

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner

v.

IMMERSION CORPORATION,
Patent Owner

U.S. Patent No. 8,749,507
Filing Date: April 6, 2012
Issue Date: June 10, 2014

Title: Systems And Methods For Adaptive Interpretation Of
Input From A Touch-Sensitive Input Device

Inter Partes Review No.: (Unassigned)

**PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 8,749,507
UNDER 35 U.S.C. §§ 311-319 AND 37 C.F.R. §§ 42.1-100, ET SEQ.**

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EXHIBIT LIST

Exhibit No.	Description
1101	U.S. Patent No. 8,749,507 (the “’507 patent”).
1102	File history of U.S. Patent No. 8,749,507.
1103	U.S. Patent No. 6,590,568 to Astala (“Astala”).
1104	U.S. Pat. App. Pub. No. 2002/0033795 to Shahoian (“Shahoian”).
1105	Patent Owner Immersion’s claim chart regarding alleged infringement of the ’507 patent by certain Apple iPhone products (Exhibit 20 to Immersion’s complaint in ITC Investigation No. 337-TA-1004).
1106	Patent Owner Immersion’s preliminary proposed claim constructions in ITC Investigation No. 337-TA-1004.
1107	Claim construction order from ITC Inv. Nos. 337-TA-990 and -1004 (consolidated).
1108	U.S. Patent No. 5,488,204 to Mead (“Mead”).
1109	U.S. Patent No. 5,734,373 to Rosenberg (“Rosenberg”).
1110	Declaration of expert Dr. Andy Cockburn (“Cockburn Decl.”).

I. INTRODUCTION

The claims of Immersion's U.S. Patent No. 8,749,507 (the "'507 patent") challenged in this Petition are invalid over the prior art. During prosecution of the '507 patent, Immersion overcame multiple rejections of the claims by adding limitations reciting various criteria used to detect the occurrence of a gesture on a pressure-sensitive device. This gesture detection algorithm, however, was known in the art, and is disclosed by the Astala prior art reference discussed below. Additional limitations of the challenged claims are disclosed by Shahoian, a prior art Immersion patent application publication that discusses at length providing haptic feedback in response to detecting a gesture.

II. COMPLIANCE WITH FORMAL REQUIREMENTS

A. Mandatory Notices Under 37 C.F.R. §§ 42.8(b)(1)-(4)

1. Real Party-In-Interest

Apple is the real party-in-interest.

2. Related Matters

The '507 patent is subject to the following actions: 1) *Certain Mobile and Portable Electronic Devices Incorporating Haptics (Including Smartphones and Laptops) and Components Thereof*, Inv. Nos. 337-TA-990 and -1004 (consolidated); 2) *Immersion Corp. v. Apple Inc., et al.*, Nos. 1:16-cv-00077 and 1:16-cv-00325 (D. Del.); and 3) *Apple Inc., v. Immersion Corp.*, IPR2016-01777.

3. Lead and Backup Counsel

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4. Service Information

Service information for lead and back-up counsel is provided in the designation of lead and back-up counsel above.

B. Proof of Service on the Patent Owner

As identified in the attached Certificate of Service, a copy of this Petition in its entirety is being served to the Patent Owner's attorney of record at the address listed in the USPTO's records by overnight courier pursuant to 37 C.F.R. § 42.6.

C. Power of Attorney

Powers of attorney are being filed with designation of counsel in accordance with 37 C.F.R. § 41.10(b).

D. Standing

In accordance with 37 C.F.R. §42.104(a), Petitioner certifies that the '507

patent is available for *inter partes* review and that Petitioner is not barred or estopped from requesting an *inter partes* review challenging the patent claims on the grounds identified in this Petition.

E. Fees

The undersigned authorizes the Director to charge the fee specified by 37 C.F.R. § 42.15(a) and any additional fees that might be due in connection with this Petition to Deposit Account No. 50-3266.

III. STATEMENT OF PRECISE RELIEF REQUESTED

In accordance with 35 U.S.C. § 311, Petitioner requests cancelation of claims 1-18 of the '507 patent in view of the following grounds:

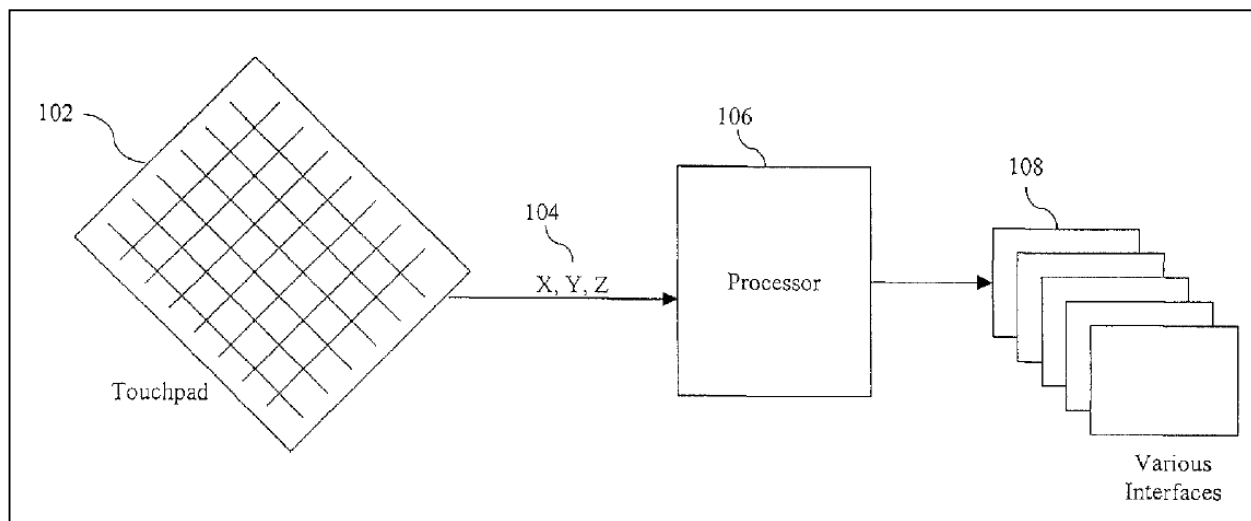
A. Claims 1-18 are rendered obvious under 35 U.S.C. § 103(a) (pre-AIA) by U.S. Patent No. 6,590,568 to Astala (Ex. 1103, "Astala") in view of U.S. Patent Publication No. 2002/0033795 to Shahoian (Ex. 1104, "Shahoian").

IV. FULL STATEMENT ON REASONS FOR REQUESTED RELIEF

A. Summary of the '507 Patent

The '507 patent is directed to systems and methods for interpreting inputs received from a touch-sensitive input device. Ex. 1101 at 1:25-27. In the only illustrated embodiment of the system, the touch-sensitive input device is a touchpad 102. *Id.* at 2:39-41, Fig. 1 (shown below). Other embodiments may use other touch-sensitive input devices, such as a touch panel or touch screen. *Id.* at

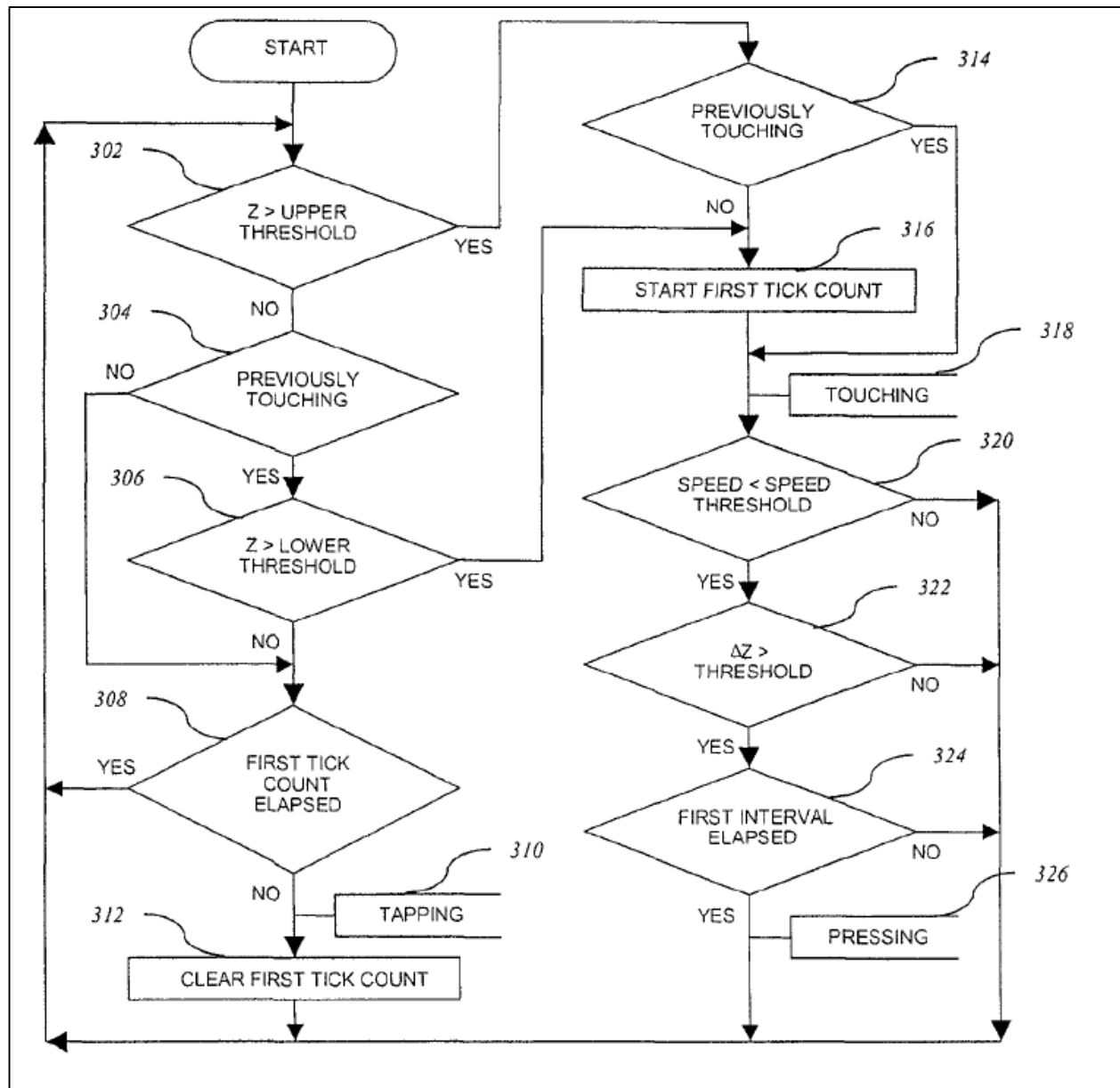
2:50-52.



According to the '507 patent, the touchpad 102 senses the position of a conductor (e.g., a finger) on the surface of the touchpad 102, and provides parameters for the determined position (X and Y) and pressure (Z) of the conductor to a processor 106. Ex. 1101 at 2:41-45, 3:51-52. Because the touchpad 102 senses capacitance, it “does not sense an actual pressure.” *Id.* at 2:53. “Instead, the pressure reading from the touchpad 102 is a pseudo pressure” based on the amount of capacitance resulting from the conductor touching the touchpad 102. *Id.* at 2:54-60; 3:10-12. “In other embodiments, actual pressure may be sensed.” *Id.* at 2:60-61. “For example, in one embodiment, a touch screen with an attached explicit pressure sensor is utilized.” *Id.* at 2:61-63.

The disclosed embodiments purportedly “address the difficulties faced in attempting to determine the intent of a user based on the X, Y, and Z parameters supplied by the touchpad 102.” Ex. 1101 at 4:56-58, 2:1-3. The patent’s Figure 3

shows an example of using parameters received from the touchpad 102 to detect and interpret touches on a touchpad.



Id. at Fig. 3, 7:7-32, 8:5-50. Petitioner discusses Figure 3 in detail below in the section regarding claim construction.

B. The '507 Patent Prosecution History

Immersion filed the application that became the '507 patent on April 6, 2012 (Application Serial No. 13/441,108 (the "'108 application")). Ex. 1102 at 414.

The '108 application claimed priority to an earlier non-provisional application that has a filing date of November 26, 2003. *Id.* at 417. During the prosecution of the '108 application, the applicant amended the claims from their original form to overcome various rejections. *See, e.g.*, Ex. 1102 at 135-38, 102-106, 43-46.

C. Person of Ordinary Skill in the Art

A person of ordinary skill in the art ("POSITA") at the time of the alleged invention of the '507 patent (*i.e.*, November 26, 2003) would have had a Bachelors' degree in computer science, electrical engineering, or a comparable field of study, plus approximately two to three years of professional experience with software engineering, touch sensitive input devices, or other relevant industry experience. Additional graduate education could substitute for professional experience and significant experience in the field could substitute for formal education. Ex. 1110 (Declaration of Dr. Andy Cockburn) ("Cockburn Decl."), ¶ 45.

D. Apple Products Accused of Infringing the '507 Patent

In the ITC Investigation referenced above, Immersion alleges that Petitioner Apple's iPhone 6s products infringe claims 1-5, 9-12, and 14-17 of the '507 patent, and Patent Owner provided a public claim chart purporting to show how these

Apple products allegedly practice claims 1, 9, and 14 of the '507 patent. Ex. 1105.

E. Claim Construction

In accordance with 37 C.F.R. § 42.104(b)(3), Petitioner provides the following statement regarding construction of the '507 patent claims. A claim subject to *inter partes* review receives the “broadest reasonable interpretation” (“BRI”) in light of the specification. 37 C.F.R. § 42.100(b). Because the BRI standard is different from that used in district court litigation, *PPC Broadband, Inc., v. Corning Optical Comms. RF, LLC*, 815 F.3d 747, 756 (Fed. Cir. 2016), the interpretation of the claims presented either implicitly or explicitly herein should not be viewed as constituting Petitioner’s own interpretation and/or construction of such claims for the purposes of the underlying litigation. Instead, such constructions in this proceeding should be viewed only as constituting an interpretation of the claims under the “broadest reasonable construction” standard.

In the ITC investigation referenced above, Immersion also has submitted to the ITC a claim chart showing how it believes that the '507 patent’s independent claims allegedly encompass certain aspects of Patent Owner Apple’s products, as described above. Ex. 1105. Petitioner respectfully requests that Immersion be held to constructions of the '507 patent claim terms at least as broad as those set forth by Immersion in this claim chart.

In the ITC Investigation, Patent Owner Immersion proposed constructions of

certain claim terms in the '507 patent. Petitioner respectfully requests that the Immersion be held to constructions of the '507 patent claim terms at least as broad as Immersion's proposed constructions. Immersion's constructions are set forth in Exhibit 1106 and in the table below.

Claim Term	Immersion's Proposed Construction
"pressure" (claims 1-3, 9-11, 14-16)	"application of force from a contact"
"determining a press if ... the change in pressure is greater than a change in pressure threshold" (claims 1, 9, 14)	"determining a press if ... the change in pressure is greater than a static or adaptive threshold for the change in pressure"
"pseudo pressure" (claims 2-3, 10-11, 15-16)	"A measure of the area of the screen contacted by the object"

Ex. 1106 at 2-3; *see also* Ex. 1107 at 49, 51, 56 (repeating Immersion's proposed constructions).

In the ITC investigation referenced above, the Chief ALJ has construed certain terms of the '507 patent, as set forth below.

Claim Term	The Chief ALJ's Construction
"pressure" (claims 1-3, 9-11, 14-16)	"application of force from a contact"
"determining a press if ... the change in pressure is greater than a change in pressure"	"determining that a press has occurred if ... the magnitude of the change in pressure (positive or negative) is greater than a static

threshold” (claims 1, 9, 14)	or adaptive threshold for the change in pressure”
“pseudo pressure” (claims 2-3, 10-11, 15-16)	“an indirect measure of pressure”

Ex. 1107 at 50, 56, 59. For the purposes of this proceeding, Petitioner respectfully requests that the Patent Owner be held to constructions of these ’507 patent claim terms at least as broad as the Chief ALJ’s constructions. Petitioner also addresses the following specific claim limitations.

1. **“determining a press if: the pressure is greater than a pressure threshold, the change in pressure is greater than a change in pressure threshold, and a first interval has elapsed” (claims 1, 9, and 14)**

This limitation recites three criteria used to determine a press: (1) the pressure is greater than a pressure threshold; (2) the change in pressure is greater than a change in pressure threshold; and (3) a first interval has elapsed. Ex. 1101 at, *e.g.*, claim 1. The Patent Trial and Appeal Board (the “Board”) previously found that “the first two conditions must be maintained for the duration of the first interval.” *Apple Inc. v. Immersion Corp.*, IPR2016-01777, Paper 7 at 4 (PTAB Mar. 23, 2017) (“Decision”); *see also id.* at 14-15 (“the other two conditions—i.e., the pressure exceeds the pressure threshold, and the change in pressure is greater than the change threshold—must be maintained for the duration of the first interval before a press is determined”). Notably, neither party, not even the Patent Owner,

has ever asked for such a narrow construction—not in this proceeding governed by the broadest reasonable interpretation standard, and not in the ongoing ITC proceeding governed by the *Phillips* standard. While this fact is not dispositive, it suggests a possible error in claim construction. As demonstrated below, Apple respectfully submits that this interpretation is incorrect and should not be adopted here.

“[T]he claim construction inquiry ... begins and ends in all cases with the actual words of the claim.” *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1248 (Fed. Cir. 1998). The ’507 patent claims recite using three independent criteria, listed above, to determine whether a press has occurred. Importantly, the actual words of the claims do not specify that the first two criteria must both be maintained for the entire duration of the first interval. For example, the actual words of the claims do not recite, “the pressure is greater than a pressure threshold while a first interval has elapsed.” The Board apparently did not find otherwise because it did not tie its construction to the actual words of the claim. Decision at 5. The Board’s interpretation therefore improperly rewrites the claims. *Rembrandt Data Techs. LP v. AOL, LLC*, 641 F.3d 1331, 1339 (Fed. Cir. 2011).

Nor does the specification disclose an embodiment that requires the first two claimed criteria to be maintained for the duration of the claimed first interval to determine a press. The Board’s Decision denying institution states that the

embodiment of Figure 3 requires that the first two conditions must be maintained for the duration of the first interval. Decision at 4-5. But the embodiment of Figure 3 includes no such requirement.

For example, in Figure 3, the system can start the tick count in step 316 (indicating the beginning of the interval), follow the “YES” branch of step 320 to step 322, branch “NO” in step 322 (indicating that the change in pressure is not greater than the change in pressure threshold), loop back to step 302, follow the “YES” branch to step 314, follow the “YES” branch to step 320, follow the “YES” branch to step 322, follow the “YES” branch to step 324 (indicating that the change in pressure is now greater than the change in pressure threshold), and follow the “YES” branch of step 324 (indicating that the first interval has elapsed) to state 326, indicating that a press has occurred. Ex. 1101 at Fig. 3. In this scenario, the change in pressure was not greater than the change in pressure threshold for part of the first interval, yet the system determined that a press had occurred. Thus, Figure 3 does not mandate that the first two criteria must be maintained for the duration of the first interval. *Id.*

As a second example, in Figure 3, assume that the claimed “first interval” is one second and that the process of Figure 3 executes 80 times per second, consistent with the patent’s disclosure of a sampling frequency of 80 Hz. Ex. 1101 at 5:59-61, 9:3-4. The system may first start the tick count in step 316 (indicating

the beginning of the interval). The system may then follow the “YES” branch from step 320 to step 322, branch “NO” in step 322 (indicating that the change in pressure is not greater than the change in pressure threshold), loop back to step 302, follow the “YES” branch to step 314, follow the “YES” branch to step 320, follow the “YES” branch to step 322, and again branch “NO” in step 322 (indicating that the change in pressure is still not greater than the change in pressure threshold). The system may repeat this loop 80 times (or more), for the entire duration of the first interval. The change in pressure may then become greater than the change in pressure threshold, such that step 322 branches “YES” to step 324. Because the first interval of one second has elapsed, step 324 will branch “YES” to state 326, indicating that a press has occurred. In this scenario, the change in pressure was not greater than the change in pressure threshold at any time during the first interval, yet the system determined that a press had occurred.

These examples are not just corner cases. Figure 3 shows that it requires that a change in pressure exceed a change in pressure threshold in only one instance because the embodiment of Figure 3 tests for the condition of whether the first interval has elapsed at step 324, only after an instance in which a change in pressure has exceeded a change in pressure threshold at step 322. As a consequence of this arrangement, step 322 can result in a “no” decision any number of times after the first tick count has started at step 316 (*i.e.*, during the

first interval), but even a single instance in which step 322 results in a “yes” decision after the first interval has elapsed at step 324 is sufficient to determine that a press has occurred at box 326.

For all of the reasons discussed above, Figure 3 does not mandate that the first two criteria must be maintained for the duration of the first interval. Nor does anything else in the rest of the specification. The Board’s interpretation therefore is not supported by the specification, and improperly excludes from the scope of the claims the embodiments described above (among others).

Even if the specification disclosed an embodiment that required the first two claimed criteria to be maintained for the duration of the claimed first interval to determine a press (which it does not), the Board’s interpretation would constitute an improper importation of that limitation into the claims because the specification does not include the lexicography or clear disavowal of claim scope required to do so. *Thorner v. Sony Computer Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (specification limitations may be read into the claims only “1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of the claim term either in the specification or during prosecution”).

Furthermore, in the ITC Investigation referenced above, the Chief ALJ construed a portion of this limitation (“determining a press if ... the change in

pressure is greater than a change in pressure threshold”) as set forth in the table above, and did not find any requirement that the change in pressure must be maintained for the duration of the claimed interval. Ex. 1107 at 59. The Chief ALJ, applying the *Phillips* standard, did not find any requirement that the change in pressure must be maintained for the duration of the claimed interval. *Id.* The Chief ALJ’s construction and accompanying analysis of this limitation further confirm that there is no such requirement. *Id.* at 56-59.

Finally, the Board’s construction is vague because it is not clear what it means for a change in pressure to be greater than a change in pressure threshold for the duration of the first interval. For example, this requirement may mean any of the following: (1) the difference between the first pressure of the interval and the last pressure of the interval is greater than the threshold; (2) each pressure determined during the interval is greater than some initial pressure by at least the threshold amount; or (3) each pressure determined during the interval is greater than the previous determined pressure. Cockburn Decl., ¶ 63. The Board’s construction therefore obfuscates, rather than clarifies, the meaning of this limitation. For all these reasons, Petitioner respectfully submits that the Board’s previous construction is incorrect and should not be adopted here.

Rather, Petitioner respectfully requests that this limitation be construed under the broadest reasonable interpretation standard as “determining a press

based, in part, on determining that the pressure is greater than a pressure threshold, determining that the change in pressure is greater than a change in pressure threshold, and determining that a first interval has elapsed.”

2. “pressure” (claims 1-3, 9-11, 14-16)

In light of the Chief ALJ’s construction of “pressure,” Immersion’s public proposed construction of “pressure,” and Immersion’s public infringement contentions, Immersion should be held to a construction of “pressure” that includes force and the application of force from a contact. Ex. 1107 at 49-50; Ex. 1106 at 2; Ex. 1105 at 40-41, 58-59, 67-68 (Immersion contending that “force” satisfies various “pressure” limitations).

3. “determining a press if ... the change in pressure is greater than a change in pressure threshold” (claims 1, 9, and 14)

Based on Immersion’s public proposed construction of “determining a press if ... the change in pressure is greater than a change in pressure threshold,” Immersion should be held to a construction of this limitation that encompasses “determine a press if ... the change in pressure is greater than a static or adaptive threshold for the change in pressure.” Ex. 1107 at 56; Ex. 1106 at 3.

4. “pseudo pressure” (claims 2, 10, and 15)

The Chief ALJ has construed “pseudo pressure” as “an indirect measure of pressure.” Ex. 1107 at 56. “Pseudo pressure” in this proceeding should therefore be interpreted to include at least all indirect measures of pressure. In addition, the

'507 patent states that “the pseudo pressure is based on the amount of capacitance resulting from the conductor touching the touchpad 102” and that “the amount of capacitance is not a direct measure of pressure but rather a pseudo pressure.” Ex. 1101 at 3:10-14. Accordingly, “pseudo-pressure” should be construed to also include any measure of pressure based on capacitance, because such measures of pressure are indirect, as recognized by the '507 patent. Cockburn Decl., ¶ 64. In addition, Immersion proposed in the ITC Investigation that “pseudo-pressure” be construed as “a measure of the area of the screen contacted by the object.” Ex. 1106 at 2. Thus, Immersion should be held to a construction of “pseudo-pressure” that also includes a measure of such contact area. Likewise, the measure of the area of the screen contacted by the object (*e.g.*, a finger) can be used to estimate pressure because as one presses harder on a screen, the object’s contact area with the screen typically increases. Cockburn Decl., ¶ 65. Thus, such a contact area is an indirect measure of pressure, *i.e.*, a pseudo pressure. *Id.*

F. This Petition Should Not Be Barred by 35 U.S.C. §315(d)

The Board should reject any argument by Patent Owner that the Board should deny institution of this petition under 35 U.S.C. §315(d). First, the arguments in this Petition address additional claims and entirely different prior art than the previous petition, IPR2016-01777. *See, e.g., Microsoft Corp. v. Bradium Techs LLC*, IPR2016-00448, Paper 9 at 10 (finding that § 315(d) did not preclude

instituting trial on a second petition because the petition raised substantively different arguments than the previous petition). Second, Petitioner has not “overwhelmed Patent Owner with an unreasonable number of challenges of patentability” because this is only the second petition that Petitioner has filed regarding the ’507 patent. *Id.* at 9 (instituting trial in such circumstances). Third, in order to conserve the resources of the Board and the private parties, Petitioner limited the petition in IPR2016-01777 to the claims asserted in the ITC investigation. The ITC action is still pending and the statutory bar provided under 35 U.S.C. § 315(b) is not limited to asserted claims. Accordingly, Petitioner files the instant Petition to challenge additional claims in light of the (currently stayed) District Court actions. This Petition aligns with the statutory goal of the America Invents Act (AIA) to provide lower-cost alternatives to such litigation. The Board has permitted second petitions under similar circumstances. *See e.g., Silicon Labs, Inc. v. Cresta Tech. Corp.*, IPR2015-00615, Paper 9 at 24-25.

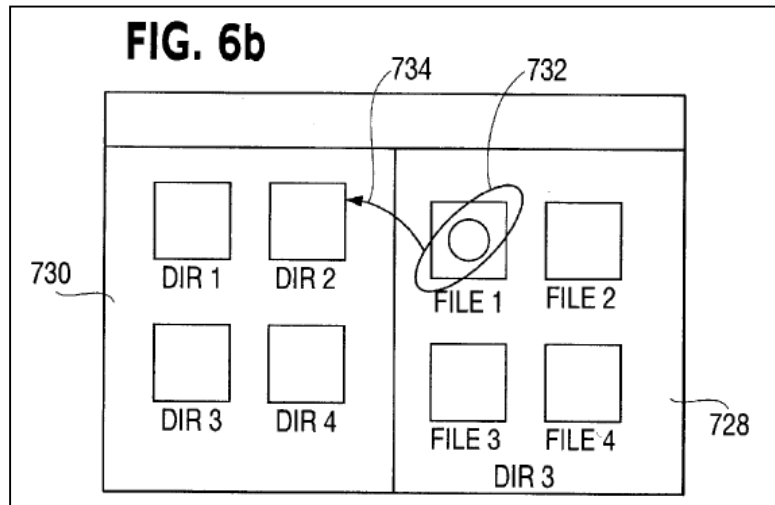
G. Ground 1: Claim 1-18 are Obvious Under 35 U.S.C. §103(a) (pre-AIA) In Light of Astala Combined with Shahoian

1. Astala is § 102(a) Prior Art

U.S. Patent No. 6,590,568 (“Astala”) is prior art under 35 U.S.C. §102(a) (pre-AIA) because it is a patent (printed publication) that issued on July 8, 2003, before the earliest priority date on the face of the ’507 patent (Nov. 26, 2003), and because it has a different inventive entity than the ’507 patent. Ex. 1103 at cover

page.

Astala relates to a method of dragging and dropping items displayed on a touchscreen. Ex. 1103 at Abstract. Astala's Figure 6(b) is shown below and shows such an item ("FILE1") displayed on a touchscreen.



Astala's Figures 6(b), 6(c), and 6(d) show "FILE 1" being dragged and dropped into the user directory "DIR 2." Ex. 1103 at Figs. 6(b), 6(c), 6(d), 9:40-57, 9:64-65. Astala discloses an algorithm to detect when the user is performing the drag-and-drop gesture on the touchscreen. *Id.* at Fig. 6(a), 9:21-65.

The Astala touchscreen is part of a "mobile terminal 20a." Ex. 1103 at 8:47-57, 6:23-27, Fig. 3 (showing a block diagram of mobile terminal 20a), 9:21-65, 2:37-47. The mobile terminal operates within Astala's "mobile display appliance (MDA) system." *Id.* at 3:30-33, 6:23-27, Fig. 1. The MDA system includes an MDA server that provides services such as email, calendar, notes, and online shopping. *Id.* at 3:47-50. Users access the MDA server via the mobile terminals.

Id. at 3:45-47.

2. Shahoian is § 102(b) Prior Art

U.S. Pat. App. Pub. No. 2002/0033795 (“Shahoian”) qualifies as prior art under 35 U.S.C. § 102(b) (pre-AIA) because it was published on March 21, 2002, more than one year before the earliest priority date of the face of the ’507 patent (Nov. 26, 2003).

Shahoian relates to touch sensitive input devices that “output haptic feedback such as tactile sensations to the user who is physically contacting [a] touchpad.” Ex. 1104, ¶ 43. Shahoian teaches outputting a haptic effect in response to the detection of a gesture, such as a dragging mode, for a touch sensitive device. Ex. 1104, ¶ 189. Petitioner discusses Shahoian in more detail below.

3. Limitation-by-Limitation Analysis

Claim 1:

[1.0] A method comprising:

Astala combined with Shahoian discloses and renders obvious a method comprising the claimed steps, as established below.

[1.1] receiving contact data from an input device;

Astala and Shahoian disclose this limitation both individually and in combination.

Astala: Astala discloses that “mobile terminal 20a” includes “[h]ardware 78,” which includes a “touch screen controller that monitors touch screen-input

parameters for processing the touch inputs on the touch screen display.” Ex. 1103 at 6:23-27, 8:54-56 (emphasis added). The touch-screen-input parameters are contact data from the touch screen display (an input device). Cockburn Decl., ¶ 75.

In addition, Astala discloses that in step 702 of Fig. 6(a), “a touch screen input is detected” on touch screen 70, and that the touch may be made with “a finger or pointed stylus.” Ex. 1103 at 9:16-18, Fig. 6(a). Astala also discloses analyzing characteristics of the touch, such as its pressure, change in pressure, movement, and so on. *Id.* at 9:21-65. Detecting a touch input on the touch screen and analyzing the characteristics of the touch necessarily requires receiving contact data from the touchscreen. Cockburn Decl., ¶ 76. Thus, Astala also inherently discloses this limitation.

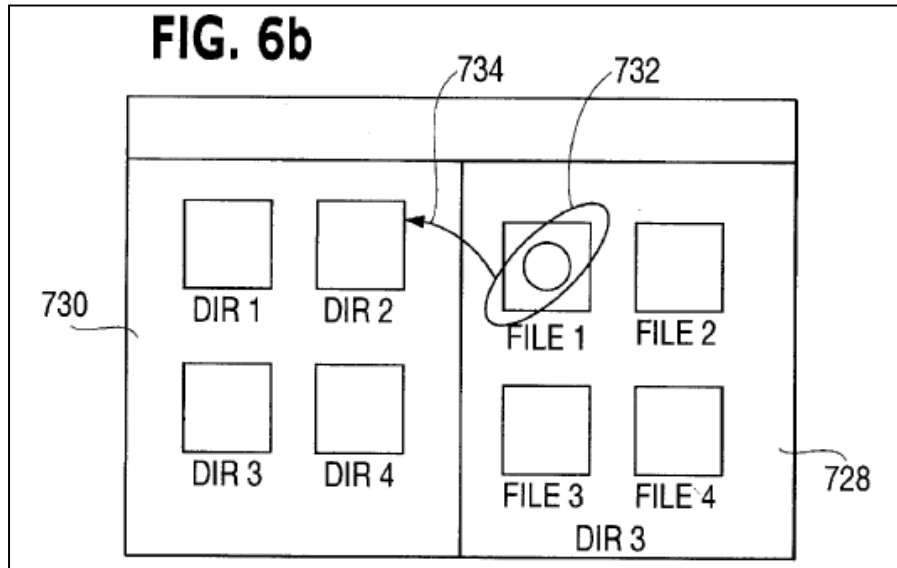
Shahoian: Shahoian discloses “contact sensors in a touchscreen” and a “sensor interface” that “can be used to convert sensor signals to signals that can be interpreted by the microprocessor” (contact data from an input device). Ex. 1104 at ¶ 70. Thus, Shahoian also discloses this limitation.

It also would have been obvious to combine the disclosure of Shahoian with the system of Astala at least for purposes of allowing a processor to interpret and analyze signals from the touchscreen’s sensors. Cockburn Decl., ¶ 78. Motivation to do so arises from Astala’s disclosure of analyzing a touch to determine a drag-

and-drop gesture, as described for limitations [1.3] and [1.5], because receiving contact data from the touch input device would be necessary to do so. *Id.* Doing so would have been well within the skill of a POSITA, could have been accomplished with minimal effort, and would have led to predictable results. *Id.* For example, Shahoian discloses that the “contact sensors” operate in a touchscreen, and Astala discloses an input device in the form of a touch screen. Ex. 1104 at ¶ 70; Ex. 1103 at 9:16-20. The only difference between this limitation and the combination of Astala and Shahoian is the lack of actual combination of their disclosures in a single prior art reference. Cockburn Decl., ¶ 78.

[1.2] determining an interaction with a displayed object on a screen based on the contact data;

Astala discloses determining an interaction with a displayed object on a screen based on the contact data. For example, Astala discloses displaying one of several “images” (displayed objects), each of which represents a file in “user directories.” Ex. 1103 at 9:9-15, Fig. 6(b)-(d). Astala’s Figure 6(b), shown below, shows displayed objects labeled “FILE 1,” “FILE 2,” “FILE 3,” and “FILE 4.”



Ex. 1103 at Fig. 6b.

Astala discloses determining that the user is selecting the “FILE 1” displayed object. Ex. 1103 at 9:26-27 (“[a]t step 708, a determination is made that file 1 is the object, that is, the selected item of touch input 732”), Fig. 6(a). Astala discloses that the determination is made using “the x and y coordinates of the touch input 732.” Ex. 1103 at 9:23-27; *see also id.* at 9:16-25. The selection of FILE 1 is an interaction with FILE 1.

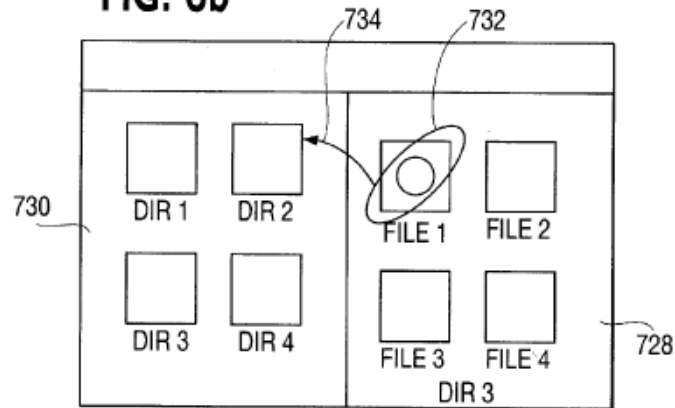
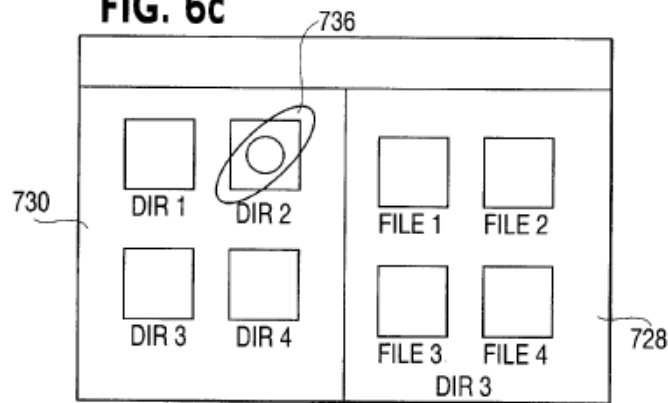
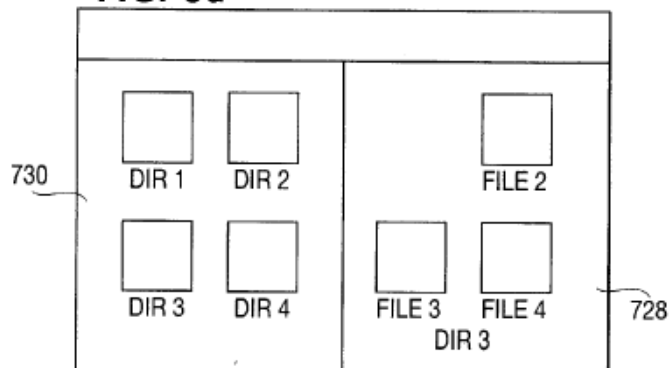
Determining that the user is interacting with the “FILE 1” displayed object is necessarily based on the contact data received from touch screen 70 caused by touch input 732. Cockburn Decl., ¶ 81. For example, such contact data must come from the touch screen because that is the component with which the user is interacting, and use of such contact data is necessary in order to determine whether that location of the user’s touch is within the bounds of the “FILE 1” object as

opposed to, for example, the “FILE 2” object. *Id.* Without consideration of such data, Astala could not make the disclosed determination that the user is interacting with the “FILE 1” object. *Id.* To the extent that this is not inherently disclosed in Astala, it would have been obvious to a POSITA to make the determination that File 1 is selected by touch input 732 on the basis of contact data including x and y coordinates from the touch screen. *Id.*

[1.3] responsive to determining the interaction, determining a gesture based on the contact data comprising:

Astala discloses, responsive to determining the interaction, determining a gesture based on the contact data. For example, Astala discloses determining a drag-and-drop gesture, as discussed further for the limitations below. Ex. 1103 at 9:3-9 (“a technique for utilizing touch screen inputs for dragging and dropping objects”), Fig. 6(a).

Astala’s Figures 6(b) through 6(d), shown below, illustrate the drag-and-drop gesture. In these figures, the user is dragging “FILE 1” into “DIR 2” (directory 2). Ex. 1103 at Figs. 6b-6d, 9:3-9; Cockburn Decl., ¶ 83.

FIG. 6b**FIG. 6c****FIG. 6d**

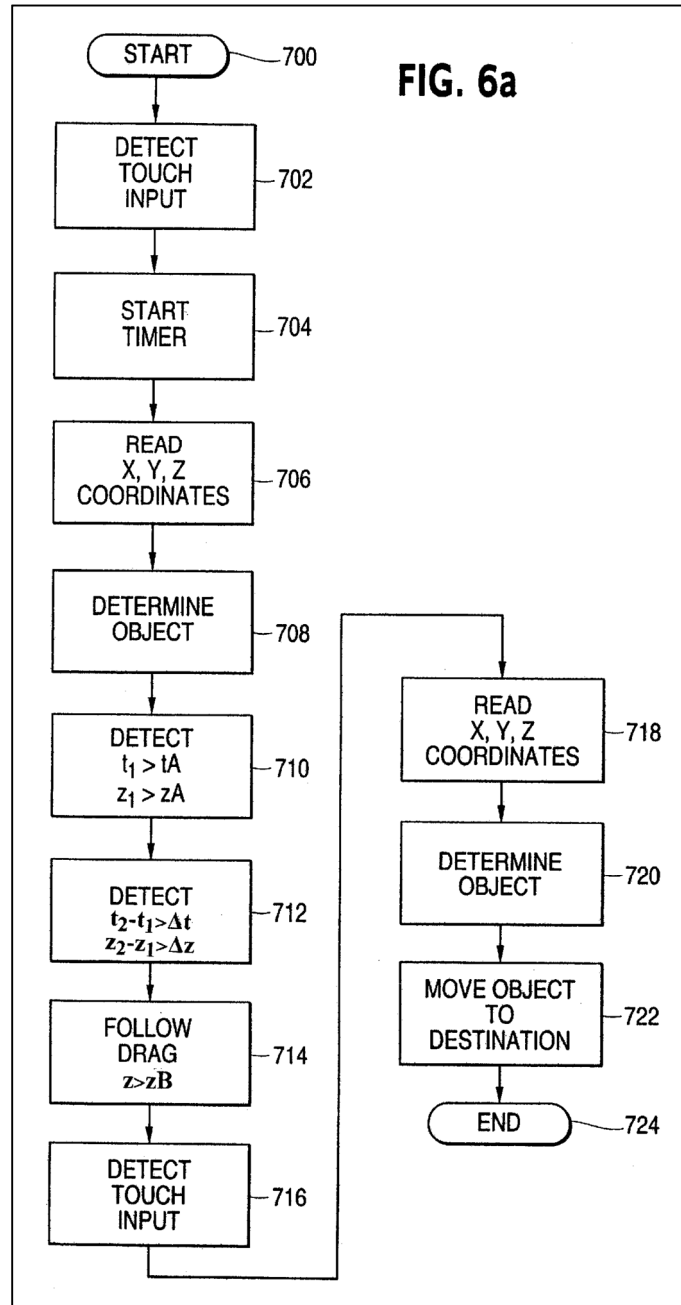
The gesture includes three main parts: 1) a touch with a pressure greater than a pressure threshold zA and longer than a predetermined time, and also a sufficiently large reduction in pressure; 2) a subsequent dragging sequence at the reduced pressure, indicated by movement of the finger; and 3) a subsequent touch

with a pressure greater than a pressure threshold zB. Ex. 1103 at 9:26-65, Fig. 6(a); *see also id.* at Figs. 6(b)-(d); Cockburn Decl., ¶ 84.

Determination of the gesture is necessarily based on the contact data from the touch input device because it is based on touch characteristics such as the pressure z, the change in pressure, the x and y coordinates, and the duration of the initial touch and the last touch. Ex. 1103 at 9:22-23, 9:28-39, 9:44, 9:51-59, Fig. 6(a); Cockburn Decl., ¶ 85. The pressure z is necessarily based on the contact data, as established below for limitation [1.4]. Cockburn Decl., ¶ 85. The x and y coordinates also are necessarily based on contact data from the touchscreen because the value of those coordinates is directly dependent on the location of the touch on the touchscreen. *Id.* The durations of initial and last touches also are necessarily based on the contact data because those values are directly dependent on the user's touching the touchscreen. *Id.* Stated another way, if Astala's gesture determination algorithm had no contact data from the touch input device, it would not be able to determine that the user is performing the drag-and-drop gesture, or any of the three parts of the gesture described above. Cockburn Decl., ¶ 85. Thus, determination of the drag-and-drop gesture is necessarily based on the contact data from the touch input device. *Id.*

Astala also discloses that the determination of the drag-and-drop gesture is made after step 708, in which "a determination is made that file 1 is ... the selected

item, of [the] touch input.” Ex. 1103 at 9:26-27; *see also id.* at Fig. 6a (steps 710, 712, 714, *et. seq.*). If the determination of step 708 does not occur, the subsequent steps do not occur. Ex. 1103 at 9:26-27; Cockburn Decl., ¶ 86. Thus, determination of the drag-and-drop gesture in steps 710, *et. seq.*, is made responsive to first determining the interaction from limitation [1.2] (the interaction with the file 1 displayed object). Astala’s Figure 6a is shown below.



Ex. 1103 at Fig. 6a; Cockburn Decl., ¶ 86.

[1.4] determining a pressure and a change in pressure based on the contact data, and

Astala discloses determining a pressure and a change in pressure based on the contact data. For example, as described more below for limitation [1.5], Astala

discloses determining the drag-and-drop gesture based in part on pressure and change in pressure. Ex. 1103 at 9:28-29 (“a determination is made that the value of the pressure z of touch input 732 is greater than a predetermined value Z_a ”), Fig. 6(a) at step 710 (“ z_1 ”), 9:36-39 (“a determination is made that the value of the pressure z of the object on the touch screen 70 has been reduced by an amount greater than a predetermined pressure differential Δz ”), Fig. 6(a) at step 712 (“ $z_2 - z_1$ ”).

The pressure (z_1) is necessarily based on contact data from the touchscreen because it reflects the pressure of the user’s touch on the touchscreen. Ex. 1103 at 9:28-29; Cockburn Decl., ¶ 88. The change in pressure ($z_2 - z_1$) is likewise necessarily based on contact data from the touchscreen because it is calculated from different instances of pressure value z , which is necessarily based on contact data from the touchscreen. Ex. 1103 at 9:36-39; Cockburn Decl., ¶ 88.

Finally, Astala discloses that the change in pressure determination that occurs in step 712 ($z_2 - z_1$) is responsive to the determination in step 708 that the user is interacting with the “FILE 1” object because each determination of Figure 6a does not occur unless the previous determination occurred. Ex. 1103 at 9:26-27, 9:36-39, Fig. 6a; Cockburn Decl., ¶ 89. For example, Astala’s steps 710 through 724 all occur in response to the interaction determination of step 708. Ex. 1103 at Fig. 6a; Cockburn Decl., ¶ 89. Similarly, a POSITA would also

understand Astala to disclose that the value of pressure *z* is determined in step 710, in response to the preceding determination in step 708 that the user is interacting with the “FILE 1” object. *See* Ex. 1103 at 9:27-35 (“the pressure ... is determined”); Cockburn Decl., ¶ 89.

Obviousness: Astala also renders this limitation obvious. For example, it would have been obvious to a POSITA to determine the pressure and change in pressure based on the contact data in response to determining an interaction with the displayed “FILE 1” object. A POSITA could do so by, for example, determining the pressure *z*, and change in pressure, of the user’s touch (as disclosed by Astala) as a result of first determining that the user is interacting with the “FILE 1” object, which Astala determines in step 708. Cockburn Decl., ¶ 90. Doing so would have been well within the skill of a POSITA, could have been accomplished with minimal effort, and would have led to predictable results. *Id.* For example, Astala already discloses determining that the user is interacting with the “FILE 1” object, and already discloses determining the pressure and change in pressure of the user’s touch, as established above. *Id.*

Motivation to do so arises from Astala’s disclosure that the pressure and change in pressure values do not need to be analyzed unless it has first determined that the user is interacting with the “FILE 1” displayed object, as established above. Ex. 1103 at 9:26-39; Cockburn Decl., ¶ 91. Thus, a POSITA would have

recognized from Astala’s disclosure that calculating the pressure and change in pressure before it is determined that the user is interacting with the “FILE 1” displayed object (or other displayed object that can be dragged-and-dropped) is unnecessary. Cockburn Decl., ¶ 91. In this regard, a POSITA would have recognized that if the user is not interacting with a displayed object, it can be assumed that the user is not performing the disclosed drag-and-drop operation and there is no need to determine the pressure and change in pressure. *Id.*

The differences between this limitation and Astala do not show otherwise. For example, Astala does not expressly disclose the steps taken to determine the pressure, but nonetheless the pressure z must necessarily be determined in Astala in order for it to determine that it is greater than Z_a . Cockburn Decl., ¶ 92. Any other differences between this limitation and Astala are likewise trivial.

In addition, this combination would not have involved more than applying a known technique (*i.e.*, Astala’s determination of the touch’s pressure and change in pressure) to a known device (*i.e.*, the Astala system) that was ready for improvement (*i.e.*, ready to determine a pressure and change in pressure in response to determining that the user is interacting with a displayed object) to yield predictable results (*i.e.*, the pressure value z and the change in pressure value). Cockburn Decl., ¶ 93.

This combination also amounts to merely choosing from a finite number of

identified, predictable solutions (*e.g.*, determining the pressure and change in pressure independently of step 708 or in response to it), to an identified problem (the need to determine the pressure and change in pressure at some point), with a reasonable expectation of success (because determining the pressure and change in pressure in steps 710 and 712, respectively, and in response to the determination of step 708, would preserve the functionality of the Astala algorithm). Cockburn Decl., ¶ 94.

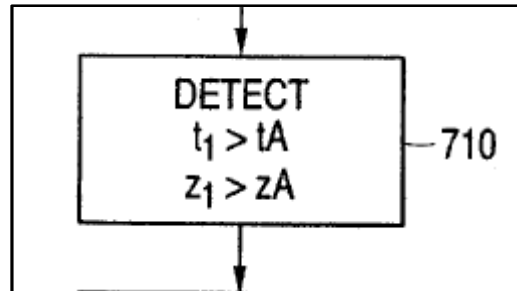
[1.5] determining a press if: the pressure is greater than a pressure threshold, the change in pressure is greater than a change in pressure threshold, and a first interval has elapsed; and

Astala discloses determining a press if the three claimed criteria are satisfied. For example, Astala discloses determining the drag-and-drop gesture referenced above in part by determining a press if the pressure is greater than a pressure threshold, the change in pressure is greater than a change in pressure threshold, and a first time interval has elapsed, as discussed in more detail below.

Ex. 1103 at Fig. 6(a), 9:3-39.

With regard to determining that the pressure is greater than a pressure threshold, Astala discloses that in step 710, “a determination is made that the value of the pressure *z* of touch input 732 is greater than a predetermined value *Z_a*” (a pressure threshold). Ex. 1103 at 9:27-30. “That is, the pressure of the object touching the touch screen 70 is determined to be greater than a predetermined

pressure value” *Id.* at 9:32-34. Step 710 from Astala’s Figure 6(a) discloses “ $z_1 > z_A$,” as shown below:

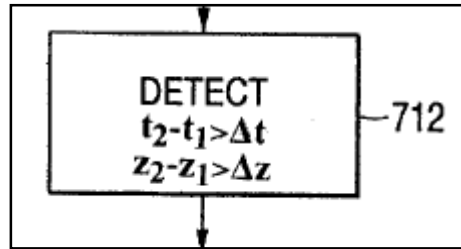


Ex. 1103 at Fig. 6(a); *see also id.* at 9:50-53.

Astala also discloses determining that the pressure z is greater than z_A “over the period of time t_1 ,” and determining that t_1 is greater than time t_A (an interval).

Ex. 1103 at 9:26-35. Thus, although this limitation has no such requirement, Astala also discloses determining that the pressure is greater than the pressure threshold for the duration of the time interval t_A . Cockburn Decl., ¶ 97.

With regard to determining that the change in pressure is greater than a change in pressure threshold, Astala discloses that in step 712, “a determination is made that the value of the pressure z of the object on the touch screen 70 has been reduced by an amount greater than a predetermined pressure differential Δz .” Ex. 1103 at 9:36-39. Step 712 from Astala’s Figure 6(a) discloses “ $z_2 - z_1 > \Delta z$,” as shown below.



Astala discloses that the object is then dragged across the touch screen at the reduced pressure. Ex. 1103 at 9:40-41.

A POSITA would have understood that the Astala system requires a sufficiently large reduction in pressure in order for the criteria of step 712 to be satisfied. Cockburn Decl., ¶ 100. In order to determine whether the pressure has been reduced by an amount greater than the change in pressure threshold Δz , one would necessarily determine that the magnitude of the change in pressure is greater than a change in pressure threshold. *Id.* For example, if successive pressure readings are 30 (z_1), then 20 (z_2), then $z_2 - z_1$ equals -10. *Id.* The magnitude of this reduction in pressure (10) would be greater than a change in pressure threshold of, for example, 5. Using such a threshold, there is a sufficiently large reduction in pressure.

Immersion may argue that this change in pressure determination is used not for purposes of determining the press, but for purposes of determining the later “drag” portion of the drag-and-drop gesture. But such an argument is incorrect. Astala discloses, “[a]t step 714, the object is dragged across the face of the touch screen 70.” Ex. 1103 at 9:40-41. Thus, Astala discloses that the drag does not

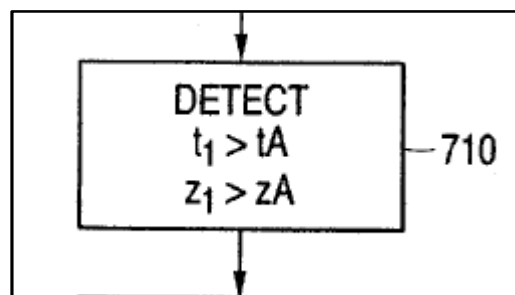
begin until step 714, after step 712, in which the reduction in pressure determination has been made. *Id.* at 9:36-39, Fig. 6a. The reduction in pressure determination therefore is not part of the drag, as Immersion may contend. Cockburn Decl., ¶ 101.

Likewise, Astala discloses determining in step 714 that the drag portion of the gesture is starting based on detecting finger movement. Ex. 1103 at 9:43-45 (“A determination that a drag operation is occurring may be discerned by detecting changes in the x and y coordinates over a predetermined period of time”). By this point in time (step 714), the determination of the reduction in pressure had already been made in the preceding step 712. *Id.* at 9:36-39, Fig. 6a. Thus, the reduction in pressure determination occurs before the drag operation, not as part of the drag operation. Cockburn Decl., ¶ 102. Consistent with this conclusion, a POSITA would recognize that a “drag” action on a touchscreen refers to movement of a finger, not a reduction in pressure during a stationary touch. *Id.* The reduction in pressure determination therefore must be part of the preceding press. *Id.*

Astala’s passage at 2:38:43 does not show otherwise because it discloses that the drag occurs at a “lighter pressure,” which is consistent with the disclosure discussed above in which the drag occurs after pressure has been reduced. Cockburn Decl., ¶ 103. Moreover, the passage at 2:38-43 is part of Astala’s

“Summary of the Invention” section, which is not necessarily describing the particular embodiment set forth in Astala’s column 9. Ex. 1103 at 9:5-6 (“an example embodiment”).

With regard to determining that a first interval has elapsed, Astala discloses that in step 710, “a determination is made that ... the object touches the touch screen 70” “over the period of time t_1 ” “that is greater than a predetermined time t_A .” Ex. 1103 at 9:28-31. “That is, ... the object touching the screen 70 is determined to be touching the screen for a period of time, which is greater than a predetermined period of time.” *Id.* at 9:32-35. Step 710 from Astala’s Figure 6(a) discloses “ $t_1 > t_A$,” as shown below:



A POSITA would have understood that Astala is disclosing determining that the time interval t_A has passed. Cockburn Decl., ¶ 105; *see also* Ex. 1103 at 9:50-55.

Obviousness: In addition, Astala renders this limitation obvious. First, if one were to find that the change in pressure determination is not part of determining a press (which it is), Astala nonetheless renders obvious making that determination as part of determining a press. Cockburn Decl., ¶ 106. The

differences between this limitation and Astala in this regard are none, because Astala discloses that such a determination is made in step 712, before the drag begins, as established above. *Id.* Motivation to do so arises from Astala's disclosure of discerning that a drag has begun (based on finger movement) after making the pressure determination, and also from the fact that a reduction in pressure alone does not indicate a drag, which requires movement. *Id.* Making the change in pressure determination as part of the press would have been well within the skill of a POSITA, could have been accomplished with minimal effort, and would have led to predictable results. *Id.* For example, if the Board finds that Astala does not already disclose doing so, Astala nonetheless already discloses effectively doing so. *Id.*

If the Board finds that the first two criteria of this limitation must be maintained for the duration of the interval (which would be incorrect, as described in the claim construction section), Astala renders such an interpretation obvious. Cockburn Decl., ¶ 107. As established above, Astala discloses determining that criteria (1) (the pressure is greater than a pressure threshold) is maintained for at least the interval t_1 , which is greater than the interval t_A . Astala also discloses determining " $t_2 - t_1 > \Delta t$ " in the same step in which it determines that criteria (2) is satisfied, step 712. Ex. 1103 at Fig. 6a. A POSITA would understand this disclosure to mean that Astala determines that the change in pressure occurred over

an interval ($t_2 - t_1$), which is larger than Δt . Cockburn Decl., ¶ 107. Thus, Astala discloses determining that each of criteria (1) and criteria (2) are satisfied for the duration of a time interval, although not necessarily the same time interval. *Id.* The difference between Astala's disclosure and determining that criteria (1) and (2) are maintained for a given interval is therefore minimal. Cockburn Decl., ¶ 107.

Motivation to determine that criteria (1) and (2) are maintained over the same interval arises from Astala's disclosure, described above, which allows for the possibility that criteria (2) was satisfied during the same interval as criteria (1). Cockburn Decl., ¶ 108. Additional motivation arises from a desire to avoid detecting false positives caused by noise. *Id.* The existence of noise in sensor data was well known to those of skill in the art, and also is acknowledged by the prior art. *Id.* For example, U.S. Patent No. 5,734,373 to Rosenberg, which is incorporated by reference into Shahoian, as discussed below for claim 8, teaches filtering data from sensors to filter noise, such as "large spikes" in the data. *Id.*; Ex. 1109 at 11:29-33, 21:22-26. By ensuring that criteria (1) and (2) are both satisfied over the same sufficiently long interval rather than, for example, instantaneously, one can account for the effects of such noise. Cockburn Decl., ¶ 108. Additional motivation to do so arises from ensuring that criteria (1) and (2) are satisfied as part of the same touch, rather than separate touches that are close in time. *Id.*

Doing so could have been accomplished, by, for example, determining that criteria (1) and (2) are both satisfied over a time interval t_B , which also would satisfy the third criteria. Doing so in this manner or any other manner would have been well within the skill of a POSITA, could have been accomplished with minimal effort, and would have led to predictable results. Cockburn Decl., ¶ 109. In this regard, Astala already discloses determining that each of criteria (1) and (2) are satisfied over a given interval, and therefore any needed modifications to Astala would have been trivial. *Id.*

[1.6] responsive to determining the gesture, outputting a haptic effect.

Astala combined with Shahoian discloses this limitation, and renders it obvious.

Astala: As established above for limitation [1.3], Astala teaches detecting a drag-and-drop gesture. *See also* Ex. 1103 at 9:3-8. Astala does not explicitly disclose the obvious limitation of outputting a haptic effect in response to determining the drag-and-drop gesture. Cockburn Decl., ¶ 111.

Shahoian: Shahoian teaches outputting a haptic effect in response to the detection of a gesture, such as a dragging gesture, for a touch-sensitive device. Ex. 1104 at ¶ 189. Specifically, Shahoian teaches that:

Other embodiments of touchpads and touchscreens allow the user to enter “gestures” or shortcuts by tracing a

symbol on the cursor control region or other region,
which is recognized as a command or data by a
processor. Haptic sensations can be associated with or
dependent on particular gestures. ... For example, such
a gesture can provide a “drag” mode in which objects
may be moved with the cursor. When the user is in such
a drag mode, a vibration or other haptic sensation can be
output to indicate to the user that this mode is active.

Ex. 1104 at ¶ 189 (emphasis added); *see also id.* at ¶ 44 (actuators providing haptic feedback), ¶ 57 (providing haptic feedback to the user’s finger via a touchscreen), ¶¶ 87-92 (using an actuator to provide haptic sensations), ¶ 94 (providing haptic feedback via a touchscreen), ¶ 96 (providing a haptic effect using a particular frequency), ¶¶ 104-111 (providing a haptic effect by applying voltage to an commercially available actuator), ¶¶ 151-155. Thus, Shahoian discloses outputting a haptic effect in response to determining a gesture on a touch-sensitive device, including doing so in response to a dragging gesture, and discloses details on how to do so. Cockburn Decl., ¶ 112. Shahoian also discloses that its haptic feedback can be provided in a system that uses a touch screen. *Id.*; Ex. 1104 at ¶¶ 7, 13, 179.

Obviousness: It would have been obvious for a POSITA at the time of the alleged invention of the ’507 patent to combine these teachings of Shahoian with

the system of Astala to make Astala output a haptic effect responsive to determining the drag-and-drop gesture. Cockburn Decl., ¶ 113.

The differences between this limitation and the prior art do not show otherwise. For example, although Astala does not disclose providing a haptic effect upon determination of a gesture, Shahoian expressly discloses doing so, even in response to a “drag” “gesture” in particular, as established above. Ex. 1104 at ¶ 189. Thus, the only difference between this limitation and the combination of Astala and Shahoian is the lack of actual combination of the elements in a single prior art reference. Cockburn Decl., ¶ 114.

In the combination of Astala and Shahoian, each element would perform the same function as it does individually. For example, Astala’s touch detection algorithm would still determine that a drag-and-drop gesture has occurred, and Shahoian’s haptic effect components would still provide a haptic effect in response to determining a gesture. Cockburn Decl., ¶ 115.

In particular, it would have been obvious to a POSITA to modify the Astala system in light of the disclosure of Shahoian in the following exemplary way. The Astala system (“mobile terminal 20a” with touch screen) could readily house Shahoian’s “commercially available” actuator and circuitry to drive the actuator. Ex. 1103 at 6:23-27, 9:21-65, Fig. 3; Ex. 1104 at ¶¶ 87, 104-106; Cockburn Decl., ¶ 116. The actuator would be mechanically coupled to the touchscreen and

operated using voltage to transmit sensations to the finger, as taught by Shahoian. Ex. 1104 at ¶¶ 57, 105-106; Cockburn Decl., ¶ 116. The Astala system would provide the haptic feedback upon detection of the gesture, as taught by Shahoian. Ex. 1104 at ¶ 189; Cockburn Decl., ¶ 116. This exemplary modification and this combination of Astala and Shahoian generally would have been well within the skill of a POSITA, could have been accomplished with minimal effort, and would have led to predictable results. Cockburn Decl., ¶ 116.

Motivation to modify Astala in such a manner arises from Shahoian, which teaches:

One problem with existing touchpads is that there is no haptic feedback provided to the user. The user of a touchpad is therefore not able to experience haptic sensations that assist and inform the user of targeting and other control tasks within the graphical environment. The touchpads of the prior art also cannot take advantage of existing haptic-enabled software run on the portable computer.

Ex. 1104 at ¶ 6 (emphasis added); *see also id.* at ¶ 7 (“The haptic sensations output on the touch control enhance interactions and manipulations”); Cockburn Decl., ¶ 117. Thus, Shahoian provides motivation to modify Astala to output a haptic

effect upon detection of the drag-and-drop gesture to overcome the “problem” and to “enhance interactions and manipulations.” *Id.*

Additional motivation for such a combination comes from the fact that Shahoian describes adding haptic feedback not only for gestures generally, but to a “drag” mode in particular, and Astala discloses a dragging portion of its drag-and-drop gesture. Ex. 1104 at ¶ 189 (“[w]hen the user is in such a drag mode, a vibration or other haptic sensation can be output”); Cockburn Decl., ¶ 118; *see also* limitation [1.3].

In addition, this combination would not have involved more than applying a known technique (i.e., Shahoian’s providing haptic output in response to a user gesture on a touch-sensitive device) to a known device (i.e., the Astala device) that was ready for improvement (i.e., ready to include haptic effects in response to determining a gesture, as taught by Shahoian) to yield predictable results (i.e., outputting a haptic effect in response to the detection of gesture on a touch sensitive device, as disclosed by Shahoian). Cockburn Decl., ¶ 119.

This combination also amounts to merely choosing from a finite number of identified, predictable solutions (Shahoian’s disclosure of providing a haptic effect in response to determining a gesture, and its disclosure of how to do so), to an identified problem (Shahoian’s identification of a lack of haptic feedback as a “problem”), with a reasonable expectation of success (because implementing the

haptic feedback disclosed in Shahoian in the Astala system would have been well within the ability of a POSITA, as established above). Cockburn Decl., ¶ 120.

Finally, the '507 patent specification's description of providing a haptic effect in response to detection of a gesture confirms that doing so at the time of the '507 patent's alleged invention required no special insight or inventiveness.

Cockburn Decl., ¶ 121. The '507 patent specification (excluding the Abstract and claims) discusses providing a haptic effect in only nine lines of its approximately 630 total lines. Ex. 1101 at 4:47-55. The '507 patent's exceedingly brief discussion of providing haptic effects does little more than acknowledge that they can be provided in response to user actions. Cockburn Decl., ¶ 121. It does not recite any challenge in doing so, any failure of the prior art to do so, or any other reason why it would not be obvious to a POSITA to do so. In short, the '507 patent specification treats the providing of a haptic effect as an obvious afterthought, and further confirms that it would have been obvious to provide a haptic effect in response to Astala's gesture detection. *Id.*

Claim 2: The method of claim 1, wherein the contact data comprises an actual pressure and a pseudo pressure.

Astala combined with Shahoian discloses this limitation, and renders it obvious.

Astala: Astala discloses contact data, as established for limitation [1.1]. Although Astala provides at least one of an actual pressure or a pseudo pressure

because it discloses analyzing the pressure of the user's touch, it does not disclose the particular type of pressure sensors used in its system, indicating that the choice of sensors and the resulting contact data would have been a design choice left to the implementer. Cockburn Decl., ¶ 123.

Shahoian: Shahoian discloses contact data that includes a pseudo pressure because Shahoian discloses that touchpad 16 may detect pressure using capacitive sensing. Specifically, Shahoian discloses that, “[s]ome resistive or other types of touchpads can detect the amount of pressure applied by the user and can use the degree of pressure for proportional or variable input to the computer 10” and that “capacitive touchpads that do not require significant pressure” (*i.e.*, capacitive touchpads that operate with light pressure) “may be better suited for the present invention in some embodiments.” Ex. 1104 at ¶ 41; *see also id.* (“[a]s with many touchpads of the prior art, touchpad 16 can be capacitive”). In other words, Shahoian discloses that touchpads can recognize pressure using capacitance. Cockburn Decl., ¶ 124. Such an estimate of pressure is an indirect measure of pressure because it is based on capacitance. *Id.* The '507 patent acknowledges that such estimates of pressure based on capacitance are indirect measures of pressure. Ex. 1101 at 3:13-14 (“the amount of capacitance is not a direct measure of pressure but rather a pseudo pressure”); *see also id.* at 3:15-50 (further explaining why the capacitance is an indirect, not direct, measure of pressure).

Thus, Shahoian discloses the claimed “pseudo pressure.” Cockburn Decl., ¶ 124.

If Immersion argues that Shahoian’s capacitive touchpads are used to determine location, not pressure, such an argument is incorrect because Shahoian discloses capacitive sensors in the context of detecting pressure, as established above, and discloses “capacitive touchpads that do not require significant pressure.” Ex. 1104 at ¶ 41; Cockburn Decl., ¶ 125.

Shahoian also discloses contact data that includes a pseudo pressure because it discloses that “touchpad 16 can be ... resistive” and that “[r]esistive touchpads are typically pressure-sensitive.” Ex. 1104 at ¶ 41. The ’507 patent categorizes resistive touchpads as providing a pseudo pressure because it distinguishes such touchpads from those that sense an “actual pressure.” Ex. 1101 at 2:56-61. (“Touchpads work by utilizing resistance, capacitance, or membrane switches.” “In other embodiments, actual pressure may be sensed.”) (emphasis added); Cockburn Decl., ¶ 126; *see also* Ex. 1107 at 55 (finding that “pseudo pressure” should be construed broadly enough to cover resistive-based devices). In addition, a pressure estimate based on resistance is an indirect measure of pressure (*i.e.*, a pseudo pressure) because resistance, like capacitance, can be influenced by factors other than applied pressure and therefore may not accurately represent the amount of pressure actually exerted. Cockburn Decl., ¶ 126; Ex. 1101 at 3:19-21 (“The pseudo pressure may not accurately represent the amount of pressure actually

exerted on the touchpad”). Shahoian therefore discloses a pseudo pressure in this additional way.

Moreover, as established in the section regarding claim construction, Immersion should be held to a construction of “pseudo pressure” that includes “a measure of the area of the screen contacted by the object.” Shahoian discloses that a touchpad may provide such a measure of contact area. Ex. 1104 at ¶ 51 (“Many touchpads include a ‘palm check’ feature,” which “computes the contact area made by the conductive object (finger, palm, arm, etc.)”); Cockburn Decl., ¶ 127. Thus, Shahoian discloses a pseudo pressure in this third way.

Shahoian also discloses that contact data includes an “actual pressure.” Shahoian discloses, in contrast to “capacitive sensors,” “pressure sensors that detect pressure applied to the touchpad.” Ex. 1104 at ¶ 5; *see also id.* at ¶ 188 (sensing “the amount of pressure the user is exerting on the touchpad”); Cockburn Decl., ¶ 128. The ’507 patent states that such an “explicit pressure sensor” is an example of a sensor that provides an actual pressure. Ex. 1101 at 2:60-63. Shahoian’s disclosure of “pressure sensors that detect pressure” (which it contrasts to capacitive sensors) therefore discloses an “actual pressure.” Ex. 1104 at ¶ 5; Cockburn Decl., ¶ 128. Shahoian therefore discloses both a “pseudo pressure” and an “actual pressure.”

Obviousness: It would have been obvious to a POSITA at the time of the

alleged invention of the '507 patent to combine the above teachings of Shahoian with Astala such that Astala's contact data includes both an actual pressure and a pseudo pressure. Cockburn Decl., ¶ 129.

For example, Astala does not disclose the particular type of sensors that its system uses to detect pressure, indicating that the choice of sensors would have been a design choice left to the implementer. Cockburn Decl., ¶ 130. The implementer therefore would have been free to choose the type of sensors (*e.g.*, capacitive sensors, explicit pressure sensors, or both) and the resulting type of pressure data in the Astala system.

Motivation to include both an actual pressure and a pseudo pressure in the contact data arises from the known advantages and disadvantages of each. For example, a POSITA would have known that capacitance changes based on factors other than pressure, such as the makeup of the user's finger, temperature, and humidity. Cockburn Decl., ¶ 131; Ex. 1108 at 21:23-24 (changing capacitance due to humidity). The '507 patent acknowledges that “[c]apacitance-based touchpads [were] well known,” confirming that such knowledge about capacitance would have been known. Ex. 1101 at 2:64; *see also id.* at 3:19-50 (“pseudo pressure may not accurately represent the amount of pressure actually exerted on the touchpad” for various reasons). A POSITA also would have known that resistive sensors are also subject to external factors other than pressure, such as temperature, and that a

contact patch area can change based on factors other than applied pressure, such as the makeup of the object pressing the touchscreen (*e.g.*, finger versus stylus), and the makeup of the user's finger. Cockburn Decl., ¶ 131. On the other hand, Shahoian discloses that capacitive-based touchpads “do not require significant contact pressure” to operate. Ex. 1104 at ¶ 41. Thus, by providing both an actual pressure and a pseudo pressure, the touch sensitive input device can compensate for the disadvantages of providing only an actual pressure (*e.g.*, potentially requiring significant contact pressure) or providing only a pseudo pressure (*e.g.*, providing potentially inaccurate data). Cockburn Decl., ¶ 131.

A related motivation for this combination arises from a desire to most accurately detect the characteristics of a user's touch on a touchscreen in order to determine the user's intent, which arises from Astala's disclosure of needing to detect when the user performs a drag-and-drop operation by using contact data from the touchscreen. *See* limitations [1.0] and [1.5]; Cockburn Decl., ¶ 132. A POSITA would have recognized that using different types of pressure sensors to include an actual pressure and a pseudo pressure in the contact data would have allowed for a more accurate determination of the user's intent in light of the known advantages and disadvantages of each, established above. *Id.*

Additional motivation to provide both a pseudo pressure and an actual pressure arises from Shahoian's disclosure that a touchpad surface contacted by the

user can include “different sensor[s].” Ex. 1104 at ¶ 197 (“each region can be sensed by a different sensor or sensor array”); Cockburn Decl., ¶ 133. A POSITA would have recognized, as Shahoian discloses, that selecting the sensors in the manner described above to be the “different sensor[s]” taught by Shahoian would have been a mere design choice with predictable results. *Id.*

For example, it would have been obvious to a POSITA to modify the Astala system in light of the disclosure of Shahoian in the following exemplary way. Astala’s touchscreen sensors would include one or more of Shahoian’s explicit pressure sensors, described above, which would provide an actual pressure, and one or more of either Shahoian’s capacitive pressure sensors or resistive pressure sensors, described above, which would provide a pseudo pressure (*e.g.*, capacitance data, resistance data, contact patch area). Cockburn Decl., ¶ 134. This exemplary modification, and this combination of Astala and Shahoian generally, both would have been well within the skill of a POSITA, could have been accomplished with minimal effort, and would have led to predictable results. *Id.* A POSITA also would have recognized that Shahoian’s methods of providing a pseudo pressure and an actual pressure for a touchpad would have been readily applicable to a touchscreen (such as Astala’s touchscreen), as acknowledged by Shahoian. Ex. 1104 at ¶ 55 (“sensor devices for implementing touch screens [were] well known to those skilled in the art”); Cockburn Decl., ¶ 134.

In a combination of Astala and Shahoian where Astala's contact data includes a pseudo pressure (*e.g.*, capacitance data) and an actual pressure, each element would perform the same function as it does individually. For example, Astala's touchscreen would still provide contact data, as described for limitation [1.1], and Shahoian's sensors would still provide capacitive data, resistance data, contact patch area data, and/or an actual pressure (depending on the sensor), as described above. Cockburn Decl., ¶ 135. Such sensor data would be part of the contact data provided by Astala's touchscreen.

This combination would not have involved more than applying known techniques (providing a pseudo pressure and providing an actual pressure, as disclosed by, for example, Shahoian) to a known device (the Astala touchscreen), that was ready for improvement (*i.e.*, ready to use different sensors in its touchscreen to provide different types of pressure data in order to more accurately gauge the user's intent) to yield predictable results (*i.e.*, receiving both an actual pressure and a pseudo pressure when a user touches the touchscreen).

This combination also amounts to merely choosing from a finite number of identified, predictable solutions (Shahoian's disclosure of various types of pressure data—capacitance, resistance, contact area, explicit pressure), to an identified problem (the need in Astala to analyze the pressure of the users' touch), with a reasonable expectation of success (because implementing the pressure estimation

methods in Shahoian would have been well within the ability of a POSITA, as established above). Cockburn Decl., ¶ 137.

Moreover, the '507 patent acknowledges that “[c]apacitance-based touchpads were well known in to those skilled in the art,” indicating that the use of capacitance to estimate pressure (*i.e.*, providing a pseudo pressure) was well known to those in the art. Ex. 1101 at 2:64-65; *see also id.* at 2:66-3:31 (describing how such well-known capacitance-based touchpads provide a pseudo pressure). The fact that such touchpads were well known further confirms that providing a capacitance-based pseudo pressure in the Astala touchscreen would have been well within the skill of a POSITA, could have been accomplished with minimal effort, would have led to predictable results, was one of a finite number of identified, predictable solutions, and otherwise would have been obvious. Cockburn Decl., ¶ 138.

The differences between this limitation and the prior art do not show otherwise. For example, Astala discloses determining the pressure of the user's touch using contact data from a touchscreen (see limitations [1.1] and [1.4], above), but does not expressly disclose the type of data (*e.g.*, capacitance data, resistance data, contact patch area) used to do so. Shahoian discloses that contact data may include pseudo pressure (*e.g.*, data from capacitive sensors and resistive sensors, and the contact patch area) and may include actual pressure, as established

above. Shahoian also discloses that contact data may include an actual pressure and a contact patch area pseudo pressure, as established above. Thus, the only difference between this limitation and the combination of Astala and Shahoian is the lack of actual combination of the elements in a single prior art reference.

Cockburn Decl., ¶ 139.

In addition, in light of the '507 patent's admission that pressure-sensitive, capacitance-based touchpads were well known in the art, it also would have been obvious to a POSITA to have Astala's touchpad provide the actual pressure disclosed by Shahoian and provide a pseudo pressure from capacitive sensors that were well known. All of the analysis above (*e.g.*, motivations to combine, expected results) applies in full to such a combination. Cockburn Decl., ¶ 140.

Claim 3: The method of claim 2, wherein the pseudo pressure is based on a change in capacitance resulting from the contact.

Astala combined with Shahoian discloses and renders obvious this limitation. For example, as established for claim 2, Shahoian discloses determining an indirect measure of pressure (a pseudo pressure) based on capacitance. Ex. 1104 at ¶ 41 (“Capacitive touchpads and other types of touchpads that do not require significant contact pressure ...”); *see also* the analysis of claim 2, incorporated here by reference. Moreover, a POSITA would have understood that this indirect measure of pressure of Shahoian is based on a change in capacitance that results from the user's contacting the touchpad with his or her

finger, a conductor. Cockburn Decl., ¶ 141.

Obviousness: It would have been obvious to a POSITA to practice this limitation, including by combining these teachings of Shahoian with the Astala system, for all of the same reasons set forth above for claim 2, which reasons are incorporated here by reference. Indeed, certain of the motivations to combine set forth above for claim 2 are based on Shahoian's disclosure of a pseudo pressure that is based on capacitance.

Claim 4: The method of claim 3, wherein the contact data is based on a contact on a specific portion of a touch-sensitive input device.

Astala discloses this limitation at least inherently. For example, Astala discloses determining that the user is touching a displayed object, such as the "FILE 1" image, based on "the x and y coordinates of the touch input 732." Ex. 1103 at 9:16-27 ("a determination is made that file 1 is ... the selected item, of touch input 732."). Because the Astala contact includes "x and y coordinates," it is based on a contact of a specific portion of a touch-sensitive input device.

Cockburn Decl., ¶ 143. In addition, a POSITA would have understood that the contact data of limitation [1.1] is necessarily based on the user's contact on a specific portion of the touch-sensitive input device (the touch screen), because otherwise Astala could not determine that the user was touching the "FILE 1" image as opposed to, for example, the "FILE 2" image. Cockburn Decl., ¶ 143; Ex. 1103 at Fig. 6b.

Claim 5: The method of claim 4, wherein the contact information comprises position data, and further comprising determining whether a contact is made on a softkey based on the position data.

Astala discloses this limitation at least inherently. For example, Astala discloses touching a displayed object, such as the “FILE 1” image, based on “the x and y coordinates of the touch input 732.” Ex. 1103 at 9:16-27 (“a determination is made that file 1 is ... the selected item, of touch input 732”). The “x and y coordinates” of Astala’s contact data is position data. Cockburn Decl., ¶ 144. In addition, the contact data of limitation [1.1] necessarily includes position data because otherwise Astala could not determine that the user was touching the “FILE 1” image as opposed to, for example, the “FILE 2” image. Cockburn Decl., ¶ 144; Ex. 1103 at Fig. 6b.

Further, Astala discloses that keyboard keys are replaced with their functional equivalents on the display screen (softkeys), and that the user contacts the softkeys. Ex. 1103 at 2:14-18 (“The keypad of the device or substantial portions of the keypad of the device are deleted and their functions implemented by the touch screen display screen, thereby allowing more space to be utilized for the display screen.”), 7:6-7 (“The user can provide input using a virtual keyboard displayed on the display 70”), 8:48-50 (“virtual keyboard displayed on display 70”). Determining a contact is made on one of these softkeys is necessarily based on the position data because otherwise Astala could not determine which key of the

virtual keypad or virtual keyboard the user was touching. Cockburn Decl., ¶ 145; Ex. 1103 at Fig. 6b.

Claim 6: The method of claim 1, wherein the determining a gesture comprises determining a tapping gesture.

Astala combined with Shahoian discloses and renders obvious this limitation. Astala teaches a drag-and-drop gesture, as established for limitation [1.3]. Shahoian teaches that “a user can select a graphical object or menu item by ‘tapping’ the touchpad” and that touchpad 16 “may allow a user to ‘tap’ (rapidly touch and remove the object from the pad) in a particular location to provide a command.” Ex. 1104 at ¶¶ 42, 189 (emphasis added); *see also id.* at ¶ 194 (“the user ‘taps’ a finger ... to make a selection”). Shahoian also discloses a gesture that includes a tap component and a drag component:

Some touchpads may recognize a ‘tap-and-a-half’ or double tap, which is the user doing a tap and then again touching the pad and maintaining the finger or object on the pad while moving the finger. For example, such a gesture can provide a ‘drag’ mode in which objects may be moved with the cursor.

Id. at ¶ 189. Thus, Shahoian discloses this limitation.

Obviousness: It would have been obvious to a POSITA at the time of the

alleged invention of the '507 patent to combine Shahoian's teaching of a gesture that includes a tapping gesture with Astala's drag-and-drop gesture.

The only difference between this limitation and the combination of Astala and Shahoian is the lack of actual combination of the elements in a single prior art reference. Cockburn Decl., ¶ 148.

In the combination of Astala and Shahoian, each element would perform the same function as it does individually. Astala's touch detection algorithm would still determine that a drag-and-drop gesture has occurred, and Shahoian's tapping gesture would still involve "rapidly touch[ing] and remov[ing]" a finger from the touch-sensitive input device. Cockburn Decl., ¶ 149.

In particular, it would have been obvious to a POSITA to modify the Astala system in light of the disclosure of Shahoian in the following exemplary way. The Astala system would require that a tap occurs at the end of its drag-and-drop gesture, as part of "dropping" the file into its destination folder. Cockburn Decl., ¶ 150. The Astala touchscreen could detect the tap gesture in the same manner that Shahoian detects the tap gesture. *Id.*; Ex. 1104 at ¶¶ 42, 189. In this regard, a POSITA would recognize that Astala would be able to do so by analyzing the characteristics of the touch that Astala already considers – pressure, change in pressure, time interval, etc. Cockburn Decl., ¶ 150. This exemplary modification and this combination of Astala and Shahoian generally would have been well

within the skill of a POSITA, could have been accomplished with minimal effort, and would have led to predictable results. *Id.* Shahoian’s teaching of detecting a tapping gesture on a touchpad would have also been applicable to, and readily transferrable to, the Astala touchscreen. *Id.*; *see also* Ex. 1104 at ¶¶ 74, 94-95, 107, 158-159, 163, 167, 189-189, 198 (treating touchpads and touchscreens interchangeably).

Motivation to include such a tap gesture in the drag-and-drop gesture arises from Shahoian’s disclosure of a “drag” that includes a tap gesture, as established above. Cockburn Decl., ¶ 151. Further and complementary motivation arises from Astala’s disclosure that “many other variations” of the drag-and-drop gesture are possible, including variations in the gesture to select the first item (to be moved) and/or to select the second item (the destination). *Id.*; Ex. 1103 at 9:66-10:9. In light of such disclosure, a POSITA would recognize that the actions of the gesture are a mere design choice, and could involve a tap. Cockburn Decl., ¶ 151.

Additional motivation arises from a desire to reduce false positives when detecting the item the user has selected as a destination by requiring a deliberate action to make such a selection.

Claim 7:

[7.0] The method of claim 1, wherein determining the gesture further comprises: calculating a first value associated with a speed of movement of a contact across the input device;

Astala discloses this limitation. Astala discloses that “[a] determination that a drag operation is occurring may be discerned by detecting changes in the x and y coordinates over a predetermined period of time.” Ex. 1103 at 9:43-45. A change in the x coordinate and/or a change in y coordinate over a period of time is distance over time, or speed. Cockburn Decl., ¶ 152. Astala also discloses that the movement may be of the user’s finger across the touchscreen. Ex. 1103 at 9:17-18.

[7.1] comparing the first value to a speed threshold value; and

Astala inherently discloses this limitation. Astala discloses discerning that “[a] drag operation is occurring” by calculating at least one speed value, as established above. Astala also discloses that in the drag operation, “the object” (e.g., a finger) “is dragged across the face of the touch screen.” Ex. 1103 at 9:40-41, 9:17-18. In order to determine such movement of the finger, Astala must necessarily compare the speed calculation to some threshold to determine that the speed is non-zero. Cockburn Decl., ¶ 153. Otherwise, Astala would not be able to use the speed value described above to “discern[]” that “the drag operation is occurring.” *Id.*; Ex. 1103 at 9:43-44.

[7.2] outputting a signal if the first value is less than the speed threshold value.

Astala inherently discloses this limitation. As established above, Astala discloses “discern[ing]” that a “drag operation is occurring” using the speed value(s) described for limitation [7.0]. Astala also discloses that, after the drag, at step 718, the “x and y coordinates of the second touch input” are determined, in order to determine that the user has selected “directory 2.” Ex. 1103 at 9:58-60. Astala must therefore necessarily determine that the drag operation has stopped such that it can reliably use the touch’s current x, y coordinates to determine the displayed object that the user has selected as the destination. Cockburn Decl., ¶ 154. Because Astala discerns the occurrence of the drag operation using the speed value(s), it must necessarily determine that the speed values have fallen below a speed threshold value in order to make this determination. *Id.* In other words, once the movement’s speed has fallen below the threshold, the finger is no longer considered to be moving across the face of the touchscreen. *Id.*

Claim 8: The method of claim 7, further comprising applying a speed filter to the first value before comparing the speed to the speed threshold value.

Astala combined with Shahoian discloses this limitation. Astala inherently discloses comparing the speed to the speed threshold value, as established above.

Shahoian incorporates by reference the entirety of U.S. Patent No. 5,734,373 to Rosenberg (“Rosenberg”) (Ex. 1109) by identifying it with detailed particularity and clearly identifying what portions of it are incorporated by reference (the “entirety”). Ex. 1104 at ¶ 49; Cockburn Decl., ¶ 157; *Liebel-Flarsheim Co. v.*

Medrad, Inc., 481 F.3d 1371, 1382 n.3 (Fed. Cir. 2007). Rosenberg discloses calculating velocity from sensor data and that “[t]he calculated velocity ... values can then be filtered to remove noise from the data, such as large spikes that may result in velocity calculations from quick changes in position of object 34.” Ex. 1109 at 21:20-25; *see also id.* at 21:8-14. Thus, Rosenberg discloses applying a speed filter to a speed value.

Obviousness: It would have been obvious for a POSITA at the time of the alleged invention of the ’507 patent to combine these teachings of Shahoian (via Rosenberg) with Astala. The only differences between this limitation and the combination of the Astala and Shahoian disclosures is the lack of actual combination of the elements in a single prior art reference. Cockburn Decl., ¶ 158.

In the combination, each element would perform the same function as it does individually. *Id.* The filter would still be used to remove noise, such as large spikes, and the speed comparison would still be used for discerning the drag operation. *Id.* Motivation to apply the Shahoian speed filter to Astala’s calculated speed value before comparison arises from Shahoian, which discloses (via Rosenberg) that such filters are useful for removing noise. Ex. 1109 at 21:20-25. Indeed, such use of filters was well known in the art. Cockburn Decl., ¶ 159. Doing so would have been well within the skill of a POSITA, could have been accomplished with minimal effort, and would have led to predictable results. *Id.*

Claim 9:

[9.0] A non-transitory computer-readable medium comprising program code for causing a processor to execute a method, the program code comprising:

Astala discloses this preamble. Astala discloses that its touchscreen is part of a “mobile terminal 20a.” Ex. 1103 at 8:47-57, 6:23-27, Fig. 3 (showing a block diagram of mobile terminal 20a), 9:21-65, 2:37-47. Astala also discloses that mobile terminal 20a may include “a memory for storing data” and for storing “the software for operating the terminal,” such as a browser. *Id.* at 6:23-30. The mobile terminal may also include hardware 78 and a driver 76. *Id.* at 6:25-30.

Mobile terminal 20a necessarily includes a processor for executing program code in order to, for example, execute the disclosed browser software and to otherwise operate the mobile terminal. Cockburn Decl., ¶ 161. And all of the mobile terminal functionality disclosed in Astala necessarily is a result of a processor executing program code from a non-transitory computer-readable medium, such as the disclosed “memory for storing data.” *Id.*; Ex. 1103 at 6:23-30. It also would have been obvious to practice this limitation in light of Astala’s disclosure of a memory for storing data, software for operating the terminal, hardware, and drivers. Motivation arises from the fact that software runs on a processor, and typically would be stored on a memory such as the disclosed memory.

[9.1] program code for receiving contact data from an input device;

See limitation [1.1].

[9.2] program code for determining an interaction with a displayed object on a screen based on the contact data;

See limitation [1.2].

[9.3] program code for, responsive to determining the interaction, determining a gesture based on the contact data comprising:

See limitation [1.3].

[9.4] program code for determining a pressure and a change in pressure based on the contact data, and

See limitation [1.4].

[9.5] program code for determining a press if: the pressure is greater than a pressure threshold, the change in pressure is greater than a change in pressure threshold, and a first interval has elapsed; and

See limitation [1.5].

[9.6] program code for, responsive to determining the gesture, outputting a haptic effect.

See limitation [1.6].

Claim 10: The non-transitory computer-readable medium of claim 9, wherein the contact data comprises an actual pressure and a pseudo pressure.

See claim 2.

Claim 11: The non-transitory computer-readable medium of claim 10, wherein the pseudo pressure is based on a change in capacitance resulting from the contact.

See claim 3.

Claim 12: The non-transitory computer-readable medium of claim 11, wherein the contact data is based on a contact on a specific portion of a touch-sensitive input device.

See claim 4.

Claim 13: The non-transitory computer-readable medium of claim 9, wherein the program code for determining a gesture comprises program code for determining a tapping gesture.

See claim 6.

Claim 14:

[14.0] A system comprising:

Astala combined with Shahoian discloses and renders obvious a system comprising the claimed elements as established below.

[14.1] a computer-readable medium; and

See limitation [9.0].

[14.2] a processor in communication with the computer-readable medium, the processor configured to:

See limitation [9.0].

[14.3] receive contact data from an input device;

See limitation [1.1].

[14.4] determine an interaction with a displayed object on a screen based on the contact data;

See limitation [1.2].

[14.5] responsive to determining the interaction, determine a gesture based on the contact data comprising:

See limitation [1.3].

[14.6] determining a pressure and a change in pressure based on the contact data, and

See limitation [1.4].

[14.7] determining a press if: the pressure is greater than a pressure threshold, the change in pressure is greater than a change in pressure threshold, and a first interval has elapsed; and

See limitation [1.5].

[14.8] responsive to determining the gesture, output a haptic effect.

See limitation [1.6].

Claim 15: The system of claim 14, wherein the contact data comprises an actual pressure and a pseudo pressure.

See claims 2 and 10.

Claim 16: The system of claim 15, wherein the pseudo pressure is based on a change in capacitance resulting from the contact.

See claims 3 and 11.

Claim 17: The system of claim 16, wherein the contact data is based on a contact on a specific portion of a touch-sensitive input device.

See claims 4 and 12.

Claim 18: The system of claim 14, wherein the processor is configured to determine a gesture by determining a tapping gesture.

See claim 6.

V. CONCLUSION

For the foregoing reasons, Petitioner requests that the Board institute trial and cancel claims 1-18 of the '507 patent.

Dated: April 21, 2017

Respectfully Submitted,

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CERTIFICATION UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR §42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals approximately 13,806 as calculated by Microsoft Word, which is less than the 14,000 allowed under 37 CFR § 42.24(a)(i).

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing Petition for Inter Partes Review and all Exhibits and other documents filed together with the petition were served on April 21, 2017, via United Parcel Service, directed to the attorneys of record for the patent at the following address:

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