

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARUBA NETWORKS, INC.,
Petitioner,

v.

XR COMMUNICATIONS LLC d/b/a VIVATO TECHNOLOGIES,
Patent Owner.

Case IPR2018-00726
Patent 7,729,728 B2

Before BARBARA A. PARVIS, TERRENCE W. McMILLIN, and
JAMES J. MAYBERRY, *Administrative Patent Judges*.

McMILLIN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Challenged Claim Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Aruba Networks, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) to institute an *inter partes* review of claim 16 of U.S. Patent No. 7,729,728 B2 (Ex. 1001, “the ’728 patent”). Petitioner identifies itself and its parent, Hewlett Packard Enterprise Company, as the real parties in interest. Pet. 4. XR Communications LLC d/b/a Vivato Technologies (“Patent Owner”) filed a Preliminary Response. Paper 8. As authorized (Paper 9), the Petitioner filed a Reply (Paper 12) to the Preliminary Response and Patent Owner filed a Sur-Reply (Paper 13). We instituted this review. Paper 15 (“Inst. Dec.”).

Subsequent to institution, Patent Owner filed a Patent Owner’s Response. Paper 20 (“PO Resp.”). Petitioner filed a Reply. Paper 29 (“Reply”). Patent Owner filed a Sur-Reply. Paper 30 (“Sur-Reply”).¹

Petitioner has also filed a Motion to Exclude directed against Exhibit 2012 (Transcript of the Deposition of Jack H. Winters, Ph. D.) and portions of the record that reference this exhibit. Paper 32 (“Motion to Exclude”). Patent Owner filed an opposition to the Motion to Exclude. Paper 36. Petitioner filed a Reply in Support of its Motion to Exclude. Paper 37.

¹ There was no oral argument in this proceeding. Neither party requested oral argument. Papers 33, 34. Instead, both parties requested that the transcript of the oral hearing in IPR2018-00725 conducted on June 18, 2019, be made part of the record in this proceeding. *Id.* Pursuant to these requests, the Board ordered the transcript of the oral argument in IPR2018-00725 be made part of the record in the instant proceeding. Paper 35, 2–3 (“[W]e will . . . treat the oral argument in IPR2018-00725 as applicable to this proceeding to the extent that upon review of that transcript we determine it is applicable.”). The transcript of the oral argument in IPR2018-00725 is Exhibit 3001 in this proceeding.

This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. After reviewing the evidence and assertions, we determine that Petitioner has met its burden of showing, by a preponderance of the evidence, that claim 16 of the '728 patent is unpatentable.

A. Related Matters

The parties indicate that the '728 patent has been asserted in the following litigations:

XR Communications, LLC d/b/a Vivato Technologies v. ARRIS International plc et al, 8-18-cv-00192 (C.D. Cal.), filed February 2, 2018; *XR Communications, LLC d/b/a Vivato Technologies v. Aruba Networks, Inc.*, 2-17-cv-02945 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. Newo Corp. d/b/a Amped Wireless*, 5-17-cv-00744 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. ASUS Computer International et al*, 2-17-cv-02948 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. Cisco Systems, Inc.*, 2-17-cv-02951 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. Extreme Networks, Inc.*, 2-17-cv-02953 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. NETGEAR, Inc.*, 2-17-cv-02959 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. Ruckus Wireless, Inc.*, 2-17-cv-02961 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. Ubiquiti Networks, Inc.*, 2-17-cv-02968 (C.D. Cal.), filed April 19, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. Belkin International, Inc.*, 8-17-cv-00674 (C.D. Cal.), filed April 13, 2017; *XR Communications, LLC d/b/a Vivato Technologies v. D-Link Systems, Inc.*, 8-17-cv-00596

(C.D. Cal.), filed April 3, 2017; and *XR Communications, LLC d/b/a Vivato Technologies v. Xirrus, Inc.*, 3-17-cv-00675 (C.D. Cal.), filed April 3, 2017. Pet. 4; Paper 4, 1–3.

The '728 patent is also challenged in IPR2018-00763 and IPR2018-01018. The '728 patent issued from a continuation of the application from which U.S. Patent No. 7,062,296 B2 (“the '296 patent”) issued. The '296 patent is challenged in IPR2018-00725, IPR2018-00764, and IPR2018-01017.

B. The '728 Patent

The '728 patent is titled, “Forced Beam Switching in Wireless Communication Systems Having Smart Antennas.” Ex. 1001, (54). The '728 Patent is directed to a method and apparatus for allowing a wireless communication system using a smart antenna to cause a receiving device to switch from one transmitted beam to another transmitted beam. Ex. 1001, 1:15–20. According to the '728 patent, in wireless communications that use smart antennas, a receiving device has difficulty switching from one beam to another beam because the smart antenna produces narrower, directed beams as compared to conventional, omni-directional antennas. *Id.* at 2:25–31.

Figure 1 of the '728 patent is reproduced below.

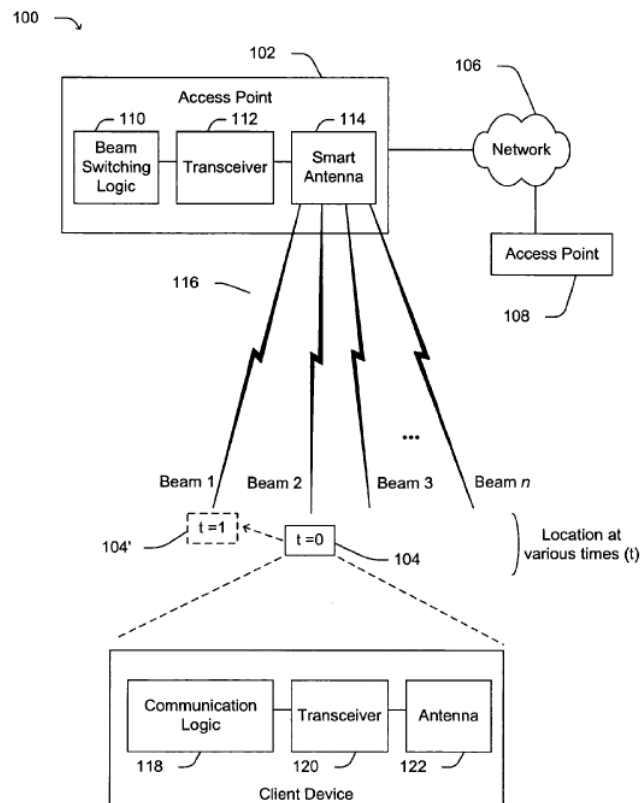


Fig. 1

Figure 1 depicts a block diagram of wireless communications system 100 having access point 102 in communication with client 104 over one of main beams 116. Ex. 1001, 5:1–3. As shown in Figure 1, access point 102 includes beam switching logic 110, smart antenna 114, and transceiver 112, which is coupled to switching logic 110 and smart antenna 114. *Id.* at 5:3–6, Fig. 1. Smart antenna 114 transmits main beams 116 in correspondence with transmit signals output by transceiver 112 and receives signals transmitted by client 104. *Id.* at 5:6–16.

Access point 102 is configured to cause receiving client 104 to switch between main beams 116. *Id.* at 4:61–65. In particular, beam switching logic 110 detects the location of client 104. *Id.* at 5:47–49. When beam

switching logic 110 determines that client 104 is associated with the “wrong beam,” beam switching logic 110 causes client 104 to re-associate with another one of main beams 116 by altering the operation of transceiver 112. *Id.* at 5:55–60.

C. Challenged Claim

Petitioner challenges claim 16 of the '728 patent. Pet. 6. Claim 16 recites:

16. A wireless communication system, comprising:

a phased array antenna configured to transmit beam downlinks;

a transceiver operatively coupled to the phased array antenna and configured to send and receive electromagnetic signals via the phased array antenna; and

an access point that includes the phased array antenna and the transceiver, the access point configured to:

selectively allow a receiving device to operatively associate with a beam downlink transmitted to the receiving device via the phased array antenna;

receive an uplink transmission from the receiving device through the phased array antenna;

determine from the uplink transmission if the receiving device should operatively associate with a different beam downlink transmission; and

at least one of: allow the receiving device to operatively associate with the different beam downlink if determined that the receiving device should operatively associate with the different beam downlink; force the receiving device to operatively associate with the different beam downlink if

determined that the receiving device should be operatively associated with the different beam downlink;

wherein the access point is further configured to actively probe the receiving device by generating a signal to initiate that the phased array antenna transmit at least one downlink transmittable message over the beam downlinks, and gather signal parameter information from uplink transmittable messages received from the receiving device through the phased array antenna.

Ex. 1001, 12:25–55.

D. Cited Art

Petitioner relies on the following references:

U.S. Patent No. 7,346,365 B1, filed April 16, 2002 (“Hovers”) (Ex. 1003); and

WO 00/38455, published June 29, 2000 (“Jetzek”) (Ex. 1004).

The earliest priority date claimed for the ’728 patent is November 4, 2002, based on U.S. Provisional Application No. 60/423,660. Ex. 1001, (60), 1:7–15. Patent Owner does not challenge the prior art status of the cited references. *See generally* PO Resp. We find that the cited art qualifies as prior art to the ’728 patent.

E. Asserted Ground of Unpatentability

Petitioner asserts that “[c]laim 16 of the ’728 patent should be cancelled as obvious over the combination of Hovers and Jetzek.” Pet. 6.

In support of its contentions, Petitioner relies on the Declaration of Anthony Acampora (Ex. 1009). Dr. Acampora is a technical declarant retained for this proceeding. Ex. 1009 ¶ 1. In support of its contentions, Patent Owner relies on the Declarations of Robert Short, Ph.D. (Exs. 2002, 2003). Dr. Short is a technical declarant retained by Patent Owner.

Ex. 2002 ¶ 1.

II. ANALYSIS

A. Claim Construction

Neither party raises any issues relating to claim construction. Pet. 6–7; *see generally* PO Resp. We determine that no terms require construction for purposes of this decision. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (providing that only those terms that are in controversy need to be expressly construed, and only to the extent necessary to resolve the controversy).

B. Legal Standards

A patent claim is unpatentable under 35 U.S.C. § 103² if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness.³ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §103. Because the ’728 patent has an effective filing date before the effective date of the applicable AIA amendment, we refer to the pre-AIA version of 35 U.S.C. §103.

³ Neither party presents any objective evidence of nonobviousness or any related arguments for us to consider.

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

C. Level of Skill in the Art

With regard to the level of ordinary skill in the art, Petitioner contends:

A person of ordinary skill in the art of the ’728 patent at the time of the alleged invention (“POSA”) would have had either a Bachelor’s degree in electrical engineering with at least three to four years of experience in the field of wireless communications, or a Master’s degree in electrical engineering with at least two years of experience in the field of wireless communications technology or other communication-related technology.

Pet. 11 (citing Ex. 1009 (Acampora Decl.) ¶ 71). Patent Owner does not address this issue. *See generally* PO Resp. We find Petitioner’s contention to be reasonable and consistent with the prior art of record. We adopt the level of ordinary skill in the art as proposed by Petitioner.

D. Asserted Obviousness of Claim 16 Based on Hovers and Jetzek

Petitioner challenges claim 16 as obvious in view of Hovers and Jetzek. Pet. 6, 20–47.

1. Hovers (Ex. 1003)

Hovers is directed to using a smart antenna in a wireless communications system. Ex. 1003, 1:5–7. Figure 1 of Hovers is reproduced below.

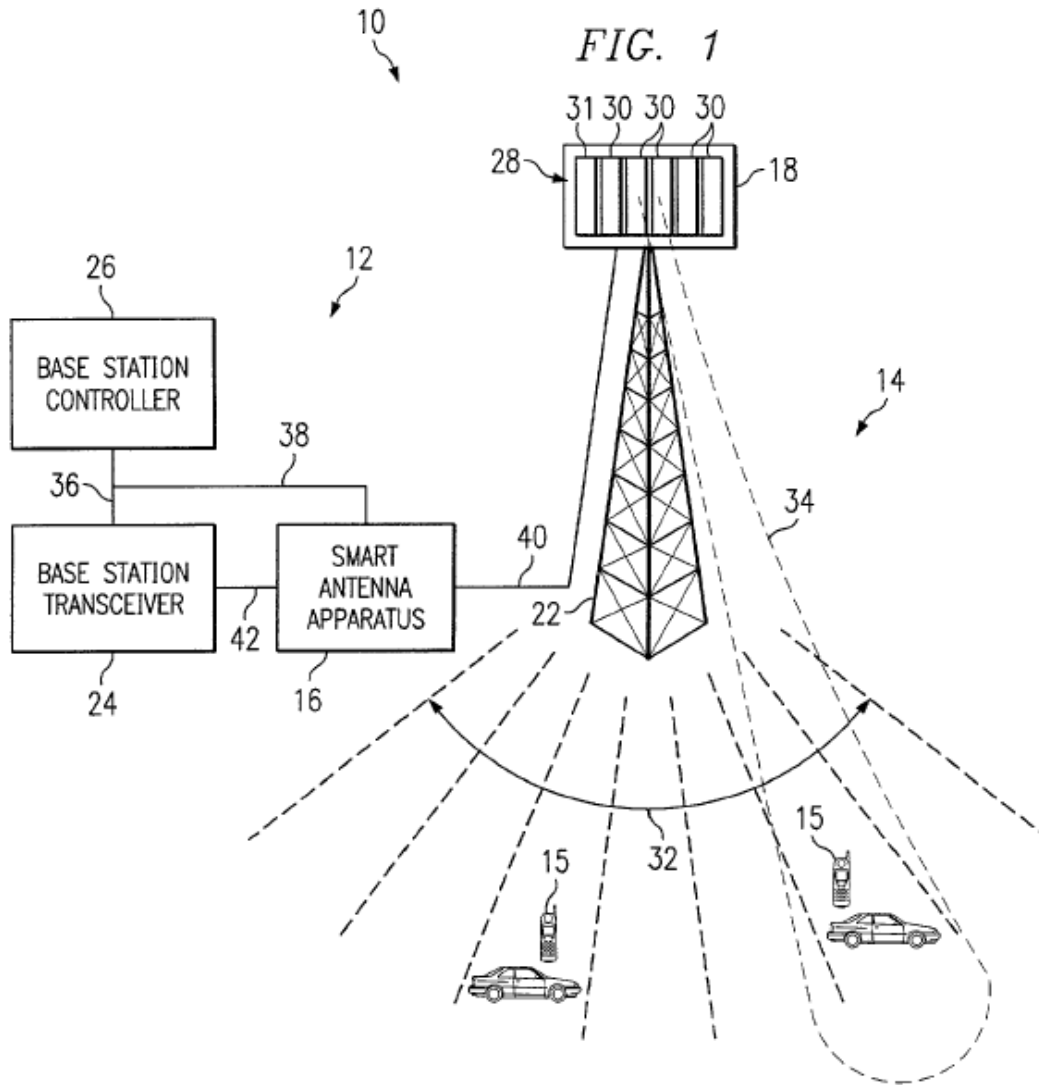


Figure 1 depicts wireless communication system 10 including smart antenna system 14, base station system 12, and mobile stations 15. Ex. 1003, 5:49–52. Smart antenna system 14 includes antenna unit 18 and smart antenna

apparatus 16, which is coupled to base station system 12. *Id.* at 5:64–67. Antenna unit 18 includes smart antenna array 28 having antenna elements 30 and sector antenna 31. *Id.* at 6:29–31. Antenna unit 18 is located on antenna tower 22 so that signals to and from antenna unit 18 are unobstructed. *Id.* at 6:35–40. Smart antenna system 14 forms narrow beams 34. *Id.* at 6:46–50.

Smart antenna system 14 transmits and receives signals from mobile stations 15 via one or more narrow beams 34. *Id.* at 7:53–61. In particular, smart antenna apparatus 16 within smart antenna system 14 processes signals to select the best of narrow beams 34 and to allow uplink signals received via that one of the narrow beams 34. *Id.* at 7:17–24. When downlink signals are to be transmitted from base station system 12 to mobile station 15, the downlink signals are communicated from base station transceiver 24 to smart antenna apparatus 16 to select the best one of narrow beams 34 through which to send the downlink signals. *Id.* at 7:39–44.

2. *Jetzek (Ex. 1004)*

Jetzek is directed to handing over a connection from one channel or base station to another in radio communications systems. *Ex. 1004*, 1:5–7. According to *Jetzek*, transferring a connection without overlap in time between transmissions is referred to as a “hard” handoff. *Id.* at 2:1–3. *Jetzek* describes the mobile station making measurements and, if network evaluated handoff (NEHO) is employed, the mobile station reports the measurements to the system, which performs an evaluation using a handoff algorithm. *Id.* at 13:22–14:3. *Jetzek* describes, alternatively, if mobile evaluated handover (MEHO) is employed, the mobile station itself performs the evaluation. *Id.* at 14:3–5.

Figure 3 of Jetzek is reproduced below.

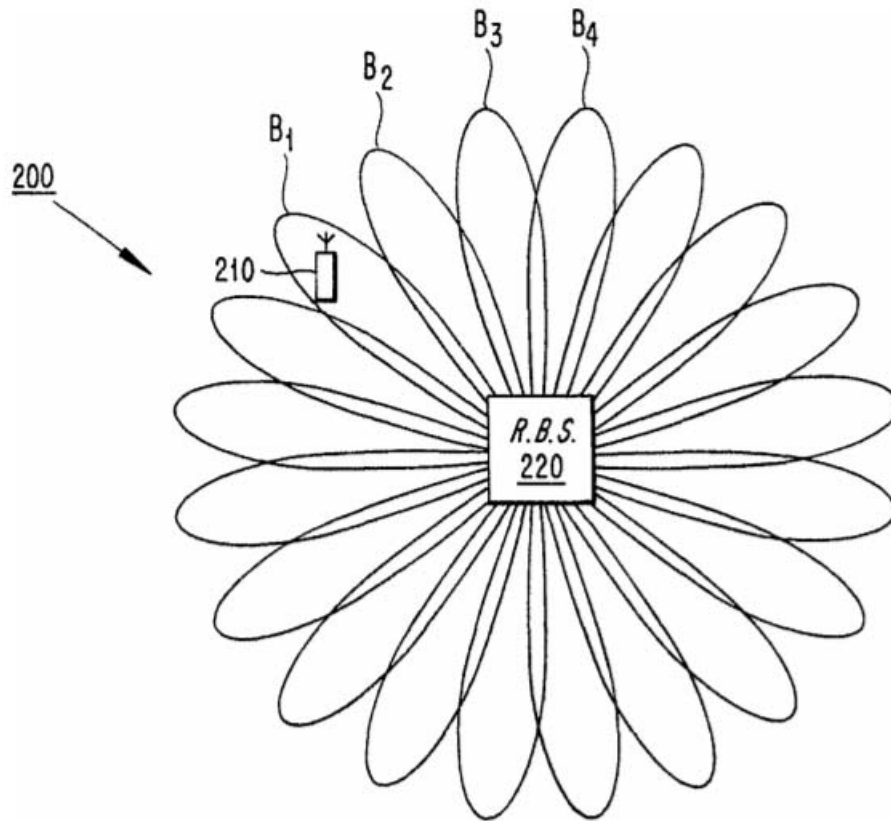


Fig. 3

Figure 3 depicts “a base station employing an array antenna.” Ex. 1004, 11, 18. Jetzek provides, “the system or cell may employ an array antenna structure as shown in Figure 3” and “the phased array can actually consist of three phased array sector antennas.” *Id.* at 3:5–6, 12–13. The description of Figure 3 states,

Therein, an exemplary radio communication system 200 includes a radio base station 220 employing a fixed-beam phased array (not shown). The phased array generates a plurality of fixed narrow beams (B₁, B₂, B₃, B₄, etc.) which radially extend from the base station 220, at least one of which (B₁) is used to communicate with MS [mobile station] 210.

Id. at 3:6–10.

Jetzek's system includes, "transmitter/receiver TRX 500." *Id.* at 13:9, Fig. 6. Jetzek states that, "[i]n a preferable embodiment, the transmission sources comprise transceivers disposed within a same base station." *Id.* at 10:7–9.

3. Claim 16

Petitioner contends that independent claim 16 would have been obvious in view of Hovers and Jetzek. Pet. 6, 20–47. Petitioner's contentions with regard to the asserted combination of references teaching all the limitations of claim 16 are detailed and well-supported. *Id.* Patent Owner does not argue that the cited art fails to teach any of the limitations of claim 16. *See generally* PO Resp. Patent Owner directs its arguments in the Response to motivation to combine. *Id.* After consideration of the arguments and evidence submitted by the parties, we conclude that Petitioner establishes, by a preponderance of the evidence, that claim 16 is unpatentable.

"A wireless communication system, comprising"

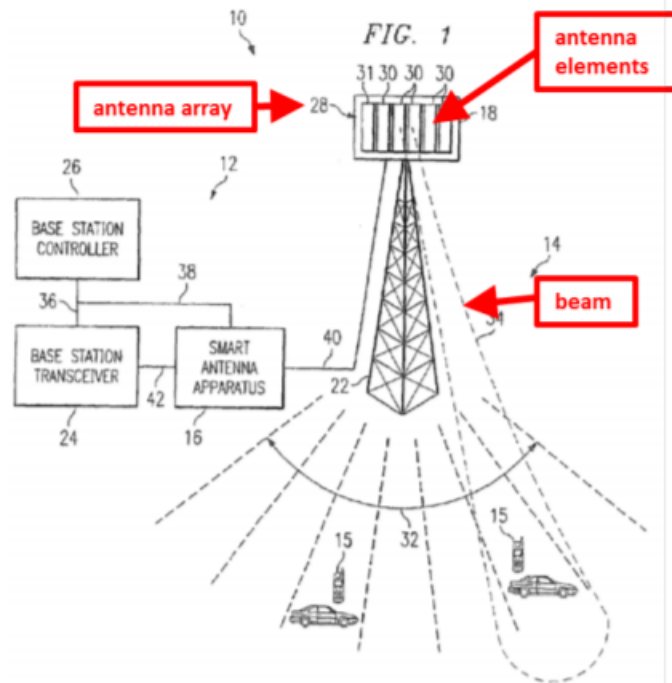
Petitioner asserts, "[t]o the extent the preamble is limiting, Hovers discloses it."⁴ Pet. 23. Hovers states that its Figure 1, which we reproduced

⁴ "[W]here a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention, the preamble is not a claim limitation." *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997). The preamble of claim 16 is a statement of purpose or intended use and claim 16 otherwise appears to define a structurally complete invention. However, we need not decide whether the preamble of claim 16 is limiting as we determine that Petitioner establishes the cited art teaches a wireless communication system.

above, “illustrates an embodiment of a **wireless communication system** 10 that includes a base station system 12, a smart antenna system 14, and one or more mobile stations 15.” Ex. 1003, 5:49–52 (emphasis added). Patent Owner acknowledges, “Hovers describes a wireless communication system.” PO Resp. 4 (citing Ex. 2003 (Short Decl.) ¶ 31). Based on this evidence, we find Hovers teaches a wireless communication system.

“a phased array antenna configured to transmit beam downlinks”

Petitioner relies on Figure 1 and the related description of Hovers as teaching this limitation. Pet. 24 (citing Ex. 1003, 5:49–6:40, Fig. 1). The Petition includes an annotated Figure 1 of Hovers, which is reproduced below.



Annotated Figure 1 of Hovers depicts antenna array 28 comprised of a plurality of antenna elements 30 and a beam. *Id.* Hovers states, “The downlink beam is used to communicate downlink signals from the base station transceiver to the mobile station.” Ex. 1003, 4:53–55. Based on these teachings in Hovers, Petitioner contends:

A POSA would have appreciated that the smart antenna array with a plurality of antenna elements in Hovers is a “phased array antenna” because it was conventional to use a multiple element phased array antenna to create narrow directed beams for uplink and downlink wireless communications in order to increase capacity by enabling frequency re-use. Additionally, the description of the “smart antenna apparatus” in Hovers as an array of antenna elements matches the description in the ’728 patent of “smart antenna 144 [which] may include one or more phased array antenna panels having a plurality of transmit and/or receive elements.”

Pet. 24–25 (alteration in original) (quoting Ex. 1001, 5:1–10; Ex. 1009 (Acampora Decl.) ¶ 76). Patent Owner acknowledges, “Hovers describes a wireless communication system in which a smart antenna array can be coupled to a base station in order to send and receive signals to and from a mobile device using directed beams on both the ‘downlink’ and the ‘uplink.’” PO Resp. 4 (citing Ex. 2003 (Short Decl.) ¶ 31). Based on this evidence, we find Hovers teaches “a phased array antenna configured to transmit beam downlinks,” as recited in claim 16.

“a transceiver operatively coupled to the phased array antenna and configured to send and receive electromagnetic signals via the phased array antenna”

Petitioner relies on Hovers as teaching this limitation. Pet. 25. As depicted in Figure 1, reproduced above, Hovers teaches base station transceiver 24 connected to smart antenna apparatus 16, which is, in turn, connected to antenna array 28 and antenna unit 18. The related description teaches, “Base station transceiver 24 is generally operable to communicate radio signals to and from antenna unit 18 via one or more radio signal wires 40 and 42.” Ex. 1003, 6:1–3. Patent Owner acknowledges, “Hovers teaches ‘a smart antenna apparatus that may be coupled to a new or existing base station as an add-on or applique without having to modify, alter, or reconfigure the base station transceiver or any other component of the base station system, such as base station controllers.’” PO Resp. 3 (citing Ex. 1003, 2:25–30; Ex. 2003 (Short Decl.) ¶ 30). Based on this evidence, we find that Hovers teaches this limitation.

“an access point that includes the phased array antenna and the transceiver, the access point configured to”

Petitioner relies on Hovers as teaching this limitation. Pet. 26. As shown above with regard to the “phased array antenna” limitation and the “transceiver” limitation, Hovers teaches a base station that includes a phased array antenna and a transceiver. Petitioner contends:

[A] POSA would have recognized that Hovers’ base station is an “access point” because the terms “base station” and “access point” are often used interchangeably in the field of wireless communications. Indeed, the ’728 patent equates the two terms: “Here, for example, **a base station (e.g., access point)** includes a phased array antenna panel that is configured to transmit a main beam to a client device.”

Id. (quoting Ex. 1001, 2:1–4; Ex. 1009 (Acampora Decl.) ¶ 78). Based on this evidence, we find that Hovers teaches this limitation.

“selectively allow a receiving device to operatively associate with a beam downlink transmitted to the receiving device via the phased array antenna”

Petitioner relies on a combination of Hovers and Jetzek as teaching this limitation. Pet. 26–28. Specifically, Petitioner contends, “[T]he limitation is satisfied by the Hovers system, as modified to use Jetzek’s hard handoff algorithm.” *Id.* at 26–27.

Petitioner relies on Hovers’s disclosure of “one or more mobile stations 15” (depicted in Figure 1) as teaching “a receiving device.” Pet. 27 (citing Ex. 1003, 5:49–52). In addition, Petitioner relies on Hovers’s teachings that “[t]he smart antenna apparatus is operable to execute one or more algorithms, based on a number of inputs, to select an uplink beam for uplink signals and a downlink beam for downlink signals” and “[t]he downlink beam is used to communicate downlink signals from the base station transceiver to the mobile station.” *Id.* (citing Ex. 1003, 4:47–51, 4:53–55). Based on these teachings, Petitioner contends:

Thus, the smart antenna system in Hovers’ access point (“base station”) is configured to selectively allow a receiving device (“mobile station”) to operatively associate with a beam downlink transmittable to the receiving device (“select . . . a downlink beam” that is “used to communicate . . . from the base station to the mobile station”) via the phased array antenna (antenna system including a “smart antenna array”), as required by this limitation.

Pet. 27. This contention is supported by cited passages in Hovers. *See* Ex. 1003, 4:47–51, 4:53–55, 5:49–52, Fig. 1.

Petitioner relies on Jetzek’s teaching that “hard and soft handoffs can be performed between sectors or beams of the same base station.” Pet. 27 (citing Ex. 1004, 3:17–18). Petitioner contends:

[A] POSA would have had reason to modify Hovers to use the hard handoff algorithm disclosed by Jetzek as one of its “one or more algorithms,” Ex. 1003, 4:47–55, for achieving the association between a beam and a mobile device. Jetzek’s hard handoff algorithm likewise is used to allow a mobile device to associate with a downlink beam transmitted by a base station. . . . Thus, this claim limitation is met when Jetzek’s hard handoff algorithm is used in Hovers.

Pet. 27–28 (citing Ex. 1009 (Acampora Decl.) ¶¶ 80–81).

Patent Owner acknowledges that “[i]n Hover’s system, the smart antenna determines which available fixed beam is the ‘best’ for receiving uplink signals from the mobile station, and which fixed beam is the ‘best’ for transmitting downlink signals to the mobile station” (PO Resp. 4 (citing Ex. 2003 (Short Decl.) ¶ 32)) and “Jetezek teaches that the appropriate downlink beam should be selected based on signal quality measurements made directly on the *downlink* beams” (*id.* at 7 (citing Ex. 2003 (Short Decl.) ¶¶ 41–42)).

Based on this evidence, we find the combination of Hovers and Jetzek teaches this limitation.

“receive an uplink transmission from the receiving device through the phased array antenna”

The Petition states, “This limitation is disclosed by the combination of Hovers and Jetzek (i.e., the Hovers system as modified to use Jetzek’s hard handoff algorithm).” Pet. 28. Petitioner relies on Hovers’s statement that, as depicted in Figure 1, “[w]hen a mobile station 15 transmits uplink signals, the uplink signals may be received along any number of narrow beams 34” as teaching “Hovers’ access point (‘base station’) is configured to receive an uplink transmission (‘process uplink signals received along each narrow beam’) from the receiving device (‘mobile station’) through the phased array antenna (antenna system including a ‘smart antenna array’), as required by this limitation.” *Id.* (citing Ex. 1003, 7:8–10; Ex. 1009 (Acampora Decl.) ¶ 82).

The Petition further states with regard to this limitation:

[A] POSA would have had reason to modify Hovers to use the hard handoff algorithm disclosed by Jetzek as one of its “one or more algorithms,” Ex. 1003, 4:47–55, for achieving beam association between a beam and a mobile device. In Jetzek’s hard handoff algorithm, the mobile device reports its channel measurements (i.e., the “downlink received signal strength,” Ex. 1004, 9:11–14) over the uplink to the base station, in response to a “measurement command” sent from the base station to the mobile device. Ex. 1004, 13:22–14:5; Ex. 1009, ¶83. Thus, this claim limitation is met when Jetzek’s hard handoff algorithm is used in Hovers. Ex. 1009, ¶84.

Pet. 28–29. Patent Owner acknowledges that “[w]ith respect to selecting uplink beams, Hovers teaches that the selection is based on processing ‘uplink signals received,’ such as ‘signaling information,’ ‘signal strength, signal quality, relevant power, and signal history of signals received [from]

one or more mobile stations” (PO Resp. 4–5 (citing Ex. 1003, 7:16–22; Ex. 2003 (Short Decl.) ¶ 33)) and “in Jetzek, ‘the mobile device reports its channel measurements (i.e., the “downlink received signal strength”) over the uplink to the base station, in response to a “measurement command” sent from the base station to the mobile device” (*id.* at 7).

Based on this evidence, we find the cited art teaches “receive an uplink transmission from the receiving device through the phased array antenna,” as recited in claim 16.

“determine from the uplink transmission if the receiving device should operatively associate with a different beam downlink transmission”

The Petition states, “This limitation is disclosed by the combination of Hovers and Jetzek (i.e., the Hovers system as modified to use Jetzek’s hard handoff algorithm)” (Pet. 29) and “[w]hile this limitation would be satisfied by Hovers alone, it is likewise met by Hovers in combination with Jetzek” (*id.* at 30). Thus, Petitioner contends both that Hovers alone and the combination of Hovers and Jetzek teaches this limitation.

In this regard, Hovers teaches:

Smart antenna apparatus 16 may select a best narrow beam 34 through which to send the downlink signals . . . the beam selection for the downlink signals may be based on one or more inputs or parameters, including signaling information received by signaling information monitoring system 106. Other example inputs or parameters include signal strength, signal quality, relevant power, and signal history of signals received from one or more mobile stations.

Ex. 1003, 7:42–51. Petitioner also relies on Hovers’s teachings of a “fast decision beam selection” process and a “smart decision beam selection

process” through which a determination can be made if the mobile station should communicate with the base station using a different beam for uplink and downlink signals. Pet. 30 (citing Ex. 1003, 12:4–21, 27:13–18).

Petitioner contends, “Thus Hovers’ access point (‘base station’) is configured to determine if its receiving device (‘mobile station’) should operatively associate with a different beam downlink transmission (select the ‘best narrow beam through which to send the downlink signals’), as required by this limitation.” *Id.* at 29–30. Hovers supports this contention. See Ex. 1003, 7:42–51, 12:4–21, 27:13–18.

With regard to the combination of Hovers and Jetzek, the Petition states:

Hovers states that its system “may determine whether to use the fast decision beam selection, the smart decision beam selection, or neither” for selecting the uplink and/or downlink beams, depending on the circumstances. Ex. 1003, 27:64–67; *see also id.*, 41:62–67; 42:27–31. Thus, a POSA would have appreciated that Hovers permits use of other algorithms for selecting a different beam downlink. A POSA further would have recognized that Jetzek discloses another system in which communication between a base station and a mobile device can be switched from one narrow downlink beam to another, in a configuration in which the base station includes an antenna array that forms a plurality of narrow downlink beams. Ex. 1004, 3:5–13; Fig. 3. Thus, Jetzek (like Hovers) discloses a system in which the base station makes a handoff (that is, beam switching) determination. *Id.*, 13:22–14:5. Ex. 1009, ¶87.

Pet. 30–31. We agree that Hovers allows for other methods of making the determination recited in this limitation and that Jetzek teaches a method of making that determination.

With regard to Jetzek teaching the determination recited in the limitation, the Petition states:

Jetzek teaches that its mobile stations report (over the uplink to the base station) signal strength measurements of the downlink beams transmitted by the base station in response to a “measurement command” received by the mobile stations from the base station. Ex. 1004, 13:22–14:5. A POSA would have appreciated that in such a case, the base station determines information from the uplink transmission as claimed, and that the mobile device’s report of its channel measurements is the determined information. Ex. 1009, ¶87. Jetzek discloses that, in its “network evaluated handoff (NEHO)” mode (i.e., the mode in which the handoff decision is made in the base station), the base station then evaluates the signal quality measured for these different beams “using a handoff algorithm.” *Id.*

Based on these received measurements, Jetzek’s hard handoff algorithm determines whether the current downlink beam that a mobile station is associated with should be replaced by a different downlink beam. Ex. 1004, 14:6–16:7; Fig. 7. Jetzek teaches that, like Hovers’ smart decision beam selection process, the handoff decision criteria is based on “the quality of a measured cell (base station, transmission source, **beam**, sector, etc.).” *Id.*, 16:20–21 (emphasis added). Ex. 1009, ¶88. Thus, just as this claim limitation is met by Hovers alone, it is likewise met when Jetzek’s hard handoff is used in Hovers. *Id.*

Pet. 31–32. Thus, Jetzek teaches that the mobile station transmits a report to the base station from which a determination is made whether the mobile station should associate with a different downlink beam. Accordingly, we agree that Jetzek teaches making the determination recited in this limitation.

Patent Owner acknowledges, “Hovers teaches that both determinations—the selection of the best uplink beam and best downlink beam—are made using measurements of the uplink transmission.” PO Resp. 4 (citing Ex. 1003, 7:16–22; Ex. 2003 (Short Decl.) ¶ 33). Patent Owner

also acknowledges that “Jetzek teaches that the appropriate downlink beam should be selected based on signal quality measurements made directly on the downlink beams” and that “in Jetzek, ‘the mobile device reports its channel measurements (i.e., the “downlink received signal strength”) over the uplink to the base station, in response to a “measurement command” sent from the base station to the mobile device.’” *Id.* at 7.

Based on this evidence, we find the cited art teaches “determine from the uplink transmission if the receiving device should operatively associate with a different beam downlink transmission,” as recited in claim 16.

“and at least one of: allow the receiving device to operatively associate with the different beam downlink if determined that the receiving device should operatively associate with the different beam downlink; force the receiving device to operatively associate with the different beam downlink if determined that the receiving device should be operatively associated with the different beam downlink”

The Petition states, “This limitation is disclosed by the combination of Hovers and Jetzek (i.e., the Hovers system as modified to use Jetzek’s hard handoff algorithm).” Pet. 34. Petitioner contends, “The purpose of ‘beam selection’ and ‘beam switching’ as described by Hovers is to select, that is, *identify*, a narrow beam, different from the beam over which the mobile device is currently communicating, and *allow* communication to be switched to that different beam if the criteria of the algorithm are met.” *Id.* at 35 (citing Ex. 1003, 1:34–41, 1:45–46, 7:52–58 (“[W]hen mobile station 15 moves to a new location, smart antenna system 14 may switch from one narrow beam 34 to another narrow beam 34 for receiving uplink signals

from and/or transmitting downlink signals to mobile station 15.”); Ex. 1009 (Acampora Decl.) ¶ 90.

As discussed above with regard to the “determine” limitation, “Hovers permits use of other algorithms for selecting a different beam downlink in place of the smart decision or fast decision beam selection algorithms.” Pet. 35 (citing Ex. 27:64–67, 41:62–67, 42:27–31). And Petitioner contends, “[A] POSA further would have had an express motivation to use Jetzek’s hard handoff algorithm for determining whether to select a different beam in Hovers’ system.” *Id.* at 35–36 (citing Ex. 1009 (Acampora Decl.) ¶¶ 87, 91).

Petitioner contends that Jetzek teaches that in its hard handoffs, the base station can be both allowed and forced to associate with a different beam downlink. Pet. 36–38. The Petition states:

Jetzek provides an example of an a “hard handoff” for a mobile station between transmission source “B” and transmission source “D,” Ex. 1004, 15:20–16:4, Fig. 7, and discloses that such hard handoffs can be performed “**between sectors or beams of the same base station,**” *id.*, 3:14–19 (emphases added). In this example, Jetzek discloses a “hard handover to D” from B, “in which **all connections of the current active set [beam B] will be removed and a new connection to [beam D] will be set up.**” *Id.* 15:20–16:4 (emphasis added), Fig. 7. Jetzek discloses that in this hard handoff of the mobile station from beam B to beam D, “there is no overlap in time between transmissions received” from beam B and from beam D. *Id.* at 2:1– 6. Ex. 1009, ¶92. Thus, when Hovers is modified to use Jetzek’s hard handoff algorithm, its access point (“base station”) is configured to allow its receiving device (“mobile station”) to both (i) allow the receiving device to operatively associate with the different beam downlink if determined that the receiving device should operatively associate with the different beam downlink (by adding that

different beam to the “active set” of beams that the mobile station is allowed to connect to), and (ii) force the receiving device to operatively associate with the different beam downlink if determined that the receiving device should be operatively associated with the different beam downlink (by deleting the current beam from the “active set” of beams that the mobile station is allowed to connect to)—thus satisfying this limitation.

A POSA would have understood that such a hard handoff is an example of the claimed functionality; that is, “an access point configured to: . . . at least one of: allow the receiving device to operatively associate with the different beam downlink . . . [or] force the receiving device to operatively associate with the with a different beam (in the above example, Beam D) when that different beam is added to the active set of beams with which the mobile may associate. And the mobile device is forced to operatively associate with a different beam (in the above example, Beam D) when the beam with which it had previously been communicating (in the above example, Beam B) is removed from the active set. In this way, Jetzek’s system “identifies” that the mobile device is both “allowed” to communicate with a different beam and additionally is “forced” to communicate with that different beam. Thus, a POSA would have appreciated that Jetzek discloses both the “allow” and the “force” options set forth in this claim limitation. Ex. 1009, ¶9.

Pet. 36–38. Patent Owner acknowledges:

Jetzek describes a wireless communication system in which a mobile device can “hand off” between various base stations using either a “hard handoff” or a “soft handoff” process. Pet. 16; Ex. 2003 ¶ 36. In a hard handoff, the prior transmission source is let go before moving to a new transmission source, such that there is no overlap in time between transmissions from different sources. Pet. 17; Ex. 1004 at 2:1-6; Ex. 2003 ¶ 37. In a soft handoff, a mobile device receives signals from at least two transmission sources simultaneously as it transitions from one transmission source to the next. Pet. 17; Ex. 1004 at 2:7-22; Ex. 2003 ¶ 38.

PO Resp. 6.

Based on this evidence, we find that the cited art teaches this limitation.

“wherein the access point is further configured to actively probe the receiving device by generating a signal to initiate that the phased array antenna transmit at least one downlink transmittable message over the beam downlinks, and gather signal parameter information from uplink transmittable messages received from the receiving device through the phased array antenna”

In regard to this limitation, the Petition states, “This limitation is disclosed by the combination of Hovers and Jetzek. That is, this limitation is satisfied by the Hovers system, as modified to use Jetzek’s hard handoff algorithm and active probing.” Pet. 38.

Hovers teaches, “The receiving system is operable to receive a plurality of uplink beams, each including traffic signals transmitted by a mobile station. The beam analysis modules are operable to analyze the uplink beams to determine one or more characteristics of each uplink beam.”

Ex. 1003, 1:54–58. Hovers also teaches:

Smart antenna apparatus 16 processes uplink signals received along each narrow beam 34 and/or other input signals or data to select the best narrow beam 34 and to allow uplink signals received via that narrow beam 34 to be communicated to base station transceiver 24 via radio signal wires 42. For example, smart antenna apparatus 16 may select the best narrow beam 34 based on one or more inputs or parameters . . . example[s of] inputs or parameters include signal strength, signal

quality, relevant power, and signal history of signals received from one or more mobile stations 15.

Id. at 7:17–29. We find that Hovers teaches that “the access point is further configured to . . . gather signal parameter information from uplink transmittable messages received from the receiving device through the phased array antenna,” as recited in the “wherein” limitation of claim 16.

With regard to the “actively probe” portion of this limitation, the Petitioner relies on Jetzek. Pet. 40–47. The Petition states:

In implementing the combined teachings of Hovers and Jetzek, a POSA would have appreciated that the result of utilizing Jetzek’s active probing technique in Hover’s beam switching algorithm would be to cause the radio transceiver in the base station to “generat[e] a signal to initiate that the phased array antenna transmit at least one downlink transmittable message over the beam downlinks,” as required by this claim limitation, because ultimately it is the smart antenna that transmits the downlink signals over the beams that have been selected by the handoff algorithm.

Id. at 43–44 (citing Ex. 1009 (Acampora Decl.) ¶ 104). The Petition (Pet. 40–41) relies upon the following passage in Jetzek for teaching active probing by the base station:

When the mobile station receives a list of channel numbers, codes or other channel identifying information in a measurement command, it will measure the received signal quality associated with each of those channels. Once the mobile station has made the requested measurements . . . if network evaluated handoff (NEHO) is employed, then the mobile station will report the measurements to the system which will then evaluate the various sectors using a handoff algorithm.

Ex. 1004, 13:22–14:3. Petitioner argues:

Accordingly, in Jetzek, the access point (the base station) has been configured to generate a signal to initiate its phased array antenna (the smart antenna array with a plurality of antenna elements) to actively probe the receiving device (the mobile station) by sending downlink transmittable messages (the signals identified in the measurement command) over different beams in addition to the beam over which the mobile device is currently communicating with the base station, causing the mobile station to measure the signals received over each of those beams and return those measurements to the base station.

Pet. 40–41 (citing Ex. 1009 (Acampora Decl.) ¶ 96). Patent Owner acknowledges:

Jetzek teaches that its base station sends a “measurement command” to the mobile device, instructing the mobile device to take various downlink signal strength measurements. *Id.* at 28–29 (stating that in Jetzek, “the mobile device reports its channel measurements (i.e., the ‘downlink received signal strength’) over the uplink to the base station, in response to a ‘measurement command’ sent from the base station to the mobile device.”); *id.* at 31 (“Jetzek teaches that its mobile stations report (over the uplink to the base station) signal strength measurements of the downlink beams transmitted by the base station in response to a ‘measurement command’ received by the mobile stations from the base station.”); *id.* at 45 (stating that in Jetzek’s approach, “the measurement command requires the mobile station to make measurements from a ‘list’ of channels”); Ex. 2003 ¶ 42.

PO Resp. 7.

Based on this evidence, we find that the cited art teaches “actively probing,” as recited in the “wherein” limitation of claim 16.

Motivation to Combine the Cited Art

Petitioner contends, “[A] POSA would have been motivated to use Jetzek’s ‘hard handoff’ algorithm to allow mobile devices to switch between

beams transmitted by a base station in Hovers’ wireless communications system—and thus satisfy the ‘associate with a different beam’ limitations found in the challenged claim.” Pet. 20–21. Petitioner provides the following reasons for combining the relevant teachings of Hovers and Jetzek:

Both references come from the same field of endeavor; that is, enabling wireless communications systems to more efficiently service mobile client devices. Ex. 1003, 5:49–67; Ex. 1004, 1:15–24. Each reference addresses the same problem: when a mobile device in communication with a wireless communication source moves, the strength or quality of the channel through which the mobile transmits and receives may degrade to such an extent that it is desirable to switch, or “hand off,” the communication to another channel, which may include switching to another source. See Ex. 1003, 1:34–41 (“when a mobile user is located in a particular location within a sector, the smart antenna system may select a best beam for that location As the user moves to new locations, the smart antenna system may adapt by switching to the beam or beams that provide the best coverage for those locations”); Ex. 1004, 1:21–24 (“Depending on the quality of the current channel, it may also be desirable to transfer a connection from one channel of the base station to another channel supported by the same base station”). And Jetzek provides express motivation for using a “hard handoff” algorithm to switch a mobile device between beams—that is, a hard handoff method promotes efficient use of system resources. *Id.*, 20:1–4; 3:20–4:2. A POSA would thus look to the disclosures of these references together to solve the problems associated with implementing these functions. Ex. 1009, ¶73. See *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 415–419 (2007) (obvious to implement known techniques to improve similar devices and methods in known ways to yield predictable results, especially where some teaching, suggestion or motivation exists to do so).

Pet. 21–22. Petitioner provides additional reasoning for “implement[ing] a hard handoff algorithm such as taught by Jetzek to determine if a receiving device should operatively associate with a different beam downlink transmission from the smart antenna of Hovers based on the determined relative signal strength or quality parameters.” *Id.* at 32 (citing Ex. 1009 (Acampora Decl.) ¶ 88. Petitioner asserts that “a hard handoff scheme conserves bandwidth.” *Id.* In support, Petitioner states:

As is apparent from Jetzek, in a soft handoff, there is duplication in the signals communicated by the mobile device because during the soft handoff, the same information is communicated between more than one transmission source (i.e., base station or beam) and the mobile device. In a hard handoff, there is no signal transmission duplication.

Id. And, the Petition states:

Jetzek describes the desirability of controlling handoffs in a way such that “efficient use of system resources is promoted.” Ex. 1004, 20:1–4. Moreover, Jetzek expressly teaches that “soft handoff requires more system resources than hard handoff. **An advantage of hard handoff, therefore, is a reduced need for system resources.**” *Id.*, 3:20–4:2 (emphasis added). Moreover, while Jetzek acknowledges that there may be drawbacks to hard handoff in terms of “a higher probability of dropped calls,” *id.*, Jetzek describes that hard handoffs may be more appropriate in certain use cases, such as where good line-of-sight channels exist. *Id.*, 19:8–13. For at least these reasons, Jetzek provides an express teaching, suggestion, or motivation to implement its hard handoff algorithm in the system and method of Hovers. Additionally, Jetzek’s hard handoff in this manner constitutes nothing more than “application of a known technique [hard handoff] to a piece of prior art ready for the improvement [Hovers].” *KSR*, 550 U.S. at 417.

Pet. 32–33. Petitioner has provided detailed and well-supported reasoning as to the motivation to combine Jetzek’s hard-handoff technique with Hovers’s beam-switching process.

Petitioner further contends, “[A] POSA also would have been motivated to use Jetzek’s active measurement commands to prompt the mobile devices in Hovers’ system to report back beam strength measurements to the base station instead of passively listening for signals at the base station—and thus satisfy the ‘actively probing’ limitations found in the challenged claim.” Pet. 22. In support of this contention, the Petition states:

As Hovers explains, there are “situations in which the best beam for receiving uplink signals from a mobile stations is not the same as the best beam for transmitting signals to that mobile station,” Ex. 1003, 7:61–8:5; *see also id.*, 13:11–20, and Jetzek discloses making signal quality measurements directly on the downlink beam over which the mobile receives signals.

Pet. 22. Petitioner argues, “This provides an express teaching, suggestion, or motivation to use Jetzek’s active probing scheme, which enables measurements directly on the downlink beam (unlike the measurement schemes recited in Hovers.)” Pet. 45. Petitioner further reasons:

As a POSA would have appreciated, when the channels in the two directions (downlink and uplink) are not symmetric, one cannot necessarily rely on measurements of the uplink signal quality in order to assess downlink signal quality. Ex. 1009, ¶103. Hovers teaches specific approaches for evaluating uplink signals (e.g., “signal strength, signal quality, relevant power, and signal history” of the signals received from the mobile devices, Ex. 1003, 7:22–29), but not for evaluating downlink signals. Jetzek’s active probing, on the other hand, allows for a direct measurement of the downlink signal. Ex. 1009, ¶103. Therefore, using Jetzek’s active probing techniques in Hovers would

constitute nothing more than “application of a known technique [direct measurement of a downlink channel] to a piece of prior art ready for the improvement [Hovers].” *KSR*, 550 U.S. at 417.

Id. at 45–46. And, Petitioner and its declarant, Dr. Acampora, provide the following additional “motivations that a POSA would have recognized for using Jetzek’s active probing techniques in Hovers’ beam switching system” (Pet. 46):

[A] POSA would recognize that directly measuring the downlink signal quality at the mobile device (as opposed to at the base station) would avoid the need to carefully calibrate the base station’s receiving and transmitting equipment to make those uplink measurements. Additionally, active probing of the mobile devices (instead of passively waiting for transmissions from these devices, which may be unacceptably delayed) ensures that the signal quality measurements will be made as frequently as needed. This ensures that the base station’s beam selections are not chosen based on signal quality measurements that have become out of date due to mobile device motion.

Finally, active probing was a well-known technique in the art that would have been routinely applied to a beam-switching system (like Hovers) to yield predictable results.

Pet. 46 (citing Ex. 1009 (Acampora Decl.) ¶ 103). Petitioner has provided detailed and well-supported reasoning as to the motivation to combine the teachings of Hovers and Jetzek so as to use Jetzek’s active probing scheme to determine the best beam to use in the beam selection process of Hovers.

In summary, the Petitioner provides the following reasons for combining the relevant teachings of Hovers and Jetzek:

1. Hovers and Jetzek “come from the same field of endeavor; that is, enabling wireless communications systems to more efficiently service mobile client devices.” Pet. 21.⁵
2. Hovers and Jetzek “address[] the same problem: when a mobile device in communication with a wireless communication source moves, the strength or quality of the channel through which the mobile transmits and receives may degrade to such an extent that it is desirable to switch, or ‘hand off,’ the communication to another channel, which may include switching to another source.” *Id.*
3. “Jezek provides express motivation for using a ‘hard handoff’ algorithm to switch a mobile device between beams—that is, a hard handoff method promotes efficient use of system resources.” *Id.*
4. “[A] hard handoff scheme conserves bandwidth. As is apparent from Jezek, in a soft handoff, there is duplication in the signals communicated by the mobile device because during the soft handoff, the same information is communicated between more than one transmission source (i.e., base station or beam) and the mobile device. In a hard handoff, there is no signal transmission duplication.” *Id.* at 32.
5. “Jezek expressly teaches that ‘soft handoff requires more system resources than hard handoff. ***An advantage of hard handoff, therefore, is a reduced need for system resources.***”” *Id.* at 32–33.

⁵ In this summary, the citations to the evidence relied upon in support of Petitioner’s contentions are omitted. The citations to the evidence are provided in the above detailed analysis of Petitioner’s presentation on motivation to combine.

6. “As Hovers itself explains, there are ‘situations in which the best beam for receiving uplink signals from a mobile station[] is not the same as the best beam for transmitting signals to that mobile station.’ This provides an express teaching, suggestion, or motivation to use Jetzek’s active probing scheme, which enables measurements directly on the downlink beam (unlike the measurements schemes recited in Hovers).” *Id.* at 45.
7. “[U]sing Jetzek’s active probing techniques in Hovers would constitute nothing more than ‘application of a known technique [direct measurement of a downlink channel] to a piece of prior art ready for the improvement [Hovers].’” *Id.* at 45–46.
8. “[D]irectly measuring the downlink signal quality at the mobile device (as opposed to at the base station) would avoid the need to carefully calibrate the base station’s receiving and transmitting equipment to make those uplink measurements.” *Id.* at 46.
9. “[A]ctive probing of the mobile devices (instead of passively waiting for transmissions from these devices, which may be unacceptably delayed) ensures that the signal quality measurements will be made as frequently as needed. This ensures that the base station’s beam selections are not chosen based on signal quality measurements that have become out of date due to mobile device motion.” *Id.* at 46.
10. “[A]ctive probing was a well-known technique in the art that would have been routinely applied to a beam-switching system (like Hovers) to yield predictable results.” *Id.* at 46.

Thus, Petitioner has provided a number of persuasive reasons that the skilled artisan would have had for combining the relevant teachings of Hovers and Jetzek.

As noted previously, Patent Owner directs its arguments in the Response to motivation to combine. *See generally* PO Resp. Patent Owner argues that Petitioner made misrepresentations to the Board regarding motivation to combine. PO Resp. 1, 9–11. Specifically, Patent Owner argues that Petitioner misrepresented that “[t]he Petition does not rely on Jetzek (or its NEHO mode) to meet the requirements that beam-switching be performed at the base station.” *Id.* at 1, 9 (citing Paper 12, 1). We find that Petitioner did not misrepresent its position.⁶

The paper (Petitioner’s Reply to Patent Owner’s Preliminary Response (Paper 12)) from which the alleged misrepresentation is taken states:

Petitioner does not dispute that Jetzek discloses both “network evaluated handoff (NEHO)” mode (where the beam-switching decision is performed at the base station) and “mobile evaluated handover (MEHO)” mode (where the decision is performed at a mobile device), as acknowledged by the Petition (at 18) and Dr. Acampora, Ex. 1009 at ¶ 63. But this is beside the point, because Hovers itself teaches beam-switching performed by the base station. *See* Pet. at 29–30.

⁶ Patent Owner made a similar argument prior to institution. In its Preliminary Response, Patent Owner argued that Petitioner “surreptitiously” relied on “NEHO mode” from Jetzek to modify Hovers in order to satisfy claim requirements that beam-switching be performed at the base station. Paper 8, 13–17. The Board analyzed and rejected that argument in the Decision on Institution. Inst. Dec. 30–31.

Accordingly, the Petition does not rely on Jetzek to meet this aspect of the claims. And a POSA, in looking to incorporate Jetzek's handoff algorithms into the system of Hovers, would of course refer to Jetzek's NEHO embodiment (in which, like Hovers, the beam-switching is performed by the base station, Pet. at 30–31), as opposed to Jetzek's separate, non-pertinent MEHO embodiment.

Paper 12, 1. Thus, as clearly stated by Petitioner, Petitioner alleges that beam-switching at the base station is taught by both of the cited references. Accordingly, the Petition provides arguments and evidence related to both of the alternative teachings. The alleged misrepresentation was no more than Petitioner explaining that it was not necessary for Jetzek to teach this element as it was taught in Hovers. See Reply 4 (“Hovers alone satisfies the claim requirements that beam switching be performed at the base station. Accordingly, there is no need for the Petition to rely on Jetzek (or its NEHO mode) to modify the base reference on the claim element.”). Patent Owner acknowledges, “Hovers describes a wireless communication system in which a smart antenna array can be coupled to a base station in order to send and receive signals to and from a mobile device on both the ‘downlink’ and the ‘uplink’” (Resp. 4) and Hovers “teaches two beam-switching algorithms that may be used to select both the uplink beam and the downlink beam” (*id.* at 5). Indeed, Patent Owner also acknowledges that “unmodified Hovers *takes measurements at the base station*, and thus must perform beam switching at the base station.” Paper 13, 2. Patent Owner never addresses Petitioner's showing that Hovers alone teaches that the access point (base station) determines that the mobile device should associate with a different beam for downlink transmissions.

Patent Owner also argues that Petitioner provides no reasoning to support combining Jetzek's teachings related to beam-switching with the methods and systems taught in Hovers. PO Resp. 12. This is also incorrect. As shown above, in the Petition, Petitioner provides detailed and well-supported reasoning for combining these teachings of the cited references. See Pet. 20–22, 32–33. Here again, Patent Owner fails to address Petitioner's showing that a combination of the cited art teaches that the access point (base station) determines that the mobile device should associate with a different beam for downlink transmissions.

Patent Owner argues, "The Petition fails to explain *how* a POSA could have implemented Jetzek's 'active measurement command' in combination with Hovers, much less with an expectation of success." PO Resp. 18. "In particular, the Petition and Dr. Acampora's declaration contain no showing that Jetzek's 'active measurement command' could be implemented in a real world environment, such as a GSM environment, or how such a command would have been sent from the network to a mobile device." *Id.* at 19 (citing Ex. 2003 (Declaration of Dr. Short) ¶ 48). We do not find this argument persuasive because Patent Owner's argument rests on alleged differences between the prior art and claim 16 that are not based on limitations found in claim 16.

Claim 16 is broadly directed to a "wireless communication system" comprising an antenna, transceiver, and access point. Ex. 1001, 12:25–55. Claim 16 does not otherwise recite and is not limited to any particular environment, such as a GSM environment. *Id.* at 4:36–38 ("The exemplary methods and apparatuses are adaptable to various protocols and/or standards."). Patent Owner has not argued that claim 16 should be construed

as limited to any particular environment. *See generally* PO Resp. And, Patent Owner acknowledges that Hovers⁷ teaches that its method and systems are intended for implementation in a wide variety of environments, including GSM environments. PO Resp. 3 (“Hovers likewise emphasizes that the system and methods it teaches are intended to operate with network and mobile equipment implementing a wide variety of telecommunication standards, including GSM, CDMA, CDMA 2000, W-CDMA, TD SSDMA, TETRA, TDMA.”).

As discussed above, we find that Petitioner has established that the combination of Hovers and Jetzek teaches the active probing recited in claim 16. We again note that Patent Owner does not dispute that Jetzek teaches that the base station sends an “active measurement command” to the mobile device instructing the mobile device to take downlink signal strength measurements and that, in response, the mobile device reports its measurements to the base station over the uplink. *See* PO Resp. 7. And, the Petition includes detailed and well-supported arguments showing a motivation to combine the relevant teachings of Hovers and Jetzek and that a person having ordinary skill in the art would have had a reasonable expectation of success.

⁷ Hovers specifically teaches that its system is intended to be implemented in a GSM environment. Ex. 1003, 5:52–54 (“In one embodiment, wireless communication system 10 operates in a GSM (Global System for Mobile Communications) environment.”); *see also id.* at 6:15–19 (“In a GSM (Global System for Mobile communications) environment, base station 12 may be a Base Station System (BSS), base station transceiver 24 may be a Base Station Transceiver Station (BTS) and base station controller 26 may be a Base Station Controller (BSC).”).

Patent Owner further argues that “[t]he Petition additionally fails because a POSA would not have been motivated to modify Hovers to make handoff decisions based on downlink beam measurements, as the Petition has proposed.” PO Resp. 25. Specifically, Patent Owner argues, “the POSA would have faced another significant obstacle to modifying Hovers to rely on downlink beam measurements for its beam switching determinations: in GSM phones, those measurements are taken approximately once every half a second—far too slowly to serve as a viable substitute for Hover’s uplink measurements.” *Id.* Here again, Patent Owner’s argument rests on distinctions based on limitations that are not recited in claim 16. Claim 16 is not limited to GSM phones and contains no relevant temporal limitation. Patent Owner’s arguments are not commensurate with the recited scope of claim 16. Considering the combination of the teachings of Hovers and Jetzek presented by Petitioner, we see no “differences between the prior art and the claims at issue.” *See Graham*, 383 U.S. at 17.

And, even if Patent Owner’s argument is correct, “obviousness must be determined in light of *all the facts*, and . . . a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.” *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (emphasis added); *see also PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1196 (Fed. Cir. 2014) (“The presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact.”). We find, on the complete record, that Petitioner’s reasoning demonstrates, by a preponderance of the evidence, that a person having ordinary skill in the art

would have been motivated to modify Hover's with Jetzek's teachings as proposed by Petitioner.

Petitioner establishes, and Patent Owner does not contest, that Hovers and Jetzek teach all the limitations of claim 16. Petitioner provides well-supported and numerous reasons for combining the relevant teachings of Hover and Jetzek that Patent Owner fails to squarely address. We also are persuaded that Petitioner shows a person having ordinary skill in the art would have had a reasonable expectation of success and Patent Owner's arguments and evidence do not undermine Petitioner's showing. Weighing all the evidence and arguments presented by the parties, we conclude that a preponderance of the evidence establishes that claim 16 is unpatentable based on Hovers and Jetzek.

E. Motion to Exclude

Petitioner moves to exclude "Exhibit 2012, and portions of the record that reference this exhibit, including portions of Patent Owner's Sur-Reply (Paper No. 30 at 16–17)." Motion to Exclude 1.⁸ However, this evidence is offered by Patent Owner in support of an argument that the Board has rejected because it is not based on a recited claim limitation. The Board has not relied on Exhibit 2012 or any portion of the record relating to Exhibit 2012 in reaching this decision. Update to Office Trial Practice Guide, 83 Fed. Reg. 39989 (Aug. 13, 2018) (*available at <https://go.usa.gov/xU7GP>*) at 17 ("In the Board's experience, consideration of the objected-to evidence is often unnecessary to resolve the patentability of the challenged claims, and

⁸ Within five business days of service of Exhibit 2012 and Patent Owner's Sur-Reply, Petitioner filed a timely objection as required pursuant to 37 C.F.R. § 42.64(b)(1). See Paper 31.

the motion to exclude is moot.”). As such, we do not believe it is necessary or appropriate for us to exclude Exhibit 2012 or the related arguments. Therefore, we deny the Motion to Exclude.

III. CONCLUSION⁹

For the foregoing reasons, we conclude that Petitioner has shown, by a preponderance of the evidence, that claim 16 is unpatentable.

In summary:

References	Basis	Claim	Claim Shown Unpatentable	Claims Not shown Unpatentable
Hovers and Jetzek	§ 103	16	16	

IV. ORDER

Accordingly, it is:

ORDERED that claim 16 of U.S. Patent No. 7,729,728 B2 has been shown to be unpatentable;

FURTHER ORDERED that Petitioner’s Motion to Exclude is denied; and

⁹ Should Patent Owner wish to pursue amendment of the challenged claim in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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