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NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

QUEEN'S UNIVERSITY AT KINGSTON,
Appellant

v.

**SAMSUNG ELECTRONICS CO., LTD.,
SAMSUNG ELECTRONICS AMERICA, INC.,**
Appellees

2016-2723, 2016-2725

Appeals from the United States Patent and Trade-
mark Office, Patent Trial and Appeal Board in Nos.
IPR2015-00583, IPR2015-00584.

JUDGMENT

SHAWN DANIEL BLACKBURN, Susman Godfrey LLP,
Houston, TX, argued for appellant. Also represented
by IAN B. CROSBY, Seattle, WA; MICHELLE KINGHAM
HOLOUBEK, ROBERT GREENE STERNE, Sterne Kessler
Goldstein & Fox, PLLC, Washington, DC.

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CRAIG E. COUNTRYMAN, Fish & Richardson, PC,
San Diego, CA, argued for appellees. Also represented
by MICHAEL J. MCKEON, Washington, DC.

THIS CAUSE having been heard and considered, it is OR-
DERED and ADJUDGED:

PER CURIAM (DYK, MOORE, and WALLACH, *Circuit
Judges*).

AFFIRMED. See Fed. Cir. R. 36.

ENTERED BY ORDER OF THE COURT

January 10, 2018

Date

/s/ Peter R. Marksteiner

Peter R. Marksteiner
Clerk of Court

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Paper 54
Entered: July 27, 2016

UNITED STATES PATENT
AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL
AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

QUEEN'S UNIVERSITY AT KINGSTON,
Patent Owner.

Case IPR2015-00583
Patent 7,762,665 B2

Before RICHARD E. RICE, LYNNE E. PETTIGREW,
and MITCHELL G. WEATHERLY, *Administrative Pa-
tent Judges.*

RICE, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
 35 U.S.C. §318(a) and 37 C.F.R. §42.73

I. INTRODUCTION

A. *Background*

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) for *inter partes* review challenging claims 1-6, 8-13, 15, 16, and 18-20 of U.S. Patent No. 7,762,665 B2 (Ex. 1001, “the ’665 Patent”). Petitioner supported the Petition with a declaration from Dr. Don Turnbull (Ex. 1003).

We instituted a trial as to all of the challenged claims, on the following grounds.

| References(s) | Basis | Claims Challenged |
|--|--------------|--------------------------------|
| US 2003/0038754 A1, filed Aug. 22, 2001 (Ex. 1005, “Goldstein”) | § 102(e) | 1, 4-6, 8, 9, 11-13, and 18-20 |
| U.S. 5,994,530, issued Aug. 31, 1999 (Ex. 1006, “Ho”) | § 102(b) | 1-5, 9, 10, 16, and 18-20 |
| Ho and US 2002/0115050 A1, filed Feb. 21, 2001 (Ex. 1008, “Roschelle”) | § 103(a) | 11-13 |

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|---|----------|----------------------------------|
| US 6,618,716 B1, filed July 30, 1999 (Ex. 1014, “Horvitz”), and US 5,831,594, issued Nov. 3, 1998 (Ex. 1015, “Tognazzini”) ¹ | § 103(a) | 1, 4, 5, 8-10, 15, 16, and 18-20 |
|---|----------|----------------------------------|

Paper 11 (“Inst. Dec.”), 25.

After institution of the trial, Queen’s University at Kingston (“Patent Owner”) filed a Patent Owner Response (Paper 20, “PO Resp.”), to which Petitioner filed a Reply (Paper 30, “Pet. Reply”). Patent Owner supported the Patent Owner Response with declarations from Dr. Ravin Balakrishnan (Ex. 2007) and Dr. Jeff B. Pelz (Ex. 2008), and Petitioner supported the Reply with a declaration from Dr. Irfan A. Essa (Ex. 1085).

With our authorization, Patent Owner filed a combined Motion to Strike Petitioner’s Reply and/or File a Surreply to Petitioner’s Reply (Paper 34), to which Petitioner filed an Opposition (Paper 37). We denied Patent Owner’s request to strike the Reply, but authorized Patent Owner to file a sur-reply responding to Petitioner’s arguments and evidence with respect to enablement of the Goldstein publication (identified in the table above). Paper 39. Patent Owner then filed a Surreply (Paper 45, “Surreply”).

¹ Petitioner contends, and we agree, that Goldstein, Roschelle, and Horvitz each qualify as prior art under 35 U.S.C. § 102(e). Pet. 3. Patent Owner does not contest the prior art status of any of these references.

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The parties each filed a Motion to Exclude (Papers 40, 44), an Opposition to the Motion of the other party (Papers 47, 49), and a Reply to the other party's Opposition (Papers 50, 51). Patent Owner also filed a Motion for Observation on Cross Examination of Dr. Essa (Paper 43), to which Petitioner filed a Response (Paper 48). Patent Owner did not move to amend any claim of the '665 Patent.

We heard oral argument on April 27, 2016. A transcript of the argument has been entered in the record (Paper 52 (confidential session), Paper 53 (open session)) ("Tr.").

We have jurisdiction under 35 U.S.C. § 6(c). The evidentiary standard is a preponderance of the evidence. *See* 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

For the reasons explained below, we conclude that Petitioner has demonstrated by a preponderance of evidence that claims 1-6, 8-13, 15, 16, and 18-20 are unpatentable. We also deny the parties' respective Motions to Exclude.

B. Related Matters

Petitioner identifies a related federal district court case involving the '665 Patent: *Queen's University at Kingston v. Samsung Electronics Co., Ltd.*, No. 2:14-cv-00053 (E.D. Tex.). Pet. 1. Patent Owner identifies three *inter partes* reviews directed to U.S. Patent Nos.

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8,096,660 B2, 8,322,856 B2, and 8,672,482 B2, which are related to the '665 Patent. Paper 6, 2; *see* IPR2015-00584, Paper 2; IPR2015-00603, Paper 2; IPR2015-00604, Paper 2.

C. The '665 Patent

The '665 Patent, titled “Method and Apparatus for Communication between Humans and Devices,” issued from U.S. Application No. 10/392,960, filed March 21, 2003 (which the parties refer to as the “Critical Date”). Ex. 1001, at (54), (21), (22). The '665 Patent “relates to attentive user interfaces for improving communication between humans and devices” and, more particularly, “to use of eye contact/gaze direction information by technological devices and appliances to more effectively communicate with users, in device or subject initiated communications.” *Id.* at 1:7-12. “Eye contact sensors as used in the invention are distinguished from eye trackers, in that eye contact sensors detect eye contact when a subject or user is looking at the sensor, whereas eye trackers detect eye movement to determine the direction a subject or user is looking.” *Id.* at 6:57-61.

In a preferred embodiment, an attentive user interface employs eye contact information and/or eye gaze direction information about the user of a device. *Id.* at 6:54-55. In some embodiments, an attentive user interface employs an eye contact sensor such as a video camera for “bright-dark pupil detection.” *Id.* at 6:62-64. In other embodiments, an attentive user interface

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employs eye gaze direction information obtained from an “eye tracker.” *Id.* at 9:21-24. Such information is used by the attentive user interface to determine “whether, how, when, etc., to interrupt or send a notification to a user.” *Id.* at 7:55-57. Further, “[b]y progressively sampling the user’s attention, and appropriately signaling notifications, the user can be notified with minimal interruption.” *Id.* at 9:39-41. Disclosed applications of the attentive user interface include computers, cell phones, personal digital assistants (“PDAs”), and telephones. *Id.* at 11:33-38, 12:15-18.

Of the challenged claims, claim 1 is independent. Claims 2-6, 8-13, 15, 16, and 18-20 depend, directly or indirectly, from claim 1. Claims 1 and 11 are illustrative of the claimed subject matter, and are reproduced below:

1. A method of modulating operation of a device, comprising:

disposing a hardware sensor in or on the device for sensing attention of a user specifically toward the device;

processing a signal from the hardware sensor and outputting to the device a measure or index of the user’s attention toward the device; and

modulating operation of the device on the basis of the measure or index of the user’s attention toward the device;

wherein the operation that is modulated is initiated by the device and provides

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a notification and/or information and/or communication to the user based on the user's attention toward the device.

Id. at 21:50-63.

11. The method of claim 1, wherein the hardware device is a cellular telephone.

Id. at 22:28-29.

II. ANALYSIS

A. *Level of Skill in the Art*

The parties do not appear to disagree on the level of skill in the art. *See* Ex. 1003 ¶ 12; Ex. 1085 ¶¶ 12, 106; Ex. 2007 ¶ 19; Ex. 2008 ¶ 11; Pet. 4; PO Resp. 14. We agree with, and adopt for purposes of this Decision, the level of skill advanced by Dr. Balakrishnan, i.e., that “a person having ordinary skill in the art [‘POSA’ or ‘POSITA’] would have had a bachelor’s degree or higher degree in Computer Science or Computer Engineering or the equivalent, and at least several years of experience in user interface development,” and that “[l]ess education could be compensated by more direct experience and vice versa.” Ex. 2007 ¶ 19. We also agree with, and adopt for purposes of this Decision, Dr. Essa’s observation that “many people were working on eye sensing technology” and “the relative skill of those in the art was relatively high.” Ex. 1085 ¶ 106.

B. Claim Construction

In an *inter partes* review, the Board gives claim terms in an unexpired patent their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); see *Cuozzo Speed Techs. LLC v. Lee*, No. 15-446, 2016 WL 3369425, at *12 (U.S. June 20, 2016). Under that standard, a claim term generally is given its ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. See *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). While our claim interpretation cannot be divorced from the specification and the record evidence, see *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015) (quoting *In re NTP, Inc.*, 654 F.3d 1279, 1288 (Fed. Cir. 2011)), we must be careful not to import limitations from the specification that are not part of the claim language. See *Super-Guide Corp. v. DirectTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. See *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

1. “measure”

In our Institution Decision, we preliminarily determined that the broadest reasonable interpretation consistent with the Specification of the claim term “measure” is “the extent, quantity, amount, or degree of something, as determined by measurement or

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calculation.” Inst. Dec. 9. As neither party proposes any change to our interpretation, and our review of the evidence does not indicate that any change is necessary, we maintain that interpretation.

2. *“a measure or index of the user’s attention toward the device”*

Claim 1 requires the step of “processing a signal from the hardware sensor and outputting to the device *a measure or index of the user’s attention toward the device*” (emphasis added). In our Institution Decision, we preliminarily determined that the broadest reasonable interpretation consistent with the Specification of “a measure or index of the user’s attention toward the device” is “a measure or index of the user’s attention toward all, or any portion, of the device.” *Id.* at 7. As neither party proposes any change to our interpretation, and our review of the evidence does not indicate that any change is necessary, we maintain that interpretation.

3. *“modulating operation of the device on the basis of the measure or index of the user’s attention toward the device”*

Claim 1 requires the step of “modulating operation of the device on the basis of the measure or index of the user’s attention toward the device.” Neither party proposes an explicit construction of this step, but Patent Owner asserts an implicit construction in arguing that, in the Ho prior art reference,

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modulating of an operation is essentially triggered by time (i.e., comparing multiple scans over a predetermined time threshold)—in stark contrast to the claimed features where the modulation of an operation is *triggered based on the instant a user's attention is not directed toward the device or attention is redirected toward the device*.

PO Resp. 39 (emphasis added) (citing Ex. 2007 ¶¶ 120-126, 130-133). Dr. Balakrishnan explains this asserted instantaneous, or immediate, triggering requirement as follows:

Modulating based on attention described by the '665 patent is only useful when the modulation occurs *immediately* in response to a determination that the user is either paying attention or not paying attention. For example, in the ['665 patent's augmented television device, if the television is configured to pause audiovisual material when the user is not paying attention, the pausing operation should occur *immediately* when it is determined that the user's attention is not directed toward the device (e.g., glint, pupil and camera are not aligned on the camera axis). *Immediate* pausing is necessary so that the user does not miss any portion of the audiovisual material. If the television did not pause *immediately*, then the '665 patent's modulation would prove to be ineffective and indeed not a true modulation based on the user's attention toward the device, as claimed. The same holds true for the '665 patent's attention monitor example, where a user would need *immediate*

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re-routing or prioritization of messages/calls, in order for the modulation of the operation based on the user's attention to prove meaningful and effective. This aspect of the '665 patent is important in order to properly appreciate the significant differences between Ho and the claimed invention of the '665 patent.

Ex. 2007 ¶ 126 (emphasis added). We do not agree with Dr. Balakrishnan that modulating based on attention, as described in the '665 Patent, is useful only when the modulation occurs immediately in response to a determination that the user is or is not paying attention. *See id.* As Petitioner argues, Dr. Balakrishnan's analysis fails to consider examples described in the '665 Patent that require monitoring attention over time. *See* Pet. Reply 16; Ex. 1001, 12:42-53, 14:35-51, 17:37-49; 18:62-65; Ex. 1068, 187:7-193:22.

In one example described in the '665 Patent, "attentive user interfaces employing eye contact sensors or other related eye tracking technology may be used to initiate the retrieval of information on the basis of progressive disclosure." Ex. 1001, 17:37-40. "For example, information may initially be shown with limited resolution on the side of a display." *Id.* at 17:40-42. If the user looks at that information "for a set amount of time, [however,] more detailed information is retrieved and rendered on the screen using a larger surface." *Id.* at 17:42-45. "Examples include stock market tickers that grow and provide more information when users pay attention to it." *Id.* at 17:45-46.

Accordingly, we are not persuaded by Patent Owner that “modulating operation of the device on the basis of the measure or index of the user’s attention toward the device” requires instantaneous, or immediate, triggering. To the contrary, as described in the ’665 Patent, operation of the device may be modulated on the basis of a measure or index of the user’s attention toward the device over a period of time.

4. *“initiated by the device”*

Claim 1 recites that “the operation that is modulated is *initiated by the device* and provides a notification and/or information and/or communication to the user based on the user’s attention toward the device” (emphasis added). In our Institution Decision, we preliminarily determined that the broadest reasonable interpretation consistent with the Specification of “initiated by the device” is its ordinary meaning, i.e., “set going by the device.” Inst. Dec. 9 (citing Ex. 3001 (MERRIAM-WEBSTER’S COLLEGIATE DICTIONARY 601 (10th ed. 1993))). Below, we revisit our preliminary interpretation but determine to maintain it.

Petitioner asserted in the Petition that “[t]he ’665 Patent draws a distinction between ‘user-initiated’ and ‘device-initiated’ operations.” Pet. 6 (citing Ex. 1001, 1:64-67, 9:21-31). “For user-initiated operation,” according to Petitioner, “the operation initiates in response to explicit user input control provided by a user and, for a device-initiated operation, the operation initiates without explicit user input control provided by a

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user.” *Id.* (citing Ex. 1003 ¶ 20). Petitioner argued that “a proper construction of ‘initiated by the device’ must be broad enough to include ‘initiated without explicit user input control provided by a user.’” *Id.* at 7. In our Institution Decision, we disagreed with Petitioner’s proposed construction based on the following analysis:

To the extent Petitioner argues that, by definition in the Specification, a device-initiated operation *must* initiate without explicit user input control provided by a user, we disagree. The Specification provides several examples where a user’s explicit attention toward a device functions as an input control with respect to device-initiated operations. *See, e.g., id.* at 9:66-10:11 (user’s attention directed to a particular device in a network of devices controls routing of device-initiated messages to that device), 11:14-32 (user’s acknowledgment of a device’s request for attention controls the method of device-initiated communication to the user), 19:27-35 (user’s fixed gaze at a display icon controls enlargement of the icon to reveal a device-initiated message). Accordingly, we are not persuaded that a person of ordinary skill in the art (“POSITA”) “would have understood that the specification differentiates a user-initiated operation and a device-initiated operation based on the explicit user input control needed to initiate the operation,” as Petitioner contends. Ex. 1003 ¶ 20; *see* Pet. 6.

Inst. Dec. 8.

In the Patent Owner Response, Patent Owner proposes to clarify our preliminary interpretation of “initiated by the device” as “set going by the device *without explicit user-initiated control*.” PO Resp. 14-15 (emphasis added). Patent Owner asserts that the prosecution history of the ’665 Patent supports its proposed claim construction, because the claims were amended during prosecution “specifically to distinguish over prior art related to user-initiated control of the device.” *Id.* at 14 (citing Ex. 1002, 55-56). Petitioner’s Reply does not address Patent Owner’s proposed clarification.

Patent Owner has not persuaded us that any change to our preliminary interpretation is necessary. We note that the portion of the prosecution history cited by Patent Owner does not indicate that the term “initiated by the device” was added or changed during prosecution. Accordingly, we maintain our interpretation.

C. The Parties’ Post-Institution Arguments

In our Institution Decision, we concluded that the argument and evidence adduced by Petitioner demonstrated a reasonable likelihood that various selections of claims 1-6, 8-13, 15, 16, and 18-20 were unpatentable as either anticipated by Goldstein, Inst. Dec. 9-14, or Ho, *id.* at 14-17, or obvious in view of the combinations of Ho and Roschelle, *id.* at 17-19, or Horvitz and Tognazzini, *id.* at 19-23. We must now determine whether Petitioner has established by a preponderance of the evidence that the specified claims are

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unpatentable over the cited prior art. 35 U.S.C. § 316(e). In this connection, we previously instructed Patent Owner that “any arguments for patentability not raised in the [Patent Owner Response] will be deemed waived.” Paper 12, 3; *see also* 37 C.F.R. § 42.23(a) (“Any material fact not specifically denied may be considered admitted.”). Additionally, the Board’s Trial Practice Guide states that the Patent Owner Response “should identify all the involved claims that are believed to be patentable and state the basis for that belief.” Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012).

In connection with the uncontested arguments and evidence adduced by Petitioner to support its positions, for example, with respect to the dependent claims (identified below) that Patent Owner chose not to address in its Patent Owner Response, the record now contains unrebutted arguments and evidence presented by Petitioner regarding the manner in which the asserted prior art teaches all other elements of the claims against which that prior art is asserted. Based on the preponderance of the evidence before us, we conclude that the prior art identified by Petitioner describes all limitations of the reviewed claims except for those that Patent Owner contested in the Patent Owner Response, which we address below.

D. Asserted Anticipation by Goldstein

To anticipate a patent claim under 35 U.S.C. § 102, “a single prior art reference must expressly or inherently

disclose each claim limitation.” *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008). Under the principles of inherency, if the prior art necessarily functions in accordance with, or includes, the claim limitations, it anticipates, even though artisans of ordinary skill may not have recognized the inherent characteristics or functioning of the prior art. *MEHL/Biophile Int’l Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999) (citation omitted); *In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1349-50 (Fed. Cir. 2002).

Petitioner contends that Goldstein anticipates claims 1, 4-6, 8, 9, 11-13, and 18-20. *See* Pet. 13-25. For the reasons discussed below, we determine that Petitioner has established anticipation of those claims by Goldstein by a preponderance of the evidence.

1. Overview of Goldstein

Goldstein is a U.S. Patent Application Publication titled “Method and Apparatus for Gaze Responsive Text Presentation in RSVP^[2] Display.” Ex. 1005, at (10), (54).³ Goldstein discloses that, “[b]y means of the invention, adjustments for . . . *inattention* . . . are modeled . . . into the RSVP electronic reading paradigm.” *Id.* ¶ 8 (emphasis added). “More particularly, if the user of an RSVP text display device becomes *inattentive* so that his eyes are no longer focused on the text display

² “RSVP” is an acronym for “rapid serial visual presentation.”

³ The inventors listed on the face of the publication are Mikael Goldstein, Bjorn Jonsson, and Per-Olof Nerbrant. *Id.* at (76).

window, text presentation is automatically paused or halted.” *Id.* (emphasis added). “Thereafter, when the reader’s eyes again focus on the display window, text presentation is automatically resumed, usefully at the beginning of the last sentence previously read.” *Id.* The Abstract mirrors this disclosure:

Eye tracking sensors are used to detect when a reader’s focus shifts outside the text window, indicating that the reader has become *inattentive* to displayed text. Thereupon, presentation of text is halted. When the eye tracking sensors detect that the focus of the reader’s eyes has shifted back into the text window, text presentation is resumed.

Id. at (57) (emphasis added).

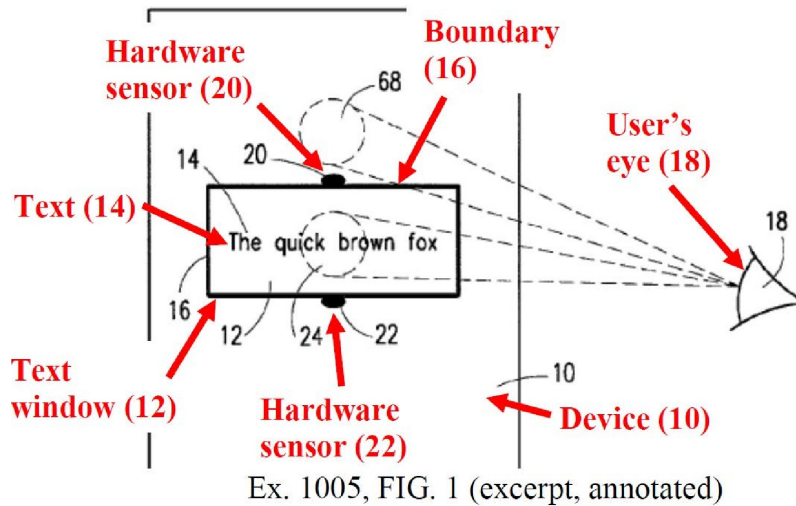
2. *Analysis of Claim 1*

According to Petitioner, Goldstein discloses all limitations of claim 1. Pet. 9-10, 13-22. As explained by Petitioner, Goldstein describes the process of pausing and resuming presentation of text on a mobile device based on the user’s attentiveness towards the device, which is determined by sensing the user’s “eye gaze direction” or “point of gaze.” *Id.* at 9-10, 13-22. Petitioner provides a detailed analysis explaining where Goldstein discloses each limitation of claim 1. *Id.* at 13-22. For the reasons advanced by Petitioner, and the additional reasons discussed below, we agree that Goldstein anticipates claim 1.

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a) “in or on the device”

Regarding the claimed step of “disposing a hardware sensor *in or on the device* for sensing attention of a user specifically toward the device” (emphasis added), Petitioner asserts that “FIG. 1 [of Goldstein] shows the hardware sensors 20 and 22 disposed *on the device 10.*” Pet. 13-14 (emphasis added). Petitioner’s annotated version of Goldstein’s Figure 1 is reproduced below.



Id. Petitioner’s annotated version of Goldstein’s Figure 1 shows hardware sensors 20 and 22.

As shown in the annotated figure above, Goldstein’s mobile device 10 includes rectangular window 12. *See* Ex. 1005 ¶ 19. “[B]oundary 16 [is] positioned along respective edges of rectangular window 12.” *Id.* ¶ 20. “[E]ye tracking sensors 20 and 22 [are] located

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proximate to boundary 16, above and below window 12, respectively.” *Id.* ¶ 21. Goldstein discloses that:

Sensor 20 could, for example, comprise an eye tracking device developed by the IBM Corporation at its Almaden Research Center, which is referred to by the acronym MAGIC and is described in further detail hereinafter, in connection with FIG. 2. This device is mounted *proximate to a display screen, in a known positional relationship.*

Id. (emphasis added).

Patent Owner disputes Petitioner’s assertion that Goldstein discloses disposing a hardware sensor “in or on the device.” *See* PO Resp. 16. According to Patent Owner, “Goldstein only states that sensors 20 and 22 are ‘mounted proximate to a display screen, in a known positional relationship.’” *Id.* (citing Ex. 1005 ¶ 21). Patent Owner argues that “[t]he words ‘mounted proximate’ indicate that the sensors are *near*—but not *in* or *on*—the device.” *Id.* at 16-17 (citing Ex. 2007 ¶¶ 37-38, 42, 44).

Patent Owner also asserts that “the frontal views” provided by Goldstein’s figures do not show depth and thus do not disclose “the true proximity of the sensors to the device.” *Id.* at 17. Accordingly, Patent Owner argues, “a proper analysis must consider what a POSA would interpret the disclosure to mean.” *Id.* (citing *In re Daniel*, 34 F.2d 995, 999-1000 (CCPA 1929)). Patent Owner further asserts that “[a] POSA would have understood that Goldstein’s Fig. 1, for example, is *not to*

scale.” *Id.* According to Patent Owner, “a POSA would have understood Goldstein’s figures to simply illustrate the general concept, and not an actual to-scale implementation of Goldstein’s system—let alone the claimed combination.” *Id.* at 17-18.

Further, relying on extrinsic evidence, Patent Owner argues that “Goldstein actually identifies an exemplary sensor—IBM’s MAGIC tracker” (*id.* at 18 (citing Ex. 1005 ¶ 21)), “[b]ut such a system was not conventionally implemented ‘in or on’ a cell phone” as required by claim 11 (*id.* (citing Ex. 2007 ¶¶ 48-51; Ex. 2008 ¶¶ 25-41)). “Instead,” according to Patent Owner, “IBM’s MAGIC tracker was placed ‘proximate to’ or near a display screen—consistent with Goldstein’s explicit disclosure.” *Id.* Patent Owner asserts that “IBM’s MAGIC tracker was three times larger than Goldstein’s entire 1 1/2 inch display window.” *Id.*

Patent Owner further argues that “[a] POSA would [not have] envisioned the remote eye tracking systems referenced at 20 and 22 to have actually been implemented *in or on* a mobile device.” *Id.* This is because, as asserted by Patent Owner, the large size of eye tracking technology would have destroyed the mobile device’s mobility, and “it was not uncommon to place an eye tracker in a central, proximate relation to a computer screen without having the hardware in or on the screen.” *Id.* (citing Ex. 2011; Ex. 2014, ch. 7; Ex. 2007 ¶¶ 52-56). Patent Owner argues that, consistent with Goldstein’s disclosure, a separate eye tracker could have been mounted in front of the screen and aimed at the eyes of a user, who looks at the screen. *Id.*

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at 18-19 (citing Ex. 1005, Fig. 1; Ex. 2011, Figs. 3-6; Ex. 2007 ¶¶ 53-54).

We have considered all of Patent Owner’s arguments, but we are persuaded that Goldstein discloses disposing a hardware sensor “in or on the device,” as claim 1 requires. As stated in Goldstein, Figure 1 “is a simplified view showing an RSVP display disposed to operate in accordance with an embodiment of the invention.” Ex. 1005 ¶ 13. The referenced “RSVP display” is “window 12 for displaying a text segment 14 on a single line.” *Id.* ¶ 19, Fig. 1. Goldstein describes device 10 as “provided with” window 12, and Figure 1 clearly indicates that window 12 and its boundary 16 are located in or on mobile device 10. *Id.* ¶ 19, 20, Fig. 1.

Similarly, Goldstein describes sensors 20 and 22 as located proximate to boundary 16, above and below window 12, respectively. *See* Ex. 1005 ¶ 21, Fig. 1. Figure 1 shows sensors 20 and 22 touching the outside of boundary 16. In that context, a POSA would have understood Figure 1 to depict a simplified view of sensors 20 and 22 located in or on mobile device 10, proximate to boundary 16, and above and below window 12. *See* Ex. 1085 ¶ 26 (opining that “sensors 20 and 22 are located on the mobile device 10 in the same way the display window 12 is located on the mobile device 10”).

Claim 11 of Goldstein confirms that sensors 20 and 22 are located in or on mobile device 10. The claim pertinently recites:

11. *In a device* provided with an RSVP display window for presenting text to a reader,

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said window having a boundary, apparatus for selectively adjusting said presentation of text comprising:

a sensor for detecting changes in orientation of a reader's eyes. . . .

Ex. 1005, claim 11 (emphases added). As expressly recited, a sensor is located “in” the device. *See* Ex. 1085 ¶ 25 (asserting that “claim 11 in Goldstein also discloses ‘a sensor’ as being ‘[i]n a device’”).

Furthermore, the only reasonable understanding of Goldstein's disclosure is that sensors 20 and 22 are located in or on mobile device 10. Patent Owner has not explained credibly how sensors 20 and 22 can be located as described in Goldstein, i.e., “proximate to boundary 16, above and below window 12, respectively,” unless they are located in or on mobile device 10. Patent Owner's argument that a separate sensor could be located in front of screen 12 would require a structure for mounting the sensor in the disclosed positional relationship. As Dr. Essa testifies, however, “[o]ther than the mobile device 10, no mounting structure for the sensors 20 and 22 is shown in FIG. 1, and no additional mounting structure is disclosed in Goldstein.” Ex. 1085 ¶ 26. Further, Goldstein discloses a mobile device, not a stationary device. Patent Owner has not explained how the sensor could be mounted in the required positional relationship with respect to the screen of Goldstein's mobile device.

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b) *“a measure or index of the user’s attention toward the device”*

Regarding the claimed step of “processing a signal from the hardware sensor and outputting to the device *a measure or index of the user’s attention toward the device*” (emphasis added), Petitioner asserts that Goldstein’s processor 46 processes a signal from eye tracking sensor 20 and outputs to the device, i.e., to text presentation control 48, a signal that constitutes a binary measure of the user’s attention toward the device. Pet. 15. Further, with respect to the limitation “modulating operation of the device on the basis of the measure or index of the user’s attention toward the device,” Petitioner asserts:

By pausing and resuming presentation of text content based on point of gaze data provided by the hardware sensor 20/22 and a control signal representative of whether the point of gaze data indicates that the reader is looking at the display, Goldstein “modulat[es] operation of the device on the basis of the measure or index of the user’s attention toward the device.”

Id. at 20 (citing Ex. 1003 ¶¶ 34, 35). Petitioner explains that the signal from processor 46 to text presentation control 48

represents a binary measure of the user’s attention toward the device in that the signal changes between two states (e.g., an inattentive state that causes the text presentation control 48 to pause presentation and an

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attentive state that causes the text presentation control 48 to resume presentation) depending on whether the reader is looking at the device or not.

Id. at 18 (citing Ex. 1005 ¶ 31; Ex. 1003 ¶ 32).

In response, Patent Owner asserts that “Goldstein never outputs a measure or index of the user’s attention toward the device.” PO Resp. 35. According to Patent Owner, the geometric computation in Goldstein that determines the reader’s point of gaze is “the only information that arguably can be relied upon to meet the claimed measure of the user’s attention toward the device.” *Id.* at 36. Patent Owner asserts that Goldstein does not disclose outputting the geometric computation toward the device, as required by the claim, but rather discloses outputting only a simple binary control signal:

Goldstein explicitly states that once the geometric computation (i.e., user’s attention toward the device) is performed, processor 46 sends a control signal to a text presentation control 48 to either pause or resume further presentation of text on the display window. [Ex. 1005] ¶ 0031. Hence, Goldstein delineates a difference between its geometric computation (i.e., user’s measure of attention toward the device) and its control signal (i.e., a simple binary signal to control the presentation of text).

Id. Patent Owner further asserts:

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The control signal output to the text presentation control 48, for example, may simply be in the form of a single bit of digital data (i.e., a 1 or 0) to indicate the pausing or resuming of text display. As such, the control signal may contain no information about the data actually sensed by the sensor or the location of the reader's gaze. In other words, the control signal is not necessarily a measurement or index of a user's attention.

Id.

We agree with Petitioner that the signal from processor 46 to text presentation control 48 is “a measure or index of the user's attention toward the device.” As disclosed in Goldstein, processor 46, which is contained within mobile device 10, performs a geometric calculation to determine the direction of the reader's point of gaze based on data received from sensor 20. Ex. 1005 ¶ 31, Fig. 3. “If processor 46 determines that the reader's point of gaze has moved out of the display window 12 since the last computation, processor 46 sends a signal to a text presentation control 48 to pause further presentation of text on the display window.” *Id.* ¶ 31. “Thereafter, processor 46 will signal control 48 to resume presentation, upon determining that the reader's point of gaze is again focused upon the text in window 12.” *Id.* The signal from processor 46 to text presentation control 48 is representative of the extent, quantity, amount, or degree of the reader's attention toward the device, as determined by measurement or calculation, and thus is a “measure” of the user's

attention under our claim interpretation. *See supra* Section II.B.1.

Patent Owner has not persuaded us that a simple binary control signal cannot be a measure or index of a user's attention toward a device. Indeed, the '665 Patent expressly describes using "eye contact sensors," for example, with "televisions and other audiovisual content delivery systems . . . to determine whether [their] content is being viewed, and to take appropriate action when it is no longer viewed." Ex. 1001, 15:13-14; *see id.* at 6:57-61. A binary signal determined by calculation of eye contact/no eye contact accords with our interpretation of "measure," discussed above, in that it indicates the extent, quantity, amount, or degree of something, as determined by measurement or calculation. *See supra* Section II.B.1.

c) Summary

For the reasons given, we conclude that Petitioner has shown by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 102(e) as anticipated by Goldstein.

3. Analysis of Claim 11

a) Disclosure

Claim 11 recites "[t]he method of claim 1, wherein the hardware device is a cellular telephone." We are persuaded that Goldstein discloses the "cellular telephone" limitation of claim 11, because Goldstein

discloses implementing claim 1 on mobile communication devices, including mobile phones, and a POSA would have identified cellular telephones as a well-known species of mobile phones. *See* Pet. 24-25; Ex. 1005, Abstract, ¶¶ 2, 19; Ex. 1003 ¶ 41; Ex. 2003, 21. “Verbatim disclosure of a particular species is not required in every case for anticipation because disclosure of a small genus can be a disclosure of each species within the genus.” *Ineos USA LLC v. Berry Plastics Corp.*, 783 F.3d 865, 872 (Fed. Cir. 2015) (citing *Atofina v. Great Lakes Chemical Corp.*, 441 F.3d 991, 999 (Fed. Cir. 2006) (citing *In re Petering*, 301 F.2d 676, 682 (CCPA 1962))).

b) *Enablement*

(1) *The Shifting Burdens of Production*

As Petitioner contends, prior art printed publications are presumptively enabling. Pet. Reply 7 (citing *In re Antor Media Corp.*, 689 F.3d 1282, 1287-88 (Fed. Cir. 2012); *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1355 (Fed. Cir. 2003)); *accord Google, Inc. v. Jongerious Panoramic Techs., LLC*, IPR2013-00191, slip op. at 37 (PTAB Aug. 12, 2014) (Paper 70). In view of that presumption, Petitioner satisfied its initial burden of production with respect to its anticipation challenge to claim 11 based on Goldstein by arguing persuasively that Goldstein’s disclosure was anticipating. *See Amgen*, 314 F.3d at 1355; *Impax Labs., Inc. v. Aventis Pharms., Inc.*, 545 F.3d 1312, 1316 (Fed. Cir. 2008); *Dynamic Drinkware, LLC v. Nat’l*

Graphics, Inc., 800 F.3d 1375, 1379-80 (Fed. Cir. 2015). The burden of production then shifted to Patent Owner to argue or to produce evidence that Goldstein actually does not anticipate, or that its relevant disclosures are not pertinent prior art, for example, as Patent Owner argues in this case, because they are not enabled. See *Amgen*, 314 F.3d at 1355; *Dynamic Drinkware*, 800 F.3d at 1380.⁴

Patent Owner argues that “Goldstein’s disclosure would not have enabled a POSA to arrive at claim 11 of the ’665 patent, due to the significant technical problems a POSA would have faced when trying to implement Goldstein’s disclosed eye tracker on a cellular phone.” PO Resp. 20. Among the technical problems a POSA would have faced, Patent Owner asserts, are: (1) operating system limitations; (2) insufficient processor speed and memory; and (3) the problem of relative movement of user and tracker in a handheld environment. *Id.* at 21 (citing Ex. 2010, 19; Ex. 2008 ¶¶ 44-59, 60-73).

Relying on testimony from Dr. Balakrishnan and Dr. Pelz, Patent Owner argues that, “[at] the time of invention, implementing eye tracking systems on mobile devices had not been achieved, because available eye tracking systems were not suitable for integration in or on mobile devices.” *Id.* at 20-21 (citing Ex. 2007

⁴ As Patent Owner notes, the ultimate burden of persuasion in this *inter partes* review is on Petitioner to prove “unpatentability by a preponderance of the evidence,” 35 U.S.C. § 316(e), and that burden never shifts to Patent Owner. Surreply 1-2 (citing *Dynamic Drinkware*, 800 F.3d at 1378).

¶¶ 57-59; Ex. 2008, ¶¶ 42-59). Patent Owner further argues that “Goldstein’s alleged disclosure that one could simply implement the eye-tracking system on a cell phone or PDA, without additional detail, is insufficient to enable a POSA to accomplish this task.” *Id.* at 21. Patent Owner also argues that “[a] POSA would not have been able to implement IBM’s eye tracker, as described by Goldstein, in or on a mobile device, such as a PDA or cell phone, without undue experimentation.” *Id.* at 21-22 (citing Ex. 2007 ¶¶ 57-59; Ex. 2008 ¶¶ 42-59). Patent Owner asserts: “Experts in the field have actually tried and failed to implement eye *trackers* similar to the IBM tracker on handheld devices before and long after the time of invention.” *Id.* at 22 (citing Ex. 2007 ¶¶ 57-59; Ex. 2010; Ex. 2019; Ex. 2015; Ex. 2012).

Patent Owner’s expert, Dr. Pelz, testifies, for example, that a group of researchers in the field failed in their attempt to port a desktop eye-tracking system, called “Smart Eye,” “to the most powerful PDA available at the time, the iPAQ 3630.” Ex. 2008 ¶ 47 (citing Ex. 2010, 27). Dr. Pelz explains that the researchers wanted to use the Smart Eye system to control a RSVP application for PDAs, called “Bailando.” *Id.* (citing Ex. 2010, 16-18). Dr. Pelz further testifies that “[t]he failure to implement the Smart Eye system on a handheld device lead researchers to instead implement the Smart Eye system as a desktop server with the PDA as its client.” *Id.* ¶ 48 (citing Ex. 2010, 27). This client/server implementation is the “Smart Bailando,” discussed below. *See* Ex. 2010, 20.

(2) *Petitioner's Reply Evidence*

Petitioner challenges the testimony of Patent Owner's experts, Dr. Balakrishnan and Dr. Pelz, based largely on the testimony of Dr. Essa. *See, e.g.*, Pet. Reply 9-14; Ex. 1085 ¶¶ 33-108. Petitioner argues that "Dr. Essa evaluated the *Wands* factors (858 F.2d 731 (Fed. Cir. 1988)) and concluded that a POSITA would have found Goldstein enabling." *Id.* at 14 (citing Ex. 1085 ¶¶ 99-108). Dr. Essa testifies, for example, as follows:

100. In particular, a POSITA would have been able to mount an eye sensor on a mobile device (e.g., cellular phone or PDA) as of the Critical Date. For instance, . . . the Smart Bailando prototype^[5] shows a camera used to perform eye sensing mounted to a PDA. In addition, the sensor described in the Morimoto paper (Ex. 1062)^[6] could have been

⁵ Dr. Balakrishnan discusses a "*Bailando* prototype" that is different from the Smart Bailando prototype discussed by both Dr. Pelz and Dr. Essa. *Compare* Ex. 2007 ¶¶ 43-44, *with* Ex. 1085 ¶¶ 55-62 *and* Ex. 2008 ¶¶ 47-48. The "*Bailando* prototype" was an experimental setup in which subjects wore infrared eye-tracking goggles connected to a personal computer ("PC"). Ex. 2007 ¶ 43 (citing Ex. 2024, 113). In the Smart Bailando prototype, a camera was mounted on a personal digital assistant ("PDA"). Ex. 1085 ¶ 56 (citing Ex. 1067, 4).

⁶ Dr. Balakrishnan discusses the SONY EVI-D30 camera implementation of the IBM MAGIC Tracker, but this is not the IBM eye tracker device disclosed by Goldstein. *See* Pet. Reply 10 (citing Ex. 1085 ¶ 64); Ex. 1005 ¶¶ 21, 30. Rather, Goldstein discloses (Ex. 1005 ¶¶ 21, 30) the IBM eye tracker device referenced in the "MAGIC paper" (Ex. 1017) and the "Morimoto paper" (Ex. 1062). *See* Ex. 1085 ¶¶ 29, 33-35.

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mounted or attached to PDAs and cellular phones available as of the Critical Date. . . . I also believe the IBM PupilCam⁷ could have been mounted to these types of devices. . . . In addition, a POSITA would have been able to reduce the size of the sensor described in the Morimoto paper and the IBM PupilCam based on the camera used and implementation details.

101. Further, as of the Critical Date, cellular phones and PDAs included built-in cameras that could have been used as the imaging device in an eye sensor. . . . Also, as of the Critical Date, camera add-ons were available that could have been used as the imaging device in an eye sensor. . . . By using a built-in or add-on camera, a POSITA would have only needed to add lighting components to implement the IBM eye sensing technology.

Ex. 1085 ¶¶ 100-101 (citations omitted).

Petitioner argues that “Dr. Balakrishnan only reviewed a SONY EVID30 camera version of the IBM MAGIC Tracker,” and “fail[ed] to consider a number of [other] IBM sensors available at the relevant time frame.” Pet. Reply 10 (citing Ex. 1085 ¶ 64). Petitioner further argues that “Dr. Pelz’s declaration relies solely on the same IBM MAGIC Tracker as Dr. Balakrishnan and is similarly deficient.” *Id.* (citing Ex. 1085 ¶¶ 25-41). Petitioner additionally challenges Dr. Pelz’s testimony

⁷ The IBM PupilCam was another IBM eye sensing system available as of the Critical Date. Ex. 1085 ¶ 40 (citing Ex. 1061, Abstract, 1).

regarding the state of mobile device technology in 2003. *Id.* at 10-12.

Petitioner additionally asserts that “neither Dr. Balakrishnan nor Dr. Pelz assessed ability to implement *eye contact detection* on a mobile device.” *Id.* at 9 (emphasis added). According to Petitioner, “[b]oth [Dr. Balakrishnan and Dr. Pelz] consistently discuss implementation of an ‘eye tracker’ and both agreed that, when they referred to an ‘eye tracker’ or ‘eye tracking,’ they were referring to tracking gaze over time.” *Id.* (citing Ex. 1068, 159:13-160:13, 175:7-23; Ex. 1069, 120:10-121:21). Petitioner argues that “Goldstein’s pause/resume functionality does not require tracking gaze over time and, as such, [Patent Owner’s] declarants considered a more difficult problem than required.” *Id.* (citing Ex. 1085 ¶ 63).

Petitioner also disputes Patent Owner’s assertion of “failures” and, in particular, the assertion that the Smart Bailando prototype was a failure. Pet. Reply 9-10. Petitioner argues that “even though ‘Smart Bailando’ used a ‘client/server implementation,’ ‘Smart Bailando’ still satisfied all elements of the ’665 patent claims” because “the processing of claim 1 need not be located on the cell phone.” *Id.* at 10.

(3) *Patent Owner’s Surreply*

In its Surreply, Patent Owner asserts that “Goldstein only describes an *eye tracker*, not an *eye contact sensor*,” and “[b]ecause Goldstein never mentions an eye contact sensor, [Petitioner’s] enablement analysis

is wholly erroneous.” Surreply 1, 3. Patent Owner argues:

[Petitioner] argues that it only “relies on Goldstein’s pause/resume *functionality* to anticipate the ’665 patent claims.” Pet.’s Reply 8-9 (emphasis added). According to [Petitioner], an eye contact sensor—as opposed to an eye gaze tracker—could be used to enable this functionality. Because Goldstein never mentions an eye contact sensor, [Petitioner’s] enablement analysis is wholly erroneous.

Id. at 3. Patent Owner also argues that “the Petition explicitly relies on Goldstein’s disclosure of its ‘eye tracking sensor’ as the claimed hardware sensor.” *Id.* at 4 (citing Pet. 14-16).

Patent Owner additionally argues that Petitioner’s reliance on the IBM PupilCam and the sensor described in the Morimoto paper is “technically flawed” because “(i) neither of these devices has any discernible link to Goldstein; and (ii) neither of these disclosures indicate[s] that the respective cameras were operable in a mobile environment.” *Id.* at 7 (citing Ex. 1061, 2; Ex. 1062). Patent Owner also argues that Petitioner relies on the Smart Bailando prototype “despite . . . the researchers of the Smart Bailando prototype explicitly stating that the Bailando prototype did not work.” *Id.* (citing Ex. 2010, 27). Further, Patent Owner contends that Petitioner failed to rebut Patent Owner’s evidence. *Id.* at 8-10. Patent Owner argues, for example, that Petitioner “was unable to point to a singular cell phone that was available in 2003 and

capable of performing eye tracking.” *Id.* at 9 (citing Ex. 2119, 183:15-26).

(4) *Analysis*

“In order to anticipate a claimed invention, a prior art reference must enable one of ordinary skill in the art to make the invention without undue experimentation.” *Impax Labs.*, 545 F.3d at 1314 (citations omitted). In examining the “without undue experimentation” requirement, we consider such factors as: (1) the quantity of experimentation; (2) the amount of direction or guidance present; (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.” *See id.* at 1314-15 (citing *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988)).

Prior art is not enabling so as to be anticipating unless a POSA could have combined the publication’s description of the invention with his own knowledge to make the claimed invention. *See Impax Labs., Inc. v. Aventis Pharms., Inc.*, 468 F.3d 1366, 1381 (Fed. Cir. 2006) (citing *In re Donohue*, 766 F.2d 531, 533 (Fed. Cir. 1985) (citation omitted)). “The standard for what constitutes proper enablement of a prior art reference for purposes of anticipation under section 102, however, differs from the enablement standard under section 112.” *Verizon Servs. Corp. v. Cox Fibernet Virginia, Inc.*, 602 F.3d 1325, 1337 (Fed. Cir. 2010) (citing *Rasmusson*

v. SmithKline Beecham Corp., 413 F.3d 1318, 1325 (Fed. Cir. 2005)). “It is well-settled that utility or efficacy need not be demonstrated for a reference to serve as anticipatory prior art under section 102.” *Id.* (citations omitted).

As discussed below, we determine that Petitioner’s reply evidence, particularly, the testimony of Petitioner’s reply expert, Dr. Essa, successfully rebuts Patent Owner’s evidence, including the testimony of Dr. Balakrishnan and Dr. Pelz, that a POSA could not have implemented an eye-tracking system on a PDA or cell phone, as of the Critical Date, without undue experimentation. *Compare* Ex. 1085 ¶¶ 33-108, *with* Ex. 2007 ¶¶ 48-51, 57-59 *and* Ex. 2008 ¶¶ 27, 36-73.

*Goldstein’s Disclosure of the
IBM Almaden Eye Tracker*

As discussed above, with respect to Figure 1, Goldstein discloses that “[s]ensor 20 could, for example, comprise an eye tracking device developed by the IBM Corporation at its Almaden Research Center. . . .” Ex. 1005 ¶ 21, Fig. 1. Referring to Figure 2, Goldstein further discloses “there is shown an eye tracking device of a type developed by the IBM Corporation and referred to above, which may be adapted for use as the sensor 20.” *Id.* ¶ 26. As described in Goldstein, the eye tracking device comprises two near infrared time multiplexed light sources, each composed of a set of infrared “light emitting diodes (‘LEDs’) synchronized with the camera frame rate.” *Id.* ¶ 27. Goldstein further discloses

that “[t]he eye tracker device disclosed above is described in further detail in a paper entitled Manual and Gaze Input Cascaded (Magic), S. Zhai, C. Morimoto and S. Ihde, In Proc. CHI ’99: ACM Conference on Human Factors in Computing Systems, pages 246-253. Pittsburgh, 1999” (Ex. 1017, the “MAGIC paper”). *Id.* ¶ 30.

The MAGIC Paper

The MAGIC paper describes the “IBM Almaden Eye Tracker” as follows:

We . . . chose to develop and use our own eye tracking system [10]. . . .

The Almaden system uses two near infrared (IR) time multiplexed light sources, composed of two sets of IR LED’s, which were synchronized with the camera frame rate. One light source is placed very close to the camera’s optical axis and is synchronized with the even frames. Odd frames are synchronized with the second light source, positioned off-axis. The two light sources are calibrated to provide approximately equivalent whole-scene illumination. Pupil detection is realized by means of subtracting the dark pupil image from the bright pupil image. After thresholding the difference, the largest connected component is identified as the pupil. This technique significantly increases the robustness and reliability of the eye tracking system. . . .

Once the pupil has been detected, the corneal reflection (the glint reflected from the surface of the cornea due to one of the light sources) is determined from the dark pupil image. The reflection is then used to estimate the user's point of gaze in terms of the screen coordinates where the user is looking at. The estimation of the user's gaze requires an initial calibration procedure, similar to that required by commercial eye trackers.

Ex. 1017, 4.

Reference “[10]” of the MAGIC paper, cited in the above quotation, is “Morimoto, C., *et al.*, *Pupil detection and tracking using multiple light sources*, 1998, IBM Almaden Research Center: San Jose” (Ex. 1062, the “Morimoto paper”). *Id.* at 8.

The Morimoto Paper

The Abstract of the Morimoto paper contains a description of a pupil detection and tracking system that is similar to the description of the “IBM Almaden Eye Tracker” set forth in the MAGIC paper. Ex. 1062, Abstract. The pupil detection and tracking system described in the Morimoto paper consists of a camera and two light sources. *Id.* at 3. Figure 1 of the Morimoto paper is reproduced below.

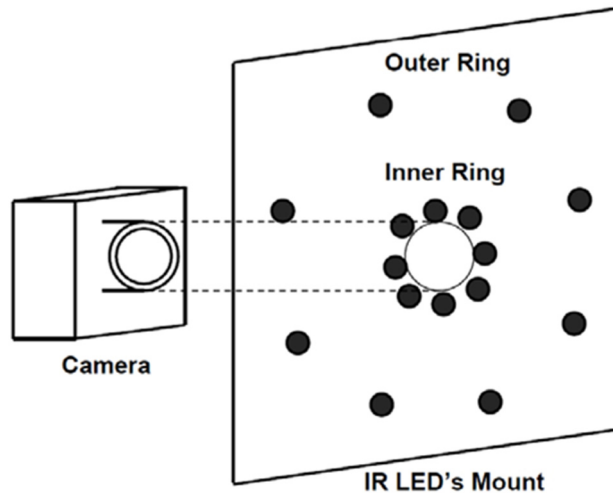


Figure 1 is a diagram showing the configuration of the camera and the light sources (illuminators). *Id.*, Fig. 1. As described in the Morimoto paper, the illuminators consist of 16 infrared LEDs distributed around two concentric rings, with 8 LEDs in each ring. *Id.* at 3. The Morimoto paper further describes a real-time implementation of the pupil detection system “running at 15 frames per second on a single processor Pentium 200 machine.” *Id.* The implementation uses a 1/3 inch CCD B & W board camera. *Id.* “[T]he system is quite robust even for people wearing glasses.” *Id.* at 6, Fig. 3. The Morimoto paper concludes: “The system has been successfully tested for a large number of people, and it has proven to be very robust indoors, particularly for office environments, although it has not been tested outdoors, where high intensity illumination might introduce difficulties.” *Id.* Further, “[t]he system is inexpensive and very compact (the dimensions of the current

implementation [are] about 9x9x3cm), and we are confident that his method could greatly increase the robustness and accuracy of current remote face and eye-tracking systems.” *Id.*

Implementation of IBM Eye Sensing Technology

We credit the testimony of Dr. Essa that, as of the Critical Date, “processing capabilities of mobile devices (e.g., cellular phones or PDAs) were sufficient to enable a POSITA to implement the IBM eye sensing technology,” including the eye-tracking system described in the Morimoto paper (Ex. 1062) and the eye sensing described in Dr. Essa’s work with Myron Flickner (Exs. 1063 and 1064).⁸ *See* Ex. 1085 ¶ 102. Contrary to Dr. Pelz’s testimony that the most powerful PDA processor, the iPAQ 3630, operated at 206 MHz (Ex. 2008 ¶ 47), Dr. Essa testified credibly that, in fact, there were a number of cellular phones and PDAs with 400 MHz processors, including the iPAQ 3950 released in July 2002 as an updated version of the iPAQ 3630. *See* Ex. 1085 ¶ 72 (citing Ex. 1044, 2; Ex. 1052, 1, 3), ¶¶ 73-88. In fact, the Tiqit eightythree was a handheld device with cellular capability that ran a desktop

⁸ Dr. Essa’s work with Myron Flickner was directed to improving pupil detection and eye tracking technology for “creating attentive user interfaces.” *See* Ex. 1085 ¶ 43 (citing Ex. 1064, Abstract). Dr. Essa and Myron Flickner built a reliable, real-time, non-invasive eye tracker using computer vision that could robustly locate and track eyes without any calibration, and estimate the user’s focus of attention. *Id.* The eye tracker ran on a single Pentium II 200 MHz processor. *Id.* ¶ 46 (citing Ex. 1063, 5).

operating system with a Pentium 300 MHz processor. *Id.* ¶¶ 87-88.

We give little weight to Dr. Balakrishnan’s enablement analysis because it is based on a SONY EVI-D30 camera implementation of the IBM MAGIC Tracker, without consideration of other relevant eye sensing technology of which a POSA would have known. *See, e.g.*, Ex. 2007 ¶¶ 57-59; Ex. 1085 ¶¶ 33-47, 64. Dr. Balakrishnan testified, for example, that eye-tracking devices at the time, such as IBM’s MAGIC Tracker, were too massive for a POSA to have considered placing them on a mobile device. Ex. 2007 ¶¶ 48-50. Dr. Balakrishnan, however, did not consider the eye-tracking system described in the Morimoto paper (Ex. 1062)⁹ or the eye sensing described in Dr. Essa’s work with Myron Flickner (Exs. 1063 and 1064). *See* Ex. 1085 ¶¶ 36-38, 42-47. We credit the testimony of Dr. Essa that the Tiqit eightythree, discussed above, could have implemented the eye sensing described in the Morimoto paper (Ex. 1062) and the eye sensing described in Dr. Essa’s work with Myron Flickner (Exs. 1063 and 1064):

For instance, the Tiqit eightythree included a Pentium Class 300 MHz processor that ran a full PC operating system (Microsoft Windows XP). . . . This device certainly could have

⁹ The Morimoto paper describes a pupil detection system that is “very compact (the dimensions . . . [are] about 9x9x3 cm).” *See* Ex. 1085 ¶ 38 (quoting Ex. 1062, 7). The pupil detection system ran on a single Pentium 200 processor. *See id.* (citing Ex. 1062, 5).

implemented the eye sensing described in the Morimoto paper (Ex. 1062) and the eye sensing described in my prior work with Myron Flickner (Exs. 1063 and 1064), as those systems ran on less powerful Pentium processors. . . . These eye sensing technologies could have been used to implement the eye sensing needed for Goldstein’s automated pause/resume functionality. Moreover, the Tiqit eighty-three device shows that it was possible to include a Pentium processor running a full PC operating system in a handheld form factor.

Id. ¶ 102.

The Smart Bailando Prototype

Mikael Goldstein, one of the inventors named on the face of the asserted Goldstein prior art reference, co-authored a paper titled: “Utilizing Gaze Detection to Simulate the Affordances of Paper in the Rapid Serial Visual Presentation Format” (the “Goldstein paper”). Ex. 1067, 1. The Goldstein paper states:

If one enhanced the RSVP application with sensors that register the reader’s gaze, *gaze detection*, the application could become context-aware [15] and automatically stop/start the text presentation when the reader looked away from the text. A precondition for this would be that the terminal using the RSVP format would have a built-in camera focused on the reader’s eyes continuously during RSVP reading. Mobile phones are currently being released on the market with such a

camera integrated into their design (e.g. the Sony Ericsson P800 and the Nokia 7650) and cameras can be bought as add-on modules for PDAs (e.g. the HP Pocket Camera) soon making this requirement very easy to fulfill. Based on the observations presented above, we believe that adding gaze detection functionality to RSVP reading on hand-held PDAs and cellular phones is one feasible route to making reading on small devices as convenient as ordinary screen or paper reading.

Id. at 2-3. The Goldstein paper discusses the “Smart Bailando,” which also is the subject of a Master’s Thesis titled “Smart Bailando, Eye controlled RSVP on handhelds.” *Id.* at 3; Ex. 2010, 1.

As discussed below, the Smart Bailando prototype constitutes a *working model* of the invention of claim 1 of the ’665 Patent as implemented on a handheld device. *See Impax Labs.*, 545 F.3d at 1314; Ex. 1085 ¶ 105. Built as the client of a client-server application running on a PC, the Smart Bailando prototype utilizes a camera mounted “on” a PDA to control text presentation by starting and pausing RSVP text flow based on gaze detection, i.e., sensing attention of a user specifically toward the device. Ex. 1085 ¶¶ 54-56 (citing Ex. 1067, Abstract, 4); Ex. 1067, 3; Ex. 2010, 8. With respect to the processing step of claim 1 of the ’665 Patent, we concur with Dr. Essa’s conclusion that “[a]lthough the processing in the Smart Bailando prototype does not occur on the PDA, the claims of the ’665 Patent do not require the processing to occur on the device.” Ex. 1085 ¶ 62.

We have considered the statement in Exhibit 2010, on which Patent Owner relies, that porting the Smart Eye gaze detection system to an iPAQ 3630 PDA “would not work,” as well as the related testimony of Dr. Pelz concluding that the attempt of the Smart Eye Company to port its system to a handheld device was a “failure.” *See* Surreply 7 (citing Ex. 2010, 27); Ex. 2008 ¶¶ 47, 48. We, however, accord little weight to this evidence for two reasons, which we discuss below.

First, we are not persuaded that either claim 1 or claim 11 of the '665 Patent requires directly *porting* an eye detection system to a device such that the required processing occurs on the device. Claim 1 recites a method of modulating a device that includes the step of “processing a signal from the hardware sensor and outputting to the device a measure or index of the user’s attention toward the device.” As discussed above, nothing in this language precludes utilizing a client/server implementation whereby the signal is processed at the server rather than the client device. *See* Ex. 1085 ¶ 62. Accordingly, directly porting an eye gaze detection system to a device, such that processing occurs on the device, is not necessary to implement the claimed method.

Second, the Smart Eye Company’s unsuccessful attempt to port its eye gaze detection system to an iPAQ 3630 PDA is of little probative value in determining whether a POSA could have ported an eye-tracking system to a handheld device as of the Critical Date, without undue experimentation. This is because: (1) the Smart Eye system required significantly more processing

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power than other eye-tracking systems available to a POSA as of the Critical date, such as the eye-tracking system described in the Morimoto paper (Ex. 1062) or the eye sensing described in Dr. Essa's work with Myron Flickner (Exs. 1063 and 1064); and (2) the iPAQ 3630 PDA possessed significantly less processing power than other handheld devices available to a POSA as of the Critical Date, such as the Tiqit eightythree handheld device (Ex. 1081). *See* Ex. 2008 ¶ 47; Ex. 2010, 21, 27; Ex. 1085 ¶¶ 38, 46, 72, 102, 103. Specifically, the Smart Eye system required a 1 GHz processor, and the iPAQ 3630 PDA ran at 206 MHz. Ex. 2008 ¶ 47; Ex. 2010, 21, 27. In contrast, the eye-tracking system described in the Morimoto paper required only a 200 MHz Pentium processor and the eye tracker built by Dr. Essa and Myron Flickner required only a Pentium II 200 MHz processor, while the Tiqit eightythree handheld device included a Pentium Class 300 MHz processor that ran a full PC operating system (Microsoft Windows XP). Ex. 1085 ¶¶ 38, 43, 46, 72, 88.

We also are not persuaded that either claim 1 or claim 11 of the '665 Patent requires a solution to the problem of "relative movement of [the] user and the tracker in a handheld environment," as Patent Owner contends. PO Resp. 21 (citing Ex. 2008 ¶¶ 46-59; Ex. 2010, 19); Surreply 8 (citing Ex. 2008 ¶¶ 46-59; Ex. 2010, 19). Dr. Pelz testifies that "remote eye detection systems" at the time, including the Smart Eye system, suffered from "limited ability to cope with head movement of the user," a "problem [that] became especially acute for attempts to implement eye detection on a

handheld device.” Ex. 2008 ¶ 48 (Ex. 2010, 37). Dr. Pelz further testifies that the Smart Bailando researchers concluded:

The handheld market is not yet ready to introduce gaze detection, partly because the lack of processor capacity and partly for the reason that all too few units have built-in cameras. Some handheld devices have a camera as an add-on, but it makes the unit all too heavy to make it feel comfortable in the every day use.

Id. ¶ 49 (quoting Ex. 2010, 41). But Petitioner does not need to demonstrate utility or efficacy for enablement of Goldstein’s relevant disclosures. *See Verizon Servs.*, 602 F.3d at 1337. The evidence establishes that eye detection systems of the time, such as the Smart Eye system, the eye-tracking system described in the Morimoto paper, and the eye sensing described in Dr. Essa’s work with Myron Flickner, functioned reliably when head and device were held still. *See, e.g.*, Ex. 2010, 17; Ex. 1062, 4-7; Ex. 1085 ¶ 43. Claims 1 and 11 of the ’665 Patent do not recite a method that must be able to cope with head movement as Patent Owner contends.

Further, although the Smart Bailando utilized a camera mounted on a PDA, rather than a cell phone as required by claim 11, a preponderance of the evidence establishes that a POSA would have known how to add cell phone capability to a PDA or other handheld device. *See, e.g.*, Ex. 2010, 12 (explaining, in the context of the Smart Bailando prototype, that “PDAs more and

more often come[] with mobile phone functionality or vice versa”); Ex. 1085 ¶ 88 (testifying credibly that “the Tiquit eightythree’s PCMCIA slot allowed it to be used as a cellular phone”). This evidence supports Goldstein’s disclosure of commonality of features among mobile phones, PDAs, and desktop computers:

Mobile devices such as mobile phones and Personal Digital Assistants (PDAs), are increasingly being used to directly acquire information, in the form of electronic text, from sources such as the Internet. The usability of such mobile devices should preferably match or surpass usability of stationary desktop computers, so that all tasks that can be accomplished in the stationary office environment can likewise be accomplished in the mobile context. Notwithstanding differences between the two types of devices in size and weight, screen size, and computational power and software complexity, it is anticipated that in time the mobile devices will have substantially the same features as stationary computers.

Ex. 1005 ¶ 2.

Conclusion

For the reasons discussed above, we agree with Dr. Essa’s conclusion, as summarized in paragraphs 99-108 of his Declaration, that a POSA would have found Goldstein’s disclosure of the automated pause/resume functionality to be enabling for the functionality recited

in claims 1 and 11, and that a POSA would have been able to implement Goldstein's automated pause/resume functionality on a cellular phone as of the Critical Date. *See, e.g.*, Ex. 1085 ¶¶ 99-108.

4. Analysis of Claims 4-6, 8, 9, 12, 13, and 18-20

Petitioner argues that Goldstein discloses each of the limitations added by dependent claims 4-6, 8, 9, 12, 13, and 18-20. Pet. 22-25. Patent Owner does not argue the patentability of those dependent claims. PO Resp. 15-23. We agree with, and adopt, Petitioner's argument that Goldstein discloses each of the limitations added by dependent claims 4-6, 8, 9, 12, 13, and 18-20.

5. Summary of Goldstein Anticipation Analysis

For the reasons given, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 4-6, 8, 9, 11-13, and 18-20 are unpatentable under 35 U.S.C. § 102(e) as anticipated by Goldstein. In view of our determination, we do not address Petitioner's additional ground that claims 11-13 would have been unpatentable for obviousness over the combination of Ho and Roschelle. *See* Pet. 44-46.

E. Asserted Anticipation by Ho

Petitioner contends that Ho anticipates claims 1-5, 9, 10, 16, and 1820. Pet. 30-40. For the reasons discussed below, we agree.

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1. *Overview of Ho*

Ho discloses “a computer-aided-educational system and method that automatically consider a student’s concentration-sensitive behavior while the student is working on the study materials.” Ex. 1006, 1:48-51. In one embodiment, the system includes a presenter, a non-intrusive sensor, a controller, and an indicator. *Id.* at 1:52-54. In this embodiment, the presenter presents study materials to a student, the sensor automatically senses the student’s concentration-sensitive behavior, the controller analyzes the behavior based on one or more rules, and the indicator indicates the student’s concentration level based on the analysis. *Id.* at 1:54-61. One rule taught by Ho is that “if the student is not looking at the monitor showing the study materials for a predetermined period of time, the student has lost concentration in the study materials.” *Id.* at 2:10-13. Ho discloses an embodiment that reacts according to the indication of the student’s concentration. *Id.* at 1:61-62, 11:9-10, Fig. 3. Examples of reactions taught by Ho include stimulation, reward, punishment, or change of study materials. *Id.* at 11:10-12.

2. *Analysis of Claim 1*

Petitioner identifies where each of the limitations of claim 1 is found in Ho. Pet. 30-37. Petitioner argues, for example, that the location of Ho’s non-intrusive sensor adjacent a monitor satisfies the “disposing a hardware sensor” requirement. *Id.* at 31 (citing Ex. 1006, 1:52-63, 3:36-47, 8:42-51). Regarding the “processing”

and “outputting” requirements, Petitioner argues that Ho’s controller processes a signal from the sensor and outputs to the device a measure or index of the student’s attention toward the device. *Id.* at 32-34. Petitioner argues that Ho’s system determines the measure or index by comparing the student’s “monitored behavior” with the student’s preestablished behavior measured “when the student is paying *attention.*” *Id.* at 31 (citing Ex. 1006, 2:33-39). Petitioner argues that Ho’s device performs the “modulating” requirement by reacting to the student’s detected concentration/attention level, for example, by changing the study materials displayed on the monitor. *Id.* at 34-37.

Patent Owner responds that Petitioner has failed to show that Ho discloses all limitations of claim 1. Prelim. Resp. 37. First, Patent Owner argues that Ho’s “digital camera 180 (the alleged claimed hardware sensor) . . . is neither ‘in or on’ the device, but rather . . . ‘adjacent to the monitor’ of the device.” PO Resp. 38 (citing Ex. 1006, 8:40-48). In support of that argument, Patent Owner asserts that “[Ho’s] Fig. 2B illustrates that digital camera 180 is connected to the system via peripheral controller 106, indicating that digital camera 180 is external to Ho’s device, not ‘in or on’ the device.” *Id.* (citing Ex. 2007 ¶¶ 112-114). Patent Owner further argues:

Ho’s Fig. 2A has a vertical line extending from digital camera 180 to Ho’s computer. However, the vertical line connecting digital camera 180 and the computer does not indicate that the digital camera 180 is “in or on”

the device. Ex. 2007, ¶¶ 116-117. Rather, consistent with Ho's specification (and other lines in Fig. 2A), this vertical line only represents an artistic rendering of a communicative link between Ho's digital camera and the client computer. *Id.*

Id. For these reasons, Patent Owner contends that "a POSA would have understood that Ho's digital camera is merely next to the monitor." *Id.*

In its Reply, Petitioner argues, and we agree, that Patent Owner ignores Ho's other disclosures, for example, that "[t]he sensor 110 includ[es] the digital camera 180" and that "the sensor 110 can be ***in a client computer.***" Pet. Reply 14-15 (quoting Ex. 1006, 3:38, 8:43). Petitioner further argues, and we agree, that "Ho also describes that 'there is no restriction preventing all components to reside ***in one element, such as a client computer.***'" *Id.* at 15 (quoting Ex. 1006, 3:44-46). Accordingly, we agree with Petitioner that Ho discloses "disposing a hardware sensor *in or on the device* for sensing attention of a user specifically toward the device" (emphasis added), as required by claim 1.

Next, Patent Owner argues that Ho does not disclose "modulating . . . on the basis of the measure or index of the user's attention toward the device." PO Resp. 39-40. Instead, Ho's system performs modulation, Patent Owner asserts, "based on a student's concentration level over a period of time—a modulation that is not the same as and will result in a different functionality than the claimed 'modulating.'" *Id.* at 39

(citing Ex. 2007 ¶¶ 127-128). Patent Owner further explains:

Since Ho's modulation is triggered by time, Ho cannot, for example, modulate a device (e.g., pausing) *immediately upon a determination that the user's attention is not directed toward the device* (e.g., the user steps away or looks away from device). Ex. 2007, ¶ 129. Thus, the result of Ho's modulation is different from the result of the claimed modulation. *Id.* [Petitioner] has failed to explain how Ho's time-based modulation is analogous to the claimed features and has not met its burden in showing how Ho anticipates this feature.

Id. at 39-40 (emphasis added).

Petitioner responds in its Reply that claim 1 does not require modulating "immediately upon a determination that the user's attention is not directed toward the device" as Patent Owner contends. Pet. Reply 16. We agree. As discussed above, Patent Owner's asserted implicit claim construction is inconsistent with the '665 Patent, which discloses multiple examples of monitoring attention over time. *See* Section II.B.2 *supra*; Ex. 1001, 12:42-53, 14:35-51, 17:37-49; 18:62-65. Accordingly, we agree with Petitioner that Ho discloses "modulating . . . on the basis of the measure or index of the user's attention toward the device," as required by claim 1.

For the reasons given, we determine that Petitioner has shown by a preponderance of the evidence

that claim 1 is unpatentable under 35 U.S.C. § 102(b) as anticipated by Ho.

3. Analysis of Claims 2-5, 9, 10, 16, and 18-20

Petitioner argues that Ho discloses each of the limitations added by dependent claims 2-5, 9, 10, 16, and 18-20. Pet. 37-40. Patent Owner relies on its arguments as to claim 1 with respect to the patentability of the dependent claims. PO Resp. 37-40. We agree with, and adopt, Petitioner's arguments, and, therefore, determine that Petitioner has shown by a preponderance of the evidence that claims 2-5, 9, 10, 16, and 18-20 are unpatentable under 35 U.S.C. § 102(b) as anticipated by Ho.

F. Asserted Obviousness over Horvitz and Tognazzini

Petitioner contends that claims 1, 4, 5, 8-10, 15, 16, and 18-20 would have been obvious over the combination of Horvitz and Tognazzini. Pet. 47-60. For the reasons discussed below, we agree.

1. Overview of Horvitz

Horvitz discloses a computerized system for managing alerts. Ex. 1014, 2:14-24. The system analyzes how and when to render an alert to a user based on "the likelihood of alternate states of attention." *Id.* at 2:56-57. In one embodiment, the system determines whether to alert the user "in an audio or visual manner, or on a

mobile device such as a cell phone or a pager.” *Id.* at 2:62-65.

Horvitz describes system 200, which includes peripheral information notification and alerts module 202, attentional status module 204, and notification decision-making module 206. *Id.* at 6:20-23. “[T]he attentional status module 204 ultimately generates a probability distribution over different states of attention 300.” *Id.* at 7:4-6, Fig. 3. The output of the attentional status module can be *the single availability probability*—the probability, for example, that the user is receptive to receiving an alert. *Id.* at 7:6-11 (emphasis added). “The probability 300 is generated in one embodiment by considering a profile of prior knowledge 302, as well as one or more contextual events 304.” *Id.* at 7:16-18. “The contextual events 304 includes computer information as well as external information.” *Id.* at 7:27-28. Computer information may indicate, for example, that the user has been focused on a single application and is typing quickly on the keyboard. *Id.* at 7:27-28. External information includes, for example, “visual cues 314” including “gaze 318.” *Id.* at 7:49-50, 58-59, Fig. 3. “The gaze 318 can be used to determine whether the user is attentive to the computer, or whether the user is looking at a book, has his or her head turned to one side, etc.” *Id.* at 7:62-65. “[T]he contextual events 304 and/or the profile 302 are used to determine the probability distribution over a user’s focus of attention, or of the single availability probability that a user is open to or actively seeking notifications.” *Id.* at 8:1-4.

2. *Overview of Tognazzini*

Tognazzini discloses an eye gaze tracking device mounted below the display of a personal computer. Ex. 1015, 6:58-60, Fig. 2. Tognazzini teaches utilizing the detected eye gaze of the computer user to regain lost context, e.g., where the user was looking, after an interruption or distraction. Ex. 1015, 8:23-54, Figs. 5A, 5B, 5C.

3. *Obviousness Analysis*

A claim is unpatentable for obviousness under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented 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 the subject matter pertains. *See KSR Intl Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). A patent claim composed of several elements, however, is not proved obvious merely by demonstrating that each of its elements was known, independently, in the prior art. *Id.* at 418. In analyzing the obviousness of a combination of prior art elements, it can be important to identify a reason that would have prompted one of skill in the art to combine the elements in the way the claimed invention does. *Id.* A precise teaching directed to the specific subject matter of a challenged claim is not necessary to establish obviousness. *Id.* Rather, “any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for

combining the elements in the manner claimed.” *Id.* at 420. 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 skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations, if in evidence. *See Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

In this case, Petitioner argues that modifying Horvitz to include the hardware sensors and eye sensing techniques taught by Tognazzini would have amounted to nothing more than the use of a known technique to improve a similar device in the same way. Pet. 48. In view of the disclosure of “gaze 318” in Horvitz, discussed above, Petitioner additionally argues that “a POSITA looking to implement Horvitz would have been motivated to look for references that describe sensors that can detect gaze for purposes of determining attention toward a device.” *Id.* at 49 (citing Ex. 1003 ¶ 80).

As to claim 1, Petitioner argues that Horvitz discloses every limitation, except the “disposing a hardware sensor” requirement, which is disclosed by Tognazzini. *Id.* at 48 (citing Ex. 1003 ¶¶ 78, 79). Regarding the “processing” and “outputting” requirements, Petitioner argues that “the attentional status module 204 takes the visual cues 314, including gaze 318, as inputs and uses the inputs to determine and output a measure of attention,” as shown in Figure 3. *Id.* at 50 (referring to Ex. 1014, Fig. 3). Petitioner

further argues that “in the combination of Horvitz and Tognazzini, the Horvitz attentional status module 204 processes a signal from the Tognazzini gaze tracking device 201 to determine a measure or index of attention.” *Id.* at 51 (citing Ex. 1003 ¶¶ 82-83). “Then,” according to Petitioner, “as shown by the label ‘P (ATTENTION) 300’ in FIG. 3, the Horvitz attentional status module 204 outputs the measure or index of attention toward the device.” *Id.* (citing Ex. 1014, 7:4-15). Petitioner further asserts that “[t]he Horvitz attentional status module 204 outputs the measure or index of attention to the notification decision-making module 206, thereby ‘outputting to the device a measure or index of the user’s attention toward the device.’” *Id.* at 52 (citing Ex. 1003 ¶ 84). Petitioner argues that Horvitz’s device performs the “modulating” requirement “[b]y making decisions about how, if, and when to alert a user.” *Id.* at 53 (citing Ex. 1003 ¶ 85). With respect to the “initiated by the device” limitation, Petitioner argues that, as disclosed in Horvitz, notification operations are “based on an automated determination by the Horvitz device of the user’s attention towards the device.” *Id.* at 55 (citing Ex. 1003 ¶ 89).

Patent Owner responds that “Horvitz and Tognazzini do not teach or suggest outputting a measure or index of a user’s attention toward the claimed device.” PO Resp. 40 (citing Ex. 2007 ¶ 137). Patent Owner argues:

[Petitioner] relies on, but never explains why Horvitz’s P(ATTENTION) is a measure of attention toward the device. Pet. 51-52. Horvitz

merely teaches two potential outputs from its system: (1) general user-availability probability and (2) a probability distribution over a user's focus of attention. Ex. 1014, 2:30-34, 7:4-15. Neither is clearly a measure of a user's attention toward a device. Ex. 2007, ¶¶ 139-40. However, because these outputs are probabilistic, neither is based on a measure of a user's attention specifically toward a device. *Id.* In order to meet this claimed feature, the prior art must at least (1) process a signal from a hardware sensor that senses attention specifically toward a device, and (2) output to the device a measure or index of the user's attention toward the device. *Id.*, ¶ 137. Hence, outputting a generalized measure of the user's attention, status, or availability is not sufficient. *Id.*, ¶ 137, 139. Outputting a *focus* of attention that does not include a measure or index of the user's (sic, attention) toward the device is likewise deficient. *Id.*, ¶ 137, 140. Yet, [Petitioner] alleges and evinces no more. *Id.*, ¶ 137.

Id.

Patent Owner acknowledges the disclosure that “gaze 318 can be used to determine whether the user is attentive to the computer, or whether the user is looking at a book, has his or her head turned to one side, etc.” PO Resp. 41 (citing Ex. 1014, 7:62-65). But Patent Owner argues that “even if the determination of whether the user is attentive to the computer was considered a measure or index of the user's attention, Horvitz does not disclose outputting that determination.” *Id.*

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(citing Ex. 2007 ¶ 142). In that regard, Patent Owner additionally argues:

First, the determination may be used by the ASM's Bayesian model, but not output. *Id.* For example, a probability that the user is “receptive to receiving an alert or is actively seeking the peripheral information associated with one or more alerts” (Ex. 1014, 7:10-12) is *not* a measure or index of user's attention specifically toward *any device*. Ex. 2007, ¶ 142.

Second, Horvitz's system may modulate some other device (i.e., not the computer) based on the determination, as demonstrated by Horvitz's various examples. *Id.* For example, [the] system may “check[] to see if the user is around or not at the desktop system before making a decision that the only way to reach the user is to ‘render’ the notification via the cell phone.” Ex. 1014, 13:43-46. This check is not based on gaze. Ex. 2007, ¶ 142.

Id.

Upon consideration of the competing arguments, we agree with Petitioner that the combination of Horvitz and Tognazzini teaches or suggests the subject matter of claim 1. We are persuaded, for example, that Horvitz and Tognazzini teach or suggest: (1) disposing a hardware sensor in or on a device for sensing gaze (attention of the user specifically toward the device); (2) processing the signal from the hardware sensor and outputting an availability probability to the device; and (3) modulating operation of the device on the basis

of the availability probability. Horwitz teaches that the availability probability is “a measure or index of the user’s attention toward the device” as required by claim 1. This is clear, for example, from the disclosure that notification decision-making module 206 uses the availability probability from attentional status module 204 to determine the manner by which the user should be alerted at the computer, for example, in a visual and/or an audio manner, and when the user should be alerted. *See, e.g.,* Ex. 1014, 9:29-38; Pet. Reply 21-22 (arguing that “a receptiveness to receiving an alert necessarily involves a receptiveness to receiving an alert *at the single computer* and attention is necessarily measured *toward the single computer*”).

Patent Owner also challenges Petitioner’s rationale for combining Horwitz and Tognazzini. PO Resp. 42. Patent Owner argues that “given Horwitz’s central, intended purpose of minimizing distractions, a POSA would not have looked to a system requiring an elaborate calibration procedure, such as Tognazzini’s gaze-tracker, as it would have rendered Horwitz unsuitable for its intended purpose.” *Id.* Patent Owner further argues:

Tognazzini’s gaze-tracking required user calibration (i.e., mapping of coordinates of eye gaze to a display coordinate system) for each user each time the system is used. Ex. 1015, 7:57-8:16. Such an elaborate calibration procedure would have constrained and distracted the user—precisely contrary to Horwitz’s goal.

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See Ex. 2007, ¶¶ 43-44; Ex. 2008, ¶¶ 25, 32-33, 51-52; Ex. 2107, p. 16.

Id.

We are persuaded, however, that Petitioner has provided a sufficient rationale for the combination. Horvitz teaches using gaze 318 to determine whether the user is attentive to the computer. Ex. 1014, 7:62-65. As Petitioner argues, combining Tognazzini's teachings with respect to gaze tracking with Horvitz's teaching with respect to gaze 318 would have amounted to nothing more than the use of a known technique to improve a similar device in the same way. *See* Pet. 48. Patent Owner's argument challenging the combination fails to give sufficient weight to Horvitz's teaching with respect to the advantage of using gaze 318 to determine whether the user is attentive to the computer. We find the advantages of incorporating Tognazzini's gaze-tracking technique in Horvitz outweigh the disadvantages cited by Patent Owner. *See Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (“[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”) (citation omitted).

Furthermore, we are not persuaded that Tognazzini requires a calibration procedure that would have constrained and distracted the user to the degree asserted by Patent Owner, or rendered Horvitz unsuitable for its intended purpose. *See* PO Resp. 42 (citing Ex. 2007 ¶¶ 43-44; Ex. 2008 ¶¶ 25, 32-33, 51-52; Ex.

2107, 16). Patent Owner's citations to Exhibits 2007, 2008, and 2107 do not pertain specifically to Tognazzini. To the extent Patent Owner argues that *any* prior art *eye-tracking* device would have suffered from the same or similar disadvantages, Patent Owner has failed to show that a POSA would have used a different gaze-detection technique to implement Horvitz's teachings with respect to gaze 318. Also, Patent Owner fails to reconcile or explain the facial inconsistency between its undue constraint-and-distraction argument and Tognazzini's teaching that a gaze-tracking device can be used to assist the computer user in being more productive in the face of interruptions and distractions. *See* Ex. 1015, 8:23-27, 49-54.

Petitioner also argues that dependent claims 4, 5, 8-10, 15, 16, and 18-20 would have been obvious over the combination of Horvitz and Tognazzini. Pet. 57-60. Patent Owner relies on its arguments as to independent claim 1 with respect to the patentability of the dependent claims. PO Resp. 40-43. We agree with, and adopt, Petitioner's arguments.

For the reasons given above, as well as those discussed below with respect to objective indicia of nonobviousness, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 4, 5, 8-10, 15, 16, and 18-20 are unpatentable under 35 U.S.C. § 103(a) as obvious over Horvitz and Tognazzini.

G. Objective Indicia of Nonobviousness

“For objective evidence . . . to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention.” *Rambus, Inc. v. Rea*, 731 F.3d 1248, 1256 (Fed. Cir. 2013) (quoting *In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011) (quoting *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010)) (emphasis omitted) (internal quotation marks omitted)). “While objective evidence of nonobviousness lacks a nexus if it exclusively relates to a feature that was ‘known in the prior art,’ the obviousness inquiry centers on whether ‘the claimed invention as a whole’ would have been obvious.” *Rambus*, 731 F.3d at 1257-58 (citation omitted). Thus, “[w]here the allegedly obvious patent claim is a combination of prior art elements, . . . the patent owner can show that it is the claimed combination as a whole that serves as a nexus for the objective evidence.” *WBIP, LLC v. Kohler Co.*, Nos. 2015-1038, -1044, 2016 WL 3902668, at *7 (Fed. Cir. July 19, 2016) (citing *Rambus*, 731 F.3d at 1258). “[T]here is a presumption of nexus for objective considerations when the patentee shows that the asserted objective evidence is tied to a specific product and that product ‘is the invention disclosed and claimed in the patent.’” *WBIP*, 2016 WL 3902668, at *6 (citations omitted).

Further, objective evidence of nonobviousness “must be reasonably commensurate with the scope of the claims.” *In re Kao*, 639 F.3d at 1068 (citations omitted); accord *S. Ala. Med. Sci. Found. v. Gnosis S.p.A.*, 808 F.3d 823, 827 (Fed. Cir. 2015). This does not mean that

the proponent of the evidence must test every embodiment within the scope of the claims. *Id.* Rather, for the objective evidence of nonobviousness to be reasonably commensurate with the scope of the claims, the requirement is that “an adequate basis [exists] to support the conclusion that other embodiments falling within the claim will behave in the same manner.” *Id.*

Patent Owner proffers objective evidence to show the nonobviousness of claims 1 and 11. *See* PO Resp. 45-60. Patent Owner argues that “[e]vidence such as long-felt but unmet need, failure of others, copying, and praise of others collectively demonstrate[s] that the inventions of claims 1 and 11 were not obvious.” *Id.* at 46. The features introduced by claim 11, however, are not relevant to our analysis of Patent Owner’s evidence because Petitioner does not challenge claim 11 as obvious over Horvitz and Tognazzini.¹⁰ For the reasons discussed below, we agree with Petitioner that the evidence of objective indicia of nonobviousness is insufficient to overcome the other evidence that claim 1 would have been obvious. *See* Pet. Reply 22-25.¹¹

¹⁰ As noted above, we determined not to address Petitioner’s ground that claim 11 is unpatentable as obvious over the combination of Ho and Roschelle.

¹¹ Although Petitioner also challenges dependent claims 4, 5, 8-10, 15, 16, and 18-20 as obvious in view of Horvitz and Tognazzini, Patent Owner does not argue any feature introduced by those claims as being the basis of its assertion that secondary considerations justify a finding of nonobviousness. Therefore, we determine that the features introduced by dependent claims 4, 5, 8-10, 15, 16, and 18-20 are not relevant to our analysis of secondary considerations of nonobviousness.

Patent Owner asserts that “[c]laim 1 of the ’665 patent solved a long-felt but unmet need—a way for a *non-intrusive, fully integrated, reliable* attention-sensing device to intelligently modulate operations on the basis of a user’s attention toward the device.” PO Resp. 48 (citing Ex. 2112, 87-98) (emphases added). The prior art (represented by the Goldstein and Ho references), however, discloses the combination of features recited in claim 1. *See supra* Section II.D.2; Section II.E.2. Accordingly, Patent Owner’s evidence does not establish that the claimed combination, rather than the prior art, provided the asserted solution to the asserted long-felt but unmet need. *See WBIP*, 2016 WL 3902668, at *7.

Further, to the extent Patent Owner’s evidence relates to embodiments that use an *eye contact* hardware sensor, the evidence is not reasonably commensurate with the scope of claim 1. For example, Patent Owner cites Exhibit 2013 as evidence that “[t]he ’665 patent’s technology provided a reliable solution” to the long-felt problem of intrusive and disruptive computer devices. *See* PO Resp. 48 (citing Ex. 2013, 189-190). The cited portion of Exhibit 2013 refers specifically to a gaze detection technique using “an eye contact sensor” as opposed to a gaze tracking sensor. Ex. 2013, 189-190 (“There is no intention here to track the user’s gaze position; the idea is simply to detect whether or not the person has looked at the sensor.”). Claim 1 of the ’665 Patent is not limited, however, to embodiments that use an *eye contact* hardware sensor. Rather, the scope of claim 1 includes embodiments that use other types of hardware sensors, for example, an *eye tracking*

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hardware sensor. Patent Owner has not provided an adequate basis to support the conclusion that other embodiments falling within claim 1, such as embodiments that use an eye tracking hardware sensor, will behave in the same manner as the asserted embodiment that uses an eye contact hardware sensor. To the contrary, Patent Owner argues that embodiments using eye tracking hardware sensors failed to meet the asserted long-felt need. PO Resp. 49-51, 53-55. Accordingly, Patent Owner's evidence relating to embodiments that use an eye contact hardware sensor is not reasonably commensurate with the scope of claim 1.

Patent Owner asserts that claim 1 "directly provided the reliable solution that users and the computing industry had been searching for[,] years before the '665 patent." PO Resp. 55. As discussed above, however, the prior art discloses all limitations of claim 1. *See, e.g., supra* Section II.D.2; Section II.E.2. Accordingly, Patent Owner's argument that claim 1 provided a solution to the asserted problem is not persuasive.

Patent Owner further argues:

Prior to the work performed by Dr. Vertegaal [a named '665 Patent inventor], no one was able to create a device that:

- (i) performed device-initiated operations; *and*
- (ii) included an integrated hardware sensor capable of measuring a user's attention toward the device, such that operations were modulated based on the measure of the user's attention.

PO Resp. 49. As discussed above, however, the prior art (for example, Goldstein and Ho) discloses this combination of features (as recited in claim 1 of the '665 Patent). *See, e.g., supra* Section II.D.2; Section II.E.2.

Further, Patent Owner cites Exhibit 2010 (the Smart Bailando Master's Thesis) as proof of a long-felt need for the claimed invention. *See* PO Resp. 48-49. As discussed above, however, the Smart Bailando prototype constitutes a working model of the invention defined by claim 1 of the '665 Patent. *See supra* Section II.D.3.b; Ex. 1085 ¶ 105. Thus, contrary to Patent Owner's arguments, the Smart Bailando prototype is not evidence of a long-felt need for the invention of claim 1.

Patent Owner's evidence and arguments relating to failure of others are unpersuasive for the same reasons as discussed above with respect to Patent Owner's arguments and evidence with respect to long-felt but unmet need. *See* PO Resp. 53-55. The Smart Bailando prototype, in particular, is fatal to Patent Owner's arguments. As discussed above, it constitutes a successful implementation of the invention of claim 1 prior to the Critical Date. *See supra* Section II.D.3.b; Ex. 1085 ¶¶ 62, 105.

With respect to copying, Patent Owner argues that "there is direct evidence that [Petitioner] had access to Dr. Vertegaal's patented technology," and "[t]hereafter, [Petitioner] made extensive efforts to replicate the claimed technology, culminating in the release of

[Petitioner's] SmartPause™ feature.” PO Resp. 55. Patent Owner asserts that:

[Petitioner's] devices have a hardware sensor (i.e. camera) in the device that senses attention of the user specifically toward the device (detect user looking away and looking back) and uses the measure of attention as a basis for modulation of device-initiated operations (pause/resume playback of video)—making the SmartPause™ feature a direct copy and embodiment of [claim 1].

Id. at 56.

Petitioner does not dispute having access to the patented technology in late 2003 and early 2004 in the course of direct interactions with Patent Owner relating to Petitioner's “Attentive Home Theatre” project. *See* Pet Reply 24-25. Nor does Petitioner dispute that its SmartPause™ feature is an embodiment of claim 1 of the '665 Patent. Instead, Petitioner argues that any presumption of copying is “simply not credible” because the SmartPause™ feature was “unveiled” in a 2013 cellular phone, almost a decade after Petitioner learned about Patent Owner's technology. *Id.* at 25. Petitioner also argues that Patent Owner's evidence fails to establish that Patent Owner ever developed a specific *product* or that Petitioner replicated any such product. Pet. Reply 24.

“[C]opying requires evidence of efforts to replicate a specific product, which may be demonstrated through internal company documents, direct evidence

such as disassembling a patented prototype, photographing its features, and using the photograph as a blueprint to build a replica, or access to the patented product combined with substantial similarity to the patented product.” *Wyers*, 616 F.3d at 1246. That the SmartPause™ feature of Petitioner’s cellular phones performs the method of claim 1 is not enough to establish copying. *See* PO Resp. 55-56; *Wyers*, 616 F.3d at 1246 (“Not every competing product that arguably falls within the scope of a patent is evidence of copying; otherwise, ‘every infringement suit would automatically confirm the nonobviousness of the patent.’”) (quoting *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004)).

Patent Owner has not directed us to SmartPause™ features indicative of copying the claimed invention as opposed to using technology in the public domain. *See* PO Resp. 55-56; *Windsurfing Int’l, Inc. v. AMF, Inc.*, 782 F.2d 995, 1000 (Fed. Cir. 1986) (“[C]opying the claimed invention, rather than one within the public domain, is indicative of non-obviousness.”). Goldstein and the Smart Bailando prototype each disclose the specific SmartPause™ features on which Patent Owner relies, including “looking away and looking back” and “pause/resume playback of video.” *See* PO Resp. 56; Ex. 1005 ¶ 8, Abstract; Ex. 1085 ¶¶ 54-56 (citing Ex. 1067, Abstract, 4); Ex. 1067, 3; Ex. 2010, 8). For this reason, we are not persuaded that Patent Owner’s evidence establishes copying.

Finally, Patent Owner argues that the claimed technology of claim 1 of the ’665 Patent has received

significant praise in the industry.¹² PO Resp. 57. Again, however, the prior art discloses the claimed technology. *See, e.g., supra* Section II.D.2; Section II.E.2. Accordingly, Patent Owner’s evidence does not establish that the claimed technology, rather than the prior art, should receive credit for the asserted praise.

Moreover, Patent Owner’s evidence of industry praise is largely based on praise of the SmartPause™ feature of Petitioner’s cellular phone, or praise of Patent Owner made by Petitioner. *See* PO Resp. 58. We are not persuaded that praise of the SmartPause™ feature of Petitioner’s cellular phone is “equivalent” to praise of claim 1 of the ’665 Patent as Patent Owner contends. *See id.* at 59; Pet. Reply 25. Claim 1 is not limited to use on mobile devices, such as Petitioner’s cellular phone. Rather, the scope of claim 1 includes stationary devices, for example, a standard desktop personal computer (“PC”).

Patent Owner argues, for example, that “[o]ut of all the features [Petitioner] debuted with its [cellular phone] device, it was the SmartPause™ technology that was identified as being ‘the most interesting’ and providing ‘efficacy’ for the industry.” *Id.* at 58 (quoting Ex. 2066, 1). The article on which Patent Owner relies, however, focuses on “mobile video.” Ex. 2066, 1. There is no mention of interest or efficacy in the context of

¹² Patent Owner also argues that the technology recited in claim 11 received such praise. However, as noted above, analysis of secondary considerations for claim 11 is unnecessary because claim 11 is not challenged as obvious in view of Horvitz and Tognazzini.

stationary devices. As another example, Patent Owner argues that “users were intrigued by the SmartPause™ technology. PO Resp. 58 (citing Exs. 2057, 2063-2067). The cited evidence, however, praises the technology for use on mobile devices, not stationary devices. *See* Ex. 2057 (watching videos in bed); Ex. 2063 (“smartphones”); Ex. 2064 (smartphones); Ex. 2065 (“mobile devices”); Ex. 2066 (mobile video); Ex. 2067 (mobile video).

Patent Owner has not provided an adequate basis to support the conclusion that the asserted praise for the SmartPause™ feature of Petitioner’s cellular phone extends to other embodiments within the scope of claim 1, such as stationary devices. Accordingly, Patent Owner’s evidence based on praise for the SmartPause™ feature of Petitioner’s cellular phone is not reasonably commensurate with the scope of claim 1.

With respect to asserted praise of Patent Owner made by Petitioner, we agree with Petitioner that, after showing initial interest in Patent Owner’s technology, Petitioner subsequently communicated concerns over the technology. *See* Pet. Reply 25 (citing Ex. 2077, 2); *compare* Ex. 2090, Ex. 2092, Ex. 2095, *with* Ex. 2077, 2.¹³ Accordingly, Patent Owner’s evidence is insufficient to show industry praise for the claimed invention.

For these reasons, we agree with Petitioner that the evidence of objective indicia of nonobviousness

¹³ Exhibits 2077, 2090, 2092, and 2095 are sealed protective order materials.

does not overcome the strong evidence that claims 1, 4, 5, 8-10, 15, 16, and 18-20 would have been obvious over Horvitz and Tognazzini. *See* Pet. Reply 25.

H. Patent Owner's Motion to Strike Petitioner's Reply

In Patent Owner's Motion to Strike Petitioner's Reply, Patent Owner argued that Petitioner's Reply "exceeds its rebuttal function by shifting the original alleged grounds of anticipation to obviousness, providing a new theory of anticipation, submitting new evidence which could have been presented earlier, and circumventing the page limits through improper incorporation of expert testimony." Paper 34, 2. Patent Owner sought an order striking the entirety of Petitioner's Reply or, in the alternative, authorizing Patent Owner to submit "a surreply and expert testimony on the issue of whether the prior art enables the claimed invention." *Id.* at 9. Petitioner filed an Opposition responding to each of Patent Owner's arguments. Paper 37, 1-10. After considering the competing arguments, we denied Patent Owner's Motion to Strike Petitioner's Reply, but authorized Patent Owner to file a Sur-Reply addressing the Goldstein enablement issue. Paper 39.

At the oral hearing, Patent Owner re-argued its Motion to Strike Petitioner's Reply. Tr. 62:23-67:20 (asserting "12 things that we think that the [R]eply went beyond"). Upon considering Patent Owner's arguments at the oral hearing, we affirm our denial of Patent Owner's Motion to Strike Petitioner's Reply, because Petitioner's arguments and the evidence submitted

with the Reply, including the arguments and evidence addressing the Goldstein enablement issue, fall within the proper scope of a reply.

I. The Motions to Exclude

We have reviewed Petitioner's Motion to Exclude (Paper 40), Patent Owner's Opposition to the Motion (Paper 47), and Petitioner's Reply to Patent Owner's Opposition (Paper 51). We also have reviewed Patent Owner's Motion to Exclude (Paper 44), Petitioner's Opposition to the Motion (Paper 49), and Patent Owner's Reply to Petitioner's Opposition (Paper 50).

1. Patent Owner's Motion

Patent Owner first moves to exclude Exhibits 1020, 1021, 1023-1039, and 1041, as irrelevant, because they are not cited in Petitioner's Reply or in Dr. Essa's Declaration. Paper 44, 1-2. Petitioner responds, and we agree, that Exhibits 1020, 1021, 1023, 1024, 1026, 1028, 1032, 1034, 1037, 1039, and 1041 are relevant because they were discussed during Dr. Balakrishnan's deposition. Paper 49, 1-2. Accordingly, we deny Patent Owner's request to exclude those exhibits. Petitioner has withdrawn Exhibits 1025, 1027, 1029-1031, 1033, 1035, 1036, and 1038, and, thus, Patent Owner's Motion is moot as to those exhibits. *See id.* at 3.

Patent Owner also moves to exclude Exhibits 1060, 1061, 1062, and 1067, as irrelevant. Paper 44,

2-9. Patent Owner argues that those exhibits constitute “new evidence” and, additionally, that their admission would be unfairly prejudicial to Patent Owner. *Id.* Dr. Essa, however, relies on each of those exhibits to rebut the testimony of Dr. Balakrishnan and Dr. Pelz with respect to the Goldstein enablement issue. *E.g.*, Ex. 1085 ¶¶ 35-41, 54-64, 100, 102-107. We agree with Petitioner’s argument that those exhibits are relevant and that Patent Owner is not unfairly prejudiced by their admission (*see* Paper 49, 3-11), and we deny Patent Owner’s Motion as to those exhibits.

Finally, Patent Owner moves to exclude Exhibits 1074, 1075 and 1077-1084 as inadmissible hearsay. Paper 44, 9-10. Patent Owner argues that “Dr. Essa asserts the statements in each of these Exhibits for its truth—as alleged evidence of the state of the art at the time of the invention.” *Id.* Petitioner responds that “none of these exhibits should be excluded because, under [Rule 703 of the Federal Rules of Evidence], it is proper for Dr. Essa to rely on otherwise inadmissible facts or data so long as experts in the particular field would reasonably rely on those kinds of facts or data in forming an opinion on the subject.” Paper 49, 11. We agree, and deny Patent Owner’s Motion as to those exhibits.

2. *Petitioner’s Motion*

Petitioner moves to exclude all or portions of Exhibits 2007-2019, 2021-2027, 2029-2069, 2071-2086, 2088, 2099-2110, and 2112, for reasons that track

Patent Owner's objections to Petitioner's evidence, discussed above. Paper 40, 2 ("Petitioner . . . advances this motion to exclude to ensure that any exclusion of Petitioner's evidence should find comparable exclusion in Patent Owner's evidence for reasons advanced by Patent Owner."). We deny Petitioner's Motion for the reasons that we deny Patent Owner's Motion, discussed above.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has shown by a preponderance of the evidence that claims 1-6, 8-13, 15, 16, and 18-20 are unpatentable.

This Final Written Decision discusses or cites information that is the subject of motions to seal. *See, e.g., supra* Section II.G. Accordingly, we have entered this Decision in the Board's E2E system as "Board and Parties Only." If either Party believes that any portion of this Decision should be maintained under seal, the Party must file, within five (5) business days from the entry of the Decision, a motion to seal portions of the Decision. The motion must include a proposed redacted version of the Decision, accompanied by an explanation as to why good cause exists to maintain under seal each redacted portion. In the absence of a motion to seal by the specified deadline, the full version of this Decision will become public. Any opposition to a motion must be filed within three (3) business days from the

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date of entry of the motion; no reply to an opposition is authorized.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1-6, 8-13, 15, 16, and 18-20 of U.S. Patent No. 7,762,665 B2 are unpatentable;

FURTHER ORDERED that each of the parties is authorized to file, within five (5) business days from the date of entry of this Final Written Decision, a motion to seal portions of the Decision that includes a proposed redacted version of the Decision and an explanation as to why good cause exists to maintain under seal each redacted portion;

FURTHER ORDERED that any opposition to a motion to seal portions of the Decision must be filed within three (3) business days from the date of entry of the motion; and

FURTHER ORDERED that no reply to an opposition is authorized.

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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Paper 53
Entered: July 27, 2016

UNITED STATES PATENT
AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL
AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.
AND SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

QUEEN'S UNIVERSITY AT KINGSTON,
Patent Owner.

Case IPR2015-00584
Patent 8,096,660 B2

Before RICHARD E. RICE, LYNNE E. PETTIGREW,
and MITCHELL G. WEATHERLY, *Administrative Pa-
tent Judges*.

RICE, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
 35 U.S.C. §318(a) and 37 C.F.R. §42.73

I. INTRODUCTION

A. Background

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) for *inter partes* review challenging claims 1-6, 8-16, 18, 19, and 21 of U.S. Patent No. 8,096,660 B2 (Ex. 1001, “the ’660 Patent”). Petitioner supported the Petition with a Declaration from Dr. Don Turnbull (Ex. 1003).

We instituted a trial as to all of the challenged claims, on the following grounds.

| Reference(s) | Basis | Claims Challenged |
|--|----------|---------------------------|
| US 2003/0038754 A1, filed Aug. 22, 2001 (Ex. 1005, “Goldstein”) | § 102(e) | 1-6, 10-12, 14-16, and 21 |
| U.S. 5,944,530, issued Aug. 31, 1999 (Ex. 1006, “Ho”) | § 102(b) | 1-3, 5, 8-13, 19, and 21 |
| Ho and US 2002/0115050 A1, filed Feb. 21, 2001 (Ex. 1008, “Roschelle”) | § 103(a) | 14-16 |

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| | | |
|---|----------|----------------------------|
| US 6,618,716 B1, filed July 30, 1999 (Ex. 1014, “Horvitz”), and US 5,831,594, issued Nov. 3, 1998 (Ex. 1015, “Tognazzini”) ¹ | § 103(a) | 1-5, 10-13, 18, 19, and 21 |
|---|----------|----------------------------|

Paper 11 (“Inst. Dec.”), 25.

After institution of the trial, Queen’s University at Kingston (“Patent Owner”) filed a Patent Owner Response (Paper 19, “PO Resp.”), to which Petitioner filed a Reply (Paper 29, “Pet. Reply”). Patent Owner supported the Patent Owner Response with Declarations from Dr. Ravin Balakrishnan (Ex. 2007) and Dr. Jeff B. Pelz (Ex. 2008), and Petitioner supported the Reply with a Declaration from Dr. Irfan A. Essa (Ex. 1085).

With our authorization, Patent Owner filed a combined Motion to Strike Petitioner’s Reply and/or File a Surreply to Petitioner’s Reply (Paper 33), to which Petitioner filed an Opposition (Paper 36). We denied Patent Owner’s request to strike the Reply, but authorized Patent Owner to file a surreply responding to Petitioner’s arguments and evidence with respect to enablement of the Goldstein publication (identified in the table above). Paper 38. Patent Owner then filed a Surreply (Paper 44, “Surreply”).

The parties each filed a Motion to Exclude (Papers 39, 42), an Opposition to the Motion of the other party (Papers 46, 48), and a Reply to the other party’s

¹ Petitioner contends, and we agree, that Goldstein, Roschelle, and Horvitz each qualify as prior art under 35 U.S.C. § 102(e). Pet. 3. Patent Owner does not contest the prior art status of any of these references.

Opposition (Papers 49, 50). Patent Owner also filed a Motion for Observation on Cross Examination of Dr. Essa (Paper 41), to which Petitioner filed a Response (Paper 47). Patent Owner did not move to amend any claim of the '660 Patent.

We heard oral argument on April 27, 2016. A transcript of the argument has been entered in the record (Paper 51 (confidential session), Paper 52 (open session)) (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c). The evidentiary standard is a preponderance of the evidence. *See* 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

For the reasons explained below, we conclude that Petitioner has demonstrated by a preponderance of evidence that claims 1-6, 8-16, 18, 19, and 21 are unpatentable. We also deny the parties’ respective Motions to Exclude.

B. Related Matters

Petitioner identifies a related federal district court case involving the '660 Patent: *Queen’s University at Kingston v. Samsung Electronics Co., Ltd.*, No. 2:14-cv-00053 (E.D. Tex.). Pet. 1. Patent Owner identifies three *inter partes* reviews directed to U.S. Patent Nos. 7,762,665 B2 (“’665 Patent”), 8,322,856 B2, and 8,672,482 B2, which are related to the '660 Patent.

Paper 6, 2; *see* IPR2015-00583, Paper 2; IPR2015-00603, Paper 2; IPR2015-00604, Paper 2.

C. The '660 Patent

The '660 Patent, titled “Method and Apparatus for Communication between Humans and Devices,” issued from U.S. Application No. 12/843,399, filed July 26, 2010, and claims priority from U.S. Application No. 10/392,960 (now U.S. Patent No. 7,762,665 B2), filed March 21, 2003 (which the parties refer to as the “Critical Date”). Ex. 1001, at (54), (21), (22), (63). The '660 Patent “relates to attentive user interfaces for improving communication between humans and devices” and, more particularly, “to use of eye contact/gaze direction information by technological devices and appliances to more effectively communicate with users, in device or subject initiated communications.” *Id.* at 1:14-19. “Eye contact sensors as used in the invention are distinguished from eye trackers, in that eye contact sensors detect eye contact when a subject or user is looking at the sensor, whereas eye trackers detect eye movement to determine the direction a subject or user is looking.” *Id.* at 6:67-7:4.

In a preferred embodiment, an attentive user interface employs eye contact information and/or eye gaze direction information about the user of a device. *Id.* at 6:64-65. In some embodiments, an attentive user interface employs an eye contact sensor such as a video camera for “bright-dark pupil detection.” *Id.* at 7:5-7. In other embodiments, an attentive user interface

employs eye gaze direction information obtained from an “eye tracker.” *Id.* at 9:54-56. Such information is used by the attentive user interface to determine “whether, how, when, etc., to interrupt or send a notification to a user.” *Id.* at 7:63-65. Further, “[b]y progressively sampling the user’s attention, and appropriately signaling notifications, the user can be notified with minimal interruption.” *Id.* at 10:5-7. Disclosed applications of the attentive user interface include computers, cell phones, personal digital assistants (“PDAs”), and telephones. *Id.* at 11:66-12:5, 12:50-53.

Of the challenged claims, claim 1 is independent. Claims 2-6, 8-16, 18, 19, and 21 depend, directly or indirectly, from claim 1. Claims 1 and 14 are illustrative of the claimed subject matter, and are reproduced below:

1. Apparatus for communication between a user and a device, comprising:

a hardware sensor in or on the device that senses attention of the user specifically toward the device; and

a processor that processes a signal from the hardware sensor and outputs to the device a measure or index of the user’s attention toward the device; and

wherein the operation of the device is modulated on the basis of the measure or index of the user’s attention toward the device;

wherein the operation that is modulated is initiated by the device and provides a

notification and/or information and/or communication to the user based on the user's attention toward the device.

Id. at 22:22-35.

14. The apparatus of claim 1, wherein the device is a cellular telephone.

Id. at 23:5-6.

II. ANALYSIS

A. *Level of Skill in the Art*

The parties do not appear to disagree on the level of skill in the art. *See* Ex. 1003 ¶ 12; Ex. 1085 ¶ 12, 106; Ex. 2007 ¶ 19; Ex. 2008 ¶ 11; Pet. 4; PO Resp. 14. We agree with, and adopt for purposes of this Decision, the level of skill advanced by Dr. Balakrishnan, i.e., that “a person having ordinary skill in the art [‘POSA’ or ‘POSITA’] would have had a bachelor’s degree or higher degree in Computer Science or Computer Engineering or the equivalent, and at least several years of experience in user interface development,” and that “[l]ess education could be compensated by more direct experience and vice versa.” Ex. 2007 ¶ 19. We also agree with, and adopt for purposes of this Decision, Dr. Essa’s observation that “many people were working on eye sensing technology” and “the relative skill of those in the art was relatively high.” Ex. 1085 ¶ 106.

B. Claim Construction

In an *inter partes* review, the Board gives claim terms in an unexpired patent their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); see *Cuozzo Speed Techs. LLC v. Lee*, No. 15-446, 2016 WL 3369425, at * 12 (U.S. June 20, 2016). Under that standard, a claim term generally is given its ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. See *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). While our claim interpretation cannot be divorced from the specification and the record evidence, see *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015) (quoting *In re NTP, Inc.*, 654 F.3d 1279, 1288 (Fed. Cir. 2011)), we must be careful not to import limitations from the specification that are not part of the claim language. See *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004). Any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. See *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

1. “measure”

In our Institution Decision, we preliminarily determined that the broadest reasonable interpretation consistent with the Specification of the claim term “measure” is “the extent, quantity, amount, or degree of something, as determined by measurement or

calculation.” Inst. Dec. 9. As neither party proposes any change to our interpretation, and our review of the evidence does not indicate that any change is necessary, we maintain that interpretation.

2. *“a measure or index of the user’s attention toward the device”*

Claim 1 recites “a processor that . . . outputs to the device *a measure or index of the user’s attention toward the device*” (emphasis added). In our Institution Decision, we preliminarily determined that the broadest reasonable interpretation consistent with the Specification of “a measure or index of the user’s attention toward the device” is “a measure or index of the user’s attention toward all, or any portion, of the device.” *Id.* at 7. As neither party proposes any change to our interpretation, and our review of the evidence does not indicate that any change is necessary, we maintain that interpretation.

3. *“modulated on the basis of the measure or index of the user’s attention toward the device”*

Claim 1 recites that “the operation of the device is *modulated on the basis of the measure or index of the user’s attention toward the device*” (emphasis added). Neither party proposes an explicit construction of this phrase, but Patent Owner asserts an implicit construction in arguing that, in the Ho prior art reference,

modulating of an operation is essentially triggered by time (i.e., comparing multiple scans

over a predetermined time threshold)—in stark contrast to the claimed features where the modulation of an operation is *triggered based on the instant a user’s attention is not directed toward the device or attention is redirected toward the device*.

PO Resp. 39 (citing Ex. 2007 ¶¶ 120-126, 130-133) (emphasis added). Dr. Balakrishnan explains this asserted instantaneous, or immediate, triggering requirement as follows:

The modulation based on attention described by the ’660 patent is only useful when the modulation occurs *immediately* in response to a determination that the user is either paying attention or not paying attention. For example, in the [’]660 patent’s augmented television device, if the television is configured to pause audiovisual material when the user is not paying attention, the pausing operation should occur *immediately* when it is determined that the user’s attention is not directed toward the device (e.g., glint, pupil and camera are not aligned on the camera axis). *Immediate* pausing is necessary so that the user does not miss any portion of the audiovisual material. If the television did not pause *immediately*, then the ’660 patent’s modulation would prove to be ineffective and indeed not a true modulation based on the user’s attention toward the device, as claimed. The same holds true for the ’660 patent’s attention monitor example, where a user would need *immediate* re-routing or prioritization of messages/calls, in order for the modulation of

the operation based on the user's attention to prove meaningful and effective. This aspect of the '660 patent is important in order to properly appreciate the significant differences between Ho and the claimed invention of the '660 patent.

Ex. 2007 ¶ 126 (emphasis added). We do not agree with Dr. Balakrishnan that the modulation based on attention, as described in the '660 Patent, is useful only when the modulation occurs immediately in response to a determination that the user is or is not paying attention. *See id.* As Petitioner argues, Dr. Balakrishnan's analysis fails to consider examples described in the '660 Patent that require monitoring attention over time. *See* Pet. Reply 16; Ex. 1001, 13:9-20, 15:4-21, 18:9-21; 19:34-37; Ex. 1068, 187:7-193:22.

In one example described in the '660 Patent, “attentive user interfaces employing eye contact sensors or other related eye tracking technology may be used to initiate the retrieval of information on the basis of progressive disclosure.” Ex. 1001, 18:9-12. “For example, information may initially be shown with limited resolution on the side of a display.” *Id.* at 18:12-14. If the user looks at that information “for a set amount of time, [however,] more detailed information is retrieved and rendered on the screen using a larger surface.” *Id.* at 18:14-17. “Examples include stock market tickers that grow and provide more information when users pay attention to it.” *Id.* at 18:17-18.

Accordingly, we are not persuaded by Patent Owner that “modulated on the basis of the measure or

index of the user's attention toward the device" requires instantaneous, or immediate, triggering. To the contrary, as described in the '660 Patent, operation of the device may be modulated on the basis of a measure or index of the user's attention toward the device over a period of time.

4. *"initiated by the device"*

Claim 1 recites that "the operation that is modulated is *initiated by the device* and provides a notification and/or information and/or communication to the user based on the user's attention toward the device" (emphasis added). In our Institution Decision, we preliminarily determined that the broadest reasonable interpretation consistent with the Specification of "initiated by the device" is its ordinary meaning, i.e., "set going by the device." Inst. Dec. 9 (citing Ex. 3001 (MERRIAM-WEBSTER'S COLLEGIATE DICTIONARY 601 (10th ed. 1993))). Below, we revisit our preliminary interpretation but determine to maintain it.

Petitioner asserted in the Petition that "[t]he '660 Patent draws a distinction between 'user-initiated' and 'device-initiated' operations." Pet. 6 (citing Ex. 1001, 2:4-7, 9:58-64). "For user-initiated operation," according to Petitioner, "the operation initiates in response to explicit user input control provided by a user and, for a device-initiated operation, the operation initiates without explicit user input control provided by a user." *Id.* (citing Ex. 1003 ¶ 20). Petitioner argued that "a proper construction of 'initiated by the device' must be

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broad enough to include ‘initiated without explicit user input control provided by a user.’” *Id.* at 7. In our Institution Decision, we disagreed with Petitioner’s proposed construction based on the following analysis:

To the extent Petitioner argues that, by definition in the Specification, a device-initiated operation *must* initiate without explicit user input control provided by a user, we disagree. The Specification provides several examples where a user’s explicit attention toward a device functions as an input control with respect to device-initiated operations. *See, e.g.*, Ex. 1001, 10:36-44 (user’s attention directed to a particular device in a network of devices controls routing of device-initiated messages to that device), 11:58-64 (user’s acknowledgment of a device’s request for attention controls the method of device-initiated communication to the user), 20:1-3 (user’s fixed gaze at a display icon controls enlargement of the icon to reveal a device-initiated message). Accordingly, we are not persuaded that a person of ordinary skill in the art (“POSITA”) “would have understood that the specification differentiates a user-initiated operation and a device-initiated operation based on the explicit user input control needed to initiate the operation,” as Petitioner contends. Ex. 1003 ¶ 20; *see* Pet. 6.

Inst. Dec. 8.

In the Patent Owner Response, Patent Owner proposes to clarify our preliminary interpretation of “initiated by the device” as “set going by the device *without*

explicit user-initiated control.” PO Resp. 14-15 (emphasis added). Patent Owner asserts that the prosecution history of the related ’665 Patent supports its proposed claim construction, because the claims were amended during prosecution “specifically to distinguish over prior art related to user-initiated control of the device.” *Id.* at 14 (citing Ex. 2006, 55-56). Petitioner’s Reply does not address Patent Owner’s proposed clarification.

Patent Owner has not persuaded us that any change to our preliminary interpretation is necessary. We note that the portion of the prosecution history cited by Patent Owner does not indicate that the term “initiated by the device” was added or changed during prosecution. Accordingly, we maintain our interpretation.

C. The Parties’ Post-Institution Arguments

In our Institution Decision, we concluded that the argument and evidence adduced by Petitioner demonstrated a reasonable likelihood that various selections of claims 1-6, 8-16, 18, 19, and 21 were unpatentable as either anticipated by Goldstein, Dec. 9-14, or Ho, *id.* at 14-17, or obvious in view of the combinations of Ho and Roschelle, *id.* at 17-19, or Horvitz and Tognazzini, *id.* at 20-23. We must now determine whether Petitioner has established by a preponderance of the evidence that the specified claims are unpatentable over the cited prior art. 35 U.S.C. § 316(e). In this connection, we previously instructed Patent Owner that “any

arguments for patentability not raised in the [Patent Owner Response] will be deemed waived.” Paper 12, 3; *see also* 37 C.F.R. § 42.23(a) (“Any material fact not specifically denied may be considered admitted.”). Additionally, the Board’s Trial Practice Guide states that the Patent Owner Response “should identify all the involved claims that are believed to be patentable and state the basis for that belief.” Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012).

In connection with the uncontested arguments and evidence adduced by Petitioner to support its positions, for example, with respect to the dependent claims (identified below) that Patent Owner chose not to address in its Patent Owner Response, the record now contains unrebutted arguments and evidence presented by Petitioner regarding the manner in which the asserted prior art teaches all other elements of the claims against which that prior art is asserted. Based on the preponderance of the evidence before us, we conclude that the prior art identified by Petitioner describes all limitations of the reviewed claims except for those that Patent Owner contested in the Patent Owner Response, which we address below.

D. Asserted Anticipation by Goldstein

To anticipate a patent claim under 35 U.S.C. § 102, “a single prior art reference must expressly or inherently disclose each claim limitation.” *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008). Under the principles of inherency, if the prior

art necessarily functions in accordance with, or includes, the claim limitations, it anticipates, even though artisans of ordinary skill may not have recognized the inherent characteristics or functioning of the prior art. *MEHL/Biophile Int'l Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999) (citation omitted); *In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1349-50 (Fed. Cir. 2002).

Petitioner contends that Goldstein anticipates claims 1-6, 10-12, 14-16, and 21. *See* Pet. 13-25. For the reasons discussed below, we determine that Petitioner has established anticipation of those claims by Goldstein by a preponderance of the evidence.

1. Overview of Goldstein

Goldstein is a U.S. Patent Application Publication titled “Method and Apparatus for Gaze Responsive Text Presentation in RSVP^[2] Display.” Ex. 1005, at (10), (54).³ Goldstein discloses that, “[b]y means of the invention, adjustments for . . . *inattention* . . . are modeled . . . into the RSVP electronic reading paradigm.” *Id.* ¶ 8 (emphasis added). “More particularly, if the user of an RSVP text display device becomes *inattentive* so that his eyes are no longer focused on the text display window, text presentation is automatically paused or halted.” *Id.* (emphasis added). “Thereafter, when the

² “RSVP” is an acronym for “rapid serial visual presentation.”

³ The inventors listed on the face of the publication are Mikael Goldstein, Bjorn Jonsson, and Per-Olof Nerbrant. *Id.* at (76).

reader's eyes again focus on the display window, text presentation is automatically resumed, usefully at the beginning of the last sentence previously read." *Id.* The Abstract mirrors this disclosure:

Eye tracking sensors are used to detect when a reader's focus shifts outside the text window, indicating that the reader has become *inattentive* to displayed text. Thereupon, presentation of text is halted. When the eye tracking sensors detect that the focus of the reader's eyes has shifted back into the text window, text presentation is resumed.

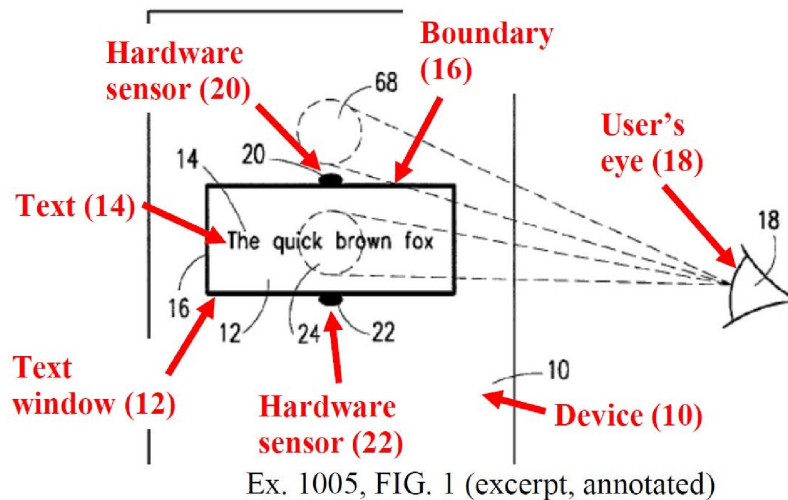
Id. at (57) (emphasis added).

2. *Analysis of Claim 1*

According to Petitioner, Goldstein discloses all limitations of claim 1. Pet. 13-22. As explained by Petitioner, Goldstein describes the process of pausing and resuming presentation of text on a mobile device based on the user's attentiveness towards the device, which is determined by sensing the user's "eye gaze direction" or "point of gaze." *Id.* at 9-10, 13-22. Petitioner provides a detailed analysis explaining where Goldstein discloses each limitation of claim 1. *Id.* at 13-22. For the reasons advanced by Petitioner, and the additional reasons discussed below, we agree that Goldstein anticipates claim 1.

a) “in or on the device”

Regarding the limitation “a hardware sensor *in or on the device* that senses attention of the user specifically toward the device” (emphasis added), Petitioner asserts that “FIG. 1 [of Goldstein] shows the hardware sensors 20 and 22 disposed *on* the device 10.” Pet. 13-14 (emphasis added). Petitioner’s annotated version of Goldstein’s Figure 1 is reproduced below.



Id. Petitioner’s annotated version of Goldstein’s Figure 1 shows hardware sensors 20 and 22.

As shown in the annotated figure above, Goldstein’s mobile device 10 includes rectangular window 12. *See* Ex. 1005 ¶ 19. “[B]oundary 16 [is] positioned along respective edges of rectangular window 12.” *Id.* ¶ 20. “[E]ye tracking sensors 20 and 22 [are] located

proximate to boundary 16, above and below window 12, respectively.” *Id.* ¶ 21. Goldstein discloses that:

Sensor 20 could, for example, comprise an eye tracking device developed by the IBM Corporation at its Almaden Research Center, which is referred to by the acronym MAGIC and is described in further detail hereinafter, in connection with FIG. 2. This device is *mounted proximate to a display screen, in a known positional relationship.*

Id. (emphasis added).

Patent Owner disputes Petitioner’s assertion that Goldstein discloses disposing a hardware sensor “in or on the device.” *See* PO Resp. 16. According to Patent Owner, “Goldstein only states that sensors 20 and 22 are ‘mounted proximate to a display screen, in a known positional relationship.’” *Id.* 16-17 (citing Ex. 1005 ¶ 21). Patent Owner argues that “[t]he words ‘mounted proximate’ indicate that the sensors are *near—but not in or on—the device.*” *Id.* at 17 (citing Ex. 2007 ¶¶ 37-38, 42, 44).

Patent Owner also asserts that “the frontal views” provided by Goldstein’s figures do not show depth and thus do not disclose “the true proximity of the sensors to the device.” *Id.* Accordingly, Patent Owner argues, “a proper analysis must consider what a POSA would interpret the disclosure to mean.” *Id.* (citing *In re Daniel*, 34 F.2d 995, 999-1000 (CCPA 1929)). Patent Owner further asserts that “[a] POSA would have understood that Goldstein’s Fig. 1, for example, is *not to scale.*” *Id.*

According to Patent Owner, “a POSA would have understood Goldstein’s figures to simply illustrate the general concept, and not an actual to-scale implementation of Goldstein’s system—let alone the claimed combination.” *Id.* at 17-18.

Further, relying on extrinsic evidence, Patent Owner argues that “Goldstein actually identifies an exemplary sensor—IBM’s MAGIC tracker” (*id.* at 18 (citing Ex. 1005 ¶ 21)), “[b]ut such a system was not conventionally implemented ‘in or on’ a cell phone” as required by claim 14 (*id.* (citing Ex. 2007 ¶¶ 48-51; Ex. 2008 ¶¶ 25-41)). “Instead,” according to Patent Owner, “IBM’s MAGIC tracker was placed ‘proximate to’ or near a display screen—consistent with Goldstein’s explicit disclosure.” *Id.* Patent Owner asserts that IBM’s MAGIC tracker was three times larger than Goldstein’s entire 1 1/2 inch display window.” *Id.*

Patent Owner further argues that “[a] POSA would [not have] envisioned the remote eye tracking systems referenced at 20 and 22 to have actually been implemented *in or on* a mobile device.” *Id.* This is because, as asserted by Patent Owner, the large size of eye tracking technology would have destroyed the mobile device’s mobility, and “it was not uncommon to place an eye tracker in a central, proximate relation to a computer screen without having the hardware in or on the screen.” *Id.* (citing Ex. 2011; Ex. 2014, ch. 7; Ex. 2007 ¶¶ 52-56). Patent Owner argues that, consistent with Goldstein’s disclosure, a separate eye tracker could have been mounted in front of the screen and aimed at the eyes of a user, who looks at the screen. *Id.*

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at 18-19 (citing Ex. 1005, Fig. 1; Ex. 2011, Figs. 3-6; Ex. 2007 ¶¶ 53-54).

We have considered all of Patent Owner's arguments, but we are persuaded that Goldstein discloses a hardware sensor "in or on the device," as claim 1 requires. As stated in Goldstein, Figure 1 "is a simplified view showing an RSVP display disposed to operate in accordance with an embodiment of the invention." Ex. 1005 ¶ 13. The referenced "RSVP display" is "window 12 for displaying a text segment 14 on a single line." *Id.* ¶ 19, Fig. 1. Goldstein describes device 10 as "provided with" window 12, and Figure 1 clearly indicates that window 12 and its boundary 16 are located in or on mobile device 10. *Id.* ¶¶ 19, 20, Fig. 1.

Similarly, Goldstein describes sensors 20 and 22 as located proximate to boundary 16, above and below window 12, respectively. *See* Ex. 1005 ¶ 21, Fig. 1. Figure 1 shows sensors 20 and 22 touching the outside of boundary 16. In that context, a POSA would have understood Figure 1 to depict a simplified view of sensors 20 and 22 located in or on mobile device 10, proximate to boundary 16, and above and below window 12. *See* Ex. 1085 ¶ 26 (opining that "sensors 20 and 22 are located on the mobile device 10 in the same way the display window 12 is located on the mobile device 10").

Claim 11 of Goldstein confirms that sensors 20 and 22 are located in or on mobile device 10. The claim pertinently recites:

11. *In a device* provided with an RSVP display window for presenting text to a reader,

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said window having a boundary, apparatus for selectively adjusting said presentation of text comprising:

a sensor for detecting changes in orientation of a reader's eyes. . . .

Ex. 1005, claim 11 (emphases added). As expressly recited, a sensor is located “in” the device. *See* Ex. 1085 ¶ 25 (asserting that “claim 11 in Goldstein also discloses ‘a sensor’ as being ‘[i]n a device’”).

Furthermore, the only reasonable understanding of Goldstein's disclosure is that sensors 20 and 22 are located in or on mobile device 10. Patent Owner has not explained credibly how sensors 20 and 22 can be located as described in Goldstein, i.e., “proximate to boundary 16, above and below window 12, respectively,” unless they are located in or on mobile device 10. Patent Owner's argument that a separate sensor could be located in front of screen 12 would require a structure for mounting the sensor in the disclosed positional relationship. As Dr. Essa testifies, however, “[o]ther than the mobile device 10, no mounting structure for the sensors 20 and 22 is shown in FIG. 1, and no additional mounting structure is disclosed in Goldstein.” Ex. 1085 ¶ 26. Further, Goldstein discloses a mobile device, not a stationary device. Patent Owner has not explained how the sensor could be mounted in the required positional relationship with respect to the screen of Goldstein's mobile device.

b) “*a measure or index of the user’s attention toward the device*”

Regarding the limitation “a processor that processes a signal from the hardware sensor and outputs to the device *a measure or index of the user’s attention toward the device*” (emphasis added), Petitioner asserts that Goldstein’s processor 46 processes a signal from eye tracking sensor 20 and outputs to the device, i.e., to text presentation control 48, a signal that constitutes a binary measure of the user’s attention toward the device. Pet. 15. Further, with respect to the limitation “operation of the device is modulated on the basis of the measure or index of the user’s attention toward the device,” Petitioner asserts:

By pausing and resuming presentation of text content based on point of gaze data provided by the hardware sensor 20/22 and a control signal representative of whether the point of gaze data indicates that the reader is looking at the display, operation of the Goldstein mobile device “is modulated on the basis of the measure or index of the user’s attention toward the device.”

Id. at 20 (citing Ex. 1003 ¶¶ 34, 35). Petitioner explains that the signal from processor 46 to text presentation control 48

represents a binary measure of the user’s attention toward the device in that the signal changes between two states (e.g., an inattentive state that causes the text presentation control 48 to pause presentation and an

attentive state that causes the text presentation control 48 to resume presentation) depending on whether the reader is looking at the device or not.

Id. at 18 (citing Ex. 1005 ¶ 31; Ex. 1003 ¶ 32).

In response, Patent Owner asserts that “Goldstein never outputs a measure or index of the user’s attention toward the device.” PO Resp. 35. According to Patent Owner, the geometric computation in Goldstein that determines the reader’s point of gaze is “the only information that arguably can be relied upon to meet the claimed measure of the user’s attention toward the device.” *Id.* at 36. Patent Owner asserts that Goldstein does not disclose outputting the geometric computation toward the device, as required by the claim, but rather discloses outputting only a simple binary control signal:

Goldstein explicitly states that once the geometric computation (i.e., user’s attention toward the device) is performed, processor 46 sends a control signal to a text presentation control 48 to either pause or resume further presentation of text on the display window. [Ex. 1005 ¶ 31]. Hence, Goldstein delineates a difference between its geometric computation (i.e., user’s measure of attention toward the device) and its control signal (i.e., a simple binary signal to control the presentation of text).

Id. Patent Owner further asserts:

The control signal output to the text presentation control 48, for example, may simply be in the form of a single bit of digital data (i.e., a 1 or 0) to indicate the pausing or resuming of text display. As such, the control signal may contain no information about the data actually sensed by the sensor or the location of the reader's gaze. In other words, the control signal is not necessarily a measurement or index of a user's attention.

Id. at 36-37.

We agree with Petitioner that the signal from processor 46 to text presentation control 48 is “a measure or index of the user's attention toward the device.” As disclosed in Goldstein, processor 46, which is contained within mobile device 10, performs a geometric calculation to determine the direction of the reader's point of gaze based on data received from sensor 20. Ex. 1005 ¶ 31, Fig. 3. “If processor 46 determines that the reader's point of gaze has moved out of the display window 12 since the last computation, processor 46 sends a signal to a text presentation control 48 to pause further presentation of text on the display window.” *Id.* ¶ 31. “Thereafter, processor 46 will signal control 48 to resume presentation, upon determining that the reader's point of gaze is again focused upon the text in window 12.” *Id.* The signal from processor 46 to text presentation control 48 is representative of the extent, quantity, amount, or degree of the reader's attention toward the device, as determined by measurement or

calculation, and thus is a “measure” of the user’s attention under our claim interpretation. *See supra* Section II.B.1.

Patent Owner has not persuaded us that a simple binary control signal cannot be a measure or index of a user’s attention toward a device. Indeed, the ’660 Patent expressly describes using “eye contact sensors,” for example, with “televisions and other audiovisual content delivery systems . . . to determine whether [their] content is being viewed, and to take appropriate action when it is no longer viewed.” Ex. 1001, 15:49-52; *see id.* at 6:67-7:4. A binary signal determined by calculation of eye contact/no eye contact accords with our interpretation of “measure,” discussed above, in that it indicates the extent, quantity, amount, or degree of something, as determined by measurement or calculation. *See supra* Section II.B.1.

c) Summary

For the reasons given, we conclude that Petitioner has shown by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 102(e) as anticipated by Goldstein.

3. Analysis of Claim 14

a) Disclosure

Claim 14 recites “[t]he apparatus of claim 1, wherein the device is a cellular telephone.” We are persuaded that Goldstein discloses the “cellular

telephone” limitation of claim 14, because Goldstein discloses implementing claim 1 on mobile communication devices, including mobile phones, and a POSA would have identified cellular telephones as a well-known species of mobile phones. *See* Pet. 24-25; Ex. 1005, Abstract, ¶¶ 2, 19; Ex. 1003 ¶ 41; Ex. 2003, 21. “Verbatim disclosure of a particular species is not required in every case for anticipation because disclosure of a small genus can be a disclosure of each species within the genus.” *Ineos USA LLC v. Berry Plastics Corp.*, 783 F.3d 865, 872 (Fed. Cir. 2015) (citing *Atofina v. Great Lakes Chemical Corp.*, 441 F.3d 991, 999 (Fed. Cir. 2006) (citing *In re Petering*, 301 F.2d 676, 682 (CCPA 1962))).

b) Enablement

(1) The Shifting Burdens of Production

As Petitioner contends, prior art printed publications are presumptively enabling. Pet. Reply 7 (citing *In re Antor Media Corp.*, 689 F.3d 1282, 1287-88 (Fed. Cir. 2012); *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1355 (Fed. Cir. 2003)); *accord Google, Inc. v. Jongerious Panoramic Techs., LLC*, IPR2013-00191, slip op. at 37 (PTAB Aug. 12, 2014) (Paper 70). In view of that presumption, Petitioner satisfied its initial burden of production with respect to its anticipation challenge to claim 14 based on Goldstein by arguing persuasively that Goldstein’s disclosure was anticipating. *See Amgen*, 314 F.3d at 1355; *Impax Labs., Inc. v. Aventis Pharms., Inc.*, 545 F.3d 1312, 1316

(Fed. Cir. 2008); *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1379-80 (Fed. Cir. 2015). The burden of production then shifted to Patent Owner to argue or to produce evidence that Goldstein actually does not anticipate, or that its relevant disclosures are not pertinent prior art, for example, as Patent Owner argues in this case, because they are not enabled. See *Amgen*, 314 F.3d at 1355; *Dynamic Drinkware*, 800 F.3d at 1380.⁴

Patent Owner argues that “Goldstein’s disclosure would not have enabled a POSA to arrive at claim 14 of the ’660 Patent, due to the significant technical problems a POSA would have faced when trying to implement Goldstein’s disclosed eye tracker on a cellular phone.” PO Resp. 20. Among the technical problems a POSA would have faced, Patent Owner asserts, are: (1) operating system limitations; (2) insufficient processor speed and memory; and (3) the problem of relative movement of user and tracker in a handheld environment. *Id.* at 21 (citing Ex. 2010, 19; Ex. 2008 ¶¶ 44-59, 60-73).

Relying on testimony from Dr. Balakrishnan and Dr. Pelz, Patent Owner argues that, “[a]t the time of invention, implementing eye tracking systems on mobile devices had not been achieved, because available eye tracking systems were not suitable for integration

⁴ As Patent Owner notes, the ultimate burden of persuasion in this *inter partes* review is on Petitioner to prove “unpatentability by a preponderance of the evidence,” 35 U.S.C. § 316(e), and that burden never shifts to Patent Owner. Surreply 1-2 (citing *Dynamic Drinkware*, 800 F.3d at 1378).

in or on mobile devices.” *Id.* at 21 (citing Ex. 2007 ¶¶ 57-59; Ex. 2008, ¶¶ 42-59). Patent Owner further argues that “Goldstein’s alleged disclosure that one could simply implement the eye-tracking system on a cell phone or PDA, without additional detail, is insufficient to enable a POSA to accomplish this task.” *Id.* Patent Owner also argues that “[a] POSA would not have been able to implement IBM’s eye tracker, as described by Goldstein, in or on a mobile device, such as a PDA or cell phone, without undue experimentation.” *Id.* at 22 (citing Ex. 2007 ¶¶ 57-59; Ex. 2008 ¶¶ 42-59). Patent Owner asserts: “Experts in the field have actually tried and failed to implement eye *trackers* similar to the IBM tracker on handheld devices before and long after the time of invention.” *Id.* (citing Ex. 2007 ¶¶ 57-59; Ex. 2010; Ex. 2019; Ex. 2015; Ex. 2012).

Patent Owner’s expert, Dr. Pelz, testifies, for example, that a group of researchers in the field failed in their attempt to port a desktop eye-tracking system, called “Smart Eye,” “to the most powerful PDA available at the time, the iPAQ 3630.” Ex. 2008 ¶ 47 (citing Ex. 2010, 27). Dr. Pelz explains that the researchers wanted to use the Smart Eye system to control a RSVP application for PDAs, called “Bailando.” *Id.* (citing Ex. 2010, 16-18). Dr. Pelz further testifies that “[t]he failure to implement the Smart Eye system on a handheld device lead researchers to instead implement the Smart Eye system as a desktop server with the PDA as its client.” *Id.* ¶ 48 (citing Ex. 2010, 27). This client/server implementation is the “Smart Bailando,” discussed below. *See* Ex. 2010, 20.

(2) *Petitioner's Reply Evidence*

Petitioner challenges the testimony of Patent Owner's experts, Dr. Balakrishnan and Dr. Pelz, based largely on the testimony of Dr. Essa. *See, e.g.*, Pet. Reply 8-14; Ex. 1085 ¶¶ 33-108. Petitioner argues that "Dr. Essa evaluated the *Wands* factors (858 F.2d 731 (Fed. Cir. 1988)) and concluded that a POSITA would have found Goldstein enabling." *Id.* at 14 (citing Ex. 1085 ¶¶ 99-108). Dr. Essa testifies, for example, as follows:

100. In particular, a POSITA would have been able to mount an eye sensor on a mobile device (e.g., cellular phone or PDA) as of the Critical Date. For instance, . . . the Smart Bailando prototype^[5] shows a camera used to perform eye sensing mounted to a PDA. In addition, the sensor described in the Morimoto paper (Ex. 1062)^[6] could have been

⁵ Dr. Balakrishnan discusses a "*Bailando* prototype" that is different from the Smart Bailando prototype discussed by both Dr. Pelz and Dr. Essa. *Compare* Ex. 2007 ¶¶ 43-44, *with* Ex. 1085 ¶¶ 55-62 *and* Ex. 2008 ¶¶ 47-48. The "*Bailando* prototype" was an experimental setup in which subjects wore infrared eye-tracking goggles connected to a personal computer ("PC"). Ex. 2007 ¶ 43 (citing Ex. 2024, 113). In the Smart Bailando prototype, a camera was mounted on a personal digital assistant ("PDA"). Ex. 1085 ¶¶ 56 (citing Ex. 1067, 4).

⁶ Dr. Balakrishnan discusses the SONY EVI-D30 camera implementation of the IBM MAGIC Tracker, but this is not the IBM eye tracker device disclosed by Goldstein. *See* Pet. Reply 10 (citing Ex. 1085 ¶ 64); Ex. 1005 ¶¶ 21, 30. Rather, Goldstein discloses (Ex. 1005 ¶¶ 21, 30) the IBM eye tracker device referenced in the "MAGIC paper" (Ex. 1017) and the "Morimoto paper" (Ex. 1062). *See* Ex. 1085 ¶¶ 29, 33-35.

mounted or attached to PDAs and cellular phones available as of the Critical Date. . . . I also believe the IBM PupilCam⁷ could have been mounted to these types of devices. . . . In addition, a POSITA would have been able to reduce the size of the sensor described in the Morimoto paper and the IBM PupilCam based on the camera used and implementation details.

101. Further, as of the Critical Date, cellular phones and PDAs included built-in cameras that could have been used as the imaging device in an eye sensor. . . . Also, as of the Critical Date, camera add-ons were available that could have been used as the imaging device in an eye sensor. . . . By using a built-in or add-on camera, a POSITA would have only needed to add lighting components to implement the IBM eye sensing technology.

Ex. 1085 ¶¶ 100-101 (citations omitted).

Petitioner argues that “Dr. Balakrishnan only reviewed a SONY EVID30 camera version of the IBM MAGIC Tracker,” and “fail[ed] to consider a number of [other] IBM sensors available at the relevant time frame.” Pet. Reply 10 (citing Ex. 1085 ¶ 64). Petitioner further argues that “Dr. Pelz’s Declaration relies solely on the same IBM MAGIC Tracker as Dr. Balakrishnan and is similarly deficient.” *Id.* (citing Ex. 1085 ¶¶ 25-41). Petitioner additionally challenges Dr. Pelz’s

⁷ The IBM PupilCam was another IBM eye sensing system available as of the Critical Date. Ex. 1085 ¶ 40 (citing Ex. 1061, Abstract, 1).

testimony regarding the state of mobile device technology in 2003. *Id.* at 10-12.

Petitioner additionally asserts that “neither Dr. Balakrishnan nor Dr. Pelz assessed ability to implement *eye contact detection* on a mobile device.” *Id.* at 9 (emphasis added). According to Petitioner, “[b]oth [Dr. Balakrishnan and Dr. Pelz] consistently discuss implementation of an ‘eye tracker’ and both agreed that, when they referred to an ‘eye tracker’ or ‘eye tracking,’ they were referring to tracking gaze over time.” *Id.* (citing Ex. 1068, 159:13-160:13, 175:7-23; Ex. 1069, 120:10-121:21). Petitioner argues that “Goldstein’s pause/resume functionality does not require tracking gaze over time and, as such, [Patent Owner’s] declarants considered a more difficult problem than required.” *Id.* (citing Ex. 1085 ¶ 63).

Petitioner also disputes Patent Owner’s assertion of “failures” and, in particular, the assertion that the Smart Bailando prototype was a failure. Pet. Reply 9-10. Petitioner argues that “even though ‘Smart Bailando’ used a ‘client/server implementation,’ ‘Smart Bailando’ still satisfied all elements of the ‘660 Patent claims” because “the processor of claim 1 need not be located on the cell phone.” *Id.* at 10.

(3) *Patent Owner’s Surreply*

In its Surreply, Patent Owner asserts that “Goldstein only describes an *eye tracker*, not an *eye contact sensor*,” and “[b]ecause Goldstein never mentions an eye contact sensor, [Petitioner’s] enablement analysis

is wholly erroneous.” Surreply 1, 3. Patent Owner argues:

[Petitioner] argues that it only “relies on Goldstein’s *pause/resume functionality* to anticipate the ’660 Patent claims.” Pet.’s Reply 8-9 (emphasis added). According to [Petitioner], an eye contact sensor—as opposed to an eye gaze tracker—could be used to enable this functionality. Because Goldstein never mentions an eye contact sensor, [Petitioner’s] enablement analysis is wholly erroneous.

Id. at 3. Patent Owner also argues that “the Petition explicitly relies on Goldstein’s disclosure of its ‘eye tracking sensor’ as the claimed hardware sensor.” *Id.* at 4 (citing Pet. 14-16).

Patent Owner additionally argues that Petitioner’s reliance on the IBM PupilCam and the sensor described in the Morimoto paper is “technically flawed” because “(i) neither of these devices has any discernible link to Goldstein; and (ii) neither of these disclosures indicate[s] that the respective cameras were operable in a mobile environment.” *Id.* at 7 (citing Ex. 1061, 2; Ex. 1062). Patent Owner also argues that Petitioner relies on the Smart Bailando prototype “despite . . . the researchers of the Smart Bailando prototype explicitly stating that the Bailando prototype did not work.” *Id.* (citing Ex. 2010, 27). Further, Patent Owner contends that Petitioner failed to rebut Patent Owner’s evidence. *Id.* at 8-10. Patent Owner argues, for example, that Petitioner “was unable to point to a single cell phone that was available in 2003 and

capable of performing eye tracking.” *Id.* at 9 (citing Ex. 2119, 183:15-26).

(4) *Analysis*

“In order to anticipate a claimed invention, a prior art reference must enable one of ordinary skill in the art to make the invention *without undue experimentation*.” *Impax Labs.*, 545 F.3d at 1314 (citations omitted) (emphasis added). In examining the “without undue experimentation” requirement, we consider such factors as: (1) the quantity of experimentation; (2) the amount of direction or guidance present; (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. *See id.* at 1314-15 (citing *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988)).

Prior art is not enabling so as to be anticipating unless a POSA could have combined the publication’s description of the invention with his own knowledge to make the claimed invention. *See Impax Labs., Inc. v. Aventis Pharms., Inc.*, 468 F.3d 1366, 1381 (Fed. Cir. 2006) (citing *In re Donohue*, 766 F.2d 531, 533 (Fed. Cir. 1985) (citation omitted)). “The standard for what constitutes proper enablement of a prior art reference for purposes of anticipation under section 102, however, differs from the enablement standard under section 112.” *Verizon Servs. Corp. v. Cox Fibernet Virginia, Inc.*, 602 F.3d 1325, 1337 (Fed. Cir. 2010) (citing *Rasmusson*

v. SmithKline Beecham Corp., 413 F.3d 1318, 1325 (Fed. Cir. 2005)). “It is well-settled that utility or efficacy need not be demonstrated for a reference to serve as anticipatory prior art under section 102.” *Id.* (citations omitted).

As discussed below, we determine that Petitioner’s reply evidence, particularly, the testimony of Petitioner’s reply expert, Dr. Essa, successfully rebuts Patent Owner’s evidence, including the testimony of Dr. Balakrishnan and Dr. Pelz, that a POSA could not have implemented an eye-tracking system on a PDA or cell phone, as of the Critical Date, without undue experimentation. *Compare* Ex. 1085 ¶¶ 33-108, *with* Ex. 2007 ¶¶ 48-51, 57-59 *and* Ex. 2008 ¶¶ 27, 36-73.

*Goldstein’s Disclosure of the
IBM Almaden Eye Tracker*

As discussed above, with respect to Figure 1, Goldstein discloses that “[s]ensor 20 could, for example, comprise an eye tracking device developed by the IBM Corporation at its Almaden Research Center. . . .” Ex. 1005 ¶ 21, Fig. 1. Referring to Figure 2, Goldstein further discloses “there is shown an eye tracking device of a type developed by the IBM Corporation and referred to above, which may be adapted for use as the sensor 20.” *Id.* ¶ 26. As described in Goldstein, the eye tracking device comprises two near infrared time multiplexed light sources, each composed of a set of infrared “light emitting diodes (‘LEDs’) synchronized with the camera frame rate.” *Id.* ¶ 27. Goldstein further

discloses that “[t]he eye tracker device disclosed above is described in further detail in a paper entitled Manual and Gaze Input Cascaded (Magic), S. Zhai, C. Morimoto and S. Ihde, In Proc. CHI ’99: ACM Conference on Human Factors in Computing Systems, pages 246-253. Pittsburgh, 1999” (Ex. 1017, the “MAGIC paper”). *Id.* ¶ 30.

The MAGIC Paper

The MAGIC paper describes the “IBM Almaden Eye Tracker” as follows:

We . . . chose to develop and use our own eye tracking system [10]. . . .

The Almaden system uses two near infrared (IR) time multiplexed light sources, composed of two sets of IR LED’s, which were synchronized with the camera frame rate. One light source is placed very close to the camera’s optical axis and is synchronized with the even frames. Odd frames are synchronized with the second light source, positioned off-axis. The two light sources are calibrated to provide approximately equivalent whole-scene illumination. Pupil detection is realized by means of subtracting the dark pupil image from the bright pupil image. After thresholding the difference, the largest connected component is identified as the pupil. This technique significantly increases the robustness and reliability of the eye tracking system. . . .

Once the pupil has been detected, the corneal reflection (the glint reflected from the surface of the cornea due to one of the light sources) is determined from the dark pupil image. The reflection is then used to estimate the user's point of gaze in terms of the screen coordinates where the user is looking at. The estimation of the user's gaze requires an initial calibration procedure, similar to that required by commercial eye trackers.

Ex. 1017, 4.

Reference “[10]” of the MAGIC paper, cited in the above quotation, is “Morimoto, C., *et al.*, *Pupil detection and tracking using multiple light sources*, 1998, IBM Almaden Research Center: San Jose” (Ex. 1062, the “Morimoto paper”). *Id.* at 8.

The Morimoto Paper

The Abstract of the Morimoto paper contains a description of a pupil detection and tracking system that is similar to the description of the “IBM Almaden Eye Tracker” set forth in the MAGIC paper. Ex. 1062, Abstract. The pupil detection and tracking system described in the Morimoto paper consists of a camera and two light sources. *Id.* at 3. Figure 1 of the Morimoto paper is reproduced below.

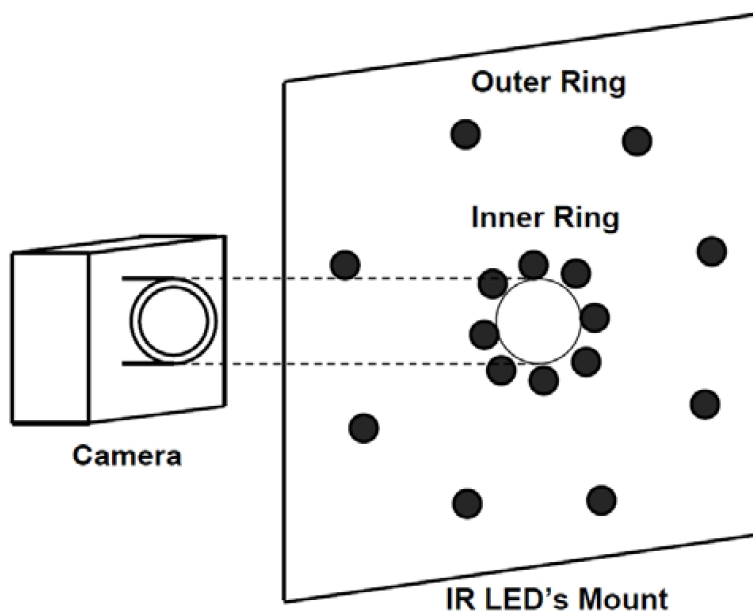


Figure 1 is a diagram showing the configuration of the camera and the light sources (illuminators). *Id.*, Fig. 1. As described in the Morimoto paper, the illuminators consist of 16 infrared LEDs distributed around two concentric rings, with 8 LEDs in each ring. *Id.* at 3. The Morimoto paper further describes a real-time implementation of the pupil detection system “running at 15 frames per second on a single processor Pentium 200 machine.” *Id.* at 5. The implementation uses a 1/3 inch CCD B & W board camera. *Id.* “[T]he system is quite robust even for people wearing glasses.” *Id.* at 6, Fig. 3. The Morimoto paper concludes: “The system has been successfully tested for a large number of people, and it has proven to be very robust indoors, particularly for office environments, although it has not been tested

outdoors, where high intensity illumination might introduce difficulties.” *Id.* at 6. Further, “[t]he system is inexpensive and very compact (the dimensions of the current implementation [are] about 9x9x3cm), and we are confident that his method could greatly increase the robustness and accuracy of current remote face and eye-tracking systems.” *Id.*

Implementation of IBM Eye Sensing Technology

We credit the testimony of Dr. Essa that, as of the Critical Date, “processing capabilities of mobile devices (e.g., cellular phones or PDAs) were sufficient to enable a POSITA to implement the IBM eye sensing technology,” including the eye-tracking system described in the Morimoto paper (Ex. 1062) and the eye sensing described in Dr. Essa’s work with Myron Flickner (Exs. 1063 and 1064).⁸ *See* Ex. 1085 ¶ 102. Contrary to Dr. Pelz’s testimony that the most powerful PDA processor, the iPAQ 3630, operated at 206 MHz (Ex. 2008 ¶ 47), Dr. Essa testified credibly that, in fact, there were a number of cellular phones and PDAs with 400 MHz processors, including the iPAQ 3950 released in July 2002 as an updated version of the iPAQ 3630. *See* Ex. 1085 ¶ 72 (citing Ex. 1044, 2; Ex. 1052, 1, 3),

⁸ Dr. Essa’s work with Myron Flickner was directed to improving pupil detection and eye tracking technology for “creating attentive user interfaces.” *See* Ex. 1085 ¶ 43 (citing Ex. 1064, Abstract). Dr. Essa and Myron Flickner built a reliable, real-time, non-invasive eye tracker using computer vision that could robustly locate and track eyes without any calibration, and estimate the user’s focus of attention. *Id.* The eye tracker ran on a single Pentium II 200 MHz processor. *Id.* ¶ 46 (citing Ex. 1063, 5).

¶¶ 73-88. In fact, the Tiqit eightythree was a handheld device with cellular capability that ran a desktop operating system with a Pentium 300 MHz processor. *Id.* ¶¶ 87-88.

We give little weight to Dr. Balakrishnan's enablement analysis because it is based on a SONY EVI-D30 camera implementation of the IBM MAGIC Tracker, without consideration of other relevant eye sensing technology of which a POSA would have known. *See, e.g.*, Ex. 2007 ¶¶ 5759; Ex. 1085 ¶¶ 33-47, 64. Dr. Balakrishnan testified, for example, that eye-tracking devices at the time, such as IBM's MAGIC Tracker, were too massive for a POSA to have considered placing them on a mobile device. Ex. 2007 ¶¶ 48-50. Dr. Balakrishnan, however, did not consider the eye-tracking system described in the Morimoto paper (Ex. 1062)⁹ or the eye sensing described in Dr. Essa's work with Myron Flickner (Exs. 1063 and 1064). *See* Ex. 1085 ¶¶ 36-38, 42-47. We credit the testimony of Dr. Essa that the Tiqit eightythree, discussed above, could have implemented the eye sensing described in the Morimoto paper (Ex. 1062) and the eye sensing described in Dr. Essa's work with Myron Flickner (Exs. 1063 and 1064):

For instance, the Tiqit eightythree included a Pentium Class 300 MHz processor that ran a full PC operating system (Microsoft Windows

⁹ The Morimoto paper describes a pupil detection system that is "very compact (the dimensions . . . [are] about 9x9x3cm)." *See* Ex. 1085 ¶ 38 (quoting Ex. 1062, 7). The pupil detection system ran on a single Pentium 200 processor. *See id.* (citing Ex. 1062, 5).

XP). . . . This device certainly could have implemented the eye sensing described in the Morimoto paper (Ex. 1062) and the eye sensing described in my prior work with Myron Flickner (Exs. 1063 and 1064), as those systems ran on less powerful Pentium processors. . . . These eye sensing technologies could have been used to implement the eye sensing needed for Goldstein’s automated pause/resume functionality. Moreover, the Tigit eightythree device shows that it was possible to include a Pentium processor running a full PC operating system in a handheld form factor.

Id. ¶ 102.

The Smart Bailando Prototype

Mikael Goldstein, one of the inventors named on the face of the asserted Goldstein prior art reference, co-authored a paper titled: “Utilizing Gaze Detection to Simulate the Affordances of Paper in the Rapid Serial Visual Presentation Format” (the “Goldstein paper”). Ex. 1067, 1. The Goldstein paper states:

If one enhanced the RSVP application with sensors that register the reader’s gaze, *gaze detection*, the application could become context-aware [15] and automatically stop/start the text presentation when the reader looked away from the text. A precondition for this would be that the terminal using the RSVP format would have a built-in camera focused on the reader’s eyes continuously

during RSVP reading. Mobile phones are currently being released on the market with such a camera integrated into their design (e.g. the Sony Ericsson P800 and the Nokia 7650) and cameras can be bought as add-on modules for PDAs (e.g. the HP Pocket Camera) soon making this requirement very easy to fulfill. Based on the observations presented above, we believe that adding gaze detection functionality to RSVP reading on hand-held PDAs and cellular phones is one feasible route to making reading on small devices as convenient as ordinary screen or paper reading.

Id. at 2-3. The Goldstein paper discusses the “Smart Bailando,” which also is the subject of a Master’s Thesis titled “Smart Bailando, Eye controlled RSVP on handhelds.” *Id.* at 3; Ex. 2010, 1.

As discussed below, the Smart Bailando prototype constitutes a *working model* of the invention of claim 1 of the ’660 Patent as implemented on a handheld device. *See Impax Labs.*, 545 F.3d at 1314; Ex. 1085 ¶ 105. Built as the client of a client-server application running on a PC, the Smart Bailando prototype utilizes a camera mounted “on” a PDA to control text presentation by starting and pausing RSVP text flow based on gaze detection, i.e., sensing attention of a user specifically toward the device. Ex. 1085 ¶¶ 54-56 (citing Ex. 1067, Abstract, 4); Ex. 1067, 3; Ex. 2010, 8. With respect to the “processor limitation” of claim 1 of the ’660 Patent, we concur with Dr. Essa’s conclusion that “[a]lthough the processing in the Smart Bailando prototype does not occur on the PDA, . . . the claims of the

'660 Patent do not require the processor to be part of the device.” Ex. 1085 ¶ 62.

We have considered the statement in Exhibit 2010, on which Patent Owner relies, that porting the Smart Eye gaze detection system to an iPAQ 3630 PDA “would not work,” as well as the related testimony of Dr. Pelz concluding that the attempt of the Smart Eye Company to port its system to a handheld device was a “failure.” See Surreply 7 (citing Ex. 2010, 27); Ex. 2008 ¶¶ 47, 48. We, however, accord little weight to this evidence for two reasons, which we discuss below.

First, we are not persuaded that either claim 1 or claim 14 of the '660 Patent requires directly *porting* an eye detection system to a device such that the recited “processor” is a part of the device. Claim 1 recites “a processor that processes a signal from the hardware sensor and outputs to the device a measure or index of the user’s attention toward the device.” As discussed above, nothing in this language precludes utilizing a client/server implementation whereby the processor that performs the functional requirements of the claim is a part of the server rather than the client device. See Ex. 1085 ¶ 62. Accordingly, directly porting an eye gaze detection system to a device, such that the processor is a part of the device, is not required by the claim.

Second, the Smart Eye Company’s unsuccessful attempt to port its eye gaze detection system to an iPAQ 3630 PDA is of little probative value in determining whether a POSA could have ported an eye-tracking system to a handheld device as of the Critical Date,

without undue experimentation. This is because: (1) the Smart Eye system required significantly more processing power than other eye-tracking systems available to a POSA as of the Critical date, such as the eye-tracking system described in the Morimoto paper (Ex. 1062) or the eye sensing described in Dr. Essa's work with Myron Flickner (Exs. 1063 and 1064); and (2) the iPAQ 3630 PDA possessed significantly less processing power than other handheld devices available to a POSA as of the Critical Date, such as the Tiqit eightythree handheld device (Ex. 1081). *See* Ex. 2008 ¶ 47; Ex. 2010, 21, 27; Ex. 1085 ¶¶ 38, 46, 72, 102, 103. Specifically, the Smart Eye system required a 1GHz processor, and the iPAQ 3630 PDA ran at 206 MHz. Ex. 2008 ¶ 47; Ex. 2010, 21, 27. In contrast, the eye-tracking system described in the Morimoto paper required only a 200 MHz Pentium processor and the eye tracker built by Dr. Essa and Myron Flickner required only a Pentium II 200 MHz processor, while the Tiqit eightythree handheld device included a Pentium Class 300 MHz processor that ran a full PC operating system (Microsoft Windows XP). Ex. 1085 ¶¶ 38, 43, 46, 72, 88.

We also are not persuaded that either claim 1 or claim 14 of the '660 Patent requires a solution to the problem of "relative movement of [the] user and the tracker in a handheld environment," as Patent Owner contends. PO Resp. 21 (citing Ex. 2008 ¶¶ 46-59; Ex. 2010, 19); Surreply 8 (citing Ex. 2008 ¶¶ 46-59; Ex. 2010, 19). Dr. Pelz testifies that "remote eye detection systems" at the time, including the Smart Eye system, suffered from "limited ability to cope with head

movement of the user,” a “problem [that] became especially acute for attempts to implement eye detection on a handheld device.” Ex. 2008 ¶ 48 (Ex. 2010, 37). Dr. Pelz further testifies that the Smart Bailando researchers concluded:

The handheld market is not yet ready to introduce gaze detection, partly because the lack of processor capacity and partly for the reason that all too few units have built-in cameras. Some handheld devices have a camera as an add-on, but it makes the unit all too heavy to make it feel comfortable in the every day use.

Id. ¶ 49 (quoting Ex. 2010, 41). But Petitioner does not need to demonstrate utility or efficacy for enablement of Goldstein’s relevant disclosures. *See Verizon Servs.*, 602 F.3d at 1337. The evidence establishes that eye detection systems of the time, such as the Smart Eye system, the eye-tracking system described in the Morimoto paper, and the eye sensing described in Dr. Essa’s work with Myron Flickner, functioned reliably when head and device were held still. *See, e.g.*, Ex. 2010, 17; Ex. 1062, 4-7; Ex. 1085 ¶ 43. Claims 1 and 14 of the ’660 Patent do not require an apparatus that must be able to cope with head movement as Patent Owner contends.

Further, although the Smart Bailando utilized a camera mounted on a PDA, rather than a cell phone as required by claim 14, a preponderance of the evidence establishes that a POSA would have known how to add cell phone capability to a PDA or other handheld

device. *See, e.g.*, Ex. 2010, 12 (explaining, in the context of the Smart Bailando prototype, that “PDAs more and more often come[] with mobile phone functionality or vice versa”); Ex. 1085 ¶ 88 (testifying credibly that “the Tiqit eightythree’s PCMCIA slot allowed it to be used as a cellular phone”). This evidence supports Goldstein’s disclosure of commonality of features among mobile phones, PDAs, and desktop computers:

Mobile devices such as mobile phones and Personal Digital Assistants (PDAs), are increasingly being used to directly acquire information, in the form of electronic text, from sources such as the Internet. The usability of such mobile devices should preferably match or surpass usability of stationary desktop computers, so that all tasks that can be accomplished in the stationary office environment can likewise be accomplished in the mobile context. Notwithstanding differences between the two types of devices in size and weight, screen size, and computational power and software complexity, it is anticipated that in time the mobile devices will have substantially the same features as stationary computers.

Ex. 1005 ¶ 2.

Conclusion

For the reasons discussed above, we agree with Dr. Essa’s conclusion, as summarized in paragraphs 99-108 of his Declaration, that a POSA would have found

Goldstein's disclosure of the automated pause/resume functionality to be enabling for the functionality recited in claims 1 and 14, and that a POSA would have been able to implement Goldstein's automated pause/resume functionality on a cellular phone as of the Critical Date. *See, e.g.*, Ex. 1085 ¶¶ 99-108.

4. Analysis of Claims 2-6, 10-12, 15, 16, and 21

Petitioner argues that Goldstein discloses each of the limitations added by dependent claims 2-6, 10-12, 15, 16, and 21. Pet. 22-25. Patent Owner does not argue the patentability of those dependent claims. PO Resp. 15-23. We agree with, and adopt, Petitioner's argument that Goldstein discloses each of the limitations added by dependent claims 2-6, 10-12, 15, 16, and 21.

5. Summary of Goldstein Anticipation Analysis

For the reasons given, we determine that Petitioner has shown by a preponderance of the evidence that claims 1-6, 10-12, 14-16, and 21 are unpatentable under 35 U.S.C. § 102(e) as anticipated by Goldstein. In view of our findings above, we do not address Petitioner's additional ground that claims 14-16 would have been unpatentable for obviousness over the combination of Ho and Roschelle. *See* Pet. 44-46.

E. Asserted Anticipation by Ho

Petitioner contends that Ho anticipates claims 1-3, 5, 8-13, 19, and 21. Pet. 30-40. For the reasons discussed below, we agree.

1. Overview of Ho

Ho discloses “a computer-aided-educational system and method that automatically consider a student’s concentration-sensitive behavior while the student is working on the study materials.” Ex. 1006, 1:48-51. In one embodiment, the system includes a presenter, a non-intrusive sensor, a controller, and an indicator. *Id.* at 1:52-54. In this embodiment, the presenter presents study materials to a student, the sensor automatically senses the student’s concentration-sensitive behavior, the controller analyzes the behavior based on one or more rules, and the indicator indicates the student’s concentration level based on the analysis. *Id.* at 1:54-61. One rule taught by Ho is that “if the student is not looking at the monitor showing the study materials for a predetermined period of time, the student has lost concentration in the study materials.” *Id.* at 2:10-13. Ho discloses an embodiment that reacts according to the indication of the student’s concentration. *Id.* at 1:61-62, 11:9-10, Fig. 3. Examples of reactions taught by Ho include stimulation, reward, punishment, or change of study materials. *Id.* at 11:10-12.

2. *Analysis of Claim 1*

Petitioner identifies where each of the limitations of claim 1 is found in Ho. Pet. 30-37. Petitioner argues, for example, that the location of Ho's non-intrusive sensor adjacent a monitor satisfies the "hardware sensor in or on the device" requirement. *Id.* at 31 (citing Ex. 1006, 1:52-63, 3:36-47, 8:42-51). Regarding the "processor" requirement, Petitioner argues that Ho's controller processes a signal from the sensor and outputs to the device a measure or index of the student's attention toward the device. *Id.* at 32-34. Petitioner argues that Ho's system determines the measure or index by comparing the student's "monitored behavior" with the student's preestablished behavior measured "when the student is paying *attention*." *Id.* at 31 (citing Ex. 1006, 2:33-39). Petitioner argues that Ho's device performs the "modulated on the basis of the measure or index" requirement by reacting to the student's detected concentration/attention level, for example, by changing the study materials displayed on the monitor. *Id.* at 34-37.

Patent Owner responds that Petitioner has failed to show that Ho discloses all limitations of claim 1. Prelim. Resp. 37. First, Patent Owner argues that Ho's "digital camera 180 (the alleged claimed hardware sensor) . . . is neither 'in or on' the device, but rather . . . 'adjacent to the monitor' of the device." PO Resp. 38 (citing Ex. 1006, 8:40-48). In support of that argument, Patent Owner asserts that "[Ho's] Fig. 2B illustrates that digital camera 180 is connected to the system via peripheral controller 106, indicating that digital

camera 180 is external to Ho's device, not 'in or on' the device." *Id.* (citing Ex. 2007 ¶¶ 112-114). Patent Owner further argues:

Ho's Fig. 2A has a vertical line extending from digital camera 180 to Ho's computer. However, the vertical line connecting digital camera 180 and the computer does not indicate that the digital camera 180 is "in or on" the device. Ex. 2007, ¶¶ 116-117. Rather, consistent with Ho's specification (and other lines in Fig. 2A), this vertical line only represents an artistic rendering of a communicative link between Ho's digital camera and the client computer. *Id.*

Id. For these reasons, Patent Owner contends that "a POSA would have understood that Ho's digital camera is merely next to the monitor." *Id.*

In its Reply, Petitioner argues, and we agree, that Patent Owner ignores Ho's other disclosures, for example, that "[t]he sensor 110 includ[es] the digital camera 180" and that "the sensor 110 can be *in a client computer*." Pet. Reply 14-15 (quoting Ex. 1006, 3:38, 8:43). Petitioner further argues, and we agree, that "Ho also describes that 'there is no restriction preventing all components to reside *in one element, such as a client computer*.'" *Id.* at 15 (quoting Ex. 1006, 3:44-46). Accordingly, we agree with Petitioner that Ho discloses "a hardware sensor *in or on the device*" (emphasis added), as required by claim 1.

Next, Patent Owner argues that Ho does not disclose "modulated on the basis of the measure or index

of the user’s attention toward the device.” PO Resp. 39-40. Instead, Ho’s system performs modulation, Patent Owner asserts, “based on student’s concentration level over a period of time—a modulation that is not the same as and will result in a different functionality than the claimed modulation.” *Id.* at 39 (citing Ex. 2007 ¶¶ 127-128). Patent Owner further explains:

Since[,] Ho’s modulation is triggered by time, Ho cannot, for example, modulate a device (e.g., pausing) *immediately upon a determination that the user’s attention is not directed toward the device* (e.g., the user steps away or looks away from device). Ex. 2007, ¶ 129. Thus, the result of Ho’s modulation is different from the result of the claimed modulation. *Id.* [Petitioner] has failed to explain how Ho’s time-based modulation is analogous to the claimed features and has not met its burden in showing how Ho anticipates this feature.

Id. at 39-40 (emphasis added).

Petitioner responds in its Reply that claim 1 does not require modulation to occur “immediately upon a determination that the user’s attention is not directed toward the device” as Patent Owner contends. Pet. Reply 16. We agree. As discussed above, Patent Owner’s asserted implicit claim construction is inconsistent with the ’660 Patent, which discloses multiple examples of monitoring attention over time. *See* Section II.B.2 *supra*; Ex. 1001, 13:9-20, 15:4-21, 18:9-21; 19:34-37. Accordingly, we agree with Petitioner that Ho discloses “modulated on the basis of the measure or index

of the user's attention toward the device," as required by claim 1.

For the reasons given, we determine that Petitioner has shown by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 102(b) as anticipated by Ho.

3. Analysis of Claims 2, 3, 5, 8-13, 19, and 21

Petitioner argues that Ho discloses each of the limitations added by dependent claims 2, 3, 5, 8-13, 19, and 21. Pet. 37-40. Patent Owner relies on its arguments as to claim 1 with respect to the patentability of the dependent claims. PO Resp. 37-40. We agree with, and adopt, Petitioner's argument, and, therefore, determine that Petitioner has shown by a preponderance of the evidence that claims 2, 3, 5, 8-13, 19, and 21 are unpatentable under 35 U.S.C. § 102(b) as anticipated by Ho.

*F. Asserted Obviousness over
Horvitz and Tognazzini*

Petitioner contends that claims 1-5, 10-13, 18, 19, and 21 would have been obvious over the combination of Horvitz and Tognazzini. Pet. 46-60. For the reasons discussed below, we agree.

1. Overview of Horvitz

Horvitz discloses a computerized system for managing alerts. Ex. 1014, 2:14-24. The system analyzes

how and when to render an alert to a user based on “the likelihood of alternate states of attention.” *Id.* at 2:56-57. In one embodiment, the system determines whether to alert the user “in an audio or visual manner, or on a mobile device such as a cell phone or a pager.” *Id.* at 2:62-65.

Horvitz describes system 200, which includes peripheral information notification and alerts module 202, attentional status module 204, and notification decision-making module 206. *Id.* at 6:20-23. “[T]he attentional status module 204 ultimately generates a probability distribution over different states of attention 300.” *Id.* at 7:4-6, Fig. 3. The output of the attentional status module can be *the single availability probability*—the probability, for example, that the user is receptive to receiving an alert. *Id.* at 7:6-11 (emphasis added). “The probability 300 is generated in one embodiment by considering a profile of prior knowledge 302, as well as one or more contextual events 304.” *Id.* at 7:16-18. “The contextual events 304 includes computer information as well as external information.” *Id.* at 7:27-28. Computer information may indicate, for example, that the user has been focused on a single application and is typing quickly on the keyboard. *Id.* at 7:27-28. External information includes, for example, “visual cues 314” including “gaze 318.” *Id.* at 7:49-50, 58-59, Fig. 3. “The gaze 318 can be used to determine whether the user is attentive to the computer, or whether the user is looking at a book, has his or her head turned to one side, etc.” *Id.* at 7:62-65. “[T]he contextual events 304 and/or the profile 302 are

used to determine the probability distribution over a user's focus of attention, or of the single availability probability that a user is open to or actively seeking notifications." *Id.* at 8:1-4.

2. *Overview of Tognazzini*

Tognazzini discloses an eye gaze tracking device mounted below the display of a personal computer. Ex. 1015, 6:58-60, Fig. 2. Tognazzini teaches utilizing the detected eye gaze of the computer user to regain lost context, e.g., where the user was looking, after an interruption or distraction. Ex. 1015, 8:23-54, Figs. 5A, 5B, 5C.

3. *Obviousness Analysis*

A claim is unpatentable for obviousness under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented 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 the subject matter pertains. *See KSR In'tl Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). A patent claim composed of several elements, however, is not proved obvious merely by demonstrating that each of its elements was known, independently, in the prior art. *Id.* at 418. In analyzing the obviousness of a combination of prior art elements, it can be important to identify a reason that would have prompted one of skill in the art to combine the elements in the way the claimed invention does. *Id.* A

precise teaching directed to the specific subject matter of a challenged claim is not necessary to establish obviousness. *Id.* Rather, “any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *Id.* at 420. 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 skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations, if in evidence. *See Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

In this case, Petitioner argues that modifying Horvitz to include the hardware sensors and eye sensing techniques taught by Tognazzini would have amounted to nothing more than the use of a known technique to improve a similar device in the same way. Pet. 48. In view of the disclosure of “gaze 318” in Horvitz, discussed above, Petitioner additionally argues that “a POSITA looking to implement the techniques of Horvitz would have been motivated to look for references that describe sensors that can detect gaze for purposes of determining attention toward a device.” *Id.* at 49 (citing Ex. 1003 ¶ 80).

As to claim 1, Petitioner argues that Horvitz discloses every limitation, except the “hardware sensor” requirement, which is disclosed by Tognazzini. *Id.* at 48 (citing Ex. 1003 ¶¶ 78, 79). Regarding the “processor” requirement, Petitioner argues that Horvitz’s

“attentional status module 204 takes the visual cues 314, including gaze 318, as inputs and uses the inputs to determine and output a measure of attention,” as shown in Figure 3. *Id.* at 50 (referring to Ex. 1014, Fig. 3). Petitioner further argues that in the combination of Horvitz and Tognazzini, the Horvitz attentional status module 204 processes a signal from the Tognazzini gaze tracking device 201 to determine a measure or index of attention. *Id.* at 51 (citing Ex. 1003 ¶¶ 82-83). “Then,” according to Petitioner, “as shown by the label ‘P (ATTENTION) 300’ in FIG. 3, the Horvitz module 204 outputs the measure or index of attention.” *Id.* (citing Ex. 1014, 7:4-15). Petitioner further asserts that “[t]he Horvitz processor outputs the measure or index of attention to the notification decision-making module 206, thereby ‘output[ting] to the device a measure or index of the user’s attention toward the device.’” *Id.* at 52 (citing Ex. 1003 ¶ 84; Ex. 1014, 6:20-30, 7:4-8:15). Petitioner argues that Horvitz’s device performs the “modulated on the basis of the measure or index” requirement “[b]y making decisions about how, if, and when to alert a user.” *Id.* at 53 (citing Ex. 1003 ¶ 85). With respect to the “initiated by the device” limitation, Petitioner argues that, as disclosed in Horvitz, notification operations are “based on an automated determination by the Horvitz device of the user’s attention towards the device.” *Id.* at 55 (citing Ex. 1003 ¶ 89).

Patent Owner responds that “Horvitz and Tognazzini do not teach or suggest the claimed processor that outputs a measure or index of a user’s attention toward

the claimed device.” PO Resp. 40 (citing Ex. 2007 ¶ 137). Patent Owner argues:

[Petitioner] relies on, but never explains why Horvitz’s P(ATTENTION) is a measure of attention toward the device. Pet. 51. Horvitz merely teaches two potential outputs from its system: (1) general user-availability probability and (2) a probability distribution over a user’s focus of attention. Ex. 1014, 2:30-34, 7:4-15. Neither is clearly a measure of a user’s attention toward a device. Ex. 2007, ¶¶ 139-40. However, because these outputs are probabilistic, neither is based on a measure of a user’s attention specifically toward a device. *Id.* In order to meet this claimed feature, the prior art must at least have a processor that (1) processes a signal from a hardware sensor that senses attention specifically toward a device, and (2) outputs to the device a measure or index *of the user’s attention toward the device*. *Id.*, ¶ 137. Hence, outputting a generalized measure of the user’s attention, status, or availability is not sufficient. *Id.*, ¶ 137, 139. Outputting a *focus* of attention that does not include a measure or index of the user’s (sic, attention) toward the device is likewise deficient. *Id.*, ¶ 137, 140. Yet, [Petitioner] alleges and evinces no more. *Id.*, ¶ 137.

Id. at 40-41.

Patent Owner acknowledges the disclosure that “gaze 318 can be used to determine whether the user is attentive to the computer, or whether the user is looking at a book, has his or her head turned to one

side, etc.” PO Resp. 41 (citing Ex. 1014, 7:62-65). But Patent Owner argues that “even if the determination of whether the user is attentive to the computer was considered a measure or index of the user’s attention, Horvitz does not disclose outputting that determination.” *Id.* (citing Ex. 2007 ¶ 142). In that regard, Patent Owner additionally argues:

First, the determination may be used by the ASM’s Bayesian model, but not output. *Id.* For example, a probability that the user is “receptive to receiving an alert or is actively seeking the peripheral information associated with one or more alerts” (Ex. 1014, 7:10-12) is *not* a measure or index of user’s attention specifically toward *any device*. Ex. 2007, ¶ 142.

Second, Horvitz’s system may modulate some other device (i.e., not the computer) based on the determination, as demonstrated by Horvitz’s various examples. *Id.* For example, [the] system may “check[] to see if the user is around or not at the desktop system before making a decision that the only way to reach the user is to ‘render’ the notification via the cell phone.” Ex. 1014, 13:43-46. This check is not based on gaze. Ex. 2007, ¶ 142.

Id. 41-42.

Upon consideration of the competing arguments, we agree with Petitioner that the combination of Horvitz and Tognazzini teaches or suggests the subject matter of claim 1. We are persuaded, for example, that Horvitz and Tognazzini teach or suggest: (1) a

hardware sensor in or on a device that senses gaze (attention of the user specifically toward the device); (2) a processor that processes a signal from the hardware sensor and outputs an availability probability to the device; and (3) modulation of the device on the basis of the availability probability. Horvitz teaches that the availability probability is “a measure or index of the user’s attention toward the device” as required by claim 1. This is clear, for example, from the disclosure that notification decision-making module 206 uses the availability probability from attentional status module 204 to determine the manner by which the user should be alerted at the computer, for example, in a visual and/or an audio manner, and when the user should be alerted. *See, e.g., Ex. 1014, 9:29-38; Pet. Reply 21-22* (arguing that “a receptiveness to receiving an alert necessarily involves a receptiveness to receiving an alert *at the single computer* and attention is necessarily measured *toward the single computer*”).

Patent Owner also challenges Petitioner’s rationale for combining Horvitz and Tognazzini. PO Resp. 42. Patent Owner argues that “given Horvitz’s central, intended purpose of minimizing distractions, a POSA would not have looked to a system requiring an elaborate calibration procedure, such as Tognazzini’s gaze-tracker, as it would have rendered Horvitz unsuitable for its intended purpose.” *Id.* Patent Owner further argues:

Tognazzini’s gaze-tracking required user calibration (i.e., mapping of coordinates of eye gaze to a display coordinate system) for each

user each time the system is used. Ex. 1015, 7:57-8:16. Such an elaborate calibration procedure would have constrained and distracted the user—precisely contrary to Horvitz’s goal. See Ex. 2007, ¶¶ 43-44; Ex. 2008, ¶¶ 25, 32-33, 51-52; Ex. 2107, p. 16.

Id.

We are persuaded, however, that Petitioner has provided a sufficient rationale for the combination. Horvitz teaches using gaze 318 to determine whether the user is attentive to the computer. Ex. 1014, 7:62-65. As Petitioner argues, combining Tognazzini’s teachings with respect to gaze tracking with Horvitz’s teaching with respect to gaze 318 would have amounted to nothing more than the use of a known technique to improve a similar device in the same way. See Pet. 48. Patent Owner’s argument challenging the combination fails to give sufficient weight to Horvitz’s teaching with respect to the advantage of using gaze 318 to determine whether the user is attentive to the computer. We find the advantages of incorporating Tognazzini’s gaze-tracking technique in Horvitz outweigh the disadvantages cited by Patent Owner. See *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (“[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”) (citation omitted).

Furthermore, we are not persuaded that Tognazzini requires a calibration procedure that would have constrained and distracted the user to the degree

asserted by Patent Owner, or rendered Horvitz unsuitable for its intended purpose. *See* PO Resp. 42 (citing Ex. 2007 ¶¶ 43-44; Ex. 2008 ¶¶ 25, 32-33, 51-52; Ex. 2107, 16). Patent Owner's citations to Exhibits 2007, 2008, and 2107 do not pertain specifically to Tognazzini. To the extent Patent Owner argues that *any* prior art *eye-tracking* device would have suffered from the same or similar disadvantages, Patent Owner has failed to show that a POSA would have used a different gaze-detection technique to implement Horvitz's teachings with respect to gaze 318. Also, Patent Owner fails to reconcile or explain the facial inconsistency between its undue constraint-and-distraction argument and Tognazzini's teaching that a gaze-tracking device can be used to assist the computer user in being more productive in the face of interruptions and distractions. *See* Ex. 1015, 8:2327, 49-54.

Petitioner also argues that dependent claims 2-5, 10-13, 18, 19, and 21 would have been obvious over the combination of Horvitz and Tognazzini. Pet. 57-60. Patent Owner relies on its arguments as to independent claim 1 with respect to the patentability of the dependent claims. PO Resp. 40-43. We agree with, and adopt, Petitioner's arguments.

For the reasons given above, as well as those discussed below with respect to objective indicia of nonobviousness, we determine that Petitioner has shown by a preponderance of the evidence that claims 1-5, 10-13, 18, 19, and 21 are unpatentable under 35 U.S.C. § 103(a) as obvious over Horvitz and Tognazzini.

G. Objective Indicia of Nonobviousness

“For objective evidence . . . to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention.” *Rambus, Inc. v. Rea*, 731 F.3d 1248, 1256 (Fed. Cir. 2013) (quoting *In re Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011) (quoting *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010)) (emphasis omitted) (internal quotation marks omitted)). “While objective evidence of nonobviousness lacks a nexus if it exclusively relates to a feature that was ‘known in the prior art,’ the obviousness inquiry centers on whether ‘the claimed invention as a whole’ would have been obvious.” *Rambus*, 731 F.3d at 1257-58 (citation omitted). Thus, “[w]here the allegedly obvious patent claim is a combination of prior art elements, . . . the patent owner can show that it is the claimed combination as a whole that serves as a nexus for the objective evidence.” *WBIP, LLC v. Kohler Co.*, Nos. 2015-1038, -1044, 2016 WL 3902668, at *7 (Fed. Cir. July 19, 2016) (citing *Rambus*, 731 F.3d at 1258). “[T]here is a presumption of nexus for objective considerations when the patentee shows that the asserted objective evidence is tied to a specific product and that product ‘is the invention disclosed and claimed in the patent.’” *WBIP*, 2016 WL 3902668, at *6 (citations omitted).

Further, objective evidence of nonobviousness “must be reasonably commensurate with the scope of the claims.” *In re Kao*, 639 F.3d at 1068 (citations omitted); accord *S. Ala. Med. Sci. Found. v. Gnosis S.p.A.*, 808 F.3d 823, 827 (Fed. Cir. 2015). This does not mean

that the proponent of the evidence must test every embodiment within the scope of the claims. *Id.* Rather, for the objective evidence of nonobviousness to be reasonably commensurate with the scope of the claims, the requirement is that “an adequate basis [exists] to support the conclusion that other embodiments falling within the claim will behave in the same manner.” *Id.*

Patent Owner proffers objective evidence to show the nonobviousness of claims 1 and 14. *See* PO Resp. 45-60. Patent Owner argues that “[e]vidence such as long-felt but unmet need, failure of others, copying, and praise of others collectively demonstrate[s] that the inventions of claims 1 and 14 were not obvious.” *Id.* at 46. The features introduced by claim 14, however, are not relevant to our analysis of Patent Owner’s evidence because Petitioner does not challenge claim 14 as obvious over Horvitz and Tognazzini.¹⁰ For the reasons discussed below, we agree with Petitioner that the evidence of objective indicia of nonobviousness is insufficient to overcome the other evidence that claim 1 would have been obvious. *See* Pet. Reply 22-25.¹¹

¹⁰ As noted above, we determined not to address Petitioner’s ground that claim 14 is unpatentable as obvious over the combination of Ho and Roschelle.

¹¹ Although Petitioner also challenges dependent claims 2-5, 10-13, 18, 19, and 21 as obvious in view of Horvitz and Tognazzini, Patent Owner does not argue any feature introduced by those claims as being the basis of its assertion that secondary considerations justify a finding of nonobviousness. Therefore, we determine that the features introduced by dependent claims 25, 10-13, 18, 19, and 21 are not relevant to our analysis of secondary considerations of nonobviousness.

Patent Owner asserts that “[c]laim 1 of the ’660 patent solved a long-felt but unmet need—a way for a *non-intrusive, fully integrated* attention-sensing device that was *reliable* and able to intelligently modulate operations on the basis of a user’s attention toward the device.” PO Resp. 48 (citing Ex. 2112, 87-98) (emphases added). The prior art (represented by the Goldstein and Ho references), however, discloses the combination of features recited in claim 1. *See supra* Section II.D.2; Section II.E.2. Accordingly, Patent Owner’s evidence does not establish that the claimed combination, rather than the prior art, provided the asserted solution to the asserted long-felt but unmet need. *See WBIP*, 2016 WL 3902668, at *7.

Further, to the extent Patent Owner’s evidence relates to embodiments that have an *eye contact* hardware sensor, the evidence is not reasonably commensurate with the scope of claim 1. For example, Patent Owner cites Exhibit 2013 as evidence that “[t]he ’660 patent’s technology provided a reliable solution” to the long-felt problem of intrusive and disruptive computer devices. *See* PO Resp. 48 (citing Ex. 2013, 189-190). The cited portion of Exhibit 2013 refers specifically to a gaze detection technique having “an eye contact sensor” as opposed to a gaze tracking sensor. Ex. 2013, 189-190 (“There is no intention here to track the user’s gaze position; the idea is simply to detect whether or not the person has looked at the sensor.”). Claim 1 of the ’660 Patent is not limited, however, to embodiments having an *eye contact* hardware sensor. Rather, the scope of claim 1 includes

embodiments having other types of hardware sensors, for example, an *eye tracking* hardware sensor. Patent Owner has not provided an adequate basis to support the conclusion that other embodiments falling within claim 1, such as embodiments that have an eye tracking hardware sensor, will behave in the same manner as the asserted embodiment that has an eye contact hardware sensor. To the contrary, Patent Owner argues that embodiments having eye tracking hardware sensors failed to meet the asserted long-felt need. PO Resp. 49-51, 53-55. Accordingly, Patent Owner's evidence relating to embodiments that have an eye contact hardware sensor is not reasonably commensurate with the scope of claim 1.

Patent Owner asserts that claim 1 "directly provided the reliable solution that users and the computing industry had been searching for[,] years before the '660 patent." PO Resp. 55. As discussed above, however, the prior art discloses all limitations of claim 1. *See, e.g., supra* Section II.D.2; Section II.E.2. Accordingly, Patent Owner's argument that claim 1 provided a solution to the asserted problem is not persuasive.

Patent Owner further argues:

Prior to the work performed by Dr. Vertegaal [a named '660 Patent inventor], no one was able to create a device that: (i) performed device-initiated operations; *and* (ii) included an integrated hardware sensor capable of measuring a user's attention toward the device, such that operations were modulated based on the measure of the user's attention.

PO Resp. 49. As discussed above, however, the prior art (for example, Goldstein and Ho) discloses this combination of features (as recited in claim 1 of the '660 Patent). *See, e.g., supra* Section II.D.2; Section II.E.2.

Further, Patent Owner cites Exhibit 2010 (the Smart Bailando Master's Thesis) as proof of a long-felt need for the claimed invention. *See* PO Resp. 48-49. As discussed above, however, the Smart Bailando prototype constitutes a working model of the invention defined by claim 1 of the '660 Patent. *See supra* Section II.D.3.b; Ex. 1085 ¶ 105. Thus, contrary to Patent Owner's arguments, the Smart Bailando prototype is not evidence of a long-felt need for the invention of claim 1.

Patent Owner's evidence and arguments relating to failure of others are unpersuasive for the same reasons as discussed above with respect to Patent Owner's arguments and evidence with respect to long-felt but unmet need. *See* PO Resp. 53-55. The Smart Bailando prototype, in particular, is fatal to Patent Owner's arguments. As discussed above, it constitutes a successful implementation of the invention of claim 1 prior to the Critical Date. *See supra* Section II.D.3.b; Ex. 1085 ¶¶ 62, 105.

With respect to copying, Patent Owner argues that "there is direct evidence that [Petitioner] had access to Dr. Vertegaal's patented technology," and "[t]hereafter, [Petitioner] made extensive efforts to replicate the claimed technology, culminating in the release of

[Petitioner's] SmartPause™ feature.” PO Resp. 55. Patent Owner asserts that:

[Petitioner's] devices have a hardware sensor (i.e. camera) in the device that senses attention of the user specifically toward the device (detect user looking away and looking back) and uses the measure of attention as a basis for modulation of device-initiated operations (pause/resume playback of video)—making the SmartPause™ feature a direct copy and embodiment of [claim 1].

Id. at 56.

Petitioner does not dispute having access to the patented technology in late 2003 and early 2004 in the course of direct interactions with Patent Owner relating to Petitioner's “Attentive Home Theatre” project. *See* Pet Reply 24-25. Nor does Petitioner dispute that its SmartPause™ feature is an embodiment of claim 1 of the '660 Patent. Instead, Petitioner argues that any presumption of copying is “simply not credible” because the SmartPause™ feature was “unveiled” in a 2013 cellular phone, almost a decade after Petitioner learned about Patent Owner's technology. *Id.* at 25. Petitioner also argues that Patent Owner's evidence fails to establish that Patent Owner ever developed a specific *product* or that Petitioner replicated any such product. Pet. Reply 24.

“[C]opying requires evidence of efforts to replicate a specific product, which may be demonstrated through internal company documents, direct evidence

such as disassembling a patented prototype, photographing its features, and using the photograph as a blueprint to build a replica, or access to the patented product combined with substantial similarity to the patented product.” *Wyers*, 616 F.3d at 1246. That the SmartPause™ feature of Petitioner’s cellular phone falls within the scope of claim 1 is not enough to establish copying. *See* PO Resp. 55-56; *Wyers*, 616 F.3d at 1246 (“Not every competing product that arguably falls within the scope of a patent is evidence of copying; otherwise, ‘every infringement suit would automatically confirm the nonobviousness of the patent.’”) (quoting *Iron Grip Barbell Co. v. USA Sports, Inc.*, 392 F.3d 1317, 1325 (Fed. Cir. 2004)).

Patent Owner has not directed us to SmartPause™ features indicative of copying the claimed invention as opposed to using technology in the public domain. *See* PO Resp. 55-56; *Windsurfing Int’l, Inc. v. AMF, Inc.*, 782 F.2d 995, 1000 (Fed. Cir. 1986) (“[C]opying the claimed invention, rather than one within the public domain, is indicative of non-obviousness.”). Goldstein and the Smart Bailando prototype each disclose the specific SmartPause™ features on which Patent Owner relies, including “looking away and looking back” and “pause/resume playback of video.” *See* PO Resp. 56; Ex. 1005 ¶ 8, Abstract; Ex. 1085 ¶¶ 54-56 (citing Ex. 1067, Abstract, 4); Ex. 1067, 3; Ex. 2010, 8). For this reason, we are not persuaded that Patent Owner’s evidence establishes copying.

Finally, Patent Owner argues that the claimed technology of claim 1 of the ’660 Patent has received

significant praise in the industry.¹² PO Resp. 57. Again, however, the prior art discloses the claimed technology. *See, e.g., supra* Section II.D.2; Section II.E.2. Accordingly, Patent Owner’s evidence does not establish that the claimed technology, rather than the prior art, should receive credit for the asserted praise.

Moreover, Patent Owner’s evidence of industry praise is largely based on praise of the SmartPause™ feature of Petitioner’s cellular phone, or praise of Patent Owner made by Petitioner. *See* PO Resp. 58. We are not persuaded that praise of the SmartPause™ feature of Petitioner’s cellular phone is “equivalent” to praise of claim 1 of the ’660 Patent as Patent Owner contends. *See id.* at 59; Pet. Reply 25. Claim 1 is not limited to mobile devices, such as Petitioner’s cellular phone. Rather, the scope of claim 1 includes stationary devices, for example, a standard desktop personal computer (“PC”).

Patent Owner argues, for example, that “[o]ut of all the features [Petitioner] debuted with its [cellular phone] device, it was the SmartPause™ technology that was identified as being ‘the most interesting’ and providing ‘efficacy’ for the industry.” *Id.* at 58 (quoting Ex. 2066, 1). The article on which Patent Owner relies, however, focuses on “mobile video.” Ex. 2066, 1. There is no mention of interest or efficacy in the context of

¹² Patent Owner also argues that the technology recited in claim 14 received such praise. However, as noted above, analysis of secondary considerations for claim 14 is unnecessary because claim 14 is not challenged as obvious in view of Horvitz and Tognazzini.

stationary devices. As another example, Patent Owner argues that “users were intrigued by the SmartPause™ technology. PO Resp. 58 (citing Exs. 2057, 2063-2067). The cited evidence, however, praises the technology for mobile devices, not stationary devices. *See* Ex. 2057 (watching videos in bed); Ex. 2063 (“smartphones”); Ex. 2064 (smartphones); Ex. 2065 (“mobile devices”); Ex. 2066 (mobile video); Ex. 2067 (mobile video).

Patent Owner has not provided an adequate basis to support the conclusion that the asserted praise for the SmartPause™ feature of Petitioner’s cellular phone extends to other embodiments within the scope of claim 1, such as stationary devices. Accordingly, Patent Owner’s evidence based on praise for the SmartPause™ feature of Petitioner’s cellular phone is not reasonably commensurate with the scope of claim 1.

With respect to asserted praise of Patent Owner made by Petitioner, we agree with Petitioner that, after showing initial interest in Patent Owner’s technology, Petitioner subsequently communicated concerns over the technology. *See* Pet. Reply 25 (citing Ex. 2077, 2); *compare* Ex. 2090, Ex. 2092, Ex. 2095, *with* Ex. 2077, 2.¹³ Accordingly, Patent Owner’s evidence is insufficient to show industry praise for the claimed invention.

For these reasons, we agree with Petitioner that the evidence of objective indicia of nonobviousness

¹³ Exhibits 2077, 2090, 2092, and 2095 are sealed protective order materials.

does not overcome the strong evidence that claims 1-5, 10-13, 18, 19, and 21 would have been obvious over Horvitz and Tognazzini. *See* Pet. Reply 25.

H. Patent Owner's Motion to Strike Petitioner's Reply

In Patent Owner's Motion to Strike Petitioner's Reply, Patent Owner argued that Petitioner's Reply "exceeds its rebuttal function by shifting the original alleged grounds of anticipation to obviousness, providing a new theory of anticipation, submitting new evidence which could have been presented earlier, and circumventing the page limits through improper incorporation of expert testimony." Paper 33, 2. Patent Owner sought an order striking the entirety of Petitioner's Reply or, in the alternative, authorizing Patent Owner to submit "a surreply and expert testimony on the issue of whether the prior art enables the claimed invention." *Id.* at 9. Petitioner filed an Opposition responding to each of Patent Owner's arguments. Paper 36, 1-10. After considering the competing arguments, we denied Patent Owner's Motion to Strike Petitioner's Reply, but authorized Patent Owner to file a Surreply addressing the Goldstein enablement issue. Paper 38.

At the oral hearing, Patent Owner re-argued its Motion to Strike Petitioner's Reply. Tr. 62:23-67:20 (asserting "12 things that we think that the [R]epley went beyond"). Upon considering Patent Owner's arguments at the oral hearing, we affirm our denial of Patent Owner's Motion to Strike Petitioner's Reply, because Petitioner's arguments and the evidence submitted

with the Reply, including the arguments and evidence addressing the Goldstein enablement issue, fall within the proper scope of a reply.

I. The Motions to Exclude

We have reviewed Petitioner's Motion to Exclude (Paper 39), Patent Owner's Opposition to the Motion (Paper 46), and Petitioner's Reply to Patent Owner's Opposition (Paper 50). We also have reviewed Patent Owner's Motion to Exclude (Paper 42), Petitioner's Opposition to the Motion (Paper 48), and Patent Owner's Reply to Petitioner's Opposition (Paper 49).

1. Patent Owner's Motion

Patent Owner first moves to exclude Exhibits 1020, 1021, 1023-1039, and 1041, as irrelevant, because they are not cited in Petitioner's Reply or in Dr. Essa's Declaration. Paper 42, 1-2. Petitioner responds, and we agree, that Exhibits 1020, 1021, 1023, 1024, 1026, 1028, 1032, 1034, 1037, 1039, and 1041 are relevant because they were discussed during Dr. Balakrishnan's deposition. Paper 48, 1-2. Accordingly, we deny Patent Owner's request to exclude those exhibits. Petitioner has withdrawn Exhibits 1025, 1027, 1029-1031, 1033, 1035, 1036, and 1038, and, thus, Patent Owner's Motion is moot as to those exhibits. *See id.* at 3.

Patent Owner also moves to exclude Exhibits 1060, 1061, 1062, and 1067, as irrelevant. Paper 42,

2-9. Patent Owner argues that those exhibits constitute “new evidence” and, additionally, that their admission would be unfairly prejudicial to Patent Owner. *Id.* Dr. Essa, however, relies on each of those exhibits to rebut the testimony of Dr. Balakrishnan and Dr. Pelz with respect to the Goldstein enablement issue. *E.g.*, Ex. 1085 ¶¶ 35-41, 54-64, 100, 102-107. We agree with Petitioner’s argument that those exhibits are relevant and that Patent Owner is not unfairly prejudiced by their admission (*see* Paper 48, 3-11), and we deny Patent Owner’s Motion as to those exhibits.

Finally, Patent Owner moves to exclude Exhibits 1074, 1075 and 1077-1084 as inadmissible hearsay. Paper 42, 9-10. Patent Owner argues that “Dr. Essa asserts the statements in each of these Exhibits for its truth—as alleged evidence of the state of the art at the time of the invention.” *Id.* Petitioner responds that “none of these exhibits should be excluded because, under [Rule 703 of the Federal Rules of Evidence], it is proper for Dr. Essa to rely on otherwise inadmissible facts or data so long as experts in the particular field would reasonably rely on those kinds of facts or data in forming an opinion on the subject.” Paper 49, 11. We agree, and deny Patent Owner’s Motion as to those exhibits.

2. *Petitioner’s Motion*

Petitioner moves to exclude all or portions of Exhibits 2007-2019, 2021-2027, 2029-2069, 2071-2086, 2088, 2099-2110, and 2112, for reasons that track

Patent Owner's objections to Petitioner's evidence, discussed above. Paper 39, 2 ("Petitioner . . . advances this motion to exclude to ensure that any exclusion of Petitioner's evidence should find comparable exclusion in Patent Owner's evidence for reasons advanced by Patent Owner."). We deny Petitioner's Motion for the reasons that we deny Patent Owner's Motion, discussed above.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has shown by a preponderance of the evidence that claims 1-6, 8-16, 18, 19, and 21 are unpatentable.

This Final Written Decision discusses or cites information that is the subject of motions to seal. *See, e.g., supra* Section II.G. Accordingly, we have entered this Decision in the Board's E2E system as "Board and Parties Only." If either Party believes that any portion of this Decision should be maintained under seal, the Party must file, within five (5) business days from the entry of the Decision, a motion to seal portions of the Decision. The motion must include a proposed redacted version of the Decision, accompanied by an explanation as to why good cause exists to maintain under seal each redacted portion. In the absence of a motion to seal by the specified deadline, the full version of this Decision will become public. Any opposition to a motion must be filed within three (3) business days from the date of entry of the motion; no reply to an opposition is authorized.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1-6, 8-16, 18, 19, and 21 of U.S. Patent No. 8,096,660 B2 are unpatentable;

FURTHER ORDERED that each of the parties is authorized to file, within five (5) business days from the date of entry of this Final Written Decision, a motion to seal portions of the Decision that includes a proposed redacted version of the Decision and an explanation as to why good cause exists to maintain under seal each redacted portion;

FURTHER ORDERED that any opposition to a motion to seal portions of the Decision must be filed within three (3) business days from the date of entry of the motion; and

FURTHER ORDERED that no reply to an opposition is authorized.

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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App. 155

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Paper 39
Entered: March 25, 2016

UNITED STATES PATENT AND
TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND
APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

QUEEN'S UNIVERSITY AT KINGSTON,
Patent Owner.

Case IPR2015-00583 (Patent 7,762,665 B2)
Case IPR2015-00584 (Patent 8,096,660 B2)
Case IPR2015-00603 (Patent 8,322,856 B2)
Case IPR2015-00604 (Patent 8,672,482 B2)¹

Before RICHARD E. RICE, LYNNE E. PETTIGREW,
and MITCHELL G. WEATHERLY, *Administrative Pa-
tent Judges.*

RICE, *Administrative Patent Judge.*

¹ This Order addresses issues that are identical in related cases. Therefore, we exercise our discretion to issue one order to be filed in each case. The parties, however, are not authorized to use this style heading in any subsequent papers.

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ORDER

Denying Motion to Strike and Authorizing Sur-Reply
37 C.F.R. § 42.5

With our prior authorization, in each of these cases: Patent Owner filed a combined Motion To Strike Petitioner's Reply and/or File a Sur-Reply to Petitioner's Reply; and Petitioner filed an Opposition to Patent Owner's Motion.

Upon consideration of the competing arguments, we deny Patent Owner's Motion to Strike and authorize Patent Owner to file a Sur-Reply, limited to 10 pages, without new evidence. The scope of Patent Owner's Sur-Reply shall be limited to responding to Petitioner's arguments and evidence relating to the question of whether the asserted Goldstein reference is enabling.

It is hereby:

ORDERED that Patent Owner's Motion to Strike Petitioner's Reply is denied;

FURTHER ORDERED that Patent Owner's Motion to File a Sur-Reply to Petitioner's Reply is granted;

FURTHER ORDERED that Patent Owner's Sur-Reply shall be limited to 10 pages, Patent Owner may not file any evidence with its Sur-Reply, and Patent Owner shall file its Sur-Reply within five business days from the date of this Order; and

FURTHER ORDERED that the scope of Patent Owner's Sur-Reply shall be limited to responding to Petitioner's arguments and evidence relating to the question of whether the asserted Goldstein reference is enabling.

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NOTE: This order is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

QUEEN'S UNIVERSITY AT KINGSTON,
Appellant

v.

**SAMSUNG ELECTRONICS CO., LTD.,
SAMSUNG ELECTRONICS AMERICA, INC.,**
Appellees

2016-2723, 2016-2725

Appeals from the United States Patent and Trade-
mark Office, Patent Trial and Appeal Board in Nos.
IPR2015-00583, IPR2015-00584.

ON PETITION FOR REHEARING EN BANC

Before PROST, *Chief Judge*, NEWMAN, LOURIE, DYK,
MOORE, O'MALLEY, REYNA, WALLACH, TARANTO, CHEN,
HUGHES, and STOLL, *Circuit Judges*.

PER CURIAM.

ORDER

(Filed Mar. 27, 2018)

Appellant Queen's University at Kingston filed a
petition for rehearing en banc. The petition was first

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referred to the panel that heard the appeals, and thereafter the petition for rehearing en banc was referred to the circuit judges who are in regular active service.

Upon consideration thereof,

IT IS ORDERED THAT:

The petition for panel rehearing is denied.

The petition for rehearing en banc is denied.

The mandate of the court will issue on April 3, 2018.

FOR THE COURT

March 27, 2018

Date

/s/ Peter R. Marksteiner

Peter R. Marksteiner
Clerk of Court

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5 U.S.C.A. § 556. Hearings; presiding employees; powers and duties; burden of proof; evidence; record as basis of decision

(a) This section applies, according to the provisions thereof, to hearings required by section 553 or 554 of this title to be conducted in accordance with this section.

(b) There shall preside at the taking of evidence –

(1) the agency;

(2) one or more members of the body which comprises the agency; or

(3) one or more administrative law judges appointed under section 3105 of this title.

This subchapter does not supersede the conduct of specified classes of proceedings, in whole or in part, by or before boards or other employees specially provided for by or designated under statute. The functions of presiding employees and of employees participating in decisions in accordance with section 557 of this title shall be conducted in an impartial manner. A presiding or participating employee may at any time disqualify himself. On the filing in good faith of a timely and sufficient affidavit of personal bias or other disqualification of a presiding or participating employee, the agency shall determine the matter as a part of the record and decision in the case.

(c) Subject to published rules of the agency and within its powers, employees presiding at hearings may –

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- (1) administer oaths and affirmations;
 - (2) issue subpoenas authorized by law;
 - (3) rule on offers of proof and receive relevant evidence;
 - (4) take depositions or have depositions taken when the ends of justice would be served;
 - (5) regulate the course of the hearing;
 - (6) hold conferences for the settlement or simplification of the issues by consent of the parties or by the use of alternative means of dispute resolution as provided in subchapter IV of this chapter;
 - (7) inform the parties as to the availability of one or more alternative means of dispute resolution, and encourage use of such methods;
 - (8) require the attendance at any conference held pursuant to paragraph (6) of at least one representative of each party who has authority to negotiate concerning resolution of issues in controversy;
 - (9) dispose of procedural requests or similar matters;
 - (10) make or recommend decisions in accordance with section 557 of this title; and
 - (11) take other action authorized by agency rule consistent with this subchapter.
- (d) Except as otherwise provided by statute, the proponent of a rule or order has the burden of proof. Any oral or documentary evidence may be received, but the

agency as a matter of policy shall provide for the exclusion of irrelevant, immaterial, or unduly repetitious evidence. A sanction may not be imposed or rule or order issued except on consideration of the whole record or those parts thereof cited by a party and supported by and in accordance with the reliable, probative, and substantial evidence. The agency may, to the extent consistent with the interests of justice and the policy of the underlying statutes administered by the agency, consider a violation of section 557(d) of this title sufficient grounds for a decision adverse to a party who has knowingly committed such violation or knowingly caused such violation to occur. A party is entitled to present his case or defense by oral or documentary evidence, to submit rebuttal evidence, and to conduct such cross-examination as may be required for a full and true disclosure of the facts. In rule making or determining claims for money or benefits or applications for initial licenses an agency may, when a party will not be prejudiced thereby, adopt procedures for the submission of all or part of the evidence in written form.

(e) The transcript of testimony and exhibits, together with all papers and requests filed in the proceeding, constitutes the exclusive record for decision in accordance with section 557 of this title and, on payment of lawfully prescribed costs, shall be made available to the parties. When an agency decision rests on official notice of a material fact not appearing in the evidence

in the record, a party is entitled, on timely request, to an opportunity to show the contrary.

35 U.S.C.A. § 102. Conditions for patentability;
novelty and loss of right to patent

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months before the filing of the application in the United States, or

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the

applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for the purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language;¹ or

(f) he did not himself invent the subject matter sought to be patented, or

(g)(1) during the course of an interference conducted under section 135 or section 291, another inventor involved therein establishes, to the extent permitted in section 104, that before such person's invention thereof the invention was made by such other inventor and not abandoned, suppressed, or concealed, or (2) before such person's invention thereof, the invention was made in this country by another inventor who had not abandoned, suppressed, or concealed it. In determining priority of invention under this subsection, there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

¹ So in original. The semicolon probably should be a comma.

35 U.S.C.A. § 282. Presumption of validity; defenses

Effective: September 16, 2012

(a) In General. – A patent shall be presumed valid. Each claim of a patent (whether in independent, dependent, or multiple dependent form) shall be presumed valid independently of the validity of other claims; dependent or multiple dependent claims shall be presumed valid even though dependent upon an invalid claim. The burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity.

(b) Defenses. – The following shall be defenses in any action involving the validity or infringement of a patent and shall be pleaded:

(1) Noninfringement, absence of liability for infringement or unenforceability.

(2) Invalidity of the patent or any claim in suit on any ground specified in part II as a condition for patentability.

(3) Invalidity of the patent or any claim in suit for failure to comply with –

(A) any requirement of section 112, except that the failure to disclose the best mode shall not be a basis on which any claim of a patent may be canceled or held invalid or otherwise unenforceable; or

(B) any requirement of section 251.

(4) Any other fact or act made a defense by this title.

(c) Notice of Actions; Actions During Extension of Patent Term.

– In an action involving the validity or infringement of a patent the party asserting invalidity or noninfringement shall give notice in the pleadings or otherwise in writing to the adverse party at least thirty days before the trial, of the country, number, date, and name of the patentee of any patent, the title, date, and page numbers of any publication to be relied upon as anticipation of the patent in suit or, except in actions in the United States Court of Federal Claims, as showing the state of the art, and the name and address of any person who may be relied upon as the prior inventor or as having prior knowledge of or as having previously used or offered for sale the invention of the patent in suit. In the absence of such notice proof of the said matters may not be made at the trial except on such terms as the court requires. Invalidity of the extension of a patent term or any portion thereof under section 154(b) or 156 because of the material failure –

- (1) by the applicant for the extension, or
- (2) by the Director,

to comply with the requirements of such section shall be a defense in any action involving the infringement of a patent during the period of the extension of its term and shall be pleaded. A due diligence determination under section 156(d)(2) is not subject to review in such an action.

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UNITED STATES PATENT AND
TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND
APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and
SAMSUNG ELECTRONICS AMERICA, INC.
Petitioners

v.

QUEEN'S UNIVERSITY AT KINGSTON
Patent Owner

Case IPR2015-00583
Patent 7,762,665

**PATENT OWNER'S MOTION TO STRIKE
PETITIONER'S REPLY AND/OR FILE A
SURREPLY TO PETITIONER'S REPLY¹**

Mail Stop PATENT BOARD

Patent Trial and Appeal Board
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Samsung's Reply and accompanying exhibits im-
properly attempt to fill holes in its original petition and
modify the grounds on which trial was instituted.

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Instead of simply rebutting the substantive arguments and evidence presented in the POR, Samsung elected to swap out its defective and deficient evidence. The Reply presents a 68-page Declaration from a new expert and 65 new exhibits attempting to cure the Petitioner's failings. Under the guise of addressing issues raised regarding the prior art's enablement, Samsung's Reply repeatedly crossed the line from the responsive to the new. To condone this behavior would be unfairly prejudicial to the patent owner and would destroy the integrity of the trial.

I. Queen's University moves to strike the Petitioner's Reply to preserve the integrity and fairness of the trial process

"[T]he challenger [is] obliged to make an adequate case in its *Petition and the Reply limited to a true rebuttal role.*" *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1367 (Fed. Cir. 2015) (emphasis added). The *Petition* must identify specific portions of the evidence relied upon to support the challenge and its relevance. 37 C.F.R. § 42.104(b)(5). These principles "reflect[] the combination of efficiency and fairness interests also embodied in the regulation limiting Reply submissions to matter responsive to the [POR]." *Ariosa*, 805 F.3d at 1368 (citing 37 CFR §42.23(b)). A Petitioner's Reply that "crosses the line from the responsive to the new" evades these procedural safeguards and risks expunction. *See id.*

“Examples of indications that a new issue has been raised in a reply include new evidence necessary to make out a *prima facie* case for the patentability or unpatentability . . . and new evidence that could have been presented in a prior filing.” 77 Fed. Reg. 48612, 48767. “Rebuttal evidence is supposed to be limited to that which is responsive to the adversary’s evidence: ‘the traditional principle [is] that evidence offered to rebut must accomplish the function of rebuttal; ‘to explain, repel, counteract, or disprove the evidence of the adverse party.’” *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1081-82 (Fed. Cir. 2015). Here, Samsung’s Reply exceeds its rebuttal function by shifting the original alleged grounds of anticipation to obviousness, providing a new theory of anticipation, submitting new evidence which could have been presented earlier, and circumventing the page limits through improper incorporation of expert testimony.

In a first example, Samsung attempts to supplement its Goldstein *anticipation* ground by pointing to the never-before-mentioned IBM PupilCam (Ex. 1060), stating that a person of ordinary skill would have considered this new pupil sensor as one that could have been used with Goldstein’s device. Reply 7; Ex. 1085 ¶¶40-41. This improperly swaps the PupilCam for the MAGIC tracker that was explicitly disclosed in Goldstein – even though the PupilCam was not an eye tracker and did not perform all the same functions of the MAGIC tracker. Nowhere does Goldstein describe a pupil camera and the Petition makes no mention of this sensor.

“Anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim.” *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983). Replacing an expressly disclosed component of the reference – especially one that was used in the Petition to form the basis of an anticipation challenge – with another element that is “known in the art” improperly converts the original anticipation challenge to an obviousness challenge. *See In re Donohue*, 766 F.2d 531, 534 (Fed. Cir. 1985) (relying on additional references to meet the claim limitations, as in rejections under 35 U.S.C. § 103, “would be pointless”).² Samsung will likely allege that Ex. 1060 was submitted as evidence of enablement. Yet, the relevant discussion of the PupilCam does not appear in the Reply’s enablement section. Rather, the PupilCam was submitted as alleged evidence of an eye-tracker including a processor, specifically to challenge whether Goldstein teaches the claimed step of “processing a signal from the hardware sensor.” Reply 6-7. Reliance on Ex. 1060 as evidence of

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enablement does not excuse Samsung's attempt to cure a deficiency of the Goldstein reference.

More importantly, a challenge to a reference's enablement is not *carte blanche* for a challenger to add all new evidence of *anything* that would have been known to one of skill.³ There are some instances where proper rebuttal evidence is appropriate. But enablement does *not* open the door to combine the original disclosure with anything in the art that could have been used as an alternative to what is actually described. ***There must be a line between anticipation and obviousness.*** See *In re Arkley*, 455 F.2d 586, 587 (1972). The Reply crossed that line. While Goldstein generically states that "any suitable device" known to those of skill in the art may be used, Goldstein only describes eye tracking sensors, and only identifies the MAGIC tracker. Ex. 1005 ¶ 21. Samsung's attempt to fill holes in Goldstein by pointing to another reference is an improper attempt to transition from anticipation to obviousness – not a mere rebuttal of "enablement."

Samsung will also likely allege that the PupilCam evidence is submitted to rebut the credibility of Patent Owner's expert, Dr. Balakrishnan. Indeed, Petitioner attempts to discredit Dr. Balakrishnan for "fail[ing] to consider several variations of IBM sensors, including the PupilCam." *Id.* Samsung's contention begs the question: how could Dr. Balakrishnan be faulted for failing to consider whether Goldstein could have replaced the disclosed MAGIC sensor with the PupilCam

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if the PupilCam was not mentioned in Goldstein or the Petition in the first place? Submitting *new* evidence to support an anticipation ground under the guise of arguing that this evidence was not *previously* addressed is a thinly-veiled attempt to insert that new evidence into the record to cure deficiencies of the original anticipation ground, and is improper at this stage of the proceeding.

In a second example, instead of rebutting the POR's arguments against Goldstein's anticipation ground, Samsung presents an entirely new theory of anticipation. The Petition alleges that Goldstein's "eye tracker" corresponds to the claimed "hardware sensor." The Petition consistently refers to Goldstein's sensor as the "eye tracking sensor." (Pet. 14-17.) Goldstein itself consistently refers to its own sensor as an "eye tracking sensor." (Ex. 1005, Abst.) While Goldstein uses the shorthand "sensor 20" in several places (*e.g.*, *id.* at ¶30), Goldstein originally introduces that object as "eye tracking sensor 20" (*e.g.*, *id.* at ¶21) and the figures identify it as "eye tracking sensor 20." The POR addresses the Goldstein ground based on its reliance on an "eye tracker."

Samsung, in its Reply, for the first time, alleges that "eye trackers" are not important, because Goldstein allegedly discloses the *function* of "eye contact detection" – despite Goldstein's explicit disclosure of an "eye tracking sensor" as the device. Reply 9. Samsung now alleges that the "device" in Goldstein that reads on the claimed sensor is an eye contact sensor. Reply 7; Ex. 1085 ¶30. Having made the leap to this new theory

of anticipation (i.e., now relying on an undisclosed “eye contact sensor” as the hardware sensor), Samsung submits 60+ new exhibits to allegedly enable an “eye contact sensor,” ***despite Goldstein not actually disclosing such a sensor.***

Samsung will likely say that such arguments are responsive to the POR’s enablement challenge, but a reference does not anticipate by describing one thing and enabling another. *See In re Donohue*, 766 F.2d at 533. The relevant inquiry is whether a POSA “could have combined *the publication’s description of the invention* with his own knowledge to make the claimed invention.” *Id.* (emphasis added). Instead of responding to the arguments regarding Goldstein’s *eye tracking sensor* – identified in the Petition as allegedly corresponding to the claimed hardware sensor – not being enabling, Samsung’s analysis is based on whether an *undisclosed* eye contact sensor would enable the challenged claims. Such changes to the original theory of anticipation should be prohibited, especially at this late stage.

In a third example, Samsung exceeds its allowed scope by introducing a new reference (Ex. 1067) allegedly describing a *different version* of the sensor expressly disclosed in Goldstein. Reply 3-4. In the Petition, Samsung cited to Ex. 1017 – a paper mentioned in Goldstein – as providing further description of the disclosed IBM MAGIC tracker. *See* Pet. 14; Ex. 1005, ¶0030. In response to the POR pointing out that Goldstein still did not disclose that sensor 20 is “in or on” mobile device 10 (POR 16-20), Samsung *changed*

the evidence. The Petitioner’s Reply stated that newly-submitted Ex. 1067 should have been considered instead as the “most relevant evidence” for understanding how the IBM MAGIC tracker worked (*see* Reply 3-4) – despite that this “most relevant evidence” was not included in the Petition, and despite its availability to have been submitted earlier.⁴ Samsung even argues that this “most relevant evidence” of Goldstein’s sensor 20 being “in or on” a mobile device was ignored by Dr. Balakrishnan.

First, if this was the “most relevant” evidence, it should have been submitted with the Petition, so that it could have been properly addressed throughout the proceeding. Introducing such evidence at this late stage, when Patent Owner has no opportunity to fully address or respond to it, degrades the integrity of the trial process. Second, this is an improper attempt by Samsung to again add *new* evidence to fill gaps in its *anticipation* argument under the guise of trying to discredit Dr. Balakrishnan’s analysis of Samsung’s original evidence.

Again, Samsung will likely argue that such new evidence, along with new Ex. 1062 is properly submitted to rebut allegations that Goldstein is not an enabling reference. However, Samsung uses these new exhibits in the section of the Reply addressing the “in

⁴ Samsung made the same argument about Ex. 2010, which Dr. Pelz actually discovered – despite it not having been provided with the Petition.

or on” limitation, which is different from its expressly-identified anticipation section. Enablement is not an issue unless the reference is found to actually disclose the claim features – and here Samsung uses the new exhibits and evidence to argue what Goldstein *discloses*, not what it *enables*. So again Samsung’s Reply is not an effort to *rebut* the POR – but a late attempt to fix the holes the POR pointed out.

In a fourth example, the Reply exceeds its page limit by incorporating large portions of the 68-page Essa Declaration. Samsung makes broad conclusions and cites to the Declaration for the requisite analysis. One egregious instance occurs where, regarding the Ho/Roschelle ground, Samsung contends that the POR “did not adequately investigate the state of the art of mobile devices in 2003 and performed its analysis on an incorrect and more limited understanding of their capabilities.” Reply 17 (citing to 33 paragraphs of the Essa Decl.). But the Reply does not identify the alleged inadequacies or explain how they would bear on the Ho/Roschelle ground. Instead, Samsung leaves that entire discussion to **17** pages of the Essa Declaration (in turn relying on 22 new exhibits). There is a difference between using an expert declaration to identify facts that support argument and analysis in the accompanying brief, and using the declaration for the analysis itself while omitting it from the brief. Here, Samsung has improperly done the latter. Another instance of incorporation occurs where Samsung baldly concludes that Goldstein is enabling based on Dr. Essa’s evaluation of the *Wands* factors. Reply 13-14.

But the Reply itself identifies no analysis of Dr. Essa's opinion and provides no explanation of any *Wands* factors. Instead, the Reply cites to 20 paragraphs (§§ 89-108, spanning 6 pages) in the Essa Declaration to discuss the analysis and set forth Samsung's position. *Id.*

Compliance with page limits is necessary to ensure the proceeding operates in an orderly, expeditious, and fair manner. *See In re Harrington*, 392 F.2d 653, 655 (C.C.P.A. 1968). At least the thrust of Samsung's analysis needed to be in the Reply in each of the instances above. To condone Samsung's actions would be to allow Samsung self-help to increase in the length of the Reply. *See* 37 C.F.R. § 42.6(a)(3); 77 Fed. Reg. at 48,617; *see also Cisco v. C-Cation Techs.*, IPR2014-00454, Paper 12 at 10 (P.T.A.B. Aug. 29, 2014) (informative decision).

In sum, the Reply and its supporting evidence went far beyond its permissible scope and crossed the line from the responsive to the new. In addition, as the noted instances of improper incorporation illustrate, the Reply exceeds the page limits (almost doubling its length) without authorization. Samsung has egregiously contravened the PTO's Rules and prejudiced the trial process. The Trial Practice Guide promotes the practice that "[t]he Board will not attempt to sort proper from improper portions of the reply." 77 Fed. Reg. 48767. Queen's University thus requests the Reply be struck from the record.

II. Queen’s University requests authorization to file a surreply

Should the Board decide not to strike the entirety of Samsung’s Reply, Queen’s University moves for authorization to file a surreply and expert testimony on the issue of whether the prior art enables the claimed inventions.

With its Reply, Samsung submitted sixty-six new exhibits, including a declaration from new expert (Ex. 1085)⁵. “Generally speaking, a court should not consider new evidence presented in a reply without giving the other party an opportunity to respond.” *Acumed LLC v. Stryker Corp.*, 551 F.3d 1323, 1332 (Fed. Cir. 2008); *In re Kumar*, 418 F.3d 1361, 1368-69 (Fed. Cir. 2005) (holding “fairness required an opportunity for response” as applicant “was entitled to offer evidence in rebuttal”). In the IPR context, the Federal Circuit has encouraged patent owners to request permission to submit a surreply responding to the new evidence to preserve the required procedural fairness. *Belden*, 805 F.3d at 1081.

The issue of “whether a prior art reference is enabling of the features for which it has been cited” is a mixed question of law and fact. *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994). “Rebuttal evidence may show . . . that the prior art did not enable one skilled in the art to produce the now-claimed invention.” *In re*

⁵ Samsung asserts that the entire 68-page Essa Declaration (Ex. 1085) is directed to the question of whether the asserted Goldstein reference is enabling. (Ex. 2118.)

Kumar, 418 F.3d at 1368. The Federal Circuit has advised that, in particular, facts set forth in an affidavit of an expert in the field addressing inoperativeness “would be highly probative” on this issue. *In re Payne*, 606 F.2d 303, 315 (C.C.P.A. 1979). Accordingly, Queen’s University submits that rebuttal testimony on this issue is appropriate to address Samsung’s 11 pages of enablement arguments in the Reply, 68 pages of expert testimony, and 60+ new exhibits.

A surreply with supporting testimony is needed to address: (1) the feasibility of implementing the system of Goldstein or Ho (as related to the claims) on each cell phone and PDA reference newly submitted by Samsung; (2) new Ex. 1062 and Samsung’s new reliance on the IBM PupilCam; (3) Dr. Essa’s assertion that a POSITA would have understood Goldstein as disclosing the use of eye contact sensors (Ex. 1085 ¶ 31), which was never before identified by Samsung; and (4) Dr. Essa’s contention that new Exs. 1067 and 2012 represent successful implementation of the claims – despite express statements in each to the contrary.

Samsung has asserted that, in an IPR, the patentee bears the burden of proving non-enablement and that printed publications enjoy the presumption of enablement. Contrary to Samsung’s position, “[i]n an [IPR], the burden of persuasion is on the petitioner to prove unpatentability . . . [and] never shifts to the patentee.” *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). And, though the Board in IPR2014-00599 placed the burden on the

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patentee, it found the issue of presumption of enablement of a printed publication was unsettled in the context of an IPR proceeding. Thus, these issues – burden and presumption – warrant attention in a surreply.

Respectfully submitted,
STERNE, KESSLER, GOLDSTEIN
& FOX P.L.L.C.

/Michelle K. Holoubek,
Reg. # 54,179/

Date: March 15, 2016 Michelle K. Holoubek,
Counsel for Patent Owner

CERTIFICATION OF SERVICE

The undersigned hereby certifies that the foregoing **PATENT OWNER'S MOTION TO STRIKE PETITIONER'S REPLY AND/OR FILE A SURREPLY TO PETITIONER'S REPLY**, and **UPDATED EXHIBIT LIST** with Exhibit 2118 were served electronically via email on March 15, 2016 in their entireties on Petitioner Samsung:

W. Karl Renner (Lead Counsel) axf@fr.com
Jeremy Monaldo (Back-Up Counsel) [IPR39843-](mailto:IPR39843-0014IP1@fr.com)
Wasif Qureshi (Back-Up Counsel) 0014IP1@fr.com

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3200 RBC Plaza
60 South Sixth Street
Minneapolis, MN 55402

App. 180

Respectfully submitted,
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C.
/Michelle K. Holoubek, Reg. # 54,179/
Michelle K. Holoubek, Counsel for Patent Owner

Date: March 15, 2016
1100 New York Avenue, N.W.
Washington, D.C.20005-3934
(202) 371-2600
2783472_2

App. 181

UNITED STATES PATENT AND
TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND
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SAMSUNG ELECTRONICS CO., LTD. and
SAMSUNG ELECTRONICS AMERICA, INC.
Petitioners

v.

QUEEN'S UNIVERSITY AT KINGSTON
Patent Owner

Case IPR2015-00584
Patent 7,762,660

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Mail Stop PATENT BOARD

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Samsung will likely say that such arguments are responsive to the POR’s enablement challenge, but a reference does not anticipate by describing one thing and enabling another. *See In re Donohue*, 766 F.2d at 533. The relevant inquiry is whether a POSA “could have combined *the publication’s description of the invention* with his own knowledge to make the claimed invention.” *Id.* (emphasis added). Instead of responding to the arguments regarding Goldstein’s *eye tracking sensor* – identified in the Petition as allegedly corresponding to the claimed hardware sensor – not being enabling, Samsung’s analysis is based on whether an *undisclosed* eye contact sensor would enable the challenged claims. Such changes to the original theory of anticipation should be prohibited, especially at this late stage.

In a third example, Samsung exceeds its allowed scope by introducing a new reference (Ex. 1067) allegedly describing a *different version* of the sensor expressly disclosed in Goldstein. Reply 3-4. In the Petition, Samsung cited to Ex. 1017 – a paper mentioned in Goldstein – as providing further description of the disclosed IBM MAGIC tracker. *See* Pet. 14; Ex. 1005, ¶0030. In response to the POR pointing out that Goldstein still did not disclose that sensor 20 is “in or on” mobile device 10 (POR 16-20), Samsung *changed*

the evidence. The Petitioner’s Reply stated that newly-submitted Ex. 1067 should have been considered instead as the “most relevant evidence” for understanding how the IBM MAGIC tracker worked (*see* Reply 3-4) – despite that this “most relevant evidence” was not included in the Petition, and despite its availability to have been submitted earlier.⁴ Samsung even argues that this “most relevant evidence” of Goldstein’s sensor 20 being “in or on” a mobile device was ignored by Dr. Balakrishnan.

First, if this was the “most relevant” evidence, it should have been submitted with the Petition, so that it could have been properly addressed throughout the proceeding. Introducing such evidence at this late stage, when Patent Owner has no opportunity to fully address or respond to it, degrades the integrity of the trial process. Second, this is an improper attempt by Samsung to again add *new* evidence to fill gaps in its *anticipation* argument under the guise of trying to discredit Dr. Balakrishnan’s analysis of Samsung’s original evidence.

Again, Samsung will likely argue that such new evidence, along with new Ex. 1062, is properly submitted to rebut allegations that Goldstein is not an enabling reference. However, Samsung uses these new exhibits in the section of the Reply addressing the “in

⁴ Samsung made the same argument about Ex. 2010, which Dr. Pelz actually discovered – despite it not having been provided with the Petition.

or on” limitation, which is different from its expressly-identified anticipation section. Enablement is not an issue unless the reference is found to actually disclose the claim features – and here Samsung uses the new exhibits and evidence to argue what Goldstein *discloses*, not what it *enables*. So again Samsung’s Reply is not an effort to *rebut* the POR – but a late attempt to fix the holes the POR pointed out.

In a fourth example, the Reply exceeds its page limit by incorporating large portions of the 68-page Essa Declaration. Samsung makes broad conclusions and cites to the Declaration for the requisite analysis. One egregious instance occurs where, regarding the Ho/Roschelle ground, Samsung contends that the POR “did not adequately investigate the state of the art of mobile devices in 2003 and performed its analysis on an incorrect and more limited understanding of their capabilities.” Reply 17 (citing to 33 paragraphs of the Essa Decl.). But the Reply does not identify the alleged inadequacies or explain how they would bear on the Ho/Roschelle ground. Instead, Samsung leaves that entire discussion to **17** pages of the Essa Declaration (in turn relying on 22 new exhibits). There is a difference between using an expert declaration to identify facts that support argument and analysis in the accompanying brief, and using the declaration for the analysis itself while omitting it from the brief. Here, Samsung has improperly done the latter. Another instance of incorporation occurs where Samsung baldly concludes that Goldstein is enabling based on Dr. Essa’s evaluation of the *Wands* factors. Reply 13-14.

But the Reply itself identifies no analysis of Dr. Essa's opinion and provides no explanation of any *Wands* factors. Instead, the Reply cites to 20 paragraphs (§§ 89-108, spanning 6 pages) in the Essa Declaration to discuss the analysis and set forth Samsung's position. *Id.*

Compliance with page limits is necessary to ensure the proceeding operates in an orderly, expeditious, and fair manner. *See In re Harrington*, 392 F.2d 653, 655 (C.C.P.A. 1968). At least the thrust of Samsung's analysis needed to be in the Reply in each of the instances above. To condone Samsung's actions would be to allow Samsung self-help to increase in the length of the Reply. *See* 37 C.F.R. § 42.6(a)(3); 77 Fed. Reg. at 48,617; *see also Cisco v. C-Cation Techs.*, IPR2014-00454, Paper 12 at 10 (P.T.A.B. Aug. 29, 2014) (informative decision).

In sum, the Reply and its supporting evidence went far beyond its permissible scope and crossed the line from the responsive to the new. In addition, as the noted instances of improper incorporation illustrate, the Reply exceeds the page limits (almost doubling its length) without authorization. Samsung has egregiously contravened the PTO's Rules and prejudiced the trial process. The Trial Practice Guide promotes the practice that "[t]he Board will not attempt to sort proper from improper portions of the reply." 77 Fed. Reg. 48767. Queen's University thus requests the Reply be struck from the record.

II. Queen’s University requests authorization to file a surreply

Should the Board decide not to strike the entirety of Samsung’s Reply, Queen’s University moves for authorization to file a surreply and expert testimony on the issue of whether the prior art enables the claimed inventions.

With its Reply, Samsung submitted sixty-six new exhibits, including a declaration from new expert (Ex. 1085)⁵. “Generally speaking, a court should not consider new evidence presented in a reply without giving the other party an opportunity to respond.” *Acumed LLC v. Stryker Corp.*, 551 F.3d 1323, 1332 (Fed. Cir. 2008); *In re Kumar*, 418 F.3d 1361, 1368-69 (Fed. Cir. 2005) (holding “fairness required an opportunity for response” as applicant “was entitled to offer evidence in rebuttal”). In the IPR context, the Federal Circuit has encouraged patent owners to request permission to submit a surreply responding to the new evidence to preserve the required procedural fairness. *Belden*, 805 F.3d at 1081.

The issue of “whether a prior art reference is enabling of the features for which it has been cited” is a mixed question of law and fact. *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994). “Rebuttal evidence may show . . . that the prior art did not enable one skilled in the art to produce the now-claimed invention.” *In re*

⁵ Samsung asserts that the entire 68-page Essa Declaration (Ex. 1085) is directed to the question of whether the asserted Goldstein reference is enabling. (Ex. 2118.)

Kumar, 418 F.3d at 1368. The Federal Circuit has advised that, in particular, facts set forth in an affidavit of an expert in the field addressing inoperativeness “would be highly probative” on this issue. *In re Payne*, 606 F.2d 303, 315 (C.C.P.A. 1979). Accordingly, Queen’s University submits that rebuttal testimony on this issue is appropriate to address Samsung’s 11 pages of enablement arguments in the Reply, 68 pages of expert testimony, and 60+ new exhibits.

A surreply with supporting testimony is needed to address: (1) the feasibility of implementing the system of Goldstein or Ho (as related to the claims) on each cell phone and PDA reference newly submitted by Samsung; (2) new Ex. 1062 and Samsung’s new reliance on the IBM PupilCam; (3) Dr. Essa’s assertion that a POSITA would have understood Goldstein as disclosing the use of eye contact sensors (Ex. 1085 ¶ 31), which was never before identified by Samsung; and (4) Dr. Essa’s contention that new Exs. 1067 and 2012 represent successful implementation of the claims – despite express statements in each to the contrary.

Samsung has asserted that, in an IPR, the patentee bears the burden of proving non-enablement and that printed publications enjoy the presumption of enablement. Contrary to Samsung’s position, “[i]n an [IPR], the burden of persuasion is on the petitioner to prove unpatentability . . . [and] never shifts to the patentee.” *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). And, though the Board in IPR2014-00599 placed the burden on the

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patentee, it found the issue of presumption of enablement of a printed publication was unsettled in the context of an IPR proceeding. Thus, these issues – burden and presumption – warrant attention in a surreply.

Respectfully submitted,
STERNE, KESSLER, GOLDSTEIN
& FOX P.L.L.C.

/Michelle K. Holoubek,
Reg. # 54,179/

Date: March 15, 2016 Michelle K. Holoubek,
Counsel for Patent Owner

CERTIFICATION OF SERVICE

The undersigned hereby certifies that the foregoing **PATENT OWNER'S MOTION TO STRIKE PETITIONER'S REPLY AND/OR FILE A SURREPLY TO PETITIONER'S REPLY**, and the **UPDATED EXHIBIT LIST** with Exhibit 2118 were served electronically via email on March 15, 2016 in their entireties on Petitioner Samsung:

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35 U.S.C. § 316. Conduct of inter partes review

(a) Regulations. – The Director shall prescribe regulations –

(1) providing that the file of any proceeding under this chapter shall be made available to the public, except that any petition or document filed with the intent that it be sealed shall, if accompanied by a motion to seal, be treated as sealed pending the outcome of the ruling on the motion;

(2) setting forth the standards for the showing of sufficient grounds to institute a review under section 314(a);

(3) establishing procedures for the submission of supplemental information after the petition is filed;

(4) establishing and governing inter partes review under this chapter and the relationship of such review to other proceedings under this title;

(5) setting forth standards and procedures for discovery of relevant evidence, including that such discovery shall be limited to –

(A) the deposition of witnesses submitting affidavits or declarations; and

(B) what is otherwise necessary in the interest of justice;

(6) prescribing sanctions for abuse of discovery, abuse of process, or any other improper use of the proceeding, such as to harass or to cause unnecessary delay or an unnecessary increase in the cost of the proceeding;

(7) providing for protective orders governing the exchange and submission of confidential information;

(8) providing for the filing by the patent owner of a response to the petition under section 313 after an inter partes review has been instituted, and requiring that the patent owner file with such response, through affidavits or declarations, any additional factual evidence and expert opinions on which the patent owner relies in support of the response;

(9) setting forth standards and procedures for allowing the patent owner to move to amend the patent under subsection (d) to cancel a challenged claim or propose a reasonable number of substitute claims, and ensuring that any information submitted by the patent owner in support of any amendment entered under subsection (d) is made available to the public as part of the prosecution history of the patent;

(10) providing either party with the right to an oral hearing as part of the proceeding;

(11) requiring that the final determination in an inter partes review be issued not later than 1 year after the date on which the Director notices the institution of a review under this chapter, except that the Director may, for good cause shown, extend the 1-year period by not more than 6 months, and may adjust the time periods in this paragraph in the case of joinder under section 315(c);

(12) setting a time period for requesting joinder under section 315(c); and

(13) providing the petitioner with at least 1 opportunity to file written comments within a time period established by the Director.

(b) Considerations. – In prescribing regulations under this section, the Director shall consider the effect of any such regulation on the economy, the integrity of the patent system, the efficient administration of the Office, and the ability of the Office to timely complete proceedings instituted under this chapter.

(c) Patent Trial and Appeal Board. – The Patent Trial and Appeal Board shall, in accordance with section 6, conduct each inter partes review instituted under this chapter.

(d) Amendment of the Patent. –

(1) In general. – During an inter partes review instituted under this chapter, the patent owner may file 1 motion to amend the patent in 1 or more of the following ways:

(A) Cancel any challenged patent claim.

(B) For each challenged claim, propose a reasonable number of substitute claims.

(2) Additional motions. – Additional motions to amend may be permitted upon the joint request of the petitioner and the patent owner to materially advance the settlement of a proceeding under section 317, or as permitted by regulations prescribed by the Director.

(3) Scope of claims. – An amendment under this subsection may not enlarge the scope of the claims of the patent or introduce new matter.

(c) Evidentiary Standards. – In an inter partes review instituted under this chapter, the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence.
