NOTE: This disposition is nonprecedential.

United States Court of Appeals for the Federal Circuit

PROBIR KUMAR BONDYOPADHYAY,
Plaintiff-Appellant

v.

UNITED STATES,
Defendant-Appellee

2018-1674

Appeal from the United States Court of Federal Claims in No. 1:14-cv-00147-MCW, Judge Mary Ellen Coster Williams.

Decided: September 7, 2018

PROBIR KUMAR BONDYOPADHYAY, Houston, TX, pro se.

ALICE SUH JOU, Commercial Litigation Branch, Civil Division, United States Department of Justice, Washington, DC, for defendant-appellee. Also represented by GARY LEE HAUSKEN, CHAD A. READLER.

Before NEWMAN, O'MALLEY, and CHEN, *Circuit Judges.*

PER CURIAM.

Dr. Probir Kumar Bondyopadhyay, proceeding *pro se*, appeals from the U.S. Court of Federal Claims' ("Claims Court") entry of summary judgment in favor of the government finding that a prototype antenna solicited by the U.S. Air Force ("Air Force") does not infringe certain claims of U.S. Patent No. 6,292,134 ("the '134 patent") based on its construction of the term "sphere." Because the Claims Court did not err in its claim construction or in its noninfringement analysis, we *affirm*.

I. BACKGROUND

A. The '134 Patent

Dr. Bondyopadhyay is the owner and named inventor of the '134 patent, titled "geodesic sphere phased array antenna system."[1] The '134 patent "relates, in general, to phased array antennas which provide hemispherical or wider coverage for multi-satellite communications," and, more particularly relates "to a phased array antenna mounted on a geodesic sphere and adapted for multi-band communications with satellites in earth orbits." '134 patent, col. 1, ll. 8–13.

The specification explains that a phased array antenna system is a collection of smaller antenna elements that operate synchronously to create a stronger communication signal than that of a single antenna. This synchronization is accomplished by aligning the "phases" of the

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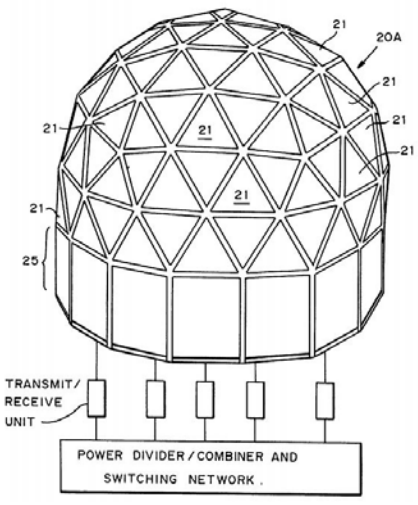
[1] The '134 patent issued on September 18, 2001, but expired on September 18, 2009 for failure to pay required maintenance fees. The '134 patent was reinstated on April 29, 2015 when the U.S. Patent and Trademark Office granted Dr. Bondyopadhyay's September 4, 2014 petition under 37 C.F.R. § 1.378(b).

antenna elements—the sinusoidal curves that send a communication signal. *Id.* col. 1, ll. 51–57. To align these sinusoidal curves, the antennas are connected by a "feed structure" that energizes electromagnetic signals to each of the individual antennas in the array. *Id.*

The specification repeatedly refers to the ability of the system to provide hemispherical, or 180 degree, communication coverage. *Id.* col. 1, ll. 57–64 (stating that "[h]emispherical or wider communication coverage by phased array antenna systems has been realized" by certain means); *id.* col. 2, ll. 11–15 (describing "useful, albeit costly phased array antenna systems that are capable of providing hemispherical communication coverage"); *id.* col. 3, ll. 50–53 ("It is the main objective of the present invention to create a low cost phased array antenna architecture that will provide communication coverage over the entire hemisphere."). Indeed, it describes "the present invention" as a phased array antenna that "comprises a plurality of substantially equilateral triangular-shaped planar subarray units" that are "arranged *in a geodesic sphere* configuration derived from a regular or semi-regular polyhedron and mounted on a geodesic structure of corresponding configuration." *Id.* col. 3, l. 66–col. 4, l. 6 (emphasis added). One embodiment of the invention is depicted in Figure 2A, reproduced below:



Claim 14, one of the three claims that Dr. Bondyopadhyay asserted against the government, recites:

> 14. A *geodesic sphere phased array antenna system* for multi-satellite communications and tracking, said antenna system comprising:
>
> a *geodesic structure* derived from a truncated icosahedron having *twelve pentagonal and twenty hexagonal planar faces*, a plurality of said geodesic planar surfaces each having mounted thereon a subarray of planar antenna element units;
>
> transmit and receive signal processing means connected to each said planar antenna element unit of each said subarray for simultaneous transmission and reception of signals;
>
> electromagnetic signal feed means connected to each said planar antenna element unit of each said subarray for forming at least one electromagnetic beam in space;
>
> electronic switching means for selectively connecting each said planar antenna element unit of said subarrays to adjacent planar antenna element unit of said subarray or adjacent subarrays for generating multiple electromagnetic beams in selective diverse directions in space;
>
> electronic phase shifting means connected to each said planar antenna element of each said subarray for providing electronic scanning capability to said subarrays of antenna element units connected by said electronic switching means with the phased array communication space being segmented into a plurality of smaller cellular spaces,
>
> each said cellular communication space for electronic scanning being defined by a plurality of discrete chosen directions corresponding to the said

> geodesic sphere phased array structure and, each said cellular communication space adapted to be electronically scanned by a plurality of active said contiguous phased subarrays corresponding to the said cellular communication space.

'134 patent, col. 14, ll. 33–67 (emphases added). Claim 25 similarly recites "[a] geodesic sphere phased array antenna system" comprising "a geodesic structure . . . having a plurality of planar faces forming a geodesic three dimensional structure," but does not specify the structure(s) or number of planar surfaces. *Id.* col. 16, ll. 14–47. Finally, claim 26, which depends from claim 25, specifies that "said geodesic structure is derived from any of the fifteen semi-regular polyhedral which is a member of" a particular class of solids. *Id.* col. 16, ll. 48–58.

B. Procedural History

On February 24, 2014, Dr. Bondyopadhyay brought suit against the government in the Claims Court, asserting primarily that the Air Force infringed claims of the '134 patent by "developing and manufacturing" a prototype geodesic dome phased-array antenna ("GDPAA") for future public use in cooperation with non-party contractors, including Ball Aerospace. Dr. Bondyopadhyay further asserted that the Air Force engaged in "procurement fraud" originating in 1999 and took his property without just compensation in violation of the Fifth Amendment to the U.S. Constitution.

On March 20, 2015, the Claims Court dismissed all of Dr. Bondyopadhyay's non-patent claims and dismissed his patent infringement claim to the extent it was premised on acts occurring on or before January 11, 2008, in light of the applicable statute of limitations.[2] The Claims Court

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[2] The Claims Court also dismissed Dr. Bondyopadhyay's infringement claims arising after the fees-

then issued a claim construction order, construing the term "sphere" to mean "greater than a hemisphere so as to provide the phased array antenna hemispherical or wider coverage." *Bondyopadhyay v. United States*, 129 Fed. Cl. 793 (Fed. Cl. 2017) ("*Claim Construction Order*"). In reaching this construction, the Claims Court (1) concluded that the preamble of the claims is limiting, *id.* at 802–04; (2) relied on passages in the specification describing the invention's spherical shape and ability to provide "hemispherical coverage," *id.* at 805–07; and (3) implicitly credited testimony from the government's experts that,

> For a geodesic sphere phased array antenna to provide coverage over an entire hemisphere—from horizon to horizon—the area covered by such antenna must be greater than a hemisphere because there must be energized phased array antenna elements 73 below the "equator" line in order to project the electromagnetic beam towards the cellular communication space 71 located on the horizon.

Id. at 798–99. Dr. Bondyopadhyay then filed initial and supplemental infringement contentions—identifying claims 14, 25, and 26 as the ones allegedly infringed—and the government thereafter moved for summary judgment of noninfringement.

The Claims Court granted the government's motion on February 9, 2018, finding there to be no dispute of material fact that the sole accused apparatus, the six-panel "Ball Advanced Technology Demonstration antenna" depicted below, does not infringe any of the asserted

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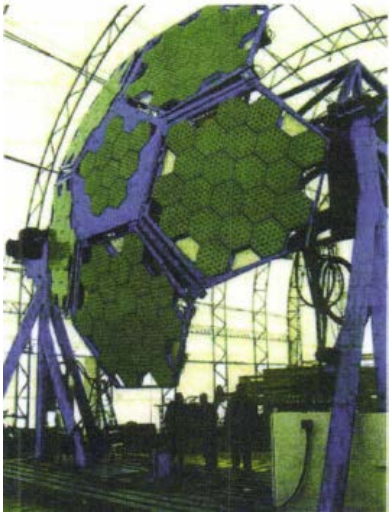
related expiration of the '134 patent, but both sides agree that this dismissal became moot after the patent was reinstated.

claims, either literally or under the doctrine of equivalents.



Bondyopadhyay v. United States, 136 Fed. Cl. 114, 120, 124 (2018) ("*Summary Judgment Order*"). In particular, the Claims Court found there to be no dispute that this six-panel antenna, which spans 120 degrees, meets neither the structural nor coverage definitions required under its claim construction. *Id.* at 121–22.

Dr. Bondyopadhyay timely appeals. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(3).[3]

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[3] Dr. Bondyopadhyay's opening brief describes the U.S. District Court for the Southern District of Texas as the "original trial court" in this case and includes an October 2013 order dismissing his complaint in *Bondyopadhyay v. Sec'y of Defense*, No. 4:13-cv-01914 (S.D. Tex.). Appellant Br. 1, 10. The government has also indicated that Dr. Bondyopadhyay filed several other cases against it in that court, all of which were dismissed prior to his initiation of the instant lawsuit in the Claims Court. *See*

II. DISCUSSION

Dr. Bondyopadhyay's appeal primarily concerns the construction of the term "sphere." He contends that the Claims Court failed to consider the claims' various descriptions of what constitutes a "geodesic structure," and submits that these descriptions explain that the word "sphere," in the context of the invention, means "spherical," not necessarily a full sphere, and that a "geodesic dome" is a special geodesic sphere that constitutes about half of the sphere. He also argues that, even if the Air Force has not yet completed a fully operative GDPAA, the Claims Court erred in finding that the accused six-panel prototype does not infringe.

The Claims Court did not err either in its construction of the term "sphere" or in its noninfringement conclusions. "[T]he ultimate issue of the proper construction of a claim should be treated as a question of law." *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 839 (2015). To ascertain the scope and meaning of the asserted claims, we look to the words of the claims themselves, the specification, the prosecution history, and any relevant extrinsic evidence. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315–17 (Fed. Cir. 2005) (en banc). We review any "subsidiary factual findings [regarding extrinsic evidence] under the 'clearly erroneous' standard." *Teva*, 135 S. Ct. at 839.

It is a "bedrock principle" of patent law that "'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips*, 415 F.3d at 1312 (quoting *Innova/Pure Water, Inc. v. Safari*

Appellee Br. 1. To the extent Dr. Bondyopadhyay challenges the district court's dismissal of any of those actions through this appeal, we lack jurisdiction over any such challenges.

Water Filtration Sys. Inc., 381 F.3d 1111, 1115 (Fed. Cir. 2004)). Claim terms should be given their ordinary and customary meaning as used in the field of invention, which is the meaning a claim term would have to a skilled artisan at the time of the invention. *Id.* at 1312–13. Moreover, a person of ordinary skill in the art is "deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.* at 1313.

First, the Claims Court correctly concluded that the preamble of each claim—"[a] geodesic sphere phased array antenna system for multi-satellite communications and tracking, said invention comprising . . ."—is limiting. *Claim Construction Order*, 129 Fed. Cl. at 802–04. A preamble may limit the scope of a patent claim if it acts as a necessary component of the claimed invention by providing an antecedent basis from which limitations in the body of the claim are derived. *Pacing Techs., LLC v. Garmin Int'l, Inc.*, 778 F.3d 1021, 1024 (Fed. Cir. 2015). The preamble is also limiting if it "recites essential structure that is important to the invention or necessary to give meaning to the claim." *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 952 (Fed. Cir. 2006) (internal quotation marks omitted). Whether the preamble is limiting depends "on the facts of each case in light of the claim as a whole and the invention described in the patent." *Storage Tech. Corp. v. Cisco Sys., Inc.*, 329 F.3d 823, 831 (Fed. Cir. 2003).

In each claim, the phrase "geodesic sphere phased array antenna system" provides an antecedent basis from which a limitation in the body is derived. *See* '134 patent, col. 14, ll. 60–67 (requiring that "each said cellular communication space for electronic scanning [is] defined by a plurality of discrete chosen directions corresponding to *the said geodesic sphere phased array structure*" (emphasis added)); *id.* col. 16, ll. 40–47 (same). The title of the

patent and its specification further support the notion that the only phased array antenna structure claimed is in the shape of a geodesic sphere. Indeed, the detailed description refers to the "present invention" as being a "geodesic sphere phased array antenna." *Id.* col. 6, ll. 24–25. These factors persuade us that the preamble is limiting. *See Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1358 (Fed. Cir. 2012) (finding the term "rotary cutter deck" in the preamble to be limiting where the term describes a "fundamental characteristic of the claimed invention" and the specification refers to the "present invention" as "an improved deck for a rotary cutter" or a "rotary cutter deck").

Given our conclusion that the phrase "geodesic sphere phased array antenna" is a claim limitation, we must next determine whether the Claims Court properly construed the term "sphere" within that phrase to mean "greater than a hemisphere so as to provide the phased array antenna hemispherical or wider coverage." *Claim Construction Order*, 129 Fed. Cl. at 807. We conclude that it did.

As a starting point, the plain and ordinary meaning of the word "sphere" connotes a three-dimensional 360-degree ball with a uniform diameter. A construction requiring that the antenna cover the full 360 degrees, however, cannot be the meaning that the patentee intended. First, some embodiments, such as the one depicted in Figure 2A, are described as being "less than a full sphere but greater than a sphere," suggesting that the word "sphere," standing alone, means something other than a full, 360-degree sphere. '134 patent, col. 6, ll. 55–56; *see also id.* col. 8, ll. 29–31 ("The geodesic sphere phased array antenna to be constructed for hemispherical coverage will be larger than the hemisphere but less than a full sphere."). Similarly, Figure 2A depicts a ground-based geodesic structure covering more than a hemisphere mounted on top of a non-spherical platform. *Id.*

Fig. 2. And other embodiments, such as the one recited in claim 13 and described in the specification, include the modifier "full" before the phrases "geodesic sphere" and "geodesic spherical structure," lending further support to the understanding that, according to the '134 patent, a geodesic sphere need not cover the full 360 degrees. *Id.* col. 6, ll. 40–44; *id.* col. 7, ll. 51–52.

What portion, then, of the surface area of a "full sphere" must a "geodesic sphere" comprise? In the proceedings below, Dr. Boundyopadhyay argued that a "geodesic sphere" could be "ten (10%), fifty percent (50%) or more up to even [one] hundred percent (100%)," depending "on the specific applications . . . for which the spherical phased array antenna is built and utilized." *Claim Construction Order*, 129 Fed. Cl. at 802. The government submitted that a "geodesic sphere" must comprise at least 50% of the surface area of a sphere—i.e., it must be at least a hemisphere. *Id.* The Claims Court agreed with the government. So do we.

The specification repeatedly and uniformly describes the "present invention" as being greater than a hemisphere to provide "hemispherical or wider coverage." '134 patent, col. 1, ll. 8–14 ("*This invention* relates, in general, to phased array antennas which provide *hemispherical or wider coverage* for multi-satellite communications and more particularly to a phased array antenna mounted on a geodesic sphere and adapted for multi-band communications with satellites . . . ." (emphases added)); *id.* col. 3, ll. 49–52 ("It is *the main objective* of *the present invention* to create a low cost phased array antenna architecture that will provide communication *coverage over the entire hemisphere*." (emphases added)); *id.* col. 8, ll. 29–34 ("The geodesic sphere phased array antenna to be constructed for hemispherical coverage will be *larger than the hemisphere but less than a full sphere*. Depending on the array antenna gain required for specific applications, the geodesic sphere array structure may extend in elevation

space from -45°> through +90° (zenith) which is *¾th sphere*." (emphases added)). As the Claims Court pointed out, the specification defines the antenna's surface area in precise, mathematical terms: "The geodesic sphere phased array antenna structure is designed to provide greater than hemispherical coverage and in the present invention, the elevation angle of the structure extends from +90° through -θ° where θ° could be 45° to 30°." *Id.* col. 6, ll. 36–40. The Claims Court then relied on the undisputed testimony of the government's expert that, viewing the geodesic sphere vertically, this statement requires that the geodesic sphere be extended between 30° and 45° below the horizon, such that it covers more than a hemisphere, a finding to which we owe deference under *Teva*. *Claim Construction Order*, 129 Fed. Cl. at 805–06. Where, as here, the patent "describes the features of the 'present invention' as a whole, this description limits the scope of the invention." *TiVo, Inc. v. EchoStar Commc'ns Corp.*, 516 F.3d 1290, 1300 (Fed. Cir. 2008) (quoting *Verizon Servs. Corp. v. Vonage Holdings Corp.,* 503 F.3d 1295, 1308 (Fed. Cir. 2007)); *see also Pacing Techs., LLC v. Garmin Int'l, Inc.*, 778 F.3d 1021, 1025 (Fed. Cir. 2015) ("When a patentee 'describes the features of the "present invention" as a whole,' he alerts the reader that 'this description limits the scope of the invention.'" (quoting *Regents of Univ. of Minn. V. AGA Med. Corp.*, 717 F.3d 929, 936 (Fed. Cir. 2013))).

Moreover, none of the figures in the specification depict an embodiment with a surface area less than a hemisphere. We agree with the Claims Court that Figures 1, 2(a), 5(b), 6(b), 12(b), and 13(a), (b), and (c) disclose embodiments of geodesic spheres that are greater than a hemisphere, *Claim Construction Order*, 129 Fed. Cl. at 806, and do not find that any of the other figures depict a geodesic sphere with less than 180-degree coverage. Although Figures 7 and 8 appear to depict shapes with less than hemispherical coverage, the written description

makes clear that these figures are intended to illustrate the "energized portion of the geodesic sphere array." '134 patent, col. 5, ll. 31–43.

Because Dr. Bondyopadhyay does not dispute that the sole accused device was only capable of providing a field of view of 120 degrees—less than the 180 degrees necessary to provide hemispherical coverage—and because he has provided no argument why the apparatus infringed under the doctrine of equivalents, the Claims Court correctly granted summary judgment of noninfringement in favor of the government. We have considered Dr. Bondyopadhyay's remaining arguments and find them unpersuasive.[4]

III. CONCLUSION

For the foregoing reasons, the judgment of the Claims Court is

AFFIRMED

COSTS

No costs.

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[4] On July 31, 2018, the court received a document from Dr. Bondyopadhyay asking for his case to be resolved expeditiously. *See* Mot. to Expedite, No. 18-1674 (July 31, 2018), ECF No. 29. Nothing in this document alters our view that the Claims Court correctly awarded summary judgment to the government. The motion is denied as moot.