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8 UNITED STATES DISTRICT COURT
9 NORTHERN DISTRICT OF CALIFORNIA
10 SAN JOSE DIVISION
11

12 Velodyne Lidar, Inc.,

13 Plaintiff,

14 vs.

15 Suteng Innovation Technology Co., Ltd.
16 (a.k.a. Robosense),

17 Defendant.

CASE NO.

COMPLAINT

DEMAND FOR JURY TRIAL

1 Velodyne Lidar, Inc. (“Velodyne”), for its Complaint against Suteng Innovation
2 Technology Co., Ltd., a.k.a. Robosense (“Robosense”), demands a jury trial and alleges as follows:

3 **INTRODUCTION**

4 1. Velodyne is a pioneer and a classic American success story. Its history reads like
5 a Hollywood script describing how one man’s genius and moxie changed the world. Indeed, even
6 typically staid financial publications and dry technology journals break form and report that
7 Velodyne’s founder, David Hall, designed an “audacious” and “revolutionary” invention that
8 “change[d] the world” by “giving automobiles the sense of sight.” The heart of this case is the
9 story of how Mr. Hall and Velodyne made that invention, persevered through criticism and
10 adversity, changed the course of history by making autonomous vehicles a reality, and built
11 Velodyne into a market leader. Also at its heart is the threat posed to that success by those,
12 including Robosense, who have taken Velodyne’s revolutionary invention, incorporated it into
13 their competing products, and are injecting those infringing products into the United States market.

14 2. In the early 2000s, the United States government was looking to spur the
15 development of autonomous vehicles. So one of its core research agencies, DARPA, challenged
16 innovators to design self-driving vehicles and enter them in a race to win \$1 million. Twenty-one
17 teams populated by leading scientists and engineers qualified for the first Grand Challenge in 2004,
18 and the field narrowed to fifteen for the race. Not a single vehicle finished that first race in 2004.
19 The most successful vehicle managed just 7.4 miles.

20 3. Enter David Hall, a designer of high-end audio speakers who founded Velodyne
21 Acoustics in 1983. Brimming with inventive energy, Mr. Hall spent much of his free time building
22 robots. By the early 2000s, he was growing frustrated with Silicon Valley’s ever-lengthening
23 commute. When DARPA announced its Grand Challenge, he saw an opportunity to leverage his
24 hobby into solving that problem. Mr. Hall entered the 2004 challenge with a camera-based system,
25 quickly realized that a better technology was needed, and in 2005 focused on laser imaging
26 detection and ranging (“LiDAR”).

27 4. Mr. Hall and his unique background brought new insights to LiDAR. While those
28 entrenched in the field were designing LiDAR systems that “scanned for objects only along a

1 single, fixed line of sight,” Mr. Hall recognized that such systems could not generate the
2 comprehensive data needed to navigate complex environments reliably. So he took a completely
3 different approach: he conceived of a novel LiDAR system that rotates a plurality of pulsing
4 laser emitters and avalanche photodiode detectors (“APDs”) to use time of flight data to generate
5 a dense “3-D point cloud” with a 360-degree field of view, which the vehicle could use to “see”
6 its complex surroundings just as humans do. His competitors were skeptical. Indeed, the field’s
7 luminaries scoffed at the idea—the data would be generated too slowly, they said. But Mr. Hall
8 trusted his instincts and stuck with his design.

9 5. Mr. Hall was right, and the triumph of his invention was unequivocal: six teams
10 completed DARPA’s 2007 Urban Challenge by navigating a 60-mile urban course in which they
11 not only had to navigate the course, but also obey all traffic laws and account for the other vehicles.
12 Five of those teams, including both the winner and the runner-up, used David Hall’s “Velodyne”
13 system.

14 6. The U.S. Patent Office awarded Mr. Hall United States Patent No. 7,969,558 (“the
15 ’558 patent”) for his invention. This invention was honored by the Smithsonian Institute, which
16 now houses the original prototype. Even the once-skeptical industry embraced his design. An
17 August 2017 Forbes article recounts the industry’s reaction to the “revolutionary” invention
18 claimed in the ’558 patent and embodied in Velodyne’s practicing sensors. The Verge, a
19 technology journal, described Mr. Hall’s invention as “audacious,” recognizing that “Velodyne
20 has become the gold standard for automotive LIDAR, used by almost all the major players trying
21 to produce driverless cars.” Velodyne was recognized as one of the most innovative companies in
22 the global transportation industry “for giving automobiles the sense of sight.” Most recently, in
23 2018, the Intellectual Property Owners Education Foundation named Mr. Hall “Inventor of the
24 Year” for “creating the groundbreaking lidar sensor technology that is the essential component for
25 fully autonomous vehicles.”

26 7. Velodyne launched its first commercial 3-D LiDAR product in 2007. By
27 continuing to invest its substantial effort, intellectual firepower, and millions of dollars in the
28 design, development, and manufacturing of 3-D LiDAR technology, Velodyne grew to the market

1 leader that it is today.

2 8. Now, Robosense threatens Velodyne and its business. Robosense took Velodyne's
3 revolutionary invention and incorporated it into its own competing products. As set forth below,
4 Robosense's rotating 3-D LiDAR systems infringe Velodyne's '558 patent. Even worse,
5 Robosense knew of and studied Velodyne's products and patented technology before incorporating
6 it into Robosense's infringing products. Velodyne asks this Court to protect its invention and halt
7 Robosense's willful and infringing conduct.

8 **NATURE OF THE ACTION**

9 9. This is a civil action for willful patent infringement under the Patent Laws of the
10 United States, 35 U.S.C. § 1 *et seq.*, and for such other relief as the Court deems just and proper.

11 **PARTIES**

12 10. Velodyne is a corporation organized under the laws of the State of Delaware and
13 has its principal place of business in 5521 Hellyer Avenue, San Jose, CA 95138.

14 11. Velodyne is an innovative developer, manufacturer, and supplier of real-time
15 LiDAR sensor technology, which is used in a variety of applications, including autonomous
16 vehicle navigation, vehicle safety systems, 3D mobile and aerial mapping, surveying, security,
17 defense, and industrial automation, among others.

18 12. Velodyne's founder David S. Hall introduced Velodyne's first high-resolution
19 LiDAR sensor, the HDL-64, in 2007. Thereafter, Velodyne quickly emerged as a global leader in
20 LiDAR technology. Velodyne has invested millions of dollars in developing its technology and,
21 as a result of its substantial investment in research and development, has invented, designed,
22 developed, manufactured, and sold some of the most advanced 3D laser imaging technology in the
23 world. While Velodyne's 3-D LiDAR sensors are best known as the roof-mounted rotating devices
24 that guide autonomous vehicles along Silicon Valley streets, they are valuable for numerous other
25 applications such as aerial mapping, mobile mapping, security, and industrial automation, to name
26 a few.

27 13. Velodyne's technological achievements have earned it various industry awards,
28 including Frost & Sullivan's 2015 American Automotive Advanced Driver Assistance System

1 (ADAS) Sensors Product Leadership Award for Velodyne’s VLP-16 LiDAR puck sensor. *Frost*
2 *& Sullivan Honors Velodyne LiDAR with 2015 North American Automotive ADAS Sensors*
3 *Product Leadership Award*, PRWEB (Mar. 25, 2015) (available at
4 <http://www.prweb.com/releases/2015/03/prweb12602944.htm>). Velodyne’s “high performance
5 LiDAR technology has [also] been recognized by global automotive OEMs and rideshare
6 customers as a critical element to enabling the development of fully autonomous vehicles.”
7 *Velodyne LiDAR Gears Up for the Autonomous Revolution with Investments from Ford and Baidu*,
8 BUSINESSWIRE (Aug. 16, 2016) (available at
9 <http://www.businesswire.com/news/home/20160816005465/en>).

10 14. Robosense is a corporation organized in China. On information and belief, it has
11 its principal place of business at Robosense Building, Block 1, South of Zhongguan Honghualing
12 Industrial District, No. 1213 Liuxian Avenue, Taoyuan Street, Nanshan District, Shenzhen.
13 Robosense has offices in Beijing, Shanghai, Germany, and the United States.

14 15. Robosense is involved in the design, development, manufacture, offer for sale, and
15 sale of rotating 3-D LiDAR devices and products containing the same, including the RS-LiDAR-
16 16, RS-LiDAR-32, RS-Ruby, RS-Bpearl, RS-P1, RS-P2, and RS-Fusion-P3 devices (collectively,
17 the “Accused Products”), and components thereof. For example, according to its website,
18 Robosense is a “LiDAR environment perception solution provider” that provides “two product
19 line-ups, including the MEMS solid-state LiDAR systems and Mechanical LiDAR systems.”
20 *About US, ROBOSENSE LIDAR*, <https://www.robosense.ai/company> (last visited Aug. 9, 2019).

21 **JURISDICTION AND VENUE**

22 16. This civil action asserts claims arising under the Patent Laws of the United States,
23 35 U.S.C. §§ 1, *et seq.* The Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331
24 and 1338(a).

25 17. This Court has personal jurisdiction over Robosense by virtue of its transacting and
26 doing business in the State of California and this District, committing acts of patent infringement
27 in the State of California and this District, and/or directing its infringing products to California for
28 use in this State. Robosense admits that it maintains a LiDAR research and development office in

1 this District and, on information and belief, Robosense directs infringing LiDAR systems to
2 California for use in this State. Accordingly, this Court has specific jurisdiction over Robosense
3 in connection with this action and its contacts with the State of California are continuous and
4 systematic to such extent that Robosense is subject to the general jurisdiction of the State of
5 California and this Court.

6 18. Venue is proper in this district under 28 U.S.C. § 1391(c)(3). Robosense is a
7 Chinese company, so venue is proper in any judicial district in the United States.

8 INTRADISTRICT ASSIGNMENT

9 19. This Complaint includes an intellectual property action, an excepted category under
10 Civil Local Rule 3-2(c), and consequently should be assigned on a District-wide basis.

11 20. In *Quanergy Systems, Inc. v. Velodyne LiDAR, Inc.*, No. 5:16-cv-05251-EJD (Sept.
12 13, 2016), the Honorable Judge Edward J. Davila previously issued a Claim Construction Order
13 construing claim terms for the patent at issue in this case. *Quanergy Sys., Inc. v. Velodyne LiDAR,*
14 *Inc.*, No. 16-cv-05251-EJD, 2017 WL 4410174, at *1 (N.D. Cal. Oct. 4, 2017). This action
15 concerns substantially the same property—Velodyne’s ’558 patent—as the *Quanergy* case, and it
16 appears likely that there will be an unduly burdensome duplication of labor and expense if this
17 case is conducted before a different judge. Under Civil Local Rule 3-12(a), the instant case is
18 related to the *Quanergy* case. This case is also related to *Velodyne Lidar, Inc. v. Hesai Photonics*
19 *Technology Co., Ltd.*, No. 5:19-cv-04742 (N.D. Cal. Aug. 13, 2019), in which Velodyne asserts
20 the same patent.

21 ASSERTED PATENT

22 21. On June 28, 2011, the United States Patent and Trademark Office, after full and fair
23 examination, duly and legally issued U.S. Patent No. 7,969,558, entitled “High Definition LiDAR
24 System,” to Mr. Hall, Velodyne’s Founder and Chief Executive Officer. Mr. Hall is the sole named
25 inventor. A true and correct copy of the ’558 patent is attached as Exhibit A.

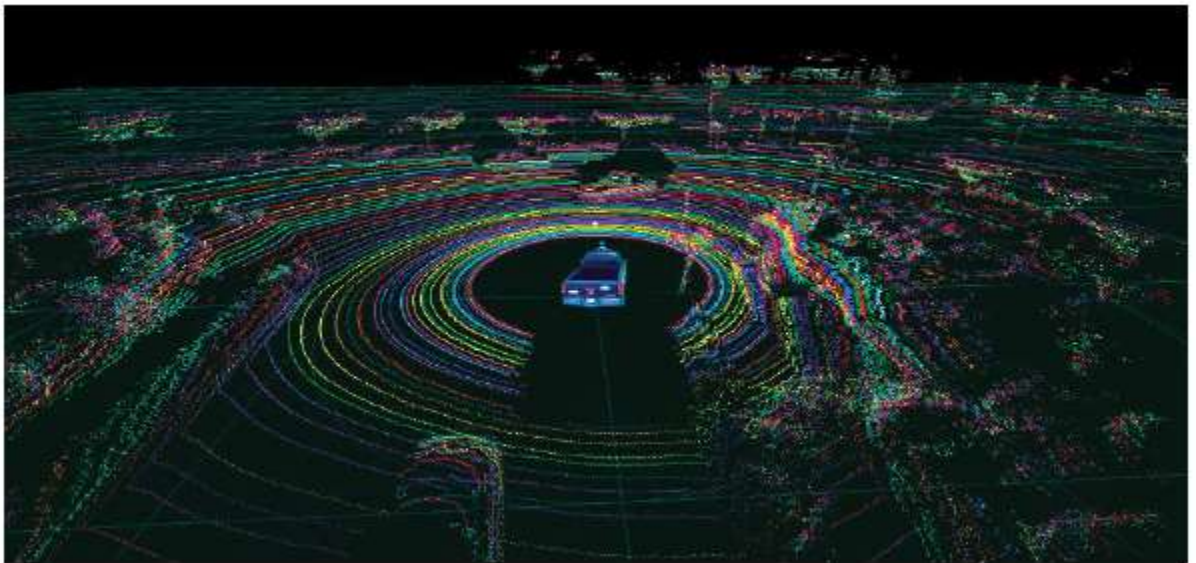
26 22. Velodyne owns by assignment all rights, title, and interest in the ’558 patent with
27 full rights to enforce the ’558 patent and sue to recover for past, present, and future infringement.

28 23. The ’558 patent application (Application No. 11/777,802) was filed on July 13,

1 2007. Velodyne filed related Provisional Patent Application No. 60/807,305 on July 13, 2006.

2 24. The '558 patent claims a LiDAR system that rotates a plurality of laser emitters and
3 APDs to generate a dense 3-D point cloud. Using the rapidly rotating structure and angular
4 orientation of the emitters claimed in the '558 patent, pulses of laser light can be transmitted in
5 many different directions in very short periods of time. The time it takes for the light to return to
6 the APD is measured, thus creating data (called a "pixel"), which corresponds to the distance from
7 the LiDAR sensor to the objects surrounding it.

8 25. When multiple pulses are emitted from a rotating sensor in varied directions and in
9 rapid succession, many pixels can be collected extremely quickly, creating a "point cloud." These
10 "point clouds" can then be rendered into "3-D point clouds," which are processed into images or
11 analyzed by a computer to map the surrounding terrain and objects. An exemplary 3-D point cloud
12 generated by Velodyne's 3-D LiDAR sensor is shown below:



22 26. The '558 patent is valid and enforceable. Indeed, the United States Patent Trial and
23 Appeal Board ("PTAB"), after instituting *inter partes* review ("IPR"), recently issued a Final
24 Written Decision upholding all challenged claims of the '558 patent as patentable. The PTAB
25 found that Mr. Hall's "claimed invention was revelatory and not obvious." IPR2018-00255, Final
26 Written Decision, Paper 59 (P.T.A.B. May 23, 2019) at 28. The invention claimed in the '558
27 patent overcame the shortcomings of the prior art to permit safe and successful autonomous
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1 navigation. Using the particular configuration and orientation set forth in the '558 patent's claims,
2 including a plurality of pulsing emitters and APDs rotated at a speed of at least 200 RPM, the
3 claimed 3-D LiDAR system can generate highly accurate and extremely dense 3-D point clouds.
4 The density of these point clouds can be used for high-speed autonomous navigation, to detect
5 both positive and negative obstacles, and to provide a 360-degree field of view, all with high point
6 cloud refresh rates—the foundation for safe and successful autonomous navigation. Put
7 differently, as the PTAB found, Mr. Hall's "claimed invention, as embodied in Velodyne's HDL-
8 64E sensor, resolved a long-felt need for a LiDAR sensor that could capture distance points rapidly
9 in all directions and produce a sufficiently dense 3-D point cloud for use in autonomous
10 navigation." *Id.* at 34.

11 27. As the PTAB's discussion and the patent itself illustrate, the '558 patent claims are
12 directed to technological improvements of pulsed LiDAR technology that solve technical
13 problems, rather than to an abstract idea or a law of nature. Likewise, as the PTAB's finding that
14 the asserted claims are "revelatory" also shows, the specific systems and methods claimed in the
15 '558 patent claims were not well-understood, routine, or conventional. In fact, those claims
16 incorporate unconventional limitations and are unconventional as a whole, as demonstrated by the
17 skepticism shown by persons of skill in the field at the time of the invention. *See supra*, ¶ 4.

18 **COUNT I – INFRINGEMENT OF U.S. PATENT NO. 7,969,558**

19 28. Velodyne repeats and realleges paragraphs 1 through 27 above as if fully set forth
20 herein.

21 29. Robosense directly infringes at least claim 1 of the '558 patent, literally or under
22 the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing the
23 Accused Products in the United States in violation of 35 U.S.C. § 271(a).

24 30. Claim 1 reads as follows.

25 1. A lidar-based 3-D point cloud system comprising:

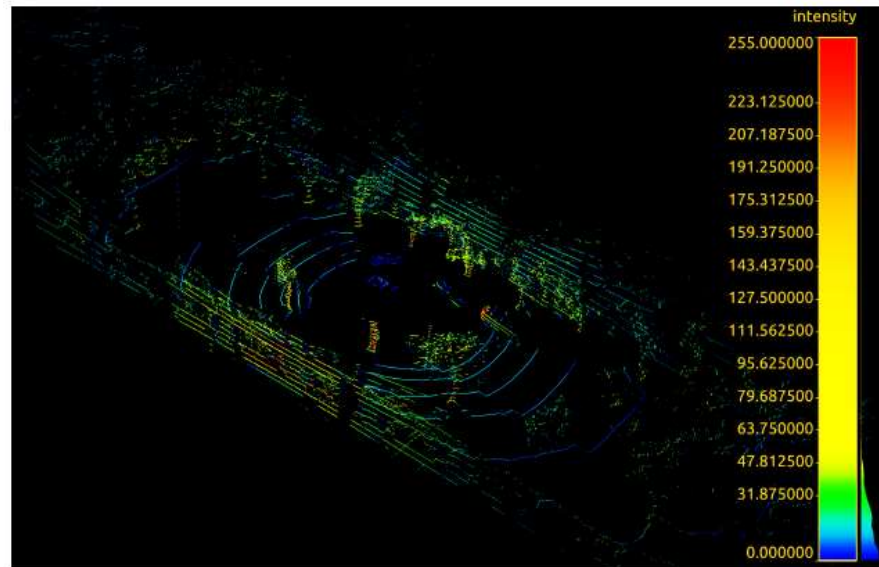
26 a support structure;

27 a plurality of laser emitters supported by the support structure;

28 a plurality of avalanche photodiode detectors supported by the support structure; and

1 a rotary component configured to rotate the plurality of laser
 2 emitters and the plurality of avalanche photodiode detectors at a
 speed of at least 200 RPM.

3 31. The Accused Products are LiDAR based 3-D point cloud systems and this claim
 4 requirement is satisfied literally or under the doctrine of equivalents. For example, Robosense
 5 characterizes its RS-LiDAR-16 device as a “solid-state hybrid LiDAR featur[ing] 16 laser
 6 channels 150-meter measurement range, 2-centimeter accuracy with 320,000 points per second
 7 data rate, 360 horizontal field of view and 30 (+/-15) vertical field of view.” The RS-LiDAR-16
 8 device uses time of flight data. As shown in the image below, the RS-LiDAR-16 device captures
 9 data used to create 3-D point clouds.



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 19 Fig. 2: Typical point-cloud collected by the RS-LiDAR

20 32. The Robosense Accused Products include, literally or under the doctrine of
 21 equivalents, a support structure. For example, the RS-LiDAR-16 device has a support structure
 22 that supports at least the laser emitters and receivers.

23 33. The Robosense Accused Products further include, literally or under the doctrine of
 24 equivalents, a plurality of laser emitters supported by the support structure. For example,
 25 Robosense admits that its RS-LiDAR-16 device “features 16 laser channels.” These lasers are
 26 supported by a support structure within the RS-LiDAR-16 device’s outer shell.

27 34. The Robosense Accused Products also include, literally or under the doctrine of
 28 equivalents, a plurality of avalanche photodiode detectors supported by the support structure. For

1 example, the RS-LiDAR-16 device has receivers that are supported by a support structure within
2 the RS-LiDAR-16 device's outer shell. The RS-LiDAR-16 device detects reflected beams with
3 its optical sensor detectors.

4 35. Although styled in some instances as "solid state" devices, the Robosense Accused
5 Products include, literally or under the doctrine of equivalents, a rotary component configured to
6 rotate the plurality of laser emitters and the plurality of avalanche photodiode detectors at a speed
7 of at least 200 RPM. For example, the RS-LiDAR-16 device rotates at a rate of 300 to 1200 RPM.
8 The laser channels and APDs are attached to a rotating motor inside the LiDAR housing.

9 36. Robosense actively, knowingly, and intentionally induces infringement of one or
10 more claims of the '558 patent, including at least claim 1, under 35 U.S.C. § 271(b) by actively
11 encouraging others, including its customers, to make, use, offer to sell, sell, and/or import the
12 Accused Products in this judicial district and elsewhere in the United States. Robosense knew of
13 and studied Velodyne's products and patented technology before it incorporated that technology
14 into its own products, as its personnel admitted in public interviews. Foreign counterparts of the
15 '558 patent were also cited in a Robosense foreign patent application (CN105824029A). Velodyne
16 also publicly identifies its products as incorporating the inventions claimed in the '558 patent and
17 marked its products accordingly. Academic researchers have noted that most of the features of
18 Velodyne's VLP-16 and Robosense's RS-LiDAR-16 "are identical or very close." On information
19 and belief, Robosense copied Velodyne's products, including the VLP-16, and learned of the '558
20 patent no later than the time at which it first inspected and performed a tear-down of Velodyne's
21 products. And Robosense actively promotes the sale, use, and importation of its infringing rotating
22 3-D LiDAR devices in marketing materials, technical specifications, data sheets, web pages on its
23 website, press releases, and user manuals, as well as at trade shows and through its sales and
24 distribution channels that encourage infringing offers to sell, sales, and/or importation of the
25 Accused Products. These actions collectively demonstrate that Robosense has had the specific
26 intent to induce, or was willfully blind to inducing, infringement of the '558 patent.

27 37. Robosense contributes to infringement of one or more claims of the '558 patent,
28 including at least claim 1, by others, including its customers. Robosense provides these customers

1 with the Accused Products, which are specially made or adapted to infringe these claims and are
2 not staple articles of commerce suitable for substantial noninfringing use. As discussed above,
3 Robosense knew of and studied Velodyne's products and patented technology before it
4 incorporated that technology into its own products, as its personnel admitted in public interviews.

5 38. Robosense's infringement of the '558 patent as alleged above has been and
6 continues to be egregious. On information and belief, Robosense had prior knowledge of the '558
7 patent and Robosense extensively studied Velodyne's technology and crafted its products to target
8 Velodyne and its customers. As noted above, Academic researchers have noted that most of the
9 features of Velodyne's VLP-16 and Robosense's RS-LiDAR-16 "are identical or very close." On
10 information and belief, Robosense copied Velodyne's products, including the VLP-16, and learned
11 of the '558 patent no later than the time at which it first inspected and performed a tear-down of
12 Velodyne's products. As such, Robosense's infringement has been and continues to be willful,
13 entitling Velodyne to enhanced damages under 35 U.S.C. § 284, and a finding that this case is
14 exceptional under 35 U.S.C. § 285.

15 39. On information and belief, Robosense has profited from and will continue to profit
16 from its infringing activities. Velodyne has been and will continue to be damaged by Robosense's
17 infringing activities. As a result, Velodyne is entitled to injunctive relief and damages adequate to
18 compensate it for such infringement, in no event less than a reasonable royalty, in accordance with
19 35 U.S.C. §§ 271, 281, 283, and 284. The amount of monetary damages Robosense's acts of
20 infringement have caused to Velodyne cannot be determined without an accounting.

21 40. The harm to Velodyne from Robosense's ongoing infringing activity is irreparable,
22 continuing, and not fully compensable by money damages, and will continue unless Robosense's
23 infringing activities are enjoined.

24 **PRAYER FOR RELIEF**

25 **WHEREFORE**, Velodyne respectfully requests that the Court enter judgment in its favor
26 and against Robosense on this Complaint as follows:
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- A. A judgment that Robosense has infringed and continues to infringe, induce the infringement of, and contribute to the infringement of the '558 patent under at least 35 U.S.C. §§ 271(a) and (b), and that Robosense's infringement was willful;
- B. A permanent injunction prohibiting Robosense and its officers, agents, representatives, assigns, licensees, distributors, employees, related entities, and all those acting in privity or acting in concert with them from:
 - a. infringing, inducing, or contributing to the infringement of the '558 patent; and
 - b. soliciting any new business or new customers using any information or materials derived from infringing the '558 patent;
- C. An award of monetary damages, to be obtained from any and all of Robosense's assets, sufficient to compensate Velodyne for Robosense's patent infringement, with interest, pursuant to at least 35 U.S.C. § 284;
- D. An award of enhanced damages, to be obtained from any and all of Robosense's assets, or three times the amount found or assessed for Robosense's willful patent infringement, pursuant to 35 U.S.C. § 284, including prejudgment interest on such damages;
- E. An order finding this case exceptional and awarding Velodyne its attorneys' fees, to be obtained from any and all of Robosense's assets, pursuant to 35 U.S.C. § 285, including prejudgment interest on such fees;
- F. An accounting and supplemental damages for all damages occurring after the period for which discovery is taken, and after discovery closes, through the Court's decision regarding the imposition of a permanent injunction;
- G. An award of Velodyne's costs and expenses of this suit as a prevailing party, to be obtained from any and all of Robosense's assets; and
- H. Any other relief that the Court deems just and proper.

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DEMAND FOR JURY TRIAL

Pursuant to Federal Rule of Civil Procedure 38(b), Velodyne hereby demands a trial by jury on all issues so triable.

Dated: August 13, 2019

LATHAM & WATKINS LLP

By /s/ Douglas E. Lumish
Douglas E. Lumish
of Latham & Watkins LLP

Attorneys for Plaintiff
Velodyne Lidar, Inc.