

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

GEOSCOPE TECHNOLOGIES PTE. LTD.
Patent Owner

Case No. IPR2023-01212
U.S. Patent No. 8,406,753

PATENT OWNER'S RESPONSE

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. OVERVIEW OF THE '753 PATENT	4
III. LEVEL OF ORDINARY SKILL IN THE ART	13
IV. SUMMARY OF THE REFERENCES ASSERTED IN THE PETITION ..	14
A. Spain	14
B. Agiwal	15
V. CLAIM CONSTRUCTION	16
A. The District Court's Construction of "Grid Point" Requires Evaluation of Calibration Data to Determine the Boundaries of the Area Represented by a "Grid Point"	17
B. The Intrinsic Record Requires Evaluation of Calibration Data to Determine the Boundaries of the Area Represented by a "Grid Point" 	20
VI. PETITIONER FAILS TO MEET ITS BURDEN TO PROVE THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE	25
A. Ground 1: The Challenged Claims are Not Anticipated by Spain or Rendered Obvious by Spain in View of Agiwal.....	25
VII. CONCLUSION	30

TABLE OF AUTHORITIES

Page(s)

Cases

<i>Advanced Display Systems, Inc. v. Kent State University</i> , 212 F.3d 1272 (Fed. Cir. 2000).....	17
<i>Phillips v. AWH Corp.</i> , 415 F.3d 1303 (Fed. Cir. 2005) (en banc)	17
<i>Trustees of Columbia University in City of New York v. Symantec Corp.</i> , 811 F.3d 1359 (Fed. Cir. 2016).....	17

LIST OF EXHIBITS

Exhibit No.	Petitioner's Exhibits
1001	U.S. Patent No. 8,406,753, issued on March 26, 2013 (“the ’753 Patent”)
1002	File History of U.S. Patent Application No. 12/026,480, filed on February 5, 2008 (“the ’480 Application”)
1003	U.S. Provisional Application No. 60/899,379, filed on February 5, 2007
1004	Not Assigned
1005	A. Agiwal et al., “LOCATOR-Location Estimation System for Wireless LANs” 2004
1006	U.S. Patent Publication No. 2003/0064735, published on April 3, 2003 to D. Spain et al. (“Spain”)
1007	Appendix D to Geoscope’s Preliminary Infringement Contentions dated April 7, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA)
1008	Declaration of David Hilliard Williams
1009	<i>Curriculum Vitae</i> of David Hilliard Williams
1010	Declaration of Dr. Sylvia Hall-Ellis
1011	<i>Curriculum Vitae</i> of Dr. Sylvia Hall-Ellis
1012	Complaint dated November 22, 2022, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022 (“the Related Litigation”)
1013	Preliminary Identification of Asserted Claims dated March 27, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a</i>

	<i>Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
1014	U.S. Patent Publication No. 2005/0266855, published on December 1, 2005 to G. Zeng <i>et al.</i> (“Zeng”)
1015	U.S. Patent No. 7,167,714, issued on January 23, 2007 to R. Dressler and D. Spain, Jr. <i>et al.</i> (“Dressler”)
1016	Difference comparison between the text of the Specifications of the Dressler and Spain
1017	U.S. Patent No. 7,433,695, issued on October 7, 2008 to S. Gordon <i>et al.</i> (“Gordon”)
1018	U.S. Patent No. 7,561,104, issued on July 14, 2009 to M. Alles <i>et al.</i> (“the ’104 Patent”)
1019	File History of Reexamination Control No. 90/012,694 (“the ’694 Reexamination”)
1020	Difference comparison between the text of the Specifications of the Gordon and Spain
1021	U.S. Patent No. 7,460,505, issued on December 2, 2008 to D. Spain (“the ’505 Patent”)
1022	Difference comparison between the text of the Specifications of the ’505 Patent and Spain
1023	Plaintiff Geoscope Technologies PTE. LTD.’s Opening Claim Construction Brief, E.D. Va. Civil Action No. 1:22-cv-01373-MSN-JFA (Dkt. No. 75).
1024	Stipulation Regarding Agreed Upon Claim Constructions dated May 23, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022

1025	Google LLC's Opening Claim Construction Brief dated May 26, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
1026	Not Assigned
1027	Not Assigned
1028	Claim Construction Memorandum Opinion & Order dated July 19, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.</i> , Civ. Action No. 1:22-cv-01331 (EDVA) filed on November 22, 2022
	Patent Owner's Exhibits
2001	Declaration of Christopher M. Gerson in Support of Patent Owner's Motion for Pro Hac Vice Admission of Christopher M. Gerson Under 37 C.F.R. § 42.10(c)
2002	U.S. Patent No. 6,944,465, issued on September 13, 2005 to D. Spain et al. ("Spain '465 Patent")
2003	Memorandum Opinion on Google's Motion for Judgment on the Pleadings on Patent Eligibility dated September 18, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC</i> , Civ. Action No. 1:22-cv-01331 (EDVA)
2004	Memorandum Opinion on Apple's Motion for Judgment on the Pleadings on Patent Eligibility dated September 18, 2023, <i>Geoscope Technologies Pte. Ltd. v. Apple Inc.</i> , Civ. Action No. 1:22-cv-01373 (EDVA)
2005	Final Judgment dated October 6, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC</i> , Civ. Action No. 1:22-cv-01331 (EDVA)
2006	Final Judgment dated October 5, 2023, <i>Geoscope Technologies Pte. Ltd. v. Apple Inc.</i> , Civ. Action No. 1:22-cv-01373 (EDVA)

2007	Order dated June 26, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC</i> , Civ. Action No. 1:22-cv-01331 (EDVA)
2008	Email from Saunak Desai to Stephen E. Noona, “Geoscope v. Google - Claim Narrowing” (June 12, 2023)
2009	Claim Construction Memorandum Opinion & Order dated July 19, 2023, <i>Geoscope Technologies Pte. Ltd. v. Apple Inc.</i> , Civ. Action No. 1:22-cv-01373 (EDVA)
2010	Order dated June 26, 2023, <i>Geoscope Technologies Pte. Ltd. v. Apple Inc.</i> , Civ. Action No. 1:22-cv-01373 (EDVA)
2011	Defendant Google LLC’s Final Invalidity Contentions dated July 3, 2023, <i>Geoscope Technologies Pte. Ltd. v. Google LLC</i> , Civ. Action No. 1:22-cv-01331 (EDVA)
2012	<i>Not Assigned</i>
2013	U.S. Patent No. 9,097,784 issued on Aug. 4, 2015 to Alles et al.
2014	U.S. Patent No. 7,383,051, issued on June 3, 2008 to Spain, Jr. et al.
2015	U.S. Patent No. 8,068,855, issued on Nov. 29, 2011 to Dressler et al.
2016	U.S. Patent No. 7,725,111, issued on May 25, 2010 to Dressler et al.
2017	<i>Not Assigned</i>
2018	Declaration of Saunak K. Desai In Support of Patent Owner’s Motion for Pro Hac Vice Admission of Saunak K. Desai Under 37 C.F.R. § 42.10(C)
2019	<i>Not Assigned</i>
2020	Declaration of Mark Alan Sturza
2021	<i>Curriculum Vitae</i> of Mark Alan Sturza

2022	Deposition Transcript of David Hilliard Williams for IPR2023-01212 (U.S. Pat. No. 8,406,753) (April 23, 2024)
2023	Deposition Transcript of David Hilliard Williams for IPR2023-01209, -01210, -01211 (U.S. Pat. Nos. 7,561,104, 8,786,494 and 8,400,358) (April 23, 2024)

I. INTRODUCTION

The Board should refuse to find claims 1, 7, 9, 32, 38, and 40 (“Challenged Claims”) of U.S. Patent No. 8,406,753 (“’753 Patent”) unpatentable because none of Petitioner’s art—individually or in combination—disclose the claimed generation of grid points from previously-gathered calibration data that is required by these claims.

The only two independent claims in the ’753 Patent (claims 1 and 32), and thus all the dependent claims, require “generating one or more sets of *grid points* for said calibration data.”¹ Ex. 1001 at cls. 1, 32 (emphasis added). The term “grid points”—which are often described with reference to “non-uniform grid points” or “NUGs” in the ’753 Patent—is not used generically in the patent. They are not just any points on a grid. Rather, as informed by the intrinsic record, the “grid points” are defined by and generated based on evaluation of previously-gathered calibration data.

This requirement is explicit in the Challenged Claims which recite that the claimed grid points are generated “for said calibration data,” which has been

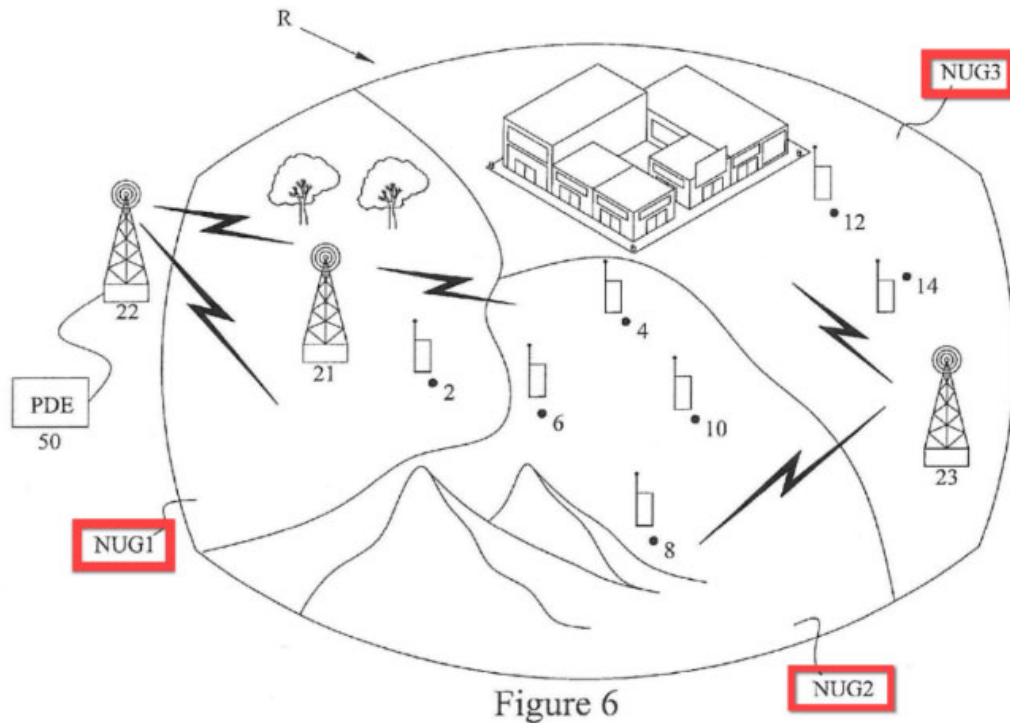
¹ Claim 32 does not use the word “generating,” but rather recites “a processor ... programmed to ... generate one or more sets of grid points for said calibration data.” Ex. 1001 at cl. 32.

collected for “each of one or more calibration points in a geographic region.” Ex. 1001 at cls. 1, 32. And this requirement is expressly described in the specification, which states that “calibration data for these locations [within a geographic region] is ***gathered and analyzed*** so that particular grid points within the geographic region can be determined and associated with a particular set or sets of calibration data.” *Id.* at Abstract, 9:34-39 (emphasis added). Notably, the ’753 Patent further explains that “[t]he geometrical shape (i.e., the shape defined by the union of locations of calibration points assigned to the NUG) and the amount of data accumulated into such NUGs is seen to be variable ***since these are determined by the statistical similarity of the data allocated to a NUG.***” *Id.* at 12:9-14 (emphasis added). In other words, the claimed grid point does not and cannot exist until after calibration data is acquired and evaluated.

In the Related Litigation (*Geoscope Technologies Pte. Ltd. v. Google LLC f/k/a Google Inc.*, Civ. Action No. 1:22-cv-01331 (EDVA)), the district court recognized this defining requirement and construed “grid point” as “a point associated with representative calibration data for an area.” Ex. 1028 at 20. That the claimed grid points are associated with “***representative*** calibration data ***for an area***”—not just any calibration data—requires by its plain language that the calibration data be evaluated to determine what constitutes such representative data and the boundaries of the area represented by that data. This representative data—

which is a subset of the calibration data gathered within the broader “geographic region” (*see* Ex. 1001 at cls. 1, 32)—is then associated with a “grid point” so that it represents the area within these determined boundaries.

To the extent the Board finds that the construction of “grid point” adopted by the district court does not require that the claimed grid points, including their geographical boundaries, be generated based on evaluation of calibration data, the language of the claim requires this. The full limitation recites “[generating/generate] one or more sets of grid points *for said calibration data*,” referring to the “calibration data for each of one or more calibration points in a geographic region” that is collected in the preceding step. Ex. 1001 at cls. 1, 32 (emphasis added). This claim language requires that the claimed grid points be generated based on this measured calibration data. And, as the intrinsic evidence shows, generating the claimed grid points includes defining the shape and boundaries of the area represented by those grid points. Ex. 1001 at 12:4-14. As a result, the claim scope is drawn to an unconventional approach to defining data structures for geolocation. For example, the figure reproduced below from a related patent depicts three “non-uniform grid points” or “NUGs”—which have been generated based on calibration data collected in a broader region “R”—showing that they look nothing like any conventional conception of a “grid” or “grid points.”



Ex. 2013 at Fig. 6.

None of Petitioner's art teaches "grid points" under the proper construction of the term, let alone the full limitation reciting "[generating/generate] one or more sets of grid points for said calibration data." The asserted art only discloses conventional predefined grids and points that are fundamentally different from the grid points claimed in the '753 Patent. Thus, Petitioner fails to meet its burden to prove that this claim is unpatentable when it is properly construed.

II. OVERVIEW OF THE '753 PATENT

The '753 Patent is directed to an invention for determining the location of a mobile device (or "geolocating") using signal information from wireless communications networks (*e.g.*, cellular signals). Ex. 1001 at 1:15-23; Ex. 2020 ¶

58. This involves collecting “calibration data,” which includes measuring the properties of such network signals at known locations referred to as “calibration points.” Ex. 1001 at 9:49-59. These properties may include, as one example, the measured strengths of the network signals, as received at those known locations. Ex. 1001 at 9:60-10:8. After the calibration data is available, mobile devices at unknown locations can observe network signals and measure their properties (*e.g.*, signal strength), and then compare this observed data to the previously-gathered calibration data to determine their location. Ex. 1001 at 9:43-48; Ex. 2020 ¶ 59.

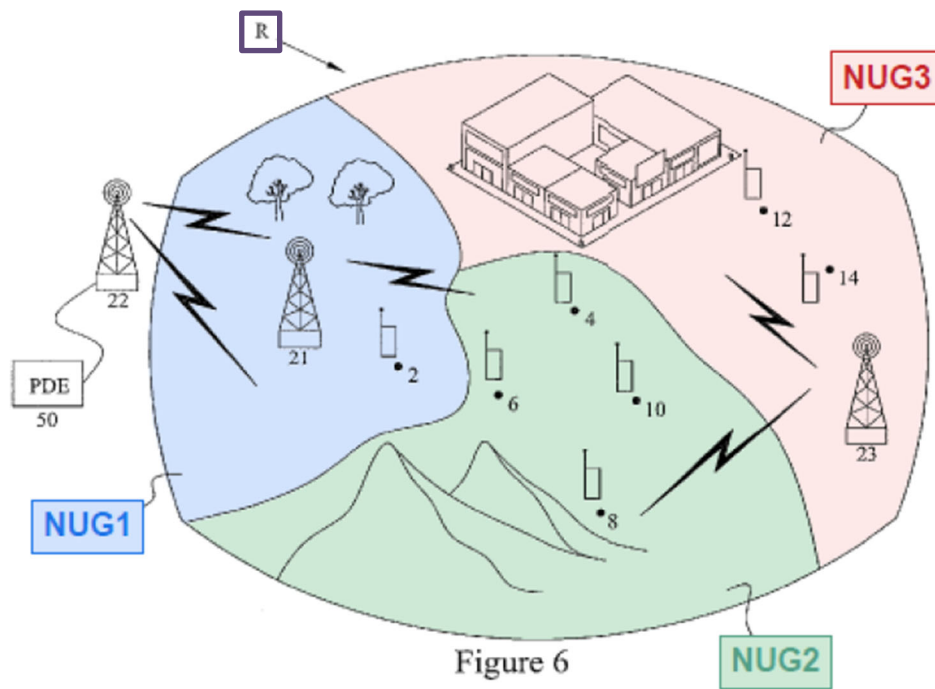
The invention of the ’753 Patent involves the generation and use of what the patent refers to as “grid points” to improve the accuracy and efficiency of this process for using network signals for geolocation. Ex. 1001 at 2:21-50; Ex. 2020 ¶ 59. As explained below, the grid points of the ’753 Patent are data structures that are generated from and associated with signal information based on analysis of the similarities between calibration data that has been previously collected in a region. The grid points serve as additional known locations associated with network signal information, creating a denser “map” for mobile devices to compare observed data to for the purpose of determining their location.

The grid points of the ’753 Patent “usually will not be uniformly distributed throughout the geographic region,” and thus the ’753 Patent (and related patents) often uses the term “non-uniform grid points” or “NUGs” when describing grid

points. Ex. 1001 at 2:43-50; *see also* Ex. 1018 at 3:50-60; Ex. 2020 ¶ 60.² The claimed grid points “represent an area of collected calibration data” and “represent the signal characteristics and/or calibration data over a given region.” Ex. 1018 at 3:50-60; Ex. 2020 ¶ 62.

This is depicted in the related '784 Patent, which shows “a geographical region (R) having NUGs represented by NUG1, NUG2, and NUG3,” and explains “[a] NUG may be generated to represent the signal characteristics and calibration data over a given region.” Ex. 2013 at 6:21-34.

² U.S. Patent No. 7,561,104 (Ex. 1018; “'104 Patent”) and U.S. Patent No. 9,097,784 (Ex. 2013; “'784 Patent”) claim priority to the same provisional application (U.S. Provisional Application No. 60/899,379 (Ex. 1003; “'379 Provisional”) as the '753 Patent, and also describe “grid points” as the term is used in this patent family. The '379 Provisional is incorporated by reference in the '753 Patent (Ex. 1001 at 1:8-11) and includes disclosures regarding “grid points” that are also found in the '104 and '784 Patents. *See* Ex. 1003 at 5-7. Thus, in the Related Litigation, the district court relied on disclosures in the '104 Patent and '784 Patent in construing the term “grid point.” *See* Ex. 1028 at 19-20 (citing '104 Patent (as “Ex. B”) and '784 Patent (as “Ex. F”)).



Id. at Fig. 6 (annotated to show each NUG in geographical region R in a different color); Ex. 2020 ¶ 62.

As seen in the figure, each NUG—which has been generated based on the calibration data collected within “geographical region (R)”—corresponds to a particular area within region R. Ex. 2013 at Fig. 6, 6:21-34; Ex. 2020 ¶ 63. And the calibration data associated with a particular NUG is representative of that area. For example, the subset of calibration data gathered in the region that is associated with NUG1 is representative of the area delineated by the boundaries of NUG1. Ex. 2013 at Fig. 6, 6:21-34; Ex. 2020 ¶ 63.

Additionally, as seen in the figure, the boundaries for each NUG differ, resulting in each NUG having a different shape and size. Consequently, the grid

points are not uniform and look nothing like any conventional notion of a “grid.” Ex. 2020 ¶ 64. This is because the boundaries of each grid point are defined by the calibration data itself. Ex. 1001 at 12:7-14; Ex. 1003 at 7³; Ex. 2020 ¶ 64. Calibration data associated with a grid point must represent the area encompassed by that grid point—*e.g.*, the calibration data associated with NUG1 represents the area within the boundaries of NUG1. Ex. 2013 at Fig. 6; Ex. 2020 ¶ 64. Until that evaluation, the boundaries are undefined and the claimed grid point does not exist. Ex. 2020 ¶ 64. As a result, the shape of each NUG is variable because it is based on evaluation of the calibration data—which itself varies throughout a region—rather than being predefined. This is stated explicitly in the ’753 Patent:

The NUGs may fully cover the region R and each NUG may have statistically similar data accumulated into itself. ***The geometrical shape (i.e., the shape defined by the union of locations of calibration points assigned to the NUG) and the amount of data accumulated into such NUGs is seen to be variable since these are determined by the statistical similarity of the data allocated to a NUG.***

Ex. 1001 at 12:7-14 (emphasis added); *see also* Ex. 1003 at 7; *see also* Ex. 1001 at 1:8-11 (stating that the ’379 Provisional is “incorporated by reference in its entirety” in the ’753 Patent); Ex. 2020 ¶ 65.

³ References to Ex. 1003 refer to the pdf page (*e.g.*, “Page 7 of 40”) rather than the internal pagination of the document.

Thus, a fundamental characteristic of a claimed grid point is that the geographical boundaries of the area it represents must be determined by evaluating the calibration data collected in a region. Ex. 2020 ¶ 66. The '753 Patent further confirms this central aspect of the claimed grid points, explaining they are generated based on evaluation of measured calibration data:

The location of a wireless mobile device may be estimated using, at least in part, one or more pre-existing Network Measurement Reports (“NMRs”) which include calibration data for a number of locations within a geographic region. *The calibration data for these locations is gathered and analyzed so that particular grid points within the geographic region can be determined* and associated with a particular set or sets of calibration data from, for example, one or more NMRs.

Ex. 1001 at Abstract, 2:31-35, 9:34-39 (emphasis added); Ex. 2020 ¶ 66.

Although the '753 Patent claims recite the generation of “grid points,” not only “non-uniform grid points” or “NUGs,” they make clear that the claimed grid points are generated “for said calibration data,” referring to the calibration data recited in the preceding limitation. Ex. 1001 at cls. 1, 32. Thus, regardless of whether the claimed grid points are ultimately uniform or non-uniform, they must be generated based on previously-gathered calibration data. Ex. 1001 at 2:31-35; Ex. 2020 ¶ 67. In practice, this will typically result in non-uniform grid points—accordingly, the '753 Patent explains that the claimed grid points “usually will not be uniformly distributed throughout the geographic region.” Ex. 1001 at 2:43-50;

Ex. 2020 ¶ 68. Although it is possible that the calibration data in a given region may be such that evaluation of the data results in generating grid points that are uniformly distributed throughout a region, this would be unusual. Ex. 1001 at 2:43-50; Ex. 2020 ¶ 68. Even in this unlikely event, however, the grid points (including the boundaries of the area they represent) are still determined from evaluation of the calibration data. Ex. 2020 ¶ 68. Put simply, even if evaluation of the calibration data ultimately results in uniform grid points, the boundaries of those uniform grid points—which define their shape and size (*e.g.*, whether the uniform grid points each cover an area on the order of meters or kilometers)—are still determined from evaluation of the calibration data. Ex. 2020 ¶ 68.

The '753 Patent also refers to a “predetermined fixed uniform grid” but the generated grid points are not necessarily part of this grid—indeed, this grid is a distinct concept from the generated grid points. Ex. 1001 at cl. 4, 13:13-20, 15:57-67, 18:13-26; Ex. 2020 ¶ 69. In other words, even if this “uniform grid” is used, the generated grid points may be non-uniformly distributed. Ex. 2020 ¶ 69. The specification explains that a “uniform grid” may be defined over a region to assign locations and data that form the “root” of a first generated grid point. Ex. 1001 at 10:29-43; Ex. 2020 ¶ 69. The subsequent grid points, however, are generated by evaluating this assigned data and may have different roots that are not part of this uniform grid. Ex. 1001 at 10:44-65; Ex. 2020 ¶ 69. Thus, a single generated grid

point may be anchored to a point on this uniform grid while the other generated grid points are not, and are non-uniformly distributed. Ex. 2020 ¶ 69. The distinction between the “uniform grid” and the generated grid points of the ’753 Patent is further exemplified by Figure 17 and its accompanying disclosure:

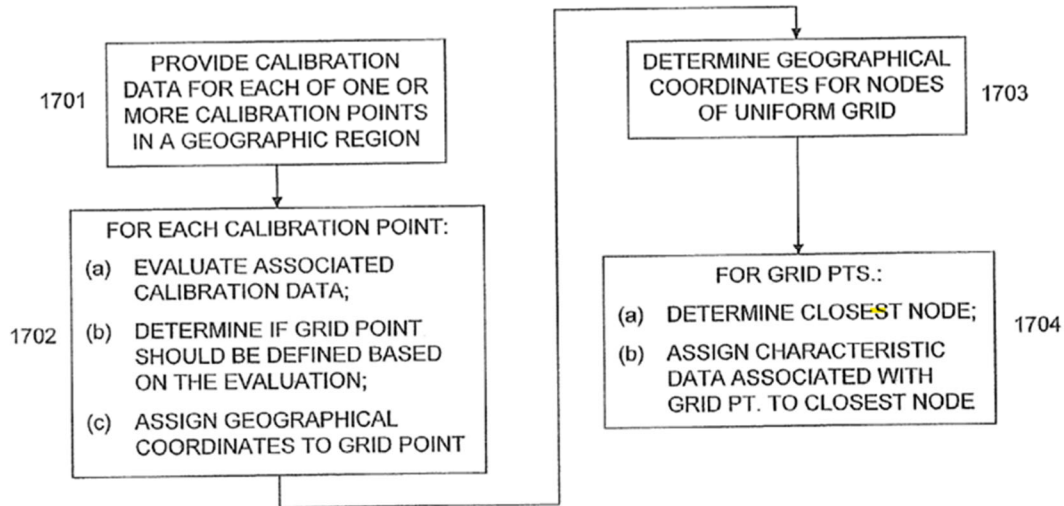


FIGURE 17

Ex. 1001 at Fig. 17, 15:57-67; Ex. 2020 ¶ 69. As seen in block 1702, grid points are generated based on evaluating the calibration data associated with calibration points where the data has been collected (block 1701). Ex. 1001 at Fig. 17, 15:57-67; Ex. 2020 ¶ 70. Then, as a distinct step, there is a determination of “nodes of [the] uniform grid.” Ex. 1001 at Fig. 17, 15:57-67; Ex. 2020 ¶ 70. Thus, the ’753 Patent distinguishes between the generated grid points and the nodes of the uniform grid.

Ex. 1001 at Fig. 17, 15:57-67; Ex. 2020 ¶ 70. Although some of the generated grid points may overlap these nodes under certain circumstances, they are still distinct elements.

The evaluation of calibration data that is part of generating a grid point involves determining which data are “statistically very similar” using “increasingly stringent tests of statistical sufficiency” such that they can be associated with (or “allocated to”) a particular grid point. Ex. 1001 at 10:44-59; Ex. 1003 at 6-7; Ex. 2020 ¶ 71. The “[s]tatistical similarity” of the gathered calibration data can be evaluated to determine where a grid point should be generated, if one should be generated at all, and what subset of gathered calibration data should be allocated to it. Ex. 1001 at 10:66-11:6; Ex. 1003 at 6-7; Ex. 2020 ¶ 71. This “[s]tatistical similarity” in the calibration data can be evaluated using different types of statistical analyses including clustering tests, a probability density function, the mean and variance of the data, or other functions of the calibration data. Ex. 1001 at 10:66-11:6, 12:4-14; Ex. 1003 at 6; Ex. 2020 ¶ 71.

The manner in which the measured calibration data is evaluated and allocated to each grid point further shows why the boundaries of the grid points are variable and dependent on the calibration data. Ex. 2020 ¶ 72. For example, the calibration data is evaluated to determine whether it “exhibit[s] clustering” and, based on that evaluation, is allocated to different grid points. Ex. 1001 at 10:46-47; Ex. 1003 at 6;

Ex. 2020 ¶ 72. If clusters of data collected at different locations (referred to as “calibration points”) are “statistically very similar,” then the data for those calibration points is allocated to the same grid point. Ex. 1001 at 10:55-59; Ex. 1003 at 6; Ex. 2020 ¶ 72. If, however, these clusters of data are determined to be “sufficiently different,” then they are allocated to different grid points. Ex. 1001 at 10:50-55; Ex. 1003 at 6; Ex. 2020 ¶ 72. Because the “geometrical shape” of the area represented by a grid point is “defined by the union of locations of calibration points” allocated to it, this process of evaluating the calibration data in order to allocate it to different grid points defines the boundaries of that area. Ex. 1001 at 12:9-14; Ex. 1003 at 7; Ex. 2020 ¶ 72.

III. LEVEL OF ORDINARY SKILL IN THE ART

Petitioner has defined a person of ordinary skill in the art (“POSITA”) as “someone knowledgeable in wireless networks, cellular radio systems, mobile communication devices and radio navigation systems” having “at least a bachelor’s degree in electrical engineering, with a background in radio frequency communications and/or navigation system technology as well as approximately two years of industry experience working on radio communication and/or navigation systems.” Pet. at 18. Patent Owner does not dispute this definition and adopts it for purposes of this proceeding. *See* Ex. 2020 ¶¶ 47-48.

IV. SUMMARY OF THE REFERENCES ASSERTED IN THE PETITION

A. Spain

Spain describes a “method for determining the location of a mobile unit” using “a fingerprint database that contains a number of fingerprints along with their corresponding location identities.” Ex. 1006 at Abstract, [0047]. Figure 10 of Spain (reproduced below) shows the structure of the fingerprint database, which includes “Lat and Long fields [that] indicate the latitude and longitude of the location to which the fingerprint corresponds” and “the time at which the fingerprint was captured.” *Id.* at [0099].

501

Fingerprint Database					
No.	Lat.	Long.	Time	Fingerprint	Description
1					
2					
3					
4					
5					
6					
...					
L					

Fig. 10

As used in Spain, “fingerprint” refers to “a predetermined combination of observable RF spectral parameters.” *Id.* at [0035]. Spain describes building the fingerprint database by “taking off-line snapshots of fingerprints at various locations” or “taking fingerprint measurements at predetermined locations and using

intelligent algorithms that interpolate the fingerprints at all locations in between the sampled locations.” *Id.* at [0100]-[0101]. Spain further describes that the “complete grid of locations for the cellular service area” can be used as training data to improve the accuracy of the fingerprint database using “learning/training techniques.” *Id.* at [0054]-[0055]. Although Spain provides scant detail on the “learning/training techniques,” Spain explains that “[p]osition will be used as the input value, while signal strength will be used as the target value.” *Id.* at [0054].

B. Agiwal

Agiwal describes “an RF-based system for locating and tracking users in an 802.11 wireless LAN framework” called “LOCATOR.” Ex. 1005 at 102. To estimate a user’s current location, the LOCATOR system utilizes a radio map database that is built by taking multiple signal strength samples at locations set apart at a certain distance and calculating, from these samples, the mean signal strength and signal strength probability distribution function at each location. *Id.* at 102, 104-105. The locations in the radio map database are defined by the desired “granularity” (i.e., “the physical closeness between two consecutive points where the signal strength samples are taken while building the radio map database”). *Id.* at 104.

Figure 3 of Agiwal (reproduced below) depicts the setup used to evaluate the performance of the LOCATOR system in the experiment. The crosses depicted in the figure “indicate the locations where signal strength samples were collected while

building the radio map database,” where the “separation between the crosses defines the granularity” of the radio map database. *Id.* at 106.

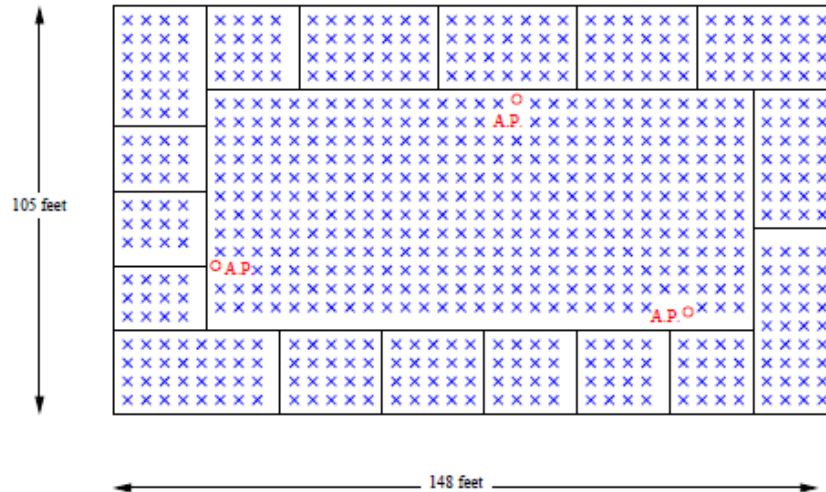


Figure 3: Experimental testbed

V. CLAIM CONSTRUCTION

Petitioner proposed constructions for five terms found in the Challenged Claims of the '753 Patent. Pet. at 19-20. The Board adopted those constructions for purposes of its Institution Decision. D.I. at 22-23. The Board construed “grid point” as “a point associated with representative calibration data for an area,” which is nominally the same construction adopted by the district court in the Related Litigation. D.I. at 23.

Although the Board facially adopted the district court’s construction of “grid point,” it found that this construction does not require the claimed grid points to be “generated based on analysis of calibration data.” *Id.* at 30-31. As explained further below, however, this is required by the district court’s construction of the term and,

in particular, the phrase “representative calibration data for an area” used in the construction. *Infra* § V.A; Ex. 2020 ¶¶ 74-79. Moreover, the intrinsic evidence confirms that the claimed grid points, including the boundaries of the areas they represent, must be generated from evaluation of calibration data. *Infra* § V.B; Ex. 2020 ¶¶ 74, 80-88.

The Board construes claim terms using the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). The intrinsic evidence—including the claim language, specification, and prosecution history—is of primary importance in construing terms. *Id.* at 1314. The ’753 Patent specification specifically incorporates the ’379 Provisional by reference. Ex. 1001 at 1:8-11; *see Trustees of Columbia Univ. in City of New York v. Symantec Corp.*, 811 F.3d 1359, 1365 (Fed. Cir. 2016) (relying on provisional application incorporated by reference in a patent specification to construe a term in the patent) (citing *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000)).

A. The District Court’s Construction of “Grid Point” Requires Evaluation of Calibration Data to Determine the Boundaries of the Area Represented by a “Grid Point”

The district court construed “grid point” as “a point associated with representative calibration data for an area.” Ex. 1028 at 18-20. In its *Markman* Order, the district court expanded on what this construction means in the context of the ’753 Patent and related patents that use the same term.

The district court adopted the phrase “representative calibration data for an area” in its construction of “grid point” to “reflect that *the defining characteristic of a NUG region*—as explained in the specifications of the ’753 Patent, ’104 Patent, and [’784] Patent—is that the data points within an area are all ‘statistically very similar’ such that each of the grid points within the NUG region can represent the overall NUG.” Ex. 1028 at 20 (emphasis added) (citing Ex. 1018 at 3:56-60; Ex. 1001 at 10:29-11:7; Ex. 2013 at 6:22-28). Thus, the district court explained that the phrase “representative calibration data for an area” in its construction means that the calibration data associated with a grid point are “statistically very similar” such that the calibration data are representative of the area encompassed by the grid point. Ex. 2020 ¶ 77. This is also how the ’753 Patent describes the claimed grid points. Ex. 1001 at 10:55-11:6 (explaining how grid points are generated based on evaluation of whether clusters of calibration data are “statistically very similar” and identifying tests used to determine such “[s]tatistical similarity”); Ex. 2020 ¶ 77. Because this is a “defining characteristic,” the claimed grid points cannot exist until after the calibration data is gathered and analyzed.

Under the district court’s construction, a “grid point” is not associated with generic calibration data. Ex. 2020 ¶ 78. Rather, a “grid point” must be associated with calibration data that is *representative for an area*. Ex. 2020 ¶ 78. This requires that the boundaries of the area represented by a given grid point be determined by

evaluating the calibration data so the subset of data associated with that grid point is representative of that area. Ex. 2020 ¶ 78. The '753 Patent describes this as involving the evaluation of statistical similarities across the set of calibration data gathered within a region, and teach examples of the statistical analyses used to generate the claimed grid points from this calibration data. Ex. 1001 at 10:39-65 (“If the aggregated cluster . . . is statistically very similar to either of the first or second clusters . . . then the data for the two calibration points may be allocated to the same NUG”), 12:4-14 (“The NUGs may fully cover the region R and each NUG has statistically similar data accumulated into itself”), 10:66-11:6; Ex. 1003 at 6-7; Ex. 2020 ¶ 78. There is no dispute that what may constitute representative calibration data for an area is a subset of the calibration data that is collected through a broader region. Ex. 2023 at 35:11-36:2, 42:10-45:9; Ex. 2020 ¶ 78; *see also* Ex. 2013 at Fig. 6, 6:21-34 (depicting geographical region (R), where calibration data is collected, divided into different areas each associated with a different grid point (NUG1, NUG2, and NUG3)).

Thus, the district court’s construction requires evaluating the calibration data to determine the boundaries of the area represented by a grid point so that “representative calibration data for [the] area” can be associated with it. Ex. 2020 ¶ 79. If the calibration data is not evaluated, the “representative calibration data for an area” cannot be defined, and thus cannot be associated with a point. Ex. 2020 ¶ 79.

Consequently, interpreting the term “grid point” in a vacuum without this requirement renders the “representative ... for an area” portion of the district court’s construction meaningless and superfluous.

B. The Intrinsic Record Requires Evaluation of Calibration Data to Determine the Boundaries of the Area Represented by a “Grid Point”

Consistent with the district court’s construction, the intrinsic record requires that “grid points,” including the boundaries of the area they represent, be generated based on evaluation of calibration data. Ex. 2020 ¶¶ 80-88. The independent claims of the ’753 Patent require “[providing/receiving] calibration data for each of one or more calibration points in a geographic region” and “generat[ing] one or more sets of grid points for said calibration data.” Ex. 1001, cls. 1 and 32. Thus, the claims require generating grid points—including the boundaries of the areas they represent—based on an evaluation of calibration data. Ex. 2020 ¶ 80.

The specification of the ’753 Patent also supports this interpretation of the claim term “grid point.” Ex. 2020 ¶¶ 81-87. For example, the specification states that “calibration data for these locations must be gathered and analyzed so that particular points (e.g., ‘grid points’) within the geographic region can be determined and associated with a particular set or sets of calibration data from, for example, one or more NMRs.” Ex. 1001 at 2:31-35, Abstract, 9:34-39; Ex. 2020 ¶ 81. Thus, the

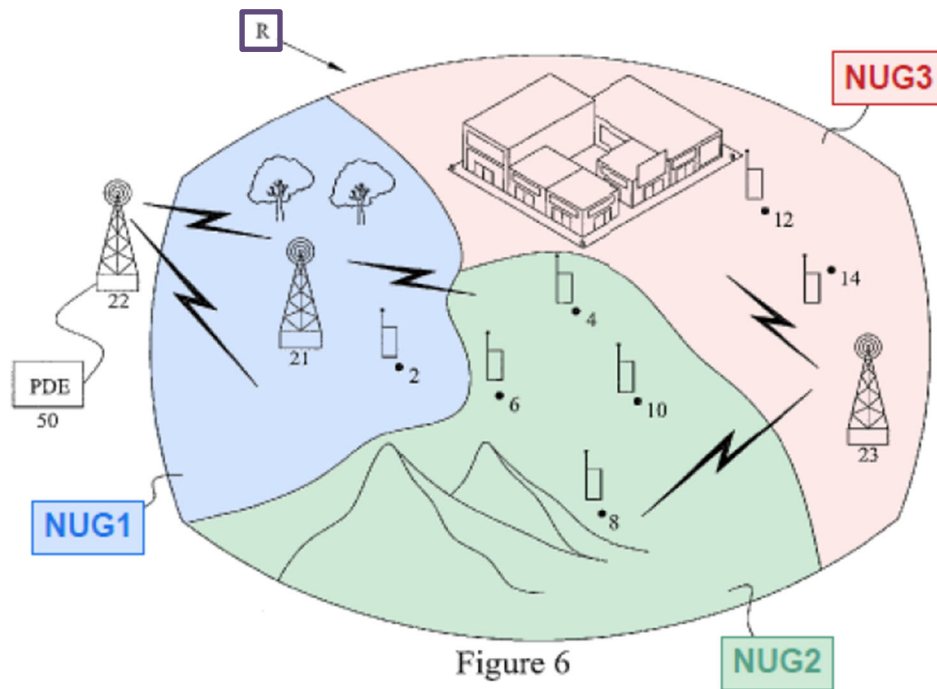
specification teaches that grid points are generated based on an analysis of calibration data. Ex. 2020 ¶ 81.

Similarly, the '753 Patent explains that the boundaries of the area represented by a grid point—which define the shape of that area—are variable because they are based on evaluation of statistical similarities across the gathered calibration data:

The NUGs may fully cover the region R and each NUG may have statistically similar data accumulated into itself. *The geometrical shape (i.e., the shape defined by the union of locations of calibration points assigned to the NUG) and the amount of data accumulated into such NUGs is seen to be variable since these are determined by the statistical similarity of the data allocated to a NUG.*

Ex. 1001 at 12:7-14 (emphasis added); *see also* Ex. 1003 at 7; Ex. 2020 ¶ 82.

NUGs that have been generated based on calibration data collected in a broader region “R” are depicted in Figure 6 of the related '784 Patent, which shows “a geographical region (R) having NUGs represented by NUG1, NUG2, and NUG3.”



Ex. 2013 at Fig. 6 (annotated to show each NUG in geographical region R in a different color), 6:21-34 (“a geographical region (R) having NUGs represented by NUG1, NUG2, and NUG3”); Ex. 2020 ¶ 83.

As shown in the annotated figure, each NUG corresponds to an area that is part of a broader region (R). Ex. 2013 at Fig. 6; Ex. 2020 ¶ 84; *see also supra* § II (further describing the claimed grid points of the ’753 Patent). Calibration data is gathered at different locations in this broader region and then analyzed to define grid points that divide the region into different areas represented by each grid point. Ex. 1001 at 2:31-35 (“The calibration data for these locations [within a geographic region] must be gathered and analyzed so that particular points (e.g., ‘grid points’) within the geographic region can be determined and associated with a particular set

or sets of calibration data from, for example, one or more NMRs.”), Abstract, 9:34-39; Ex. 2020 ¶ 84. As the ’379 Provisional—which is incorporated by reference in the ’753 Patent (Ex. 1001 at 1:8-11)—states, this evaluation of the calibration data is “of great importance since it is *fundamental* to the method” of generating grid points. Ex. 1003 at 6 (emphasis added); Ex. 2020 ¶ 86.

As explained above, the claimed grid points must be generated based on an evaluation of the measured calibration data, including to determine the boundaries of the area they represent, regardless of whether that ultimately results in grid points that are uniform or non-uniform. *Supra* § II; Ex. 1001 at 2:31-35; Ex. 2020 ¶ 85.

The ’753 Patent describes the evaluation of calibration data that occurs to generate a grid point. The “[s]tatistical similarity” of the gathered calibration data is evaluated to generate a grid point, which includes defining the area it represents and associating it with calibration data that is representative of that area. Ex. 1001 at 10:44-11:6, 12:4-14; Ex. 1003 at 6-7; Ex. 2020 ¶ 86. Multiple methods of evaluating statistical similarities across the calibration data may be used to allocate calibration data to different grid points. Ex. 1001 at 10:66-11:6 (referring to “clustering tests” and “K-means algorithm”); Ex. 1003 at 6; Ex. 2020 ¶ 86. For example, calibration data is evaluated to is evaluated to determine whether it “exhibit[s] clustering.” Ex. 1001 at 10:46-47; Ex. 1003 at 6; Ex. 2020 ¶ 86. Clusters of data collected at different “calibration points” that are determined, based on this evaluation, to be “statistically

very similar” are allocated to the same grid point while clusters of data that are “sufficiently different” are allocated to different grid points. Ex. 1001 at 10:50-59; Ex. 1003 at 6; Ex. 2020 ¶ 86.

The result of this evaluation and allocation of data to each grid point is that each has “statistically similar data accumulated into itself”—*i.e.*, each claimed grid point is associated with representative calibration data for an area. Ex. 1001 at 12:7-14; Ex. 1003 at 7; Ex. 2020 ¶ 87. Additionally, the allocation of subsets of calibration data collected at various locations (*i.e.*, different “calibration points”) within a region to different grid points defines the areas represented by each grid point. Ex. 1001 at 10:39-11:6, 12:4-14; Ex. 2020 ¶ 87. Consequently, the “geometrical shape” (*i.e.*, boundaries) of the area represented by a particular grid point is “determined by the statistical similarity of the data” allocated to a grid point, which is based on evaluation of the calibration data. Ex. 1001 at 12:4-14; Ex. 1003 at 7; Ex. 2020 ¶ 87.

For these reasons, the district court’s construction of “grid point,” which Petitioner has proposed and the Board adopted for purposes of institution, requires that a grid point—including the boundaries of the area represented by that grid point—be determined from evaluation of calibration data. *Supra* § V.A. And, as explained above, the intrinsic evidence confirms that this is a requirement of the claim term “grid point.”

**VI. PETITIONER FAILS TO MEET ITS BURDEN TO PROVE THAT
THE CHALLENGED CLAIMS ARE UNPATENTABLE**

Every Challenged Claim recites the limitation “[generating/generate] one or more sets of grid points for said calibration data,” either explicitly or through dependence on independent claims 1 and 32. Ex. 1001 at cls. 1, 32. Petitioner fails to meet its burden to show that the Challenged Claims are unpatentable under the proper construction of the term “grid point” used in these claims. *See supra* § V. Even to the extent Petitioner’s art is found to teach “grid points,” it still fails to teach or render obvious the full limitation requiring the generation of grid points “for said calibration data,” referring to the “calibration data for each of one or more calibration points in a geographic region” recited in the preceding step. Ex. 1001 at cls. 1, 32. There is no disclosure in Spain that teaches or suggests this limitation and Petitioner does not contend that Agiwal teaches or suggests this limitation. *See Pet.* at 24-27. Thus, Petitioner fails to show that Spain, either alone or in view of Agiwal, anticipates or renders obvious the Challenged Claims.

**A. Ground 1: The Challenged Claims are Not Anticipated by Spain or
Rendered Obvious by Spain in View of Agiwal**

Petitioner’s argument fails because Spain does not teach or disclose “grid points” as that term is used in the ’753 Patent (*supra* § V), much less the full

limitation reciting “[generating/generate] one or more sets of grid points for said calibration data.”⁴

Petitioner relies on Spain’s description of how a fingerprint database “is built by taking fingerprint measurements at predetermined locations and using intelligent algorithms that interpolate the fingerprints at all locations between the sampled locations” as disclosing this limitation. Pet. at 25-26 (citing Ex. 1006 at [0101] and [0054]-[0055]). Contrary to Petitioner’s assertion, this disclosure confirms a key distinction between the interpolated fingerprints of Spain and the claimed grid points. Ex. 2020 ¶ 92.

As explained previously, the district court’s construction of “grid point” in the Related Litigation—which Petitioner has proposed for this proceeding (Pet. at 20)—requires the evaluation of calibration data to define the boundaries of the area represented by a “grid point.” *Supra* § V; Ex. 2020 ¶ 93. Moreover, the full language of the relevant limitation in claim 1 recites “generating one or more sets of grid points *for said calibration data*” and in claim 32 recites a processor programmed to “generate one or more sets of grid points *for said calibration data*.” Ex. 1001 at cls.

⁴ Petitioner did not identify any disclosure in Agiwal relevant to this limitation, and thus does not even argue that Agiwal teaches or suggests this limitation. See Pet. at 24-27.

1, 32 (emphasis added). These limitations refer to “calibration data” that is provided or received in a preceding step. *Id.* Thus, the plain language of these claims requires that the claimed grid points be generated based on this calibration data. Ex. 2020 ¶ 93. The ’753 Patent explains that grid points are generated based on calibration data through evaluation of “statistical similarities” in the data that permits allocation of the data to different grid points. *Supra* §§ II, V; Ex. 1001 at 10:44-11:6; Ex. 2020 ¶ 94. This evaluation of the calibration data to allocate it to different grid points defines the “geometrical shape” (*i.e.*, the boundaries) of the area represented by the “grid point.” *Supra* §§ II, V; Ex. 1001 at 12:4-14; Ex. 2020 ¶ 94. Accordingly, even if the Board finds that the term “grid point” does not require the evaluation of calibration data to define the boundaries of the area represented by a “grid point,” the remaining claim language in the Challenged Claims includes this requirement. Ex. 2020 ¶ 94.

In Spain, however, the interpolated fingerprints are used to fill in missing fingerprint measurements at predetermined locations—*i.e.*, locations that are defined in advance independently of any calibration data. Ex. 2020 ¶ 95. Although these fingerprints may correspond to a “small area” surrounding a predetermined location, Spain does not teach how this area is defined or how its boundaries are determined. *See* Ex. 1006 at [0099]-[0101]; Ex. 2020 ¶ 96. Thus, Spain does not teach or suggest that the boundaries of this “small area” are based on evaluation of calibration data. *See* Ex. 1006 at [0099]-[0101]; Ex. 2020 ¶ 96. Indeed, the context of Spain, in which

fingerprints are associated with predetermined locations, suggests that the areas corresponding to a fingerprint—and the boundaries of such areas—are also predetermined, and thus independent of any evaluation of calibration data. Ex. 2020 ¶ 97.

For example, Spain describes “interpolat[ing] the fingerprints at *all locations* in between the sampled locations” to reduce the number of physical measurements to be made to populate the fingerprint database. Ex. 1006 at [0101] (emphasis added). That this interpolation occurs at “all locations” confirms that it is for the purpose of filling in fingerprint measurements for predetermined locations. Ex. 2020 ¶ 95. Interpolating fingerprints for “all locations” is meaningless unless those locations have already been determined and defined; “all” refers to the entire set of locations, requiring the set of locations to be defined in advance. Ex. 2020 ¶ 95.

Especially given Spain’s lack of disclosure to the contrary, a POSITA would understand Spain’s embodiment in which fingerprints may correspond to a “small area” (instead of “one exact spot” identified by a particular latitude and longitude) to similarly use predetermined areas that are defined without any evaluation of calibration data. Ex. 1006 at [0099]-[0101]; Ex. 2020 ¶¶ 96-97. That the “small area” is identified by a particular predetermined location represented in the “Lat and Long fields” further confirms that the boundaries of the “small area[s]” described by Spain are not determined from evaluation of calibration data, but rather are predetermined

without any consideration of the calibration data. Ex. 1006 at [0099]; Ex. 2020 ¶ 97. Additionally, Petitioner identifies nothing in Spain teaching evaluating the statistical similarity, or any other commonality, in the stored calibration data, despite that being a fundamental aspect of how “grid points” are described in the ’753 Patent. *See supra* §§ II, V.

In the Institution Decision, the Board preliminarily found that Patent Owner introduced requirements into the term “grid point” that are not part of the construction of the term. D.I. at 30-31. Patent Owner has further addressed the construction of “grid point” to clarify that “grid points,” including the boundaries of the areas they represent, must be generated based on evaluation of the calibration data. *Supra* § V. Moreover, as explained above, even if the Board disagrees with Patent Owner’s arguments regarding the term “grid point,” the surrounding claim language requires that the claimed grid points be generated “for said calibration data,” and Spain fails to teach or suggest this.

For these reasons, Petitioner has failed to demonstrate that Spain or Agiwal teaches or suggests “generating one or more sets of grid points for said calibration data” or a processor programmed to “generate one or more sets of grid points for said calibration data.” Because this limitation is part of every Challenged Claim, Petitioner fails to show that Spain, either alone or in view of Agiwal, anticipates or renders obvious the Challenged Claims.

VII. CONCLUSION

For the foregoing reasons, Petitioner has failed to meet its burden to prove that the Challenged Claims of the '753 Patent are unpatentable. Accordingly, the Board should confirm the patentability of the Challenged Claims.

Dated: May 29, 2024

Respectfully submitted,

/Stephen McBride/

James T. Carmichael
Reg. No. 45,306
Lead Counsel for Patent Owner
Stephen McBride
Reg. No. 78,396
Minghui Yang
Reg. No. 71,989
CARMICHAEL IP, PLLC
8607 Westwood Center Drive
Suite 270
Tysons, VA 22182
jim@carmichaelip.com
stevemcbride@carmichaelip.com
mitch@carmichaelip.com
Tel: (703) 646-9255

Ryan J. Singer
Reg. No. 79,736
Christopher M. Gerson
Pro Hac Vice
Saunak K. Desai
Pro Hac Vice
Backup Counsel for Patent Owner
SCHULTE ROTH & ZABEL LLP
919 Third Avenue
New York, New York 10022
Tel: (212) 756-2000
Fax: (212) 593-5955
ryan.singer@srz.com
chris.gerson@srz.com
saunak.desai@srz.com

Counsel for Patent Owner
Geoscope Technologies Pte. Ltd.

CERTIFICATE OF COMPLIANCE

The undersigned certifies that this brief complies with the type-volume limitations of 37 CFR § 42.24(a)(1)(i). This brief contains 6450 words as calculated by the “Word Count” feature of Microsoft Word, the word processing program used to create it. The undersigned further certifies that this brief complies with the typeface requirements of 37 CFR § 42.6(a)(2)(ii) and typestyle requirements of 37 CFR § 42.6(a)(2)(iii). This brief has been prepared in a proportionally spaced typeface using Microsoft Word in Times New Roman 14 point font.

Dated: May 29, 2024

/Stephen McBride/
James T. Carmichael
Reg. No. 45,306
Lead Counsel for Patent Owner
Stephen McBride
Reg. No. 78,396
Minghui Yang
Reg. No. 71,989
CARMICHAEL IP, PLLC
8607 Westwood Center Drive
Suite 270
Tysons, VA 22182
jim@carmichaelip.com
stevemcbride@carmichaelip.com
mitch@carmichaelip.com
Tel: (703) 646-9255

Ryan J. Singer
Reg. No. 79,736
Christopher M. Gerson
Pro Hac Vice
Saunak K. Desai
Pro Hac Vice

Backup Counsel for Patent Owner
SCHULTE ROTH & ZABEL LLP
919 Third Avenue
New York, New York 10022
Tel: (212) 756-2000
Fax: (212) 593-5955
ryan.singer@srz.com
chris.gerson@srz.com
saunak.desai@srz.com

*Counsel for Patent Owner
Geoscope Technologies Pte. Ltd.*

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing **Patent Owner's Response**, was served on May 29, 2024 via email directed to counsel of record for the Petitioner at the following address of record as listed on PTACTS:

Lead Counsel:

Patrick C. Keane, Esq.
Registration No. 32,858
BUCHANAN INGERSOLL &
ROONEY PC
1737 King Street, Suite 500
Alexandria, Virginia 22314
Direct Telephone (703) 838-652 2
Main Facsimile (703) 836-2021
patrick.keane@bipc.com

Backup Counsel:

Matthew L. Fedowitz, Esq.
Registration No. 61,386
BUCHANAN INGERSOLL &
ROONEY PC
1700 K Street, NW, Suite 300
Washington, DC 20006
Direct Telephone (202) 452-7306
Main Facsimile (202) 452-7989
matthew.fedowitz@bipc.com

Backup Counsel:

Mythili Markowski, Ph.D., Esq.
Registration No. 67,063
BUCHANAN INGERSOLL &
ROONEY PC
1700 K Street, N.W., Suite 300
Washington, DC 20006
Direct Telephone (202) 452-7314
Main Facsimile (202) 452-7989
mythili.markowski@bipc.com

Backup Counsel:

Roger H. Lee, Esq.
Registration No. 46,317
BUCHANAN INGERSOLL &
ROONEY PC
1737 King Street, Suite 500
Alexandria, Virginia 22314
Direct Telephone (703) 838-6545
Main Facsimile (703) 836-2021
roger.lee@bipc.com

Backup Counsel:

Andrew R. Cheslock, Esq.
Registration No. 68,577
BUCHANAN INGERSOLL &
ROONEY PC
1737 King Street, Suite 500
Alexandria, VA 22314
Direct Telephone (703) 838-6523
Main Facsimile (703) 836-2021
andrew.cheslock@bipc.com

Backup Counsel:

Samuel Harrod, Esq.
Registration No. 79,148
BUCHANAN INGERSOLL &
ROONEY PC
Union Trust Building,
501 Grant Street, Suite 200
Pittsburgh, PA 15219
Direct Telephone (412) 562-8805
Main Facsimile (412) 562-1041

samuel.harrod@bipc.com

Backup Counsel:

Ralph G. Fischer, Esq.
Registration No. 55,179
BUCHANAN INGERSOLL &
ROONEY PC
Union Trust Building
501 Grant Street, Suite 200
Pittsburgh, PA 15219
Direct Telephone (412) 392-2121
Main Facsimile (412) 562-1041
ralph.fischer@bipc.com

Dated: May 29, 2024

/Stephen McBride/

James T. Carmichael
Reg. No. 45,306
Lead Counsel for Patent Owner
Stephen McBride
Reg. No. 78,396
Minghui Yang
Reg. No. 71,989
CARMICHAEL IP, PLLC
8607 Westwood Center Drive
Suite 270
Tysons, VA 22182
jim@carmichaelip.com
stevemcbride@carmichaelip.com
mitch@carmichaelip.com
Tel: (703) 646-9255

Ryan J. Singer
Reg. No. 79,736
Christopher M. Gerson
Pro Hac Vice
Saunak K. Desai
Pro Hac Vice

Backup Counsel for Patent Owner
SCHULTE ROTH & ZABEL LLP
919 Third Avenue
New York, New York 10022
Tel: (212) 756-2000
Fax: (212) 593-5955
ryan.singer@srz.com
chris.gerson@srz.com
saunak.desai@srz.com

*Counsel for Patent Owner
Geoscope Technologies Pte. Ltd.*