

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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TEXAS ASSOCIATION OF REALTORS,  
Petitioner,

v.

UBER TECHNOLOGIES, INC.,  
Patent Owner.

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Case IPR2016-00615  
Patent 8,510,045 B2

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Before JUSTIN T. ARBES, THOMAS L. GIANNETTI, and  
ROBERT L. KINDER, *Administrative Patent Judges*.

KINDER, *Administrative Patent Judge*.

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

ORDER DENYING MOTION TO AMEND  
*37 C.F.R. § 42.121*

Texas Association of REALTORS (“Petitioner”) filed a Petition pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–28 (all claims) of U.S. Patent No. 8,510,045 B2, issued on August 13, 2013 (Ex. 1001, “the ’045 patent”). Paper 1 (“Pet.”). POI Search Solutions LLC filed a Preliminary Response. Paper 9 (“Prelim. Resp.”). Applying the standard set forth in 35 U.S.C. § 314(a), we instituted an *inter partes* review of all challenged claims. Paper 10 (“Dec. on Inst.”).

On September 9, 2016, counsel for POI Search Solutions LLC, informed the Board that IP3, Series 100 of Allied Security Trust I (“IP3”) had acquired the ’045 patent. Paper 14, 2. IP3 filed updated mandatory notices reflecting the change of ownership and designating new lead and backup counsel. Paper 15, 2–3.

During the trial, IP3 filed a Patent Owner Response (Paper 26, “PO Resp.”), and Petitioner filed a Reply to the Patent Owner Response (Paper 34, “Pet. Reply”). IP3’s fully briefed Motion to Amend also is pending. Paper 25 (“Mot. to Amend”); Paper 33 (“Opp. to Mot. to Amend”); Paper 36 (“Reply to Mot. to Amend”). An oral hearing was held on April 4, 2017, and a copy of the transcript has been made part of the record. Paper 42 (“Tr.”).

Subsequently, on July 20, 2017, counsel for Uber Technologies, Inc. informed the Board that Uber had acquired the ’045 patent through an assignment executed on June 16, 2017 and recorded with the Office on July

4, 2017. *See* Paper 46 (Decision Granting Motion to Substitute Counsel), Paper 47 (Mandatory Notices).<sup>1</sup>

We have jurisdiction under 35 U.S.C. § 6(b). This Decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of the claims on which we instituted trial. Based on the record before us, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–28 of the ’045 patent are unpatentable under 35 U.S.C. § 103(a). We also *deny* Patent Owner’s Motion to Amend.

## I. BACKGROUND

### A. *The ’045 Patent*

The ’045 patent describes a method for “displaying points-of-interest (‘POIs’) on a digital map.” Ex. 1001, Abstract. The ’045 patent discloses a user selecting an arbitrary region on a digital map (displayed on an electronic device, such as a smart phone) and displaying POIs on the digital map that are within the geographic confines of the arbitrary region. *Id.* at 1:15–19. POIs may include businesses, such as coffee shops, gas stations, or other attractions. *Id.* at 1:58–65. Along with selecting an arbitrary region, the user can enter a search query to allow retrieval of various POIs by the mapping application. *Id.* at 1:63–66. The ’045 patent describes retrieving POIs based on the search query, dimensions of the map, and any other logic used by the mapping application. *Id.* at 1:66–2:1. In one embodiment, a

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<sup>1</sup> Because ownership of the ’045 patent changed over the course of this proceeding, we use the generic designation “Patent Owner” throughout this Decision for ease of reference.

filtered subset of POIs may be displayed within the geographic confines of the user's selected region. *Id.* at 2:1–5.

*B. Illustrative Claim*

Claim 1 of the '045 patent recites:

1. A method of displaying points-of-interest (“POI”s) on a digital map, comprising:

displaying a digital map within a given view and at a given scale, on a graphical display of an electronic device;

receiving user input containing a search query;

providing one or more search results associated with the search query, the search results containing geographic coordinates;

receiving user input defining a geographic region within the digital map, wherein the geographic region is defined from within the current view and current scale of the digital map, and wherein the geographic region is represented by a polygon;

determining the one or more search results whose geographic coordinates are within the user defined geographic region; and

displaying the determined one or more search results as one or more graphics on the digital map; wherein the one or more graphics represent one or more POIs.

Ex. 1001, 11:64–12:16.

*C. Related Proceedings*

Petitioner and Patent Owner identify two related, but dismissed, litigations in the U.S. District Court for the Eastern District of Texas involving the '045 patent:

*POI Search Solutions LLC v. Keller Williams Realty, Inc.*, 2-15-cv-00144 (E.D. Tex.); and *POI Search Solutions LLC v. Fathom Realty, LLC*, 2-15-cv-00143 (E.D. Tex.). Pet. 59; Paper 8, 2.

*D. Real Party-in-Interest*

In accordance with 35 U.S.C. § 312(a)(2) and 37 C.F.R. § 42.8(b)(1), Petitioner identifies Texas Association of REALTORS (“TAR”) as the real party-in-interest in this proceeding. Pet. 59.

Patent Owner argues that the Petition fails to identify all real parties-in-interest, but does not include substantive arguments in its Patent Owner Response. PO Resp. 15–16. Rather, pursuant to our authorization, Patent Owner filed a Motion to Terminate *Inter Partes* Review for failure of Petitioner to name all real parties-in-interest pursuant to 35 U.S.C. § 312(a)(2). Paper 30. TAR filed an Opposition to Patent Owner’s Motion (Paper 28), and Patent Owner filed a Reply to TAR’s Opposition (Paper 31). After consideration of the party’s positions, we issued a Decision on January 17, 2017, denying Patent Owner’s Motion to Terminate. Paper 32. Patent Owner has not produced any new evidence or argument that would impact our Decision denying Patent Owner’s Motion to Terminate. *See* PO Resp. 15–16. Therefore, we maintain our previous determination, for the reasons set forth in the Decision (Paper 32).

*E. Prior Art*

The pending grounds of unpatentability in the instant *inter partes* review are based on the following prior art:

U.S. Patent No. 7,373,246 B2, issued May 13, 2008 (Ex. 1003, “O’Clair”);

U.S. Patent Application Publication No. 2010/0094548 A1, filed July 9, 2009, published April 15, 2010 (Ex. 1004, “Tadman”);

U.S. Patent Application Publication No. 2009/0153492 A1, filed December 13, 2007, published June 18, 2009 (Ex. 1005, “Popp”);

International Patent Application Publication No. WO 97/48065, published December 18, 1997 (Ex. 1006, “DeLorme”);

U.S. Patent Application Publication No. 2009/0132927 A1, filed November 16, 2007, published May 21, 2009 (Ex. 1007, “Reed”);

U.S. Patent No. 6,791,536 B2, issued September 14, 2004 (Ex. 1008, “Keely”); and,

U.S. Patent Application Publication No. 2005/0270311 A1, filed February 5, 2005, published December 8, 2005 (Ex. 1009, “Rasmussen”).

*D. Pending Grounds of Unpatentability*

The instant *inter partes* review involves the following grounds of unpatentability under 35 U.S.C. § 103(a):

References	Claim(s) Challenged
O’Clair and Tadman	1, 2, 5, and 6
O’Clair, Tadman, and Popp	3 and 4
O’Clair, Tadman, and DeLorme	7–10
O’Clair, Tadman, and Reed	11, 12, and 14–20
O’Clair, Tadman, Reed, and Popp	13
O’Clair, Tadman, Reed, and Keely	21
O’Clair, Tadman, and Rasmussen	22 and 25–28
O’Clair, Tadman, Rasmussen, and Popp	23 and 24

## II. ANALYSIS

Petitioner bears the burden of proving unpatentability of the challenged claims, and that burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must establish the facts supporting its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). Petitioner relies on the Declaration of Michael Goodchild, Ph.D. (Ex. 1010) and the Reply Declaration of Dr. Goodchild (Ex. 1020). Patent Owner does not rely on any supporting declaration or cross-examination testimony. Below, we discuss whether Petitioner has met its burden with respect to claims 1–28.

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). Obviousness is resolved based on 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,<sup>2</sup> i.e., secondary considerations. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

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<sup>2</sup> In this proceeding, the parties have not identified any objective evidence of nonobviousness that allegedly bears on the patentability of the challenged claims.

### A. Claim Interpretation

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard). Petitioner proposes constructions for three terms. *See* Pet. 6–8 (“demarcating,” “delimiting,” and “‘select’ control”).

Patent Owner does not propose any interpretations of claim terms, and Patent Owner agrees with Petitioner’s proposed constructions of “demarcating” and “delimiting” as discussed below. Patent Owner does, however, contend that claim 1 requires certain steps of the method to be performed in a specific order, specifically, that the one or more search results must be provided before the “determining” step of claim 1 is performed. PO Resp. 4. As also discussed below, Petitioner agrees with this step order interpretation.

Only terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011). For the purposes of this Decision, we interpret “demarcating” and “delimiting” as follows, and further determine that certain steps of claim 1 must be performed in the recited order.

#### 1. Step Order Interpretation

In the Decision on Institution, we determined that certain steps of claim 1 must be performed in the recited order. Dec. on Inst. 7–8. Claim 1 recites “providing one or more search results associated with the search

query” and “determining the one or more search results whose geographic coordinates are within the user defined geographic region.” Ex. 1001, 12:2–4, 12:10–12. Patent Owner again maintains that because the “determining” step refers back to “the one or more search results,” claim 1 has a specific order, requiring that “the one or more search results” are provided before the “determining” step is performed. PO Resp. 4. Petitioner agrees with this interpretation and confirms that claim 1 has a specific order of the steps because the providing step is referenced in the determining step. Tr. 14:35–15:18; Pet. Reply 3 (“Patent Owner’s proposed interpretation of claim 1 appears to be supported by the Specification.”).

We do not perceive any reason or evidence that compels any deviation from our original interpretation. Accordingly, we adopt our previous analysis and conclusion as to the order of performing the steps of claim 1 for purposes of this Decision. Dec. on Inst. 7–8.

2. “*Demarcating*” (Claim 11) and “*Delimiting*” (Claim 22)

Independent claim 11 recites “demarcating a region of the presently displayed portion of the digital map approximately matching the polygonal area defined by the second set of user input.” Ex. 1001, 12:57–59.

Independent claim 22 requires “delimiting the portion of the digital map selected by the user.” *Id.*, 13:48–49. Petitioner proposes similar constructions for both terms. Pet. 6–7.

First, Petitioner argues that based on the dictionary definition of “demarcate,” the broadest reasonable interpretation of “demarcating” is “to determine or mark off the boundaries or limits of something.” *Id.* (quoting Ex. 1013, RANDOM HOUSE WEBSTER’S UNABRIDGED DICTIONARY, (2d ed. 2001), 5); Ex. 1010 ¶¶ 35, 36. Next, Petitioner contends that the broadest

reasonable interpretation of “delimiting” is “determining or marking off the boundaries or limits of something, such as by providing a perimeter line or highlighting.” Pet. 7; Ex. 1013, 4; Ex. 1010 ¶¶ 37–39. Petitioner reasons that the Specification provides examples of delimiting “via a perimeter line in any graphical way” and by highlighting. Pet. 7 (citing Ex. 1001, 6:34–39, 8:13–19).

Patent Owner does not address these interpretations in its Response, but at oral hearing Patent Owner agrees that Petitioner’s interpretations were “a fair assessment.” Tr. 92:19–94:3. Patent Owner also responds that there was no substantive difference between the two terms – “demarcating” and “delimiting.” *Id.* at 93:19–29.

Petitioner’s proposed interpretations for “demarcating” and “delimiting” are consistent with the claim language, written description of the ’045 patent, and the plain meaning of each term. We therefore interpret “demarcating” to mean “determining or marking off the boundaries or limits of something,” and interpret “delimiting” to mean “determining or marking off the boundaries or limits of something, such as by providing a perimeter line or highlighting.”

*B. Level of Ordinary Skill in the Art*

The parties do not argue in the Petition or Patent Owner Response that we should adopt a specific formulation regarding the level of ordinary skill in the art. Dr. Goodchild, however, testifies that a person of ordinary skill in the art at the time of the ’045 patent “would have had a Bachelor of Science degree (or its equivalent), and three years’ experience in the development, management, and use of geographic information systems and related geospatial technologies.” Ex. 1010 ¶ 14. Based on the record presented,

including our review of the '045 patent and the types of problems and solutions described in the '045 patent and cited prior art, we agree with Dr. Goodchild's assessment of the level of ordinary skill in the art and therefore adopt it for purposes of this Decision. As noted, we have also considered the cited references as representative of 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 cited references themselves).

*C. Obviousness Ground Based on O'Clair and Tadman  
(Claims 1, 2, 5, and 6)*

We instituted trial on the ground that the subject matter of claims 1, 2, 5, and 6 would have been obvious over O'Clair and Tadman. Dec. on Inst. 8–13; *see* Pet. 9–18. Having now considered the evidence in the complete record established during trial, we are persuaded that, based on this record, Petitioner has demonstrated by a preponderance of the evidence that the claims would have been obvious over those references in combination.

*1. O'Clair*

O'Clair describes methods and systems for “using boundaries associated with a given map view for retrieving the location of businesses located within the boundaries of the map view.” Ex. 1003, 1:8–12. O'Clair describes adopting user-defined boundaries of a map view to “search a corpus of location listings” to identify entities or businesses “that are the most relevant to a given search query.” *Id.* at 2:54–65. In one embodiment, O'Clair describes a user-initiated search of businesses located within a user-defined geographical region. *Id.* at 3:39–46. The search includes providing a map view to a user, accepting search input from the user, and searching an index “to retrieve businesses that have corresponding latitude and longitude

location information located within the entirety of the geographical region.” *Id.* at 3:46–58. Figure 7 of O’Clair depicts the ranked identified businesses “with each business in the list including a map identifier 730, which visually indicates the location of a business on zoom level map view 700.” *Id.* at 7:37–42.

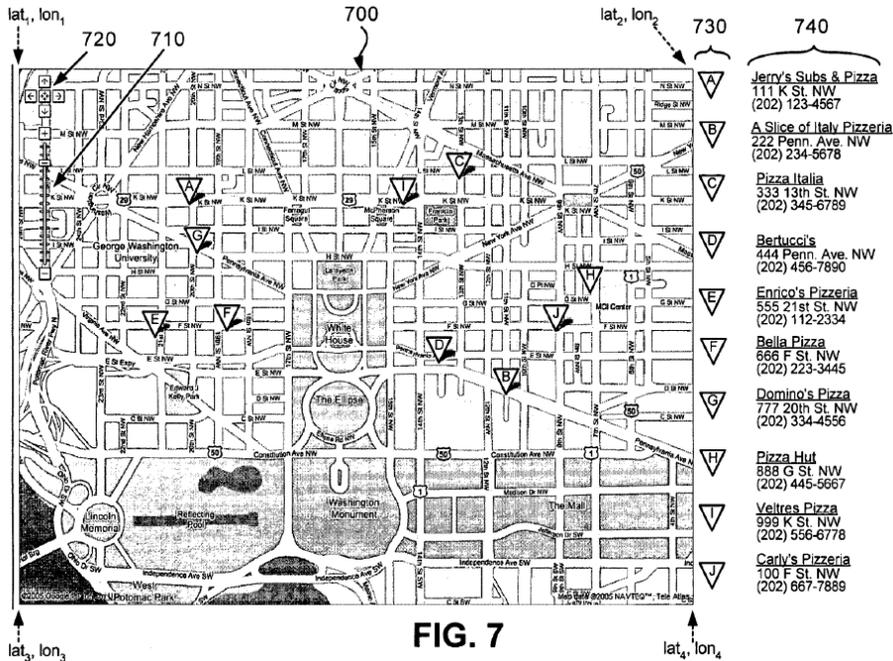


Figure 7 of O’Clair is a zoom level map identifying businesses located within the zoom level view. *Id.* at 2:42–45.

As depicted in Figure 7, the map area is defined by the latitude (“lat”) and longitude (“lon”) corresponding to each corner of the zoom level map view to define the geographical search area. *Id.* at 7:6–13. In one embodiment, O’Clair describes that “the latitude and longitude coordinates associated with each indexed business that is determined to be relevant to the search query may be compared with the latitudes and longitudes associated with the geographic search area.” *Id.* at 7:20–24. In some embodiments, ranking of identified businesses may occur “based on their

proximity to one or more geographic locations.” *Id.* at 7:32–42. Also, map identifiers 730 identify the location of the businesses on the map as depicted in Figure 7.

## 2. *Tadman*

*Tadman* describes “systems and methods for advanced features for online mapping, searching, and planning driving tours.” Ex. 1004, Abstract. *Tadman* discloses that a user may define a destination search area displayed on a geographical map utilizing either spatial or non-spatial filters. *Id.*; *see also id.* ¶ 81 (“When searching, a user may be able to combine spatial and non-spatial criteria.”). The system may utilize “a spatial search” which “may be a search or filter based on a shape,” such as a “polygon.” *Id.* ¶ 53; *see also id.* ¶ 69. *Tadman* describes an “[i]nitial launch to [a] map results page showing the interactive map graphic” and a subsequent step in which “users can interact with the map via . . . drawing a custom shape on the map.” *Id.* ¶ 36.

*Tadman* describes that the user may be able to search within selected areas for listing results and the system may also enable a user to select one or more shapes on the map to be searched. *Id.* ¶¶ 74, 81. In one embodiment, *Tadman* describes the use of geographic coordinates, for example, saving the “latitude and longitude of each point of the polygon.” *Id.* ¶ 146. *Tadman* also describes including a destination indicator within the destination search area that corresponds to the location of at least one destination. *Id.* ¶ 80.

## 3. *Claim 1*

With respect to claim 1, we have reviewed Petitioner’s analysis and supporting declarations and are persuaded that Petitioner has proved by a

preponderance of the evidence that claim 1 would have been obvious over Tadman and O'Clair. *See* Pet. 9–16.

Petitioner contends that the claim 1 requirement of “displaying a digital map within a given view and at a given scale, on a graphical display of an electronic device,” is taught by O'Clair's display of map document 100, which may be at zoom level view 110 of the geographic location provided by a user and may have boundaries that encompass a specific geographic region at a specific scale. Pet. 11 (citing Ex. 1003, 3:16–38). Petitioner asserts that O'Clair teaches the claim 1 limitation of “receiving user input containing a search query,” as O'Clair describes that a user may provide a search query and the user may initiate a search of businesses located within the desired geographic region. *Id.* at 12 (citing Ex. 1003, 6:65–7:4, 3:39–50). Petitioner contends the “providing one or more search results associated with the search query, the search results containing geographic coordinates,” limitation is taught by O'Clair. *Id.* at 11–12. Specifically, O'Clair's search query retrieves businesses from a geographic region of a map view based on their latitude and longitude information. *Id.* at 9 (citing Ex. 1003, 3:39–58).

Petitioner relies on Tadman as teaching “receiving user input defining a geographic region within the digital map, wherein the geographic region is defined from within the current view and current scale of the digital map, and wherein the geographic region is represented by a polygon.” *Id.* at 13–14. According to Petitioner, “Tadman describes an order of steps, which includes an ‘initial launch to [a] map results page showing the interactive map graphic’ . . . and a subsequent step in which ‘users can interact with the map via . . . drawing a custom shape on the map.’” *Id.* at 13 (quoting Ex.

1004 ¶ 36). Further, Tadman describes that “MLS software may include a polygon tool that may enable a user to select an area on a map by creating a polygon and enclosing an area on the map within the polygon.” *Id.* (quoting Ex. 1004 ¶ 69) (emphases omitted). According to Petitioner, the combination of O’Clair and Tadman teaches “determining the one or more search results whose geographic coordinates are within the user defined geographic region,” as required by claim 1, based on the ability to search within a selected area, such as a polygon, for a business with latitudes and longitudes associated with the defined geographic search area. *Id.* at 14. Finally, Petitioner shows that the claim 1 requirements of “displaying the determined one or more search results as one or more graphics on the digital map,” and that “the one or more graphics represent one or more POIs,” are taught by Tadman’s description that the “graphical user interface may display the map search results” and “numbered flags may appear on a map to show the location of the results,” and the references’ descriptions of displaying real estate listings and businesses. *Id.* at 15–16 (quoting Ex. 1004 ¶¶ 80, 83). We find Petitioner’s arguments persuasive.

Petitioner also provides a persuasive rationale for combining the teachings of O’Clair and Tadman. *Id.* at 9–10, 14–15. Specifically, Petitioner contends both references are in “similar fields,” with both references referring to the mapping application Google Maps, and

[a] person of ordinary skill in the art would have found it obvious and desirable at the time of the ’045 Patent’s filing to combine the features of Tadman into O’Clair to achieve, for example, the ability for a “user to conduct a joint query by using both spatial and non-spatial searches” and the other “advanced features” described by Tadman.

*Id.* at 9–10 (quoting Ex. 1010 ¶¶ 50–51). As further explained by Dr. Goodchild, “[t]he combination of O’Clair’s systems and methods with Tadman’s teachings of polygon-based search would yield the predictable and desirable result of a GIS [geographic information] system which allowed a user to obtain search results located with a polygon-shaped area of interest.” Ex. 1010 ¶ 52; *see also* Tr. 17:17–19:19.

In its Response, Patent Owner does not contest Petitioner’s rationale for combining features of Tadman and O’Clair, nor does Patent Owner challenge Petitioner’s rationale for combining any of the prior art. *See* Tr. 38:21–39:33 (counsel for Patent Owner agreeing lack of motivation to combine is not argued in the Patent Owner Response). We find persuasive Petitioner’s arguments as to why a person of ordinary skill in the art would have had reason to combine the references’ teachings in the manner asserted.

Patent Owner disputes Petitioner’s analysis for claim 1 for two reasons. First, Patent Owner argues Petitioner’s obviousness ground is deficient because O’Clair fails to teach “providing one or more search results associated with the search query, the search results containing geographic coordinates,” as required by claim 1. PO Resp. 1. More specifically, Patent Owner argues O’Clair does not teach “providing . . . search results containing geographic coordinates” because there is no “discussion in O’Clair that the ‘ranked identified businesses’ include ‘geographic coordinates,’ as required by claim 1.” *Id.* at 1–2. Patent Owner further contends that the cited portions of O’Clair only discuss a search process performed by a server to identify businesses within a given location, but O’Clair does not discuss any search results. *Id.* at 2. According to Patent Owner, O’Clair does not teach “‘geographic coordinates’ being

included with the ‘ranked identified businesses,’” and therefore O’Clair does not teach the providing step of claim 1. *Id.* at 3.

Petitioner responds that “O’Clair’s teachings are clear: ‘ranked identified businesses,’ or search results, are indeed provided to the user, and these businesses include geographic coordinates.” Pet. Reply 5 (quoting Ex. 1003, 7:37–42). Petitioner reiterates that “businesses are associated with latitude and longitude information, or geographic coordinates: ‘the latitude and longitude coordinates associated with each indexed business.’” *Id.* (quoting Ex. 1003, 3:51–57). Likewise, Petitioner contends that “the search results (the ranked identified businesses) have, or contain, geographic coordinates,” as taught by O’Clair. *Id.* at 6; Ex. 1020 ¶¶ 8–9.

Petitioner has established persuasively that O’Clair teaches providing “search results containing geographic coordinates” as required by claim 1. O’Clair states “the *latitude and longitude coordinates associated with each indexed business* that is determined to be relevant to the search query may be compared with the latitudes and longitudes associated with the geographic search area.” Ex. 1003, 7:20–24 (emphasis added). O’Clair teaches each business subject to a user search has corresponding latitude and longitude information that is utilized during and after the search. *Id.* at 3:54–56 (the “index may be searched to retrieve businesses that have corresponding latitude and longitude location information”). For example, each identified business has a corresponding map identifier (730 of Fig. 7), which visually indicates the geographic location, or coordinates, of a business on the map. *Id.* at 7:39–42. O’Clair’s use of a map identifier in the disclosed map demonstrates that the search results contain geographic coordinates. *See* Pet. Reply 6 (“A person of ordinary skill in the art would have understood that,

to visually indicate the location of a (ranked identified) business on a zoom level map view, the geographic coordinates of that ranked identified business would need to be provided and used for rendering the visual location.”) (citing Ex. 1020 ¶ 9). Notably, the providing step does not require that the search results containing geographic coordinates be “provided” to the user as Patent Owner may suggest; the providing step does not specify to whom or what the search results are provided. *See* PO Resp. 1–2 (“the only information ‘provided’ to the user are ‘ranked identified businesses’”). The only output required to be displayed is the “digital map” displayed “on a graphical display of an electronic device” and the “search results as one or more graphics on the digital map” recited in the final step of the claimed method. Therefore, we are persuaded by Petitioner’s arguments that O’Clair teaches that the provided search results (identified businesses) contain geographic coordinates as required by claim 1.

Second, Patent Owner alleges O’Clair and Tadman fail to teach “determining the one or more search results whose geographic coordinates are within the user defined geographic region” (hereinafter, the “determining step”). PO Resp. 4. Patent Owner argues that because the determining step refers back to “the one or more search results,” the steps of claim 1 must be performed in a specific order such that the search results are provided before the determining step is performed. *Id. See supra* Section II.A.1. Patent Owner contends that Tadman performs these steps in the opposite order by “first defining a shape on a map, and then searching for results within the shape.” *Id.* at 4–5. Thus, according to Patent Owner, Tadman does not teach the determining step of claim 1.

Petitioner, in its Reply, points out that “O’Clair is cited as teaching the ‘providing one or more search results. . .’ limitation,” and “[o]nce those search results are provided as taught by O’Clair, the teachings of Tadman are applied to allow a user to define a geographic region within the digital map . . . and then determine search results within that defined geographic region,” as required by claim 1. Pet. Reply 8 (citing Ex. 1010 ¶ 52). Petitioner alleges that “Patent Owner analyzes the references in isolation, and fails to consider the combined teachings of O’Clair and Tadman.” *Id.* at 9.

For the reasons discussed above, we agree with Patent Owner that under the broadest reasonable interpretation of claim 1, the determining step of claim 1 must be performed after the search results are provided. But even under this interpretation, Patent Owner’s argument fails to convince us that Petitioner’s contentions are not supported. Petitioner relies first on O’Clair as teaching the providing step. Pet. 12. Specifically, O’Clair teaches “providing one or more search results” before the determining step is carried out according to Petitioner’s proposed combination. *See id.* at 12–15. After execution of the providing step by O’Clair, Petitioner relies on the combination of O’Clair and Tadman, not Tadman alone, as teaching the determining step. *See id.* at 14–15 (“the combination of Tadman and O’Clair teaches ‘determining the one or more search results whose geographic coordinates are within the user defined geographic region’”). Thus, Petitioner establishes that O’Clair teaches providing the one or more search results associated with the search query, Tadman teaches receiving user input representing a polygon, and the references in combination teach the determining step, with sufficient explanation as to why a person of

ordinary skill in the art would have combined the references' teachings in that manner. *See id.* at 12, 14; *see also* Ex. 2020 ¶¶ 13–17.

For the reasons discussed above, we conclude that Petitioner has proved by a preponderance of the evidence that claim 1 would have been obvious over Tadman and O'Clair.

#### 4. Claims 2, 5, and 6

With respect to claims 2, 5, and 6, we have reviewed Petitioner's analysis and supporting declarations and are persuaded that Petitioner has proved by a preponderance of the evidence that claims 2, 5, and 6 would have been obvious over Tadman and O'Clair. *See* Pet. 16–18 (explaining how Tadman teaches the use of multiple geographic regions and highlighting and outlining the defined geographic regions). We examine each of these claims in turn.

Claim 2 depends from claim 1 and requires two additional steps after receiving additional user input defining a secondary geographic region: (1) “determining a new set of one or more search results whose geographic coordinates are within the secondary geographic region,” and (2) “displaying the new set of determined one or more search results as POIs on the digital map.” Ex. 1001, 12:17–23.

Petitioner establishes that Tadman teaches user selection of multiple shapes on a map, including creating multiple discontinuous destination search areas and drawing multiple custom polygons on the map. Pet. 16 (citing Ex. 1004 ¶¶ 73, 74, 139). Petitioner relies on Tadman as teaching the return of joint spatial and non-spatial results onto a map results page with the custom polygon outline displayed. *Id.* at 17. Petitioner again relies on the combination of O'Clair and Tadman, as discussed previously, to teach

determining search results whose geographic coordinates are within a geographic region. *Id.* Petitioner establishes that Tadman’s repetitive searching and drawing of multiple custom polygons teaches the limitations of claim 2. *Id.*

Claim 5 depends from claim 1 and recites “wherein in response to receiving the user input defining the geographic region within the digital map, highlighting the defined geographic region.” Ex. 1001, 12:28–30. Petitioner identifies the claimed highlighting as being taught by Tadman’s disclosure of shading the destination search area. Pet. 18 (citing Ex. 1004 ¶ 68, Fig. 4; Ex. 1010, 30–31). Petitioner relies on Tadman as also teaching the claim 6 requirement of “displaying a border outlining the defined geographic region.” Ex. 1001, 12:31–34. Petitioner notes that paragraph 68 of Tadman discloses that “a line may be displayed on the map defining the borders,” which, according to Petitioner, teaches displaying a border outlining the defined geographic region as required by claim 6.

Patent Owner relies upon the arguments it raises with respect to claim 1 and does not separately address claims 2, 5, or 6. *See* PO Resp. 6. For the reasons explained above, and for the reasons set forth in the Petition, Petitioner’s arguments are persuasive.

We conclude that Petitioner has proved by a preponderance of the evidence that claims 2, 5, and 6 would have been obvious over Tadman and O’Clair.

*D. Obviousness Ground Based on O’Clair, Tadman, and Popp  
(Claims 3 and 4)*

We instituted trial on the ground that the subject matter of claims 3 and 4 would have been obvious over O’Clair, Tadman, and Popp. Dec. on Inst. 14–15; *see* Pet. 19–21. Having now considered the evidence in the

complete record established during trial, we are persuaded that, based on this record, Petitioner has demonstrated by a preponderance of the evidence that the claims would have been obvious over those references in combination.

*1. Popp*

Popp describes an “interactive media display system” which includes “a touch-sensitive display surface configured to display a geographic map and receive a gesture input generated by a user on the touch-sensitive display surface while the geographic map is displayed.” Ex. 1005, Abstract. Popp discloses that “the gesture input defin[es] a selected geographic area on the geographic map.” *Id.*

*2. Claims 3 and 4*

Petitioner’s element-by-element analysis demonstrates where each limitation of claims 3 and 4 is found in the O’Clair, Tadman, and Popp combination. Pet. 19–21; Ex. 1010 ¶¶ 54–59. Petitioner identifies the claimed display receiving user touch input of claim 3 as being taught by Popp’s use of a touch-sensitive display surface. *Id.* at 21. Petitioner sufficiently shows that Popp’s disclosure of touch-based user input (Ex. 1005 ¶ 26) also teaches the “the user input selecting the geographic region is received via user touch” limitation of claim 4. Pet. 21; Ex. 1010 ¶ 59.

Petitioner establishes that a person of ordinary skill in the art would have been motivated to combine the teachings of O’Clair, Tadman, and Popp, because Popp teaches several advantages of using a touch-screen display on a graphical map. *Id.* at 20 (citing Ex. 1005 ¶¶ 11, 42); Ex. 1010 ¶¶ 56–58.

Patent Owner relies upon the arguments it raises with respect to claim 1 and does not raise additional arguments directed to claims 3 and 4. *See* PO Resp. 6–7. We have considered Petitioner’s arguments, including Dr. Goodchild’s declarations, and are satisfied that Petitioner has established, by a preponderance of the evidence, that claims 3 and 4 would have been obvious based on O’Clair, Tadman, and Popp under 35 U.S.C. § 103(a), for the reasons set forth above and for the reasons provided by Petitioner. *See* Pet. 19–21.

*E. Obviousness Ground Based on O’Clair, Tadman, and DeLorme  
(Claims 7–10)*

We instituted trial on the ground that the subject matter of claims 7–10 would have been obvious over O’Clair, Tadman, and DeLorme. Dec. on Inst. 15–18; *see* Pet. 21–26. Having now considered the evidence in the complete record established during trial, we are persuaded that, based on this record, Petitioner has demonstrated by a preponderance of the evidence that the claims would have been obvious over those references in combination.

*1. DeLorme*

DeLorme describes a computer-aided routing and positioning system that enables travel planning. Ex. 1006, 1:12–14. DeLorme discloses an “interactive computer travel planning guide for determining a route.” *Id.* at 1:14–17. DeLorme discloses that a “user can also select among a plurality of types of geographically locatable points of interest (POIs) within a user-defined region of interest along the travel route.” *Id.* at 1:18–20. For example, in one embodiment DeLorme discloses that a user-defined region of interest may be established by drawing a polygon enclosure at a specified tangential distance around a line segment, which represents an optimal route. *Id.* at 76:31–77:6. DeLorme also describes embodiments where users may

interactively modify routes and waypoints through a “series of multiple interactions and repeated iterations” to achieve a customized travel plan. *Id.* at 23:16–22.

## 2. Claim 7 and 10

Petitioner’s element-by-element analysis demonstrates where each limitation of claims 7 and 10 is found in the O’Clair, Tadman, and DeLorme combination. Pet. 23–24, 26. Petitioner identifies DeLorme’s disclosure of a user-defined region along a travel route as a “geographic region [that] corresponds to a route on the digital map,” as required by claim 7. *Id.* at 23–24. Claim 10 requires that “the change in the route is invoked by additional input from the user,” and Petitioner sufficiently shows on this record that DeLorme’s disclosure of updating or changing its travel route according to the user’s multiple interactions teaches this limitation. *Id.* at 26; Ex. 1006, 23:16–22.

Petitioner asserts that a person of ordinary skill in the art would have been motivated to combine the teachings of DeLorme with O’Clair and Tadman because both Tadman and DeLorme describe selecting travel routes connecting destinations, and DeLorme describes that an advantage of its invention is that it optimizes travel planning in an iterative process. Pet. 22–23.

Patent Owner relies upon the arguments it raises with respect to claim 1 and does not separately address claims 7 and 10. *See* PO Resp. 7–8. We have considered Petitioner’s arguments, including Dr. Goodchild’s declarations, and are satisfied that Petitioner has established, by a preponderance of the evidence, that claims 7 and 10 would have been obvious based on O’Clair, Tadman, and DeLorme under 35 U.S.C. § 103(a),

for the reasons set forth above, and below, as well as for the reasons provided by Petitioner. *See* Pet. 21–24, 26.

### 3. Claims 8 and 9

Petitioner asserts that claims 8 and 9 are unpatentable under § 103(a) as obvious in view of O’Clair, Tadman, and DeLorme. Pet. 24–26. Claim 8 depends from claim 7, and requires that the geographic region correspond to a route on the digital map, and further that the geographic region be “automatically set to include a route and a set amount of additional area adjacent to the route.” Ex. 1001, 12:35–39. Claim 9, which depends from claim 8, further requires “wherein in response to a change in the route on the digital map, the geographic region is updated to include a changed route.” *Id.* at 12:40–42.

Petitioner’s element-by-element analysis demonstrates where each limitation of claims 8 and 9 is found in the O’Clair, Tadman, and DeLorme combination. Pet. 24–26. Petitioner relies on DeLorme’s disclosure of identifying POIs within a user-defined region of interest along the travel route through the use of a polygonal enclosure around a line segment, or route. *Id.* at 24 (quoting Ex. 1006, 1:18–20, 76:31–77:1). According to Petitioner, because DeLorme discloses the identification of a route and an area defined by a tangential distance all around the route, DeLorme teaches that “the geographic region is automatically set to include a route and a set amount of additional area adjacent to the route” as required by claim 8. *Id.* at 25. As for claim 9, Petitioner contends DeLorme’s disclosure that “the travel route . . . can be updated or changed according to the user preferences” and that the user can develop, through “multiple interactions and repeated iterations . . . an individualized or customized travel plan,”

teaches the limitation that the geographic region is updated to include a changed route. *Id.* (quoting Ex. 1006, 1:26–29, 23:18–22).

Regarding claim 8, Patent Owner argues that Petitioner fails to address the requirement that “the geographic region is *automatically* set to include a route.” PO Resp. 7–8. Petitioner responds that “a geographic region which includes the area adjacent to the route *also* includes the route itself.” Pet. Reply 10 (citing Ex. 1020 ¶¶ 19–20). Petitioner, relying on the testimony of Dr. Goodchild, contends “a person of ordinary skill in the art would have understood that, with reference to FIG. 5B of DeLorme, the geographic region used for searching for points-of-interest would include the area around route 553 (defined by points 557, 555, and 556), which would include the route 553 itself.” *Id.* (citing Ex. 1020 ¶ 20).

We find Petitioner’s contentions persuasive for claim 8. Claim 1, from which claim 8 indirectly depends, requires “receiving user input defining a geographic region within the digital map.” Ex. 1001, 12:5–6. Thus, automatically setting the geographic region to include a route must still be based upon an initial user input that defines the geographic region. As Petitioner establishes, Figure 5B of DeLorme depicts how the geographic region used for searching for points-of-interest would include both the area around route 553 and automatically include route 553 itself. *See* Pet. Reply 10. Petitioner explains persuasively how DeLorme’s user-defined region of interest automatically includes a route and defined area along the route based upon the initial user input. *See* Pet. 24–25; Pet. Reply 10; Ex. 1010, 40.

Regarding claim 9, Patent Owner argues that Petitioner “completely fails to address the requirement of claim 9 that ‘*the geographic region is updated* to include a changed route.’” PO Resp. 8–9. According to Patent

Owner, DeLorme discloses the ability for the user to change the travel route, but not the ability to update the geographic region, as required by claim 9.

*Id.*

Petitioner responds by explaining how “DeLorme explicitly teaches the ‘modification[] . . . of highlighted routes’ and a system which is capable of ‘repeated iterations.’” Pet. Reply 11 (quoting Ex. 1006, 23:16–22).

Petitioner, relying on the testimony of Dr. Goodchild, contends “[a] person of ordinary skill in the art would have understood that iteratively modifying a route would result in iterative searching of areas adjacent to that modified route, teaching the features of claim 9.” *Id.* (citing Ex. 1020 ¶¶ 22–23).

We find Petitioner’s contentions persuasive for claim 9. DeLorme discloses modifying waypoints and routes through a “series of multiple interactions and repeated iterations” to refine travel plans. Ex. 1006, 23:17–22. Petitioner argues persuasively that DeLorme’s disclosure of iterative modification of a travel plan would result in changes being made to the route in the map, which would update the user-defined region of interest along the travel route. *See* Pet. 24–25; Ex. 1006, 1:18–20, 1:26–29. DeLorme teaches that users can “make many modifications of actual waypoints and highlighted routes, working interactively between the multimedia database and the routing function,” and that a user may engage in multiple interactions and repeated iterations in order to develop or refine a customized travel plan. Ex. 1006, 23:16–22. Petitioner has established that as part of this iterative process of changing the route on the digital map, the geographic region surrounding DeLorme’s route would be updated to reflect those changes. *See* Ex. 1010, 41–42; Ex. 1020 ¶¶ 22–23. Thus, Petitioner establishes that DeLorme teaches “in response to a change in the route on

the digital map, the geographic region is updated to include a changed route,” as required by claim 9.

We conclude that Petitioner has proved by a preponderance of the evidence that claims 8 and 9 would have been obvious over O’Clair, Tadman, and DeLorme.

*F. Obviousness Ground Based on O’Clair, Tadman, and Reed  
(Claims 11, 12, and 14–20)*

We instituted trial on the ground that the subject matter of claims 11, 12, and 14–20 would have been obvious over O’Clair, Tadman, and Reed. Dec. on Inst. 18–22; *see* Pet. 26–39. Having now considered the evidence in the complete record established during trial, we are persuaded that, based on this record, Petitioner has demonstrated by a preponderance of the evidence that the claims would have been obvious over those references in combination.

*1. Reed*

Reed describes a user interface including a view that may include a map and be configured to enable additions to the map, such as polygonal areas of interest. Ex. 1007, Abstract, ¶ 114. Reed describes making additions to a map with an addition selector. *Id.* ¶¶ 114, 162, Fig. 4 (addition selectors 222, such as drawing of a polygon or drawing of a circle). Reed also describes a map manipulation selector that can be used to drag and drop the map when enabled. *Id.* ¶ 164.

*2. Claims 11 and 14–19*

Petitioner’s element-by-element analysis demonstrates where each limitation of claims 11 and 14–19 is found in the O’Clair, Tadman, and Reed combination. Pet. 26–39.

Claim 11 is similar in scope to claim 1, but has several distinct limitations, such as “receiving a first user input requesting suspending future processing of map control commands in subsequent user input,” as well as “suspending the future processing of the map control commands,” and “receiving a third user input requesting un-suspending the future processing of the map control commands in subsequent user input.” Ex. 1001, 12:49–65. Petitioner relies on the combination of Tadman and Reed for these additional requirements. Pet. 26–30, 32–33.

Reed describes the functionality of toolbar buttons, such as a hand shaped “map manipulation selector 220” and several “map addition selectors 222,” one of which is a polygon shape, another of which is a circle shape. Ex. 1007 ¶ 114, Fig. 4. Reed is cited in the analysis of claim 11 as teaching the suspension of map commands with reference to addition selector 222. Pet. 28–30; Pet. Reply 12. Petitioner argues persuasively that Reed’s map manipulation selector corresponds to the claimed “map control commands” that are suspended in response to a first user input and then unsuspending in response to a third user input. *See* Pet. 28–30, 32–33.

Claim 11 also recites “demarcating a region of the presently displayed portion of the digital map approximately matching the polygonal area defined by the second set of user input.” Ex. 1001, 12:57–59. As previously discussed, “demarcating” means “determining or marking off the boundaries or limits of something.” *See supra* Section II.A.1. Petitioner establishes that the demarcating limitation is taught by Tadman. Specifically, Figure 4 of Tadman teaches demarcating a region through “a line displayed on the map defining the borders of a destination search area.” Pet. 31 (citing Ex. 1004, Fig. 4; Ex. 1010, 48 (relying on “Tadman’s outlining of the polygonal

area”)). Patent Owner has not challenged Petitioner’s contentions for the demarcating limitation. *See* PO Resp. 9–10.

Claims 14–19 depend directly, or indirectly, from claim 11. These claims recite limitations related to “indicating a state of operation of the digital map as suspending or un-suspending” map control commands (claim 14) or limitations related to “select” or “clear” control features (claims 15–19). Ex. 1001, 13:13–29. Petitioner again relies on the combination of Tadman and Reed for the limitations in these claims. Pet. 35–39. For example, claim 15 recites that “a ‘select’ control is displayed in association with the digital map.” Ex. 1001, 13:17–18. Petitioner notes that “Tadman describes that its polygon search button allows a user to ‘select a custom shape’ such as a ‘custom polygon.’” Pet. 35. Petitioner also relies on Reed’s teaching of map addition selectors 222 that enable drawing elements to be displayed in the map area. Petitioner establishes that Tadman’s polygon search button of Figure 4 allows a user to select a custom polygon, and because Reed states that the map addition selectors allow the user to draw select figures, the combination of Tadman and Reed teaches that a select control is displayed in association with the digital map as recited. *Id.*

Petitioner asserts that a person of ordinary skill in the art would have been motivated to combine the teachings of O’Clair, Tadman, and Reed because Tadman discloses the selection of common toolbar buttons, with little detail about how those buttons work, and Reed “fills in gaps in Tadman with respect to what occurs when each selector is used.” Pet. 26–28 (citing Ex. 1010 ¶¶ 68–71). Further, Petitioner argues that a person of ordinary skill in the art would have been motivated to integrate Reed’s approximating techniques with Tadman’s polygonal search capabilities. *Id.*

Patent Owner relies upon similar arguments it raises with respect to claim 1 and does not raise additional arguments directed to claims 11 and 14–19. *See* PO Resp. 9, 12. For example, regarding claim 11, Patent Owner repeats its contentions made with respect to claim 1 and similarly argues that the cited portions of O’Clair fail to disclose the claim 11 requirement of “presenting a set of POIs, wherein each POI is represented by longitude and latitude coordinates.” *Id.* at 9–10. For the reasons set forth above with respect to claim 1, and for the reasons provided by Petitioner (Pet. Reply 11–12), we find these arguments unpersuasive. O’Clair teaches that the provided search results (identified businesses) are represented as geographic coordinates as depicted by map identifiers 730 in Figure 7 of O’Clair.

We have considered Petitioner’s arguments, including Dr. Goodchild’s declarations, and are satisfied that Petitioner has established, by a preponderance of the evidence, that claims 11 and 14–19 would have been obvious based on O’Clair, Tadman, and Reed under 35 U.S.C. § 103(a), for the reasons set forth above and for the reasons provided by Petitioner. *See* Pet. 26–39; Pet. Reply 11–12.

### 3. Claim 12

Petitioner asserts that claim 12 is unpatentable under § 103(a) as obvious in view of O’Clair, Tadman, and Reed. Pet. 35. Claim 12 requires “wherein the map control commands include zooming and panning.” Ex. 1001, 13:9–10. Petitioner relies on Tadman’s disclosure of “features such as zooming, panning, and viewing the map through different views” as teaching this limitation. Pet. 35 (quoting Ex. 1004 ¶ 59).

Patent Owner argues that because claim 12 depends from claim 11, “the map control commands” must both be suspended, and Tadman fails to

disclose that its zooming and panning are ever suspended. PO Resp. 10 (“Thus, even if Tadman discussed zooming and panning, Petitioner admits Tadman fails disclose its zooming and panning are ever suspended.”).

Petitioner responds that “Patent Owner attacks the references in isolation, instead of considering the combined teachings of the combination.” Pet. Reply 12. Petitioner cites Tadman “in the discussion of claim 12 for teaching ‘features such as zooming, panning, and viewing the map,’” but “Reed is cited in the analysis of claim 11 as teaching the suspension of map commands with reference to the addition selector 222.” *Id.* (citing Ex. 1004, ¶ 59). According to Petitioner, “[a]s explained by Dr. Goodchild, ‘one of ordinary skill in the art would recognize that, when an addition selector 222 is selected, Reed’s systems would not process map control commands.’” *Id.* (quoting Ex. 1010, 47).

We agree with Petitioner that Patent Owner’s argument attacks Tadman individually and does not address the combination proposed by Petitioner. Petitioner relies on Reed, not Tadman, as teaching the suspending and un-suspending functions required by claim 11. Pet. 28–33; Pet. Reply 12; Ex. 1010, 47. Petitioner establishes that Tadman’s disclosure of a panning and zooming toolbar combined with Reed’s disclosure of suspending and un-suspending map control commands teaches the disputed limitations of claim 12.

We conclude that Petitioner has proved by a preponderance of the evidence that claim 12 would have been obvious over O’Clair, Tadman, and Reed.

#### 4. Claim 20

Petitioner asserts that claim 20 is unpatentable under § 103(a) as obvious in view of O'Clair, Tadman, and Reed. Pet. 39. Claim 20 requires “wherein in response to discarding all the data received from the second set of user input, all POIs displayed on the digital map in response to the second set of data, are deleted from the digital map.” Ex. 1001, 13:30–33.

Petitioner relies on Tadman's clear button that “erase[s] all selected areas from a map, leaving it clear for a user to make new selections.” Pet. 39 (quoting Ex. 1004 ¶ 89). According to Petitioner, one of ordinary skill in the art would understand Tadman's clear button to return the user to the user interface display of Figure 3, where no search results are displayed. *Id.* (citing Ex. 1010, 59).

Regarding claim 20, Patent Owner argues that although “Tadman discusses a button that can erase the ‘selected areas,’ there is no discussion or suggestion in Tadman that the button will erase any POIs displayed on the digital map.” PO Resp. 11. Patent Owner cites to exemplary embodiments of Tadman (Figs. 4–7) that show interfaces with a clear button but no POIs and to an interface that shows POIs with no clear button (Fig. 8). *Id.* Therefore, according to Patent Owner, Tadman's clear “button will erase *only selected shapes* from the map not POIs displayed on the map.” *Id.*

Petitioner responds that Tadman's disclosure of erasing selected areas from a map, “leaving it clear” (Ex. 1004 ¶ 89), would be understood by a person of ordinary skill in the art as not only erasing selected shapes from the map, but also erasing POIs displayed on the digital map. Pet. 39; Pet. Reply 13. Petitioner's position as to how a person of ordinary skill in the art would have understood Tadman is supported by the language of the

reference itself and the testimony of Dr. Goodchild. *See* Ex. 1004 ¶ 89; Ex. 1010, 59; Ex. 1020 ¶¶ 26, 28.

Specifically, paragraph 89 broadly discloses “an option that may enable a user to clear existing selections from a map. For example, a user can click on a button that may erase all the selected areas from a map, leaving it clear for a user to make new selections if the user desires.” Ex. 1004 ¶ 89; *see also id.*, Fig. 3 (depicting an exemplary clear map with no selections). We find persuasive Dr. Goodchild’s testimony that a person of ordinary skill in the art would have understood Tadman’s disclosure of leaving a map “clear” for a user to mean leaving the map “fully cleared of user-drawn polygons and search results, or points-of-interest.” Ex. 1020 ¶ 26.

Patent Owner also contends that because Tadman’s Figure 8 does not show a “Clear” button, unlike Figures 4–7, such absence is evidence that the “Clear” button will erase only selected shapes from the map and not the POIs displayed on the map in Figure 8. PO Resp. 11. We find this contention unpersuasive for two reasons. First, the depiction, or absence, of a “Clear” button in Figure 8 is immaterial, as we find that Tadman paragraph 89’s disclosure of a user “clear[ing] existing selections from a map” is sufficient to teach the limitation. Ex. 1004 ¶ 89. Second, based on the testimony of Dr. Goodchild, we are persuaded that Figure 8 is a partial screenshot of the user interface, and the scroll bar on the right hand side would suggest to a person of ordinary skill in the art that the bottom user interface of Figure 8 would also include a “Clear” button, like those shown in Figures 4–7. Ex. 1020 ¶ 27; *see also* Ex. 1004, Fig. 8 (depicting a scroll

bar on the right side with empty space on the bottom, indicating that the user could scroll down to view more of the screen).

We conclude that Petitioner has proved by a preponderance of the evidence that claim 20 would have been obvious over O'Clair, Tadman, and Reed.

*G. Obviousness Ground Based on O'Clair, Tadman, Reed, and Popp (Claim 13)*

We instituted trial on the ground that the subject matter of claim 13 would have been obvious over O'Clair, Tadman, Reed, and Popp. Dec. on Inst. 22–23; *see* Pet. 39–41. Having now considered the evidence in the complete record established during trial, we are persuaded that, based on this record, Petitioner has demonstrated by a preponderance of the evidence that claim 13 would have been obvious over those references in combination.

Petitioner's element-by-element analysis demonstrates where each limitation of claim 13 is found in the O'Clair, Tadman, Reed, and Popp combination. Pet. 39–41. For example, by describing touch screens and manually drawn boundary gesture inputs, Tadman and Popp teach “wherein at least one of the first or the second or the third user inputs are touch-based” as required by claim 13. *Id.* at 41.

Petitioner also provides a persuasive rationale on this record for combining the teachings of O'Clair, Tadman, Reed, and Popp. *Id.* at 39–40. For example, Petitioner contends that it would have been obvious to combine the teachings of O'Clair, Tadman, and Reed with the teachings of Popp to achieve “the advantages described by Popp, such as ‘efficiently access[ing] stored media associated with a geographic area, using a gesture input on a geographic map displayed on a touch sensitive display surface.’” *Id.* at 40 (quoting Ex. 1005 ¶ 42).

Patent Owner relies upon the arguments it raises with respect to claim 11 and does not raise additional arguments directed to claim 13. *See* PO Resp. 12. We have considered Petitioner’s arguments, including Dr. Goodchild’s declarations, and are satisfied that Petitioner has established, by a preponderance of the evidence, that claim 13 would have been obvious based on O’Clair, Tadman, Reed, and Popp under 35 U.S.C. § 103(a), for the reasons set forth above, and for the reasons provided by Petitioner. *See* Pet. 39–41.

*H. Obviousness Ground Based on O’Clair, Tadman, Reed, and Keely (Claim 21)*

We instituted trial on the ground that the subject matter of claim 21 would have been obvious over O’Clair, Tadman, Reed, and Keely. Dec. on Inst. 23–24; *see* Pet. 41–45. Having now considered the evidence in the complete record established during trial, we are persuaded that, based on this record, Petitioner has demonstrated by a preponderance of the evidence that claim 21 would have been obvious over those references in combination.

*1. Keely*

Keely describes a method for simulating a gesture of a pointing device, such as a mouse. Ex. 1008, Abstract. Keely discloses detecting whether a stylus is being held down on a touch-sensitive display surface for a threshold amount of time, detecting whether the stylus is removed, and responsive to the removal, generating an event representing a right mouse button click. *Id.* Keely defines the term “stylus” to include “a user’s own finger.” *Id.* at 5:46–50.

*2. Claim 21*

Petitioner’s element-by-element analysis demonstrates where each limitation of claim 21 is found in the O’Clair, Tadman, Reed, and Keely

combination. Pet. 41–45. For example, by teaching that the removal of the stylus ends pending mouse events, such as the selection event caused by the press and hold gesture, Keely teaches “when the first touch terminates, treating the first touch termination as the third set of user input” as required by claim 21. *See id.* at 44–45.

Petitioner asserts that a person of ordinary skill in the art would have been motivated to combine the teachings of Keely with those of O’Clair, Tadman, and Reed because each reference describes various compatible user interface features for interacting with a displayed map, and Keely’s solution to the problem of a touch-sensitive display screen not having a way to distinguish between a right and left mouse click would provide reason to use Keely’s solution with O’Clair, Tadman, and Reed. *Id.* at 42–43; Ex. 1010 ¶¶ 81–84.

Patent Owner relies upon the arguments it raises with respect to claim 11 and does not raise additional arguments directed to claim 21. *See* PO Resp. 12–13. We have considered Petitioner’s arguments, including Dr. Goodchild’s declarations, and are satisfied that Petitioner has established, by a preponderance of the evidence, that claim 21 would have been obvious based on O’Clair, Tadman, Reed, and Keely under 35 U.S.C. § 103(a), for the reasons set forth above, and for the reasons provided by Petitioner. *See* Pet. 39–41.

*I. Obviousness Ground Based on O’Clair, Tadman, and Rasmussen  
(Claims 22 and 25–28)*

We instituted trial on the ground that the subject matter of claims 22 and 25–28 would have been obvious over O’Clair, Tadman, and Rasmussen. Dec. on Inst. 24–28; *see* Pet. 45–56. Having now considered the evidence in the complete record established during trial, we are persuaded that, based on

this record, Petitioner has demonstrated by a preponderance of the evidence that the claims would have been obvious over those references in combination.

### *1. Rasmussen*

Rasmussen describes “methods, systems, and apparatus for implementing aspects of a digital mapping system.” Ex. 1009, Abstract. Rasmussen acknowledges issues with prior art solutions to digital mapping, and explains that those problems can be overcome by a tiling approach. *Id.* ¶¶ 10–12. Tiling involves transmitting a number of smaller images from a web server to a web browser. *Id.* ¶ 12. In one embodiment, Rasmussen describes “sending a location request from a client-side computing device to a map tile server, receiving a set of map tiles in response to the location request” and thereafter “displaying the result as a map image.” *Id.* ¶ 13, Abstract.

### *2. Claim 22*

Petitioner asserts that independent claim 22 is unpatentable under § 103(a) as obvious in view of O’Clair, Tadman, and Rasmussen. Pet. 46–49. Claim 22 is similar in scope to claim 1, but claim 22 requires using “map tiles.” *See* Ex. 1001, 13:44–45. Petitioner relies on Rasmussen because it describes implementations of digital maps using map tiles, which according to Petitioner would have been obvious to combine with O’Clair and Tadman. Pet. 45–46 (“Rasmussen acknowledges issues with prior art solutions to digital mapping, and explains that those problems can be overcome by a tiling approach.”); Ex. 1010 ¶ 87 (“one of ordinary skill in the art would have understood that using map tiles was a well-known, and indeed the primary, method of providing digital maps”).

Claim 22 also recites “wherein the displayed graphic is displayed on the digital map at the geographic coordinates of each of the determined one or more POIs.” Ex. 1001, 14:6–9. Petitioner relies on its analysis of claim 1 for this limitation. Pet. 49. For example, Petitioner contends “by describing a graphical user interface that displays map search results as numbered flags, Tadman and O’Clair teach ‘displaying the determined one or more search results as one or more graphics on the digital map’ as recited.” *Id.* at 15. In its Reply, Petitioner points out that both Tadman and O’Clair teach flags or map identifiers that show the location of the search results. Pet. Reply 15.

Patent Owner argues that displaying a graphic at the geographic coordinates of each of the determined one or more POIs is a unique limitation that Petitioner’s analysis of claim 1 fails to address. PO Resp. 13. More specifically, Patent Owner contends that none of the cited portions of Tadman or O’Clair teach displaying a graphic at the geographic coordinates. *Id.* at 14.

Petitioner has established the combination of Tadman and O’Clair teaches displaying graphics for points of interest at geographic coordinates as required by claim 22. As we previously discussed with respect to claim 1, O’Clair’s user-ranked identified businesses are associated with latitude and longitude coordinates. O’Clair teaches using geographic coordinates to determine search results within a region and also comparing relevant search results “with the latitudes and longitudes associated with the geographic search area.” Pet. 14 (quoting Ex. 1003, 7:17–26). Tadman teaches that search results, or POIs, may be displayed as numbered flags on a map to show the locations of the search results. *Id.* at 15 (citing Ex. 1004 ¶¶ 80, 83,

Fig. 8). Petitioner establishes that O’Clair and Tadman teach displaying a graphic “at the geographic coordinates” as required by claim 22.

We conclude that Petitioner has proved by a preponderance of the evidence that claim 22 would have been obvious over O’Clair, Tadman, and Rasmussen.

### *3. Claims 25, 26, and 28*

Petitioner’s element-by-element analysis demonstrates where each limitation of claims 25, 26, and 28 is found in the O’Clair, Tadman, and Rasmussen combination. Pet. 50–52, 54–56.

Petitioner identifies the claimed “polygon containing more than four sides” of claim 25 as being taught by Tadman’s Figure 4. Pet. 50. Similarly, Petitioner relies on Tadman’s Figure 5 as teaching “delimiting the different region on the digital map,” and Tadman’s discussion of combining a new selected region with a previously selected region as teaching “combining the different region with the portion of the digital map selected by the user to form a new selected region,” as required by claim 26. *Id.* at 50–51. Claim 28 recites additional steps, including “determining one or more of the map tiles that contain the selected region,” and “transmitting the coordinates of the one or more map tiles to a mapping server.” Ex. 1001, 14:40–51. Petitioner relies on Rasmussen’s description of using received location data to create a tile request that includes coordinates of the map tile for these limitations. Pet. 54–55.

Patent Owner relies upon the arguments it raises with respect to claims 22 and does not separately address claims 25, 26, and 28. *See* PO Resp. 13. We have considered Petitioner’s arguments, including Dr. Goodchild’s declarations, and are satisfied that Petitioner has established, by

a preponderance of the evidence, that claims 25, 26, and 28 would have been obvious based on O’Clair, Tadman, and Rasmussen under 35 U.S.C.

§ 103(a), for the reasons set forth above, and for the reasons provided by Petitioner. *See* Pet. 45–56.

#### 4. Claim 27

Petitioner asserts that claim 27 is unpatentable under § 103(a) as obvious in view of O’Clair, Tadman, and Rasmussen. Pet. 52–53. Claim 27 depends from claim 22, and further requires, in pertinent part, “removing one or more POIs on the digital map that are outside the new selected region.” Ex. 1001, 14:37–38. Petitioner relies on Tadman for this limitation. Pet. 53. Petitioner contends that Tadman’s search repetition can occur when shapes are deleted, and search results within those now-deleted shapes would not be returned. *Id.* Thus, according to Petitioner, “by teaching that the user may perform additional searches within newly modified selected areas, Tadman teaches ‘removing one or more POIs on the digital map that are outside the new selected region’ as recited.” *Id.*

Patent Owner argues that Petitioner fails to show how the combination of references, and specifically the relied upon paragraph 139 of Tadman, teaches “removing one or more POIs on the digital map that are outside the new selected region.” PO Resp. 14. Instead, according to Patent Owner, Tadman only discloses that a “user may manually delete specific listings.” *Id.* (quoting Ex. 1004 ¶ 139). Patent Owner argues that because Tadman’s removal of search results is done manually, the removal “has no relation to the user’s polygon – whereas in Claim 27, the POIs outside of the new selected region are removed *in response to* receiving additional user input de-selecting a previously-delimited region of the digital map.” *Id.*

Petitioner responds that although “Tadman provides the functionality for a user to manually delete results that are not of interest, that functionality has no effect on Tadman’s teaching of removing a polygon, and updating search results such that results within that removed polygon are no longer returned.” Pet. Reply 17.

Petitioner has established that the combination of Tadman, O’Clair, and Rasmussen teaches the limitation of, in response to receiving user input de-selecting a previously-delimited region, “removing one or more POIs on the digital map that are outside the new selected region.” Ex. 1001, 14:37–38. Petitioner relies on Tadman’s disclosure that a user may remove selected areas from the map, as well as Tadman’s disclosure of performing additional searches using both spatial and non-spatial criteria after selected areas are modified. Pet. 52–53 (citing Ex. 1004 ¶ 89); Ex. 1020 ¶ 34.

Petitioner relies on Tadman’s teaching that when shapes are deleted, the search results within those deleted shapes would not be returned. *Id.* at 53. We find this position, and Dr. Goodchild’s reasoning, persuasive. *See* Ex. 1020 ¶¶ 36–37. Tadman teaches that the removal of a selected polygon from the map and then repeating the search step would delete or remove search results within that removed polygon once the search is repeated. Ex. 1004 ¶¶ 89–90. Accordingly, Petitioner sufficiently establishes that when the user performs additional searches within the newly modified selected areas, the one or more POIs on the digital map that are outside the new selected region would be removed.

Further, Tadman’s ability to delete specific listings does not mean that a search polygon (spatial search) has no filtering effect on the search results returned. Ex. 1004 ¶ 139. Instead, as Dr. Goodchild points out, the

description of deleting specific listings allows a user to delete listings that are not of interest after the search results are returned. Ex. 1020 ¶ 36.

Manual deletion would not impact Petitioner's position, which is based on removal of a selected polygon from the map as set forth above. *Id.*

We conclude that Petitioner has proved by a preponderance of the evidence that claim 27 would have been obvious over O'Clair, Tadman, and Rasmussen.

*J. Obviousness Ground Based on O'Clair, Tadman, Rasmussen, and Popp (Claims 23 and 24)*

We instituted trial on the ground that the subject matter of claims 23 and 24 would have been obvious over O'Clair, Tadman, Rasmussen, and Popp. Dec. on Inst. 28–29; *see* Pet. 56–58. Having now considered the evidence in the complete record established during trial, we are persuaded that, based on this record, Petitioner has demonstrated by a preponderance of the evidence that the claims would have been obvious over those references in combination.

Petitioner's element-by-element analysis demonstrates where each limitation of claims 23 and 24 is found in the O'Clair, Tadman, Rasmussen, and Popp combination. Pet. 56–58. For example, Petitioner relies on both Tadman and Popp as teaching that the graphic display is a touch screen as required by claim 23. Petitioner also identifies the claimed "portion of the digital map selected by the user [that] corresponds to a physical area of the graphical display touched by the user" of claim 24 as being taught by Popp's touch device having a finger creating the user-drawn boundary. *Id.* at 57–58.

Petitioner asserts that a person of ordinary skill in the art would have been motivated to combine the teachings of the references for several

reasons. *Id.* at 56. For example, according to Petitioner, the combination would achieve the specific advantages described by Popp, such as allowing efficient access to stored media associated with a geographic area, and using a gesture input on a geographic map displayed on a touch sensitive display surface. *Id.*

Patent Owner relies upon the arguments it raises with respect to claim 22 and does not raise additional arguments directed to claims 23 and 24. PO Resp. 15. We have considered Petitioner's arguments, including Dr. Goodchild's declarations, and are satisfied that Petitioner has established, by a preponderance of the evidence, that claims 23 and 24 would have been obvious based on O'Clair, Tadman, Rasmussen, and Popp under 35 U.S.C. § 103(a), for the reasons set forth above, and for the reasons provided by Petitioner. *See* Pet. 56–58.

### III. CONTINGENT MOTION TO AMEND

Patent Owner filed a Motion to Amend. Mot. to Amend (Paper 25). Patent Owner states that “[s]hould independent claims 1, 11, and 22 of [the ’045 patent] be held unpatentable, the Patent Owner proposes substitute independent claims 29, 30 and 31 to replace original independent claims 1, 11 and 22, respectively.” Mot. to Amend 1. Accordingly, we construe Patent Owner’s motion as a contingent motion to amend. Patent Owner also seeks to amend original dependent claims 2–10, 12–21, and 23–28 to change their dependencies to a proposed substitute claim.<sup>3</sup> As noted previously, we have determined that Petitioner has demonstrated by a preponderance of the evidence that claims 1–28 are unpatentable. Accordingly, we consider Patent Owner’s Motion to Amend.

As the moving party, Patent Owner bears the burden of proof to establish that it is entitled to the relief requested. *See* 37 C.F.R. § 42.20(c). Entry of proposed amendments is not automatic, but occurs only upon the patent owner having met the requirements of 37 C.F.R. § 42.121 and demonstrating the patentability of the proposed substitute claims. *See MasterImage 3D, Inc. v. RealD Inc.*, Case IPR2015-00040 (PTAB July 15, 2015) (Paper 42, “*MasterImage*”) (precedential); *Idle Free Sys., Inc. v. Bergstrom, Inc.*, Case IPR2012-00027, slip op. at 7–8 (PTAB June 11, 2013) (Paper 26, “*Idle Free*”) (informative); *see also Microsoft Corp. v.*

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<sup>3</sup> Patent Owner incorrectly maintained the original numbering of dependent claims 2–10, 12–21, and 23–28, rather than proposing substitute claims with new numbers in sequence. *See* Mot. to Amend, App’x; *Office Patent Trial Practice Guide*, 77 Fed. Reg. 48,756, 48,766–48,767 (Aug. 14, 2012). For ease of reference, we refer to the claims as numbered by Patent Owner in its Motion to Amend.

*Proxycorr, Inc.*, 789 F.3d 1292, 1307–08 (Fed. Cir. 2015) (upholding the approach established in *Idle Free* of allocating to the patent owner the burden of showing the patentability of any proposed substitute claims). For the reasons explained below, we conclude that Patent Owner has not met its burden with respect to proposed substitute claims 29, 30, and 31, and proposed amended claims 2–10, 12–21, and 23–28.

*A. Proposed Substitute Claims 29, 30, and 31*

Patent Owner proposes to substitute independent claims 29, 30, and 31 for independent claims 1, 11, and 22, respectively.

Proposed substitute claim 29 is reproduced below, with strikethrough showing the subject matter deleted from claim 1 and underlining showing the subject matter added to claim 1:

29. (Proposed Substitute for Claim 1) A method of displaying points-of interest (“POI”s) on a digital map, comprising:

displaying a digital map within a given view and at a given scale, on a graphical display of an electronic device;

receiving user input containing a search query;

receiving user input defining a polygonal geographic region from within the current view and current scale of the digital map;

determining a rectangular region, smaller than the current view and current scale of the digital map and larger than the polygonal geographic region, which encapsulates the polygonal geographic region;

providing one or more search results associated with the search query and the rectangular region, the search results containing geographic coordinates;

~~receiving user input defining a geographic region within the digital map, wherein the geographic region is defined from~~

~~within the current view and current scale of the digital map, and wherein the geographic region is represented by a polygon;~~

determining the one or more search results whose geographic coordinates are within the user defined polygonal geographic region; and

displaying the determined one or more search results as one or more graphics on the digital map; wherein the one or more graphics represent one or more POIs.

Mot. to Amend, App'x A8–A9. Proposed independent claims 30 and 31 are reproduced below.

30. (Proposed Substitute for Claim 11) A method of displaying points-of interest (“POI”s) on a digital map, comprising:

displaying a digital map on a graphical display of an electronic device;

receiving a first user input requesting suspending future processing of map control commands in subsequent user input;

suspending the future processing of the map control commands;

receiving a second set of user input, wherein the second set of user input defines a polygonal area within a presently displayed portion of the digital map;

demarcating a region of the presently displayed portion of the digital map approximately matching the polygonal area defined by the second set of user input, the demarcated region smaller than the presently displayed digital map, and larger than the polygonal area and completely enclosing the polygonal area;

computing a mathematical representation of the demarcated region, wherein the mathematical representation is based on longitude and latitude coordinates;

receiving a third user input requesting un-suspending the future processing of the map control commands in subsequent user input;

un-suspending the future processing of the map control commands;

presenting a set of POIs, wherein each POI is represented by longitude and latitude coordinates;

determining from the set of POIs a further subset of POIs, wherein the longitude and latitude coordinates of each of the POIs within the further subset of POIs is determined to be within the computed mathematical representation of the demarcated region; and

displaying the subset of POIs on the digital map.

31. (Proposed Substitute for Claim 22) A method of displaying one or more points-of-interest (“POI”s) on a digital map, in conjunction with a free-hand, arbitrary, user-selected geographic region, comprising:

presenting a digital map within a given view and at a given scale, on a graphical display of an electronic device, wherein the digital map comprises map tiles and corresponds to a geographic region;

receiving free-hand user input selecting a portion of the digital map;

delimiting the portion of the digital map selected by the user, wherein the delimited portion comprises a rectangular portion larger than the free-hand user input and smaller than the current view and current scale of the digital map;

determining geographic bounds of the portion of the digital map selected by the user;

providing one or more POIs associated with the search query and the delimited portion;

determining geographic coordinates of each POI among a plurality of POIs;

determining one or more of the POIs from the plurality of POIs whose geographic coordinates are within the determined geographic bounds of the portion of the digital map selected by the user; and

displaying a graphic for each of the determined one or more POIs, wherein

the displayed graphic is displayed on the digital map at the geographic coordinates of each of the determined one or more POIs.

*Id.* at A9–A12. Proposed amendments to dependent claims 2–7, 12–15, 18, 21, and 23–28 change their dependency from the original claims to the substitute amended claims, but those claims otherwise remain unchanged.

*Id.* at A2–A8. Below we examine whether proposed substitute claims 29–31 would have been obvious in light of the prior art cited in the Petition combined with a new reference identified by Petitioner, and also whether Patent Owner has shown that the claims have adequate written description support.<sup>4</sup>

#### *B. Obviousness*

First, we deny Patent Owner’s Motion to Amend on the basis that proposed substitute claims 29, 30, and 31 are unpatentable under 35 U.S.C. § 103(a) as obvious. Petitioner has demonstrated, with supporting testimony from Dr. Goodchild (Ex. 1022), that the subject matter of proposed substitute claims 29, 30, and 31 is unpatentable over the original prior art asserted against each claim in combination with newly cited U.S. Patent Application Publication No. 2005/0273346 to Frost (Ex. 1024, “Frost”).

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<sup>4</sup> Given our disposition of these two issues, we need not address other arguments made by Petitioner, including that the proposed amendments broaden the substitute claims and do not respond to a ground of unpatentability, and that Patent Owner failed to set forth constructions for new terms introduced in the proposed substitute claims. *See Opp. to Mot. to Amend* 2–24.

Below we discuss Frost and then each of proposed substitute claims 29, 30, and 31.

*1. Frost*

Frost was published December 8, 2005, and is therefore prior art to the '045 patent pursuant to 35 U.S.C. § 102(b). *See* Ex. 1024. Frost discloses a system of finding real property using a map-based search tool and a street-based search tool. *Id.* at Abstract. The map-based search tool “allows a user to enter geographical coordinates by drawing a shape on a map.” *Id.* Frost discloses a “map-based search tool” which “generates a rectangle-approximated polygon of any polygon that a user draws . . . and finds parcels of real property that, according to the property database, are located within the rectangle-approximated polygon.” *Id.* ¶ 8. Frost also discloses that the “map-based search tool can generate the rectangle-approximated polygon by determining extreme points of the polygon.” *Id.*

*2. Claim 29*

Patent Owner contends that proposed substitute claim 29 is patentable over the prior art of record including art Petitioner identified in the Petition and in its opposition to Patent Owner’s Motion, as well as other material prior art known to Patent Owner. Mot. to Amend 13–19; Reply to Mot. to Amend 3–6. To distinguish that art, Patent Owner relies on the added limitation requiring a “rectangular region, smaller than the current view and current scale of the digital map and larger than the polygonal geographic region, which encapsulates the polygonal geographic region.” *Id.*

Petitioner contends that the Board should deny Patent Owner’s Motion because substitute claim 29 is unpatentable as obvious over O’Clair and Tadman combined with any of several other references including Frost.

Opp. to Mot. to Amend 7–12. Petitioner relies on O’Clair and Tadman as teaching those elements of claim 29 that were not amended or added. Opp. to Mot. to Amend 7–12; Ex. 1020 ¶¶ 15, 25, 27. Petitioner then relies on Frost and Tadman as teaching the newly added limitations “determining a rectangular region” and “providing one or more search results associated with . . . the rectangular region.” Opp. to Mot. to Amend 8–11; Ex. 1020 ¶¶ 16–24, 26.

The limitation of “receiving user input defining a polygonal geographic region from within the current view and current scale of the digital map” is similar in scope to the limitation in original claim 1, which is shown above as deleted from claim 29. Petitioner relies on “the same portions of O’Clair and Tadman cited in the Petition.” Opp. to Mot. to Amend 7. Specifically, Petitioner argues that “Tadman teaches that a ‘polygon tool [] may enable a user to select an area on a map by creating a polygon and enclosing an area on the map within the polygon.’” *Id.* (quoting Ex. 1004 ¶ 69). Petitioner also relies on O’Clair’s description of displaying a digital map within a given view and at a given scale. *Id.*; Ex. 1022 ¶ 15.

Petitioner contends the “determining a rectangular region” limitation is taught by Frost’s disclosure of a “map-based search tool” which “generates a rectangle-approximated polygon of any polygon that a user draws . . . and finds parcels of real property that, according to the property database, are located within the rectangle-approximated polygon.” *Id.* at 8 (quoting Ex. 1024 ¶ 8). Petitioner then argues that a person of ordinary skill in the art would have applied “Frost’s technique of determining extreme points of the polygon to Tadman,” which, according to Petitioner, “would

result in the determination of a rectangular region ‘smaller than the current view and current scale of the digital map and larger than the polygonal geographic region, which encapsulates the polygonal geographic region’ as recited in proposed claim 29.” *Id.* (quoting Ex. 1022 ¶¶ 16–19). Petitioner relies on the testimony of Dr. Goodchild, who provides an example of how Frost’s technique of generating a rectangle-approximated polygon by determining extreme points of the polygon could be applied to encapsulate the polygonal geographic area of Tadman’s Figure 5. Ex. 1022 ¶¶ 18–21.

Petitioner also identifies the claimed “providing one or more search results associated with the search query and the rectangular region” as being taught by the combination of Tadman and Frost. Opp. to Mot. to Amend 10. Petitioner contends that “Tadman teaches determining results associated with a search query within a user-defined geographic area.” *Id.* (citing Pet. 14–15). Petitioner then argues that “[a] person of ordinary skill in the art would have appreciated that search results which occur within a user-defined geographic region would also be search results associated with a bounding rectangular region determined in accordance with Frost.” *Id.* Thus, according to Petitioner, the “providing one or more search results” limitation is taught by Tadman combined with Frost’s teaching of performing a rectangle search of the areas that approximate the polygon in order to obtain search results that represent properties within that rectangle-approximated polygon. *Id.* at 10–11 (citing Ex. 1022 ¶¶ 25, 26; Ex. 1024 ¶ 204). We conclude that Petitioner has established that O’Clair, Tadman, and Frost teach each limitation of proposed claim 29.

Patent Owner argues that O’Clair fails to teach a “polygonal geographic region from within a current view” and a “rectangular region,

smaller than the current view.” Reply to Mot. to Amend 4. The combination of Tadman and O’Clair, however, teaches “receiving user input defining a polygonal geographic region from within the current view and current scale of the digital map” as required by claim 29. As admitted by Patent Owner, the “current scale and current view” limitation is essentially the same as found in claim 1. Mot. to Amend 3–4 (arguing that this “particular change is made for sake of brevity and to introduce clearer antecedent basis”). Petitioner establishes that this limitation is taught by Tadman’s disclosure of allowing a user to select an area on a displayed map by creating a polygon with a specified number of points within a defined view and scale such as depicted in Figure 4 of Tadman. Pet. 12–14. For example, Tadman describes a polygon tool that may enable a user to select an area on a map by creating a polygon and enclosing an area on the map within the polygon and O’Clair teaches displaying a digital map within a given view and at a given scale. *See* Ex. 1004 ¶ 69; Ex. 1003, 3:16–38; Ex. 1022 ¶ 15. Patent Owner also attacks O’Clair individually for failing to disclose a “rectangular region, smaller than the current view,” where Petitioner relies on the combination of Tadman and Frost for teaching this limitation. *See* Opp. to Mot. to Amend 8–10; Ex. 1022 ¶¶ 18–20.

Similarly, Patent Owner contends that “Frost fails to teach, suggest, or motivate a rectangle enclosing the entire polygon shaped region as recited in claim 29” (Reply to Mot. to Amend 4), but Patent Owner again fails to recognize that Petitioner relies on the combination of Frost with Tadman as teaching this limitation. *See* Opp. to Mot. to Amend 8–10; Ex. 1022 ¶¶ 18–20. Further, we determine that Frost alone also discloses that rectangle 823 encapsulates user drawn polygon 811 as depicted in Figure 8C. Ex. 1024

¶ 204 (“Based on the extreme points, the system, in one embodiment, defines a rectangle 823 that at least covers the polygon 811.”).

Patent Owner makes a similar unconvincing argument with respect to the limitation “providing one or more search results associated with . . . the rectangular region.” Reply to Mot. to Amend 5. Petitioner establishes how the combination of references “teach that search results which occur within a user-defined geographic region would also be search results associated with a bounding rectangular region determined in accordance with Frost.” Opp. to Mot. to Amend 10–11; Ex. 1022 ¶¶ 25, 26. O’Clair discloses that “[t]he ranked identified businesses may be provided to the user.” Ex. 1003, 7:37–42. Tadman teaches determining search results whose geographic coordinates are within a user-defined polygon, stating that a “user may be able to search within selected areas for listing results.” Ex. 1004 ¶ 81. Petitioner establishes that, based on the combined teachings of the references, these search results would be “associated with the search query and the rectangular region” because the results within Tadman’s user-selected polygon would be results associated with not only Tadman’s search query, but also the rectangular region as taught by Frost. For example, Frost describes “dividing the selected polygon into a number of rectangular areas” and “performing a rectangle search,” such that “results of the [] rectangle searches are merged into global search results that represent properties within the entire area of the rectangle-approximated polygon.” Ex. 1024 ¶¶ 204, 206. Petitioner explains persuasively, with supporting testimony from Dr. Goodchild, that Frost’s global search results would be the search results for a rectangle and that performing a rectangle search of a rectangular area that approximated a polygon teaches “providing one or

more search results associated with the search query and the rectangular region” when combined with Tadman. Opp. to Mot. to Amend 10–11; Ex. 1022 ¶ 26.

Petitioner provides a persuasive rationale as to why a person of ordinary skill in the art would have combined the teachings of Frost with those of Tadman and O’Clair. Opp. to Mot. to Amend 9–10. Frost and Tadman are both in the same field of map-based searching for real estate. *Id.* at 9. According to Petitioner, “Frost teaches advantages of its rectangular-approximation technique, for example, describing computational efficiency that may result from its techniques, as well as the ability to perform searches in parallel.” *Id.* at 9 (citing Ex. 1022 ¶ 23). We also credit the testimony of Dr. Goodchild, who opines that a person of ordinary skill in the art “would have understood Frost’s ‘rectangle-approximated polygon’ to be describing the common, and trivial, technique of creating a bounding box around a polygon whose edges are aligned with the coordinate axes to assist in determining whether a point is contained within that polygon,” and that it would have been obvious to combine Frost’s “well-known bounding box technique to Tadman’s system.” Ex. 1022 ¶¶ 22, 24.

We also find persuasive Dr. Goodchild’s testimony that “[a] person of ordinary skill in the art would have appreciated that the technique of creating a bounding box around a polygon is useful as a type of coarse filter, or initial check, to determine whether a point is contained within the polygon.” *Id.* ¶ 22. Dr. Goodchild explains that “[i]f the point is not within the bounding box (that is, if the point’s x and y values do not lie between the observed ranges of the polygon’s vertices), then further processing is not necessary,” and that “[s]uch a test can quickly filter out the vast majority of points,

leaving a smaller subset of points for more detailed processing.” *Id.* Dr. Goodchild’s testimony is consistent with the disclosure of Frost and provides sufficient reasoning for the asserted combination. Thus, we agree that a person of ordinary skill in the art would have had reason to incorporate Frost’s rectangle approximation technique into Tadman.

Patent Owner has not persuasively rebutted Petitioner’s rationale for combining Frost with Tadman and O’Clair. Patent Owner’s only argument is that “Tadman allows the user to specify a polygonal search area (*See* FIGs. 4-5), and thereby, cannot be combined with Frost to reject the claims.” Reply to Mot. to Amend 4. We find this contention unavailing because Frost discloses “drawing, on the map, a polygon that defines the geographical area to search,” just like Tadman, as well as creating “a rectangle-approximated polygon of any polygon that a user draws.” Ex. 1024 ¶ 8.

After considering the parties’ arguments and evidence, we find that Petitioner has established that the newly added limitations do not patentably distinguish claim 29 over the prior art. Rather, the evidence of record demonstrates that claim 29 would have been obvious to a person of ordinary skill in the art based on O’Clair, Tadman, and Frost.

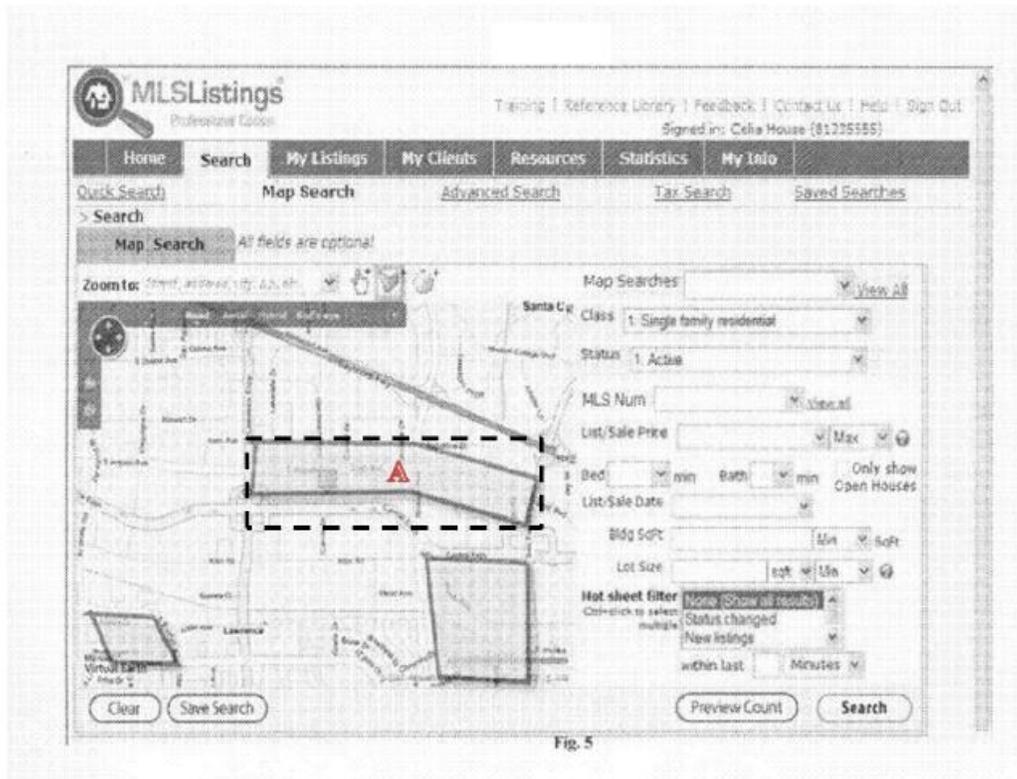
### *3. Claims 30 and 31*

Patent Owner contends that proposed substitute claims 30 and 31 are patentable over the prior art of record, including art Petitioner identified in the Petition and in its opposition to Patent Owner’s motion, as well as other material prior art known to Patent Owner. Mot. to Amend 13–19; Reply to Mot. to Amend 9, 11.

With respect to claim 30, Patent Owner relies on the added limitation requiring a “demarcated region smaller than the presently displayed digital map, and larger than the polygonal area and completely enclosing the polygonal area.” Mot. to Amend 13–19.

Petitioner contends that the Board should deny Patent Owner’s Motion because substitute claim 30 is unpatentable as obvious over the combination O’Clair, Tadman, Reed, and Frost. Opp. to Mot. to Amend 19–21. Petitioner establishes where each limitation of claim 30 is found in the combination of prior art references. *Id.* at 20 (relying on prior analysis of claim 29 and, in turn, the Petition).

Regarding the new limitation of claim 30, we find persuasive Petitioner’s contention that “Frost’s teachings of a ‘map-based search tool [that] can generate the rectangle-approximated polygon’” teaches the claimed “demarcating a region . . . the demarcated region smaller than the presently displayed digital map, and larger than the polygonal area and completely enclosing the polygonal area,” when combined with Tadman. *Id.* (quoting Ex. 1022 ¶ 41); *see also* Ex. 1024, Fig 8c (rectangle 823 surrounding user drawn polygon 811), ¶ 204. For example, in paragraph 19 of his reply declaration, Dr. Goodchild provides the following annotated version of Figure 5 of Tadman.



**TAR-1004 (Tadman), FIG. 5 (annotated)**

As explained persuasively by Dr. Goodchild, “applying Frost’s teachings to Tadman would result in a demarcated region depicted in the dashed rectangle in the above annotated Tadman Figure 5.” Ex. 1022 ¶ 41. As depicted in the annotated Figure 5 above, the demarcated region (dashed rectangle) is smaller than the displayed digital map, larger than the polygonal area (marked as “A”), and completely encloses the polygonal area.

Further, as previously discussed, Petitioner also establishes a persuasive rationale for why a person of ordinary skill in the art would have combined the prior art references. Opp. to Mot. to Amend 9–10 (citing Ex. 1022 ¶¶ 22–24, 41). As detailed above, a person of ordinary skill in the art would have found it obvious to incorporate Frost’s rectangle approximation technique into Tadman because Frost teaches several advantages of this

technique that would allow more efficient and detailed processing, such as by leaving a smaller subset of points for consideration. Patent Owner has not challenged Petitioner's rationale for the combination of references.

Claim 31 requires the added limitations of presenting a digital map “within a given view and at a given scale,” “wherein the delimited portion comprises a rectangular portion larger than the free-hand user input and smaller than the current view and current scale of the digital map,” as well as “providing one or more POIs associated with the search query and the delimited portion.” Mot. to Amend, Claims App'x A11–A12. As determined in our claim construction analysis above, “delimiting” means “determining or marking off the boundaries or limits of something, such as by providing a perimeter line or highlighting.” *See supra* Section II.A.2.

Petitioner contends that the Board should deny Patent Owner's Motion because substitute claim 31 is unpatentable as obvious over the combination of O'Clair, Tadman, Rasmussen, and Frost. Opp. to Mot. to Amend 23–24. Petitioner establishes where each limitation of claim 31 is taught in the combination of prior art references. Opp. to Mot. to Amend 23–24 (relying on claim 29 analysis and analysis in Petition); Ex. 1022 ¶ 49. Petitioner addresses the added “delimited portion” limitations with the combination of Tadman and Frost. Opp. to Mot. to Amend 23–24. As established in the Petition, “Tadman describes that the user-selected geographic region may be a free-hand region, stating ‘custom shapes may include a shape drawn free-hand by a user.’” Pet. 46–47 (quoting Ex. 1004 ¶ 53). Frost teaches a “delimited portion [that] comprises a rectangular portion,” as recited in claim 31, because Frost's Figure 8C depicts rectangular perimeter line 823 marking off the boundaries of user-drawn

polygon 811. Ex. 1024 ¶ 204. Frost explains that polygon 811 may be any polygon that a user draws, which further supports the combination with Tadman. *Id.*; *see also id.* ¶ 8 (“the map-based search tool generates a rectangle-approximated polygon of any polygon that a user draws using the second map selection tool and finds parcels of real property that, according to the property database, are located within the rectangle-approximated polygon”). As depicted in Figure 8C of Frost, the delimited portion (rectangle 823) is larger than user-drawn polygon 811. Petitioner establishes that Frost teaches that the delimited (rectangular) portion is “larger than the free-hand user input and smaller than the current view and current scale of the digital map,” as recited in claim 31. Similar to the “demarcated” limitations of claim 30, Petitioner also relies on annotated Figure 5 of Tadman (Ex. 1022 ¶ 19) to show that the delimited region (dashed rectangle) is smaller than the current view and current scale and larger than the polygonal area (marked as “A”), which also may be a free-hand polygonal area. *See* Opp. to Mot. to Amend 23–24; Ex. 1022 ¶¶ 43–49.

Petitioner establishes that the combination of Frost and Tadman teaches “providing one or more POIs associated with the search query and delimited portion.” Opp. to Mot. to Amend 24; *see also* Ex. 1024, Fig 8c (rectangle 823 surrounding user drawn polygon 811), ¶ 204. As determined above for the similar limitation of claim 29, Petitioner establishes that “Tadman teaches determining results associated with a search query within a user-defined geographic area.” Opp. to Mot. to Amend 10 (citing Pet. 14–15). Tadman’s search results that occur within a user-defined geographic region would also be search results associated with a delimited portion as

taught by Frost. Thus, the combination of Frost and Tadman teaches providing the POIs returned as search results.

As also explained above, Petitioner also provides a sufficient rationale for combining the prior art references in the manner asserted. Specifically, a person of ordinary skill in the art would have had reason to incorporate Frost's rectangle approximation technique into Tadman because Frost teaches several advantages of this technique that would allow more efficient and detailed processing, such as by leaving a smaller subset of points for consideration. *See* Opp. to Mot. to Amend 9–10; Ex. 1022 ¶¶ 22–24. Patent Owner has not challenged Petitioner's rationale for the combination of references.

### *C. Written Description*

Second, we also deny Patent Owner's Motion to Amend on the basis that Patent Owner has not demonstrated adequate written description support for the claimed subject matter of each of proposed substitute claims 29, 30, and 31, *as a whole*. *See* 37 C.F.R. § 42.121(b)(1) ("A motion to amend claims must . . . set forth: (1) The support in the original disclosure of the patent for each claim that is added or amended."); *Nichia Corp. v. Emcore Corp.*, Case IPR2012-00005, slip op. at 4 (PTAB June 3, 2013) (Paper 27) (representative); *Idle Free*, p. 8. As we explained in this proceeding, "Patent Owner must show . . . that each proposed substitute claim is supported by the written description of the application upon which the proposed substitute claims rely," and such showing "must be made for each claim that Patent Owner seeks to amend." Paper 24, 2.

With respect to claims 29, 30, and 31, Patent Owner provides a chart for each proposed claim that purports to identify the newly added claim

language with support from the '045 patent.<sup>5</sup> Mot. to Amend 5–12. Patent Owner addresses only the newly added claim language for each claim but does not attempt to establish written description support for each claim as a whole. For example, we agree with Petitioner’s contention that “Patent Owner has only alleged support for the proposed changes to challenged claim 1, and has made no attempt at showing how proposed claim 29 as a whole is supported by the '045 Patent.” Opp. to Mot. to Amend 5. Patent Owner’s citation to written description support only for the added claim language is inadequate to satisfy the written description requirement for the claims overall. *See Novozymes A/S v. DuPont Nutrition Biosciences APS*, 723 F.3d 1336, 1349 (Fed. Cir. 2013) (claim is considered as an “integrated whole” when assessing written description). Accordingly, we find that Patent Owner has failed to show adequate written description support for each of claims 29–31 in their entirety, and deny the Motion to Amend on that basis as well.

#### *D. Conclusion*

We deny Patent Owner’s Motion to Amend on the basis that claims 29, 30, and 31 are unpatentable under 35 U.S.C. § 103(a) and because adequate written description support for each of the claims as a whole has not been established. Because Patent Owner’s amendments to the remaining dependent claims 2–10, 12–21, and 23–28 simply change the dependency from the original independent claims to the proposed substitute claims, and because Patent Owner makes no separate argument directed to any

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<sup>5</sup> Support must be shown in the application upon which the proposed substitute claims rely. Paper 24, 2. Patent Owner incorrectly cites to the issued '045 patent and not the original disclosure.

dependent claim, we likewise deny Patent Owner's Motion to Amend as to the dependent claims.

#### IV. SUMMARY AND ORDER

Petitioner has demonstrated, by a preponderance of the evidence, under 35 U.S.C. § 103(a), that:

Claims 1, 2, 5, and 6 are unpatentable over O'Clair and Tadman;

Claims 3 and 4 are unpatentable over O'Clair, Tadman, and Popp;

Claims 7–10 are unpatentable over O'Clair, Tadman, and DeLorme;

Claims 11, 12, and 14–20 are unpatentable over O'Clair, Tadman, and Reed;

Claim 13 is unpatentable over O'Clair, Tadman, Reed, and Popp;

Claim 21 is unpatentable over O'Clair, Tadman, Reed, and Keely;

Claims 22 and 25–28 are unpatentable over O'Clair, Tadman, and Rasmussen; and

Claims 23 and 24 are unpatentable over O'Clair, Tadman, Rasmussen, and Popp.

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–28 of the '045 patent have been shown to be unpatentable.

FURTHER ORDERED that Patent Owner's Motion to Amend is *denied*;

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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