

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

ADVANCED TOUCHSCREEN and
GESTURE TECHNOLOGIES, LLC,
Patent Owner.

Case IPR2016-00654
Patent 8,866,785 B2

Before JONI Y. CHANG, BEVERLY M. BUNTING, and
MICHELLE N. WORMMEESTER, *Administrative Patent Judges*.

CHANG, *Administrative Patent Judge*.

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

I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively “Petitioner”) filed a Petition requesting *inter partes* review of claims 1 and 5–7 of U.S. Patent No. 8,866,785 B2 (Ex. 1001, “the ’785 patent”). Paper 2 (“Pet.”). Advanced Touchscreen and Gesture Technologies, LLC (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). Upon consideration of the Petition and Preliminary Response, we determined that there was a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, and instituted this trial, in pursuance to 35 U.S.C. § 314(a), as to claims 1 and 5–7 of the ’785 patent. Paper 10 (“Dec.”).

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 18, “PO Resp.”), and Petitioner filed a Reply (Paper 24, “Reply”). A transcript of the oral hearing held on April 3, 2017 has been entered into the record as Paper 44 (“Tr.”).¹

This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 1 and 5–7 of the ’785 patent are unpatentable.

¹ The oral hearings in the following cases were consolidated: Cases IPR2015-00652, IPR2015-00653, IPR2016-00654, and IPR2015-00655. Paper 44.

A. Related Matters

The parties indicate that the '785 patent has been asserted in *Advanced Touchscreen v. Samsung Electronics Co. Ltd.*, Case No. 3:16-cv-000557-VC (N.D. Cal.). Pet. 4; Paper 5, 2. Additionally, the parties identify three other petitions challenging the patentability of patents related to the '785 patent, including: (1) U.S. Patent No. 8,743,076 B2 (IPR2016-00652); (2) U.S. Patent No. 8,717,303 B2 (IPR2016-00653); and (3) U.S. Patent No. 8,878,810 B2 (IPR2016-00655). Pet. 4; Paper 5, 2.

B. The '785 Patent

The '785 patent generally relates to touch pad user interfaces for controlling external systems, including computers. Ex. 1001, 1:24–25. The '785 patent describes two types of touch pads: null/contact touch pads and pressure-sensor array touch pads. *Id.* at 2:12–43. Null/contact touch pads are “contact-position sensing devices that normally are in a null state unless touched and produce a control signal when touched whose signal value corresponds to typically one unique position on the touch-pad.” *Id.* at 2:12–17. Pressure-sensor array touch pads are “capable of measuring pressure gradients of many parts of the human hand or foot simultaneously.” *Id.* at 2:26–29. According to the '785 patent, one of the purported enhancements is “employing a touch-screen instance of null/contact touch-pad and positioning it over a video display.” *Id.* at 4:51–53.

C. Illustrative Claim

Of the challenged claims, claim 1 is independent. Claims 5–7 depend directly from claim 1. Claim 1 is illustrative:

1. An apparatus comprising:

a transparent touchpad positioned over a visual display,

the transparent touchpad configured to sense a contiguous region of contact from at least a portion of a human hand on a surface of the transparent touchpad,

the transparent touch pad comprising a sensor array having a plurality of sensors,

each sensor having a unique spatial location and an associated unique address,

wherein the transparent touch pad is configured to sense the contiguous region of contact by a generation of sensor measurement values associated with each of the plurality of sensors;

a plurality of sensor spatial locations having associated sensor measurement values responsive to the contiguous region of contact;

a value of at least one control parameter for the contiguous region of contact responsive to a measured change in at least one of the associated sensor measurement values,

the value obtained by performing a calculation on the associated sensor measurement values and interpreting the results as signifying a *finger flick gesture*,

wherein the at least one control parameter is associated with the finger flick gesture; and

at least one derived control parameter assigned to a specific control signal;

wherein the finger flick gesture is recognized from specific

dynamic variations among a combination of one or more hand contact patterns from a first hand contact pattern on the transparent touchpad to a second hand contact pattern on the transparent touchpad.

Ex. 1001, 10:61–11:22 (emphases added).

D. Prior Art of Record

Petitioner presents the references listed below.²

Westerman	U.S. 6,323,846 B1	Nov. 27, 2001	(Ex. 1004)
Bach	WO 90/14604	Nov. 29, 1990	(Ex. 1005)
Ure	U.S. 5,982,302	Nov. 9, 1999	(Ex. 1007)
Edwards	U.S. 5,194,862	Mar. 16, 1993	(Ex. 1009)
Greanias	U.S. 5,386,219	Jan. 31, 1995	(Ex. 1012)
Behrens	U.S. 4,899,137	Feb. 6, 1990	(Ex. 1017)
Jin	U.S. 4,644,101	Feb. 17, 1987	
(Ex. 1020, “Jin ’101 patent”)			
Boie	U.S. 4,526,043	July 2, 1985	(Ex. 1021)
Clancy	U.S. 5,952,998	Sept. 14, 1999	(Ex. 1023)
Yonekura	EP 0088132	Sept. 14, 1983	(Ex. 1024)
Young	U.S. 5,708,460	Jan. 13, 1998	(Ex. 1025)
Maw	WO 92/13328	Aug. 6, 1992	(Ex. 1026)
Gerpheide	U.S. 5,861,875	Jan. 19, 1999	(Ex. 1027)
Caldwell	EP 1562293 A2	Oct. 8, 2005	(Ex. 1028)

Beverly L. Harrison et al., *Squeeze Me, Hold Me, Tilt Me! An Exploration of Manipulative User Interfaces*, PROCEEDINGS OF THE SIGCHI CONFERENCE ON HUMAN FACTORS IN COMPUTING SYSTEMS, 17–24 (ACM Press/Addison-Wesley Publishing Co.) (Apr. 1998) (Ex. 1010, Exhibit A, “Harrison”).

² The citations to the references refer to the original page numbers, and not to the page numbers added by Petitioner.

Andrew Sears et al., *A New Era for Touchscreen Applications: High Precision, Dragging Icons, and Refined Feedback*, Human-Computer Interaction Laboratory, Department of Computer Science, University of Maryland, 1–38, (June 1990) (Ex. 1018, Exhibit A, “Sears”).

S. Jin et al., *Optically Transparent, Electrically Conductive Composite Medium*, 24 SCIENCE 255, 446–48, (Jan. 1992) (Ex. 1019, Exhibit A, “Jin”).

Larry K. Baxter, *Capacitive Sensors: Design and Applications* 1–5, 105–146 (Robert J. Herrick, ed., IEEE Press 1997) (Ex. 1022, Exhibit A, “Baxter”).

E. Instituted Grounds of Unpatentability

We instituted the instant trial based on the following grounds of unpatentability (Dec. 41):

Challenged Claims	Basis	References
1 and 5–7	§ 103(a) ³	Westerman and Bach
1 and 5–7	§ 103(a)	Ure, Edwards ⁴ , and Harrison

³ Because the claims at issue have a filing date prior to March 16, 2013, the effective date of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), we apply the pre-AIA version of 35 U.S.C. § 103 in this Decision.

⁴ Although Ure incorporates Edwards by reference (Ex. 1007, 1:37–45, 1:52–67), Petitioner identifies Edwards expressly in the statement of the asserted ground of unpatentability for clarity. Pet. 38 n.8.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Under the broadest reasonable interpretation standard, claim terms generally are given their 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).

The parties propose constructions for several claim terms. Pet. 10–13; PO Resp. 11–17. We note that only those claim terms and elements which are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). For purposes of this Decision, we find it necessary to address only the claim terms identified below.

“touch pad”

Claim 1 recites “a transparent touchpad positioned over a visual display.”⁵ Ex. 1001, 10:62. Patent Owner asserts that the “term ‘transparent

⁵ The claims at issue use the terms “touchpad” and “touch pad” interchangeably. *See, e.g.*, Ex. 1001, 10:61–11:22 (“wherein the *transparent touch pad* is configured to sense the contiguous region of contact”) (emphasis added). On this record, neither party indicates a meaningful difference between these terms. For this Decision, we refer generally to “touch pad” for consistency.

touchpad’ (when the touchpad is positioned over a visual display) is synonymous with a ‘touch screen’ and should be construed as a ‘display device configured to detect touch from regions of a hand or other parts of a body.’” Prelim. Resp. 16; PO Resp. 11, 17. As support, Patent Owner cites to the Abstract of the ’785 patent, which provides that “[t]he touchscreen can be realized with a transparent touch sensor array positioned over a visual display” (Ex. 1001, Abs.), the language of claim 1 (*id.* at 10:62–65), and Petitioner’s purported litigation contentions (Ex. 2002). Prelim. Resp. 16–17.

In its Reply, Petitioner asserts that it is not necessary to construe “touch pad” since, in this proceeding, “the parties do not dispute this term is met for each ground” and Patent Owner “has not proposed a construction” in its Patent Owner Response. Reply 6. Nevertheless, Petitioner proposes to interpret the term “touch pad” in light of the Specification as “interface that uses *touch* sensors to track the position of a touch on its surface.” Reply 6, Ex. 1001 Abstract, 1:30–35, 2:13–17, 2:25–29, 12:17–26; Ex. 1033 ¶¶ 60–62.

Upon consideration of the evidence in this entire record, we agree with Patent Owner that the claim term “transparent touchpad positioned over a visual display” is synonymous with a touch screen in light of the Specification. We also agree with Petitioner that the claim term “touchpad” alone does not require “pressure sensors.”

However, we maintain our reason noted in the Decision on Institution (Dec. 9) for declining to adopt Patent Owner’s proposed claim construction

as set forth in its Preliminary Response—a “display device configured to detect touch from regions of a *hand or other parts of a body*” (Prelim. Resp. 16, emphasis added)—in that it would exclude non-body parts (e.g., a stylus pen) for operating the touch screens, contrary to the Specification of the ’785 patent. *See, e.g.*, Ex. 1001, 1:24–28. The Specification provides that “[t]ouchpad user interfaces are used for controlling external systems such as computers, machinery, and process environments via at least three independent control signals,” and the “touchpad may be operated by hand, other parts of the body, *or inanimate object*.” Ex. 1001, 1:24–28 (emphasis added). The Specification also explains that a touch screen may be an example of a touch pad. For instance, the Specification states that a “third possible enhancement is that of employing a touch-screen instance of null/contact touch pad and positioning it over a video display.” Ex. 1001, 2:22–24, 4:51–53; *see also id.* at 3:6–20 (Examples of null/contact touch pads include “two-dimensional-sensing see-through touchscreens”).

In consideration of the foregoing, we construe the term “touch pad,” broadly, but reasonably, as an “interface device configured to detect the position of a touch on its surface.”

“finger flick”

Claim 1 recites “the finger flick gesture is recognized from specific dynamic variations among a combination of one or more hand contact patterns.” Ex. 1001, 11:18–22. In deciding whether to institute a trial, we considered the parties’ proposed constructions and supporting evidence

including the Specification, claim language, and relevant portions of the prosecution history. See Pet. 10–11 (citing Ex. 1001, 7:44–50; Ex. 1003, 704, 717; Ex. 1013, 10:8–15; Ex. 1010, 19; Ex. 1014, 5:67–68, 9:5–6, Fig. 11; Ex. 1015, 5:63–64; Ex. 1029, 113; Ex. 1031, 17–18); Prelim. Resp. 18–19 (citing Ex. 2007, 106–07, 195). Based on the record at that time, we construed the claim term “finger flick” to encompass “a touch gesture in which the user’s finger strokes a surface in a continuous movement and then lifts off from the surface” in the Decision on Institution. Dec. 10–12.

After institution, Petitioner agrees with our claim construction. Reply 3–4. However, Patent Owner maintains that the claim term “finger flick” should be construed as a “touch gesture wherein the user’s finger *gains speed as it reaches the end.*” PO Resp. 12–16 (emphasis added). Patent Owner argues that its proposed claim construction is consistent with the Specification and prosecution history, but nevertheless provides no citation to the Specification or prosecution history of the ’785 patent. Rather, Patent Owner mainly relies upon the prosecution history of *a related patent*, U.S. Patent 8,743,068 B2 (“the ’068 patent”), arguing that a “finger flick” gesture is distinguishable from a “quick-drag” gesture. *Id.* (citing Ex. 2007, 106–07, 195).

We decline to adopt Patent Owner’s proposed claim construction because it would improperly import an extraneous limitation into the claims—namely, “the user’s finger gains speed as it reaches the end point.” If a feature is not necessary to give meaning to what the inventor means by a claim term, it would be “extraneous” and should not be read into the claim.

Hoganas AB v. Dresser Indus., Inc., 9 F.3d 948, 950 (Fed. Cir. 1993); *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir. 1988). There is a presumption that a claim term carries its ordinary and customary meaning. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002). To overcome this presumption, the patentee must “clearly set forth” and “clearly redefine” a claim term away from its ordinary meaning. *Bell Atlantic Network Servs., Inc. v. Covad Commc’ns Grp., Inc.*, 262 F.3d 1258, 1268 (Fed. Cir. 2001). The disavowal must be “unmistakable” and “unambiguous.” *Dealertrack, Inc. v. Huber*, 674 F.3d 1315, 1322 (Fed. Cir. 2012).

As Petitioner points out (Pet. 10–11; Reply 3–4), Patent Owner’s proposed claim construction is not supported by the Specification (Ex. 1001, 7:44–50) or the prosecution history of the ’785 patent (Ex. 1003, 704, 717). Notably, the Specification merely discloses that “the recognized postures described thus far may be combined in sequence with specific dynamic variations among them (such as a finger flick, double-tap, etc.).” Ex. 1001, 7:44–50. Nothing in the Specification describes a “finger flick” as a “touch gesture wherein the user’s finger *gains speed as it reaches the end.*”

Although the prosecution history of other related patents and the prosecution history of the ’785 patent may be relevant as to the meaning and scope of the claim term at issue here, the evidence in the present record, as a whole, does not support Patent Owner’s proposed claim construction. Ex. 1002 (the prosecution history of the ’785 patent); Ex. 1003 (the prosecution history of a related patent, U.S. Patent No. 8,717,303 (“the ’303

patent”)); *see also* Ex. 2013; Ex. 2007 (the prosecution history of the ’068 patent, another related patent). As Petitioner notes, the prosecution history of the ’785 patent and the related patents shows that the Examiner repeatedly rejected the Applicant’s construction, and consistently construed the claim term “finger flick” as “a type of gesture that comprises some movement over a surface.” Ex. 1002, 76; Ex. 1003, 704, 717; Ex. 2007, 113, 133, 165, 294.

Indeed, the Examiner rejected Applicant’s proposed claim construction that requires the user’s finger to gain “speed as it reaches the end point”—the very same construction now advanced by Patent Owner in this proceeding (PO Resp. 12). Ex. 2007, 113 (indicating that the Examiner maintained the rejection based on Beaton), 133 (indicating in the Examiner’s Final Rejection that Applicant’s arguments regarding “finger flick” were not persuasive, and that based on the Specification and the broadest reasonable interpretation of the term “finger flick,” Beaton taught the “finger flick” claim limitation), 169. More importantly, the Examiner found that the Applicant’s proposed claim construction was not supported by the *original disclosure* of the application, explaining that “the disclosure as originally filed does not describe finger-flick in this way,” and “does not provide any details about the finger-flick gesture being different than quick drag gesture.” *Id.* The Examiner further observed that “as defined in Dictionary, the term ‘flick’ is defined as ‘a light and *rapid movement*,’ so with respect to the claim term ‘finger-flick,’ it reads on gesture of ‘a *quick* drag’ which is taught by Beaton.” *Id.* at 294 (emphases in the original).

We are not persuaded by Patent Owner's argument that "the applicant distinguished the 'finger flick' gesture from the 'quick-drag' gesture disclosed in U.S. Patent No. 6,037,937 to Beaton." PO Resp. 12–16 (citing Ex. 2007, 106–07); Tr. 46–47 (citing Ex. 2007, 149). Patent Owner directs our attention to one of the references submitted by Applicant during prosecution to support its construction. Tr. 46–47. However, the cited portion of that reference is silent as to whether the user's finger gains speed as it reaches the end in a finger flick gesture. Ex. 2007, 149. Rather, it merely describes "informal findings suggest that the end of a drag-drop gesture requires a more precise targeting effort, hence a slower velocity at the end of the gesture." *Id.* Furthermore, the Examiner had considered the evidence submitted by Applicant during prosecution, and determined that those cited references do not support the narrow claim construction advanced by Applicant because they were published after the effective filing date of the application and described the term "gesture" in the context of *mouse operation*. *Id.* at 169.

Significantly, the claims were allowed for reasons independent of the allegedly disclaiming statements. The Examiner eventually allowed the claims because Applicant amended his claims to require a limitation (reproduced below) that includes other additional features.

wherein the control parameters include parameters derived from recognizing a finger-flick touch gesture, the finger-flick touch gesture recognized from ~~pattern recognition of variations between a plurality of pressure profiles~~ a sequence of postures with specific dynamic variations among them, the sequence of postures being recognized from pressure profiles.

Id. at 399–400.

An unsuccessful argument or a proposed claim construction that was repeatedly rejected by the Examiner during prosecution does not constitute an “unmistakable” or “unambiguous” disavowal. It is well-settled that “the doctrine of prosecution disclaimer only applies to unambiguous disavowals.” *Grober v. Mako Prods., Inc.*, 686 F.3d 1335, 1341 (Fed. Cir. 2012) (citing *Abbott Labs. v. Sandoz, Inc.*, 566 F.3d 1282, 1289 (Fed. Cir. 2009)). “It is inappropriate to limit a broad definition of a claim term based on prosecution history that is itself ambiguous.” *Inverness Med. Switz. GmbH v. Warner Lambert Co.*, 309 F.3d 1373, 1382 (Fed. Cir. 2002).

Moreover, Patent Owner does not provide credible evidence or sufficient explanation as to why the finger necessarily gains speed as it reaches that end point. *Id.* Dr. Brogioli’s testimony relies only on the statements made by the Applicant from the prosecution history of a related patent, which were rejected by the Examiner, as discussed above. Ex. 2012 ¶ 82. On the contrary, Mr. Ward testifies that our construction in the Decision on Institution (Dec. 10–12)—construing “finger flick” to encompass “a touch gesture in which the user’s finger strokes a surface in a continuous movement and then lifts off from the surface”—is consistent with the use of the term in the art as understood by an ordinarily skilled

artisan. Ex. 1033 ¶ 47 (citing Ex. 1013, 10:8–15; Ex. 1010, 19; Ex. 1014, 5:67–68, 9:5–6, Fig. 11; Ex. 1015, 5:63–64).

The prior art of record, which reflects the general knowledge of a skilled artisan at the time of the invention, also does not support Patent Owner’s proposed claim construction. For instance, the prior art indicates that a “finger flick” gesture merely involves a finger stroke on the surface in a direction and then the finger lifts off from the surface. *See, e.g.*, Ex. 1013, 10:8–15 (“Examples of these ‘gestures’ are . . . single strokes or ‘flicks’ right, left, up or down, which are used for scrolling”); Ex. 1010, 19 (“a flick on the upper right corner from right to left to indicate ‘forward one page’ . . . a finger press, the direction of a stroke, and a release of pressure.”); Ex. 1014, Fig. 11 (“flick up—to scroll up”); Ex. 1015, 5:63–64 (“A ‘flick’ gesture is an upward or downward stroke that is used for scrolling.”).

In light of the arguments and evidence in this record, including the Specification and prosecution history, as well as prior art references that show the general knowledge of an ordinarily skilled artisan, we construe the claim term “finger flick” to encompass “a touch gesture in which the user’s finger strokes a surface in a continuous movement and then lifts off from the surface.”

“gesture” and “hand contact patterns”

Claim 1 recites:

wherein the finger flick *gesture* is recognized from specific dynamic variations among a combination of one or more *hand contact patterns* from a first hand contact pattern on the

transparent touchpad to a second hand contact pattern on the transparent touchpad.

Ex. 1001, 11:18–22 (emphases added).

Petitioner notes that the parties in the district court proceeding agreed to the constructions (reproduced in the table below) for the claim terms “gesture” and “hand contact patterns.” Pet. 13. Patent Owner also agrees with the use of these claim constructions in the instant proceeding. PO Resp. 11–12. As support, Patent Owner asserts that the term “gesture” is defined expressly in the Specification of the ’785 patent, which states that “recognized postures described thus far may be combined in sequence with specific dynamic variations among them” and that “such sequential dynamics among postures will be termed ‘gestures.’” *Id.* at 12 (citing Ex. 1001, 7:49–55). Patent Owner further notes that the Specification refers to the two-dimensional shapes in Figure 4 as “hand contact patterns.” *Id.* at 11; Ex. 1001, 7:38–40 (stating that “these and other hand contact patterns which will be termed ‘postures’”), Fig. 4.

We adopted these constructions in the Decision on Institution. Dec. 12–13. In its Reply, Petitioner does not challenge these constructions. Reply 2–6. Upon review of the parties’ explanations and supporting evidence before us, we discern no reason to modify our claim constructions set forth in the Decision on Institution with respect to these claim terms. Dec. 12–13. Therefore, for purposes of this Final Written Decision, we maintain the following constructions:

Claim term	Construction
“gesture”	“dynamic variations among postures or hand contact patterns combined in sequence”
“hand contact patterns”	“the two-dimensional shapes of contiguous regions of contact”

“recognized”

Claim 1 recites “the finger flick gesture is *recognized* from specific dynamic variations among a combination of one or more hand contact patterns.” Ex. 1001, 11:18–22 (emphasis added).

Patent Owner, citing to a general dictionary (Ex. 2010, 976), asserts that the term “recognized” should be construed as “to perceive to be something previously known,” consistent with the term’s plain dictionary meaning. PO Resp. 16–17. According to Patent Owner, “a touch gesture must be perceived based on *previously known* sequential dynamics (a set of *stored* touch gestures).” *Id.* (citing Ex. 1001, 7:35–38, 44–50) (emphases in the original).

Petitioner counters that the intrinsic evidence does not support Patent Owner’s proposed claim construction. Reply 4–6. In Petitioner’s view, the challenged claims “do not recite a ‘set of stored touch gestures’ or limit gesture recognition to looking up specific ‘previously known sequential dynamics’—rather, the gesture need only be recognized *from* observed specific dynamic variations among hand contact patterns, as claimed.” *Id.*

Petitioner also urges us to give the term its plain and ordinary meaning, or construe it to mean “discerned,” consistent with the Specification. *Id.* (citing Ex. 1001, 7:23–26, 33–35, 44–50).

In construing the claims, our analysis begins with, and remains centered on, the language of the claims themselves. *See Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001). “The claims, of course, do not stand alone.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc). “Rather, they are part of a fully integrated written instrument, consisting principally of a specification that concludes with the claims.” *Id.* (internal quotation marks and citation omitted). “For that reason, claims must be read in view of the specification, of which they are a part.” *Id.* (internal quotations marks and citation omitted). Indeed, apart from the claims, the specification is “the single best guide to the meaning of a disputed term.” *Id.*

We are not persuaded by Patent Owner’s arguments and decline to adopt Patent Owner’s proposed claim construction because, once again, Patent Owner attempts to import an extraneous limitation into the claims—“a touch gesture must be perceived based on *previously known* sequential dynamics (a set of *stored* touch gestures).” PO Resp. 16–17 (emphases in the original). Claim 1 merely recites “the finger flick gesture is recognized from specific dynamic variations among a combination of one or more hand contact patterns.” Ex. 1001, 11:18–22. As noted by Petitioner, the challenged claims do not recite “a set of *stored* touch gestures” or limit

gesture recognition to looking up specific “*previously known* sequential dynamics.” Reply 4–6.

Moreover, Patent Owner’s proposed claim construction relies upon an extrinsic general dictionary definition of the term “recognize” in isolation, not in the context of the entire claim element as a whole, in light of the Specification. PO Resp. 16–17 (citing Ex. 2010, 976). As noted by our reviewing court, the fact that a term “has multiple dictionary meanings does not mean that all of these meanings are reasonable interpretations in light of [the] specification.” *PPC Broadband, Inc. v. Corning Optical Commc ’ns RF, LLC*, 815 F.3d 747, 752 (Fed. Circ. 2016). In fact, the dictionary cited by Patent Owner also sets forth two other definitions that do not have the “previously known” requirement—namely, (1) “to acknowledge formally . . . to admit as being of a particular status . . .”; and (2) “to acknowledge or take notice of in some definite way . . .” Ex. 2010, 976. Patent Owner does not explain why these other definitions are not reasonably applicable. As Petitioner noted, as an example, “you don’t need to have previously known Judges Chang[,] Bunting and Wormmeester to recognize each of them as a judge. We can simply detect this in advance by [certain] characteristics.” Tr. 86–87.

Patent Owner does not identify, nor can we find, any portion of the Specification that unambiguously defines the term “recognized” to require a touch gesture to “be perceived based on *previously known* sequential dynamics (a set of *stored* touch gestures),” as urged by Patent Owner. PO Resp. 16–17 (emphases in the original). In fact, the Specification does not

describe “a set of *stored* touch gestures” or recognizing touch gestures based on “*previously known* sequential dynamics.” Ex. 1001, 7:33–50. As Petitioner points out, the Specification merely describes that “[r]elatively simple pattern recognition software can be used to *discern* . . . hand contact patterns” (i.e., postures) and gestures. *Id.* (emphasis added).

Therefore, we agree with Petitioner that the evidence in this record does not support Patent Owner’s proposed claim construction. In light of the Specification including the claim language, we give the claim element—“the finger flick gesture is *recognized from* specific dynamic variations among a combination of one or more hand contact patterns”—its plain and ordinary meaning. For example, the term “recognized” encompasses “discerned,” “acknowledged,” or “taken notice of” based on certain characteristics of the touch gesture.

B. Principles of Law

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art;

(3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

C. Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). In that regard, Mr. Jean Renard Ward, Petitioner’s expert, testifies that a person of ordinary skill in the art at the time of the invention “would have had a minimum of bachelor’s degree in mechanical engineering, electrical engineering, computer engineering, or computer science, or an equivalent technical degree and at least two years of experience in the design of computer user interface devices, or the equivalent.” Ex. 1032 ¶ 15. Michael C. Brogioli, Ph.D., Patent Owner’s expert, adopts Mr. Ward’s testimony as to the level of ordinary skill in the art. Ex. 2012 ¶¶ 26–27. Jacob O. Wobbrock, Ph.D., another of Patent Owner’s declarants, seems to agree with the testimony of Mr. Ward, but further testifies that an ordinarily skilled artisan would have “experience building interactive computer applications, including taking readings from input devices and portraying user interfaces on-screen.” Ex. 2009 ¶ 22.

Based on the evidence before us, we do not observe meaningful differences between the parties’ assessments of a person with ordinary skill

in the art. Therefore, we adopt Mr. Ward’s assessment of a person with ordinary skill in the art. We also find that the prior art references themselves represent the level of ordinary skill in the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the level of ordinary skill in the art may be evidenced by the references themselves); *GPAC*, 57 F.3d at 1579 (finding that the Board did not err in concluding that the level of ordinary skill in the art was best determined by the references of record).

D. Background of the Art

In this proceeding, both parties submit arguments and supporting evidence concerning the state of the art at the time of the invention. Pet. 1–4; PO Resp. 17–22; Ex. 1032 ¶¶ 19–28; Ex. 1033 ¶¶ 9–24; Ex. 2009 ¶¶ 26–34. Upon review of the parties’ contentions and evidence, we are not persuaded that Patent Owner’s overview of the prior art (PO Resp. 17–22) and Dr. Wobbrock’s testimony regarding the background of the art (Ex. 2009 ¶¶ 26–34) are supported by the evidence in this record. *See, e.g.*, Ex. 1033 ¶¶ 9–24 (providing examples of how “Dr. Wobbrock and Patent Owner inaccurately describe the state of the art before May 15, 1999.”). Rather, we agree with Petitioner’s description of the state of the art, which is supported by Mr. Ward’s testimony, the prior art disclosures, and other evidence in this record. *See, e.g.*, Ex. 1032 ¶¶ 19–28; Ex. 1033 ¶¶ 9–24; Ex. 1009, 10:3–22; Ex. 1001, 3:12–20 (explaining that “two-dimensional-sensing see-through touch-screens [were] often employed in public

computer kiosks.”). We credit Mr. Ward’s testimony (Ex. 1032 ¶¶ 19–28; Ex. 1033 ¶¶ 9–24) as it is consistent with the prior art in this record.

Notably, both Patent Owner and Dr. Wobbrock assert that “[m]ulti-touch screens *were not widely used* in research or embraced commercially until after 2000,” and multi-touch screens “did not become *popularized* until as late as 2005.” PO Resp. 17, 20; Ex. 2009 ¶¶ 26, 33 (emphases added). Those assertions do not undermine the fact that using touch screens as input devices was known in the art at the time of the invention, as evidenced by the prior art in this record. *See, e.g.*, Ex. 1018, 3; Ex. 1022, 115–17; Ex. 1023, 1:48–60; Ex. 3001, 3 (defining “touch screen” as a “computer screen designed or modified to recognize the location of a touch on its surface”); *see also* Prelim. Resp. 45 (admitting that the ease of learning and use of touch screens was a well-known “benefit of all touch screens,” and that “[t]ouch screens were used, for example, to select button-options on ATM’s”); Ex. 2009 ¶ 26 (confirming that “touchpads and touch screens were known to persons of ordinary skill in the art before May 15, 1999.”). For instance, Patent Owner does not dispute that Ure discloses a multi-touch touch screen. Ex. 1007, 1:52–59, 2:55–57. Edwards also describes touch sensor systems that may be used as a stand-alone input interface or, alternatively, they may be used as an overlay to a display device, with transparent sensor elements. Ex. 1009, 10:3–8. According to Edwards, “[t]ouching of the sensing elements for example may be by means of a user’s finger or by means of a stylus.” *Id.* at 1:47–48.

To the extent that Patent Owner contends that the technical features of touch screens and touch pads cannot be combined because they “are different both technologically and in the interactive capabilities” (PO Resp. 21–22; Ex. 2009 ¶¶ 27–34), we are not persuaded that Patent Owner provides sufficient explanation or credible evidence to support such an contention. Rather, we agree with Mr. Ward’s testimony that Patent Owner’s arguments and Dr. Wobbrock’s testimony “inaccurately describe the state of the art before May 15, 1999,” and that they “do not account for the fact that touchpads and touch screens are presented as alternatives in the prior art and in the ’785 patent itself.” Ex. 1033 ¶¶ 9–24; Ex. 1032 ¶¶ 30, 56, 58–59; Ex. 1004, 3:6–10, 62:3–7; 1005, 9; Ex. 1001, 1:37–38, 2:24–26, 6:26–65, 10:22–37. As discussed above, the Specification of the ’785 patent explains that a touch screen may be an example of a touch pad. Ex. 1001, 2:22–24, 4:51–53; *see also id.* at 3:6–20 (Examples of null/contact touch pads include “two-dimensional-sensing see-through touchscreens”).

In addition, Patent Owner’s reliance on a passage of an Initial Determination from the United States International Trade Commission (“ITC”) (Ex. 2003, 202, 209–210), concerning a different patent and a different prior art reference cited in a completely different evidentiary record, is misplaced. As Mr. Ward testifies, that quotation is taken out of context and is incomplete. Ex. 1033 ¶ 19. The fact that the prior art reference in that case is a doctoral dissertation authored by the inventor of Westerman (U.S. Patent 6,323,846, Ex. 1004), without more, does not compel us to make the same finding here in the instant proceeding. Patent

Owner's argument conflates the dissertation in that case and the prior art reference, Westerman (Ex. 1004), in this proceeding.

Significantly, the cited portion of the ITC's Initial Determination makes clear that the dissertation in that case discloses *a touch pad that has a separate display*, rather than "a touch screen, which is a combination of a display and an input device." PO Resp. 21; Ex. 2003, 209–210. In contrast, the prior art reference here in the instant proceeding, Westerman (Ex. 1004), discloses recognizing a gesture (e.g., a layout homing gesture, where all five fingers are placed on the surface synchronously) on a *multi-touch surface apparatus "fabricated on or integrated with a display device,"* as a user input command (to control the location of the key symbols that are reprogrammably displayed on the surface so that the home row keys will be moved automatically under the synchronized fingertips). Ex. 1004, 54:67–55:26; 62:3–4.

Furthermore, merely pointing out that the prior art acknowledges certain "perceived disadvantages" in the early development of the touch device technology, as in Sears (Ex. 1018), does not undermine the actual teachings in the prior art. PO Resp. 17–20; Ex. 2009 ¶¶ 26–34. For instance, as discuss below in Section II.E. ("Secondary Considerations of Nonobviousness") of this Decision, Sears also discloses the advantages of using touch screens and how those "perceived disadvantages" had been overcome or reduced, including the obscuring the screen problem and the "fat finger problem" (PO Resp. 13–14; Ex. 2009 ¶ 27). *See, e.g.*, Ex. 1018, 3–6 ("Many of these problems [had] been overcome or reduced by

improvements in touchscreen technology or design strategies that have been developed for touchscreen interfaces.”); *id.* at 4 (“Careful design of the interface, placing selectable items in locations that will keep the user’s hand from obscuring the screen, can significantly reduce this problem.”); *id.* at 5 (“touchscreens have improved dramatically in recent years, and, as a result, high precision, low error rate tasks can now be performed using a touchscreen”); Ex. 1033 ¶¶ 14–19.

Additionally, Patent Owner’s reliance on the problems noted in the background section of Westerman also is unavailing, as they are those that are to be solved by the invention disclosed in Westerman. PO Resp. 19–20; Ex. 2009 ¶ 32. Westerman expressly discloses that

It is also an object of the present invention to provide a system and method for distinguishing different types of manual input such as typing, multiple degree-of-freedom manipulation, and handwriting *on a multi-touch surface, via different hand [configurations] which are easy for the user to learn and easy for the system to recognize.*

Ex. 1004, 6:60–65 (emphasis added). As Petitioner and Mr. Ward also explain, other prior art of record shows that a “flick” was a standard gesture at the time of the invention, which was used, for example, to control the direction of scrolling. Pet. 3; Ex. 1032 ¶ 25 (citing Ex. 1013, 10:8–15 (“The present invention utilizes approximately a dozen standard ‘gestures.’ Examples of these gestures are . . . single strokes or ‘flicks’ right, left, up or down, which are used for scrolling.”); Ex. 1014, 5:67–68, 9:5–6, Fig. 11; Ex. 1015, 5:63–64 (“A ‘flick’ gesture is an upward or downward stroke that is used for scrolling.”)). Patent Owner and Dr. Wobbrock’s testimony do

not address the advantages of using touch screens and the technological advancements disclosed in Sears, Westerman, and other prior art in this record, but rather unduly focus on the “perceived disadvantages” or noted problems in the early development of the touch screen technology. PO Resp. 17–22; Ex. 2009 ¶¶ 26–34.

For these reasons, we are not persuaded that Patent Owner’s overview of the prior art (PO Resp. 17–22) and Dr. Wobbrock’s testimony regarding the background of the art (Ex. 2009 ¶¶ 26–34) describe the state of the art at the time of the invention accurately.

E. Obviousness over Westerman and Bach

Petitioner asserts that claims 1 and 5–7 are unpatentable under 35 U.S.C. § 103(a) as obvious over Westerman in combination with Bach. Pet. 14–37. Petitioner provides explanations to account for all of the claim limitations recited in the challenged claims (*id.* at 20–37), and reasons to combine the teachings of Westerman and Bach (*id.* at 17–20). In support of its contentions, Petitioner directs our attention to a Declaration of Mr. Ward. Ex. 1032 ¶¶ 44–146. Based on the evidence in this record, we are persuaded by Petitioner’s showing and we credit Mr. Ward’s testimony (Ex. 1032 ¶¶ 44–146) as it is consistent with the prior art disclosures.

Relying on Dr. Brogioli’s Declaration (Ex. 2012 ¶¶ 28–67), Patent Owner argues that the combination of Westerman and Bach fails to disclose certain claim limitations, and that Petitioner has not shown that one with ordinary skill in the art would have combined Westerman and Bach. PO

Resp. 28–31. In our discussion below, we begin with a brief overview of Westerman and Bach, and then we address each of the parties’ contentions in turn, focusing on the disputed claim limitations.

Westerman

Westerman discloses a multi-touch surface apparatus for sensing configurations and activities of fingers. Ex. 1004, 8:45–47. Westerman also describes a method for generating cursor movement or scrolling signals from a tangential motion of a user’s finger that is accelerating on a touch-sensitive surface before the finger is lifted. *Id.* at 10:40–65.

Figure 1 of Westerman is reproduced below.

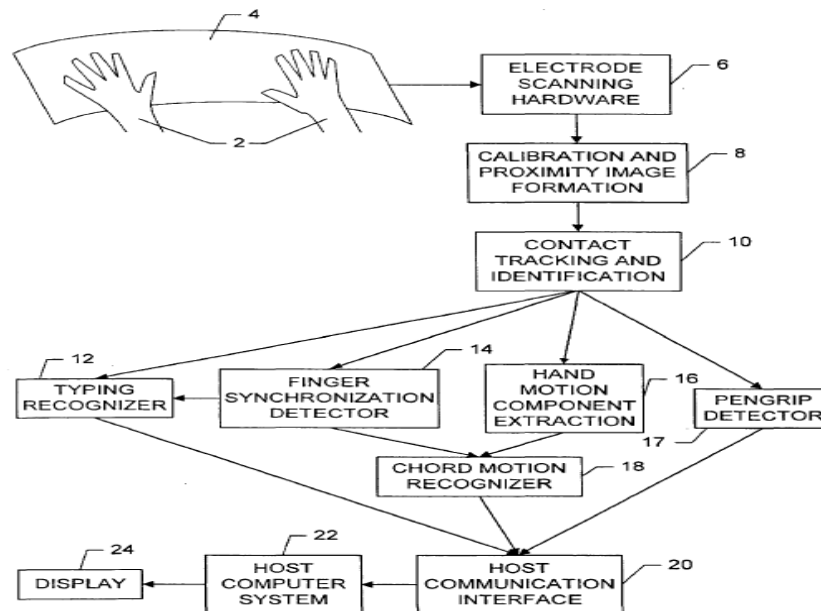


FIG. 1

Figure 1 of Westerman illustrates a block diagram of an integrated manual input apparatus, which includes multi-touch surface 2, electronic scanning hardware 6, calibration and proximity image formation module 8,

and contact tracking and identification module 10. *Id.* at 13:4–26.

Westerman’s multi-touch surface apparatus comprises an array of capacitive proximity sensors, which sense the distance and pressure between the user’s finger and the surface. *Id.* at 11:21–23, 14:31–37, 15:1–42. The multi-touch surface apparatus can be fabricated on or integrated with a display device. *Id.* at 62:3–4; Ex. 1006, 90⁶ (providing the same disclosure in Westerman’s original claims 14 and 15). It also can be used for tracking and identifying hand contacts in a sequence of proximity images, in order to support interpretation of hand configurations and activities. *Id.* at 9:15–18.

Bach

Bach relates to touch-sensitive and pressure-sensitive devices. Ex. 1005, 1. These devices include a layer of material that overlays one or more sensors. *Id.* at 4. The layer of material has dielectric characteristics that change with pressure applied thereto, and the sensors can detect the dielectric changes and generate an output indicative of the pressure. *Id.* Bach also discloses forming a superior sensing screen over a visual display unit using sensors and transparent means. *Id.* at 11.

Recognizing a Finger Flick Gesture on a Transparent Touch Pad

Petitioner asserts that Westerman, in combination with Bach, teaches or suggests recognizing a finger flick gesture on “a *transparent* touchpad

⁶ The citations to Exhibit 1006, which contains Westerman’s original disclosure, refer to the original page numbers, and not to the page numbers added by Petitioner.

positioned over a visual display,” as recited in claim 1, and required by claims 5–7. Pet. 20–21, 27–31. As support, Petitioner avers that Westerman describes a multi-touch surface apparatus fabricated on or integrated with a display device, which comprises a liquid crystal display or a light-emitting polymer display. *Id.* at 20–21 (citing, *e.g.*, Ex. 1004, 9:15–36, 55:4–8, 62:3–7). Petitioner further submits that Westerman teaches recognizing a finger flick gesture on the multi-touch surface apparatus because Westerman discloses tracking the group position of hand contacts through successive proximity images and calculating the velocity of each group along each path, and detecting the acceleration of the tangential motion of a finger before the finger is lifted. *Id.* at 27–31 (citing Ex. 1004, 10:39–65, 14:31–34, 25:67–26:29, 27:19–29:32; 44:20–46:16, Fig. 37; Ex. 1032 ¶¶ 108, 111, 114).

Petitioner observes that Westerman implicitly describes a *transparent* multi-touch surface positioned over a visual display (Ex. 1004, Abstract, 9:15–36, 55:4–8, 62:3–7), but nevertheless submits that Bach expressly discloses a *transparent* sensing screen positioned over a visual display unit. Pet. 21 (citing Ex. 1005, 1, 11). Petitioner also contends that even if Westerman does not disclose “a *transparent* touchpad positioned over a visual display,” one with ordinary skill in the art would have made Westerman’s multi-touch surface *transparent*, in light of Bach, so that a user could view the underlying display. *Id.* at 17–19; 21–22; Ex. 1032 ¶¶ 56, 65–68.

Patent Owner counters that Westerman does not disclose a *transparent* touch pad positioned over a display. PO Resp. 25. According

to Patent Owner, Westerman discloses a multi-touch touch pad separate from a display. *Id.* Patent Owner also argues that Westerman uses circuitry that obscures the underlying display, citing to the prosecution history for support. *Id.* at 30 (citing Ex. 2013, 265, 335, 345, 396, 425). Patent Owner further contends that Westerman refers to a typing keyboard, “which uses a simple ‘key layout’ where key symbols are *embedded* in the display, rather than positioning a transparent touchpad ‘over’ a display.” *Id.* at 29. Patent Owner also argues that “Westerman clearly lacks components that recognize gestures from sequential dynamics among postures *on a transparent touchpad.*” *Id.* at 28–30. In Patent Owner’s view, Westerman does not disclose *touch gestures* on a transparent touch pad positioned over a display because the typing recognition module processes *finger taps*, which are not touch gestures. *Id.* at 29–30.

Upon review of the parties’ contentions and the evidence before us, we agree with Petitioner’s analysis and find that Petitioner’s showing of how the cited passages of Westerman and Bach satisfy the claim limitations that require recognizing a finger flick gesture on a transparent touch pad is supported by sufficient explanation and credible evidence. We are not persuaded by Patent Owner’s arguments.

The relevant issue here is whether the teachings of Westerman and Bach, taken as a whole, would have suggested the patentees’ invention to a person having ordinary skill in the art. *See In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986). Attacking Westerman’s teachings individually does not undermine Petitioner’s showing of obviousness. *See In re Keller*,

642 F.2d 413, 426 (CCPA 1981) (nonobviousness cannot be established by attacking prior art teachings individually where the ground of unpatentability is based upon a combination of the prior art teachings). Furthermore, Patent Owner’s arguments are inconsistent with Westerman’s disclosure.

As Petitioner points out (Pet. 20–22), Westerman expressly discloses a multi-touch surface apparatus *fabricated on a display device*, which comprises a liquid crystal display or a light-emitting polymer display. Ex. 1004, 62:3–7 (emphasis added). More importantly, Westerman also discloses that “[t]o provide *feedback to the user* about changes in the position of the key layout, the position of the key symbols . . . would not be printed permanently on the [multi-touch] surface. Instead, the position of the key symbols would be *reprogrammably displayed on the [multi-touch] surface*.” *Id.* at 54:67–55:8 (emphases added). As Mr. Ward testifies, a “person of ordinary skill in the art would have understood that when the multi-touch surface is fabricated on a display, key symbols can be displayed on the display and thus shown on the multi-touch surface.” Ex. 1033 ¶ 67.

Given the evidence before us, and reading Westerman, as a whole, we find that Westerman reasonably suggests that the multi-touch surface fabricated on a display device is transparent. The mere fact that (1) we did not institute Petitioner’s ground based solely on Westerman because Petitioner also relies upon Bach for the express teaching of a *transparent* touch pad (Pet. 21), or (2) the Examiner allegedly determined that Westerman does not *expressly* disclose a transparent touch pad (Ex. 2013, 265, 335, 345, 396, 425) because, as Mr. Ward explains, the Examiner “did

not address Westerman's key disclosure of a touchpad 'fabricated on' a display" (Ex. 1032 ¶ 56; Ex. 1033 ¶ 29), does not undermine the teachings of Westerman or other evidence in this record before us, as implied by Patent Owner (PO Resp. 30 n.3).

Notably, Patent Owner's argument that Westerman discloses a multi-touch touchpad separate from a display (PO Resp. 29) ignores Westerman's express disclosure of a multi-touch surface apparatus fabricated on a display device (Ex. 1004, 62:3–7). Contrary to Patent Owner's assumption that Westerman discloses only "display 24," Westerman clearly discloses two displays, including the display device integrated under the multi-touch surface apparatus.

Patent Owner's contention that Westerman's touch surface purportedly uses circuitry that obscures the underlying display also is not supported by Westerman's disclosure. Westerman specifically discloses that the multi-touch surface fabricated on a display provides feedback to the user about changes in the position of the key layout, where the key symbols are *reprogrammably displayed on the surface*, and thus shown on the multi-touch surface. Ex. 1004, 54:67–55:8; Ex. 1033 ¶ 67. Further, Patent Owner's argument that Westerman's key symbols are embedded in the display also squarely contradicts Westerman's disclosure—"the position of the key symbols would be reprogrammably displayed on the surface." Ex. 1004, 54:67–55:8.

Further, we are not persuaded by Patent Owner's argument that Westerman lacks components for recognizing *touch gestures* from

sequential dynamics among postures on a transparent touch pad. PO Resp. 28–31. Patent Owner’s argument narrowly focuses on only the finger tapping disclosure of Westerman, and fails to consider Westerman, as a whole, from the perspective of an ordinarily skilled artisan. A prior art reference must be considered for everything it teaches by way of technology and is not limited to the particular example it is describing. *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907 (Fed. Cir. 1985). Furthermore, in an obviousness analysis, we must consider the combination of references, as a whole, in light of the general knowledge of an ordinarily skilled artisan. *Merck*, 800 F.2d at 1097.

Significantly, nothing in Westerman limits its multi-touch surface apparatus to a static typing keyboard that only recognizes an individual finger tap at a time, as alleged by Patent Owner (PO Resp. 29–30). Indeed, Westerman expressly discloses the recognition of a *layout homing gesture*, where all five fingers touch the surface synchronously to control the location of the key symbols that are reprogrammably displayed on the surface, so that the home row keys will be moved automatically under the synchronized fingertips. Ex. 1004, 54:67–55:26. Westerman describes using the following procedure:

Given such [a multi-touch surface] apparatus, step 702 retrieves the current paths from both hands and awaits what will be known as a *layout homing gesture*. If decision diamond 704 decides with the help of a hand’s synchronization detector that *all five of the hand’s fingers have just been placed on the surface synchronously*, step 706 will attempt to *snap the key layout to the hand such that the hand’s home row keys lie under the*

synchronized fingertips, wherever the hand is on the surface. Step 706 retrieves the measured hand offsets from the hand position estimator and translates all key regions which are normally typed by the given hand in proportion to the measured hand offsets. Note the currently measured rather than filtered estimates of offsets can be used because when all five fingers are down there is no danger of finger misidentification corrupting the measured offsets. This procedure assumes that the untranslated locations of the home row keys are the same as the default finger locations for the hand.

Ex. 1004, 55:4–26 (emphases added).

In addition, we agree with Petitioner that Westerman’s disclosure is not limited to a typing recognition module, as alleged by Patent Owner. Pet. 14–16, 20–35; Ex. 1004, Abstract (Apparatus “for simultaneously tracking multiple finger and palm contacts as hands approach, touch, and slide across a proximity-sensing . . . multi-touch surface.”), 6:60–65 (The present invention provides a system and method for “distinguishing different types of manual input such as typing, multiple degree-of-freedom manipulation, and handwriting on a multi-touch surface.”), 7:25–28 (“Another object of the present invention is to identify different hand parts as they contact the surface so that a variety of hand configurations can be recognized and used to distinguish different kinds of input activity.”), 9:15–36, 10:15–38 (generating input signals “in response to tapping or *sliding of fingers on a multi-touch surface*” (emphasis added)), 10:39–65 (generating cursor movement or scrolling signals from a tangential motion of a touch device, e.g., a finger).

In fact, Westerman also teaches detecting a *finger flick gesture*, generating a cursor movement or scrolling signal in response to a tangential motion of a user's finger that is accelerating on a touch-sensitive surface before the finger is lifted. Ex. 1004, 9:15–36, 10:39–65. Mr. Ward testifies Westerman discloses recognizing a finger flick gesture from specific dynamic variations among a combination of hand contact patterns because Westerman teaches detecting a finger flick gesture by “identifying hand contacts in a sequence of proximity images, which are derived from groups of electrodes which indicate significant proximity.” Ex. 1032 ¶¶ 98, 111, 114, 126–27; Ex. 1004, 9:15–36.

For these reasons, we are not persuaded by Patent Owner's argument that “Westerman lacks components that recognize gestures from sequential dynamics on a transparent touchpad,” and that Westerman does not disclose touch gestures on a transparent touch pad positioned over a display.

Based on the evidence in this record, we determine that Petitioner has shown sufficiently that the combination of Westerman and Bach teaches or suggests a transparent touch pad positioned over a visual display, and recognizing a finger flick gesture from a specific dynamic variations among hand contact patterns on the transparent touch pad, as required by claims 1 and 5–7.

Reasons to Combine Westerman and Bach

As discussed above, Petitioner contends that one with ordinary skill in the art would have made Westerman's multi-touch surface *transparent*, in light of Bach, so that a user could view the underlying display. Pet. 17–19,

21–22. In support of Petitioner’s contention, Mr. Ward testifies that “it was well-known that Westerman’s multi-touch surface could be made of transparent materials (e.g., conductive and dielectric materials) to allow a user to view an underlying display.” Ex. 1032 ¶ 78 (citing Ex. 1022 A, 115–17; Ex. 1023, 1:37–2:4, 4:21–42; Ex. 1012, 3:35–5:7; Ex. 1019, 446–47; Ex. 1024, 1, 6–7). Petitioner further articulates several other advantages for making a touch sensitive surface that is positioned over a visual display *transparent*—namely to achieve compactness, the flexibility of allowing the user to select the keyboard layout, and ease of learning and use, such as allowing the user to input data directly on the display. *Id.*

Patent Owner counters that Petitioner has not established that a person with ordinary skill in the art would have combined Westerman and Bach, advancing several arguments. PO Resp. 32–53.

In its Reply, Petitioner argues that Patent Owner does not dispute that (1) a person with ordinary skill in the art would have known how to make Westerman’s multi-touch surface transparent; (2) it would have been routine for such an artisan to make such an advantageous implementation choice; and (3) it would have been clear that such a combination would work and provide the expected functionality to yield predictable results. Reply 11 (citing Pet. 19–20; Ex. 1032 ¶¶ 65–68, 77–78; PO Resp. 44). Petitioner further avers that transparency would enable a user to see the underlying display of a multi-touch surface fabricated on a display, and would, therefore, promote Westerman’s intended purpose of allowing the user to interact with what can be seen on the multi-touch surface. *Id.* at 11–12.

Upon review of the parties' contentions and the evidence before us, we agree with Petitioner's analysis and determine Petitioner has articulated sufficiently reasoning with rational underpinning why a person with ordinary skill in the art would have combined the teachings of Westerman and Bach. Pet. 17–19. For the reasons discussed below, we find that Petitioner's reasons to combine the prior art teachings are supported by sufficient explanation and credible evidence. *See, e.g.*, Ex. 1032 ¶¶ 65–67, 77–78 (citing Ex. 1019, 446–48; Ex. 1020, 5:7–9; Ex. 1023, 1:37–2:3).

As Patent Owner and the prior art of record confirm, touch screens or transparent touch pads were well-known in the art at the time of the invention. Prelim. Resp. 45 (conceding that touch screens and their benefits were well known); Ex. 2009 ¶ 26 (confirming that “touchpads and touch screens were known to persons of ordinary skill in the art before May 15, 1999.”); Ex. 1018, 2–3, Ex. 1019, 446–48; Ex. 1020, 1:9–14, 5:7–9, Ex. 1023, 1:37–2:3; Ex. 3001, 3; *see also* Ex. 1001, 3:12–20 (explaining that “two-dimensional-sensing see-through touch-screens [were] often employed in public computer kiosks.”). More importantly, as Petitioner explains, other prior art of record recognizes the advantages of making a touch sensitive surface that is positioned over a visual display *transparent*. Pet. 18–20; Ex. 1022, 115–17; Ex. 1023, 1:48–60. For instance, as described in Sears, it was recognized in the art that “[t]ouchscreens free desk space for other uses.” Ex. 1018, 3. Further, as explained in Clancy, having a transparent touch pad positioned over a visual display would provide a convenient and space efficient way to receive information. Ex. 1023, Abs., 1:28–33; *see*

also Ex. 1019, 446–47; Ex. 1020, 1:9–14, 5:7–9 (“The pressure sensor can be made from transparent materials so that, e.g., a display screen can be viewed through a write pad or finger-touch-sensitive pad Similarly, transparency of the pressure sensor is an advantage for tracing an underlying pattern such as . . . a map or chart.”).

In addition, Mr. Ward testifies that it was well known in the art at the time of the invention to make a touch pad positioned over a visual display *transparent*. Ex. 1032 ¶ 65 (citing Ex. 1022A, 115–17 (“Transparent thin films are used in capacitive touch screens for touch-sensitive input application over computer monitors.”); Ex. 1023, 4:21–42; Ex. 1012, 1:44–45, 3:35–5:7; Ex. 1019A, 446–47; Ex. 1024, 1, 6, 7). According to Mr. Ward, “[i]t was well known that ‘[t]he transparency of the pressure sensor is an advantage for tracing an underlying pattern such as a map or chart or for minimizing the loss of display quality underneath the touch-sensitive screen.’” *Id.* ¶ 66 (citing Ex. 1019, 446–48; Ex. 1020, 5:7–9; Ex. 1023, 1:37–2:3).

Mr. Ward explains that an ordinarily skilled artisan would have had a reason to make Westerman’s multi-touch surface apparatus transparent “so that users could see the display underlying the multi-touch surface apparatus.” *Id.* ¶ 66. Mr. Ward further explains that such an artisan “would have been motivated to make the ‘multi-touch surface apparatus’ transparent to take advantage of Westerman’s disclosure that ‘the position of key symbols [can] be reprogrammably displayed on the surface by light emitting

polymers, liquid crystal, or other dynamic visual display means embedded in the multi-touch surface apparatus.”” *Id.*

We credit Mr. Ward’s testimony, as his explanations are consistent with Westerman’s disclosure and other evidence in this record that shows the general knowledge of an ordinarily skilled artisan regarding transparent touch pads or touch screens. *See, e.g.*, Ex. 1004, 55:4–26; Ex. 1019A, 446–48 (“The transparency of the pressure sensor is an advantage for tracing an underlying pattern such as a map or chart or for minimizing the loss of display quality underneath a touch-sensitive screen.”); Ex. 1020, 5:7–9 (“The pressure sensor can be made from transparent materials so that, *e.g.*, a display screen can be viewed through a write pad or finger-touch-sensitive pad.”); Ex. 1023, 1:37–63, 1:64–2:3 (“[A] substantially transparent touchpad [has] a substantially transparent substrate The substrate is situated over a flat panel display. Visual images are produced on the flat panel display in such fashion that the images are arranged to substantially project through the array of traces on the substrate.”).

We are not persuaded by Patent Owner’s arguments (PO Resp. 38–44), as they do not undermine Petitioner’s showing of obviousness and articulated reasons to combine Westerman and Bach. We address below each of Patent Owner’s arguments in turn.

First, Patent Owner argues that a person of ordinary skill in the art would have used the stylus suggested by Bach, rather than finger touch gestures, because Bach expressly discourages touching and smudging. *Id.* at 39–40 (citing Ex. 1005, 11). However, Patent Owner’s argument fails to

consider Bach as a whole, focusing narrowly on the stylus disclosure of Bach. As Petitioner points out (Pet. 21), Bach also discloses that “[t]he present invention relates to proximity sensors and in particular to capacitive proximity sensors for use for example in *touch-sensitive keyboards or pressure-sensitive pads*.” Ex. 1005, 1 (emphasis added). Therefore, considering Bach, as a whole, we are not persuaded that Bach discourages an ordinarily skilled artisan from using touch-sensitive keyboards or pressure-sensitive pads to recognize *touch gestures*, as Patent Owner alleges. Instead, we agree with Petitioner (Pet. 19–20; Reply 11–12) that such an artisan would have appreciated that making Westerman’s multi-touch surface transparent would enable a user to see the underlying display, advancing Westerman’s stated purpose—namely, it is “an object of the present invention to provide a system and method for distinguishing different types of manual input such as typing, multiple degree-of-freedom manipulation, and handwriting *on a multi-touch surface, via different hand [configurations] which are easy for the user to learn and easy for the system to recognize*.” Ex. 1004, 6:60–65 (emphasis added).

Second, Patent Owner contends that Petitioner’s “compactness” argument fails to establish a specific rationale to combine Westerman and Bach because Westerman compounds the “fat finger problem” by using multiple parts of two hands, rather than a single fingertip. PO Resp. 39–41. We disagree. Once again, Patent Owner’s contention is based on an unduly narrow reading of the prior art. Westerman expressly describes that “multi-touch surface 2 may be large enough to accommodate motion of *one*

hand, but may be flexible so that it can be *fitted to an armrest or clothing*.” Ex. 1004, 13:12–14 (emphases added). More importantly, as discussed above, Westerman also teaches recognizing a finger flick gesture from specific dynamic variations among a combination of one or more hand contact patterns, as required by the challenged claims. Ex. 1004, 9:15–36; 10:39–65; Ex. 1032 ¶¶ 98, 111, 114, 126–27. The prior art of record also recognizes that touchscreens “free desk space for other uses,” which supports the Petitioner’s reasons to combine Westerman and Bach. Ex. 1018, 3.

Furthermore, Patent Owner’s contention assumes, without providing credible support evidence, that the patentee of the ’785 patent overcame the alleged “fat finger” problem, and rests on the premise that the references must be combined for the same reason contemplated by the patentee. PO Resp. 39–41. As our reviewing court has held repeatedly, the reason “to modify a prior art reference to arrive at the claimed invention need not be the same motivation that the patentee had.” *Alcon Research Ltd. v. Apotex Inc.*, 687 F.3d 1362, 1369 (Fed. Cir. 2012); *In re Beattie*, 974 F.2d 1309, 1312 (Fed. Cir. 1992) (explaining that “the law does not require that the references be combined for the reasons contemplated by the inventor”). “The question is not whether the combination was obvious to the patentee but whether the combination was obvious to a person with ordinary skill in the art.” *KSR*, 550 U.S. at 420. “In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls.” *Id.* at 417.

Third, Patent Owner argues that there is no reason to combine Westerman with Bach because Westerman already expressly offered the flexibility including the choice of different keyboards. PO Resp. 41–42. According to Patent Owner, “[n]othing that Petitioner cites for this alleged motivation to combine comes from Bach.” *Id.* at 42.

However, a reason to combine or modify the prior art is not required to be found explicitly in the applied prior art. *KSR*, 550 U.S. at 418–21. Indeed, such a reason may be found explicitly or implicitly in market forces, design incentives, the “interrelated teachings of multiple patents,” “any need or problem known in the field of endeavor at the time of invention and addressed by the patent,” and the background knowledge, creativity, and common sense of the person of ordinary skill. *Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1328–29 (Fed. Cir. 2009) (citing *KSR*, 550 U.S. at 418–21) (internal quotation marks omitted).

Here, as discussed above, Mr. Ward testifies that an ordinarily skilled artisan would have had a reason to make Westerman’s multi-touch surface apparatus transparent “so that users could see the display underlying the multi-touch surface transparent.” Ex. 1032 ¶ 66. Mr. Ward further explains that such an artisan

would have been motivated to make the “multi-touch surface apparatus” *transparent* to take advantage of Westerman’s disclosure that “the position of key symbols [can] be reprogrammably displayed on the surface by light emitting polymers, liquid crystal, or other dynamic visual display means embedded in the multi-touch surface apparatus.”

Id. (emphasis added). As Petitioner also notes (Pet. 18), other prior art has recognized that “[t]ouchscreen interfaces offer flexibility not available with a keyboard. Each interface can be customized for each specific task person. Users can choose which keyboard layout they prefer, QWERTY, Alphabetic, or Dvorak, since it is display on the screen.” Ex. 1018, 2–3 (emphasis added).

Fourth, Patent Owner argues that Petitioner’s “ease of learning and use” argument is “just an alleged general benefit of all touch screens,” which does not show that a person of ordinary skill in the art “would have overcome the barriers of the prior art and actually employ the use of gestures rendered by fingers directly on the surface of an interactive display.” PO Resp. 43. Patent Owner’s argument once again rests on the premise that the references must be combined for the same reason contemplated by the patentee. *Id.* Patent Owner’s argument also conflates Petitioner’s proposed modification for having a *transparent* touch pad over a display (a touch screen), with detecting touch gestures. Petitioner relies upon Westerman to teach detecting a finger flick gesture (Ex. 1004, 9:15–36, 10:39–65), and Bach for the express teaching of transparency (Ex. 1005, 1). Pet. 21, 27–31. Petitioner’s “ease of learning and use” reason to combine Westerman and Bach directly addresses why an ordinarily skilled artisan would have made Westerman’s multi-touch surface fabricated on a display *transparent*. *Id.* at 18. As Petitioner notes (*id.*), other prior art of record recognizes “[t]ouchscreens are easy to learn to use,” and “[o]nce users realize that they must simply touch the screen to interact with the computer, they quickly

master simple actions such as touching buttons or dragging items across the screen.” Ex. 1018A, 2. Furthermore, Patent Owner’s argument that criticizes Bach for allegedly disclosing “only keying and not gestures,” attempts to attack each reference individually, rather than considering the combination of the references, as a whole.

Analogous art

In addition, Patent Owner argues that Bach is not analogous art. PO Resp. 35–36. According to Patent Owner, the pertinent field of art, with respect to the ’785 patent, is a control system, and Bach is not directed to a control system. *Id.* Patent Owner also alleges that Bach discloses a non-touched stylus drawing pad and, therefore, is not in the same field as the touch-based user interface of the ’785 patent. *Id.* at 37–38. We disagree.

A prior-art reference is considered to be analogous if it is either: (1) from the same field of endeavor, regardless of the problem addressed; or (2) reasonably pertinent to the particular problem with which the inventor is concerned, regardless of the field of endeavor. *See In re Clay*, 966 F.2d 656, 658–59 (Fed. Cir. 1992). “The field of endeavor of a patent is not limited to the specific point of novelty, the narrowest possible conception of the field, or the particular focus within a given field.” *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1001 (Fed. Cir. 2016). To determine if art is analogous, we look to the purposes of both the claimed invention and the prior art. *Id.*

Here, we are not persuaded that the field of endeavor of the ’785 patent is limited to a *control system*, as alleged by Patent Owner. Rather,

based on the evidence before us, we find that both the '785 patent and Bach are in the field of *touch-based user interface devices*.

Notably, the challenged claims of the '785 patent are directed to a “transparent *touchpad*.” Ex. 1001, 10:62 (claim 1 recites “a transparent touchpad positioned over a visual display”), 11:35–36, 40–41, 44–45 (emphasis added). The Specification of the '785 patent also repeatedly describes a touchscreen and a touchpad. For instance, the title of the '785 patent recites “sensor array *touchscreen* recognizing finger flick gesture,” and the abstract of the '785 patent describes *touchscreen user interfaces*, as well as the “summary of the invention” section of the '785 patent describes *touchpad user interfaces*. *Id.* at [54], Abstract, 1:24–43 (emphasis added). Touchpads and touchscreens, as described in the '785 patent, are touch-based user interface devices. *Id.*

Contrary to Patent Owner’s characterization that Bach is limited to “a non-touched stylus drawing pad” (PO Resp. 37), Bach expressly discloses that “[t]he present invention relates to proximity sensors and in particular to capacitive proximity sensors for use for example in *touch-sensitive keyboards or pressure-sensitive pads*,” and a “pressure sensitive *finger pad*.” Ex. 1005, 1, 9, 11 (“Using the proximity keypad in a dual mode in which *touching* signifies one thing and proximity only signifies another”) (emphases added). Touch-sensitive keyboards and pressure sensitive finger pads, as described in Bach, are likewise *touch-based user interface devices*. *Id.* More importantly, both Bach and the '785 patent use their touch-based user interface devices as user input devices, similar to a keyboard for

controlling a computer, a display, or other electronic devices. *Id.* at 11 (“Using the keypad as a pressure sensitive musical instrument keyboard, or replacing conventional capacitive sensors with the present more sensitive sensors in all keyboard applications”); Ex. 1001, 1:24–25 (“Touchpad user interfaces for controlling external systems such as computers”).

Based on the evidence in this record, we find that both Bach and the ’785 patent are in the same field of endeavor—namely, touch-based user interface devices. In short, Bach is analogous art.

Teaching away argument

Patent Owner argues that Westerman teaches away from a combination with Bach, citing Dr. Brogioli’s declaration as support. PO Resp. 32–35; Ex. 2012 ¶¶ 39–41. According to Patent Owner, because, in the background section, Westerman allegedly rejected the capacitance transduction circuitry of Boie (U.S. Patent 5,463,388, Ex. 2006) as too complex to be reproduced economically at each electrode, “Westerman would also reject the more complex circuitry of Bach which uses a separate oscillator at each sensor.” *Id.*

As Petitioner notes (Reply 15), however, “[t]hat a given combination would not be made by businessmen for economic reasons does not mean that persons skilled in the art would not make the combination because of some technological incompatibility.” *In re Farrenkopf*, 713 F.2d 714, 718 (Fed. Cir. 1983); *Velandar v. Garner*, 348 F.3d 1359, 1368 (Fed. Cir. 2003) (“expense, time, and effort involved” are distinct from likelihood of

success). Additionally, as our reviewing court explains, the existence of better alternatives “does not mean that an inferior combination is inapt for obviousness purposes.” *In re Mouttet*, 686 F.3d 1322, 1334 (Fed. Cir. 2012) (citing *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994)).

We also are not persuaded by Patent Owner’s argument that Westerman teaches away from a combination with Bach purportedly because Westerman prefers simpler sensors. *See Depuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (“A reference does not teach away, however, if it merely expresses a general preference for an alternative invention but does not “criticize, discredit, or otherwise discourage” investigation into the invention claimed.”). Westerman does not criticize, discredit, or otherwise discourage investigation into the claimed subject matter—a “transparent touchpad positioned over a visual display.” Nothing in the challenged claims requires complex sensors. Petitioner did not propose to replace Westerman’s sensors with Bach’s sensors, but rather relies upon Bach for its express teaching of a *transparent* touch pad. Pet. 21. In fact, for both the obviousness grounds based on Westerman, alone, and in combination with Bach, Petitioner relies on Westerman, not Bach, to teach or suggest the claimed sensors. *Id.* at 24–27. Moreover, Westerman describes a multi-touch surface apparatus that is fabricated on a display device, displaying reprogrammable key symbols on the surface to provide feedback to the user about changes in the position of the key layout. Ex. 1004, 54:67–55:26, 62:3–7; Ex. 1032 ¶ 56.

For these reasons, we do not discern that Westerman criticizes, discredits, or otherwise discourages the claimed subject matter—a “transparent touchpad positioned over a visual display.”

Patent Owner’s arguments and Dr. Brogioli’s testimony also improperly rest on the premise that Bach’s sensors and circuitries must be physically incorporated into Westerman’s multi-touch surface apparatus in order for the touch surface to be operated transparently, so that the user could see the display underlying the multi-touch surface apparatus. PO Resp. 32–35, 44–53; Ex. 2012 ¶¶ 43–67. “It is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements.” *Mouttet*, 686 F.3d at 1332; *In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985) (en banc); *Keller* 642 F.2d at 425 (Obviousness does not require that all of the features of the secondary reference be bodily incorporated into the primary reference). More importantly, Patent Owner’s arguments and Dr. Brogioli’s testimony also rest on the premise that Westerman’s sensor circuitry obscures the underlying display. As discussed above, that premise squarely contradicts Westerman’s disclosure that describes “reprogrammably displaying” key symbols on the surface of the multi-touch surface using “light emitting polymer, liquid crystal, or other dynamic visual display means embedded in the multi-touch surface apparatus along the proximity sensor arrays.” Ex. 1004, 54:67–55:8, 62:3–7; Ex. 1032 ¶ 56; Ex. 1033 ¶ 65. Consequently, it would not be necessary to substitute physically Westerman’s sensors with Bach’s sensors, as alleged by Patent Owner.

For the foregoing reasons, we are not persuaded by Patent Owner's argument that Westerman teaches away from a combination with Bach to arrive at the claimed invention.

Inoperable device argument

Patent Owner argues that combining Bach's transparent sensing screen with Westerman would produce an inoperable device because Bach's transparent sensing screen allegedly requires sensors with separate oscillators, citing Dr. Brogioli's declaration for support. PO Resp. 44–53; Ex. 2012 ¶¶ 39, 52–67. Once again, Patent Owner's argument and Dr. Brogioli's testimony are premised on the notion that Bach's sensors and circuitries must be physically incorporated into Westerman's multi-touch surface apparatus.

As discussed above, however, such a physical substitution is not required (*see Mouttet*, 686 F.3d at 1332), and Petitioner did not propose such a substitution (Pet. 17–21; Ex. 1032 ¶¶ 67, 78; Ex. 1033 ¶ 101). More importantly, Westerman reasonably suggests using its own sensors and circuitry in a transparent multi-touch surface apparatus to recognize a touch gesture. Ex. 1004, 62:3–4; 54:67–55:26. As Petitioner explains and Mr. Ward testifies, it was well-known at the time of the invention to make a multi-touch surface with transparent materials (e.g., conductive and dielectric materials) to allow users to view the underlying display. Pet. 19–20; Ex. 1032 ¶¶ 67, 78 (citing Ex. 1022A, 115–17; Ex. 1023, 1:37–2:4, 4:21–42; Ex. 1012, 3:35–5:7; Ex. 1019A, 446–47; Ex. 1024, 1, 6–7);

Ex. 1033 ¶¶ 101–127. On this record, Petitioner has provided sufficient evidence to show that making Westerman’s multi-touch surface *transparent* would not be “uniquely challenging or difficult for one of ordinary skill in the art” at the time of the invention. *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (citing *KSR*, 550 U.S. at 418).

Based on the evidence before us, we are not persuaded by Patent Owner’s arguments and supporting evidence that the prior art combination, as proposed by Petitioner, would produce an inoperable device.

Principle of operation argument

Patent Owner argues that combining Bach’s transparent sensing screen with Westerman would change Westerman’s principle of operation purportedly because Bach’s transparent sensing screen allegedly requires sensors with separate oscillators, citing Dr. Brogioli’s declaration for support. PO Resp. 44–53 (citing Ex. 2012 ¶¶ 39, 52–67). In particular, Patent Owner contends that Westerman’s principle of operation is to use economically replicated simple proximity transduction circuitry under each electrode to maximize signal-to-noise ratio and to reduce wiring complexity. *Id.* at 46–47.

However, that is merely one aspect of Westerman’s invention, not Westerman’s principle of operation. According to Westerman, “[i]t is a *primary object* of the present invention to provide a system and method for integrating different types of manual input such as typing, multiple degree-of-freedom manipulation, and handwriting on a multi-touch surface.”

Ex. 1004, 6:56–59 (emphases added). Westerman further explains that “[c]lassification of intuitive hand configuration and motions enables unprecedented integration of typing, resting, pointing, scrolling, 3D manipulation, and handwriting into a versatile, ergonomic computer input device.” *Id.* at Abstract.

Significantly, Patent Owner’s argument and Dr. Brogioli’s testimony again are based on the premise that Bach’s sensors and circuitries must be physically incorporated into Westerman’s multi-touch surface apparatus. As discussed above, however, such a physical substitution is not required (*see Mouttet*, 686 F.3d at 1332), and Petitioner did not propose such a substitution (Pet. 17–21; Ex. 1032 ¶¶ 67, 78; Ex. 1033 ¶ 101). More importantly, as discussed above, Westerman reasonably suggests using its own sensors and circuitry in a transparent multi-touch surface apparatus to recognize a touch gesture as an input signal. Ex. 1004, 62:3–4 (The multi-touch surface apparatus fabricated on a display device.); 54:67–55:8 (“*To provide feedback to the user about changes in the position of the key layout, . . . the position of the key symbols would be reprogrammably display on the surface.*”); 55:9–26 (“Given such an apparatus, step 702 retrieves the current paths from both hands and awaits what will be known as a *layout homing gesture.*”).

We are mindful that if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d

810, 813 (CCPA 1959). However, as our reviewing court has explained, the proposition set forth in *Ratti* is inapplicable where the modified apparatus will operate “on the same principles as before.” See *Mouttet*, 686 F.3d at 1332 (citing *In re Umbarger*, 407 F.2d 425, 430–31 (CCPA 1969)).

Here, recognizing a finger flick touch gesture as a user’s input signal using a transparent multi-touch surface apparatus that is fabricated on a visual display would not change Westerman’s principle of operation or primary objective of providing a system and method for integrating different types of manual input on a multi-touch surface. In fact, the proposed modification would improve Westerman’s multi-touch surface apparatus so that users can view the underlying display when performing a finger flick touch gesture—improving on “[c]lassification of intuitive hand configurations and motions enables unprecedented integration of typing, resting, pointing, scrolling, 3D manipulation, and handwriting into a versatile, ergonomic computer input device” (Ex. 1004, Abstract).

In addition, we are not persuaded by Patent Owner’s argument that, because, in the background section, Westerman rejects the Gerpheide reference, which was prone to noise at the driving frequency, a person of ordinary skill in the art would have known that coupling and cross-talk would impair the multi-touch capabilities that are central to Westerman’s principle of operation, blurring the multi-touch proximity images. PO Resp. 50–51. Significantly, the problems noted in the background section of Westerman are those that are to be solved by the invention disclosed in Westerman. Notably, Westerman discloses that it is “an object of the

present invention to provide a system and method for distinguishing different types of manual input such as typing, multiple degree-of-freedom manipulation, and handwriting *on a multi-touch surface, via different hand [configurations] which are easy for the user to learn and easy for the system to recognize.*” Ex. 1004, 6:60–65 (emphasis added). Westerman further discloses that it is “a further object of the present invention to provide an electronic system which can provide images of flesh proximity to an array of sensors with *such resolution that a variety of hand configurations can be distinguished.*” *Id.* at 7:16–19 (emphasis added). As Mr. Ward testifies, “Westerman addresses cross talk and capacitive coupling by selectively activating and multiplexing signals from sensors, filtering, and smoothing.” Ex. 1033 ¶ 105; Ex. 1004, 8:25–27, 16:26–41, 17:14–20, 23:21–32. For these reasons, we do not find Patent Owner’s argument persuasive.

For the foregoing reasons and based on the present record, we determine that Petitioner has articulated an adequate reason to combine the teachings of Westerman and Bach, as well as established by a preponderance of the evidence that the combination of Westerman and Bach teaches or suggests recognizing a finger flick gesture on “a transparent touchpad positioned over a visual display,” as required by claims 1, and 5–7.

Control Parameter

Claim 1 recites:

a value of at least one control parameter for the contiguous region of contact responsive to a measured change in at least one of the associated sensor measurement values,

the value obtained by performing a calculation on the associated sensor measurement values and *interpreting the results as signifying a finger flick gesture*,

wherein the at least one control parameter is associated with the finger flick gesture.

Ex. 1001, 11:8–15 (emphases added). By virtue of their dependency, all other challenged claims, claims 5–7, also require this limitation. As we discussed above in the claim construction section, we construe “gesture” as “dynamic variations among postures or hand contact patterns combined in sequence,” and construe “hand contact patterns” as “the two-dimensional shapes of contiguous regions of contact.” *See supra* Section II.A. To be clear, a “gesture” is different from a “contiguous region of contact” (e.g., hand or finger contact pattern).

Petitioner relies upon Westerman, in combination with Bach, to teach or suggest a value of at least one control parameter (group position or velocity) for the contiguous region of contact (a hand contact pattern) responsive to a measured change in at least one of the associated sensor measurement values (pressure, e_z , or proximity), the value obtained by performing a calculation on the associated sensor measurement values (the computed proximity-weighted center, tangential velocities, and liftoff velocity). Pet. 27–31 (citing Ex. 1004, 9:15–36, 10:15–65, 13:14–25, 14:31–34, 25:67–26:29, 27:19–29:32, 44:20–46:16, 50:64–51:10, 54:11–21, 65:38–42, 71:10–12, 76:1–32, Figs. 1, 18, 22, 37, 40A–B; Ex. 1032 ¶¶ 98–116). In Petitioner’s view, Westerman teaches or suggests that the results of the calculation are interpreted as signifying a finger flick gesture, and

that the control parameter (group position or velocity) is associated with a finger flick gesture (“tangential motion of a touch device” or accelerating “the tangential motion of the touch device before the touch device is lifted”). *Id.*

Petitioner further explains that Westerman discloses certain position parameters, including the group position that reflects the hand contact position for determining the finger velocity. *Id.* at 30–31 (citing Ex. 1004, 25:67–26:4). Specifically, Westerman discloses: (1) obtaining the group position by calculating a proximity-weighted center responsive to a measured change in the sensor values for each sensor (*id.* (citing Ex. 1004, 25:67–26:29; Ex.1032 ¶ 108)); (2) tracking the group position through successive proximity images and calculating velocity of each group (*id.* (citing Ex. 1004, 26:2–4, 27:19–29:32)); and (3) comparing the velocity of a finger just before liftoff to the tangential velocity (a finger flick touch gesture) (*id.* at 30–31 (citing Ex. 1004, 10:39–65, 14:31–34, 44:20–46:16, Fig. 37; Ex.1032 ¶¶ 111, 114)).

Patent Owner counters that Westerman does not disclose a value of at least one control parameter signifying a finger flick gesture. PO Resp. 54–57. To substantiate its position, Patent Owner argues that Westerman’s group position does not signify a *touch gesture* because Westerman’s group position is “a determination for the static location of fingers *before* velocity is determined.” *Id.* (citing Ex. 1004, 26:2–4). Patent Owner further argues that Westerman’s velocity does not disclose a value of a control parameter that is obtained by performing a calculation, as required by the challenged

claim, because the cited portions of Westerman disclose only *raw data and formulas* that have yet to be calculated or solved. *Id.*

Having reviewed the evidence in this record, we are not persuaded by Patent Owner’s arguments. Rather, we agree with Petitioner’s analysis, and determine that Petitioner has shown by a preponderance of the evidence that Westerman, in combination with Bach, teaches or suggests the aforementioned limitation as required by claims 1 and 5–7. Pet. 27–31; Ex. 1032 ¶¶ 98–116.

As an initial matter, Patent Owner’s argument that Westerman does not disclose a value of at least one control parameter signifying a finger flick gesture (PO Resp. 54–57) is not commensurate in scope with the claims. Patent Owner implicitly construes the aforementioned limitation to require the “control parameter” to signify a *finger flick gesture*. On the contrary, claim 1 expressly recites a “control parameter for the *contiguous region of contact*”—which encompasses a static hand or finger pattern on the touch surface, not a finger gesture, as alleged by Patent Owner. Ex. 1001, 11:8–15. Patent Owner’s argument also is inconsistent with the Specification of the ’785 patent, which expressly discloses that “control parameters” are “derived from each region of contact”—a static hand or finger pattern. *Id.* at 1:36–39, 2:39–40 (“various parameters are derived from each independent region), 2:44–49 (“It is possible to derive a very large number of independent control parameters For example, six degrees of freedom can be recovered from the *contact of a single finger*.” (emphasis added)).

We are not persuaded by Patent Owner’s argument that Westerman’s group position is not a “control parameter” as it allegedly is “a determination for the static location of fingers before velocity is determined.” PO Resp. 55–56. That argument is based on Patent Owner’s implicit construction that requires the claimed “control parameter” to signify a *finger gesture*, contradicting the actual claim language—namely, “control parameter for *the contiguous region of contact*” (e.g., a hand or finger contact pattern). *Id.*; Ex. 1001, 11:8–15. More importantly, Westerman’s group position reflects hand contact position and is necessary to determine finger velocity. Ex. 1004, 25:67–26:29, Fig. 18. Westerman teaches obtaining a basic indicator of the group position by calculating a proximity-weighted center using the values e_x , e_y , and e_z for each sensor, as shown in equations 12–14. *Id.* Mr. Ward testifies that the group position proximity-weighted center is responsive to a measured change in the sensor values. Ex. 1032 ¶ 108 (citing Ex. 1004, 26:8–29). Furthermore, as Petitioner notes (Pet. 15–16; Reply 18), Westerman’s group position is a variable that changes with the movement of a finger, and the calculations of the group position are interpreted to signify when a finger flick has occurred (e.g., when a user’s finger is continuously stroking a surface and when the finger lifts off the surface). Ex. 1004, 9:15–36; 10:39–65; Ex. 1032 ¶¶ 109–114.

We also are not persuaded by Patent Owner’s argument that Westerman’s velocities are *raw data*, not a “value obtained by performing a calculation.” PO Resp. 56–57. As Petitioner notes (Pet. 15–16, 27–31), Westerman teaches tracking the group position through successive proximity

images and *calculating* the velocity of each group along each path.

Ex. 1004, 26:2–4, 27:19–29:32. Mr. Ward testifies that the velocities calculated in Westerman are responsive to a measured change because group paths are “tracked through successive proximity images which correspond to the same physical hand contact, and the ‘velocity’ and ‘position vectors’ of each group are calculated along each path.” Ex. 1032 ¶¶ 103–08.

Furthermore, as Petitioner explains (Pet. 15–16, 27–31), by comparing the liftoff velocity to the tangential velocity, Westerman teaches detecting acceleration of the finger before it is lifted off. Ex. 1004, 10:39–65, 14:31–34, 44:20–46:16, Fig. 37. Mr. Ward testifies that the results of the calculation of the proximity-weighted center of each group’s position and tracking group paths through successive proximity images are interpreted as signifying a tangential motion of a finger (a finger flick gesture). Ex. 1032 ¶¶ 109–114. Given the evidence in this record, we are persuaded that the velocities in Westerman, are not merely raw data, as Patent Owner alleges, but rather “a value of at least one control parameter for the contiguous region of contact,” as recited by the challenged claims.

For the reasons stated above, we determine that Petitioner has demonstrated sufficiently that Westerman teaches or suggests “a value of at least one control parameter for the contiguous region of contact . . . , the value obtained by performing a calculation on the associated sensor measurement values and interpreting the results as signifying a finger flick gesture, wherein the at least one control parameter is associated with the finger flick gesture” as recited in claim 1, and required by claims 5–7.

Dependent Claims 5–7

For the foregoing reasons, we conclude that Petitioner has established by a preponderance of the evidence that independent claim 1 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Westerman and Bach. Patent Owner does not address the limitations expressly recited in dependent claims 5–7 with separate, specific arguments. Based on the evidence before us, we also determine that the explanations and supporting evidence presented by Petitioner sufficiently show how the combination of Westerman and Bach renders dependent claims 5–7 obvious. *See* Pet. 35–37; Ex. 1032 ¶¶ 130–146.

For instance, as to claim 5, Petitioner explains and Mr. Ward testifies that Westerman, in combination with Bach, discloses a transparent touch pad that is configured to sense the contiguous region of contact (a hand contact) by a generation of the associated sensor measurement values (pressure, e_z , and proximity) based on identifying a point of contact for the sensed region of contact relative to the surface of the multi-touch surface apparatus (electrodes which indicate significant proximity), as required by claim 5. Pet. 35–36; Ex. 1032 ¶¶ 130–135 (citing Ex. 1004, 8:45–55, 9:15–36, 18:13–19, 23:33–49, 63:59–64:3, Figs. 13–15, 18–19). Indeed, as discussed above, Westerman in combination with Bach discloses a transparent touch pad positioned over a visual display. More importantly, Westerman teaches a multi-touch surface apparatus having an array of proximity sensing means embedded in the surface, scanning means for forming digital proximity images from the proximities measured by the sensing means, and image

segmentation means for collecting into groups those proximity image pixels intensified by contact of the same distinguishable part of a hand. Ex. 1004, 8:45–55. Westerman further discloses tracking and identifying hand contacts in a sequence of proximity images, as well as segmenting each proximity images into groups of electrodes which indicate significant proximity. *Id.* at 9:15–36.

For claim 6, Petitioner explains and Mr. Ward testifies that Westerman, in combination with Bach, discloses the transparent touch pad configured to sense the contiguous region of contact (hand contact) by a generation of associated sensor measurement values (proximity, pressure, and e_z) based on identifying measurement values that exceed a threshold (significant proximity), as required by claim 6. Pet. 36–37; Ex. 1032 ¶¶ 136–142 (citing Ex. 1004, 9:15–36, 13:14–25, 16:44–56, 23:21–54, 24:43–55, Figs. 1, 7A, 18, 21). Indeed, Westerman teaches that, as part of segmenting each proximity images, it searches the smoothed image for local maximum pixels whose filtered proximity exceeds a significant threshold and exceeds the filtered proximities of nearest neighbor pixels. Ex. 1004, 23:28–54, Fig. 18. Westerman also describes that when determining what other electrodes belong to the group, it performs edge tests to check whether the unsmoothed proximity of the electrode is greater than the background proximity levels to determine whether the unsmoothed proximity is significant. *Id.* at 24:43–51.

With respect to claim 7, Petitioner explains and Mr. Ward testifies that Westerman, in combination with Bach, discloses the transparent touch

pad configured to track a trajectory of movement (trajectories of paths) of the portion of the human hand contacting the surface of the touch pad, as required by claim 7. Pet. 37; Ex. 1032 ¶¶ 143–146 (citing Ex. 1004, 9:15–36, 13:14–25, 19:26–29, 27:22–24, 63:66–64:6, 65:38–42, Figs. 1, 16, 22). Indeed, Westerman teaches tracking and identifying hand contacts in a sequence of proximity images including by maintaining estimates of hand and finger positions from trajectories of paths currently assigned to the fingers. Ex. 1004, 9:15–36, 13:15–26, Fig. 1. Westerman further explains that the path tracking process matches the parameterized electrode group with the predicted continuations of contact path data structures extracted from previous images. *Id.* at 19:26–29.

In light of the foregoing, we determine that Petitioner has demonstrated by a preponderance of the evidence that the combination of Westerman and Bach teaches or suggests all of the limitations recited in claims 5–7.

Secondary Considerations of Nonobviousness

We next turn to Patent Owner’s evidence and arguments relating to secondary considerations of non-obviousness. Factual inquiries for an obviousness determination include secondary considerations based on evaluation and crediting of objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). Notwithstanding what the teachings of the prior art would have suggested to one with ordinary skill in the art at the time of the invention, the totality of the evidence submitted, including objective evidence of nonobviousness, may lead to a conclusion

that the claimed invention would not have been obvious to one with ordinary skill in the art. *In re Piasecki*, 745 F.2d 1468, 1471–1472 (Fed. Cir. 1984). Secondary considerations may include any of the following: long-felt but unsolved needs, failure of others, unexpected results, commercial success, copying, licensing, and praise. *See Graham*, 383 U.S. at 17; *Leapfrog*, 485 F.3d at 1162.

Here, Patent Owner contends that “there were considerable obstacles to controlling a device with finger touch gestures directly rendered on the display.” PO Resp. 5 (citing Section IV of its Response, *id.* at 17–22 (“many of the disadvantages that plagued touch screen during the relevant time, including low resolution, arm fatigue, glare smudges, limited tactile feedback, undesired touches, price, and ‘obscuring the screen’”). In Patent Owner’s view, “[t]hese problems evidence secondary considerations of nonobviousness, including long felt but unresolved needs and the failure of others.” *Id.* In support of its contentions, Patent Owner argues that “these barriers in the prior art are secondary considerations expressly recognized,” for example, in *Sears* (Ex. 1018). *Id.* at 40. According to Patent Owner, “[e]arly touch devices were incorporated into pen-based computing devices that employed a stylus, and therefore *could not detect multi-touch gestures*,” due partly “to problems with early touch screens, including the ‘*fat finger problem*.’” PO Resp. 17–22 (emphases added).

Petitioner counters that Patent Owner fails to establish the requisite nexus, arguing that Patent Owner has not shown any evidence of long-felt need or failure of other that demonstrates both that a demand existed for the

claimed subject matter, and that others tried but failed to satisfy that demand. Reply 25–26. Petitioner further contends that solutions to Patent Owner’s alleged “barriers” in the prior art had already been recognized, for example, by Sears (Ex. 1018). We agree with Petitioner.

The relevance of long-felt need to the issue of obviousness depends on several factors. First, the need must have been a persistent one that was recognized by those of ordinary skill in the art. *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1383 (Fed. Cir. 1983). Second, the long-felt need must not have been satisfied by another before the invention by the patent owner. *Newell Cos. v. Kenney Mfg. Co.*, 864 F.2d 757, 768 (Fed. Cir. 1988) (“[O]nce another supplied the key element, there was no long-felt need or, indeed, a problem to be solved.”). Third, the invention must in fact satisfy the long-felt need. *In re Cavanagh*, 436 F.2d 491, 496 (CCPA 1971). Moreover, an allegation of failure of others is not sufficient evidence of nonobviousness, unless it is shown that widespread efforts of skilled workers having knowledge of the prior art had failed to find a solution to the problem. *In re Allen*, 324 F.2d 993, 997 (CCPA 1963).

“For objective evidence of secondary considerations to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention.” *ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1220, (Fed. Cir. 2016) (citations omitted). “A nexus may not exist where, for example, the merits of the claimed invention were readily available in the prior art.” *Id.*

Here, in fact, the alleged “problems” concerning touch screens—“low resolution, arm fatigue, glare smudges, limited tactile feedback, undesired touches, price, and ‘obscuring the screen’” (PO Resp. 18, citing Ex. 1018, 2–5)—were solved by others before the ’785 patent’s earliest priority date, May 15, 1999. Significantly, Sears (Ex. 1018), the very same reference relied upon by Patent Owner for establishing these “problems” concerning touch screens, expressly discloses that “[m]any of these problems [had] been overcome or reduced by improvements in touchscreen technology or design strategies that have been developed for touchscreen interfaces.” *See, e.g.*, Ex. 1018, 3–5. Patent Owner’s arguments and Dr. Wobbrock’s testimony unduly focus on the “perceived disadvantages” discussed in Sears regarding the early development of the touch screen technology, ignoring the known technological advancements in the art.

More importantly, as Mr. Ward testifies (Ex. 1033 ¶¶ 13–15), Sears discloses how those “perceived disadvantages” had been overcome or reduced by 1990, when Sears was published, nearly *nine years* prior to May 15, 1999. Ex. 1018, 1–5. For instance, Sears discloses that *low resolution* “is one of the biggest misconceptions about touchscreens,” and “[r]ecent research has shown that targets as small as 0.4x0.6mm could be selected with touchscreens . . . and concluded that targets 1.7x2.2mm could be selected as fast with a touchscreen as they could with a mouse, with similar error rates.” *Id.* at 3. Sears also explains that “[r]enewed interest in *reducing [arm] fatigue* appears to have resulted in simple changes to the

touchscreen position that will significantly reduce this problem.” *Id.* at 3, 22–23 (emphasis added).

As to the “*fat finger problem*” alleged by Patent Owner and Dr. Wobbrock (PO Resp. 17–19; Ex. 2009 ¶¶ 27, 29, 31), Sears discloses that “[c]areful design of the interface, placing selectable items in locations that will keep the user’s hand from obscuring the screen, can significantly reduce this problem.” Ex. 1018, 4–5 (“Design guidelines can significantly reduce the problems associated with obscuring the screen, the lack of tactile feedback, and undesired touches.”). With respect to the “*error prone*” problem, Sears discloses that “touchscreens are the fastest device for selecting stationary objects” and “alternative selection strategies can result in very low error rates.” *Id.* at 6 (“It also showed that selection of very small targets (0.4x0.6mm) is possible with the touchscreen, refuting claims that the size of the user’s finger determines the minimum target size.”).

Sears warns “the historical prejudices against the touchscreen,” and that, at the time of publication in 1990, “many people still picture touchscreens as low precision, high error rate input devices.” *Id.* at 5. Nevertheless, Sears explains that “touchscreens have improved dramatically in recent years, and, as a result, high precision, low error rate tasks can now be performed using a touchscreen.” *Id.* Sears also describes that “[t]he directness of the touchscreen as an input device makes it desirable for direct manipulation interfaces.” *Id.* at 15. As Mr. Ward testifies, reading Sears as a whole, an ordinarily skilled artisan would have understood “how to address each identified problem with touch screens, including the so-called

‘fat finger [problem],’ before the claimed priority date” of the ’785 patent.” Ex. 1033 ¶ 14.

Notably, Patent Owner and Dr. Wobbrock do not dispute that touch screens and the benefits of using touch screens as user input devices were well known at the time of the invention. Prelim. Resp. 45; PO Resp. 17; Ex. 2009 ¶ 26 (confirming that “touchpads and touch screens were known to persons of ordinary skill in the art before May 15, 1999”). Indeed, Patent Owner admits that the ease of learning and use of touch screens was a well-known “*benefit of all touch screens.*” Prelim. Resp. 45; *see also* Ex. 1018, 1 (“Touchscreens have long been thought of as being simple to use.”). Moreover, Mr. Ward confirms that touch screen and touch pad technology was well-known before May 15, 1999. Ex. 1032 ¶ 19.

We are not persuaded by Patent Owner’s argument that “researchers had not yet conceived of using postures, control parameters and touch gestures on a touch screen as disclosed in the ’785 patent.” PO Resp. 18–19. Patent Owner’s assertions that “[e]xisting touch devices at the time, and their designers, were entirely focused on mimicking the operation of basic controllers such as the computer mouse, trackball, or stylus,” and that “[e]arly touch devices were incorporated into pen-based computing devices that employed a stylus, and therefore *could not detect multi-touch gestures*” are conclusory and unsupported by sufficient evidence. *Id.* at 4–5, 17–18 (citing Ex. 2009 ¶ 31). Indeed, those unsupported assertions squarely contradict the prior art of record.

Notably, Sears, published in 1990, recognizes “[f]ree hand input and gestures allow many novel applications.” Ex. 1018, 16; *see also* Ex. 1013, 6:49–7:26, 10:8–15, 11:12–15; Ex. 1015, 1:16–43, 5:63–67. Ure, filed on March 7, 1994, and patented on November 9, 1999, discloses a multi-touch touch screen, which allows the user to control the cursor movement by moving at least one finger across the surface, such as the drag gesture. *See, e.g.*, Ex. 1007, 1:52–59 (“The invention provides for the software manipulation of data obtained from a touch sensor array . . . to achieve a simple, powerful method of user interaction in which the traditional keyboard and mouse disappear, being replaced by a display window . . . overlaid by the touch sensor array.”); 2:55–57 (“the cursor is moved by the user moving one or more fingers across the surface of the touch-sensitive member as shown in FIG. 1.”); 3:17–21. Edwards, filed on June 7, 1991, and patented on March 16, 1993, describes *touch sensor systems* that may be used as a stand-alone input interface or, alternatively, they may be used as an overlay to a display device, with *transparent sensor elements*. Ex. 1009, 10:3–8. According to Edwards, “[t]ouching of the sensing elements for example may be by means of a *user’s finger* or by means of a stylus.” *Id.* at 47–48 (emphasis added). Furthermore, Westerman teaches a multi-touch surface apparatus for sensing diverse *configurations and activities of fingers* (e.g., a layout homing gesture, and the finger flick gesture). Ex. 1004, 8:45–47, 9:15–36, 10:15–65, 54:67–55:26.

Patent Owner’s arguments and Dr. Wobbrock’s testimony also narrowly focus on the problems identified in the background section of

Westerman, but fail to appreciate that those are the stated problems that are to be solved by the invention disclosed in Westerman. PO Resp. 19–20; Ex. 2009 ¶ 32. For instance, Westerman discloses that it is “an object of the present invention to provide a system and method for distinguishing different types of manual input such as typing, multiple degree-of-freedom manipulation, and handwriting *on a multi-touch surface, via different hand [configurations] which are easy for the user to learn and easy for the system to recognize.*” Ex. 1004, 6:60–65 (emphasis added). Indeed, Westerman discloses apparatuses and methods for simultaneously tracking multiple finger contacts as the fingers slide across a proximity-sensing, compliant, and flexible multi-touch surface. *Id.* at Abstract. As discussed above, Westerman describes a multi-touch surface apparatus fabricated on or integrated with a display device, and recognizing finger touch gestures (e.g., a layout homing gesture). *Id.* at 54:67–55:26, 62:3–7. Identifying the problems stated in the background section of Westerman, without taking into account the advancements made in Westerman and the other prior art of record (e.g., Sears, Ure, Edwards, and Harrison) does not establish both that a demand existed for the claimed subject matter, and that others tried but failed to satisfy that demand.

We also are not persuaded by Patent Owner’s argument that “[t]ouch screens and touch pads are different both technologically and in the interactive capabilities.” PO Resp. 21–22; Ex. 2009 ¶¶ 27–34. Rather, we agree with Mr. Ward’s testimony that Patent Owner’s arguments and Dr. Wobbrock’s testimony “inaccurately describe the state of the art before May

15, 1999,” and that they “do not account for the fact that touchpads and touch screens are presented as alternatives in the prior art and in the ’785 patent itself.” Ex. 1033 ¶¶ 9–24; Ex. 1032 ¶¶ 30, 56, 58–59; Ex. 1004, 3:6–10, 62:3–7; 1005, 9; Ex. 1001, 1:37–38, 2:24–26, 6:26–65, 10:22–37.

As we discussed previously in Section II.D. (“Background of the Art”) of this Decision, Patent Owner’s reliance on a passage of an Initial Determination of an ITC case (Ex. 2003, 202, 209–210), concerning a different patent and a different prior art reference cited in a completely different evidentiary record, is misplaced. As Mr. Ward testifies, that quotation is taken out of context and is incomplete. Ex. 1033 ¶ 19. The fact that the prior art reference in that case is a doctoral dissertation authored by the inventor of Westerman (U.S. Patent 6,323,846, Ex. 1004), without more, does not compel us to make the same finding here in the instant proceeding. Patent Owner’s argument conflates the dissertation in that case and the prior art reference, Westerman (Ex. 1004), in this proceeding.

Significantly, the cited portion of the ITC’s Initial Determination makes clear that the dissertation in that case discloses a *touch pad that has a separate display*, rather than “a touch screen, which is a combination of a display and an input device.” PO Resp. 21–22; Ex. 2003, 209–210. In contrast, the prior art reference in the instant proceeding, Westerman (Ex. 1004), discloses recognizing a gesture (e.g., a layout homing gesture, where all five fingers are placed on the surface synchronously) on a *multi-touch surface apparatus “fabricated on or integrated with a display device,”* as an user input command (to control the location of the key

symbols that are reprogrammably displayed on the surface so that the home row keys will be moved automatically under the synchronized fingertips). Ex. 1004, 54:67–55:26; 62:3–4.

For the foregoing reasons, Patent Owner has not shown any evidence of long-felt need or failure of others that demonstrates both (1) that a demand existed for the claimed subject matter, and (2) that others tried but failed to satisfy that demand. Therefore, the objective evidence proffered by Patent Owner is accorded little weight.

We have weighed Patent Owner’s objective evidence of nonobviousness against the evidence of obviousness in the present record. Based on the evidence in this record, we conclude that, on balance, the strong evidence of obviousness outweighs the weak evidence of nonobviousness. *See Leapfrog*, 485 F.3d at 1162 (holding that the objective considerations of nonobviousness presented, including substantial evidence of commercial success, praise, and long-felt need, were inadequate to overcome a strong showing of primary considerations that rendered the claims at issue invalid).

Conclusion on Obviousness Over Westerman and Bach

In view of the foregoing, we conclude that Petitioner has established by a preponderance of the evidence that claims 1 and 5–7 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Westerman and Bach.

F. Obviousness over Ure, Edwards, and Harrison

Petitioner asserts that claims 1 and 5–7 are unpatentable under 35 U.S.C. § 103(a) as obvious over Ure, Edwards, and Harrison, citing Mr. Ward’s Declaration for support. Pet. 38–57; Ex. 1032 ¶¶ 147–229. Based on the evidence in this record, we are persuaded by Petitioner’s showing and we credit Mr. Ward’s testimony (Ex. 1032 ¶¶ 147–229) as it is consistent with the prior art disclosures.

Although Patent Owner does not challenge Petitioner’s assertion that the combination of prior art in this asserted ground teaches or suggests “a transparent touchpad positioned over a visual display” (PO Resp. 70), Patent Owner takes the position that Petitioner fails to show that the prior art combination teaches or suggests (1) recognizing a finger flick gesture, and (2) the value of a control parameter that is interpreted to signify a finger flick gesture. *Id.* at 57–68. Patent Owner also contends that an ordinarily skilled artisan would not have combined the references. *Id.* at 69–71. In support of its contentions, Patent Owner directs our attention to Dr. Brogioli’s Declaration (Ex. 2008 ¶¶ 69–94).

We first provide a brief overview of Ure, Edwards, and Harrison below, and then address the parties’ contentions in turn, focusing on the disputed limitations.

Ure (which incorporates Edwards by reference)

Ure is directed to touch-sensitive computer input device, and expressly incorporates Edwards (Ex. 1009) by reference. Ex. 1007, 1:37–45, 1:52–67. The touch-sensitive computer input device of Ure functionally

replaces the interaction of a traditional keyboard or mouse. *Id.* at 1:48–50. Edwards discloses a display device and a touch sensor array system in which the sensing elements of the array are positioned over the display output of the display device. Ex. 1009, 3:28–42. When using the touch sensor system as a display overlay, the sensing electrodes of the sensor elements should be transparent, and a 1:1 correspondence between pixels and sensing elements can be provided. *Id.* at 3:35–42, 4:39–41, 10:3–22.

Ure also discloses a touch-sensitive computer input device having a touch sensor array that overlies onto a display window. Ex. 1007, 1:6–8, 6:27–34. Figure 6 of Ure is reproduced below.

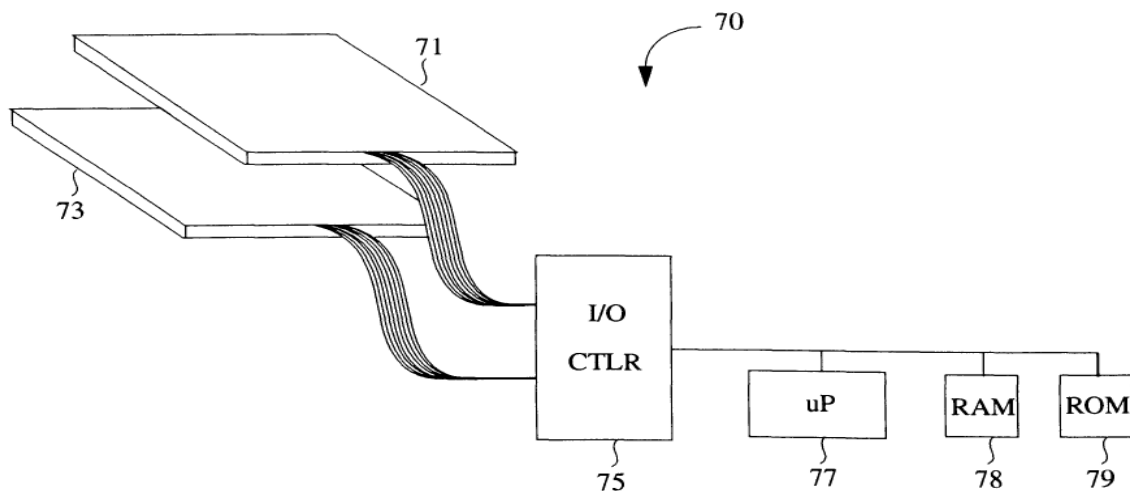


Figure 6 of Ure illustrates a simplified block diagram of touch-sensitive computer input device 70 having touch sensor array 71 that overlies display 73. *Id.* at 6:27–34. The input device also includes I/O controller 75, microprocessor 77, and memories 78, 79. *Id.*

Ure's touch-sensitive device allows a user to move the cursor by moving a finger across the surface of the touch-sensitive member. *Id.* at

2:55–57. The device detects the change in position of the touch by scanning the input window repeatedly, and builds XY tables and computing *average XY values* for each time. *Id.* at 8:44–46. The average values from the two most recent scans are stored, and the most recent value is subtracted from the next-most-recent value to produce a *difference value, d*. *Id.* at 8:46–49. Depending on the touch pattern, a speed factor is applied to the difference value, and the result is sent to the host device. *Id.* at 8:49–51.

In short, Ure discloses producing a position-related signal responsive to movement of a user’s finger across the surface. *Id.* at 11:20–24. Ure further states that the pressure and velocity of a finger may be determined in accordance with the area touched by the finger and the rate of change of the area. *Id.* at 7:24–28.

Harrison

Harrison discloses a touch sensitive display, which can “detect a finger press, the direction of a stroke, and a release of pressure.” Ex. 1010, 18–19, Fig. 1. The touch sensitive display can: (1) detect pressure points and their origin, (2) determine if this aligns with a document upper corner, (3) track the path of pressure to determine the stroke direction, and (4) execute the appropriate page turn. *Id.* at 19. For instance, a flick on the upper right corner from right to left indicates “forward one page,” and a flick on the upper left corner from left to right indicates “back one page.” *Id.* According to Harrison, these actions are “highly similar to the real world actions,” and “[a]fter a page turning manipulation, both the page number and

the contents change to reflect either the preceding or next page, depending upon the direction of the stroke.” *Id.*

Finger Flick Gesture

Claim 1 recites “wherein the *finger flick* gesture is *recognized* from specific dynamic variations among a combination of one or more hand contact patterns.” Ex. 1001, 11:18–22 (emphasis added). By virtue of their dependency, claims 5–7 also require this limitation.

Petitioner asserts that the combination of Ure (which incorporates Edwards by reference) and Harrison teaches or suggests this limitation. Pet. 41–46, 49–55. As support, Petitioner argues that Ure detects a “finger flick gesture,” as recited in claim 1, because Ure detects when a finger is touching the touch sensitive surface, the movement of the finger on the surface, and when the finger is lifted from the surface. Pet. 49–52 (citing, *e.g.*, Ex. 1007, 2:55–3:14, 6:38–42, 8:44–55, Fig. 1). Petitioner also contends that, to the extent that Patent Owner “argues that further disclosure is required for ‘interpreting the results as signifying a finger flick gesture’ . . . , Harrison discloses interpreting ‘a finger press, the direction of a stroke, and a release of pressure’ as a ‘flick’” to use as a user input command for a page turning manipulation. *Id.* (citing, *e.g.*, Ex. 1010, 18–19). As support, Mr. Ward testifies that, in light of Harrison, an ordinarily skilled artisan would have used a finger flick gesture in implementing Ure’s touch-sensitive display as a command for a page turning manipulation so that the user’s interactions are “highly similar to the real world actions.” Ex. 1032 ¶¶ 203–207.

Patent Owner counters that the prior art combination does not disclose a finger flick gesture because neither Ure (which incorporates Edwards by reference) nor Harrison discloses finger acceleration “as it reaches the end,” citing Dr. Brogioli’s testimony for support. PO Resp. 63–64 (citing Ex. 2012 ¶¶ 82–85). Patent Owner also contends that the prior art combination fails to teach any *recognition* of a finger flick gesture from sequential dynamics because “a finger flick gesture must be perceived based on *previously known* sequential dynamics (a set of *stored* touch gestures).” *Id.* at 65–66 (citing Ex. 2012 ¶¶ 86–88).

Upon review of the parties’ contentions and the evidence before us, we agree with Petitioner’s analysis, finding that Petitioner’s showing is supported by sufficient explanation and credible evidence. And we are not persuaded by Patent Owner’s arguments and Dr. Brogioli’s testimony.

At the outset, Patent Owner’s arguments and Dr. Brogioli’s testimony (*id.* at 63–66; Ex. 2012 ¶¶ 82–88) mainly are based on Patent Owner’s proposed claim constructions, interpreting the claim term “finger flick” as a “touch gesture wherein the user’s finger *gains speed as it reaches the end*” (*id.* at 12–16 (emphasis added)), and interpreting the claim term “recognized” to require that “a touch gesture must be perceived based on *previously known* sequential dynamics (a set of *stored* touch gestures)” (*id.* at 16–17). As discussed above, we decline to adopt these claim constructions. *See supra* Section II.A. Instead, in light of the Specification and prosecution history, as well as the general knowledge of an ordinarily skilled artisan, we construe the claim term “finger flick,” broadly, but

reasonably, to encompass “a touch gesture in which the user’s finger strokes a surface in a continuous movement and then lifts off from the surface.” *Id.* We also are not persuaded by Patent Owner’s argument that the term “flick,” as used in the challenged claims, has a special meaning that deviates from the plain and ordinary meaning. PO Resp. 64. Moreover, we give the claim element—“the finger flick gesture is *recognized from* specific dynamic variations among a combination of one or more hand contact patterns”—its plain and ordinary meaning. *See supra* Section II.A. For example, the term “recognized” encompasses “discerned,” “acknowledged,” or “taken notice of” based on certain characteristics of the touch gesture.

Applying the same plain and ordinary meaning of the term “flick” to both the challenged claims and prior art, we agree with Petitioner (Pet. 49–53; Reply 21–22; Ex. 1032 ¶¶ 191, 195–207; Ex. 1033 ¶¶ 43, 156–159) that Harrison’s express disclosure of a “flick” teaches a “finger flick gesture,” as recited in claim 1. Ex. 1010, 18–19. Notably, Harrison teaches a user input command of a page turning manipulation that uses “a flick on the upper right corner from right to left to indicate ‘forward one page,’” and a “flick on the upper left corner from left to right would indicate ‘back one page.’” *Id.* According to Harrison, “[t]hese actions were highly similar to the real world actions”—“[v]isual feedback was similar; pages changed (with-out animation), and the new destination page and page number became visible after the user action,” and “[a]fter a page turning manipulation, both the page number and the contents change to reflect either the preceding or next page, depending upon the direction of the stroke.” *Id.*

We also agree with Petitioner (Pet. 51–55; Reply 23–24) that Harrison discloses recognizing the finger flick gesture “from specific dynamic variations among a combination of one or more hand contact patterns,” as recited in claim 1, in that Harrison teaches detecting a finger press, the direction of a stroke, and a release of pressure, and executing the appropriate page turn. Ex. 1010, 19; Ex. 1032 ¶¶ 191, 202–207. As Petitioner notes (Reply 23–24), even applying Patent Owner’s proposed claim construction for the claim term “recognized,” Harrison would still disclose this claim limitation because Harrison discloses perceiving a “flick” from previously known sequential dynamics. Ex. 1010, 19, 21; Ex. 1033 ¶ 164.

Moreover, although Ure does not use the term “flick” explicitly, Petitioner nonetheless has shown sufficiently that Ure recognizes a finger flick gesture, as recited in claim 1, because Ure recognizes when a finger strokes a surface in a continuous movement (“the cursor is moved by the user moving one or more fingers across the surface of the touch-sensitive member” and “[o]peration continues in this manner for so long as touch continues”) and then lifts off from the surface (“[w]hen a zero (absence of touch) is detected”). Pet. 49–53; Reply 22; Ex. 1007, 2:55–3:14, 8:51–55, Fig. 1; Ex. 1032 ¶¶ 191–200; Ex. 1033 ¶¶ 156–57. Contrary to Patent Owner’s argument that Ure merely mirrors the finger’s change in position (PO Resp. 65–66), as Petitioner explains (Pet. 49–53; Reply 53), even applying Patent Owner’s proposed claim construction for the claim term “recognized,” Ure discloses recognizing gestures from previously known sequential dynamics and stored gestures by detecting the number of fingers

moving across the screen and moving a cursor at different speeds based on that number, distinguishing between gestures of a previously known set, such as “registration,” “twiddle,” “double click,” “triple click,” “drag,” and other types of touches. Pet. 49–53; Reply 23; Ex. 1007, 1:52–58, 3:1–26, 5:13–38, 6:43–65, 8:43–62; Ex. 133 ¶¶ 161–163.

Based on the evidence in this record, we determined that Petitioner has shown sufficiently that the combination of Ure (which incorporates Edwards by reference) and Harrison teaches or suggests “wherein the *finger flick* gesture is *recognized* from specific dynamic variations among a combination of one or more hand contact patterns,” as required by claims 1 and 5–7.

Reasons to Combine Ure, Edwards, and Harrison

As discussed above, Mr. Ward testifies that, in light of Harrison, an ordinarily skilled artisan would have used a finger flick gesture in implementing Ure’s touch-sensitive display as a command for a page turning manipulation so that the user’s interactions are “highly similar to the real world actions.” Ex. 1032 ¶¶ 203–206.

Citing to Dr. Brogioli’s testimony for support, Patent Owner counters that Ure was concerned with “mimicking a traditional mouse through basic mouse operations” and, therefore, an ordinarily skilled artisan would have no reason to incorporate Harrison’s page stroke into such a device. PO Resp. 69–70 (citing Ex. 2012 ¶¶ 92–94). Patent Owner also takes the position that Ure teaches away from the combination, and that such an artisan would not have placed Harrison’s *opaque* pressure strips on Ure’s

transparent display, rendering Ure's display inoperable for its intended purpose as a touch device with a display window overlaid by the touch sensor array. *Id.* 70–71 (citing Ex. 1007, Abstract, 1:62–67; Ex. 2012 ¶¶ 92–94).

Having considered the parties' contentions and supporting evidence, we determine that Petitioner has articulated an adequate reason to combine the teachings of Ure (which incorporates Edwards by reference) and Harrison. We are not persuaded by Patent Owner's arguments and supporting evidence as discussed below.

Contrary to Patent Owner's argument and Dr. Brogioli's testimony that Ure is limited to "mimicking a traditional mouse through basic mouse operations" (PO Resp. 69–70; Ex. 2012 ¶¶ 92–94), Ure also teaches replacing these operations with *finger touch gestures* "to achieve a simple, powerful method of user interaction in which the traditional keyboard and mouse disappear, being replaced by a display window . . . overlaid by the touch sensor array." Ex. 1007, 1:55–57, 3:17–21. For instance, to perform a drag operation, at least one finger is moved to produce a dragging action when the thumb is stationary contacted with the touch-sensitive member. *Id.* As Mr. Ward notes, "moving a finger across a screen to move a cursor or drag an object is easier and more intuitive than moving a mouse as disclosed in Ure." Ex. 1033 ¶ 150 (citing Ex. 1007, 2:45–3:36).

We also are not persuaded by Patent Owner's arguments and Dr. Brogioli's testimony that Ure or Edwards teaches away from combining Ure with Harrison and such a combination would render the device

inoperable for its intended purpose. PO Resp. 70–71; Ex. 2012 ¶¶ 92–94. Patent Owner’s arguments and Dr. Brogioli’s testimony improperly rest on the premise that Harrison’s sensors must be opaque, and that Harrison’s sensors also must be incorporated physically into Ure’s transparent touch-sensitive display. As Mr. Ward testifies, “Harrison does not specify that its sensors are opaque or nontransparent, and in fact teaches ‘a touch sensitive display’ as its first option.” Ex. 1033 ¶ 153 (citing Ex. 1010, 19).

Significantly, obviousness does not require that all of the features of the secondary reference be bodily incorporated into the primary reference. *Keller*, 642 F.2d at 425. Petitioner does not rely on Harrison’s sensors in the prior art combination, but, rather, relies on Ure’s sensors. As Petitioner explains, Ure discloses a touch-sensitive computer input device comprising a touch sensor array overlaid onto a display window, and Ure (which incorporates Edwards by reference) also discloses sensors that can be addressed individually by row and column (“XY counter coordinates”) and selected by addressing means. Pet. 38–39 (citing Ex. 1007, 1:37–45, 5:60–6:1, 6:27–30; Ex. 1009, 1:7–18, 4:39–41). Moreover, Edwards describes that “the sensing electrodes at least of the sensor elements should be transparent.” Pet. 38–40, 42–43; Ex. 1009, 10:3–22; Ex. 1032 ¶¶ 163–165.

Additionally, as discussed above, Harrison teaches a user input command of a page turning manipulation that uses “a flick on the upper right corner from right to left to indicate ‘forward one page,’” and a “flick on the upper left corner from left to right would indicate ‘back one page.’” Ex. 1010, 18–19. According to Harrison, “[t]hese actions were highly

similar to the real world actions”—“[v]isual feedback was similar; pages changed (with-out animation), and the new destination page and page number became visible after the user action,” and “[a]fter a page turning manipulation, both the page number and the contents change to reflect either the preceding or next page, depending upon the direction of the stroke.” *Id.* As Mr. Ward further explains, a “flick” was known to be a standard gesture for touchscreens, which was used, for example, to control the direction of scrolling. Pet. 3; Ex. 1032 ¶ 25, 204 (citing Ex. 1013, 10:8–15 (“The present invention utilizes approximately a dozen standard ‘gestures.’ Examples of these gestures are . . . single strokes or ‘flicks’ right, left, up or down, which are used for scrolling.”); Ex. 1014, 5:67–68, 9:5–6, Fig. 11; Ex. 1015, 5:63–64 (“A ‘flick’ gesture is an upward or downward stroke that is used for scrolling.”)).

For the foregoing reasons and based on the evidence before us, we credit Mr. Ward’s testimony that, in light of Harrison, an ordinarily skilled artisan would have used a finger flick gesture in implementing Ure’s touch-sensitive display as a command for a page turning manipulation so that the user’s interactions are “highly similar to the real world actions.” Ex. 1032 ¶¶ 203–207; Ex. 1033 ¶ 151. Consequently, we determine that Petitioner has articulated an adequate rationale to combine Ure (which incorporates Edwards by reference) with Harrison.

Control Parameter

Claim 1 recites:

a value of at least one control parameter for the contiguous region of contact responsive to a measured change in at least one of the associated sensor measurement values, the value obtained by performing a calculation on the associated sensor measurement values and interpreting the results as signifying a finger flick,

wherein the at least one control parameter is associated with the finger flick gesture.

Ex. 1001, 11:8–15 (emphases added). By virtue of their dependency, all other challenged claims, claims 5–7, also require this limitation.

Petitioner asserts that the combination of Ure (which incorporates Edwards by reference) and Harrison discloses this disputed limitation. Pet. 49–53. Petitioner contends that the average X and Y values and difference value d (change in position and direction), as disclosed in Ure, are control parameters, and that Ure discloses the results of the calculation on the associated sensor measurement values is interpreted as signifying a finger flick gesture. *Id.* (citing, *e.g.*, Ex. 1007, 2:12–15, 3:9–14, 5:62–66, 6:38–42, 8:44–55, Figs. 1, 3–4; Ex. 1009, 5:38–54, 5:65–68; Ex. 1032 ¶¶ 196–201). Petitioner also asserts that Harrison discloses interpreting results as signifying a finger flick gesture. *Id.* at 51–53. To support its assertions, Petitioner directs us to the passage in Harrison that discloses interpreting “a finger press, the direction of a stroke, and a release of pressure” as a finger flick gesture for a page turning manipulation. *Id.* (citing Ex. 1010, 18–19, 21). Harrison’s touch sensitive display can detect

pressure points and their origin, track the path of pressure to determine the stroke direction, and execute the appropriate page turning manipulation. Ex. 1010, 19.

Patent Owner disagrees, arguing that both Ure and Harrison fail “to teach or suggest the value of any ‘control parameter’ that is interpreted to signify a finger flick gesture.” PO Resp. 66–68. According to the Patent Owner, neither the average X and Y values, nor difference value d is interpreted to signify a finger flick gesture. *Id.* (citing Ex. 2012 ¶¶ 89–91). Patent Owner also argues that the combination of prior art does not disclose interpreting the results of calculations to obtain the value of the control parameter as signifying a finger flick gesture. *Id.* In Patent Owner’s view, the average X and Y values are coordinates for individual, stationary hand postures, and difference value d is merely a value calculated from the two most recent scans of the input window. *Id.* Patent Owner argues that difference value d has no component of time, speed, or velocity that can be used to signify variations among postures. *Id.*

Upon consideration of the evidence before us, we are not persuaded by Patent Owner’s arguments. Rather, we agree with Petitioner’s analysis, which is supported by sufficient evidence, and determine that Petitioner has shown by a preponderance of the evidence that Ure (which incorporates Edwards by reference) in combination with Harrison teaches or suggests the aforementioned limitation recited in claim 1 and required by claims 5–7.

We are not persuaded by Patent Owner’s arguments that (1) the combination of prior art does not at least suggest interpreting the value of

any control parameter, or the results of calculations to obtain the value of the control parameter, as signifying a finger flick gesture; and (2) Ure's average X and Y values are not control parameter, as they are merely "coordinates for individual, stationary hand postures." PO Resp. 66–68.

At the outset, these arguments are not commensurate in scope with the claim language. Patent Owner once again implicitly construes the aforementioned limitation to require the "control parameter" to signify a finger flick gesture. On the contrary, as discussed above, claim 1 expressly recites a "control parameter for the *contiguous region of contact*"—which encompasses a static hand or finger pattern on the touch surface, not a finger flick gesture as alleged by Patent Owner. Ex. 1001, 11:8–15. Patent Owner's argument also is inconsistent with the Specification of the '785 patent, which expressly discloses that "control parameters" are "derived from each region of contact"—a static hand or finger pattern. *Id.* at 1:36–39, 2:39–40 ("various parameters are derived from each independent region), 2:44–49 ("It is possible to derive a very large number of independent control parameters For example, six degrees of freedom can be recovered from the *contact of a single finger*." (emphasis added)).

Based on the evidence before us, we agree with Petitioner that Ure discloses a value of at least one control parameter (the average X and Y values and difference value d) for the contiguous region of contact (area touched by a finger), as required by the claims. Pet. 49–52; Ex. 1007, 6:38–42; 8:44–51; Ex. 1032 ¶ 199. Notably, Ure teaches using the average X and Y values and difference value d to detect when a finger is touching the touch

sensitive surface, the movement of the finger on the surface, and when the finger is lifted from the surface. Ex. 1007, 3:9–14, 6:38–42, 8:22–57. As Petitioner explains (Pet. 49–53), each time the sensor array is scanned in Ure, an XY table is created of the coordinates whose capacitance value (C_e) (the sensor measurement value) exceeds the value of the reference capacitance (C_r). Ex. 1007, 5:62–66, 8:44–46, Figs. 4, 11; Ex. 1009, 5:38–54, 5:65–68. Using these XY tables, the average X and Y values are calculated for all of the locations where a touch is detected. Ex. 1007, 8:44–55. When a finger is touching the surface of the touch-sensitive input device, the average X and Y values correspond to the center of the contiguous region of contact. *Id.* at 3:9–14. The movement of the finger on the touch sensitive surface is detected by calculating difference value d (subtracting the most recent average XY value from the next-most-recent XY value) to determine the trajectory of the finger movement. *Id.*

We also agree with Mr. Ward’s testimony (Ex. 1032 ¶¶ 200–201)—“Ure discloses that the results of the calculation on the associated sensor measurement values is interpreted as signifying a finger flick gesture (e.g., ‘moving one . . . finger[] across the touch-sensitive member’), wherein the at least one control parameter (e.g., ‘average X and Y values’; ‘difference valued, d’) is associated with the finger flick gesture.” Indeed, Ure discloses that “the average values from the two most recent scans are stored, and the most recent value is subtracted from the next-most-recent value to produce a difference value, d. Depending on the touch pattern, a speed factor is applied to d, and the result is sent to the host device.” Ex. 1007, 8:45–51;

3:1–14. Ure also discloses that “the cursor is moved by the user moving one or more fingers across the surface of the touch-sensitive member as shown in FIG. 1.” *Id.* at 2:55–57, 11:20–24 (“operative in a first mode of operation for producing a position-related signal responsive to movement of a user’s fingertip across the member.”), Fig. 1.

Mr. Ward also explains (Ex. 1032 ¶ 201):

Ure detects when a finger is touched to the surface (*e.g.*, Ex. 1007 (Ure) at 6:38–42 (“...Once a touch has been detected, XY tables are built...")), the movement of the finger “across the touch-sensitive member” by calculating a “difference value, *d*” from the difference between the current average XY position and the previous average XY position to determine the trajectory of the finger movement (*e.g.*, *id.* at 8:44–51), and when the finger is lift from the surface—“absence of touch” (*e.g.*, *id.* at 8:51–55 (“Operation continues in this manner for so long as a touch continues. When a zero (*absence of touch*) is detected, timers used in click processing ... is incremented.”)).

In addition, we are not persuaded by Patent Owner’s argument that Ure’s difference value *d* is merely a value calculated from the two most recent scans of the input window, but “has no component of time, speed, or velocity.” PO Resp. 67. As Mr. Ward testifies, Ure discloses that the scans are performed at a specific rate, which indicates that “*d*” times the rate (*e.g.*, “60 times per second”) is the velocity. Ex. 1033 ¶ 167 (citing Ex. 1007, 5:45–47).

Contrary to Patent Owner’s argument that Harrison does not interpret the result as signifying a finger flick (PO Resp. 68), as Petitioner explains (Pet. 51–53), Harrison interprets “a finger press, the direction of a stroke, and a release of pressure” as a flick for a page turning manipulation.

Ex. 1010, 18–19, 21. Harrison’s touch sensitive display can detect pressure points and their origin, track the path of pressure to determine the stroke direction, and execute the appropriate page turning manipulation. *Id.* at 19. Further, as Mr. Ward explains (Ex. 1032 ¶ 202), Harrison discloses that the values of the sensors are reported by each packet, which indicates the ID of the reporting sensor and the current value of the sensor, and that the location and pressure values are stored from the moment of pressure-down to pressure-up. Ex. 1010, 19, 21. Harrison also describes that if the sum of the inter-location differences is negative, the user is deemed to be stroking from right to left, signifying a finger flick from right to left. *Id.* If the sum is positive, the user is deemed to be stroking from left to right, signifying a finger flick from left to right. *Id.* Given that, we agree with Mr. Ward’s testimony that Harrison discloses the results of the calculation (the sum of inter-location differences, the value of which is calculated) are interpreted as signifying a finger flick. *Id.*; Ex. 1032 ¶ 202; Ex. 1033 ¶ 170. As a result, we determine that Petitioner also has shown adequately that Harrison discloses interpreting the results of the calculation on the associated sensor measurement values as signifying a finger flick gesture, as required by the claims.

For the reasons stated above, we determine that Petitioner has demonstrated sufficiently that Ure (which incorporates Edwards by reference) discloses “a value of at least one control parameter for the contiguous region of contact . . . , the value obtained by performing a calculation on the associated sensor measurement values and interpreting the

results as signifying a finger flick gesture, wherein the at least one control parameter is associated with the finger flick gesture” as recited in claim 1, and required by claims 5–7.

Dependent claims 5–7

For the foregoing reasons, we conclude that Petitioner has established by a preponderance of the evidence that independent claim 1 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Ure, Edwards, and Harrison. Patent Owner does not address the limitations expressly recited in dependent claims 5–7 with separate, specific arguments. Based on the evidence before us, we also determine that the explanations and supporting evidence presented by Petitioner sufficiently show how the combination of Ure, Edwards, and Harrison renders dependent claims 5–7 obvious. *See* Pet. 55–57; Ex. 1032 ¶¶ 217–229.

For instance, as to claim 5, Petitioner explains and Mr. Ward testifies that the combination of Ure, Edwards, and Harrison discloses a transparent touch pad configured to sense the contiguous region of contact (an area touched by a finger) by a generation of the associated sensor measurement values (the value of the capacitance) based on identifying a point of contact for the sensed region of contact relative to the surface of the multi-touch surface apparatus (pixels at which a touch is detected), as required by claim 5. Pet. 55; Ex. 1032 ¶¶ 217–221 (citing Ex. 1007, 2:12–15, 5:56–58, 5:60–6:3, 7:24–28, 8:44–46, Figs. 3–4, 11). Indeed, Ure teaches storing the XY counter coordinates of the pixels at which a touch is detected. Ex. 1007, 5:60–65. Ure also discloses that, using a high-resolution touch array and a

high scanning rate, the pressures and velocities of the individual fingers may be determined in accordance with the area touched by that finger and the rate of change of that area. *Id.* at 7:24–28, 8:44–46, Fig. 11.

For claim 6, Petitioner explains and Mr. Ward testifies that the combination of Ure, Edwards, and Harrison discloses the transparent touch pad configured to sense the contiguous region of contact (an area touched by a finger) by a generation of associated sensor measurement values (the value of the capacitance) based on identifying measurement values that exceed a threshold (reference capacitance), as required by claim 6. Pet. 55–56; Ex. 1032 ¶¶ 222–226 (citing Ex. 1009, 2:19–58, 5:38–61, 7:52–8:6, Fig. 7). Indeed, Ure, which incorporates Edwards by reference, discloses identifying measurement values that exceed a threshold (the reference capacitance) as part of sensing the area touched by a finger. Ex. 1007, 1:37–45, 1:52–59; Ex. 1009, 5:38–61, 7:52–8:6.

With respect to claim 7, Petitioner explains and Mr. Ward testifies that the combination of Ure, Edwards, and Harrison discloses the transparent touch pad configured to track a trajectory of movement (difference value, d) of the portion of the human hand contacting the surface of the touch pad, as required by claim 7. Pet. 56–57; Ex. 1032 ¶¶ 227–229 (citing Ex. 1007, 2:55–3:3, 3:9–14, 8:44–51, Figs. 1, 11). Indeed, Ure teaches that the transparent touch pad is further configured to track a trajectory of movement of the portion of the human hand contacting the surface of the transparent touch pad by calculating difference value, d . Ex. 1007, 2:55–3:3, 3:9–14, 8:44–51, Figs. 1, 11. Ure also discloses that in performing ordinary cursor

movement, the input window is scanned repeatedly each time building the XY tables and computing the average X and Y values, and that the average values from the two most recent scans are stored and the most recent value is subtracted from the next-most-recent value to produce a difference value, d. *Id.*

In light of the foregoing, we determine that Petitioner has demonstrated by a preponderance of the evidence that the combination Ure, Edwards, and Harrison teaches or suggests all of the limitations recited in claims 5–7.

Secondary considerations of nonobviousness

Patent Owner relies upon the same arguments and evidence of secondary considerations of nonobviousness presented in connection with the obviousness ground based on Westerman and Bach. PO Resp. 4, 13–18, 36–37; Ex. 2009 ¶¶ 26–34. We have addressed those arguments and evidence above, and we determine that they are likewise unavailing here.

Accordingly, Patent Owner’s objective evidence is accorded little weight. We conclude that, on balance, the strong evidence of obviousness outweighs the weak evidence of nonobviousness. *See Leapfrog*, 485 F.3d at 1162.

Conclusion on obviousness over Ure, Edwards, and Harrison

In view of the foregoing, we conclude that Petitioner has established by a preponderance of the evidence that claims 1 and 5–7 are unpatentable

under 35 U.S.C. § 103(a) as obvious over the combination of Ure, Edwards, and Harrison.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has established by a preponderance of the evidence that claims 1 and 5–7 of the '785 patent are unpatentable based on the following grounds:

Challenged Claims	Basis	References
1 and 5–7	§ 103(a)	Westerman and Bach
1 and 5–7	§ 103(a)	Ure, Edwards, and Harrison

IV. ORDER

For the foregoing reasons, it is

ORDERED that claims 1 and 5–7 of the '785 patent are held unpatentable; and

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

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