

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

AMERICAN NAVIGATION SYSTEMS, INC.,
Patent Owner.

Case IPR2015-00851
Patent 5,902,347

Before LYNNE E. PETTIGREW, STACEY G. WHITE, and
BETH Z. SHAW, *Administrative Patent Judges*.

PETTIGREW, *Administrative Patent Judge*.

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

I. INTRODUCTION

In this *inter partes* review, instituted pursuant to 35 U.S.C. § 314, Google Inc., Apple Inc., Samsung Electronics America, Inc., and Samsung Electronics Co., Ltd. (collectively, “Petitioner”) challenge the patentability of claims 5–10 of U.S. Patent No. 5,902,347 (Ex. 1001, “the ’347 patent”), owned by American Navigation Systems, Inc. (“Patent Owner”). We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons discussed below, Petitioner has shown by a preponderance of the evidence that claims 5–10 of the ’347 patent are unpatentable.

A. Procedural History

Petitioner filed a Petition for *inter partes* review of claims 5–10 of the ’347 patent. Paper 1 (“Pet.”). Patent Owner filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). On September 22, 2015, we instituted an *inter partes* review of all challenged claims of the ’347 patent on one asserted ground of unpatentability. Paper 9 (“Dec.”). After institution, Patent Owner filed a Patent Owner Response, Paper 21 (“PO Resp.”), and Petitioner filed a Reply to the Patent Owner Response, Paper 25 (“Pet. Reply”). An oral hearing was held on June 8, 2016.¹ A transcript of the hearing has been entered into the record. Paper 30 (“Tr.”).

B. Related Matters

The parties identify the following district court proceedings in which the ’347 patent has been asserted: *American Navigation Systems, Inc. v.*

¹ A consolidated oral hearing was held for this proceeding and IPR2015-00849. See Paper 28 (hearing order).

Apple, Inc., Case No. 3:14-cv-05297 (N.D. Cal.); *American Navigation Systems, Inc. v. Samsung Electronics Co.*, Case No. 3:14-cv-05298 (N.D. Cal.). See Pet. 2; Paper 7, 2. Petitioner filed another petition for *inter partes* review of the '347 patent in IPR2015-00849. A final written decision in that proceeding is entered contemporaneously with this decision.

C. The '347 Patent

The '347 patent, titled “Hand-Held GPS-Mapping Device,” is directed to a portable device that displays a user’s current position on a map image. Ex. 1001, 2:17–19. The device uses a “novel data compression, retrieval, and storage scheme” that allegedly addresses problems with data storage and memory limitations of prior art personal navigation systems. *Id.* at 1:24–28, 3:24–36. According to the '347 patent, the total memory available in a handheld device generally will be far less than an uncompressed map image requires. *Id.* at 3:33–34. Thus, “[i]t [i]s essential that the device be able to decompress . . . images . . . without having to load the entire (decompressed) image in memory.” *Id.* at 3:37–39.

The proposed solution described in the '347 patent processes a map image by dividing it into square arrays, or tiles, each of which contains image data for a small region. *Id.* at 4:17–19, 4:35–39. A file is created that contains header information describing the size and geographic location of each tile, pointers to the tile data, and compressed tile data. *Id.* at 4:19–22. According to the '347 patent, this file structure allows for decompression of only the desired tile. *Id.* at 5:2–5. Further, the format “facilitates caching uncompressed tiles based on user movement to facilitate smooth pan and zoom without requiring that the entire image be decompressed in memory.” *Id.* at 5:5–8.

D. Illustrative Claim

Among the challenged claims, only claim 5 is independent. Claims 6 and 8–10 depend directly from claim 5, and claim 7 depends from claim 6.

Claim 5 is illustrative of the claimed subject matter:

5. A device for personal, portable mapping and navigation, by a user, and adapted to display a map image to the user and to display, to the user, the user's actual location, on the map image, comprising:
- a) a case
 - b) a digital computer mounted in the case,
 - c) a location receiver unit associated with the case and adapted to provide user location information to the computer,
 - d) an image storage unit adapted to store image data and to provide the image data to the computer, said image data including a plurality of tile data which tiles, taken together, represent a map image, said image data including;
 - i) header data describing the size and geographical location of each tile,
 - ii) pointers to the location, in the storage unit, of the data for each tile,
 - iii) compressed tile data for each tile,
 - e) a display unit adapted to receive data from the computer and display the data as an image to the user,
 - f) a computer program adapted to control the computer, and to cause the computer to present the user location information and the image data to the display unit so that the display unit displays, to the user, a map image and the user's actual location, on the map image, said program including;
 - i) an associating routine for associating the user location with one of the tiles,
 - ii) a decompressing routine for decompressing the tile data for the said one of said tiles into a tile image for the said one of said tiles, and

iii) a locating routine for locating the user's location on said tile image.

Id. at 5:57–6:22.

E. Asserted Ground of Unpatentability

We instituted an *inter partes* review of claims 5–10 of the '347 patent on the ground of obviousness under 35 U.S.C. § 103(a) over the combination of Muller² and Steiner.³

II. DISCUSSION

A. Principles of Law

To prevail in challenging the claims of the '347 patent, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

² U.S. Patent No. 5,839,080, issued Nov. 17, 1998 (Ex. 1004, "Muller").

³ U.S. Patent No. 5,528,248, issued June 18, 1996 (Ex. 1006, "Steiner").

B. Level of Ordinary Skill in the Art

Petitioner's declarant, Dr. Michael S. Braasch, opines that a person of ordinary skill in the art at the time of the invention of the '347 patent would have had a minimum of a bachelor's degree in electrical engineering or a related engineering field and 2–5 years of experience working in the field of electrical engineering and its subfield of navigation systems. Ex. 1003 ¶ 15. Patent Owner's declarant, Mr. Jay Bhatia, generally agrees. Ex. 2010 ¶ 13. Based on our review of the record, we adopt Dr. Braasch's characterization of the level of ordinary skill in the art.

C. Claim Construction

In an *inter partes* review, we construe claim terms in an unexpired patent according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144 (2016) (holding that 37 C.F.R. § 42.100(b) “represents a reasonable exercise of the rulemaking authority that Congress delegated to the Patent Office”). Consistent with the broadest reasonable construction, claim terms are presumed to have their ordinary and customary meaning as understood by a person of ordinary skill in the art in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). An inventor may provide a meaning for a term that is different from its ordinary meaning by defining the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

In its Patent Owner Response, Patent Owner proposes constructions for two claim phrases that were not construed previously in this proceeding

by either party or in our institution decision. See PO Resp. 2–7; Dec. 5–7. Petitioner responds that Patent Owner’s proposed constructions are overly narrow and inconsistent with the plain meaning of the claim language and the specification of the ’347 patent. Pet. Reply 1–14. In view of the parties’ arguments, we construe the disputed claim language to the extent set forth below. No other claim terms require express construction.

1. “*one of the tiles*” and “*said one of said tiles*” (claim 5)

Independent claim 5 recites an image storage unit adapted to store “image data including a plurality of tile data which *tiles*, taken together, represent a map image.” Ex. 1001, 5:66–6:2 (emphasis added). Claim 5 further recites a computer program including “an associating routine for associating the user location with *one of the tiles*” and “a decompressing routine for decompressing the tile data for the *said one of said tiles* into a tile image for the said one of said tiles.” *Id.* at 6:17–21 (emphases added). Patent Owner contends that the phrases “one of the tiles” and “said one of said tiles” should be construed as a “single tile within the plurality of tiles,” i.e., one and only one tile. PO Resp. 2. In other words, Patent Owner advocates a construction that limits the scope of claim 5 to “associating a *single* tile with the user location and then decompressing that *single* tile.” *Id.* at 6.

Patent Owner argues that its proposed construction is consistent with the plain meaning of the word “one”—“being a single unit or thing.” *Id.* at 3 (quoting Ex. 2011 (definition of “one” from <http://www.merriam-webster.com>)). Patent Owner further argues that any construction of “one of the tiles” to encompass multiple tiles would contradict the plain meaning of the word “one.” *Id.* at 4. In addition, Patent Owner contends that construing

“‘one of said tiles’ as ‘multiple tiles’ would impermissibly read the claim limitation ‘one’ out of the claim.” *Id.*

Patent Owner also argues that its proposed construction is supported by the specification of the ’347 patent, which states: “Since the starting location of the data is known both geographically and in terms of data storage *only the desired tile* need be decompressed.” *Id.* at 3 (quoting Ex. 1001, 5:2–5). Patent Owner contends that although the ’347 patent discloses other embodiments in which more than one tile is decompressed, decompression of additional tiles is “optional.” *Id.* According to Patent Owner, these additional embodiments are claimed in dependent claims 6 and 7, which recite additional routines for identifying and decompressing “peripheral” tiles and “successor” tiles. *Id.* at 3–4; *see* Ex. 1001, 6:23–36.

Petitioner responds that Patent Owner’s narrow construction is “legally flawed and inconsistent with the plain meaning and the preferred embodiment of the ’347 patent.” Pet. Reply 1. First, Petitioner contends that Patent Owner’s proposed construction improperly narrows the scope of claim 5 to exclude the preferred embodiment of the ’347 patent, which “‘requires[s] at least 4 active tiles’ to be decompressed in memory.” *Id.* at 2–3 (quoting Ex. 1001, 4:42–45). Moreover, Petitioner contends, the “alternative option” relied on by Patent Owner, in which only the desired tile need be decompressed, merely indicates that a single tile would be *sufficient*, not that the system must decompress one and only one tile. *Id.* at 3–4. Petitioner also submits that dependent claims 6 and 7 demonstrate that independent claim 5 must not be strictly limited in scope to a device that decompresses one and only one tile. *Id.* at 6.

Petitioner further argues that Patent Owner’s proposed construction is inconsistent with other limitations in claim 5. *Id.* at 6. Specifically, Petitioner points out that claim 5 requires the computer program that includes the associating and decompressing routines to display a “map image,” which is represented by “a plurality of . . . tiles, taken together.” *Id.* (citing Ex. 1001, 6:1–15). Because displaying the “map image” necessarily requires decompressing the plurality of tiles that represent the map image, Petitioner submits that a construction requiring one and only one tile to be decompressed is inconsistent with claim 5 as a whole. *Id.* at 7 (citing Ex. 1015 ¶ 10 (Second Decl. of Dr. Braasch); Ex. 1022, 65:12–24, 62:17–19 (deposition testimony of Patent Owner’s declarant, Mr. Bhatia)).

Having considered all of the parties’ arguments, we agree with Petitioner that claim 5 does not limit the claimed system to one that decompresses tile data for only one tile. As an initial matter, the word “one” when used in patent claims does not necessarily mean “one and only one.” *See Accent Packaging, Inc. v. Leggett & Platt, Inc.*, 707 F.3d 1318, 1325–26 (Fed. Cir. 2013); *IGT v. Bally Gaming Int’l, Inc.*, 659 F.3d 1109, 1116–17 (Fed. Cir. 2011). In *Accent Packaging*, for example, the court held that the claim term “a respective *one*” did not limit the claims to “require[] that each elongated operator body be coupled to *one and only one* operator element” when “[n]othing in the claim language compel[led] that result.” 707 F.3d at 1326 (emphases added). Similarly, in *IGT*, the court rejected the appellant’s attempt to rewrite “one” as “only one” and held that the claim limitation “issuing a command . . . to *one* of said preselected gaming devices” did not preclude issuing commands to multiple gaming devices. 659 F.3d at 1116–17 (emphasis added). In both cases, the court emphasized

that the claim term “one,” like other claim language, must be construed in the context of the claim in which it appears and in view of the embodiments described in the patent specification. *Accent Packaging*, 707 F.3d at 1326; *IGT*, 659 F.3d at 1117.

We also note that claim 5 is an open-ended claim containing the transitional word “comprising.” In such claims, the general rule is that the indefinite articles “a” and “an” carry the meaning of “one or more.” *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1342 (Fed. Cir. 2008). A narrow exception arises only when the language of the claims themselves, the specification, or the prosecution history necessitates a departure from the general rule. *Id.* at 1342–43. In such a situation, the evidence must indicate a clear intent by the patentee to limit “a” or “an” to the singular. *Id.* Similarly, when the term “one” appears in an open-ended claim, we look to the intrinsic evidence of record to determine whether the patentee intended to limit the meaning of “one” to “only one” despite using the transitional word “comprising.” *See Accent Packaging*, 707 F.3d at 1326 (citing *Baldwin*, 512 F.3d at 1342).

Applying these principles in this case, we focus on the claim language and the written description of the ’347 patent, because neither party argues that the prosecution history informs the construction of disputed claim terms. First, we see nothing in the language of claim 5 clearly indicating that only one tile must be associated with the user location or that only one tile must be decompressed. In particular, we disagree with Patent Owner’s argument that a construction that allows for decompression of multiple files would read the word “one” out of the claim. *See PO Resp. 4*. As Petitioner submits, a system that decompresses only one tile—the same tile associated

with the user location—comes within the scope of the claim. *See* Pet. Reply 4–5. Nothing in the claim, however, precludes decompression of additional tiles. Indeed, as Petitioner argues, citing the testimony of both Petitioner’s declarant and Patent Owner’s declarant, the language in claim 5 providing for display of a “map image” suggests that the *plurality of tiles* that represent the map image must be decompressed in order to display the map image. *See id.* at 6–7 (citing Ex. 1015 ¶ 10; Ex. 1022, 65:12–24, 62:17–19).

We turn now to the written description of the ’347 patent, which by Patent Owner’s own admission is “rather terse.” Tr. 29:7. The ’347 patent describes a file structure for map image data in which data for a geographic area (e.g., a tile) are stored in compressed form together in memory. Ex. 1001, 4:12–63. In explaining how a navigation mapping device would utilize data stored in this manner, the patent states that “[i]n general, it is expected that a land user will require at least 4 active [uncompressed] tiles in memory to allow seamless pa[n]ning in the event that the user is located at the intersection of four tiles.” *Id.* at 4:42–45. It also explains that, “given a user location, the tiles needed by the user can be directly identified. Since the starting location of the data is known both geographically and in terms of data storage only the desired tile need be decompressed.” *Id.* at 5:1–5.

Petitioner argues that decompression of four tiles is a “preferred embodiment” that is excluded by Patent Owner’s proposed construction, whereas Patent Owner asserts it is just one of several embodiments. *See* Pet. Reply 2; PO Resp. 3. The ’347 patent does not explicitly refer to “preferred” or alternative embodiments, but the brevity of the patent disclosure suggests that only one embodiment is described. Regardless of

whether the four-tile scenario is a preferred embodiment, however, we are not persuaded the '347 patent describes any embodiment supporting Patent Owner's restrictive interpretation of claim 5. Patent Owner cites a single sentence, which provides that "only the desired tile need be decompressed." PO Resp. 3 (quoting Ex. 1001, 5:2–5). We agree with Petitioner that this sentence describes decompressing a minimum of one tile without requiring that only one tile be decompressed. See Pet. Reply 3–4. Moreover, the preceding and following sentences refer to "tiles" in the plural, further suggesting that the scope of the invention described and claimed in the '347 patent is not limited to decompression of only one tile. Ex. 1001, 5:1–2 ("Thus, given a user location, the *tiles* needed by the user can be directly identified." (emphasis added)); *id.* at 5:5–6 ("This format also facilitates caching *uncompressed tiles*" (emphasis added)).

For these reasons, we do not adopt Patent Owner's proposed construction of the phrases "one of the tiles" and "said one of said tiles" as a "single tile within the plurality of tiles." Instead, we agree with Petitioner that under a proper construction of those phrases, the scope of claim 5 is not limited to a device that decompresses tile data for only one tile.

2. "*projects the movement trend*" (claim 7)

Dependent claim 7 recites "a projection routine which projects the movement trend of the user's location and identifies and decompresses the successor tile which is adjacent the said one of said tile and in the path of movement of the user's location." Ex. 1001, 6:29–30. Patent Owner argues that "projects the movement trend" should be construed as "extrapolates a predicted path of movement from the prior changes in the user's position."

PO Resp. 6.⁴ Patent Owner provides dictionary definitions of “extrapolate” and “movement,” and asserts that its proposed construction is consistent with the plain meaning of the claim terms. *Id.* (citing Ex. 2012 (defining “extrapolate” as “to predict by projecting past experience or known data”); Ex. 2013 (defining “movement” as “an act of changing physical location or position”)). Patent Owner further contends that its construction is consistent with the recitation in claim 7 of a “successor tile,” which signifies that the claimed step is used to identify a future location. *Id.* at 7.

We agree with Petitioner that Patent Owner’s proposed construction is overly narrow and unsupported by the record. *See* Pet. Reply 11–14. In particular, we find no support for including a requirement that future movement be based on *prior changes* in the user’s position. First, although Patent Owner purports to rely on the plain meaning of claim terms, Patent Owner supplies a definition of “extrapolate,” which is not a recited claim term, but instead is merely a word appearing in Patent Owner’s proposed construction. *See* PO Resp. 6. The actual claim term is “project,” for which Petitioner provides the following definition: “to calculate, estimate, or predict (something in the future), *based on present data* or trends.” Ex. 1021 (emphasis added); *see* Pet. Reply 13–14. Thus, in contrast to Patent Owner’s definition of “extrapolate,” which may involve a prediction based on past data, the claim term “project” only requires a prediction based on present data.

⁴ We note that this proposed construction is slightly different from that proposed by Patent Owner in the concurrent proceeding, IPR2015-00849, involving the same patent and claims. *See* IPR2015-00849, Paper 21, 6 (construing disputed language as “extrapolates a future movement path from the past changes in the user’s location”).

Furthermore, nothing in the other terms of claim 7 cited by Patent Owner—“successor tile” and “movement”—requires a projection to be based on “prior changes” in the user’s position. *See* PO Resp. 6–7; Pet. Reply 12. At the oral hearing, Patent Owner focused on yet another claim term, suggesting that claim 7 requires a projection to be based on a “movement trend.” *See, e.g.*, Tr. 39:17–23. We agree with Petitioner, however, that the “movement trend” recited in the claim is the output or result of the claimed projection routine rather than the input. *See id.* at 62:12–20. Thus, the word “trend” in claim 7 refers to a general direction of movement that is projected for the future, rather than prior changes in the user’s position that would serve as a basis for the projection.⁵

Finally, Patent Owner cites no other intrinsic evidence to support its proposed construction. *See* PO Resp. 6–7. As Petitioner points out, the words “project” and “trend” appear nowhere in the written description of the ’347 patent. *See* Pet. Reply 14. Patent Owner’s declarant agreed that the specification does not disclose any projection routine. Ex. 1022, 94:8–10, 96:8–10. And Patent Owner admitted at the oral hearing that the specification contains no discussion that would shed light on the proper construction of “projects the movement trend.” Tr. 42:4–9.

For these reasons, we do not adopt Patent Owner’s proposed construction of “projects the movement trend,” which improperly includes a requirement that the future movement of the user’s position be based on prior changes in the user’s position. We decline to import that limitation

⁵ A plain meaning of “trend” is “[t]he general direction in which something tends to move.” AMERICAN HERITAGE DICTIONARY 1907 (3d ed. 1992) (Ex. 3001).

into claim 7 because it is not supported by the intrinsic evidence. Instead, in accordance with the ordinary meaning of the claim terms, we construe the phrase “projects the movement trend” to mean “predicts the future direction of movement based on present data.”

D. Overview of Asserted Prior Art References

1. Muller

Muller describes an aircraft terrain awareness system that monitors the position and trajectory of an aircraft based on a satellite-based navigation system, such as Global Positioning System (GPS), and provides visual warnings to a pilot via a map display. Ex. 1004, Abstract, 1:6–17, 5:20–23, 20:50–57, 21:63–22:3, Figs. 25–26. Terrain data are stored in a database by dividing the world into a plurality of latitude bands, which then are divided into a plurality of longitudinal segments. *Id.* at 6:49–57, 7:6–22, Fig. 2 (illustrating latitude bands 50 and longitudinal segments 52). Alternatively, the world may be divided into a plurality of 1°x1° map files or cells. *Id.* at 7:66–8:8, Fig. 4B (illustrating map files or cells 51, also referred to in Muller as “data files 51” or “terrain data files 51”). Map files include header data describing their size and location. *Id.* at 8:34–41. Terrain data may be compressed and stored in a flash read only memory. *Id.* at 8:27–34. To provide a display based on the position of the aircraft, the system decompresses terrain data files centered about the current position of the aircraft. *Id.* at 22:40–52, 25:34–49. Muller also discloses an example data structure for terrain data that includes a data index containing information for each individual terrain data file and header information including the “[n]umber of index’s.” *Id.* at cols. 39–40 (App. A-4).

2. *Steiner*

Steiner discloses a personal digital location apparatus (PDLA) for displaying a geographical location as an icon on a map. Ex. 1006, Abstract. The apparatus includes a GPS receiver for determining geographical location. *Id.* Steiner explains that “[i]n many aviation, marine, vehicle, and pedestrian navigation applications, the navigator uses personal navigation equipment that he carries with him when he changes airplanes, boats, or motor vehicle[s] to save the cost of having multiple sets of navigation equipment or to prevent theft of the equipment.” *Id.* at 5:9–14. In one embodiment, Steiner’s PDLA displays an aviation map with navigation information and touch screen keys. *Id.* at 9:62–64, Fig. 3.

E. Asserted Obviousness Ground

Petitioner contends that claims 5–10 are unpatentable under 35 U.S.C. § 103(a) as obvious over Muller and Steiner. Pet. 9–18, 30–45. Relying on the testimony of Dr. Braasch, Petitioner explains how the references allegedly teach or suggest the claim limitations and provides a rationale for combining the references. *Id.* (citing Ex. 1003).

In response, Patent Owner argues that the combined references fail to teach two claim limitations: “a decompressing routine for decompressing the tile data for the said one of said tiles into a tile image for the said one of said tiles,” as recited in independent claim 5, and “a projection routine which projects the movement trend of the user’s location and identifies and decompresses the successor tile which is adjacent the said one of said tile and in the path of movement of the user’s location,” as recited in dependent claim 7. PO Resp. 8–19. For support, Patent Owner relies on the testimony of Mr. Bhatia. *Id.*; see Ex. 2010 ¶¶ 19–26.

We have reviewed the Petition, Patent Owner Response, and Petitioner's Reply, as well as the relevant evidence discussed therein. For the reasons that follow, we determine Petitioner has shown by a preponderance of the evidence that claims 5–10 would have been obvious in view of the combination of Muller and Steiner.

1. Claim 5

Petitioner relies on Muller for teaching most of the limitations of independent claim 5, citing Steiner primarily to show that mapping and navigation systems for aircraft at the time of the invention of the '347 patent typically were implemented in a personal and portable computing device. Pet. 9–18, 30–41. We agree with and adopt Petitioner's contentions regarding claim 5, set forth in detail in the Petition and summarized below. *See id.* We also agree with and adopt the reasoning set forth in the Petition and Dr. Braasch's declaration for why a person of ordinary skill in the art would have implemented Muller's mapping and navigation system on a handheld personal computing device, as taught by Steiner. *See id.* at 11–12 (citing Ex. 1003 ¶¶ 28–31; Ex. 1006, 5:9–30, 4:59–5:8; *KSR*, 550 U.S. at 417).

As Petitioner asserts, Muller's terrain awareness system is a navigation and mapping device that displays the user's location (i.e., aircraft position) on a map image. *See* Pet. 12–13, 30–31 (citing Ex. 1004, 4:59–5:23, 22:40–52). Muller also discloses a location receiver (i.e., GPS receiver) and image storage unit that stores image data in the form of tiles (e.g., Muller's longitudinal segments within latitude bands or Muller's 1°x1° map files or cells) which, taken together, represent a map image. *See id.* at 12–15, 32–34 (citing Ex. 1004, 4:61–5:23, 6:49–57, 7:3–22, 7:66–8:26,

26:6–20, Figs. 3 & 4B). Muller further discloses that the image data may be compressed. *See id.* at 36–37 (citing Ex. 1004, 6:31–39, 8:27–34). In addition, Muller discloses header data for each tile describing its size and geographical location and pointers to the storage location of each tile. *See id.* at 16–17, 34–36 (citing Ex. 1004, 7:40–54, 8:34–41, 23:20–41).

Muller also discloses the computer program elements recited in claim 5. *See id.* at 12–14, 38–41. For example, with regard to the limitation “associating the user location with one of the tiles,” Muller describes search logic for determining the terrain data surrounding the aircraft, including the tile (e.g., longitudinal segment within a latitude band or map file) corresponding to the current aircraft position. *See id.* at 39 (citing Ex. 1004, 5:7–23, 6:58–7:2, 25:23–34). Muller also discloses “locating the user’s location on said tile image” in, for example, Figures 27 and 28, which illustrate terrain data centered about the current position of the aircraft. *See id.* at 13–14, 40–41 (citing Ex. 1004, 22:40–65, Figs. 27 & 28).

The remaining limitation of claim 5, “a decompressing routine for decompressing the tile data for the said one of said tiles into a tile image for the said one of said tiles,” is the only limitation in claim 5 that Patent Owner asserts is not taught by the combination of Muller and Steiner. PO Resp. 8–11. For this limitation, Petitioner cites, among other things, Muller’s disclosure that map files (i.e., 1°x1° cells) are stored in compressed form and decompressed as needed and then transferred to RAM. *See Pet.* 13, 40 (citing Ex. 1004, 22:40–52, 25:34–49, Fig. 34). Muller explains that “[o]n power-up, one or two files around the aircraft are decompressed and displayed to allow immediate display of a limited range, relative to the

position of the aircraft. As more terrain data files are decompressed, the additional range is displayed.” Ex. 1004, 25:45–49.

Patent Owner contends that Muller fails to teach the “decompressing” limitation because it does not disclose decompressing a single tile (i.e., only one tile). PO Resp. 9–11. We are unpersuaded by Patent Owner’s argument, which depends on its proposed construction of the claim language as limited to a system that decompresses only one tile. *See id.* at 9; Tr. 24:13–16 (Patent Owner admitting that all of its arguments regarding application of the prior art to the claims depend on its proposed claim construction). As discussed above, we do not adopt Patent Owner’s proposed claim construction. Under a proper construction, we agree with Petitioner that Muller teaches the “decompressing” limitation, at least because Muller’s system decompresses map files centered about the current position of the aircraft. *See* Pet. Reply 16 (citing Ex. 1004, 22:40–52, 25:34–49, 26:31–59, Figs. 34 & 34A); Ex. 1015 ¶¶ 17–19.

Moreover, even under Patent Owner’s proposed construction, we agree with Petitioner that Muller teaches decompressing a single map file (i.e., tile) associated with the user’s location. *See* Pet. Reply 17–18; Ex. 1015 ¶¶ 20–22. As Petitioner asserts, Muller discloses decompression of one map file around the aircraft to allow immediate display of a limited range around the aircraft’s position. *See* Pet. Reply 17–18 (citing Ex. 1004, 25:45–47). Muller also discloses an embodiment in which “one terrain data file 51 is decompressed one file at a time and loaded into” RAM, further suggesting a decompression routine for decompressing tile data for one tile. Ex. 1004, 26:34–37; *see* Pet. Reply 18. Patent Owner does not address these disclosures, citing only an example in Muller’s appendix that allegedly

teaches decompressing a map package file consisting of “a couple hundred compressed maps.” PO Resp. 9–10 (citing Ex. 1004, cols. 47–48 (App. A-8)).

For the foregoing reasons, we conclude that Petitioner has shown by a preponderance of the evidence that claim 5 would have been obvious over the combination of Muller and Steiner.

2. Claims 6 and 8–10

Claim 6 depends from claim 5 and further recites “a peripheral routine which identifies and decompresses a peripheral tile which is adjacent to the said one of said tile, so that the decompressed image of said peripheral tile is available to the computer for visual effects.” Ex. 1001, 6:24–27. Claim 8 depends from claim 5 and further requires the location receiver to be a GPS receiver. *Id.* at 6:36–37. Claims 9 and 10 also depend from claim 5 and respectively recite additional information contained in the header and a further limitation regarding the pointer. *Id.* at 6:38–45.

Patent Owner presents no additional arguments for these claims beyond its arguments with respect to claim 5. We agree with and adopt Petitioner’s contentions regarding claims 6 and 8–10, set forth in detail in the Petition. *See* Pet. 41–45. Accordingly, we conclude that Petitioner has shown by a preponderance of the evidence that claims 6 and 8–10 would have been obvious over the combination of Muller and Steiner.

3. Claim 7

Claim 7 depends from claim 6 and further recites:

a projection routine which projects the movement trend of the user’s location and identifies and decompresses the successor tile which is adjacent the said one of said tile and in the path of movement of the user’s location, so that the decompressed

image of said successor tile is available to the computer as the user's location changes from the said one of said tiles to the said successor tile.

Ex. 1001, 6:29–36. Petitioner contends that Muller discloses this limitation. Pet. 43. We agree with and adopt Petitioner's contentions regarding claim 7, set forth in detail in the Petition and summarized below. *See id.*

Muller discloses a variable resolution display, configured as a layered “wedding cake” in which each layer contains terrain data of a different resolution. Ex. 1004, 22:53–23:11, Fig. 28; *see* Pet. 12–14. Each layer has an “update boundary” such that as the aircraft passes through the update boundary, the RAM is updated with new terrain data that is read from memory and decompressed. Ex. 1004, 23:12–20, 26:30–43, cols. 47–48 (App. A-8); *see* Pet. 14, 43. As explained by Dr. Braasch, in Muller “the next adjacent segment or chunk of data would be loaded in after an update boundary is crossed, which is determined based on the position of the aircraft.” Ex. 2014, 23:15–18 (deposition testimony of Dr. Braasch); *see* Pet. Reply 20; Ex. 1015 ¶ 25. Thus, Muller's system “projects the movement trend,” as we have construed the phrase, because it predicts the future direction of movement based on present data, i.e., the position of the aircraft that has just crossed the update boundary. *See* Pet. Reply 20–21.

Patent Owner argues that Muller fails to teach projecting the movement trend of the user's location, as required by claim 7, because Muller's system does not extrapolate a predicted path of movement from prior changes in the user's position. PO Resp. 15–19. We are not persuaded by Patent Owner's argument because it depends on Patent Owner's proposed construction of “projects the movement trend,” which we have rejected. *See id.*; Tr. 24:13–16 (Patent Owner admitting that all of its arguments regarding

application of the prior art to the claims depend on its proposed claim construction). As discussed above, we do not adopt Patent Owner's proposed claim construction, and in particular we disagree with Patent Owner that the claim language requires a projection of future movement to be based on prior changes in the user's position. Under the proper construction—"predicts the future direction of movement based on present data"—Muller's disclosure of determining successor terrain data files (i.e., tiles) when the aircraft crosses an update boundary satisfies the projection routine limitation of claim 7.

For the foregoing reasons, we conclude that Petitioner has shown by a preponderance of the evidence that claim 7 would have been obvious over the combination of Muller and Steiner.

III. CONCLUSION

Based on the evidence and arguments, Petitioner has demonstrated by a preponderance of the evidence that claims 5–10 would have been obvious over the combination of Muller and Steiner.

IV. ORDER

Accordingly, it is:

ORDERED that claims 5–10 of U.S. Patent No. 5,902,347 have been shown to be unpatentable; and

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

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Patent 5,902,347

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