respond to any arguments raised by the owner of the '972 patent and to consider new information that becomes available to me.

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

January 20, 2026



Kevin C. Almeroth, Ph.D.