United States Court of Appeals for the Federal Circuit

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ART+COM INNOVATIONPOOL GMBH,
Plaintiff-Appellant

v.

GOOGLE LLC,
Defendant-Appellee

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2017-1016

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Appeal from the United States District Court for the District of Delaware in No. 1:14-cv-00217-TBD, Circuit Judge Timothy B. Dyk.

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Decided: October 20, 2017

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SCOTT F. PARTRIDGE, Baker Botts LLP, Houston, TX, argued for plaintiff-appellant. Also represented by MICHAEL HAWES, L. GENE SPEARS.

DARYL JOSEFFER, King & Spalding LLP, Washington, DC, argued for defendant-appellee. Also represented by JOSHUA NATHANIEL MITCHELL.

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Before LOURIE, O'MALLEY, and TARANTO, *Circuit Judges.*

O'MALLEY, *Circuit Judge.*

Art+Com Innovationpool GmbH ("Art+Com") appeals the district court's entry of judgment following a jury trial. The jury found that Appellee Google LLC ("Google") did not infringe claims 1, 3, 14, and 28 (the "asserted claims") of U.S. Patent No. RE44,550 ("the '550 patent"), and that each of the asserted claims is invalid as anticipated and/or obvious. The district court entered judgment consistent with these verdicts and denied Art+Com's renewed motion for judgment as a matter of law, finding that each is supported by substantial evidence.

Because we find that substantial evidence supports the jury's conclusion that each of the asserted claims is invalid, we *affirm* the district court's denial of Art+Com's motions for judgment as a matter of law. In light of this conclusion, we need not and do not consider the judgment of noninfringement.

I. BACKGROUND

Art+Com is the owner by assignment of the '550 patent, titled "Method and Device for Pictorial Representation of Space-Related Data." Broadly speaking, the '550 patent is directed to methods for displaying geographic—i.e., topographic or meteorological—data, such as satellite images, to a user who has a selectable viewpoint, taking into account the user's location and direction of view. The '550 patent claims priority to a U.S. patent application filed on December 17, 1996. Accordingly, it is undisputed that the critical date for purposes of anticipation under 35 U.S.C. § 102(b) is December 17, 1995.

Claim 1, on which asserted claims 3, 14, and 28 depend, recites the following:

1. A method of providing a pictorial representation of space-related data of a selectable object, the representation corresponding to a view of the object by an observer with a selectable location and a selectable direction of view comprising:

   (a) providing a plurality of spatially distributed data sources for storing space-related data;

   (b) determining a field of view including an area of the object to be represented through a selection of a distance of the observer to the object and an angle of view of the observer to the object;

   (c) requesting data for the field of view from at least one of the plurality of spatially distributed data sources;

   (d) centrally storing the data for the field of view;

   (e) representing the data for the field of view in a pictorial representation having one or more sections;

   (f) using a computer, dividing each of the one or more sections having image resolutions below a desired image resolution into a plurality of smaller sections, requesting higher resolution space-related data for each of the smaller sections from at least one of the plurality of spatially distributed data sources, centrally storing the higher resolution space-related data, and representing the

> data for the field of view in the picto-
> rial representation; and

> (g) repeating step (f), dividing the sec-
> tions into smaller sections, until eve-
> ry section has the desired image
> resolution or no higher image resolu-
> tion data is available.

'550 patent col. 10, ll. 16–44.[1]   Throughout the trial,
Google and its witnesses referred to the asserted claims
as requiring "coarse-to-fine" zooming, in which the device
iteratively "divides" parent nodes into at least two child
nodes that point to higher resolution image data, then
requests, stores, and displays the data for these child
nodes until either the desired image resolution for each
parent node is achieved or no higher image resolution
data is available. *See, e.g.*, Trial Tr. 1229 ll. 8–23, ECF
Nos. 418–23.

Art+Com filed suit against Google in February 2014,
alleging that Google's "Google Earth, Version 7" and
related software products infringe the asserted claims of
the '550 patent.   Trial commenced on May 23, 2016,
during which Google sought to prove that the invention
was placed in public use prior to December 17, 1995, and
that the '550 patent, therefore, is invalid under § 102(b).

Google introduced several forms of evidence in sup-
port of this effort.   First, it called Stephen Lau as a wit-
ness, who testified that, while he was employed at the
federally funded, not-for-profit company Stanford Re-
search Institute ("SRI"), he helped develop SRI Ter-

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[1]   Because the '550 patent is a reissue patent, its
claims contain certain language in brackets and in bold or
italics that reflect additions, deletions, and modifications
from prior applications.   To assist the reader, we only
include the operative language.

raVision, "an earth visualization application" that "used a co[arse-to-fine] algorithm to retrieve images [sic] data across the network from multiple servers." Trial Tr. 1029 ll. 9–18. He further testified that SRI TerraVision was part of the "MAGIC project," an "umbrella federally funded research project" that focused on terrain visualization. *Id.* at 1030 ll. 9–12, 1043 ll. 5–10. He also testified both that he wrote about 89 percent of the source code underlying SRI TerraVision and that the project was meant to be put into the public domain. *Id.* at 1030–32, 1151. Lau further testified that SRI TerraVision allowed a user to navigate around a two- or three-dimensional representation of a graphical area and to zoom in and out to different levels of detail, and described how SRI TerraVision drew its image data from a network of multiple servers spread across the country. *Id.* at 1034–35, 1051.

While Lau was on the stand, Google displayed a 1994 VHS tape in which the narrator walks the viewer through the operation of SRI TerraVision. J.A. 2565. In the tape, the narrator describes how a user can move from a low-resolution picture of a larger geographic area to a higher-resolution picture of a smaller geographic area using a "multi-resolution pyramid." J.A. 2565, 3532–33. The narrator continues:

> At each level of the resolution pyramid, groups of four tiles from the next higher resolution are averaged down into a single tile. Consequently, each level of the pyramid covers the entire terrain, but uses only a quarter as many tiles as the previous level. The pyramid is built layer by layer until the entire terrain is represented by a single tile. . . .
>
> But what if some of the tiles needed for a given view are not in local memory when they are needed for a display? . . . . Notice that, each time we click on the map, the image first seems out of fo-

> cus, and then becomes clearer. What's happening
> is that, when we first move to a new area, the
> high resolution tiles are not available in local
> memory, so TerraVision is forced to use lower res-
> olution tiles. At the same time as the display is
> being processed, TerraVision is requesting higher
> resolution tiles from the server. As they arrive,
> TerraVision uses these higher resolution tiles, and
> the image becomes progressively better focused.

Id. Lau corroborated the narrator's description of how SRI TerraVision operates. He testified that, where the program "couldn't predict where the user was going to go such as if a user clicked in an unexpected place," the program would "use[] a course [sic] to fine algorithm . . . to come up with the best display it could" beginning with a "frustrum, a field of view" and using "quadtrees" arranged in a "resolution pyramid" to enhance the image resolution. Trial Tr. 1036–37.

Lau testified that he demonstrated SRI TerraVision to an audience of more than 100 people at the 1994 MAGIC Technical Symposium held at the University of Kansas in August 1994 and to an audience of more than 500 people at the SIGGRAPH '95 conference held in Los Angeles in August 1995, the latter of which was attended by at least two members of Art+Com. *Id.* at 1048–50, 1058–59. Lau explained that he gave individuals from Art+Com copies of the SRI TerraVision "source code, walked them through it, and talked to them about it." *Id.* at 1050–51. Google also introduced into evidence an overview of the MAGIC project and a draft technical paper coauthored by Lau, both of which described how TerraVision functioned. J.A. 3158–3271, 1758–77.

Google's expert, Dr. Goodchild, testified that, based on his review of the 1994 VHS tape and the publications introduced into evidence, it was his opinion that SRI TerraVision anticipates the asserted claims. Trial Tr.

1133–35, 1150. Dr. Goodchild walked through each claim limitation and pointed to evidence demonstrating why he believed SRI TerraVision disclosed these limitations. *Id.* at 1135–50. On cross-examination, counsel for Art+Com took issue with Dr. Goodchild's purported reliance on the MAGIC project overview, which contemplated using servers co-located at a facility in Sioux Falls, South Dakota and highlighted several "research issues" that remained to be solved. *Id.* at 1201–04. In response to these questions, Dr. Goodchild testified that "the system demonstrated in 1994 and 1995 was the system that [he] analyzed and that system as I shown [sic] meets all the claims." J.A. 1331.

The jury reached a verdict on May 27, 2016, finding, among other things, that Google proved by clear and convincing evidence both that SRI's TerraVision system was publicly used before December 17, 1995 and that this system anticipates each of the asserted claims. The district court denied Art+Com's renewed motion for judgment as a matter of law and entered judgment in favor of Google. Art+Com timely appealed. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

II. STANDARD OF REVIEW

"This court reviews a denial of JMOL following a jury verdict by reapplying the district court's standard of review." *Minn. Min. & Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1300 (Fed. Cir. 2002) (quoting *SIBIA Neurosciences, Inc. v. Cadus Pharm. Corp.*, 225 F.3d 1349, 1354 (Fed. Cir. 2000)). Thus, a motion for JMOL should be granted if either (1) "the jury's factual findings, presumed or express, cannot be supported by substantial evidence," or (2) "the legal conclusions implied from the jury's verdict cannot be supported by the jury's factual findings." *Id.*

When reviewing a district court's denial of JMOL following a jury verdict, we must determine whether, "viewing the evidence in the light most favorable to the non-

moving party," and giving the non-movant "the benefit of all reasonable inferences," there is sufficient evidence in the record to support a jury verdict in favor of the non-movant. *Id.* at 1300–01 (quoting *Sw. Software, Inc. v. Harlequin Inc.*, 226 F.3d 1280, 1289 (Fed. Cir. 2000)).

Anticipation is a question of fact, and a jury determination of anticipation is reviewed for substantial evidence. *Acromed Corp. v. Sofamor Danek Grp., Inc.*, 253 F.3d 1371, 1378–79 (Fed. Cir. 2001). Under pre-AIA § 102, one way in which a patent is anticipated is where "the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States. . . ." 35 U.S.C. § 102(b) (2000). Public use under pre-AIA § 102(b) includes any use of the claimed invention by a person other than the inventor who is under no limitation, restriction or obligation of secrecy to the inventor. *Netscape Commc'ns Corp. v. Konrad*, 295 F.3d 1315, 1321 (Fed. Cir. 2002).

III. DISCUSSION

Art+Com outlines three reasons why it claims Google failed to prove by clear and convincing evidence that SRI TerraVision placed the invention of the asserted claims in public use. First, it submits that, because Google did not present any evidence to corroborate Lau's "vague" testimony regarding the features and operation of SRI TerraVision, Dr. Goodchild should not have been permitted to rely on this testimony to "cherry-pick selected excerpts to stitch together the claimed invention." Appellant Br. 49. Second, it contends that, even assuming there was an adequate foundation for Lau's testimony, Dr. Goodchild's opinions do not demonstrate that SRI TerraVision disclosed each claim limitation. Third, Art+Com argues that Google failed to demonstrate either that SRI TerraVision was "ready for patenting" under the Supreme Court's

decision in *Pfaff v. Wells Electronics, Inc.*, 525 U.S. 55, 60 (1998), or that "the public could actually discern the patented invention in SRI TerraVision," as required under this court's precedents. *Id.* at 54–58.

We find none of these contentions persuasive. Although Art+Com is correct that we have emphasized the importance of corroboration in the context of § 102(b) challenges, *see Finnigan Corp. v. International Trade Commission*, 180 F.3d 1354, 1367 (Fed. Cir. 1999), Lau's testimony was sufficiently corroborated by both documentary and videographic evidence. First, the jury watched the 1994 VHS tape that Lau testified he had helped create and display in public fora prior to the critical date of December 17, 1995. Second, the jury received two papers describing the features and operation of SRI TerraVision—the more recent of which Lau coauthored.

Google argued at trial that one skilled in the art would understand from watching the 1994 VHS tape and from reading these two papers that every claim element was disclosed therein. But Art+Com ignores the VHS tape. And it provides no legal support for its claim that Lau himself was required to specifically identify where in the corroborating evidence each claim element can be found. Finally, to the extent Art+Com claims Lau was biased because he was compensated by Google for his consulting work, the jury was free to weigh this evidence and conclude that Lau's testimony was not unduly influenced by these payments. We conclude that the documentary and videographic evidence of record was sufficient to corroborate Lau's testimony and provided an adequate foundation from which Dr. Goodchild could offer his opinions.

Art+Com's argument that Google failed to demonstrate that SRI TerraVision disclosed each claim limitation—in particular, steps (b), (c), (f), and (g) of claim 1 and the additional limitations of claim 3—also misses the

mark. "[T]he dispositive question regarding anticipation is whether one skilled in the art would reasonably understand or infer from the prior art reference's teaching that every claim element was disclosed in that single reference." *Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368 (Fed. Cir. 2003) (internal quotation marks, alterations, and citation omitted). Google submitted evidence from which the jury reasonably could conclude that SRI TerraVision provided a basis for such an understanding.

Steps (b) and (c) of claim 1 require "(b) determining a field of view including an area of the object to be represented through a selection of a distance of the observer to the object and an angle of view of the observer to the object; [and] (c) requesting data for the field of view from at least one of the plurality of spatially distributed data sources." '550 patent col. 10, ll. 23–28. Art+Com claims that the jury did not receive substantial evidence that step (b), "which is very specific in defining what data the application will request in step (c)," was performed, and questions how Dr. Goodchild could "'f[in]d' this step in DTX1023's bare reference to 'incremental retrieval of the database,' . . . a reference he concedes does not 'state what increment is being used to retrieve the data, whether it's been done in increments of field of view or some other type of increment.'" Appellant Br. 52.

These limitations, however, are disclosed by the evidence. For example, portions of a draft technical note titled *TerraVision: A Terrain Visualization System*, which the parties refer to as DTX1023, and the 1994 VHS tape: (1) reveal that users can choose different viewpoint scenarios within SRI TerraVision; (2) explain that the program fetches geographic data "across the network as it is needed while the user moves about the terrain;" and (3) show how the program displays geographic data at a particular distance and from the user's angle of view— and, just as importantly, does not display data outside

that field of view. J.A. 1758–77, 2565, 3532–33. Art+Com fails to address any of this evidence. Art+Com also discounts Lau's testimony that SRI TerraVision computes what data to display using "a frustrum, a field of view" and then "project[s] out where you're looking in the terrain and where you're at [and] figure[s] out how far away each of the tiles should be." Trial Tr. 1036. But the jury was entitled to believe Lau's testimony, as well as Dr. Goodchild's opinions on these questions, Art+Com's skepticism of that testimony notwithstanding.

As stated above, steps (f) and (g) of claim 1 require iteratively "dividing" parent nodes into at least two child nodes that point to higher resolution image data and then requesting, storing, and displaying geographic data for these child nodes until either the desired image resolution for each parent node is achieved or no higher image resolution data is available. Art+Com argues that the jury heard "no evidence, much less substantial evidence," that these steps are implemented in SRI TerraVision. Appellant Br. 52. It also claims that the following sentence from the draft technical paper reveals that SRI TerraVision does *not* practice these steps:

> TerraVision basically uses an incremental retrieval of the data base as required by the user, *rather than* forcing the user to copy a part of the database to local storage, visualizing that part, and *repeating this until he/she has found the portion of the terrain that was of interest . . .*

Id. (citing J.A. 1760) (emphasis in brief).

When asked on cross-examination how he interprets that sentence, however, Dr. Goodchild testified that, in his opinion, the sentence means: "once we get to [']visualizing that part[,] and repeating this until he/she has found a portion of interest,['] that now follows the first part of the sentence rather than following the section after the comma." Trial Tr. 1211 ll. 4–14. We do not find

Dr. Goodchild's interpretation to be unreasonable, and conclude that the jury was entitled to believe his opinion on this issue.

Other evidence presented to the jury also shows that SRI TerraVision *does* perform the "coarse-to-fine" zooming required by steps (f) and (g). First, DTX1023 teaches a "search algorithm" that uses "recursive subdivision" for each node, where "a test is applied to determine whether or not the node should be sub-divided into its four children. If so, the search is carried on. Otherwise, it is stopped." J.A. 1766. Second, Lau testified that TerraVision used quadtrees to perform coarse-to-fine zooming on resolution pyramids by "subdividing" the quadtree tiles "until you got to the . . . highest resolution that you had." Trial Tr. 1036–37. Third, the 1994 VHS tape visually and audibly demonstrates that SRI TerraVision uses a "resolution pyramid" where "each level of the pyramid covers the entire terrain, but uses only 1/4 as many tiles as the previous level," and that when using this pyramid to "request[] higher-resolution tiles from the server, . . . the image becomes progressively better focused." J.A. 2565, 3532–33. It was within the jury's purview to credit Dr. Goodchild's opinion that TerraVision used a "quadtree" to perform a coarse-to-fine search that would "successively divide and request" image data in a manner that discloses steps (f) and (g). Trial Tr. 1141–42.

With respect to claim 3, Art+Com argues that Dr. Goodchild's opinion that this claim was practiced in SRI TerraVision is based on a reference in DTX1037 to "the transformation that's necessary as it is in any computer graphic system from the 3D coordinate to the 2D coordinate system of the screen." Appellant Br. 53. According to Art+Com, "these routine transformations" are not those defined by claim 3; rather, the "*claimed* coordinate transformation is one that follows—per claim 2 from which claim 3 depends—a change in the selectable location, such

that the data and co-ordinates of the data are determined in terms of new co-ordinates." *Id.*

Fatal to Art+Com's argument is that other evidence was presented at trial regarding whether the additional limitations present in claim 3 were disclosed in SRI TerraVision. For example, the jury heard from Lau that SRI TerraVision performed coordinate transformation that normalized the newly selected coordinates. Trial Tr. 1047. When asked why the system operated this way, Lau explained that it helped avoid precision errors when moving from one location to another. *Id.* This testimony explains how SRI TerraVision "alter[s] the selectable location and perform[s] the steps (b) through (g)" and "determin[es] the data and/or the co-ordinates of the data in terms of a new co-ordinate system." '550 patent col. 10, ll. 45-50.

Finally, we reject Art+Com's contention that Google failed to demonstrate that SRI TerraVision was "ready for patenting" and that the invention was "discernable" in SRI TerraVision. Appellant Br. 54–58. The public use bar applies when, before the critical date, the claimed invention is "publicly used" and is "ready for patenting." *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 424 F.3d 1374, 1379–80 (Fed. Cir. 2005) (holding that the Supreme Court's "ready for patenting test" set forth in *Pfaff*, a case concerning § 102(b)'s on-sale bar, "applies to the public use bar under § 102(b)"). The latter condition "may be satisfied in at least two ways: by proof of reduction to practice before the critical date; or by proof that prior to the critical date the inventor had prepared drawings or other descriptions of the invention that were sufficiently specific to enable a person skilled in the art to practice the invention." *Pfaff*, 525 U.S. at 67–68.

Under this court's precedent, an "invention is reduced to practice when it works for its intended purpose"—that is, "when there is a demonstration of its workability or

utility." *Atlanta Attachment Co. v. Leggett & Platt, Inc.*, 516 F.3d 1361, 1366–67 (Fed. Cir. 2008). In *Atlanta Attachment*, we found that a prior art device was ready for patenting when a "prototype" of the device "demonstrated the workability and utility of the invention . . . during [a] demonstration." *Id.* at 1367. In *Hamilton Beach Brands, Inc. v. Sunbeam Products, Inc.*, we similarly found a prior art product ready for patenting when there were "working prototypes" that "met all the limitations of the asserted patent claims" and retail customers were provided with "specific descriptions" and "drawings" of the device. 726 F.3d 1370, 1378–79 (Fed. Cir. 2013).

Here, Lau testified that he and his team demonstrated the SRI TerraVision system shown in the 1994 VHS tape to audiences at both the 1994 MAGIC Technical Symposium and the SIGGRAPH '95 conference. Trial Tr. 1048–50, 1058–59. Lau further testified that, at the SIGGRAPH '95 conference, he performed live demonstrations of SRI TerraVision to at least 500 people, and in fact "gave [] the source code to TerraVision" to Art+Com employees who were in attendance and "walk[ed] them through the source code." *Id.* at 1050 l. 21–1052 l. 3. Lau's testimony regarding his demonstrations at these conferences and his provision of source code to individuals at Art+Com constitutes substantial evidence that SRI TerraVision was "ready for patenting."

Art+Com nevertheless states that "[n]either Dr. Goodchild nor Lau said anything about the development goals or performance criteria targeted by SRI, about metrics evaluated through testing of the system, or about when the system was considered complete." Appellant Br. 56. An invention may be reduced to practice for purposes of the public use bar "even though it may later be refined or improved." *New Railhead Mfg., L.L.C. v. Vermeer Mfg. Co.*, 298 F.3d 1290, 1297 (Fed. Cir. 2002). Although Art+Com notes that SRI identified certain "research issues" it believed needed to be resolved at a future point

in time, we nevertheless conclude that substantial evidence supports the jury's implicit determination that SRI TerraVision was "ready for patenting."

Art+Com's argument that Google "did not attempt to prove that the public could actually discern the patented invention in SRI TerraVision," but instead "tried to prove the invention was 'discernable' in cherry-picked excerpts from documents purporting to describe the system" is no more persuasive. Appellant Br. 54. Art+Com cites *Dey, L.P. v. Sunovion Pharmaceuticals, Inc.*, 715 F.3d 1351 (Fed. Cir. 2013), and *Delano Farms Co. v. California Table Grape Commission*, 778 F.3d 1243 (Fed. Cir. 2015), for the proposition that the "claimed invention must be discernable to the public from a purported public use." *Id.* at 55. These cases are inapposite, however, as both involve circumstances that created an expectation of secrecy similar to that imposed by confidentiality agreements. *Dey*, 715 F.3d at 1357–59; *Delano Farms*, 778 F.3d at 1249–50.

Here, by contrast, the jury heard testimony that the SRI TerraVision system was publicly demonstrated at two technical conferences to attendees with knowledge of the art and without any restriction or effort to maintain confidentiality. Indeed, Google presented evidence that both the papers on which Dr. Goodchild relied in forming his opinions and the source code itself were made publicly available. Trial Tr. 1043–44, 1051. In light of Dr. Goodchild's testimony that source code "essentially defines what the computer does," *id.* at 1097, the jury was entitled to find that the claimed inventions were discernable in SRI TerraVision.

We conclude that substantial evidence supports the jury's verdict that claims 1, 3, 14, and 28 are each anticipated by SRI TerraVision. We therefore affirm the district court's entry of judgment of invalidity on that ground. Because we hold that there was adequate sup-

port for the jury's conclusion that each of the asserted claims is anticipated by SRI TerraVision, we affirm the district court's judgments without considering Art+Com's remaining arguments or the parties' debates over the jury's noninfringement finding. *Cf. Ecolab, Inc. v. FMC Corp.*, 569 F.3d 1335, 1348 (Fed. Cir. 2009), *amended on reh'g in part*, 366 F. App'x 154 (Fed. Cir. 2009); *Nobelpharma AB v. Implant Innovations, Inc.*, 141 F.3d 1059, 1066 (Fed. Cir. 1998).

IV. CONCLUSION

For the foregoing reasons, we *affirm* the district court's judgment.

AFFIRMED