

**Nos. 2024-2116, 2024-2151**

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**In the United States Court of Appeals  
For the Federal Circuit**

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MHL CUSTOM, INC.,  
*Plaintiff - Cross-Appellant*

v.

WAYDOO USA, INC., SHENZHEN WAYDOO INTELLIGENCE  
TECHNOLOGY CO., LTD.,  
*Defendants - Appellants*

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Appeal from the United States District Court for the District of Delaware  
No. 21-cv-91, Hon. Richard G. Andrews

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**BRIEF OF APPELLANTS**

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## CLAIM LANGUAGE

Claim 1 of U.S. Patent No. 9,359,044 recites:

1. A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:
  - a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section, and the flotation device being controlled via weight shift of the user;
  - a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;
  - a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface and designed to provide passive static stability controlled solely by weight shift of the user;
  - a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; andthe watercraft having no movable steering system.

Appx198.

Claim 1 of U.S. Patent No. 9,586,659 recites:

1. A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:
  - a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section;

a strut having a upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;

a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface;

a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; and

the watercraft having no movable steering system.

Appx210.

**CERTIFICATE OF INTEREST**

**Case Number** 2024-2116, 2024-2151

**Short Case Caption** *MHL Custom, Inc. v. Waydoo USA, Inc.*

**Filing Party/ Entity** Appellants / Waydoo USA, Inc.; Shenzhen Waydoo Intelligence Technology Co., Ltd.

I certify the following information and any attached sheets are accurate and complete to the best of my knowledge.

/s/ Julie S. Goldemberg  
 Julie S. Goldemberg  
*Counsel for Appellants Waydoo USA, Inc.<sup>1</sup> and Shenzhen Waydoo Intelligence Technology Co., Ltd.*

Dated: November 20, 2024

<b>1. Represented Entities.</b> Fed. Cir. R. 47.4(a)(1).	<b>2. Real Party in Interest.</b> Fed. Cir. R. 47.4(a)(2).	<b>3. Parent Corporations and Stockholders.</b> Fed. Cir. R. 47.4(a)(3).
Provide the full names of all entities represented by undersigned counsel in this case.	Provide the full names of all real parties in interest for the entities. Do not list the real parties if it are the same as the entities.  <input checked="" type="checkbox"/> None/Not Applicable	Provide the full names of all parent corporations for the entities and all publicly held companies that own 10% or more stock in the entities.  <input type="checkbox"/> None/Not Applicable
Shenzhen Waydoo Intelligence Technology Co., Ltd.		SZ DJI Technology Co. Ltd. (partial owner of Shenzhen Waydoo)

<sup>1</sup> As noted below, Waydoo USA, Inc. has been dissolved.

		Joy Surf Ltd. (partial owner of Shenzhen Waydoo)
Waydoo USA, Inc. (dissolved)		

**4. Legal Representatives.** List all law firms, partners, and associates that (a) appeared for the entities in the originating court or agency or (b) are expected to appear in this court for the entities. Do not include those who have already entered an appearance in this court. Fed. Cir. R. 47.4(a)(4).

Richards Layton & Finger:  Dorronda R. Bordley  Kelly E. Farnan	Haug Partners:  Edgar H. Haug  Mark Basanta  Jason A. Kanter  Patrick Lavery  Robert E. Colletti  Roman A. Khasidov
-----------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------

**5. Related Cases.** Provide the case titles and numbers of any case known to be pending in this court or any other court or agency that will directly affect or be directly affected by this court’s decision in the pending appeal. Do not include the originating case number(s) for this case. Fed. Cir. R. 47.4(a)(5). See also Fed. Cir. R. 47.5(b).

Yes (file separate notice; see dkt. 10.)       No    N/A (amicus/movant)

**6. Organizational Victims and Bankruptcy Cases.** Provide any information required under Fed. R. App. P. 26.1(b) (organizational victims in criminal cases) and 26.1(c) (bankruptcy case debtors and trustees). Fed. Cir. R. 47.4(a)(6).

None/Not Applicable

**TABLE OF CONTENTS**

	<b>Page</b>
Claim Language	
Certificate of Interest .....	i
Table of Authorities .....	vi
Statement of Related Cases.....	xi
Jurisdictional Statement .....	1
Statement of the Issues.....	2
Statement of the Case.....	3
I.    Introduction to Electric Hydrofoil (“eFoil”) Watercraft.....	3
II.   The Patents .....	3
III.  MHL Buys the Patents .....	7
IV.  Other Skilled Artisans Build Similar Hydrofoils.....	7
V.    MHL Licenses the Patents to Fliteboard along with Other Intellectual Property .....	10
VI.  Waydoo Enters the Market.....	11
VII. MHL Sues Wayoo for Patent Infringement .....	11
VIII. The Patent Trial and Appeal Board Considers the Evolo Report and Finds It Publicly Accessible .....	13
Summary of the Argument.....	14
Standard of Review .....	16
Argument.....	17
I.    Waydoo Is Entitled to Judgment as a Matter of Law of Non- Infringement because the Accused Products Are Not “Dynamically Stable.” .....	17
A.    Waydoo’s Accused Products Are Not Dynamically Stable.....	18
1.    The YouTube Evidence Is Insufficient for a Reasonable Jury to Find Infringement. ....	18
2.    The “Crosscheck” Calculations Are Insufficient for a Reasonable Jury to Find Infringement.....	20

**TABLE OF AUTHORITIES**  
(continued)

	<b>Page(s)</b>
B. The District Court Erred in Construing the Preamble of Claim 1 of the '044 Patent. ....	22
1. Preambles May Limit Claim Scope.....	23
2. Several <i>Catalina Marketing</i> Factors Demonstrate the Preamble in Claim 1 of the '044 Patent Is Limiting. ....	24
3. The District Court Erred in Declining to Construe the Preamble as Limiting.....	27
4. This Court May Wish to Reconsider Its Preamble Jurisprudence. ....	28
II. The District Court Erred in Denying Waydoo’s Motion for Judgment as a Matter of Law related to the Evolo Report.....	29
A. The Evolo Report Was Publicly Accessible. ....	29
1. Waydoo Proved Public Accessibility of the Evolo Report as a Matter of Law. ....	30
2. The District Court Erred in Denying Waydoo’s Renewed Motion for Judgment as a Matter of Law.....	33
B. The Evolo Report Is Enabling.....	37
1. The Evolo Report Discloses a Stable eFoil. ....	37
2. MHL Failed to Meet Its Burden of Proof on Non-Enablement. ....	39
a. Mr. Barry Conflated a Prototype of the Evolo with the Full Evolo Report Disclosure. ....	39
b. The Absence of Calculations Proving Stability Fails to Show Non-Enablement.....	40
c. The “Flat Plate” Fails to Show Non-Enablement. ....	41

**TABLE OF AUTHORITIES**  
(continued)

	<b>Page(s)</b>
d.    The District Court Erroneously Conflated Waydoo’s Sufficiency Challenge with an Evidentiary Challenge. ....	42
e.    The Evolo Report Provides at least the Same Level of Enabling Information as the Patents. ....	42
(1)    The Patents’ Disclosure .....	43
(2)    The Evolo Report’s Disclosure.....	45
(3)    The District Court’s Error .....	46
III.    The District Court Erred in Admitting the Testimony of MHL’s Damages Expert. ....	47
A.    The Fliteboard License Was Entered into under Threat of Litigation and Should Have Been Excluded.....	49
B.    Dr. Stec Failed to Apportion the Royalty Rate from the Fliteboard License.....	52
Conclusion & Prayer for Relief .....	58
Addendum.....	59
Certificate of Compliance with Type-Volume Limitations	

**TABLE OF AUTHORITIES**

	<b>Page(s)</b>
<b>CASES</b>	
<i>Acceleration Bay, LLC v. Activision Blizzard Inc.</i> , 908 F.3d 765 (Fed. Cir. 2018) .....	23, 33, 34
<i>Agrizap, Inc. v. Woodstream Corp.</i> , 520 F.3d 1337 (Fed. Cir. 2008) .....	16
<i>AK Steel Corp. v. Sollac &amp; Ugine</i> , 344 F.3d 1243 (Fed. Cir. 2003) .....	41, 46
<i>Alnylam Pharm., Inc. v. Pfizer, Inc.</i> , No. CV 22-336-CFC, 2024 WL 3742313 (D. Del. Aug. 9, 2024) .....	28
<i>Am. Med. Sys., Inc. v. Biolitec, Inc.</i> , 618 F.3d 1354 (Fed. Cir. 2010) .....	23
<i>Apple Inc. v. Corephotonics, Ltd.</i> , 861 F. App'x 443 (Fed. Cir. 2021) .....	37
<i>Apple Inc. v. Wi-LAN Inc.</i> , 25 F.4th 960 (Fed. Cir. 2022) .....	53, 55
<i>Bayer AG v. Elan Pharm. Rsch. Corp.</i> , 212 F.3d 1241 (Fed. Cir. 2000) .....	18
<i>Bell Commc'ns Rsch., Inc. v. Vitalink Commc'ns Corp.</i> , 55 F.3d 615 (Fed. Cir. 1995) .....	25
<i>Bicon, Inc. v. Straumann Co.</i> , 441 F.3d 945 (Fed. Cir. 2006) .....	23, 24
<i>Blue Calypso, LLC v. Groupon, Inc.</i> , 815 F.3d 1331 (Fed. Cir. 2016) .....	31, 32
<i>Bone v. Comm'rs of Marion Cnty.</i> , 251 U.S. 134 (1919) .....	35

**TABLE OF AUTHORITIES**  
(continued)

	<b>Page(s)</b>
<i>Brooke Grp. Ltd. v. Brown &amp; Williamson Tobacco Corp.</i> , 509 U.S. 209 (1993).....	21, 42
<i>CardSoft (assignment for the Benefit of Creditors), LLC v. VeriFone, Inc.</i> , 807 F.3d 1346 (Fed. Cir. 2015) .....	16
<i>Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.</i> , 289 F.3d 801 (Fed. Cir. 2002) .....	23, 24, 25, 26
<i>Centricut, LLC v. Esab Grp., Inc.</i> , 390 F.3d 1361 (Fed. Cir. 2004) .....	17
<i>Constant v. Advanced Micro-Devices, Inc.</i> , 848 F.2d 1560 (Fed. Cir. 1988) .....	46
<i>Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.</i> , 868 F.2d 1251 (Fed. Cir. 1989) .....	24
<i>Daubert v. Merrell Dow Pharms., Inc.</i> , 509 U.S. 579 (1993).....	18, 22, 52, 56
<i>Deere &amp; Co. v. Bush Hog, LLC</i> , 703 F.3d 1349 (Fed. Cir. 2012) .....	26
<i>Eli Lilly &amp; Co. v. Teva Pharm. Int’l GmbH</i> , 8 F.4th 1331 (Fed. Cir. 2021) .....	23
<i>Function Media, LLC v. Google, Inc.</i> , 708 F.3d 1310 (Fed. Cir. 2013) .....	36
<i>Gen. Elec. Co. v. Nintendo Co.</i> , 179 F.3d 1350 (Fed. Cir. 1999) .....	24
<i>Georgia-Pacific Corp. v. U.S. Plywood Corp.</i> , 318 F. Supp. 1116 (S.D.N.Y. 1970) .....	48, 49
<i>Glass v. Phila. Elec. Co.</i> , 34 F.3d 188 (3d Cir. 1994) .....	56

**TABLE OF AUTHORITIES**  
(continued)

	<b>Page(s)</b>
<i>GoPro, Inc. v. Contour IP Holding LLC</i> , 908 F.3d 690 (Fed. Cir. 2018) .....	29
<i>Hanson v. Alpine Valley Ski Area, Inc.</i> , 718 F.2d 1075 (Fed. Cir. 1983) .....	49
<i>Imperium IP Holdings (Cayman), Ltd. v. Samsung Elecs. Co.</i> , 757 F. App'x 974 (Fed. Cir. 2019) .....	32
<i>In re Epstein</i> , 32 F.3d 1559 (Fed. Cir. 1994) .....	46
<i>In re Hall</i> , 781 F.2d 897 (Fed. Cir. 1986) .....	31, 32
<i>In re Howarth</i> , 654 F.2d 103 (Cust. & Pat. App. 1981) .....	35
<i>In re Wands</i> , 858 F.2d 731 (Fed. Cir. 1988) .....	37, 39
<i>Jazz Pharms., Inc. v. Amneal Pharms., LLC</i> , 895 F.3d 1347 (Fed. Cir. 2018) .....	29, 30, 31
<i>Kumho Tire Co., Ltd. v. Carmichael</i> , 526 U.S. 137 (1999) .....	16
<i>LaserDynamics, Inc v. Quanta Comput., Inc.</i> , 694 F.3d 51 (Fed. Cir. 2012) .....	49, 51, 52
<i>MagSil Corp. v. Hitachi Glob. Storage Techs., Inc.</i> , 687 F.3d 1377 (Fed. Cir. 2012) .....	37
<i>Omega Eng'g, Inc. v. Raytek Corp.</i> , 334 F.3d 1314 (Fed. Cir. 2003) .....	27, 53, 55, 56
<i>Omega Pats., LLC v. CalAmp Corp.</i> , 13 F.4th 1361 (Fed. Cir. 2021) .....	52, 53, 54, 55

**TABLE OF AUTHORITIES**  
(continued)

	<b>Page(s)</b>
<i>Samsung Elecs. Co. v. Infobridge Pte. Ltd.</i> , 929 F.3d 1363 (Fed. Cir. 2019) .....	35
<i>Sanofi-Synthelabo v. Apotex</i> , 550 F.3d 1075 (Fed. Cir. 2018) .....	37
<i>Shoes by Firebug LLC v. Stride Rite Children’s Grp., LLC</i> , 962 F.3d 1362 (Fed. Cir. 2020) .....	24
<i>Spectra-Physics, Inc. v. Coherent, Inc.</i> , 827 F.2d 1524 (Fed. Cir. 1987) .....	41, 42, 46
<i>SRI Int’l, Inc. v. Internet Sec. Sys., Inc.</i> , 511 F.3d 1186 (Fed. Cir. 2008) .....	46
<i>Storage Tech. Corp. v. Cisco Sys., Inc.</i> , 329 F.3d 823 (Fed. Cir. 2003) .....	23
<i>TNS Media Rsch., LLC v. Tivo Rsch. &amp; Analytics, Inc.</i> , 629 F. App’x. 916 (Fed. Cir. 2015) .....	40
<i>U.S. v. Google LLC</i> , No. 20-CV-3010 (APM), 2024 WL 3647498 (D.D.C. Aug. 5, 2024) .....	34
<i>VirnetX, Inc. v. Cisco Sys., Inc.</i> , 767 F.3d 1308 (Fed. Cir. 2014) .....	52, 53
<i>Voter Verified, Inc. v. Premier Election Sols., Inc.</i> , 698 F.3d 1374 (Fed. Cir. 2012) .....	32
 <b>STATUTES</b>	
28 U.S.C. § 1295 .....	1
28 U.S.C. § 1331 .....	1
35 U.S.C. § 112 .....	47

**TABLE OF AUTHORITIES**  
(continued)

**Page(s)**

**RULES**

Fed. R. Civ. P. 50 .....16

Fed. R. Evid. 702 .....56

**OTHER AUTHORITIES**

3 CHISUM ON PATENTS § 8.06 (2018).....23

Mark A. Lemley, *Without Preamble*, 100 B. U. L. REV. 357 (2020) .....28

## STATEMENT OF RELATED CASES

This case was previously before this Court in *MHL Custom, Inc. v. Waydoo USA, Inc.*, No. 24-1036. This Court dismissed the previous appeal on April 30, 2024, due to lack of jurisdiction before the briefing began. *See id.* at Dkt. 30.

The following cases are pending before the U.S. Patent and Trademark's Patent Trial and Appeal Board, involve the patents at issue in this appeal, and therefore may directly affect or be directly affected by this court's decision:

- *Foil Boarding Company, Inc. v. MHL Custom, Inc.*, IPR2024-00086 (PTAB)
- *Foil Boarding Company, Inc. v. MHL Custom, Inc.*, IPR2024-00085 (PTAB)
- *Shenzhen Waydoo Intelligence Technology Co., Ltd. v. MHL Custom, Inc.*, IPR2024-00999 (PTAB)
- *Shenzhen Waydoo Intelligence Technology Co., Ltd. v. MHL Custom, Inc.* IPR2024-00998 (PTAB)
- *Bombardier Recreational Products, Inc. v. MHL Custom, Inc.*, IPR2024-01108 (PTAB)
- *Bombardier Recreational Products, Inc. v. MHL Custom, Inc.*, IPR2024-01107 (PTAB)
- *Bombardier Recreational Products, Inc. v. MHL Custom, Inc.*, IPR2024-01391 (PTAB)

### **JURISDICTIONAL STATEMENT**

The district court had federal question jurisdiction over this case under 28 U.S.C. § 1331.

The district court entered a final judgment on June 17, 2024. Appx49. Appellant filed a timely notice of appeal on July 16, 2024. Appx7048

This Court has jurisdiction over this appeal of a final decision of a district court in a civil action arising under the Patent and Trademark Act. 28 U.S.C. § 1295(a)(1).

### STATEMENT OF THE ISSUES

1. Whether Waydoo is entitled to judgment as a matter of law on non-infringement of the asserted claims of the '659 Patent because a reasonable jury could not have found that the accused Waydoo eFoils are dynamically stable.

2. If so, whether the district court erred in construing claim 1 of the '044 Patent's preamble—which requires dynamic stability—as non-limiting such that Waydoo is also entitled to judgment as a matter of law on non-infringement of the asserted claims of the '044 Patent.

3. Whether Waydoo is entitled to judgment as a matter of law that the Evolo Report was publicly accessible and enabled where a reasonable jury could not have found otherwise.

4. Whether the district court erred in admitting damages expert testimony that placed undue importance on the royalty terms of a license agreement that was entered into under duress and covered additional patents not at issue in this case.

## STATEMENT OF THE CASE

### I. Introduction to Electric Hydrofoil (“eFoil”) Watercraft

Appellant Waydoo and Appellee MHL both sell personal electric hydrofoil watercraft called “eFoils,” which operate as “flying surfboards” by combining surfing and hydrofoiling with electric propulsion to move across a body of water. Appx5345. The effect is to create the feeling of “surfing on open ocean” or “snowboarding or skateboarding” on the water. Appx5488.



Appx7243



Appx7253

### II. The Patents

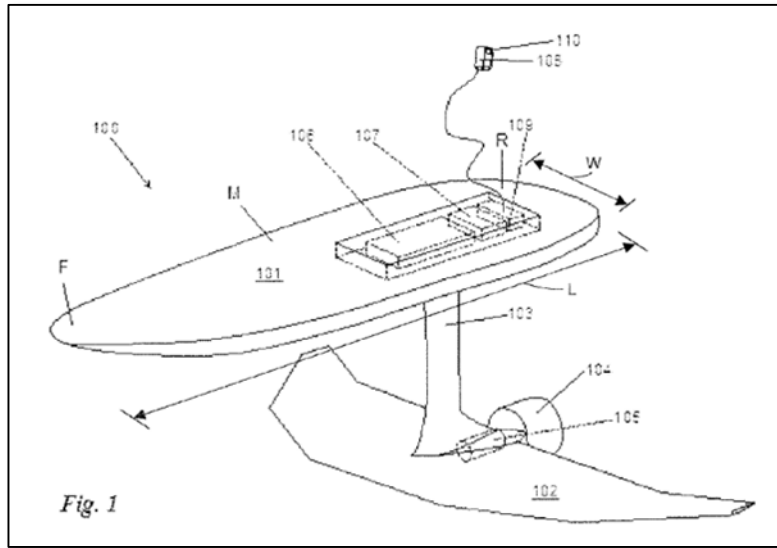
The two patents at issue are United States Patent No. 9,359,044, titled “Weight-Shift Controlled Personal Hydrofoil Watercraft” (“the ’044 Patent”), Appx189-198, and United States Patent No. 9,586,659, titled “Powered Hydrofoil

Board” (“the ’659 Patent”), Appx200-211 (collectively, “the Patents”). Jacob Langelaan, a Pennsylvania State University professor, is the named inventor of both Patents. Appx5491.

Both Patents claim priority to the provisional application Dr. Langelaan filed on October 10, 2013, Appx114, and share a specification. During prosecution of the later filed ’659 Patent, Dr. Langelaan filed a terminal disclaimer to overcome a double patenting rejection in view of the ’044 Patent. Appx406.

The Patents are directed to personal hydrofoil watercraft that can be controlled by users shifting their weight. Appx207, 1:14-16. The purported invention provides for “desired levels of stability and controllability” by “a combination of airfoil design, planform design, and tailoring the span-wise twist distribution to achieve desired outcomes.” *Id.*, 2:20-28.

Figure 1, reproduced below, depicts a representative embodiment of a weight-shift controlled personal hydrofoil watercraft.



### Appx203

The watercraft comprises four structural elements: a floatation device 101 for the user, a fixed strut 103 connected to the floatation device, a hydrofoil 102 with no moveable surfaces connected to the lower end of the strut 103, and a propulsion system 104 that is connected to the hydrofoil 102. Appx208, 3:7-14, 4:26-28. In addition to the four main structural elements, the watercraft can include a battery 106, motor speed controller 107, and handheld throttle system 108. *Id.*

The hydrofoil of the watercraft provides “passive stability” to obviate the need for active control systems. Appx209, 6:7-9. The district court construed “passive stability” to include both “static stability” and “dynamic stability.” Appx74, Appx76. The specification discloses ways for the hydrofoil to achieve passive stability. Appx209, 5:35-65 (disclosing the use of fixed canards, winglets, horizontal tails, and vertical tails). The specification recognizes that the amount of

stability provided by the hydrofoil can vary, because increasing stability decreases maneuverability. Appx210, 7:10-18.

Claim 1 of the '044 Patent requires:

1. A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:
  - a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section, and the flotation device being controlled via weight shift of the user;
  - a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;
  - a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface and designed to provide passive static stability controlled solely by weight shift of the user;
  - a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; andthe watercraft having no movable steering system.

Appx198.

Claim 1 of U.S. Patent No. 9,586,659 similarly recites:

1. A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:
  - a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section;

- a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;
  - a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface;
  - a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; and
- the watercraft having no movable steering system.

Appx210.

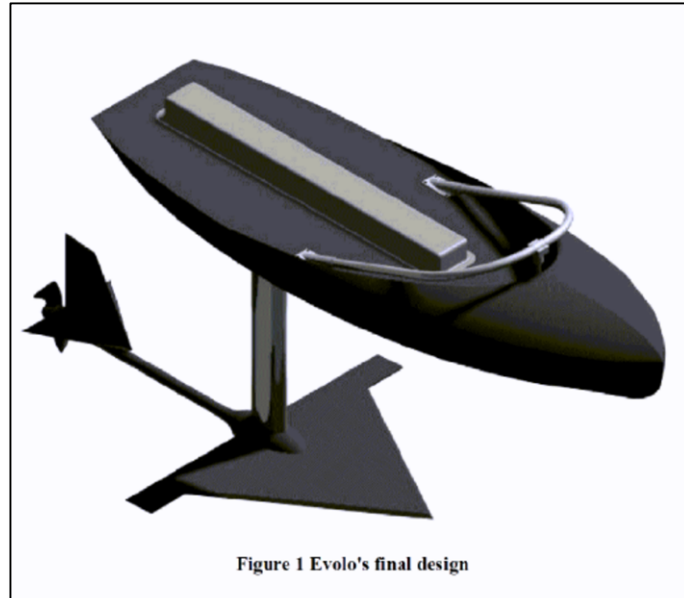
### **III. MHL Buys the Patents**

Dr. Langelaan was not alone in his desire to experiment with hydrofoil watercraft. Appellee/cross-appellant MHL Custom, Inc., a Puerto Rican company that sells stand-up paddle boards and stand-up racing boards, independently developed a hydrofoil with a jet propulsion system around the time of the alleged invention. Appx5390, Appx5401-5404. When MHL discovered Dr. Langelaan's patent applications, it negotiated a licensing agreement and later purchased all rights to the Patents. *See* Appx5404-5411, Appx7102-7125.

### **IV. Other Skilled Artisans Build Similar Hydrofoils**

Similarly, well before Dr. Langelaan, participants in a Master's Level course on Marine Design/Lightweight Design at Kungliga Tekniska högskolan Royal Institute of Technology in Stockholm, Sweden developed and published information about a prototype product for "electric surfing where there are no waves," Appx9027, which the class named "Evolvo." The student team published its "Evolvo

Report” online of more than 500 pages detailing their self-propelled personal watercraft. Appx8464-9017.



Appx8465

Mark Lanterman—a forensic expert—analyzed subpoena records from Google and server logs from the Evolo Report’s website. Appx6025, Appx6033-6034; *see also* Appx9019-9020. Based on those records and his analysis of other evidence, Mr. Lanterman testified that the Evolo Report was created on May 14, 2009, and it was not modified after that. Appx6025. It was posted on the internet by June 2009, first “seen” by Google—meaning Google became aware of the file—on June 18, 2009, and “first crawled” by Google—meaning first collected and indexed by Google—on January 30, 2010. Appx6025-6026.

The Evolo Report was thus accessible through a Google search as of January 30, 2010, Appx6027, and it was downloaded at least 25 times (at least 17 unique downloads) prior to the Patents' priority date of October 10, 2013, including 7 times in the United States. Appx6023, Appx6035, Appx6038, Appx6045-6045. MHL did not present an expert to rebut Mr. Lanterman's opinions. Appx6036.

A popular Swedish boating magazine named Båtnytt (which translates to "Boat News"), noticed the class's work and published an article in its August 2009 issue about the Evolo Project with accompanying photographs. Appx9021-9027.



**Electric surfing - taste the word. Maybe the next fly. At least if Evolo, developed by students at KTH, breaks through.**

**Text & photo:** Åsa Bostelius

It's just incredibly fun and extremely difficult physically, says test pilot Mikael Raada.

It is at the beginning of June that Båt-nytt gets the chance to see Evolo in action. The semester is over, but almost the entire group of 15 students at KTH who during the year developed the "flying"

watercraft is gathered for test driving at Strömman in Stockholm.

Yes, the course is over so this is free time, but we think it's a blast, says Joacim Westlund who, however, has not yet tried Evolo.

Evolo is powered by an electric motor that is located at the bottom

of the "keel" where there are also delta-type carrier planes. You squat and stay in the aluminum frame where there is a small throttle, control you do with the body weight. It is also provided with a dead man's grip. Yes, then just hook your knee and drive - and pose the balance of course.

**Challenge to drive**

The fact that only Mikael Raada and to some extent Mattias Kemnerdal are the only ones who have tried to run the prototype has its simple explanation:

When we started

experimenting with it last fall, it was cold and damn in the water. Since only Mattias and I wore dry suits, we became volunteer guinea pigs. Then I was the easiest of us and then I continued, says Mikael Raada.

But some tanned Evolo-riders he is not. Only twice before has Evolo been test-run, ten minutes earlier the same day and on one occasion in May. But Mikael still thinks that the technology can be compared to riding a unicycle

3099022.v1  
561



Evolo is a hydro toy powered by a 4 kW electric motor and 16 3V battery cells. Dimensions 2.31 x 0.7 meters. At the bottom of the 80 cm long buttress are the delta-shaped carrier planes.



Almost the entire gang behind Evolo gathered. From left, Nils Waller, Erik Jertigård, Fredrik Bender, Nirjam Farhi, Torvakk Manssers, Markus Norberg, Mattias Kemnerdal, Joacim Westlund, Anders Lundell and Mikael Raada.

BÅTNYTT 92009

3099022.v1

Appx9024-9025 (translated)

The Båtnytt article shows each of the main features of the Evolo watercraft, including a flotation device and a strut linking the flotation device to both a propulsion system and a hydrofoil. Appx9021-9027. Further, the Båtnytt article included a link that took readers to the Evolo Report’s website. Appx9027 (“Evolo was one of three projects that could be followed online during the Spring. . . . Read more about Evolo at [www.evolo.se](http://www.evolo.se), [www.msy.se](http://www.msy.se), [http://flygmac7.flyg.kth.se/cdio/old\\_projects/evolo/](http://flygmac7.flyg.kth.se/cdio/old_projects/evolo/)”).

**V. MHL Licenses the Patents to Fliteboard along with Other Intellectual Property**

MHL has only licensed the Patents to one party. As part of a broader license (which included two patents that MHL did not assert against Waydoo, Appx7118, Appx5875-5876), an Australian company named Fliteboard purchased a license in exchange for a 5.25% royalty of net sales of licensed products. *See* Appx7105-7120.

MHL secured Fliteboard’s agreement to pay the 5.25% royalty rate only after MHL threatened litigation and used “intimidation.” Appx5431-5432, Appx5449-5450.

## **VI. Waydoo Enters the Market**

Appellants Waydoo USA, Inc. and Shenzhen Waydoo Intelligence Technology Co., Ltd. (collectively, “Waydoo”) were founded in 2018. Appx5976-5977, Appx5983.<sup>2</sup> Waydoo has a staff of 136, including 50 engineers. *Id.*

Like MHL, Dr. Langelaan, and the Evolo Project students, Waydoo developed an eFoil product, which it named the Waydoo Flyer NTS and began marketing in the United States in January 2019. Appx5976. It brought its second-generation product, the Waydoo Flyer One, to market in June 2020. *Id.* And in March 2022 Waydoo brought to market its “2.5 generation product,” the Waydoo Flyer One Plus, which is the current product Waydoo sells. *Id.* Waydoo works with a North American distributor, Shred Services, to sell its eFoils in the United States. Appx5987, Appx5992-5994.

## **VII. MHL Sues Wayoo for Patent Infringement**

In January 2021, MHL sued Waydoo for infringement of the Patents. Appx175.

One heavily contested issue in the litigation was the meaning of “passively stable,” which appears in the preamble of both independent claims. Prior to trial, the district court construed “A passively stable, weight-shift controlled personal

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<sup>2</sup> Waydoo USA, Inc., a subsidiary of Shenzhen Waydoo Intelligence Technology Co., Ltd., has since been dissolved.

hydrofoil watercraft” from claim 1 of the ’659 Patent to be limiting (by party agreement) and to mean “a weight-shift controlled personal watercraft having a hydrofoil that does not have any moveable components and which, when distributed (1) has an initial tendency to return to its original condition and (2) eventually returns to its original condition.” Appx68.

Although claim 1 of the ’659 Patent and claim 1 of the ’044 Patent share an identical preamble—“A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising”—the district court construed them differently. MHL conceded that the preamble was **limiting** in claim 1 of the ’659 Patent but persuaded the district court that the identical preamble was **not limiting** in claim 1 of the ’044 Patent. *Id.*

The case proceeded to trial, with MHL accusing Waydoo of infringing independent claim 1 as well as dependent claims 2, 5, and 6 of the ’044 Patent and independent claim 1 as well as dependent claim 2 of the ’659 Patent.

Following a five-day trial, the jury found that Waydoo infringed all asserted claims. Appx5157-5158. In addition, the jury found that the Evolo Report was not publicly accessible before October 10, 2013, and that the Evolo Report was not enabling. *Id.* In view of these findings, the jury did not reach the question of whether the Evolo Report anticipated the asserted claims. Appx5159. The jury awarded

MHL a royalty rate of \$500 per eFoil—approximately an 18.6% royalty—with damages totaling \$1,334,000. Appx5161.

Waydoo filed post-trial motions for judgment as a matter of law, which the district court denied. Appx1-27.

### **VIII. The Patent Trial and Appeal Board Considers the Evolo Report and Finds It Publicly Accessible**

In co-pending inter partes review proceedings before the U.S. Patent and Trademark Office involving the same Patents, the Patent Trial and Appeal Board considered whether the same Evolo Report qualified as a prior art printed publication. *See Foil Boarding Co., Inc. v. MHL Custom, Inc.*, IPR2024-00085, Dkt. 20 (PTAB May 28, 2024); *Foil Boarding Co., Inc. v. MHL Custom, Inc.*, IPR2024-00086, Dkt. 12 (PTAB May 28, 2024). The Board found that there was a reasonable likelihood that the Evolo Report qualified as a prior art printed publication. IPR2024-00085, Dkt. 20, at 20-21 (recognizing the reference to the Evolo Report in the Båtnytt article is a “research aid” that would have guided a skilled artisan to the Evolo project’s website and the Evolo Report); IPR2024-00086, Dkt. 12, at 26-27 (same). The Board instituted inter partes reviews in both proceedings.<sup>3</sup>

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<sup>3</sup> Waydoo has since filed similar petitions and moved for joinder of the inter partes review proceedings.

## SUMMARY OF THE ARGUMENT

This appeal stems from several independent errors below.

First, the district court erred in denying Waydoo judgment as a matter of law of non-infringement of the '659 Patent because MHL failed to present sufficient evidence that the accused products are “dynamically stable.” The district court also declined to construe the identical preamble of claim 1 of the '044 Patent as limiting, and under a correct construction, Waydoo should receive judgment as a matter of law of non-infringement on these claims as well.

Second, the district court erred in denying Waydoo judgment as a matter of law regarding the public accessibility of the Evolo Report, a detailed prior art publication that was published on a university website that recorded substantial visitor activity, was indexed by Google, and was prominently featured in a boating magazine, all before the priority date of the Patents. The Patent Trial and Appeal Board recently considered similar evidence and found the Evolo Report was publicly accessible. No reasonable jury could have found the Evolo Report was not publicly accessible. The Evolo Report also included significantly more information on how to build a product than the Patents themselves, enabling a skilled artisan to do so. No reasonable jury could have found the Evolo Report was not enabled. As a result, this Court should remand for a new trial (or, more likely, summary judgment) regarding anticipation.

Third, the district court erroneously admitted the testimony of MHL's damages expert, Jeffrey Stec, who relied on a license agreement that had terms the licensee considered "more generous than industry practice" and that the licensee entered into only under threat of litigation. The district court permitted Dr. Stec to flout the requirement that the license be comparable and instead to rely on MHL's unilateral representations as to what patents were driving the agreement. Rather than disaggregate the value of the Patents from the other licensed patents, Dr. Stec simply opined that the **per-unit** royalty would be the same, regardless of the fact that Waydoo's products sell for approximately thirty percent of the amount the licensed products sell for. His opinions should never have been presented to the jury.

Each error requires correction, and the decision below cannot stand.

## STANDARD OF REVIEW

Applying Third Circuit law, this Court “exercise[s] plenary review over a district court’s rulings on motions for [judgment as a matter of law], applying the same standard as the district court.” *Agrizap, Inc. v. Woodstream Corp.*, 520 F.3d 1337, 1341-42 (Fed. Cir. 2008). A grant of judgment as a matter of law is appropriate “where a party has been fully heard on an issue during a jury trial and the court finds that a reasonable jury would not have had a legally sufficient evidentiary basis to find for the party on that issue.” *Id.* at 1342; *see* Fed. R. Civ. P. 50.

This Court reviews “a district courts ultimate interpretation of a claim term, as well as its interpretations of evidence intrinsic to the patent, de novo and its subsidiary factual findings about extrinsic evidence for clear error.” *CardSoft, (assignment for the Benefit of Creditors), LLC v. VeriFone, Inc.*, 807 F.3d 1346, 1348 (Fed. Cir. 2015).

A court of appeals is to apply an abuse-of-discretion standard when it “review[s] a trial court’s decision to admit or exclude expert testimony.” *Kumho Tire Co., Ltd. v. Carmichael*, 526 U.S. 137, 152 (1999). A court may exclude evidence that is based upon unreliable principles or methods, legally insufficient facts and data, or where the reasoning or methodology is not sufficiently tied to the facts of the case. *Id.* at 150.

## ARGUMENT

### **I. Waydoo Is Entitled to Judgment as a Matter of Law of Non-Infringement because the Accused Products Are Not “Dynamically Stable.”**

All asserted claims share the same preamble: “A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising.” The district court construed the preamble to mean “a weight-shift controlled personal watercraft having a hydrofoil that does not have any movable components and which, when disturbed” has both (1) “static stability,” i.e., “an initial tendency to return to its original condition” and (2) “dynamic stability,” i.e., “eventually returns to its original condition.” Appx74, Appx76. It construed the general term “stable” to mean “both having static stability and dynamic stability.” *Id.*

The district court correctly construed the preamble as limiting with respect to the '659 Patent but erred in construing the same preamble as not limiting with respect to the '044 Patent. As detailed below, correctly construed, the preamble is limiting for both patents. And, because a reasonable jury did not have a legally sufficient basis to find that Waydoo's products have “dynamic stability,” Waydoo is entitled to judgment as a matter of law on infringement.

Infringement is a question of fact, which the patentee must prove by a preponderance of the evidence. *Centricut, LLC v. Esab Grp., Inc.*, 390 F.3d 1361, 1367 (Fed. Cir. 2004). If a patentee fails to prove even a single claim element, there

is no infringement as a matter of law. *Bayer AG v. Elan Pharm. Rsch. Corp.*, 212 F.3d 1241, 1247 (Fed. Cir. 2000).

**A. Waydoo’s Accused Products Are Not Dynamically Stable.**

MHL relied on the testimony of its technical expert, Christopher Barry, to prove infringement. Mr. Barry testified that he found infringement after watching clips of YouTube videos and running calculations in software that showed the accused eFoils were dynamically **unstable**, not stable. His opinions should never have been admitted, and they are insufficient to prove infringement.

**1. The YouTube Evidence Is Insufficient for a Reasonable Jury to Find Infringement.**

Mr. Barry’s infringement analysis of dynamic stability began with him viewing YouTube video segments of Waydoo’s eFoils on the water—the longest of which was only eight seconds—which led him to a “positive determination” of dynamic stability without “do[ing] any mathematical calculations.” Appx5740-5741, Appx5777-5778. This opinion is unsupported, conclusory, and unscientific; as a “gatekeeper” the district court should have excluded it as unreliable. *See Daubert v. Merrell Dow Pharms., Inc.*, 509 U.S. 579, 593-94 (1993); Appx1060-1082 (Waydoo’s *Daubert* motion). Mr. Barry did not cite any source endorsing determining dynamic stability by watching a video. Appx5741, Appx5745. Mr. Barry’s YouTube opinions are insufficient to support a jury verdict.

Mr. Barry's opinion based on the videos is further precluded because he testified that while analyzing Waydoo's eFoils he applied the standard that if a rider is able to operate the eFoil "for a small period of time" without necessary movements, "then it's stable," meaning it has both static and dynamic stability. Appx5742. But Mr. Barry admitted that "small period of time" "doesn't have any particular meaning" for his work in this case. Appx5743.

Nor did Mr. Barry apply a consistent view of "a small period of time" when assessing videos. Of the various definitions Mr. Barry offered for "a small period of time," the shortest measurable one was 20 seconds. Appx5743-5746. But the single video on which Mr. Barry based his infringement opinion does not contain any segment that is 20 seconds long. Appx5746-5747, Appx5748-5752. The longest segment, according to Mr. Barry, was "eight seconds." Appx5750-5751. Under his own definition, Mr. Barry did not observe Waydoo's eFoils for "a small period of time." Waydoo's expert Michael Triantafyllou further confirmed that stability cannot positively be determined just from viewing short YouTube videos. Appx6081-6082. And when given the opportunity, even Mr. Barry could not confirm his approach was scientific. Appx5745.

The district court held a jury could still have credited this YouTube video evidence and testimony because "[t]he record shows that watching a video of a watercraft can, at least, give **some indication** about stability." Appx19 (citing

Appx6140-6141 (Triantafyllou); Appx5741 (Barry)) (emphasis added). But the jury could have gleaned **some indication** of stability from watching the videos itself; Mr. Barry's testimony lending expert credence to it was unduly prejudicial. Further, "some indication" does not support a finding by a preponderance of the evidence, which is what MHL needed to prove. Mr. Barry's testimony should have been excluded, and the videos cannot support an infringement finding.

## **2. The "Crosscheck" Calculations Are Insufficient for a Reasonable Jury to Find Infringement.**

Mr. Barry also provided "crosscheck" evidence to "confirm[] what [he] s[aw] with [his] eyes." Appx5778. Mr. Barry used software to calculate the "eigenvalue" solution for the accused products, which serves as an indication of dynamic stability. Appx5677-5678. Both experts agreed that in an eigenvalue analysis, all sigma values must be **negative** for a craft to be dynamically stable. Appx5726, Appx5729 (Barry); Appx6072, Appx6079 (Triantafyllou).

Mr. Barry's analyses of Waydoo's eFoils each have at least one **positive** sigma value. Appx5730 (Barry). Mr. Barry conceded that "even small positive sigma values are going to result in big motions," confirming that any positive value is dynamically unstable. Appx5728-5729 (Barry). Thus, far from supporting his opinion of dynamic stability, Mr. Barry's calculated refuted it.

Faced with an empirical analysis that disproved his opinion, Mr. Barry testified that "water has a number of effects that will all reduce the real eigenvalue."

Appx5731.<sup>4</sup> But, according to Mr. Barry, “[t]he effects of water are very complicated and generally reduce these values . . . but there is no really good way of” calculating that. Appx5731 (“[W]e can’t predict it exactly in water.”). Mr. Barry could not quantify the so-called water “damping” effects, much less show that they would cause the eigenvalues to move from positive to negative. Appx5734-5735. Mr. Barry also did not cite to any engineering textbooks or articles to support what he called his “damping” effect from the water, relying on his own *ipse dixit*. Appx5736. The only scientific literature expressly mentioned by either expert contradicts Mr. Barry’s testimony and states that “damping can be stabilizing and **destabilizing.**” Appx6079-6081 (Triantafyllou) (citing the work of Stephen Crandall; emphasis added).

The district court rejected Waydoo’s challenges to Mr. Barry’s testimony, commenting “the jury was free to consider Mr. Barry’s testimony about . . . his eigenvalue analysis and weigh it against the testimony of Waydoo’s expert.” But the issue here is not a credibility choice between conflicting expert opinions but rather to the sufficiency of the evidence. And “[w]hen an expert opinion is not supported by sufficient facts to validate it in the eyes of the law, . . . it cannot support a jury’s verdict.” *See Brooke Grp. Ltd. v. Brown & Williamson Tobacco Corp.*, 509

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<sup>4</sup> Mr. Barry did not even bring up these issues in his opening expert report, only offering them in response after Waydoo “pointed out the instability that [Mr. Barry] demonstrated.” Appx5733-5734.

U.S. 209, 242 (1993). Mr. Barry's eigenvalue calculations disproved his opinion, and his speculation that other variables might have affected those calculations is, at most, a basis for disregarding the calculations entirely and not affirmative evidence of dynamic stability.

The district court violated the Supreme Court's and this Court's well-established *Daubert* precedent and erred in admitting Mr. Barry's testimony. No reasonable jury could have credited it as supporting infringement, and without it MHL failed to prove by a preponderance of the evidence that the accused products were dynamically stable. Waydoo is entitled to judgment as a matter of law of no infringement on all claims that require dynamic stability, which includes, at least, the asserted claims of the '659 Patent.

**B. The District Court Erred in Construing the Preamble of Claim 1 of the '044 Patent.**

If this Court agrees that Waydoo is entitled to judgment as a matter of law regarding infringement of claims requiring "dynamic stability," then it must review the district court's construction of the preamble of claim 1 of the '044 Patent.

The district court correctly construed this preamble as limiting with respect to the '659 Patent but incorrectly construed the identical preamble as not limiting with respect to the '044 Patent. This was error. Correctly construed, the preamble is limiting for both patents, and Waydoo is entitled to judgment as a matter of law on non-infringement of all asserted claims.

## 1. Preambles May Limit Claim Scope.

“A claim typically contains three parts: the preamble, the transition, and the body.” *Acceleration Bay*, 908 F.3d at 770 (quoting 3 CHISUM ON PATENTS § 8.06 (2018)). Depending on “the facts of each case in light of the claim as a whole and the invention described in the patent,” a preamble term may be construed as limiting the scope of the claim. *Am. Med. Sys., Inc. v. Biolitec, Inc.*, 618 F.3d 1354, 1358 (Fed. Cir. 2010).

There is no simple test for determining whether a claim preamble is limiting because the proper construction must take into account the claim language as a whole and the corresponding description of the invention in the specification. *Eli Lilly & Co. v. Teva Pharm. Int’l GmbH*, 8 F.4th 1331, 1340 (Fed. Cir. 2021) (citing *Storage Tech. Corp. v. Cisco Sys., Inc.*, 329 F.3d 823, 831 (Fed. Cir. 2003)); *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 952 (Fed. Cir. 2006) (“no ‘litmus test’ for determining whether preamble language is limiting”) (quoting *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002)).

This Court has explained that a preamble is not limiting if the claim body recites a structurally complete invention, but a preamble may be limiting if (1) “it recites essential structure or steps”; (2) the claims “depen[d] on a particular disputed preamble phrase for antecedent basis”; (3) it “is essential to understand limitations or terms in the claim body”; (4) it “recit[es] additional structure or steps underscored

as important by the specification”; or (5) there was “clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art.” *Id.* (citations omitted). In other words, a preamble is limiting if it is necessary to give “life, meaning, and vitality” to the claim. *Shoes by Firebug LLC v. Stride Rite Children’s Grp., LLC*, 962 F.3d 1362, 1367 (Fed. Cir. 2020).

## 2. Several *Catalina Marketing* Factors Demonstrate the Preamble in Claim 1 of the ’044 Patent Is Limiting.

The preamble of claim 1 of the ’044 Patent is limiting because it recites an essential element not found in the body of the claim—the “dynamic stability” aspect of stability. “[W]hen reciting additional structure or steps underscored as important by the specification, the preamble may operate as a claim limitation.” *Catalina Mktg.*, 289 F.3d at 808; *see also Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989) (limiting claim scope to “optical waveguides” rather than all optical fibers in light of specification); *Gen. Elec. Co. v. Nintendo Co.*, 179 F.3d 1350, 1361–62 (Fed. Cir. 1999) (limiting claim scope to a “raster scanned display device” rather than all display systems in view of specification’s focus on the prior art problem of displaying binary data on a raster scan display device).

The patent specification repeatedly defines **the invention** as a stable watercraft, which the district court held (at Appx76) includes static and dynamic stability:

- “**The watercraft of the present invention** is specifically **designed to achieve** desired levels of **stability** and controllability without the need for moveable surfaces.” Appx7085, 2:20-22 (emphasis added).
- “This trim condition is **stable** if a disturbance results in a restoring moment that returns the hydrofoil to its original condition.” Appx7087, 6:3-5 (emphasis added). The district court interpreted this as “[t]he hydrofoil returning to its original condition is a description of dynamic stability, not static stability.” Appx76.
- “To ensure a trimmable, **stable** hydrofoil, the following conditions must be true:  $C_{m0} > 0$ ,  $C_{m\alpha} < 0$ ,  $C_{mQ} < 0$ .” *Id.*, 6:13-15 (emphasis added).

The preamble should therefore be limiting because it contains the only language in the claim that requires dynamic stability; the rest of the body of claim 1 only mentions static stability when describing the hydrofoil. Appx7088. But, as the district court held, a watercraft that is only statically stable is not stable overall. Appx76. An unstable watercraft is not the invention. *See, e.g.*, Appx5420, Appx5437 (MHL’s witness Nick Leason describing the watercraft as “stable” and “perfectly stable”); Appx5494, Appx5518 (named inventor Dr. Langelaan testifying “It is important for a watercraft to stable” and agreeing his stable prototype reflects the invention set forth in the ’044 Patent).

In addition, the claim’s last limitation states “the watercraft having no movable steering system,” which depends on the introduction of “watercraft” in the preamble. This indicates the preamble is limiting because the claim “depen[ds] on a particular disputed preamble phrase for antecedent basis.” *Catalina Mktg.*, 289 F.3d at 808; *see also Bell Commc ’ns Rsch., Inc. v. Vitalink Commc ’ns Corp.*, 55 F.3d

615, 620 (Fed. Cir. 1995) (“[W]hen the claim drafter chooses to use both the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects.”).

The watercraft in the body of the claim is not just introduced via the preamble, it is also informed by the preamble, another factor this Court should consider. *Catalina Mktg.*, 289 F.3d at 808. In *Deere & Co. v. Bush Hog, LLC*, this Court concluded that the preamble term “rotary cutter deck” in the preamble of an apparatus claim was “necessary to understand the subject matter encompassed by the claim” because it “inform[ed] the meaning of the ‘torsional stiffness’ limitation” in the claim body by indicating “the claimed structure must possess sufficient stiffness to withstand the torsional loads imposed by the operation of a rotary cutter.” 703 F.3d 1349, 1358 (Fed. Cir. 2012). The specification also “repeatedly refer[ed] to the ‘present invention’ as an improved deck for a rotary cutter[.]” *Id.* at 1358. Likewise, here the “passively stable, weight-shift controlled personal hydrofoil watercraft” is necessary to understand the subject matter encompassed in the claim because it informs the meaning of the “watercraft having no movable steering system” by indicating how the watercraft is steered, and the specification refers to the stable watercraft as the present invention. Appx7085, 2:20-22.

In view of this intrinsic evidence, the preamble of claim 1 of the '044 Patent should be construed as limiting.

### **3. The District Court Erred in Declining to Construe the Preamble as Limiting.**

The district court rejected these arguments but—on de novo review—this Court should not. The district court largely focused on the fact that it need not as a matter of law construe the preamble as limiting solely because it is limiting in the related (and terminally disclaimed) '659 Patent. Appx82. But it makes no sense to treat the claims' preambles differently when supported by the same specification and directed to the same invention. *See Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1334 (Fed. Cir. 2003) (“[W]e presume, unless otherwise compelled, that the same claim term in the same patent or related patents carries the same construed meaning.”).

The district court also identified “significant differences from the form of claim 1 of the '659 patent,” Appx82, but the only difference the district court discussed is an “explicit recitation of static stability in the body of claim 1 of the '044 Patent.” Appx83 n.6. According to the district court, because “[t]he body of claim 1 of the '659 Patent does not contain any limitations pertaining to stability”—an “essential element”—it is proper to read the preamble into the claim (which requires both static and dynamic stability). Appx82-84. But, the district court reasoned, because there is a reference only to passive stability in claim 1 of the '044 Patent, it is improper to read the recitation of dynamic stability from the preamble as limiting. *Id.*

This claim interpretation ignores the overwhelming evidence in the record indicating claim 1 of the '044 Patent requires dynamic stability too. Indeed, the district court recognized that the specification “repeatedly describe[s] the invention as being ‘stable’ or having ‘passive stability,’ and dynamic stability is a component of those terms.” Appx82. But the district court then interpreted the specification as stressing the importance of “static stability” and held dynamic stability was not “essential” enough to require the preamble to be limiting. As shown above in Section I.B.2, this was a misinterpretation of the specification.

The district court erred in construing the preamble in claim 1 of the '044 Patent as nonlimiting. On de novo review, this Court should reverse.

#### **4. This Court May Wish to Reconsider Its Preamble Jurisprudence.**

Recently, in *Alnylam Pharm., Inc. v. Pfizer, Inc.*, No. CV 22-336-CFC, 2024 WL 3742313, at \*4 (D. Del. Aug. 9, 2024), District of Delaware Chief Judge Connolly took the position that “a claim should be construed to give effect to all its terms” and called on this Court “to jettison its rulings that treat language in the preamble of a patent claim as not limiting the scope of the claim.” *Id.* at 10. Preeminent Professor Mark Lemley agrees. *See* Mark A. Lemley, *Without Preamble*, 100 B. U. L. REV. 357, 388 (2020) (“The Supreme Court (or the en banc Federal Circuit) should get rid of all these doctrines and simply hold that all the words of a patent claim matter.”).

Waydoo acknowledges that this argument is foreclosed by circuit precedent but respectfully raises the argument. If the Court were inclined to revisit its preamble precedent, this case provides such an opportunity to address this issue.

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When properly construed, MHL failed to prove infringement of any asserted claim. The Court should hold Waydoo is entitled to judgment as a matter of law of non-infringement.

**II. The District Court Erred in Denying Waydoo’s Motion for Judgment as a Matter of Law related to the Evolo Report.**

The jury found that the Evolo Report was not publicly accessible and that MHL proved that it was not enabling. Appx5157-5159. As a result, the jury did not reach the question of whether the Evolo Report anticipates the asserted claims. *Id.*

The jury’s findings regarding public accessibility and enablement are unsupported by the record, and Waydoo is entitled to judgment as a matter of law.

**A. The Evolo Report Was Publicly Accessible.**

A reference is publicly accessible if it “has been . . . made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, can locate it.” *Jazz Pharms., Inc. v. Amneal Pharms., LLC*, 895 F.3d 1347, 1355 (Fed. Cir. 2018). But “direct availability to an ordinarily skilled artisan is [not] dispositive.” *GoPro, Inc. v. Contour IP Holding LLC*, 908 F.3d 690, 694 (Fed. Cir. 2018). Whether prior art was publicly accessible

is a question of fact, which the patent challenger must prove by clear and convincing evidence. *Jazz Pharms.*, 895 F.3d at 1354.

**1. Waydoo Proved Public Accessibility of the Evolo Report as a Matter of Law.**

Waydoo presented copious evidence and unchallenged expert testimony that the Evolo Report was publicly accessible via two avenues: Google and the *Båtnytt* magazine. It further demonstrated visitor activity on the course website for the Evolo Project, bolstering its public accessibility evidence.

Waydoo established the following undisputed facts at trial:

- The Evolo Report was created in May 2009 and posted to the Evolo project webpage by June 2009. Appx6024-6025 (Lanterman).
- In January 2010, Google first crawled and indexed the Evolo Report. Appx6025-6026 (Lanterman), Appx7842-7846. As a result, the Evolo Report became available to be returned in the results of an appropriate Google search in January 2010. Appx6027, 727:5-7 (Lanterman).
- The Evolo course website had activity every day from November 2011 to October 2013 (besides a 3-week gap in the Spring of 2013). Appx7841, Appx6034 (Lanterman). During that period, over 5,000 unique visitors accessed the Evolo Report’s course website, 120 unique visitors accessed the Evolo Project webpage, and 17 unique visitors downloaded the 500+ page Evolo Report. Appx7841, Appx6034-6035 (Lanterman).
- Although the Evolo team was based in Sweden and in Swedish, seven of the seventeen downloads occurred in the United States. Appx6045-6046 (Lanterman).
- The August 2009 issue of the Swedish magazine “*Båtnytt*” (“Boat News”) summarized the Evolo Project and contained a link to the Evolo project webpage for those who wanted to “[r]ead more about Evolo.” Appx9021-9027.

When proving prior art accessibility “there is no requirement to show that particular members of the public actually received the information.” *Jazz Pharm.*, 895 F.3d at 1356. But Waydoo used visitor logs to the Evolo Report website to demonstrate exactly that: members of the public from as far away as the United States accessed the Evolo Report. *Cf. Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1349 (Fed. Cir. 2016) (“Even if we assume that Ratsimor was available online on Dr. Ratsimor’s personal page before the critical date, Groupon does not point to any evidence indicating that Ratsimor was viewed or downloaded.”). And there is no dispute that at least the editorial staff at Båtnytt was aware of the team’s work. Since it was indexed by Google, Waydoo also demonstrated that the Evolo Report could have been located via a Google Search. *Id.* (“An adequate roadmap [to a potentially invalidating reference] need not give turn-by-turn directions.”).

*In re Hall*, 781 F.2d 897, 899-900 (Fed. Cir. 1986), is instructive. In that case this Court considered whether a dissertation was sufficiently indexed by a university library to make it publicly accessible. The record evidence consisted of affidavits that “consistently maintain that inasmuch as the Foldi dissertation was received by the library in early November 1977, the dissertation most probably was available for general use toward the beginning of the month of December, 1977.” *Id.* The Court considered this not only “competent evidence” but also “persuasive evidence that the Foldi dissertation was accessible prior to the critical date” where “appellant

proffered no rebuttal evidence.” *Id.* Thus, the affidavits “establishe[d] a prima facie case for unpatentability of the claims under the § 102(b) publication bar” that stood “unrebutted.” *Id.*

Here, Waydoo’s Google indexing evidence is stronger than the evidence in *In re Hall* because it establishes when the Evolo Report became accessible via a search. Appx6025-6026 (Lanterman), Appx7842-7846. That evidence alone establishes a prima face case, and MHL offered no expert testimony to rebut Mr. Lanterman or the Google evidence. Waydoo’s evidence of public accessibility “is uncontradicted and unimpeached.” *Imperium IP Holdings (Cayman), Ltd. v. Samsung Elecs. Co.*, 757 F. App’x 974, 979 (Fed. Cir. 2019).

The Google indexing evidence should, as a matter of law, be enough. *See Blue Calypso*, 815 F.3d at 1349 (recognizing that whether a prior art reference has been indexed through a search engine “is [] an important question for determining if a reference stored on a given webpage in cyberspace is publicly accessible.”) (citing *Voter Verified, Inc. v. Premier Election Sols., Inc.*, 698 F.3d 1374, 1380 (Fed. Cir. 2012)).

But here Waydoo offered so much more than the Google indexing; it offered proof that the Evolo Report was downloaded—via the course website activity logs—and viewed by those interested in the subject matter—via the Båtnytt article. The

Evolvo Report was publicly accessible years before the October 2013 priority date of the Patents.

**2. The District Court Erred in Denying Waydoo’s Renewed Motion for Judgment as a Matter of Law.**

Given the strength of Waydoo’s evidence, a reasonable jury could not have found as a matter of law that the Evolo Report was not publicly accessible before 2013. In denying Waydoo’s motion for judgment as a matter of law, the district court held that “a reasonable jury could conclude that Waydoo did not meet its heavy evidentiary burden to show the Evolo Report was publicly accessible.” Appx7.

The district court began by agreeing that Waydoo proved the Evolo Report was “technically accessible,” but the district court held that is not enough. Appx7 (citing *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 773 (Fed. Cir. 2018) (“public accessibility requires more than technical accessibility.”)).

But the district court misapplied *Acceleration Bay* to these facts. In *Acceleration Bay*, this Court affirmed the holding that certain publications were not publicly accessible, even when those publications were placed on a library’s website, because the publications were “not indexed in a meaningful way” and “the website’s advanced search form was deficient.” *Id.* Another issue for the patent challenger in *Acceleration Bay* was “there was no evidence that [the prior art] was disseminated to the public.” *Id.*

Here, unlike in *Acceleration Bay*, the Evolo Report was indexed by a world-class search engine and was actually disseminated to the public. Waydoo does not rely on the Evolo Report's course website's or even the University website's internal indexing and search functions. Rather, Waydoo relies on subpoenaed business records from the world's largest and most famous search engine—**Google**—that located and indexed the Evolo Report months after the report was posted. Appx7842-7846. That is precisely the evidence that was missing in *Acceleration Bay* and, as addressed above, should be sufficient to show public accessibility. *See U.S. v. Google LLC*, No. 20-CV-3010 (APM), 2024 WL 3647498, at \*9 (D.D.C. Aug. 5, 2024) (recognizing Google as “create[ing] fulsome web search indexes that generate accessible results.”); Appx6026-6029 (Mr. Lanterman describing the Google indexing process that occurred before the priority date).

In addition, Mr. Lanterman testified that the Evolo Report was publicly available. In holding that a reasonable jury could have refused to credit Mr. Lanterman's opinion, the district court noted the testimony that Mr. Lanterman did not personally perform a Google search to locate the Evolo Report and that he did not know what search phrase would have located the article on Google. Appx9 (citing Appx6027, Appx6043, Appx6045-6047).

The district court's analysis took Mr. Lanterman's testimony out of context. Mr. Lanterman testified that he did not perform a search for the Evolo Report

because the report was in Swedish, a language he does not speak. Appx6027. But the fact the report was in Swedish has no bearing on public accessibility. Courts have long held that the fact a prior-art reference is in a foreign language is irrelevant. *See, e.g., In re Howarth*, 654 F.2d 103, 106 (Cust. & Pat. App. 1981) (“Foreign ‘printed publications’ preclude the grant of a patent”); *Bone v. Comm’rs of Marion Cnty.*, 251 U.S. 134, 144-45 (1919) (“[The patentee’s] device having been described in printed publications, although in foreign countries, patentable novelty or originality cannot be asserted for it.”). Mr. Lanterman’s testimony that he did not personally search for and find the report in Swedish does nothing to undermine the (uncontroverted) facts that the Evolo Report was publicly available on the internet, indexed by Google, and thus available through a Google search.

The district court also found that a reasonable jury could discredit the Båtnytt article due to Waydoo’s alleged failure to “establish that an interested party would be able to find or locate the [Båtnytt] Boat News magazine.” Appx8. The district court misunderstood Waydoo’s argument: the question was not whether an interested party would have been able to locate the Båtnytt magazine but whether an interested party would be able to find and locate the **Evolo Report**. *See, e.g., Samsung Elecs. Co. v. Infobridge Pte. Ltd.*, 929 F.3d 1363, 1374 (Fed. Cir. 2019) (The standard for public accessibility is whether an interested person “could . . . access a reference”). The undisputed fact that the Evolo team’s work was

prominently featured, described, and linked to in the Båtnytt magazine evidences that parties interested in watercraft and naval architecture—at the very least the author of the article and the magazine’s editorial staff—found and accessed the Evolo Report.

The evidence of public accessibility is overwhelming and uncontroverted. Viewing the record evidence as a whole—which includes Google indexing, Båtnytt, and the website logs, along with Mr. Lanterman’s unchallenged and unimpeached testimony—no reasonable jury could have found the Evolo Report was not publicly accessible. Indeed, recently when considering nearly identical evidence the Patent Trial and Appeal Board instituted *inter partes* review after finding there was a reasonable likelihood that the Evolo Report qualified as a prior art printed publication. *See Foil Boarding Company*, IPR2024-00085, Dkt. 20 at 20-21; *Foil Boarding Company*, IPR2024-00086, Dkt. 12 at 26-27.<sup>5</sup>

A reasonable jury would not have had a legally sufficient evidentiary basis to find against Waydoo on this issue, and the district court erred in denying Waydoo’s motion for judgment as a matter of law.

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<sup>5</sup> “It is proper to take judicial notice of a decision from another court or agency at any stage of the proceeding, even if it was not available to the lower court.” *See Function Media, LLC v. Google, Inc.*, 708 F.3d 1310, 1316 n.4 (Fed. Cir. 2013).

## **B. The Evolo Report Is Enabling.**

The jury also found that the Evolo Report was not enabling. Appx5158. Enablement is a question of law based on underlying factual findings. *MagSil Corp. v. Hitachi Glob. Storage Techs., Inc.*, 687 F.3d 1377, 1380 (Fed. Cir. 2012).

A patentee must prove that a prior-art reference is not enabling because “[i]t is well-established that prior art . . . printed publications,” including foreign-language ones, “are presumed enabling.” *Apple Inc. v. Corephotonics, Ltd.*, 861 F. App’x 443, 449 (Fed. Cir. 2021). This Court considers whether a skilled artisan “can practice the subject matter based on the reference without undue experimentation.” *Sanofi-Synthelabo v. Apotex*, 550 F.3d 1075, 1082 (Fed. Cir. 2018).

Factors relevant to determining whether experimentation is undue such that the reference is not enabled include: (1) the quantity of experimentation; (2) the amount of direction or guidance present; (3) the presence or absence of working examples; (4) the nature of the invention; (5) the state of the prior art; (6) the relative skill of those in the art; (7) the predictability or unpredictability of the art; and (8) the breadth of the claims. *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

### **1. The Evolo Report Discloses a Stable eFoil.**

There is no dispute that the Evolo Report discloses “all of the physical parts” needed to make an eFoil. Appx6367 (MHL’s technical expert Mr. Barry).

MHL’s challenge to enablement of the Evolo Report focused on the purported lack of stability of the Evolo, despite Mr. Barry admitting the point of the Evolo project was to “make a stable watercraft.” Appx6309. MHL failed to carry its burden to prove non-enablement by clear and convincing evidence.

To the contrary, the evidence showed that the Evolo was stable. The authors of the Evolo Report claim to have successfully achieved a “stable watercraft”—while using the same definition for stability that the patents use. Appx6312 (Mr. Barry admitting both the Evolo Report and the Patents define stability of an eFoil as “stable in pitch”); Appx6320 (Mr. Barry: “They reported success.”).

The Evolo Report discloses that embodiment X7—the result of several rounds of experimenting—“had much better pitch direction stability” and “felt much more stable in the pitch direction.” Appx6315. “The craft was, according to theory, self-righting with the center of gravity located on the front of the main wing.” Appx6315. Mr. Barry explained that self-righting means that the craft “snaps right up . . . and goes vertical,” i.e., that the craft is stable. Appx6316.

Mr. Barry also testified that assessing stability required observing a watercraft for 20-30 seconds. Appx6316. And he admitted the Evolo Report describes a successful 30-40 seconds in “flying mode” for the X7 embodiment. Appx6416. A later X8 embodiment involved improvements to the wing configuration—using “a unique combination of a delta wing and a regular straight wing plus ten degrees angle

of attack.” Appx6317. Mr. Barry admitted this configuration was similar to what airplanes use and is the “normal way of achieving stability.” Appx6318-6319.

Given these disclosures in the Evolo Report and the admissions from MHL’s technical expert, MHL necessarily failed to carry its burden to prove non-enablement, and a reasonable jury did not have a legally sufficient evidentiary basis to find in MHL’s favor on the issue.

**2. MHL Failed to Meet Its Burden of Proof on Non-Enablement.**

MHL relied heavily on its technical expert’s testimony to attempt to prove non-enablement. But Mr. Barry did not address the *Wands* factors at all, and his testimony failed to carry MHL’s burden.

**a. Mr. Barry Conflated a Prototype of the Evolo with the Full Evolo Report Disclosure.**

Mr. Barry showed the jury a video of the Evolo team’s testing from YouTube and opined that the **Evolo Prototype** featured in the video was not sufficiently stable. Appx6290-6293.

Mr. Barry’s testimony regarding the prototype does not permit a finding of non-enablement. The **Evolo Prototype** in the YouTube video does not represent the full disclosure of the **Evolo Report**. For example, the Evolo Report states that the final design required a motor with a power output of 4 kW to achieve greater speeds. Appx6345. Both parties’ experts testified that stability is often conditioned on a

watercraft's speed. Appx6060-6062, Appx6105 (Triantafyllou); *see also* Appx5677, Appx5755 (Mr. Barry analogizing stability of an eFoil to stability of a bicycle).

The video shows the Evolo team testing the prototype with a 2 kW motor (what the team had on hand). Appx6347-6348 (Mr. Barry admitting that “they put a two-kilowatt motor on there”). But the Evolo team recognized that they needed to “[f]ind a larger motor that meets the requirements for power and speed” of their final design to provide sufficient stability. Appx6348-6349, Appx9011.

The district court reasoned that the jury could have credited Mr. Barry's testimony that the more powerful motor would not make the watercraft stable because the watercraft would not reach the requisite speed to achieve stability without crashing first. Appx13 (citing Appx6390-6391). But the district court misstated Mr. Barry's testimony. When asked about the effect of a more powerful motor, he admittedly speculated: “[M]y guess would be had they had a bigger motor on it, it would have just had more spectacular crashes.” Appx6391. Such “speculative or conjectural” testimony cannot be credited. *TNS Media Rsch., LLC v. Tivo Rsch. & Analytics, Inc.*, 629 F. App'x. 916, 934 (Fed. Cir. 2015).

**b. The Absence of Calculations Proving Stability Fails to Show Non-Enablement.**

Mr. Barry also noted the absence of calculations showing stability, but the missing calculations are a red herring. There is no dispute that skilled artisans since

the 1960s have known how to perform the calculations. Appx6373-6374 (Barry). An “artisan’s knowledge of the prior art and routine experimentation can often fill gaps, interpolate between embodiments, and perhaps even extrapolate beyond the disclosed embodiments, depending upon the predictability of the art.” *AK Steel Corp. v. Sollac & Ugine*, 344 F.3d 1243, 1244 (Fed. Cir. 2003). Just as a patent “need not teach, and preferably omits, what is well known in the art,” *Spectra-Physics, Inc. v. Coherent, Inc.*, 827 F.2d 1524, 1534 (Fed. Cir. 1987), a prior art reference similarly need not teach what is known to be enabling. The fact that calculations do not show that the Evolo embodiments were stable cannot satisfy MHL’s burden to prove that the Evolo Report was not enabling.

**c. The “Flat Plate” Fails to Show Non-Enablement.**

Finally, Mr. Barry opined that the Evolo’s use of a “flat plate” hydrofoil “is unlikely to produce stability.” Appx6309; *see also* Appx6377-6378 (“could not achieve stability simply from being a flat plate”). But in later testimony, Mr. Barry conceded that flat-plate airfoils, e.g., a delta wing with sharp edges like the ones disclosed in the Evolo Report, can achieve stability and are disclosed as doing so in textbooks that he considers authoritative. Appx6380-6381. The district court correctly “agree[d] with Waydoo that this does not support an argument that the Evolo Report discloses a watercraft that is inherently unstable because the hydrofoils are flat plates.” Appx13-14.

But the district court nonetheless held a jury could have credited this testimony because “the fact that the Evolo Report discloses using flat plates, which may not be conducive to stability (per Mr. Barry’s testimony), makes it a relevant aspect for Mr. Barry, and therefore the jury, to consider in the context of the full Evolo Report.” *Id.* Even crediting the testimony that flat plates are capable of stability but “not conducive to stability,” a reasonable jury would not have a legally sufficient evidentiary basis to find by clear and convincing evidence that the Evolo Report does not enable a stable watercraft.

**d. The District Court Erroneously Conflated Waydoo’s Sufficiency Challenge with an Evidentiary Challenge.**

The district court denied Waydoo’s motion for post-trial relief on the enablement of the Evolo Report because “[i]t is not for me to weigh the credibility of the witnesses.” Appx14. But Wadyoo’s challenge is to the sufficiency of the underlying evidence Mr. Barry relied upon, not on his credibility. *See Brooke Grp. Ltd.*, 509 U.S. at 242 (“When an expert opinion is not supported by sufficient facts to validate it in the eyes of the law, . . . it cannot support a jury’s verdict.”). Such is the case here.

**e. The Evolo Report Provides at least the Same Level of Enabling Information as the Patents.**

Finally, the Patents themselves (which the jury found were enabling) confirm that the Evolo Report is enabling. Appx5158, Appx5160. Indeed, the 500+ page

disclosure in the Evolo Report (at Appx8464-9017) far surpasses the ten-page disclosure in the Patents.

The Patents and the Evolo Report disclose the same “physical parts” needed to make an eFoil. Appx6367 (Barry). Neither includes stability calculations. Appx6352. Both therefore rely on the knowledge of skilled artisans to make their own design choices to achieve sufficient stability. And both cite to textbooks and other materials known to skilled artisans to assist with such choices. Appx6376-6377 (Barry).

### **(1) The Patents’ Disclosure**

The Patents do not provide information to create a “passively stable” watercraft (’659 Patent, claim 1) or a hydrofoil that “provide[s] passive static stability” (’044 Patent, claim 1).

The only guidance is that “achiev[ing] desired levels of stability . . . without the need for moveable surfaces . . . is done through a combination of airfoil design, planform design, and tailoring the span-wise twist distribution.” Appx7085, 2:20-25; *see also* Appx7087, 5:51-54, Appx7088, 7:13-18. Those three concepts relate to the shape of a single hydrofoil wing. *See* Appx5763-5765 (Barry). But all hydrofoil wings have some sort of “airfoil design” and “planform design.” “[T]ailoring of the span-wise twist distribution” is “moot” because even “zero twist” qualifies. Appx5763-5767 (Barry).

The Patents do not otherwise provide guidance on designing a hydrofoil's shape or how the particulars of a hydrofoil's shape influence stability. The named inventor understood the positives and negatives of such design choices were known to skilled artisans, and he left it to the skilled artisans to make the final selections.

The Patents similarly provide no guidance for arranging two hydrofoil wings for stability. Appx7087 at 5:37-38, 5:45-50. The Patents are silent about wing arrangements, the importance of the location of the eFoil's center of gravity compared to the front wing, that the center of gravity must shift as speed changes, or that stability depends on speed. Appx6102-6106 (Triantafyllou). All of that knowledge, the named inventor recognized, was well within the knowledge of skilled artisans.

MHL's witnesses testified that the passages in the Patents that instruct a skilled artisan how to make the claimed passively stable watercraft are contained in columns 5-7. Appx5535-5536 (Langelaan), Appx6371-6372 (Barry). But all of the information about stability in the Patents, including columns 5-7, was undisputedly known in the art and is found in textbooks dating back to the 1960's. Appx6373-6374 (Barry). The Patents do not discuss anything new about stability, nor do they suggest how it should be achieved beyond the aforementioned reference to airfoil selection, hydrofoil sweep, and span-wise twist. Appx6374 (Barry), Appx7087. The named inventor Mr. Langelaan explained that skilled artisans could nonetheless use

their background knowledge—i.e., “use the textbooks”—“to develop a watercraft that is then passively stable.” Tr. 314:17-315:13 (Langelaan).

## **(2) The Evolo Report’s Disclosure**

The Evolo Report provides much more information about achieving a passively stable eFoil than the Patents. The normal way to achieve stability in airplanes is through the use of a “longitudinal dihedral” wing arrangement, where the front wing produces positive lift (pushes up) and the back wing produces negative lift (pushes down). Appx6318-6319 (Barry), Appx6091-6092 (Triantafyllou). The Evolo Report teaches this, but the Patents do not. Appx6319 (Barry).

An eFoil lacks control surfaces, unlike an airplane. See Appx6064-6065 (Triantafyllou). As a result, an eFoil’s combined center of gravity must be in front of the front wing, and the combined center of gravity must shift forward as the eFoil’s speed increases. Appx6357 (Barry). The Evolo Report teaches this, but the Patents do not. Appx6104-6106 (Triantafyllou), Appx6315 (Barry).

The Evolo Report discusses the importance of speed and that stability is dependent on speed, but the Patents do not. *Id.* The Evolo Report contains extensive experimental data and working examples, complete with dimensioned drawings and technical specifications. *E.g.*, Appx8463-8464, Appx8873-8903, Appx6107 (Triantafyllou). The Patents do not. *See* Appx6351-6352 (Barry).

Because the jury found the (minimal) disclosure in the Patents enables a skilled artisan to build a passively stable watercraft, the far greater disclosure in the Evolo Report does the same. *See SRI Int'l, Inc. v. Internet Sec. Sys., Inc.*, 511 F.3d 1186, 1194 (Fed. Cir. 2008) (“With the [prior art reference] providing similar, or even a partially identical, disclosure to the [asserted patent], the [reference] meets the lower enablement standard” for prior art.).

### (3) The District Court’s Error

The district court erred in “reject[ing] Waydoo’s argument that the Evolo Report must be enabled because the Asserted Patents” are enabled. Appx14. After acknowledging the undisputed testimony that the Evolo Report referred to and cited to textbooks discussing stability considerations, the district court held that “the Report’s authors having access to other prior art references does not mean the Evolo Report teaches how to apply that information.” Appx14. But, as discussed above, the Patents do not teach how to apply that information beyond providing design considerations. And a prior art reference similarly need not teach what is known to be enabling. *AK Steel Corp.*, 344 F.3d at 1244; *Spectra-Physics*, 827 F.2d at 1534.

The Patents’ failure to provide any details about design choices “supports [a] finding that one skilled in the art would have known how to implement the features of the references and would have concluded that the reference disclosures would have been enabling.” *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994); *Constant*

*v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1569 (Fed. Cir. 1988) (“The disclosure in Exhibit 5 is at least at the same level of technical detail as the disclosure in the ’491 patent. If disclosure of a computer program is essential for an anticipating reference, then the disclosure in the ’491 patent would fail to satisfy the enablement requirement of 35 U.S.C. § 112, First ¶.”).

For the same reasons that the Patents are enabled, the Evolo Report is necessarily enabling as well.

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The record lacks sufficient evidence for a reasonable jury to find that the Evolo Report was neither publicly accessible nor enabling. The district court erred in denying Waydoo’s motion for judgment as a matter of law on these issues. This Court should remand for a new trial (or, more likely, summary judgment) regarding whether the Evolo Report anticipates the Patents.

### **III. The District Court Erred in Admitting the Testimony of MHL’s Damages Expert.**

The jury awarded MHL damages in the amount of \$1,334,000, with a royalty rate of \$500 per eFoil unit sold. Appx5161. It did so after hearing testimony from MHL’s damages expert witness, Dr. Stec—over MHL’s objections—that a reasonable royalty would be \$560 per unit sold. Appx5810-5832.

MHL’s licensing agreement with Fliteboard served as the foundation for Dr. Stec’s royalty opinions. Dr. Stec’s royalty analysis begins and ends with the

Fliteboard License and the \$560 per-unit royalty that he derives from it, despite the fact the agreement covered more patents than the two Patents asserted here.

But Dr. Stec did not even apply the Fliteboard License's 5.25% royalty to Waydoo's products, which would have resulted in a royalty of approximately \$157.50. Appx5560, Appx5851. Instead, Dr. Stec converted the agreement's percentage royalty into a per-unit royalty, based on Fliteboard's premium products that sell for over \$10,000. Dr. Stec then took the highest per-unit amount that Fliteboard would pay for its most expensive product—\$560 (5.6% of \$10,000)—and applied it to Waydoo's sales of its entry-level product, sold to retailers for only \$3,000. Appx5860-5861. Dr. Stec's analysis resulted in an approximately 18.6% royalty, far higher than the royalty rate actually paid by Fliteboard. (Waydoo's damages expert, Philip Kline, recommended a 2.5% royalty rate after analyzing the Fliteboard License. Appx6184.)

Dr. Stec did not adjust his \$560 figure after analyzing the *Georgia-Pacific* factors. Appx5831. Nor did Dr. Stec recognize—let alone account for—the Fliteboard agreement's litigation-driven nature or its breadth of licensed rights. Dr. Stec's Fliteboard-centered opinions are unreliable and should have been excluded. Waydoo is entitled to a new trial on damages or remittitur.

**A. The Fliteboard License Was Entered into under Threat of Litigation and Should Have Been Excluded.**

The district court erred in allowing Dr. Stec to rely on the Fliteboard License in his analysis because it was entered into only following MHL's repeated threats of litigation, rendering the license non-comparable to the *Georgia Pacific* hypothetical negotiation. *See Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

This Court has long cautioned against the use of licenses negotiated under threatened or actual litigation as a measure of damages. *Hanson v. Alpine Valley Ski Area, Inc.*, 718 F.2d 1075, 1078-79 (Fed. Cir. 1983) (license offers “made after the infringement had begun and litigation was threatened or probable . . . should not be considered evidence of an established royalty since license fees negotiated in the face of a threat of high litigation costs may be strongly influenced by a desire to avoid full litigation.”) (citation omitted). As this Court explained, “The propriety of using prior settlement agreements to prove the amount of a reasonable royalty is questionable” because such agreements “are tainted by the coercive environment of patent litigation [and] are unsuitable to prove a reasonable royalty . . . assum[ing] a voluntary agreement will be reached between a willing licensor and willing licensee.” *LaserDynamics, Inc v. Quanta Computer, Inc.*, 694 F.3d 51, 77 (Fed. Cir. 2012).

The Fliteboard License is exactly the type of agreement that courts have warned against—it was entered into under repeated threats of litigation by MHL. For example, during the negotiation for the Fliteboard license, the CEO of MHL warned Fliteboard about MHL’s “war chest” to “enforce our IP,” and asserted that MHL would happily litigate the patents because MHL was “backed by an excellent insurance package to cover our [litigation] expenses.” Appx2583. In his communications with Fliteboard, MHL’s CEO threatened to “unload our whole insurance policy on you guys first and keep you out of the market,” asserting that by doing so, MHL “will probably be worth a whole lot more to a big fish that wants to back us up.” Appx2617; *see also* Appx2615 (noting that if Fliteboard did not take a license, it would be at “risk of being sued for infringement”). MHL’s witnesses admitted using “intimidation” to secure the Fliteboard License. Appx5431-5432, Appx5449-5450.

Fliteboard likewise perceived the negotiation as being litigation-driven, and it was intimidated. Fliteboard made clear that it did not believe that it had infringed any valid patent, and Fliteboard instead entered into a license only because it wished to avoid the costs involved with a lawsuit:

As previously discussed, the rationale for the license agreement from Fliteboard’s perspective is to avoid the legal costs involved in revoking the Langelaan patents and/or defending any infringement action. Fliteboard’s view is that its time and money (and MHL’s time and money) are better spent on product development and marketing, rather than dealing with the PTAB and court system.

Appx2601. Fliteboard emphasized it would pay a 5.25% royalty that is “more generous than industry practice” so that “the parties avoid litigation (both offensive and defensive) for the duration of the agreement in respect of the licensed IP.” *Id.* Because Fliteboard agreed to a “generous” license only to avoid litigation costs, the Fliteboard License cannot serve as a reliable benchmark for the value of a reasonable royalty of the Patents. *LaserDynamics*, 694 F.3d at 77.

Dr. Stec admitted that he did not attempt to account for these litigation threats in his analysis. Appx5887-5888 (“Q. In fact, you assumed that there were no threats of litigation; right? Dr. Stec. I didn’t see evidence that there was.”); Appx5838 (Dr. Stec: “What I think he means there is that essentially MHL was holding a stick over Fliteboard saying, if you don’t take this patent or this license, we will sue you. I didn’t see any evidence of that.”). Dr. Stec instead asserted that it was his understanding—based on discussions with MHL’s employees—that “MHL did not ‘threaten’ litigation but had simply stated to Fliteboard that MHL was willing to defend its patents.” Appx5887-5888.

But there is little distinction between stating a plan to “defend” patents and threatening to file a lawsuit, and the contemporaneous communications MHL had with Fliteboard and summarized above speak for themselves. Because the Fliteboard License was litigation driven, Dr. Stec should not have considered its royalty rate—let alone relied on it as the entire basis for his opinion. Appx5810-5832. Dr. Stec’s

Fliteboard License opinions should have been excluded. *LaserDynamics*, 694 F.3d at 77-79; *see also* Appx1089-1097 (Waydoo's *Daubert* motion).

**B. Dr. Stec Failed to Apportion the Royalty Rate from the Fliteboard License.**

Even if it were not improper for Dr. Stec to consider the Fliteboard License, the district court should have excluded Dr. Stec's opinions due to how he relied on the Fliteboard License. Despite giving lip service to other considerations, Dr. Stec mechanically calculated a \$560 per product royalty rate—the highest possible per-product royalty from the Fliteboard License. Appx5809, Appx5818, Appx5832.<sup>6</sup>

Damages owed to the patentee must reflect the value of only the patented improvement. *Omega Pats., LLC v. CalAmp Corp.*, 13 F.4th 1361, 1376 (Fed. Cir. 2021). “No matter what the form of the royalty, a patentee must take care to seek only those damages attributable to the infringing features.” *VirnetX, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1326 (Fed. Cir. 2014). The patentee bears the burden to establish that any licenses it relies on are sufficiently comparable such that apportionment is “effectively baked into the purportedly comparable license[s].” *Omega*, 13 F.4th at 1377, 1380 (remanding for new trial on damages where patentee

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<sup>6</sup> As noted above, Dr. Stec did not adopt the percentage rate from the Fliteboard License because that would result in smaller damages on Waydoo's less expensive products. He instead converted the percentage royalty rate from the Fliteboard License into a per-product amount, and he opined that Waydoo should pay that per-product amount, more than Fliteboard pays on its lower-cost products. Appx5860-5861.

failed to show portfolio licenses were comparable to hypothetical negotiation involving single patent).

This Court has applied an exacting standard for patentees advancing damages theories utilizing supposedly comparable licenses as part of a hypothetical negotiation analysis. “[L]icenses relied on by the patentee in proving damages must be sufficiently comparable to the hypothetical license at issue.” *Virnetx, Inc. v. Cisco Sys., Inc.*, 767 F.3d 1308, 1330 (Fed. Cir. 2014). To demonstrate sufficient comparability, a party must “account for differences in the technologies and economic circumstances of the contracting parties.” *Apple*, 25 F.4th at 971. Even if a license is sufficiently comparable, the patentee still needs to account for “distinguishing facts when invoking [a] license[]” to satisfy apportionment. *Omega Pats.*, 13 F.4th at 1380. Only in the circumstance where the license’s royalty rate and royalty base combination effectively “embody the value of the asserted patent” can apportionment be “effectively baked into” the licensed rate. *Id.* at 1377.

In *Omega*, this Court rejected a damages theory based on allegedly comparable licenses that failed to “account[] for apportionment.” 13 F.4th at 1379. Omega’s president testified that “under Omega’s licensing program, the licensing fee was five dollars per unit whether it’s one patent or 50 patents.” *Id.* “[R]elying on Omega’s licensing arrangement,” along with several portfolio licenses that “generally carry a royalty rate of at least \$5.00 per unit,” Omega’s damages expert

testified that the defendant “should pay [a per-unit royalty rate of \$5.00] . . . no matter how many claims or how many of the patents it infringes.” *Id.* This Court vacated the damages award and remanded for a new trial, as Omega’s theories failed to “distinguish[] facts between the proffered licenses and the hypothetical negotiation over a single-patent license.” *Id.* at 1380. “Most glaringly,” the licenses Omega proffered each involved “numerous patents, in contrast to a hypothetical negotiation for a single-patent license.” *Id.* Because Omega’s damages expert had “merely identified such differences,” without “me[eting] its obligation to account for such distinguishing facts,” Omega had “failed to show that [the] agreements attributed [the] per-unit royalty to the value of the [infringed] patent.” *Id.* at 1379-81.

To support MHL’s \$560 per product royalty rate here, MHL’s damages expert Dr. Stec relied on the Fliteboard License’s per unit 5.25% rate for four patents and testified that same (but converted to \$560 per product) rate was appropriate in this case for a license of just the two Patents. Appx5876. But Mr. Stec did not account for the value that the Patents represented within the Fliteboard License.

Instead, like *Omega’s* damages expert, Dr. Stec accepted MHL’s own witnesses’ self-serving representations that “essentially that [other] patent[s] w[ere] thrown in as part of the license. [The other patents] didn’t guide the license in any way, shape or form, nor did they attribute any value.” Appx5876. Dr. Stec admitted

he primarily relied on conversations with MHL's president, someone who had never valued a patent, in coming to his no-value opinion for the other two patents. Appx5877. Dr. Stec examined no contemporaneous documents to support MHL's presidents' recollection. Dr. Stec needed to meaningfully "address the extent to which these other patents contributed to the royalty rate in the license," *Apple*, 25 F.4th at 973, but his generic reliance on MHL's own conclusory and self-interested assertions cannot suffice.

As in *Omega*, "absent evidence of a comparable license or comparable negotiation to support an identical [royalty] rate for a one-patent license to the [infringed] patent," Dr. Stec failed to "account[] for apportionment." *Omega*, 13 F.4th at 1379.

Because Dr. Stec failed to account for the significant differences between the Fliteboard License and a hypothetical negotiation to license the Patents, his damages opinions were unreliable and should have been excluded. *See also Apple Inc. v. Wi-LAN Inc.*, 25 F.4th 960, 971-72 (Fed. Cir. 2022) (rejecting expert testimony as unreliable where expert testified to royalty rate for specific patents on licenses to broader portfolios and expert "failed to address the extent to which these other patents contributed to the royalty rate" despite allocating a 25% discount). The district court erred in finding the jury was "free to consider Dr. Stec's testimony" and his reliance on MHL's own self-serving patent valuations. Appx21.

The issue of how to properly consider purportedly comparable patent licenses is before this Court for en banc rehearing in *EcoFactor Inc. v. Google, LLC*, No. 2023-1101 (Fed. Cir.), where this Court vacated its prior decision and ordered additional briefing “addressing the district court’s adherence to Federal Rule of Evidence 702 and *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), in its allowance of testimony from EcoFactor’s damages expert assigning a per-unit royalty rate to the three licenses in evidence.” *Id.* at Dkt. 76. Should the Court rule in Google’s favor, there would be no principled basis to affirm in this case.

And even apart from this Court’s decision in *EcoFactor*, Dr. Stec’s opinion should have been excluded under *Omega* and this Court’s other precedent.

\* \* \*

An error in admitting evidence is harmless only “if it is highly probable that the error did not affect the outcome of the case.” *Glass v. Phila. Elec. Co.*, 34 F.3d 188, 191 (3d Cir. 1994). Dr. Stec’s damages opinions heavily focused on the Fliteboard License to come to his \$560 per unit reasonable royalty. This was unquestionably harmful because it was the only evidence presented by MHL regarding damages, and the jury came to a verdict of a similar \$500 per-product royalty. This Court cannot say that it is “highly probable” that these errors did not affect the outcome. This Court should order a new trial on damages or, in the

alternative, remit the damages to reflect the highest amount proven at trial:

Waydoo's expert's 2.5% royalty. Appx6174-6182.

## CONCLUSION & PRAYER FOR RELIEF

For the foregoing reasons, Waydoo respectfully requests the Court vacate the district court's denial of Waydoo's motion for judgment as a matter of law and remand for further proceedings.

Dated: November 20, 2024

Respectfully submitted,

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**ADDENDUM**

## TABLE OF CONTENTS

ECF No.	Docket Text	Date	Appx Page No(s).
257	MEMORANDUM OPINION. Signed by Judge Richard G. Andrews on 9/6/2023. (nms) (Entered: 09/06/2023)	9/6/2023	Appx1-25
258	ORDER: Defendants' Motion for Renewed Judgment as a Matter of Law and Motion for a New Trial (D.I. 234) is DENIED. Signed by Judge Richard G. Andrews on 9/6/2023. (nms) (Entered: 09/06/2023)	9/6/2023	Appx26
66	MEMORANDUM OPINION: Providing claim construction for multiple terms in U.S. Patent Nos. 9,359,044 and 9,586,659. Within five days the parties shall submit a proposed order consistent with this Memorandum Opinion suitable for submission to the jury. Signed by Judge Richard G. Andrews on 6/24/2022. (nms) (Entered: 06/24/2022)	6/24/2022	Appx55-65
68	CLAIM CONSTRUCTION ORDER. Signed by Judge Richard G. Andrews on 6/30/2022. (nms) (Entered: 06/30/2022)	6/30/2022	Appx66-67
142	ORDER: Regarding construction of "passively stable" (see Order for further details). Signed by Judge Richard G. Andrews on 1/3/2023. (nms) (Entered: 01/03/2023)	1/3/2023	Appx68-69
153	MEMORANDUM OPINION. Signed by Judge Richard G. Andrews on 2/3/2023. (nms) (Entered: 02/03/2023)	2/3/2023	Appx70-95

<b>ECF No.</b>	<b>Docket Text</b>	<b>Date</b>	<b>Appx Page No(s).</b>
155	MEMORANDUM ORDER: The motion as to Defendants' computer/internet expert, Mark Lanterman (D.I. 74) is DENIED. The motion as to Defendants' damages expert, Philip Kline (D.I. 75) is DENIED. The motion as to Defendants' technical expert, Dr. Michael Triantafyllou (D.I. 76) is DENIED. Defendants' motions (D.I. 81) are GRANTED in part and DENIED in part (see Memorandum Order for further details). Signed by Judge Richard G. Andrews on 2/3/2023. (nms) (Entered: 02/03/2023)	2/3/2023	Appx98-100
—	Plaintiff's Trial Exhibit No. 013: US Patent 9,359,044	3/27/2023	Appx7079-7088
—	Plaintiff's Trial Exhibit No. 014: US Patent 9,586,659	3/27/2023	Appx7089-7101

**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE**

MHL CUSTOM, INC.,

Plaintiff,

v.

WAYDOO USA, INC. and SHENZHEN  
WAYDOO INTELLIGENCE  
TECHNOLOGY CO., LTD.,

Defendants.

Civil Action No. 21-0091-RGA

**MEMORANDUM OPINION**

Blake A. Bennett, COOCH AND TAYLOR, P.A., Wilmington, DE; Dennis D. Murrell, Robert J. Theuerkauf, Brian P. McGraw, Megan E. Gibson, MIDDLETON REUTLINGER, Louisville, KY.

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September 6, 2023

  
ANDREWS, UNITED STATES DISTRICT JUDGE:

Before me are Defendants Waydoo USA's and Shenzhen Waydoo Intelligence Technology's (collectively, "Waydoo") post-trial motions.

Waydoo moves for renewed judgment as a matter of law on a variety of issues. (D.I. 234). In the alternative, Waydoo moves for a new trial.<sup>1</sup> (*Id.*). The motions have been fully briefed. (D.I. 236, 245, 252).

**I. BACKGROUND**

Plaintiff MHL Custom ("MHL") filed suit against Waydoo alleging infringement of U.S. Patent Nos. 9,359,044 (the "'044 patent") and 9,586,659 (the "'659 patent") (collectively, the "Asserted Patents"). (D.I. 1). The Asserted Patents relate to a weight-shift controlled personal hydrofoil watercraft (often referred to as an eFoil). The Asserted Patents share a common specification.

I held a jury trial from March 24-31, 2023, on claims 1-2, 5, and 6 of the '044 patent and claims 1-2 of the '659 patent. The jury found the asserted claims to be valid and infringed, the infringement was willful, and MHL was entitled to a reasonable royalty of \$500 per board sold by Waydoo (totaling \$1,334,000 in damages). (D.I. 219). The parties have now filed post-trial motions.<sup>2</sup>

Waydoo seeks renewed judgment as a matter of law, or in the alternative, a new trial, on (1) whether the Evolo Report (a potential prior art reference) was publicly accessible; (2) whether the Evolo Report is enabled; (3) whether the Asserted Patents are enabled; (4) whether Waydoo

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<sup>1</sup> Waydoo does not make any arguments in favor of its new trial motion. Instead, it simply has a perfunctory sentence that it includes at the end of the JMOL arguments. In my view, it has forfeited its new trial arguments.

<sup>2</sup> MHL's post-trial motions (D.I. 230-233) are addressed in a separate opinion.

infringed the '659 patent; (5) whether Waydoo's infringement of the Asserted Patents was willful; and (6) whether the jury's award of damages is supported by the evidence. (D.I. 236 at 1-2). I address each issue in turn. I note that Waydoo does not challenge the correctness of any of the jury instructions.

## II. LEGAL STANDARD

### A. Judgment as a Matter of Law

Judgment as a matter of law is appropriate if "the court finds that a reasonable jury would not have a legally sufficient evidentiary basis to find for [a] party" on an issue. FED. R. CIV. P. 50(a)(1). "Entry of judgment as a matter of law is a 'sparingly' invoked remedy, 'granted only if, viewing the evidence in the light most favorable to the nonmovant and giving it the advantage of every fair and reasonable inference, there is insufficient evidence from which a jury reasonably could find liability.'" *Marra v. Phila. Hous. Auth.*, 497 F.3d 286, 300 (3d Cir. 2007) (citation omitted).

"To prevail on a renewed motion for JMOL following a jury trial, a party must show that the jury's findings, presumed or express, are not supported by substantial evidence or, if they were, that the legal conclusion(s) implied by the jury's verdict cannot in law be supported by those findings." *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1348 (Fed. Cir. 1998) (cleaned up). "'Substantial' evidence is such relevant evidence from the record taken as a whole as might be accepted by a reasonable mind as adequate to support the finding under review." *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893 (Fed. Cir. 1984).

In assessing the sufficiency of the evidence, the Court must give the non-moving party, "as [the] verdict winner, the benefit of all logical inferences that could be drawn from the evidence presented, resolve all conflicts in the evidence in his favor and, in general, view the record in the light most favorable to him." *Williamson v. Consol. Rail Corp.*, 926 F.2d 1344, 1348 (3d Cir.

1991). The Court “must not determine credibility of witnesses, and must not substitute its choice for that of the jury between conflicting elements in the evidence.” *Perkin-Elmer*, 732 F.2d at 893. Rather, the Court must determine whether the evidence supports the jury’s verdict. *See Dawn Equip. Co. v. Ky. Farms Inc.*, 140 F.3d 1009, 1014 (Fed. Cir. 1998); 9B CHARLES ALAN WRIGHT & ARTHUR R. MILLER, FEDERAL PRACTICE AND PROCEDURE § 2524 (3rd ed. 2008) (“The question is not whether there is literally no evidence supporting the party against whom the motion is directed but whether there is evidence upon which the jury might reasonably find a verdict for that party.”).

Where the moving party bears the burden of proof, the Third Circuit applies a different standard. This standard “requires the judge to test the body of evidence not for its insufficiency to support a finding, but rather for its overwhelming effect.” *Fireman’s Fund Ins. Co. v. Videfreeze Corp.*, 540 F.2d 1171, 1177 (3d Cir. 1976) (quoting *Mihalchak v. Am. Dredging Co.*, 266 F.2d 875, 877 (3d Cir. 1959)). The Court “must be able to say not only that there is sufficient evidence to support the finding, even though other evidence could support as well a contrary finding, but additionally that there is insufficient evidence for permitting any different finding.” *Id.* at 1171 (quoting *Mihalchak*, 266 F.2d at 877).

#### **B. Motion for a New Trial**

Federal Rule of Civil Procedure 59(a)(1)(A) provides, in pertinent part: “The court may, on motion, grant a new trial on all or some of the issues—and to any party—... after a jury trial, for any reason for which a new trial has heretofore been granted in an action at law in federal court....” Among the most common reasons for granting a new trial are: (1) the jury’s verdict is against the clear weight of the evidence, and a new trial must be granted to prevent a miscarriage of justice; (2) newly discovered evidence exists that would likely alter the outcome of the trial; (3) improper conduct by an attorney or the court unfairly influenced the verdict; or (4) the jury’s verdict

was facially inconsistent. *See Zarow-Smith v. New Jersey Transit Rail Operations, Inc.*, 953 F. Supp. 581, 584–85 (D.N.J.1997).

The decision to grant or deny a new trial is committed to the sound discretion of the district court. *See Allied Chem. Corp. v. Daiflon, Inc.*, 449 U.S. 33, 36 (1980); *Olefins Trading, Inc. v. Han Yang Chem. Corp.*, 9 F.3d 282, 289 (3d Cir.1993) (reviewing district court's grant or denial of new trial motion under the “abuse of discretion” standard). Although the standard for granting a new trial is less rigorous than the standard for granting judgment as a matter of law—in that the Court need not view the evidence in the light most favorable to the verdict winner—a new trial should only be granted where “a miscarriage of justice would result if the verdict were to stand,” the verdict “cries out to be overturned,” or where the verdict “shocks [the] conscience.” *Williamson*, 926 F.2d at 1352–53.

### **III. DISCUSSION**

One of the significant issues at trial and now at JMOL was whether the “Evolvo Report” anticipated the asserted patent claims. The jury did not reach the merits of the anticipation issue because it found that the Evolo Report was not publicly accessible and that it was not enabled. (D.I. 219 at 2). Each finding alone is sufficient to support the verdict. Waydoo challenges both of these findings. In order to obtain any relief, Waydoo must be successful on both challenges. I address the two findings separately.

#### **A. Public Accessibility of The Evolo Report**

##### **1. Legal Standard**

“Whether a reference qualifies as a ‘printed publication’ under § 102(b) is a legal conclusion based on underlying factual findings.” *Jazz Pharm., Inc. v. Amneal Pharm., LLC*, 895 F.3d 1347, 1356 (Fed. Cir. 2018). “A reference is considered publicly accessible if it was

disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, can locate it.” *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 772 (Fed. Cir. 2018) (citation and internal quotation marks omitted). “The test for public accessibility is not ‘has the reference been indexed,’” *id.* at 774, and “‘public accessibility’ requires more than technical accessibility,” *id.* at 773. The patent challenger bears the burden of establishing that a particular document is a printed publication by clear and convincing evidence. *See Medtronic, Inc. v. Barry*, 891 F.3d 1368, 1380 (Fed. Cir. 2018); *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1359 (Fed. Cir. 2007) (“Since we must presume a patent valid, the patent challenger bears the burden of proving the factual elements of invalidity by clear and convincing evidence.”).

## 2. Analysis

The Evolo Report is a document detailing the capstone project of a group of engineering students in Sweden. (D.I. 242 at 783:13-19 (Triantafyllou); *see also* D.I. 243 at 968:21-24 (Barry)). The students’ capstone project was essentially “to create a vehicle which looks like an eFoil.” (D.I. 242 at 783:15-16 (Triantafyllou)).

At trial, Waydoo argued the Evolo Report was a printed publication that anticipated the Asserted Patents. The priority date of the Asserted Patents is October 10, 2013. (D.I. 212 at 8). The jury found the Evolo Report was not publicly accessible. (D.I. 219 at 2).

Waydoo argues that it is entitled to judgment as a matter of law, or a new trial, because it presented unchallenged evidence that the Evolo Report was publicly accessible. (D.I. 236 at 4). Waydoo cites Mr. Lanterman’s testimony that the Evolo Report was posted on the Evolo project webpage of Prof. Kutteneuler’s course website in June 2009. (*Id.* (citing D.I. 242 at 724:23-725:4 (Lanterman))). Waydoo contends that the record shows there was “successful activity” on the

course website almost every day from November 2011 to October 2013 (*id.* (citing DTX068A; D.I. 242 at 734:8-16 (Lanterman))), the Evolo project webpage had 120 unique visitors, and 17 unique visitors downloaded the Evolo Report from the webpage (*id.* (citing (DTX068A; D.I. 242 at 734:22-735:9 (Lanterman))). Mr. Lanterman further testified that Google crawled and indexed the Evolo Report in January 2010. (*Id.* (citing D.I. 242 at 725:4-726:6 (Lanterman))).

In addition to accessing the Evolo Report through Google, Waydoo argues the Evolo Report was publicly accessible through the August 2009 issue of the Swedish magazine “Båtnytt” (“Boat News”). An article in that issue featured a link to the Evolo project webpage. (*Id.* at 4).

In short, Waydoo argues the Evolo Report was publicly accessible through two avenues: Google Search and the Boat News article.

MHL concedes the evidence shows the “Evolo Report existed online and may have been downloaded by 17 different people prior to the critical date.” (D.I. 245 at 5). MHL, however, contends that “online availability, standing alone, is not enough to demonstrate public accessibility.” (*Id.*). MHL argues it was reasonable for the jury to conclude that Waydoo failed to meet its burden to show the Evolo Report was not publicly accessible because Waydoo did not (1) present evidence that anyone accessed the Evolo Report through the Boat News article or (2) show how an interested person could find the Evolo Report through a Google Search. (*Id.* at 7).

I agree with MHL that a reasonable jury could conclude that Waydoo did not meet its heavy evidentiary burden to show the Evolo Report was publicly accessible. Waydoo’s evidence establishes that the Evolo Report was technically accessible. MHL concedes that. But “‘public accessibility’ requires more than technical accessibility.” *Acceleration Bay*, 908 F.3d at 773. I find there is sufficient evidence for a reasonable jury to conclude that the Evolo Report was not publicly

accessible, despite being technically accessible, and that Waydoo has not shown that there is “insufficient evidence for permitting any” finding other than public accessibility.

First, the Boat News article may have provided an adequate roadmap for an interested party to arrive at the Evolo Report by linking to the Evolo project page. *See Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1350 (Fed. Cir. 2016) (“An adequate roadmap need not give turn-by-turn directions, but should at least provide enough details from which we can determine that an interested party is reasonably certain to arrive at the destination: the potentially invalidating reference.”). What is lacking in Waydoo’s argument is evidence to establish that an interested party would be able to find or locate the Boat News magazine. Waydoo has not pointed to any evidence regarding whether Boat News, a Swedish boating magazine, is a publication that the “interested public” would have access to, have been aware of, or have been able to locate. *Cf. Voter Verified, Inc. v. Premier Election Sols., Inc.*, 698 F.3d 1374, 1380 (Fed. Cir. 2012) (finding article was publicly accessible when it was posted on a website that was “was well known to the community” interested in that subject matter); *Cornell Univ. v. Hewlett-Packard Co.*, 2008 WL 11274580 at \*6 (N.D.N.Y. May 14, 2008) (finding an article in a “seminal publication” to be a “research aid” for locating a prior art reference). Therefore, I think a reasonable jury could conclude that Waydoo did not meet its burden in showing that the Evolo Report was publicly accessible through the Boat News article. Likewise, I do not think there is such “overwhelming effect” to disturb the jury’s decision. *Fireman’s Fund*, 540 F.2d at 1177.

Second, I think a reasonable jury could conclude that Waydoo did not meet its burden to prove that the Evolo Report was publicly accessible through Google Search. The Federal Circuit has cautioned that indexing, by itself, is not sufficient to prove public accessibility. *Acceleration Bay, LLC*, 908 F.3d at 774 (“We have explained that where indexing is concerned, whether online

or in tangible media, the ultimate question is whether the reference was available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, can locate it.” (citation and internal quotation marks omitted)). Mr. Lanterman testified that the Evolo Report was accessible, but his testimony pertained to technical accessibility (i.e., Google confirmed the link was active, crawled, and indexed). (D.I. 242 at 746:12-24 (Lanterman)). While Mr. Lanterman testified that an interested person could have found the Evolo Report through Google (*id.* at 745:7-11), he also testified that he did not perform a Google search to locate the Evolo Report (*id.* at 743:9-13) and that he did not know what a sufficient Google search would have been to locate the Evolo Report (*id.* at 727:18-23, 743:6-8, 743:14-745:11). I think a reasonable jury could conclude from Mr. Lanterman’s testimony that the report was only technically accessible, and not publicly accessible such that “persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence,” could locate the Evolo Report through Google.

Third, Waydoo contends that it should prevail because the evidence it provided “is uncontradicted and unimpeached,” and “MHL did not present any evidence that would permit a different finding.” (D.I. 236 at 6-7). I disagree. As the patent challenger, it was Waydoo’s burden to prove by clear and convincing evidence that the Evolo Report was publicly accessible. *See Medtronic*, 891 F.3d at 1380; *Pfizer*, 480 F.3d at 1359. As already discussed, I think a reasonable jury could determine that Waydoo failed to meet its burden.

Therefore, I will deny Waydoo’s JMOL motion as it pertains to the public accessibility of the Evolo Report. For the same reasons, I find that the jury’s finding that the Evolo Report was not publicly accessible is not against the clear weight of the evidence. Therefore, Waydoo’s motion for a new trial on this issue is denied.

## **B. Enablement**

### **1. Legal Standard**

A patent's "specification must enable the full scope of the invention as defined by its claims." *Amgen Inc. v. Sanofi*, 143 S. Ct. 1243, 1254 (2023). For a patent claim to be enabled, the patent specification must "contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same[.]" 35 U.S.C. § 112(a). "The enablement requirement is met where one skilled in the art, having read the specification, could practice the invention without 'undue experimentation.'" *Streck, Inc. v. Rsch. & Diagnostic Sys., Inc.*, 665 F.3d 1269, 1288 (Fed. Cir. 2012) (citation omitted); *see also Amgen*, 143 S. Ct. at 1255 ("[A] specification may call for a reasonable amount of experimentation to make and use a patented invention. What is reasonable in any case will depend on the nature of the invention and the underlying art."). Factors for assessing whether a disclosure would require undue experimentation include:

- (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

*In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988).

"Enablement is a question of law based on underlying facts." *Wyeth & Cordis Corp. v. Abbott Lab'ys*, 720 F.3d 1380, 1384 (Fed. Cir. 2013). The party challenging validity must prove lack of enablement by clear and convincing evidence. *Cephalon, Inc. v. Watson Pharms., Inc.*, 707 F.3d 1330, 1336 (Fed. Cir. 2013).

## 2. Analysis

### i. Enablement of Evolo Report

At trial, the jury found that the Evolo Report is not enabled. (D.I. 219). “I presume a prior art printed publication is enabling.” *Lambda Optical Sols. LLC v. Alcatel Lucent USA Inc.*, 2015 WL 5734427, at \*1 (D. Del. Sept. 30, 2015) (citing *Robocast, Inc. v. Apple, Inc.*, 39 F. Supp. 3d 552, 565 (D. Del. 2014)). It is therefore the patentee’s initial burden to show that a prior art reference is not enabled, but, if the patentee presents some evidence of enablement, “the burden still rests on the party asserting invalidity to ultimately demonstrate by clear and convincing evidence that the prior art is enabled.” *Robocast*, 39 F. Supp. 3d 552, 566 (D. Del. 2014) (quoting *Forest Labs., Inc. v. Ivax Pharm., Inc.*, 438 F.Supp.2d 479, 487 n. 3 (D. Del. 2006), *aff’d*, 501 F.3d 1263 (Fed. Cir. 2007) (internal citations omitted)).

Waydoo argues that it is MHL’s burden to prove that the Evolo Report is not enabled. (D.I. 236 at 7 (citing *Apple Inc. v. Corephotonics, Ltd.*, 861 F. App’x 443, 449 (Fed. Cir. 2021))). I do not think shifting the evidentiary burden back to Waydoo after MHL presents some evidence of non-enablement is contrary to *Corephotonics*. See *Corephotonics*, 861 F. App’x at 450 (finding [the PTAB] erred when it refused to consider evidence Apple introduced in support of enablement of a printed publication after Corephotonics raised the issue of non-enablement); see also *id.* at 449 (“[T]he [PTAB] shifted the burden to Apple to provide evidence before institution (i.e., in its petition) that [a patent publication] was enabling as part of its burden to prove anticipation. This was error.”).<sup>3</sup>

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<sup>3</sup> Even if the evidentiary burden to prove a prior art reference is non-enabled ultimately lies with MHL, it would not alter my analysis because I find there is substantial evidence to support the jury’s finding that the Evolo Report is not enabled.

Waydoo contends that Mr. Barry's opinions about enablement were about the Evolo prototypes, not the final Evolo Report. (D.I. 236 at 8). Waydoo explains that none of the Evolo prototypes reflect the "final" product of the Evolo Report because the last prototype built used a motor that did not have the requisite power. (*Id.* at 9). Waydoo contends the final prototype is not representative of the Evolo Report's full disclosure because the final prototype used a 2 kW motor, but the Evolo Report indicated that a more powerful 4 kW motor was required. (*See* D.I. 243 at 1011:12-1012:21). The Evolo Report discussed using a larger motor to meet the requirements for power and speed. (*Id.* at 1012:16-23 (Barry)). Waydoo argues the Evolo Report's instruction to use a 4 kW motor would render the Report enabled as the larger motor is necessary to achieve stability.

Waydoo further argues that the Evolo Report must be enabled because textbooks from the 1960's teach the same information about stability that is disclosed in the patent specification. (*Id.* at 11). Waydoo contends that "if the [Asserted] Patent's disclosure enables a POSA to make a stable eFoil, the same prior art disclosures enable the Evolo Report too." (D.I. 252 at 4).

Waydoo argues that Mr. Barry put forth an invalid "inherency" argument based on the Evolo hydrofoils being flat plates. (D.I. 236 at 10-11). Mr. Barry testified that the Evolo hydrofoils could not achieve stability because they were flat plates. (*See* D.I. 243 at 1041:21-1042:2). Waydoo contends this argument must fail because Mr. Barry contradicted himself and stated that flat plates can achieve stability. (D.I. 236 at 10-11). I take Waydoo to be framing Mr. Barry's testimony as saying the Evolo hydrofoils are inherently unstable because they are flat plates, but, because Mr. Barry contradicted himself, that argument does not support his opinion.

MHL argues there was sufficient evidence for the jury to find the Evolo Report is not enabled. Mr. Barry concluded the Evolo Report is not enabled because the Evolo team "didn't ever

do the calculations required to produce stability . . . they never considered stability in the physical design of the object.” (D.I. 245 at 9 (quoting D.I. 243 at 973:3-9)). Mr. Barry concluded that a POSA would read the Evolo Report and understand that an automatic control system was required rather than understand that the watercraft had a passively stable system. (*Id.* (quoting D.I. 243 at 956:18-957:3)). Mr. Barry testified that using a higher-powered motor would not change his opinion that the Evolo Report was not enabled. (*Id.* (quoting D.I. 243 at 1055:9-15)). Mr. Barry also testified that the “delta wing” in the Evolo Report was a flat plat, which would prevent it from achieving stability. (*Id.* at 11).

I think there is substantial evidence to support the jury’s finding that the Evolo Report is not enabled.

First, Mr. Barry testified that the Evolo Report was not enabled, independent of the watching the YouTube videos of the different Evolo prototypes. (D.I. 243 at 973:1-13). Therefore, MHL’s evidence was about the Evolo Report itself, not just about the Evolo prototypes.

Second, Mr. Barry testified that the Evolo Report’s instruction to use a 4 kW motor in the watercraft, as opposed to the 2 kW motor actually used in the final prototype, would not change his opinion that the Evolo Report was not enabled. Waydoo argues the Evolo Report instructed that a 4 kW motor was required and, as a result, would make the Evolo Report enabled. (D.I. 236 at 8). Mr. Barry explained that a more powerful motor would not make the watercraft stable because the watercraft would not reach the requisite speed to achieve stability without crashing first. (D.I. 243 at 1054:25-1055:15).

Third, Mr. Barry expressed that using a flat plate could achieve stability, but it was unlikely to do so. (*Id.* at 973:10-11 (“And, further, the use of the hydrofoil they selected is unlikely to produce stability.”), 1041:18-24). I agree with Waydoo that this does not support an argument that

the Evolo Report discloses a watercraft that is inherently unstable because the hydrofoils are flat plates. I think, however, the fact that the Evolo Report discloses using flat plates, which may not be conducive to stability (per Mr. Barry's testimony), makes it a relevant aspect for Mr. Barry, and therefore the jury, to consider in the context of the full Evolo Report.

For each of these three points, the jury was entitled to assess the credibility of Mr. Barry and believe him over Waydoo's expert. It is not for me to weigh the credibility of the witnesses.

Fourth, I reject Waydoo's argument that the Evolo Report must be enabled because the Asserted Patents disclose information about stability that existed in textbooks. Mr. Barry testified that the Asserted Patents teach stability at the same level of detail as textbooks from the 1960's. (D.I. 243 at 1037:23-1038:11). Mr. Barry testified that the Evolo Report referred to and cited those textbooks and that the Report's authors therefore "would have had all the information." (*Id.* at 1041:3-9). Waydoo's argument seems to be that the Evolo Report must be enabled because a POSA would, or could, use the information that is disclosed in other prior art references with the Evolo Report. (*See* D.I. 236 at 11).

But the Report's authors having access to other prior art references does not mean the Evolo Report teaches how to apply that information such that the disclosure of the Evolo Report is enabled. Waydoo cites *SRI Int'l, Inc. v. Internet Sec. Sys., Inc.*, 511 F.3d 1186, 1194 (Fed. Cir. 2008) for support, but that case is distinguishable. In *SRI*, the anticipating prior art reference was found to be enabling because it provided a "similar, or even a partially identical" disclosure to the specification of the patent in that case. *Id.* ("Thus, the 1997 publication with its similarities in technical scope and description to the specification of the '212 patent meets the enabling hurdle for a prior art reference.").

I do not think the fact that the Asserted Patents' disclosures about stability existed in textbooks (i.e., other prior art references) means the Evolo Report must be enabled. Even though the patent's information about stability may have been well-known in the art (D.I. 243 at 1038:12-22 (Barry)), and accessible to a POSA, I think the proper focus for determining enablement is how the Evolo Report teaches a POSA to apply those principles. Mr. Barry testified that the Evolo Report does not enable a passively stable eFoil. (*See* D.I. 243 at 998:5-14). Another way of phrasing this is that the Evolo Report applies those well-known principles to achieve an unstable watercraft. I do not think a prior art reference that applies the knowledge of a POSA to achieve a non-enabled embodiment necessarily enables a different, enabled embodiment just because it is possible to apply that same knowledge in a different manner. As such, I think it is reasonable for a jury to determine that the Evolo Report is not enabled because, if they chose to credit Mr. Barry's testimony, there was sufficient evidence to determine that the Evolo Report only teaches one to apply the principles from the textbooks to achieve an unstable watercraft. As such, the jury could conclude that undue experimentation would be required to practice a stable watercraft. Therefore, I do not think the Evolo Report is automatically enabled just because the information disclosed in the Asserted Patents existed in textbooks.

I find a reasonable jury could have considered Mr. Barry's testimony and determined that the Evolo Report is not enabled. Therefore, Waydoo's JMOL motion is denied.

For the same reasons, I find the jury's finding that the Evolo Report is not enabled is not against the clear weight of the evidence. Therefore, Waydoo's motion for a new trial is denied.

## **ii. Enablement of the Asserted Patents**

Waydoo advances two arguments for why the Asserted Patents are not enabled. First, Waydoo argues that if the Evolo Report is not enabled, then the Asserted Patents must not be

enabled. (D.I. 236 at 11-13). More specifically, Waydoo contends that the Asserted Patents are not enabled because they fail to disclose key information regarding stability and hydrofoil design that the Evolo Report teaches. (*Id.* at 12 (listing concepts in the Evolo Report such as longitudinal dihedral wing arrangement, location of the center of gravity, and the importance of speed with respect to stability, that are not in the patent specification); *see also* D.I. 242 at 805:2-25 (Dr. Triantafyllou); D.I. 244 at 1149:1-18 (arguing such concepts are disclosed in the Evolo Report) (Waydoo closing)). If the Evolo Report, which discloses more than the Asserted Patents, is not enabled, then, Waydoo argues, it must logically follow that the Asserted Patents are not enabled.

Waydoo appears to contend that the Asserted Patents needed to describe the missing information rather than rely on a POSA to supply it. Waydoo cites *Auto. Techs. Int'l, Inc. v. BMW of N. Am., Inc.*, 501 F.3d 1274, 1284 (Fed. Cir. 2007), for the proposition that “it is insufficient to merely state that known technologies can be used to ‘achieve passive stability.’” (D.I. 236 at 14 (citing *Auto. Techs.*, 501 F.3d at 1283)).

In *Auto. Techs.*, the Federal Circuit found an electronic side impact sensor was not enabled in part because “side impact sensing was a new field and . . . there were no electronic sensors in existence that would detect side impact crashes.” *Auto. Techs.*, 501 F.3d at 1284.

The case here is distinguishable. The Evolo Report may teach additional content not found in the patent specification, but I do not think that is sufficient to find the Asserted Patents not to be enabled. Waydoo does not argue and fails to cite evidence (e.g., expert testimony) that would indicate that the absence of this information in the Asserted Patents would mean undue experimentation is required to practice the invention. (*See* D.I. 236 at 12). In *Auto. Techs.*, the record was far more developed to show that the patent was not enabled because it was missing key information. *See* 501 F.3d at 1284 (noting expert testimony identified two problems in practicing

the invention and that a “‘great deal of experimentation’ would have been necessary to make an electronic side impact sensor after reading the specification”). Such evidence is lacking here.

Second, Waydoo argues that the Asserted Patents do not enable dual-wing crafts and, therefore, do not enable the full scope of the claims.<sup>4</sup> Waydoo reiterates its points that the Asserted Patents do not enable a passively stable watercraft, generally. (D.I. 236 at 12). As already discussed, I reject that argument. Waydoo further argues that the specification does not describe how to arrange or design two hydrofoil wings to achieve stability. (*Id.* at 13). Waydoo contends the specification disparages dual-wing hydrofoils as only being suitable for training purposes. (*Id.* at 13).

I think a reasonable jury could conclude that Waydoo failed to meet its burden to show that the Asserted Patents are not enabled. Waydoo contends the specification lacks guidance in designing or arranging two hydrofoil wings but offers no support that undue experimentation would be required to practice a dual-wing craft. (*See* D.I. 236 at 13). Waydoo contends that the patents are not enabled because they do not contain any experimental data or working examples. (*Id.*). Actual working examples, however, are not required to satisfy the enablement requirement. *Allergan, Inc. v. Sandoz Inc.*, 796 F.3d 1293, 1310 (Fed. Cir. 2015).

I also disagree that the patent disparages dual-wing hydrofoils or that the statements in the specification would prevent a POSA from practicing a dual-wing hydrofoil without undue

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<sup>4</sup> This is the first time that Waydoo is raising the argument that the claims are not enabled for practicing dual-wing crafts, specifically. At trial, Waydoo moved for judgment as a matter of law for lack of enablement because the patents “teach you nothing new.” (D.I. 243 at 1067:14-16). Thus, Waydoo may have forfeited this argument. *See United States v. Dowdell*, 70 F.4th 134, 140 (3d Cir. 2023) (“[A]n example of [forfeiture] is an inadvertent failure to raise an argument.” (alteration in original) (quoting *Barna v. Bd. of Sch. Dirs. of Panther Valley Sch. Dist.*, 877 F.3d 136, 147 (3d Cir. 2017))). MHL, however, does not object to Waydoo raising this argument now. Because MHL fails to argue the issue is forfeited, MHL has forfeited any forfeiture argument, and I address the issue.

experimentation. The patent indicates that hydrofoils can be designed to have certain tradeoffs (i.e., lower speed, but greater stability). (See '044 patent at col. 2:26-35). The specification indicates that designs with greater stability may be better used for training. (*Id.*). The specification indicates that a hydrofoil design that includes a “fixed canard” (i.e., a second wing) increases stability and is “suitable for training.” (*Id.* at col. 5:36-37; *see also id.* at col. 5:45-50). The specification does not state that these designs are only suitable for training, or that even being suitable for training is undesirable. The specification is just explaining an advantage of a particular embodiment.

I think a reasonable jury could conclude that Waydoo failed to carry its burden in showing the Asserted Patents are not enabled. Therefore, Waydoo’s JMOL motion is denied.

For the same reasons, I find the jury’s finding that the Asserted Patents are enabled is not against the clear weight of the evidence. Therefore, Waydoo’s motion for a new trial is denied.

### **C. Infringement of the '659 Patent**

Waydoo contends there is insufficient evidence to show that the Waydoo eFoils are stable. As such, Waydoo argues there is insufficient evidence to show that Waydoo infringed the '659 Patent.<sup>5</sup> Waydoo contends that the only evidence regarding whether Waydoo’s eFoils are dynamically stable<sup>6</sup> are Mr. Barry’s testimony from watching videos of individuals riding Waydoo’s boards and Mr. Barry’s eigenvalue analysis. (D.I. 236 at 14-15). Waydoo contends that stability cannot be assessed from watching videos of the eFoils being ridden. Waydoo argues Mr. Barry’s determination about stability from the video clips was unscientific for the additional reason

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<sup>5</sup> I construed the preamble of claim 1 of the '659 patent to be limiting and to require static and dynamic stability. (D.I. 212 at 7). Claim 2 of the '659 patent depends from claim 1.

<sup>6</sup> Waydoo does not argue that its eFoils are not statically stable.

that the clips viewed were shorter than 20 seconds, which was the shortest time frame he indicated was necessary to make a determination about stability. (*Id.* at 15).

Waydoo argues the results from the eigenvalue analysis show Waydoo's eFoils are dynamically unstable as each board has at least one positive sigma value.<sup>7</sup> (D.I. 236 at 15). Waydoo contends that Mr. Barry's "damping" theory to explain why the eFoils are stable, despite the positive sigma values, is unsupported.

MHL contends that Mr. Barry did not rely solely on videos to determine if the Waydoo eFoils were stable. (D.I. 245 at 13). MHL argues that Mr. Barry explained that the eigenvalue analysis was a conservative estimate and that in the real world there would be damping effects that would stabilize the eFoil. (*Id.* at 14 (citing D.I. 241 at 472:20-473:2)).

I find a reasonable jury could have determined the '659 patent was infringed. Mr. Barry testified that the Waydoo eFoils were stable based on watching videos. The jury saw at least some of the same videos. (*See e.g.*, D.I. 241 at 487:11-24 (playing a video Mr. Barry used to "make a positive determination of stability of the Waydoo products")). Waydoo contends that whether a watercraft is stable cannot be evaluated just from watching videos. (D.I. 236 at 14-15). The record shows that watching a video of a watercraft can, at least, give some indication about stability. (D.I. 242 at 840:24-841:11 (Triantafyllou); D.I. 241 at 482:2-5 (Barry)). Therefore, it was reasonable for the jury to consider Mr. Barry's testimony about stability based on the videos of the Waydoo eFoils.

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<sup>7</sup> As I noted when addressing Waydoo's motion for summary judgment on non-infringement of the '659 patent, "The parties agree that this type of analysis can be used to assess whether a watercraft is dynamically stable." (D.I. 153 at 8 (citing D.I. 83 at 31; and then citing D.I. 91 at 43)). "If an eigenvalue analysis reports a positive 'sigma value,' it indicates that [a watercraft] is unstable." (D.I. 153 at 8 (quoting D.I. 83 at 3)).

The jury did not just have the video evidence and Mr. Barry's testimony about the stability of Waydoo's eFoils. The jury also had Mr. Barry's testimony about the eigenvalue analysis he performed, from which he concluded that the eFoils were stable. (D.I. 241 at 423:10-424:15).

The eigenvalue analysis produced at least one marginally positive sigma value for the Waydoo eFoil, indicating that the eFoils are dynamically unstable. (*Id.* at 471:22-25). Mr. Barry, however, testified that there are real-world damping effects that the analysis program did not consider. (*Id.* at 474:1-5, 474:11-16). The damping effects, if considered, would result in lesser sigma values than the program would indicate. (*Id.* at 471:6-10). Mr. Barry did not quantify the damping effects, but provided testimony that the damping effects would be "very large." (*Id.* at 476:6-17). Mr. Barry concluded the eigenvalue analysis supported his dynamic stability conclusion notwithstanding the one marginally positive sigma value.

Thus, the jury was free to consider Mr. Barry's testimony about the videos and his eigenvalue analysis and weigh it against the testimony of Waydoo's expert. It is not my place to determine the credibility of the witnesses. *Perkin-Elmer*, 732 F.2d at 893.

I think there is substantial evidence to support the jury's determination. Therefore, Waydoo's JMOL motion is denied.

Likewise, I find that the jury's determination that Waydoo infringed the '659 patent is not against the clear weight of the evidence. Therefore, Waydoo's motion for a new trial is denied.

#### **D. Damages**

Waydoo contends that the jury's damages award of a reasonable royalty of \$500 per board is not supported by the evidence. Waydoo contends that damages should be limited to a 2.5% royalty rate. (D.I. 236 at 20). Waydoo raises four arguments as to why the royalty rate of \$500 per board is not a *reasonable* royalty. I address each one in turn.

First, Waydoo challenges the comparability of the Fliteboard Agreement, which Dr. Stec used as a comparable license agreement, because it was made under the threat of litigation and Dr. Stec did not account for such threats in his analysis. (D.I. 236 at 18). MHL counters that the Fliteboard Agreement was not the product of threats of litigation nor was it used to settle active litigation.

I addressed a similar “threat of litigation” argument in Waydoo’s *Daubert* motions. (D.I. 155 at 3). When I denied Waydoo’s *Daubert* motion to exclude Dr. Stec’s testimony, I noted that the Fliteboard Agreement was not used to settle litigation and that Dr. Stec had a “plausible case for economic comparability.” (*Id.*). The jury was free to consider Dr. Stec’s testimony regarding the Fliteboard Agreement.

Second, Waydoo contends that the Fliteboard Agreement is not comparable because it included two other patents, in addition to the Asserted Patents, and Dr. Stec failed to apportion any value to those two patents in the Fliteboard Agreement. (D.I. 236 at 19). MHL contends that Dr. Stec did an apportionment analysis of the Fliteboard Agreement and concluded that the two non-asserted patents here had no value. I agree with MHL that Dr. Stec did an apportionment analysis. He testified that he apportioned no value to the two non-asserted patents as they were “thrown in” as Mr. Wagner, President of MHL Custom, informed him that those patents “didn't guide the license in any way, shape or form.” (D.I. 241 at 617:16-25). Waydoo contends that Dr. Stec relied on Mr. Wagner’s representation about the value of the other patents and Mr. Wagner never valued a patent before. Dr. Stec, however, clarified he relied on Mr. Wagner for his perspective of the negotiations. (*Id.* at 618:1-7). The jury was free to consider Dr. Stec’s testimony.

Third, Waydoo maintains that the \$500 per board royalty is not reasonable because it exceeds Waydoo’s 15% profit margin (i.e., \$450 per board) and, thus, would not have been the

agreed upon royalty in a hypothetical negotiation. (D.I. 236 at 19). MHL argues that the \$500 per board royalty is reasonable because Mr. Ping testified, at least at one point, that Waydoo's profit margin was 35%. Even though Mr. Ping also testified that Waydoo's profit margin was 15%, MHL argues it was up to the jury to consider the inconsistent testimony to ascertain Waydoo's profit margin.

I think there is substantial evidence to support the jury's determination that \$500 per board is a reasonable royalty. Mr. Ping's testimony about Waydoo's profit margin is inconsistent. At one time he indicated it was 35%. (D.I. 241 at 535:17-536:9). At another time he indicated it was 15% and the 35% value was just a goal. (D.I. 241 at 616:3-5). When a party's witness gives conflicting testimony about something that is solely within the party's knowledge, a jury will usually have a substantial basis to credit either version. Thus, I think the jury to determine that Waydoo's profit margin is 35%.

Even if the 35% profit margin was just Waydoo's goal, however, I think a jury could still consider it when determining a reasonable royalty from a hypothetical negotiation. A hypothetical negotiation takes place on the eve of infringement. *LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694 F.3d 51, 76 (Fed. Cir. 2012) ("Indeed, the basic question posed in a hypothetical negotiation is: if, on the eve of infringement, a willing licensor and licensee had entered into an agreement instead of allowing infringement of the patent to take place, what would that agreement be?"). It seems reasonable to me that in a hypothetical negotiation the parties would take into account the parties' expectations, such as Waydoo's expected (or even hoped-for) 35% profit margin.

Fourth, Waydoo contends that "the percent royalty of the Fliteboard Agreement is not economically comparable to MHL's per-unit hypothetical negotiation." (D.I. 236 at 19-20). Waydoo contends that for the Fliteboard Agreement to be comparable the royalty should be

assessed at \$157.50 per board, which is a 5.25% royalty, as used in the Fliteboard Agreement. I addressed a similar issue in Waydoo's *Daubert* motion. (D.I. 155 at 3 ("It is about whether the license should be evaluated on a royalty rate based on percentage of sales price or a royalty rate based on a dollar amount per sales unit.")). I determined, "It is for the jury to decide how convincing Dr. Stec's analysis is." (*Id.*). The jury considered Dr. Stec's testimony and chose, at least to some extent, to credit it. Therefore, I do not see this as a reason to grant Waydoo's motion for judgment as a matter of law or a new trial.

I think there was sufficient evidence for the jury to determine a reasonable royalty to be \$500 per board. Therefore, Waydoo's JMOL motion is denied.

For the same reasons, I find the jury's award of damages is not against the clear weight of the evidence. Therefore, Waydoo's motion for a new trial is denied.

#### **E. Willfulness**

Waydoo contends there is not substantial evidence that Waydoo's infringement was willful. Waydoo argues that MHL did not present any evidence that Waydoo had the specific intent to infringe MHL's patents. (D.I. 236 at 17). Waydoo argues that the only evidence produced at trial were the cease-and-desist letters MHL sent Waydoo on January 31, 2019, April 9, 2019, and April 12, 2019. (*Id.*). Waydoo disputes that it received these letters. (*Id.* at 17 n.13). Waydoo further argues those letters are not sufficient to support a finding of willfulness because the letters, even if received, did not provide specificity regarding the infringement (e.g., no claim charts). (*Id.*). Waydoo argues that none of the cease-and-desist letters refer to Waydoo's Flyer ONE product, which is the product Waydoo is currently selling.

MHL contends there is substantial evidence that infringement was willful. MHL argues that the short amount of time between Waydoo's formation as a company and Waydoo's

development of an eFoil ready for market implies that Waydoo copied MHL. (D.I. 245 at 15). MHL contends that the cease-and-desist letters informed Waydoo in 2019 that Waydoo was infringing the Asserted Patents. (*Id.* at 16). MHL sent the first two letters to the email address on Waydoo's website and the third letter via mail to Waydoo's physical address. (D.I. 240 at 344:12-19 (Wagner)).

“Under *Halo*, the concept of ‘willfulness’ requires a jury to find no more than deliberate or intentional infringement.” *Eko Brands, LLC v. Adrian Rivera Maynez Enterprises, Inc.*, 946 F.3d 1367, 1378 (Fed. Cir. 2020) (citing *Halo Elecs., Inc. v. Pulse Elecs., Inc.*, 579 U.S. 93, 105 (2016)). Taking all reasonable inferences in MHL's favor, I think it is reasonable for the jury to infer that Waydoo received the letters given that they were sent to the email address listed on Waydoo's website.

With respect to the content of the cease-and-desist letters, I think they are specific enough for the jury to conclude Waydoo's infringement was willful. The letters referenced the Asserted Patents. (D.I. 240 at 342:24-343:1 (Wagner)). Mr. Wagner testified that the letters referenced the Waydoo Flyer (*id.* at 343:2-5, 343:20-21), which was the eFoil Waydoo was marketing at the time (D.I. 236 at 17).

Waydoo contends that the letters were not specific because they did not include a claim chart. (D.I. 236 at 17). I do not think a claim chart is required to establish that Waydoo had knowledge that it was infringing the Asserted Patents. I think the reference to the patents and the product Waydoo was marketing is sufficient for the jury to infer that Waydoo knew of the infringement.<sup>8</sup> See *Purewick Corp. v. Sage Prod., LLC*, 2023 WL 2734418, at \*9 (D. Del. Mar.

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<sup>8</sup> Waydoo appears to argue that the letters only “‘assert[]’ that a Waydoo eFoil infringes” the Asserted Patents.” (D.I. 236 at 17 (citing D.I. 240 at 342:14-343:5 (Wagner))). Even if the letters only referenced a Waydoo eFoil, rather than the Flyer by name, I think that is sufficient to put

31, 2023) (“Plaintiff must show that the accused infringer knew of the patent-in-suit, and knowingly or intentionally infringed the patent after acquiring that knowledge.” (citation and internal quotation marks omitted)), *appeal dismissed*, 2023 WL 4230367 (Fed. Cir. June 28, 2023).

I also do not think that Waydoo started marketing the Flyer One, the second-generation product, in June 2020, necessarily means Waydoo’s infringement with respect to the Flyer One is not willful. Waydoo merely points to the fact that the product was not accused in the 2019 letters, which were sent before Waydoo began marketing the Flyer One. Waydoo does not point to any differences between the models that would lead one to think the Flyer One was different from the Flyer with respect to infringing the Asserted Patents. Taking all reasonable inferences in MHL’s favor, I think a jury could infer that Waydoo knew the Flyer One was infringing the Asserted Patents because of its knowledge that the Flyer was infringing.

I think there is substantial evidence that Waydoo knew of the Asserted Patents and that its products infringed the Asserted Patents. Therefore, Waydoo’s JMOL motion is denied.

For the same reasons, I find the jury’s finding of willful infringement is not against the clear weight of the evidence. Therefore, Waydoo’s motion for a new trial is denied.

#### **IV. CONCLUSION**

For the reasons discussed above, Waydoo’s renewed JMOL motions and motions for a new trial are denied.

An appropriate order will issue.

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Waydoo on notice as it was only marketing one eFoil at the time. (D.I. 236 at 17 (noting the Flyer ONE was not introduced until June 2020)).

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

MHL CUSTOM, INC.,

Plaintiff,

v.

WAYDOO USA, INC. and SHENZHEN  
WAYDOO INTELLIGENCE  
TECHNOLOGY CO., LTD.,

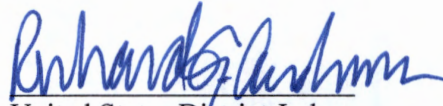
Defendants.

Civil Action No. 21-0091-RGA

**ORDER**

For the reasons stated in the accompanying opinion, IT IS HEREBY ORDERED that Defendants' Motions for Renewed Judgment as a Matter of Law and Motion for a New Trial (D.I. 234) is DENIED.

IT IS SO ORDERED this 6<sup>th</sup> day of September 2023.

  
United States District Judge

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

MHL CUSTOM, INC.,

Plaintiff;

v.

WAYDOO USA, INC, and SHENZHEN  
WAYDOO INTELLIGENCE TECHNOLOGY  
CO., LTD,

Defendants.

Civil Action No. 21-91-RGA

MEMORANDUM OPINION

Blake A. Bennett, COOCH AND TAYLOR, P.A., Wilmington, DE; Dennis D. Murrell, Robert J. Theuerkauf (argued), Daniel W. Redding, MIDDLETON REUTLINGER; Louisville, Kentucky;

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Attorneys for Defendants.

June 24, 2022



**ANDREWS, UNITED STATES DISTRICT JUDGE:**

Before me is the issue of claim construction of multiple terms in U.S. Patent Nos. 9,359,044 (“the ’044 Patent”) and 9,586,659 (“the ’659 Patent”). I held a claim construction hearing on May 3, 2022 and requested supplemental briefing on several questions. I have considered the parties’ joint and supplemental briefing. (D.I. 46, 59, 60, 62).

**I. LEGAL STANDARD**

“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 v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (cleaned up). “[T]here is no magic formula or catechism for conducting claim construction.’ Instead, the court is free to attach the appropriate weight to appropriate sources ‘in light of the statutes and policies that inform patent law.’” *SoftView LLC v. Apple Inc.*, 2013 WL 4758195, at \*1 (D. Del. Sept. 4, 2013) (quoting *Phillips*, 415 F.3d at 1324) (alteration in original). When construing patent claims, a court considers the literal language of the claim, the patent specification, and the prosecution history. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977–80 (Fed. Cir. 1995) (en banc), *aff’d*, 517 U.S. 370 (1996). Of these sources, “the specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.” *Phillips*, 415 F.3d at 1315 (cleaned up).

“[T]he words of a claim are generally given their ordinary and customary meaning. . . . [Which is] the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Id.* at 1312–13 (citations and internal quotation marks omitted). “[T]he ordinary meaning of a claim term is its meaning to [an] ordinary artisan after reading the entire patent.” *Id.* at 1321

(internal quotation marks omitted). “In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words.” *Id.* at 1314.

When a court relies solely upon the intrinsic evidence—the patent claims, the specification, and the prosecution history—the court’s construction is a determination of law. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331 (2015). The court may also make factual findings based upon consideration of extrinsic evidence, which “consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Phillips*, 415 F.3d at 1317–19 (cleaned up). Extrinsic evidence may assist the court in understanding the underlying technology, the meaning of terms to one skilled in the art, and how the invention works. *Id.* Extrinsic evidence, however, is less reliable and less useful in claim construction than the patent and its prosecution history. *Id.*

## II. BACKGROUND

The patents claim a “personal hydrofoil”—a surfboard-like device that achieves a hovering effect by using a fin that glides under the surface of the water. This fin—the hydrofoil—“enable[s] higher speeds and to lift the surfboard above the choppy, turbulent surface of the water, thus enabling surfing on larger waves.” ’044 Patent, 1:26-28.

The ’044 patent application was filed October 8, 2014. The ’659 patent application was filed March 8, 2016 and is a continuation of the ’044 patent. The ’044 and ’659 patents share a specification. The parties agree that the following claims are representative for their respective patents. The disputed claim language is italicized.

’044 Patent, Claim 1:

A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:

a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, *wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position*, the flotation device having a forward section, a middle section, and a rear section, and the flotation device being controlled via weight shift of the user;

a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;

a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface and *designed to provide passive static stability* controlled solely by weight shift of the user;

a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; and

the watercraft having no movable steering system.

'044 Patent, Claim 5:

A watercraft in accordance with claim 1, wherein *the design for providing the passive static stability is achieved through a combination of airfoil design, planform design and tailoring of span-wise twist distribution*.

'659 Patent, Claim 1:

*A passively stable, weight-shift controlled personal hydrofoil watercraft*, comprising:

a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, *wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position*, the flotation device having a forward section, a middle section, and a rear section;

a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;

a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface;

a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; and

the watercraft having no movable steering system.

'659 Patent, Claim 16:

A personal hydrofoil watercraft, comprising:

a surfboard-shaped flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, *wherein the top surface has a substantially horizontal supporting surface configured to support a user in a prone, kneeling, or standing position*, the flotation device having a forward section, a middle section, and a rear section;

a hydrofoil interconnected with the surfboard-shaped flotation device, the hydrofoil having a strut and a first hydrofoil wing, an upper end of the strut being fixedly interconnected with the surfboard-shaped flotation device;

a propulsion system attached to the surfboard-shaped flotation device for propelling the watercraft in a body of water, the propulsion system comprising a battery, an electric motor, a motor speed controller, and a propulsor, wherein the propulsor is selected from a propeller, a ducted propeller, or a pump-jet, and the battery and motor speed controller are contained in a watertight compartment integrated into the flotation device;

the watercraft having no movable steering system;

a handheld controller having a throttle; and

a throttle interface, wherein the throttle is adapted to send electronic signals to the throttle interface that cause an output of the propulsion system to change.

### III. CONSTRUCTION OF DISPUTED TERMS

#### A. Term 1: “wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position” ('044 Patent, Cl. 1; '659 Patent, Cl. 1)

1. *Plaintiff's proposed construction*: “Wherein a user can be disposed on the top surface of the flotation device in each of the following positions: lying chest down; kneeling; or standing.”
2. *Defendants' proposed construction*: Plain and ordinary meaning.
3. *Court's construction*: “‘Prone, kneeling, or standing’ are alternatives. Only one of them is required.”

Plaintiff argues that the top surface of the board must allow the user to use the device in each listed position (prone, kneeling, and standing). Defendants disagree, arguing that the use of the word “or” in the claim limitation means that the board must allow a user to “be in any (or all) of the three positions.” (D.I. 62 at 4).

“Or” usually designates alternatives. *See Kustom Signals, Inc. v. Applied Concepts, Inc.*, 264 F.3d 1326, 1331 (Fed. Cir. 2001). To deviate from the usual interpretation, a party must show that the deviation is “clearly explained in the patent documents.” *Id.* Here, I do not think that the patent documents show that “or” has anything other than its common usage.

The claim describes “a flotation device ... wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position ....” ’044 Patent, Cl. 1. Plaintiff argues, “The conjunction ‘or’ is necessary because a user cannot be in all three positions at once . . . .” (D.I. 46 at 14). I do not think that “or” was “necessary”—the patentee could have drafted the claim with more clarity to claim a board that must support all three positions. The claim language, as drafted, claims a top surface that supports a user in a prone position, a kneeling position, or a standing position.

The specification does not clearly explain that “or” ought to be given anything other than its usual meaning. Plaintiff cites an embodiment in support of its proposed construction. (D.I. 46 at 12–14). The embodiment describes a “flotation board . . . similar to those used in surfing or sailboarding.” ’044 Patent, 3:7–8. Figure 1 shows the flotation board to be “substantially flat.” (D.I. 46 at 12). The specification further describes, “To operate the watercraft 100, a user initially lies prone on the flotation board 101. The throttle is engaged, causing the craft to accelerate. As the craft gains speed the user may move to a kneeling or standing position.” ’044 Patent, 4:33-36.

Defendants argue that Plaintiff seeks to import limitations from embodiments into the claims. (D.I. 46 at 18). I agree. As Defendants argue, “claim 1 (of both patents) and claim 16 (of the ’659 patent) are each directed to a ‘personal hydrofoil watercraft,’ of which a surfboard is just one example.” (D.I. 46 at 19). The Figure 1 embodiment, far from clearly explaining that the top surface of the claimed device must support a user in all three positions, suggests that a “flat upper surface to allow an adult human to lie prone, sit, kneel or stand” is merely “preferential[.]” (’044 patent, 3:13–17).

Thus, I reject Plaintiff’s proposed construction. I will give “or” its customary meaning of designating alternatives. The claimed top surface must support a user in at least one of the three listed positions, but it need not support a user in more than one of the three.

**B. Term 2: “wherein the top surface has a substantially horizontal supporting surface configured to support a user in a prone, kneeling, or standing position” (’659 Patent, Cl. 16)**

1. *Plaintiff’s proposed construction*: “Wherein the top surface has a substantially horizontal supporting surface configured to support a user in each of the following positions: lying chest down; kneeling; or standing.”
2. *Defendants’ proposed construction*: Plain and ordinary meaning.
3. *Court’s construction*: “‘Prone, kneeling, or standing’ are alternatives. Only one of them is required.”

For the reasons stated in Section III.A, I reject Plaintiff’s proposed construction.

**C. Term 3: “designed to provide passive static stability” (’044 Patent, Cl. 1)**

1. *Plaintiff’s proposed construction*: “Designed such that the hydrofoil has an initial tendency to return to its original condition when disturbed without the hydrofoil having any moveable components.”

2. *Defendants' proposed construction:* Indefinite or, in the alternative, “designed to provide stability without mechanisms or active control systems.”
3. *Court's construction:* “Designed such that the hydrofoil has an initial tendency to return to its original condition when disturbed without the hydrofoil having any moveable components.”

Defendants argue this term is indefinite. (D.I. 46 at 38). This is because, according to Defendants, the specification treats stability as simply a “personal preference” and a person of skill in the art (“POSA”) would be unable to determine whether “any particular personal hydrofoil watercraft falls inside or outside the scope of the claims.” (*Id.* at 39.). Plaintiff responds that there are criteria listed in the specification for determining stability and point to the expert opinion of Mr. Barry. (*Id.* at 46–50). I agree with Plaintiff. The concept of stability appears to be well-known in the art. (*See* D.I. 59, 60). Plaintiff's expert, who considers himself a POSA, has explained how the patents use the term. (D.I. 39-1, Ex. A ¶¶ 71, 77–79). Thus, I reject Defendants' argument that the term is indefinite.

Defendants also dispute Plaintiff's proposed construction. The dispute is over the role of “static” in the term “passive static stability.” Defendants argue for the construction, “designed to provide stability without mechanisms or active control systems” while Plaintiff has proposed the construction “Designed such that the hydrofoil has an initial tendency to return to its original condition when disturbed without the hydrofoil having any moveable components.” I requested supplemental letters providing definitions of “stability” from sources such as textbooks. The letters were helpful. Stability in the field of aerodynamics has two categories: static and dynamic. Static stability “deals with the *initial* tendency of a vehicle to return to equilibrium . . .

after being disturbed. It says nothing about whether it ever reaches its equilibrium position or how it gets there. Such matters are the realm of dynamic stability.” (D.I. 60–2, Ex. B at 602).

Defendants’ proposed construction does not account for the fact that static stability is a sub-category of stability. Plaintiff’s proposed construction, on the other hand, captures the concept of static stability. Thus, I will adopt Plaintiff’s proposed construction.

**D. Term 4: “A passively stable, weight-shift controlled personal hydrofoil watercraft” (’659 Patent, Cl. 1)**

1. *Plaintiff’s proposed construction*: “A watercraft having a hydrofoil, the hydrofoil having an initial tendency to return to its original condition when disturbed without the hydrofoil having any moveable components and that is controlled by weight-shift of the user.”
2. *Defendants’ proposed construction*: Indefinite or, in the alternative, “A weight-shift controlled personal hydrofoil watercraft that is stable without mechanisms or active control systems.”
3. *Court’s construction*: Plain and ordinary meaning.

Unlike the last claim term, this term does not specify “static” stability. As discussed *supra*, stability incorporates both static and dynamic stability. Plaintiff asserts that a person of skill in the art would find “passively stable” and “passive static stability” to be interchangeable. (D.I. 46 at 36). I doubt that. Thus, I reject Plaintiff’s proposition that the term here ought to have substantially the same construction as the last term. Defendants’ proposed construction, however, does not construe “stable” at all. For now, I will construe the term to have its plain and ordinary meaning. The parties may readdress this issue, if it is important, in case dispositive motions.

**E. Term 5: “wherein the design for providing the passive static stability is achieved through a combination of airfoil design, planform design and tailoring of span-wise twist distribution” (’044 Patent, Cl. 5)**

1. *Plaintiff’s proposed construction*: “The design for providing the passive static stability is achieved through a combination of:

- a geometry of a cross-section of the hydrofoil;
- a shape of the hydrofoil as viewed from above; and
- a measure of rotation of a hydrofoil section along the span of the hydrofoil.”

2. *Defendants’ proposed construction*: “This claim term is not limiting or, in the alternative, no construction is needed at this time.”

3. *Court’s construction*: Plain and ordinary meaning.

Plaintiff’s position is that airfoil design, planform design, and tailoring of span-wise twist distribution are “structural characteristics.” (D.I. 46 at 53). Defendants argue that they are methods of design, not structure. (*Id.* at 58). The parties dispute, for instance, whether “tailoring” describes an act or a structure.

“Tailoring” and “design” could be a structure, as Plaintiff argues. At this point, however, I am not convinced that the term means anything other than its plain and ordinary meaning. In support of their proposed construction, Plaintiff largely cites to its expert’s declaration, but I give that no weight. (D.I. 46 at 53–57). Neither party has made a strong claim construction argument based on the intrinsic record. The parties are free to address the construction of this term again, if it is important, in case dispositive motions.

#### **IV. CONCLUSION**

Within five days the parties shall submit a proposed order consistent with this Memorandum Opinion suitable for submission to the jury.

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

MHL CUSTOM, INC.,

Plaintiff,

v.

WAYDOO USA, INC. and SHENZHEN  
WAYDOO INTELLIGENCE TECHNOLOGY  
CO., LTD,

Defendant.

C.A. No. 21-0091-RGA

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**CLAIM CONSTRUCTION ORDER**

Consistent with the Court’s Memorandum Opinion (D.I. 66), the Court has determined that the following terms in U.S. Patent Nos. 9,359,044 (“the ’044 Patent”) and 9,586,659 (“the ’659 Patent”) are construed as set forth below:

TERM	PATENT CLAIMS	CONSTRUCTION
“wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position”	Claim 1 of the ’044 Patent; Claim 1 of the ’659 Patent	“‘Prone, kneeling, or standing’ are alternatives. Only one of them is required.”
“wherein the top surface has a substantially horizontal supporting surface configured to support a user in a prone, kneeling, or standing position”	Claim 16 of the ’659 Patent	“‘Prone, kneeling, or standing’ are alternatives. Only one of them is required.”
“designed to provide passive static stability”	Claim 1 of the ’044 Patent	“Designed such that the hydrofoil has an initial tendency to return to its original condition when disturbed without the hydrofoil having any moveable components.”

TERM	PATENT CLAIMS	CONSTRUCTION
“A passively stable, weight-shift controlled personal hydrofoil watercraft”	Claim 1 of the '659 Patent	Plain and ordinary meaning.
“wherein the design for providing the passive static stability is achieved through a combination of airfoil design, planform design and tailoring of span-wise twist distribution”	Claim 5 of the '044 Patent	Plain and ordinary meaning.

SO ORDERED this 30th day of June, 2022.

/s/ Richard G. Andrews  
 The Honorable Richard G. Andrews

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

MHL CUSTOM, INC.,	:	
	:	
Plaintiff,	:	
	:	
v.	:	Civil Action No. 21-0091-RGA
	:	
WAYDOO USA, INC. and SHENZHEN	:	
WAYDOO INTELLIGENCE	:	
TECHNOLOGY CO., LTD,	:	
	:	
Defendants.	:	

**ORDER**

The Court has considered the briefing for the partial summary judgment and *Daubert* motions. (D.I. 80, 83, 91, 93, 101, 106). The Court previously construed the term “A passively stable, weight-shift controlled personal hydrofoil watercraft,” which both parties agree is a limiting preamble in claim 1 of U.S. Patent No. 9,586,659, to have its plain and ordinary meaning. (D.I. 66 at 9). The parties, however, were permitted to readdress the construction of this term in case dispositive motions. (*Id.*). The meaning of this claim term, specifically with respect to “passively stable,” has been raised as an issue in the parties’ briefs. (*See, e.g.*, D.I. 80 at 36-37; D.I. 83 at 7-9; D.I. 91 at 17-22). I think the construction of “passively stable” is a question of law for the Court.

I propose to construe “A passively stable, weight-shift controlled personal hydrofoil watercraft” to mean “a weight-shift controlled personal watercraft having a hydrofoil that does not have any moveable components and which, when disturbed, (1) has an initial tendency to return to its original condition and (2) eventually returns to its original condition.”

This construction would only apply to U.S. Patent No. 9,586,659. I propose to conclude that the preamble to claim 1 of U.S. Patent No. 9,359,044, which has identical wording, is not limiting.

IT IS SO ORDERED this 3<sup>rd</sup> day of January 2023.

/s/ Richard G. Andrews  
United States District Judge

**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE**

MHL CUSTOM, INC.,

Plaintiff,

v.

WAYDOO USA, INC. and SHENZHEN  
WAYDOO INTELLIGENCE  
TECHNOLOGY CO., LTD.,

Defendants.

Civil Action No. 21-0091-RGA

**MEMORANDUM OPINION**

Blake A. Bennett, COOCH AND TAYLOR, P.A., Wilmington, DE; Dennis D. Murrell, Robert J. Theuerkauf (argued), Brian P. McGraw (argued), Megan E. Gibson, MIDDLETON REUTLINGER, Louisville, KY.

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Attorneys for Defendants.

February 2, 2023

  
ANDREWS, UNITED STATES DISTRICT JUDGE:

Before me are Plaintiff MHL Custom's ("MHL") and Defendants Waydoo USA's and Shenzhen Waydoo Intelligence Technology's (collectively, "Waydoo") motions for partial summary judgment. The parties have fully briefed the motions. (D.I. 80, 83, 91, 93, 101, 106). I heard oral argument on January 4, 2023.

**I. BACKGROUND**

Plaintiff alleges that Defendants infringe two of Plaintiff's patents. Those patents are U.S. Patent Nos. 9,359,044 (the, "'044 Patent") and 9,586,659 (the, "'659 Patent") (collectively, the "Asserted Patents"). The Asserted Patents relate to a personal hydrofoil watercraft. The Asserted Patents share a common specification.

Plaintiff asserts that Defendants' products infringe all claims of the '044 Patent (claims 1-22) and '659 Patent (claims 1-20). Defendants counterclaimed. (D.I. 13). The parties agree claim 1 of the '044 Patent and claims 1 and 16 of the '659 Patent are representative of the other claims for purposes of the pending motions.<sup>1</sup>

Plaintiff has moved for summary judgment of (1) direct infringement of claim 1 of the '044 Patent, (2) the '044 Patent and '659 Patent are not anticipated, and (3) Plaintiff has standing. (D.I. 77, 78, 79). Defendants have moved for summary judgment of (1) claims 16-20 of the '659 Patent are invalid for lack of written description, (2) non-infringement of the '044 Patent, and (3) non-infringement of claims 1-15 of the '659 Patent. (D.I. 81).

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<sup>1</sup> These three claims are the independent claims in the two patents. For purposes of the pending motions, Parties agree that the other elements of the dependent claims are met and only dispute as to whether all the claim elements as listed in the three independent claims are infringed by Defendants' products.

## II. LEGAL STANDARD

“The court shall grant summary judgment if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law.” FED. R. CIV. P. 56(a). Material facts are those “that could affect the outcome” of the proceeding. *Lamont v. New Jersey*, 637 F.3d 177, 181 (3d Cir. 2011) (quoting *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986)). “[A] dispute about a material fact is ‘genuine’ if the evidence is sufficient to permit a reasonable jury to return a verdict for the nonmoving party.” *Id.* The burden on the moving party may be discharged by pointing out to the district court that there is an absence of evidence supporting the non-moving party’s case. *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986).

The burden then shifts to the non-movant to demonstrate the existence of a genuine issue for trial. *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 586–87 (1986); *Williams v. Borough of West Chester*, 891 F.2d 458, 460–61 (3d Cir. 1989). A non-moving party asserting that a fact is genuinely disputed must support such an assertion by: “(A) citing to particular parts of materials in the record, including depositions, documents, electronically stored information, affidavits or declarations, stipulations . . . , admissions, interrogatory answers, or other materials; or (B) showing that the materials cited [by the opposing party] do not establish the absence . . . of a genuine dispute . . . .” FED. R. CIV. P. 56(c)(1). The non-moving party’s evidence “must amount to more than a scintilla, but may amount to less (in the evaluation of the court) than a preponderance.” *Williams*, 891 F.2d at 460–61.

When determining whether a genuine issue of material fact exists, the court must view the evidence in the light most favorable to the non-moving party and draw all reasonable inferences in that party’s favor. *Scott v. Harris*, 550 U.S. 372, 378 (2007); *Wishkin v. Potter*, 476 F.3d 180,

184 (3d Cir. 2007). If the non-moving party fails to make a sufficient showing on an essential element of its case with respect to which it has the burden of proof, the moving party is entitled to judgment as a matter of law. *See Celotex*, 477 U.S. at 322.

### III. DISCUSSION

#### A. INFRINGEMENT OF CLAIMS 1-15 OF THE '659 PATENT

Defendants have moved for summary judgment on non-infringement of claims 1-15 of the '659 Patent (D.I. 80 at 20-26; D.I. 83 at 29-32). The dispute focuses on whether Defendants infringe claim 1 of the '659 Patent. Claims 2-15 depend on claim 1. The claim reads as follows:

1. A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:

a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section;

a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;

a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface;

a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; and

the watercraft having no movable steering system.

('659 Patent, cl. 1). The parties agree that the preamble of the '659 Patent—A passively stable, weight-shift controlled personal hydrofoil watercraft—is limiting. (D.I. 83 at 30; D.I. 91 at 41). The parties dispute whether the “stable” aspect of the limitation is met. (D.I. 83 at 29-32; D.I. 91 at 43-45).

There are two issues to this dispute.

The first issue is whether “stable” includes both static stability – having an initial tendency to return to an original condition when disturbed – and dynamic stability – eventually returning to an original condition when disturbed. (D.I. 60-2, Ex. B at 602). Defendants argue both are included; Plaintiff, only static stability. I previously construed this term to have its plain and ordinary meaning but permitted the parties to readdress the issue at this stage of the case. (D.I. 66 at 9). Because there is a dispute over the scope of the claim term, I must construe the term before addressing the question of infringement. *O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361 (Fed. Cir. 2008) (“A determination that a claim term ‘needs no construction’ or has the ‘plain and ordinary meaning’ may be inadequate . . . when reliance on a term’s ‘ordinary’ meaning does not resolve the parties’ dispute.”).

The second issue is whether Defendants infringe the stability limitation as construed.

### **1. Claim Construction**

“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 v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal quotation marks omitted). “[T]here is no magic formula or catechism for conducting claim construction.’ Instead, the court is free to attach the appropriate weight to appropriate sources ‘in light of the statutes and policies that inform patent law.’” *SoftView LLC v. Apple Inc.*, 2013 WL 4758195, at \*1 (D. Del. Sept. 4, 2013) (quoting *Phillips*, 415 F.3d at 1324) (alteration in original). When construing patent claims, a court considers the literal language of the claim, the patent specification, and the prosecution history. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977–80 (Fed. Cir. 1995) (en banc), *aff’d*, 517 U.S. 370 (1996). Of these sources, “the specification is always highly relevant to the claim construction

analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.” *Phillips*, 415 F.3d at 1315 (internal quotation marks omitted).

“[T]he words of a claim are generally given their ordinary and customary meaning. . . . [Which is] the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Id.* at 1312–13 (citations and internal quotation marks omitted). “[T]he ordinary meaning of a claim term is its meaning to [an] ordinary artisan after reading the entire patent.” *Id.* at 1321 (internal quotation marks omitted). “In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words.” *Id.* at 1314.

When a court relies solely upon the intrinsic evidence—the patent claims, the specification, and the prosecution history—the court’s construction is a determination of law. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331 (2015). The court may also make factual findings based upon consideration of extrinsic evidence, which “consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises.” *Phillips*, 415 F.3d at 1317–19 (internal quotation marks omitted). Extrinsic evidence may assist the court in understanding the underlying technology, the meaning of terms to one skilled in the art, and how the invention works. *Id.* Extrinsic evidence, however, is less reliable and less useful in claim construction than the patent and its prosecution history. *Id.*

Defendants argue that “stable” should mean being statically stable and dynamically stable. Defendants cite to the patent specification and textbooks for support that a person of ordinary skill in the art (“POSA”) would read “stable” to require static and dynamic stability. (D.I. 83 at 4-7).

Plaintiff argues that “stable” should be interchangeable with statically stable or having static stability, and therefore, does not require that the watercraft have dynamic stability. (D.I. 91 at 22). Plaintiff cites to their expert, Mr. Barry, for support that “‘stable’ and ‘static stability’ are ‘commonly used interchangeably with respect to aircraft and hydrofoil stability.’” (D.I. 91 at 18 (citing D.I. 80-31, ¶ 12)). Mr. Barry also expressed an opinion that the patent uses the terms interchangeably. (*Id.* at 19).

I agree with Defendants that “stable” should mean having both static stability and dynamic stability. I previously rejected Plaintiff’s argument that “stable” and “static stability” could be used interchangeably. (D.I. 66 at 9). Plaintiff has not provided compelling intrinsic or extrinsic evidence to convince me to deviate from my initial view. Furthermore, the patent specification recites, “This trim condition is stable if a disturbance results in a restoring moment that returns the hydrofoil to its original condition.” (’659 Patent, col. 6:14-16). The hydrofoil returning to its original condition is a description of dynamic stability, not static stability. Therefore, the patent specification indicates that stable and statically stable (or static stability) are not interchangeable.

Therefore, I will construe “A passively stable, weight-shift controlled personal hydrofoil watercraft” to mean “a weight-shift controlled personal watercraft having a hydrofoil that does not have any moveable components and which, when disturbed, (1) has an initial tendency to return to its original condition and (2) eventually returns to its original condition.”<sup>2</sup>

## **2. Non-Infringement by the Accused Products**

The remaining issue is whether the accused products have static stability and dynamic stability. Defendants argue that their products are dynamically unstable (or lack dynamic stability) and Plaintiff has provided no evidence to show the accused products are dynamically stable. Thus,

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<sup>2</sup> I proposed this construction prior to oral argument. (D.I. 142).

Defendants argue there is no genuine issue of material fact that precludes summary judgment that the accused products do not infringe claims 1-15 of the '659 Patent.

Defendants contend that the only evidence Plaintiff has that shows Defendants' products are dynamically stable are "eigenvalue" analyses of some of the accused products. (D.I. 83 at 31). The parties agree that this type of analysis can be used to assess whether a watercraft is dynamically stable. (D.I. 83 at 31; D.I. 91 at 43). "If an eigenvalue analysis reports a positive 'sigma value,' it indicates that [a watercraft] is unstable." (D.I. 83 at 3). Defendants assert, because "[a]ll of Mr. Barry's eigenvalue analyses for [Defendants'] products report positive sigma values," Plaintiff's own expert shows conclusively that Defendants' products do not have dynamic stability. (D.I. 83 at 32).

Plaintiff argues that Defendants are not entitled to summary judgment because there still exists a genuine issue of material fact as to whether Defendants' products are dynamically stable. Plaintiff cites to Mr. Barry's deposition where he testified that he did not believe his analyses showed the products were dynamically unstable. (D.I. 91 at 44). Plaintiff contends that: (1) while Mr. Barry's eigenvalue analysis showed the watercrafts to be dynamically unstable, the results were "close" to showing dynamic stability, and (2) when Mr. Barry viewed the accused products operating in the real world, he concluded that they were dynamically stable, notwithstanding the eigenvalue analysis. (*Id.*; see D.I. 85-1, Ex. 6, 402:8-403:23 (stating positive eigenvalues did not indicate dynamic instability in part because the software was "an approximation" and did not account for all effects)). Plaintiff, therefore, argues that the eigenvalue analysis is not conclusive when considering Mr. Barry's testimony and other analyses.

Plaintiff also relies on Mr. Barry's statements that the Athena Vortex Lattice (AVL) software he used to analyze the stability of the watercrafts understated the stability of the accused

products.<sup>3</sup> Mr. Barry stated that the AVL software does not account for additional stabilizing factors that “exist once the effect of the water in which the hydrofoil is operating in is considered,” such as “damping, free surface, added mass, and viscosity”. (D.I. 91 at 44; *see, e.g.*, D.I. 80-33, Ex. 31, ¶¶ 23 (free surface), 55 (damping, added mass and viscosity effects)). Therefore, Plaintiff contends that Mr. Barry’s testimony about his different analyses and his conclusions raises a genuine dispute as to whether the accused products are dynamically stable.

I agree with Plaintiff that there is a genuine dispute whether the accused products are dynamically stable. Defendants are correct that the eigenvalue analyses of the watercrafts show at least one positive sigma value for each product analyzed, which Plaintiff does not dispute, indicating dynamic instability. Those analyses, however, are not the only evidence in the record. The record also includes testimony by Mr. Barry, in which he concludes that the watercraft are dynamically stable based on analyzing the stability derivatives using the AVL software and observation of the watercraft in the real world. (D.I. 91 at 44; *see, e.g.*, D.I. 80-33, ¶¶ 26-28, 53-55). Taking the evidence in the light most favorable to Plaintiff, as I am required to do, I determine that a reasonable jury could conclude that the accused products have dynamic stability and therefore do infringe.

Therefore, I will deny summary judgment of infringement of claims 1-15 of the ’659 Patent.

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<sup>3</sup> Mr. Barry used the AVL software to analyze the pitch stability derivative, directional stability derivative, and roll stability derivative to assess watercraft stability. Mr. Barry also used the AVL software to analyze the eigenvalues for his eigenvalue analysis. (*See, e.g.*, D.I. 85-1, Ex. 3, ¶¶ 95-96, 155-156)

## **B. INFRINGEMENT OF THE '044 PATENT**

The parties have cross-moved for summary judgment on infringement of claims 1-22 of the '044 Patent (D.I. 80 at 20-26; D.I. 83 at 29-32). The parties agree that whether either side is entitled to summary judgment comes down to whether there is a genuine issue of material fact that Defendants infringe claim 1 of the '044 Patent. The claim reads as follows:

1. A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:

a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section, and the flotation device being controlled via weight shift of the user;

a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;

a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface and designed to provide passive static stability controlled solely by weight shift of the user;

a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; and

the watercraft having no movable steering system.

('044 Patent, cl. 1). There are two disputes at issue here. First, the parties dispute whether the preamble of claim 1 is limiting. Plaintiff argues it is not; Defendants, that it is. Second, the parties dispute whether Defendants' products satisfy the stability limitations of claim 1. Resolving the second issue necessarily depends on the outcome of the first issue.

### **1. Whether the Preamble of Claim 1 is Limiting**

As an initial matter, it is proper for me to determine whether the preamble of claim 1 is limiting or not. Plaintiff argues that this is a determination to be left for the jury. (D.I. 91 at 41).

Plaintiff is mistaken. Determining the effect of preamble language is a claim-construction issue. *See Cochlear Bone Anchored Solutions AB v. Oticon Medical AB*, 958 F.3d 1348, 1354 (Fed. Cir. 2020). Claim construction and resolving the scope of asserted claims are questions of law left to the court. *See Every Penny Counts, Inc. v. American Express Co.*, 563 F.3d 1378, 1383 (citing *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1361-62 (Fed. Cir. 2008)). Therefore, I find it is necessary for me to make this determination now.<sup>4</sup>

“[A]s a general rule preamble language is not treated as limiting.” *Aspex Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d 1335, 1347 (Fed. Cir. 2012). “Whether to treat a preamble as a limitation is ‘determined on the facts of each case in light of the overall form of the claim, and the invention as described in the specification and illuminated in the prosecution history.’” *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1357 (Fed. Cir. 2012) (quoting *Applied Materials, Inc. v. Advanced Semiconductor Materials Am., Inc.*, 98 F.3d 1563, 1572-73 (Fed. Cir. 1996)). “In general, a preamble limits the invention if it recites essential structure or steps, or if it is necessary to give life, meaning, and vitality to the claim.” *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (citation and quotation marks omitted). “The preamble may be limiting to the extent it is ‘necessary to provide antecedent basis for the body of the claim.’” *Cochlear Bone*, 958 F.3d at 1355 (quoting *Symantec Corp. v. Computer Assoc. Int'l, Inc.*, 522 F.3d 1279, 1288 (Fed. Cir. 2008)). In addition, the preamble may be limiting when the preamble “is essential to understand limitations or terms in the claim body,” recites “additional structure or steps underscored as important by the specification,” or there was “clear reliance on the preamble during

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<sup>4</sup> While I have construed identical preamble language in the context of claim 1 of the '659 Patent as limiting, both parties agreed the preamble was limiting in that patent.

prosecution to distinguish the claimed invention from the prior art.” *Catalina*, 289 F.3d at 808. In other words, there are numerous exceptions to the default rule that a preamble is not limiting.

Plaintiff contends that the preamble is not limiting because there is a presumption against reading a preamble as limiting and this case does not present one of the recognized exceptions to that presumption. Specifically, Plaintiff argues that the “preamble does not: (1) recite essential structure; (2) provide antecedent basis to the claim term at issue; and (3) is not essential to understand limitations or terms in the claim body.” (D.I. 91 at 42).

Plaintiff further argues that there was no reliance on the preamble during prosecution. (*Id.* at 43). Plaintiff cites to the fact the preamble was present in the original claim as filed, and the static stability limitation was added to overcome prior art. (D.I. 146 at 2). Plaintiff contends that this shows that neither the inventor nor Examiner relied on the preamble during prosecution because the addition of the static stability limitation would be unnecessary if the preamble were limiting. (*Id.* at 2).

Defendants argue the preamble should be limiting because claim 1 of the '659 Patent, which is part of the same patent family and has an identical specification, recites identical language and both parties agree the preamble is limiting in that context. Defendants contend that there is “no technical or legal justification for why identical preambles should be treated differently.” (D.I. 83 at 30). Defendants further argue that the preamble “is limiting because it recites an ‘essential’ element not found in the body of the claim (i.e., dynamic stability).” (D.I. 106 at 15). To put it another way, Defendants argue that the patent specification “repeatedly defines the invention as an overall stable watercraft,” and therefore the preamble should be limiting because only the preamble specifies that the invention is dynamically stable. (D.I. 145 at 3).

I agree with Plaintiff that the preamble is not limiting. As an initial matter, I am not aware of any case law that states a preamble must be limiting in one patent because the identically worded preamble is limiting in another patent belonging to the same patent family. Defendants have also not supplied any such case law, despite being given additional time to do so. (D.I. 145 at 1).

The proposed identically-worded-preamble rule is inconsistent with the case law.<sup>5</sup> The Federal Circuit has stated “[w]hether to treat a preamble as a limitation is determined on the facts of each case in light of the overall form of the claim[] and the invention as described in the specification and illuminated in the prosecution history.” *Cochlear Bone*, 958 F.3d at 1354 (quoting *Deere & Co.*, 703 F.3d at 1357). I am thus required to analyze the form of claim 1 of the ’044 Patent, which has significant differences from the form of claim 1 of the ’659 Patent, when determining whether the preamble is limiting. Therefore, I do not believe that the presumption against reading a preamble as non-limiting is overcome just because the same preamble is limiting in claim 1 of the ’659 Patent.

I do not find that dynamic stability is an “essential” element that requires the preamble to be limiting. Nor do I think dynamic stability is “underscored as important by the specification.” *Catalina*, 289 F.3d at 808. Nowhere in the ’044 Patent is the term “dynamic stability” or “dynamically stable” used.

The ’044 Patent specification does repeatedly describe the invention as being “stable” or having “passive stability,” and dynamic stability is a component of those terms. *See* Section III.A.1

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<sup>5</sup> Furthermore, I have not applied such a rule even when the claims sharing the identical preamble are part of the same patent. *See Takeda Pharma. Co. v. Actavis Lab ’ys FL, Inc.*, 2016 WL 3193188, at \*6 n.6, \*7 n.7, \*7-8 (D. Del. June 6, 2016) (independently analyzing whether identical preamble language is limiting in two separate claims of the same patent), *aff’d in part, rev’d in part sub nom. Nalproprion Pharms., Inc. v. Actavis Lab ’ys FL, Inc.*, 934 F.3d 1344 (Fed. Cir. 2019).

*supra*. “But not every preamble reference to additional structure is limiting, even when the structure is noted in the specification—even, indeed, when the structure is ‘underscored as important by the specification.’” *Arctic Cat Inc. v. GEP Power Products, Inc.*, 919 F.3d 1320, 1329 (Fed. Cir. 2019) (quoting *Catalina*, 289 F.3d at 808 (“[W]hen reciting additional structure or steps underscored as important by the specification, the preamble may operate as a claim limitation.”)). Furthermore, even though the specification references the importance of stability, it similarly does so with respect to static stability. *See* ’044 Patent 2:17-20 (“The prior art in powered hydrofoil surfboards have all relied on moveable surfaces for control, and have ignored the possibility of designing the hydrofoil for passive static stability.”); 5:50-54 (“Note that other versions of the hydrofoil are possible: the key is designing the hydrofoil for passive static stability via planform design, airfoil design, and span-wise twist distribution.”). Therefore, I read the specification as underscoring the importance that the watercraft have static stability.

The body of claim 1 of the ’044 Patent addresses this essential, static stability element of the invention by reciting “a hydrofoil . . . designed to provide passive static stability.” (’044 Patent, cl. 1). Because having static stability is already an explicit limitation in the body of the claim, I do not read the preamble as supplying an essential element for claim 1 of the ’044 Patent.<sup>6</sup>

Accordingly, I conclude that the preamble of claim 1 of the ’044 Patent is not limiting.

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<sup>6</sup> It is this explicit recitation of static stability in the body of the claim 1 of the ’044 Patent that differentiates the effect of the preamble in claim 1 of the ’044 Patent from the effect of the preamble in claim 1 of the ’659 Patent. The body of claim 1 of the ’659 Patent does not contain any limitations pertaining to stability. As already discussed, the shared patent specification underscores the importance of the watercraft having static stability. Therefore, the preamble is providing an essential element in claim 1 of the ’659 Patent by stating that the watercraft needs to be “stable.” Since the preamble is limiting, the full scope of “stable” becomes a limitation.

## 2. Non-Infringement of the '044 Patent

Defendants' motion for summary judgment of non-infringement of the '044 Patent is premised on the preamble of claim 1 of the '044 Patent being limiting and requiring the additional limitation of dynamic stability. (D.I. 83 at 29-31). Because I have determined that the preamble to claim 1 is not limiting, there is no dynamic stability limitation in the claims of the '044 Patent. Therefore, Defendants' motion for summary judgment of non-infringement of the '044 Patent is denied.

## 3. Infringement of the '044 Patent

Plaintiff moves for summary judgment that Defendants infringe claim 1 of the '044 Patent, and, by extension, all other claims of the '044 Patent, on the ground that there is no genuine issue of fact that Defendants' accused products are statically stable.<sup>7</sup> Plaintiff argues that the testimony of its expert witness, Mr. Barry, and the analysis he conducted of the accused products, demonstrates that the accused products are passively statically stable. (D.I. 80 at 24-26). Plaintiff contends that because Defendants have not produced any affirmative evidence to dispute that the accused products are passively statically stable, there is no disputed fact in the record that prevents finding that the accused products infringe the '044 Patent. (*Id.* at 25-26).

Defendants argue, "There is a genuine dispute as to whether [Plaintiff] has evidence sufficient to meet its burden for showing even static stability." (D.I. 93 at 25). Defendants contend that their expert witness, Dr. Triantafyllou, has "explained that in trying to show static stability of the Accused Products, Mr. Barry concocted his own stability standard rather than assess them according to the standard set out in the Asserted Patents." (*Id.* at 26). Defendants further argue,

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<sup>7</sup> The parties agree that the only claim limitation in question is whether Defendants' products meet the stability limitation of claim 1. As discussed above, claim 1 of the '044 Patent only requires static stability because the preamble is not limiting.

“Without undisputed evidence that the Accused Products meet the standard set out in the Asserted Patents—which [Plaintiff] does not have because Mr. Barry did not so opine—summary judgment of infringement is improper.” (*Id.*). Defendants also argue that summary judgment is improper because Mr. Barry did not examine all of the accused products for infringement. (*Id.*).

I agree with Defendants that there exists a genuine issue of material fact. Plaintiff has provided evidence through Mr. Barry’s testimony and analysis to show that Defendants’ accused products are statically stable. Defendants’ expert responded by noting that Mr. Barry’s analysis deviates from that included in the asserted patents, and the reason for doing so goes unexplained. (D.I. 85-1, Ex. 8, ¶ 17). A reasonable juror could weigh the testimony by the parties’ experts and reach the conclusion that Plaintiff has not carried its burden to show that Defendants’ products are statically stable.

Therefore, I will deny summary judgment as to infringement of the ’044 Patent.

### **C. WRITTEN DESCRIPTION OF CLAIMS 16-20 OF THE ’659 PATENT**

Defendants move for summary judgment of invalidity for lack of written description for claims 16-20 of the ’659 Patent. Claim 16, which is representative of the other claims,<sup>8</sup> reads as follows:

16. A personal hydrofoil watercraft, comprising:

a surfboard-shaped flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein the top surface has a substantially horizontal supporting surface configured to support a user in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section;

a hydrofoil interconnected with the surfboard-shaped flotation device, the hydrofoil having a strut and a first hydrofoil wing, an upper end of the strut being fixedly interconnected with the surfboard-shaped flotation device;

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<sup>8</sup> Claims 17-20 are dependent claims that depend on claim 16.

a propulsion system attached to the surfboard-shaped flotation device for propelling the watercraft in a body of water, the propulsion system comprising a battery, an electric motor, a motor speed controller, and a propulsor, wherein the propulsor is selected from a propeller, a ducted propeller, or a pump-jet, and the battery and motor speed controller are contained in a watertight compartment integrated into the flotation device;

the watercraft having no movable steering system;

a handheld controller having a throttle; and

a throttle interface, wherein the throttle is adapted to send electronic signals to the throttle interface that cause an output of the propulsion system to change.

(’659 Patent, cl. 16). Defendants assert the claims are invalid for lack of written description because they do not contain a stability limitation (i.e., do not require the watercraft to be statically stable, dynamically stable, or both), but the specification of the Asserted Patents “clearly discloses the alleged invention as being a stable hydrofoil watercraft, and never suggests that the alleged invention can be anything other than stable.” (D.I. 83 at 26). Defendants further contend that the file history of the ’044 Patent shows the patent examiner “explicitly relied on the hydrofoil providing static stability in allowing the ’044 [P]atent.” (*Id.*). Defendants analogize the present case to *ICU Medical, Inc. v. Alaris Medical Sys., Inc.*, 558 F.3d 1368, 1377-79 (Fed. Cir. 2009).

Plaintiff does not dispute that neither static stability nor dynamic stability (or both together) are limitations of the claims 16-20 of the ’659 Patent. Plaintiff asserts the written description requirement is met because the patent specification does not limit the invention to a “stable” watercraft. Plaintiff analogizes the present case to *ScriptPro LLC v. Innovation Assoc., Inc.*, 833 F.3d 1336, 1340-42 (Fed. Cir. 2016). Plaintiff argues that a stable watercraft is just one purpose of the invention and claims 16-20 of the ’659 Patent are written to address other purposes of the invention, such as not having a movable steering system, providing a “surfing feel,” and being easy to transport and maintain. (D.I. 91 at 39).

The written description requirement contained in 35 U.S.C. § 112 requires that the specification “clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.” *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (alteration in original). “In other words, the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.” *Id.* “When determining whether a specification contains adequate written description, one must make an ‘objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art.’” *Bos. Sci. Corp. v. Johnson & Johnson*, 647 F.3d 1353, 1366 (Fed. Cir. 2011) (quoting *Ariad*, 598 F.3d at 1351).

The written description inquiry is a question of fact. *Ariad*, 598 F.3d at 1351. Although it is a question of fact, “[c]ompliance with the written description requirement . . . is amenable to summary judgment in cases where no reasonable fact finder could return a verdict for the non-moving party.” *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1307 (Fed. Cir. 2008). “A party must prove invalidity for lack of written description by clear and convincing evidence.” *Vasudevan Software, Inc. v. MicroStrategy, Inc.*, 782 F.3d 671, 682 (Fed. Cir. 2015).

I find that Defendants are entitled to summary judgment that claims 16-20 of the ’659 Patent are invalid for lack of written description. The patent specification does not disclose that the patentee possessed a personal hydrofoil watercraft that lacks both static and dynamic stability. There is no genuine disputed fact about this.

The specification of the ’659 Patent only, and repeatedly, describes the invention as being a watercraft that is either stable or at least has static stability. For example, the abstract of the patent recites, “A passively stable personal hydrofoil watercraft . . . .” (’659 Patent at Abstract). The

patent specification further recites, “The hydrofoil of the present invention has been designed to provide passive stability in the longitudinal direction, making traditional altitude control systems based on moveable surfaces unnecessary.” (*Id.* at col. 2:8-12).

Static stability distinguishes the invention from the prior art. The specification recites, “The prior art in powered hydrofoil surfboards have all relied on moveable surfaces for control, and have ignored the possibility of designing the hydrofoil for passive static stability. . . . [T]he present invention is specifically designed to achieve desired levels of stability and controllability without the need for moveable surfaces.” (*Id.* at col. 2:20-26). The patent specification further emphasizes that the hydrofoil should be designed to provide static stability to the watercraft, even for undisclosed embodiments. (*Id.* at col. 5:62-65 (“Note that other versions of the hydrofoil are possible: the key is designing the hydrofoil for passive static stability via planform design, airfoil design, and span-wise twist distribution.”)). The patent specification attributes the ability to be controlled by weight shift to the stability of the watercraft. The specification states, “This invention exploits passive stability to obviate the necessity for mechanisms or active control systems to provide stability. This passive stability allows the watercraft to be controlled by weight shift rather than by mechanical systems.” (*Id.* at col. 6:7-11). There is nothing in the patent specification to suggest that a watercraft that is both statically and dynamically unstable is part of the disclosure. See *LizardTech, Inc. v. Earth Resource Mapping, Inc.*, 424 F.3d 1336, 1346 (Fed. Cir. 2005).

I agree with Defendants that the present case is similar to *ICU Medical*. In *ICU Medical*, the patent at issue claimed medical valves with spikes and without spikes (i.e., valves without the spike limitation). The specification of the patent, however, only described “medical valves with spikes.” *Id.* at 1378. The Federal Circuit upheld the district court’s grant of summary judgment

that the “spikeless” claims were invalid for lack of written description because a POSA would not have understood the patentee to have invented a “spikeless” medical valve. *Id.* at 1378-79.

Similarly, in the present case, the '659 Patent only discusses a watercraft that is at least statically stable. There is nothing in the specification that would signal to a POSA that the patentee invented a watercraft that is statically unstable. Furthermore, at oral argument, Plaintiff failed to point to any disclosure in the patent specification of a description or embodiment of a watercraft that was not at least statically stable. (D.I. 147 at 73:9-23). *See ICU Medical*, 558 F.3d at 1379.

While Plaintiff argues that this case is more analogous to *ScriptPro LLC v. Innovation Assoc., Inc.*, 833 F.3d 1336 (Fed. Cir. 2016), I disagree. In *ScriptPro*, the Federal Circuit reversed the district court’s ruling that claims without a limitation of employing a “sorting and storage scheme based on patient-identifying information” were invalid for lack of written description. *Id.* at 1341. The Federal Circuit noted that while the patent specification “focuses on embodiments employing a sorting and storage scheme based on patient-identifying information,” it is not a limitation of the invention because the invention is used to solve many problems, not all of which involve using a scheme based on patient-identifying information. *Id.* Specifically, the Federal Circuit cautioned that “a specification’s focus on one particular embodiment or purpose cannot limit the described invention where the specification expressly contemplates other embodiments or purposes.” *Id.* at 1341.

Plaintiff’s arguments that watercraft stability is just one solution the invention addresses, like the scheme in *ScriptPro*, misses the mark. First, in *ScriptPro*, the Federal Circuit stated that the “patent’s express disclosure that sorting and storing can be done in a number of ways distinguishes this case from . . . *ICU Medical*.” *Id.* Specifically, the Federal Circuit found that the invention was not limited to using a patient-identifying information sorting scheme because the

patent specification disclosed that “any predetermined storage scheme will do.” *Id.* Unlike in *ScriptPro*, there is no such express disclosure in the ’659 Patent specification that the watercraft can be statically and dynamically unstable. Nor is there anything that could reasonably be interpreted as an implied disclosure.

Second, the Federal Circuit noted that the patent in *ScriptPro* was aimed at addressing multiple problems and that the different claims were directed at “covering these different aspects of the invention.” *Id.* at 1342. In this case, however, the patent specification clearly describes static stability as a limitation of the invention as a whole, not an aspect of some embodiments or one purpose. *See* p.19 *supra*. The patent specification is not just describing some embodiments as stable or having static stability. (*See, e.g.*, ’659 Patent, col. 2:9-12; 2:23-25, 5:62-65). Nor is the specification describing stability as just one purpose of the invention. The patent specification, instead, is emphasizing that it is the stability of the watercraft – or at the least static stability provided by the hydrofoil – that permits the invention to achieve the full scope of its purposes such as not having a moveable steering system. (*See id.* at col. 6:7-11).

Therefore, I find that Defendants are entitled to summary judgment that claims 16-20 of the ’659 Patent are invalid for lack of written description.

#### **D. ANTICIPATION OF THE ’044 PATENT AND ’659 PATENT**

Plaintiff moves for summary judgment on Defendants’ counterclaims that the Asserted Patents are invalid as anticipated by Plaintiff’s products. (D.I. 80 at 26-37; *see also* D.I. 13 at 13-14). Defendants concede that they are not arguing that Plaintiff’s own products invalidate the Asserted Patents. (D.I. 93 at 27 (“Waydoo is not asserting that the Asserted Patents are invalid over MHL’s own products.”)). Therefore, this issue is moot and Plaintiff’s motion is dismissed.

Plaintiff also moves for summary judgment on Defendants' counterclaims that the Asserted Patents are invalid as anticipated by the Evolo Report. The Evolo Report is a 554 page report from "a graduate-level student project that was completed in 2009 by naval architecture students at the Royal Institute of Technology in Stockholm, Sweden." (D.I. 80 at 26-37).<sup>9</sup>

There are two issues to this dispute.

The first issue is whether the Evolo Report discloses the static stability limitation of the claims 1-22 of the '044 Patent and claims 1-15 of the '659 Patent.<sup>10</sup> Plaintiff argues it does not; Defendants argue it does.

The second issue is whether the Evolo Report is a printed publication. Plaintiff argues the Evolo Report is not because it was not publicly accessible before the priority date of the Asserted Patents. Defendants argue there is a genuine issue of material fact as to whether the Evolo Report was publicly accessible.

I address each issue in turn.

#### **1. Does the Evolo Report Disclose the Static Stability Limitation?**

"To show that a patent claim is invalid as anticipated, the accused infringer must show by clear and convincing evidence that a single prior art reference discloses each and every element of a claimed invention." *Silicon Graphics, Inc. v. ATI Tech., Inc.*, 607 F.3d 784, 796 (Fed. Cir. 2010). "[E]very element of the claimed invention [must be described], either expressly or inherently, such

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<sup>9</sup> Plaintiff argue that Defendants improperly combine multiple Evolo-related references into one anticipation analysis. Defendants argue in their briefing that the Evolo Report itself is the single prior art reference that anticipates the Asserted Patents. (D.I. 93 at 30). Therefore, for purposes of this motion, I focus only on the Evolo Report.

<sup>10</sup> Plaintiff also argues that claims 16-20 of the '659 Patent are not invalidated by anticipation because the Evolo Report does not disclose a motor speed controller, but this issue is moot as I have found claims 16-20 of the '659 Patent to be invalid for lack of written description. *See* Section III.C *supra*.

that a person of ordinary skill in the art could practice the invention without undue experimentation.” *Callaway Golf Co. v. Acushnet Co.*, 576 F.3d 1331, 1346 (Fed. Cir. 2009). As with infringement, the court construes the claims and compares them against the prior art. See *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1332 (Fed. Cir. 2010). “While anticipation is a question of fact, it may be decided on summary judgment if the record reveals no genuine dispute of material fact.” *Encyclopaedia Britannica, Inc. v. Alpine Elecs. of Am., Inc.*, 609 F.3d 1345, 1349 (Fed. Cir. 2010).

Plaintiff argues that the Evolo Report does not disclose a statically stable watercraft. Specifically, Plaintiff argues that Defendants cannot meet their burden because Dr. Triantafyllou did not mathematically assess the stability of the watercraft disclosed in the Evolo Report. (D.I. 80 at 34-35). Plaintiff also cites to Mr. Barry’s expert report to show that the Evolo Report discloses a statically unstable watercraft (*Id.* at 35-36).

Defendants argue that there is a material issue of fact as to whether the Evolo Report discloses a statically stable watercraft because Dr. Triantafyllou concluded that the Evolo Report discloses a statically stable watercraft. (D.I. 93 at 32 (citing D.I. 85-1, Ex. 7, ¶¶ 220-241)). Defendants contend that Dr. Triantafyllou responded to the arguments raised by Plaintiff’s expert, Mr. Barry. (D.I. 93 at 32 (citing D.I. 85-1, Ex. 9, ¶¶ 71-77)).

I find there are genuine issues of material fact as to whether the Evolo Report discloses a statically stable watercraft. Both parties rely on the testimony of their expert witnesses to establish their positions. A reasonable juror could weigh the testimony by the parties’ experts and reach the conclusion that Defendants have shown that the Evolo Report discloses a statically stable watercraft.

## 2. Is the Evolo Report a Printed Publication?

“Whether a reference qualifies as a “printed publication” under § 102(b) is a legal conclusion based on underlying factual findings.” *Jazz Pharm., Inc. v. Amneal Pharm., LLC*, 895 F.3d 1347, 1356 (Fed. Cir. 2018). “A reference is considered publicly accessible if it was disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, can locate it.” *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 772 (Fed. Cir. 2018) (citation and internal quotation marks omitted). “The test for public accessibility is not ‘has the reference been indexed?’” *Id.* at 774. Instead, “the ultimate question is whether the reference was ‘available to the extent that persons interested and ordinarily skilled in the subject matter or art[,] exercising reasonable diligence, can locate it.’” *Voter Verified, Inc. v. Premier Election Sols., Inc.*, 698 F.3d 1374, 1380 (Fed. Cir. 2012) (quoting *SRI Int’l, Inc. v. Internet Sec. Sys., Inc.*, 511 F.3d 1186, 1194 (Fed. Cir. 2008)).

Plaintiff argues the Evolo Report was not publicly accessible before the priority date of the Asserted Patents. (D.I. 80 at 30-32). Plaintiff specifically contends that there is no evidence that the Evolo website, which contained a link to the Evolo Report, was indexed by Google, would turn up on a Google search in 2013, or was otherwise accessible to a POSA before the Asserted Patents’ priority date. (D.I. 32).

Defendants argue that Plaintiff is not entitled to summary judgment because there is evidence that the Evolo Report was publicly accessible before the Asserted Patents’ priority date. Therefore, there is a disputed material of fact, making summary judgment inappropriate. Defendants argue that the record contains evidence that the Evolo Report was downloaded in the United States before the priority date of the Asserted Patents; that their expert Mr. Lanterman

concluded that the Evolo website was likely indexed by Google and had regular activity, and that an article published in the Swedish magazine *Båtnytt* (“Boat News”) in August 2009 detailed the Evolo project and contained a link to the Evolo website. (D.I. 93 at 28-30).

I find there is a genuine issue of material fact as to whether the Evolo Report was publicly accessible to a POSA prior to October 2013. Plaintiff concedes that there was at least one user in the United States (or at least outside of Sweden and Switzerland) who downloaded the Evolo Report. (D.I. 80 at 16, n.7). Further, the article in *Båtnytt* may also have served as a publicly accessible “research aid” that would have led a POSA to the Evolo website, which contained the Evolo Report. *See, e.g., Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1350 (Fed. Cir. 2016); *Bruckelmyer v. Ground Heaters, Inc.*, 445 F.3d 1374, 1379 (Fed. Cir. 2006). For these reasons, I find a reasonable jury could determine that the Evolo Report was publicly accessible before the Asserted Patents’ priority date.

Therefore, I find Plaintiff is not entitled to summary judgment on Defendants’ counterclaims that the Asserted Patents are anticipated by the Evolo Report.

#### **E. PLAINTIFF’S STANDING**

Plaintiff moved for summary judgment on Defendants’ affirmative defense that Plaintiff lacks standing. (D.I. 79). After oral argument, Defendants stated they are not challenging standing. (D.I. 145).

Therefore, I will dismiss Plaintiff’s motion for summary judgment on standing as moot.

#### **IV. CONCLUSION**

For the reasons stated above, I deny Plaintiff’s motion for summary judgment for infringement of the ’044 Patent, deny Plaintiff’s motion for summary judgment for the Asserted

Patents not being invalid as anticipated by the Evolo Report, and dismiss Plaintiff's motion for summary judgment on Defendants' lack of standing argument.

I deny Defendants' motion for summary judgment for non-infringement of the '044 Patent and '659 Patent and grant Defendants' motion for summary judgment of invalidity for lack of written description for claims 16-20 of the '659 Patent.

An appropriate order will issue.

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

MHL CUSTOM, INC.,	:	
	:	
Plaintiff,	:	
	:	
v.	:	Civil Action No. 21-0091-RGA
	:	
WAYDOO USA, INC. and SHENZHEN	:	
WAYDOO INTELLIGENCE	:	
TECHNOLOGY CO., LTD,	:	
	:	
Defendants.	:	

**MEMORANDUM ORDER**

As part of the case dispositive motion briefing, both sides submitted various *Daubert* motions. (D.I. 74, 75, 76, 81).

The motion as to Defendants’ computer/internet expert, Mark Lanterman (D.I. 74) is DENIED. His qualifications are not challenged. Rather, Plaintiff essentially challenges the correctness of his conclusions about the indexing of the EVOLO report and how easily the report could be found, calling the conclusions unreliable. Lanterman sufficiently explains the basis for his conclusions. What remains is simply the question of whether he got it right, which is not a basis to exclude.

The motion as to Defendants’ damages expert, Philip Kline (D.I. 75) is DENIED. Plaintiff mostly bases its challenge on his qualifications to give opinions relating to competition and consumer demand in the relevant market. (D.I. 80 at 11). Defendants respond with citations to Kline’s resume. (D.I. 93 at 8; *see* D.I. 85-1 at 1009 of 1039). Kline has an economics degree and works for an economics consulting firm. He has experience in patent valuation. He is sufficiently qualified to render the challenged opinions. There is a secondary challenge that he

factors in Defendants' expected (lack of) profits to his reasonable royalty opinion. Profits, or lack thereof, would be a consideration at the hypothetical negotiation, so Plaintiff's challenge is without merit.

The motion as to Defendants' technical expert, Dr. Michael Triantafyllou (D.I. 76) is DENIED. I expect at trial his testimony will follow the rules that he cannot combine multiple pieces of prior art to make an anticipation argument. The criticism that he contradicts himself is grounds for cross-examination, not exclusion. The criticism that he opines on the intent of individuals involved with the EVOLO report is not a significant *Daubert* challenge, and the briefing (D.I. 80 at 8, 18-19) is too cursory to even show whether he does this. It appears the statements are based on science, not mind reading. And, if I am wrong, Plaintiff can object at trial if Plaintiff thinks certain testimony is improper under the evidentiary rules. The argument that Dr. Triantafyllou should not be allowed to give legal conclusions that a claim is obvious or indefinite is simply an evidentiary objection. I note that such conclusions are routinely given in patent cases because they can be helpful to the jury.

Defendants' motions (D.I. 81) are GRANTED in part and DENIED in part.

Defendants challenge Plaintiff's technical expert on multiple issues. A number of them are connected to a claim construction dispute, which I am separately resolving. I expect Mr. Barry to testify consistent with that resolution.<sup>1</sup> There are a number of places where Defendants state that Mr. Barry makes errors or is confused. Even experts make errors; the truth of whether such is the case should be resolved through some combination of opposing expert testimony and cross-examination. If Defendants show errors, it will cut into Mr. Barry's credibility. Mr. Barry,

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<sup>1</sup> The parties should meet and confer on this. If there are any issues that the parties cannot resolve, the parties should submit a letter identifying the dispute and proposing a resolution.

who is a technical expert, has no qualifications to testify about economic issues. Mr. Barry's opinions about commercial success are excluded.

Defendants challenge Plaintiff's damages expert, Dr. Jeffery Stec, on various grounds. As to the Fliteboard license, the criticisms do not make his use of the license unreliable, and Dr. Stec has a plausible case for economic comparability. The Fliteboard license did not settle litigation. And, as I understand it, litigation could not even have been instituted at the time the Fliteboard license was negotiated. Defendants' argument about economic comparability is not really about economic comparability (i.e., length of license, exclusivity, territory, etc.). It is about whether the license should be evaluated on a royalty rate based on percentage of sales price or a royalty rate based on a dollar amount per sales unit. It is for the jury to decide how convincing Dr. Stec's analysis is. The second issue concerns Dr. Stec's use of non-final agreements (and the negotiations about them to date). A non-final agreement is not a license. Thus, it also cannot be a comparable license. Thus, as things stand, the Manta and MSLR negotiations and putative licenses are excluded.

IT IS SO ORDERED this 3<sup>rd</sup> day of February 2023.

  
United States District Judge



US009359044B2

(12) **United States Patent**  
**Langelaaan**

(10) **Patent No.:** **US 9,359,044 B2**  
(45) **Date of Patent:** **Jun. 7, 2016**

(54) **WEIGHT-SHIFT CONTROLLED PERSONAL HYDROFOIL WATERCRAFT**

(71) Applicant: **Jacob Willem Langelaaan**, State College, PA (US)

(72) Inventor: **Jacob Willem Langelaaan**, State College, PA (US)

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/509,289**

(22) Filed: **Oct. 8, 2014**

(65) **Prior Publication Data**

US 2015/0104985 A1 Apr. 16, 2015

**Related U.S. Application Data**

(60) Provisional application No. 61/889,071, filed on Oct. 10, 2013.

(51) **Int. Cl.**

**B63B 1/24** (2006.01)  
**B63B 35/79** (2006.01)  
**B63H 21/17** (2006.01)  
**B63H 21/21** (2006.01)  
**B63H 5/14** (2006.01)  
**B63H 11/04** (2006.01)  
**B63H 1/16** (2006.01)

(52) **U.S. Cl.**

CPC ..... **B63B 1/248** (2013.01); **B63B 35/7926** (2013.01); **B63B 35/7943** (2013.01); **B63H 5/14** (2013.01); **B63H 21/17** (2013.01); **B63H 21/21** (2013.01); **B63H 1/16** (2013.01); **B63H 11/04** (2013.01)

(58) **Field of Classification Search**

CPC ..... B63B 1/248  
USPC ..... 441/74, 79  
See application file for complete search history.

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*Primary Examiner* — Lars A Olson

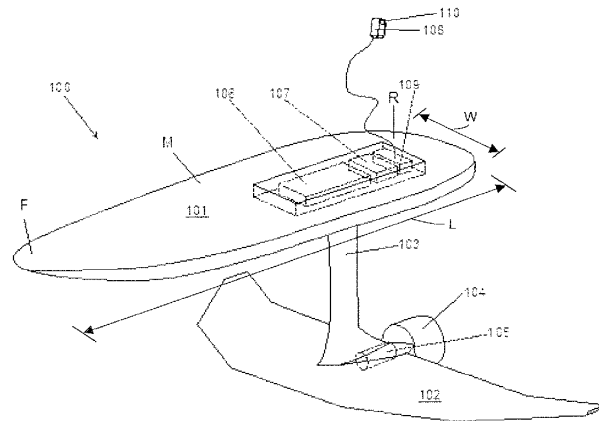
*Assistant Examiner* — Jovon Hayes

(74) *Attorney, Agent, or Firm* — Lerner, David, Littenberg, Krumholz & Mentlik, LLP

(57) **ABSTRACT**

A passively stable personal hydrofoil watercraft that has a flotation device, wherein a user can ride in a prone, kneeling, or standing position. The watercraft includes a strut having an upper end interconnected with the flotation device and lower end connected with a hydrofoil. The hydrofoil greatly reduces the power required to travel at higher speed. The watercraft also includes a propulsion system connected to the hydrofoil. Both longitudinal and directional control of the watercraft is via weight shift, eliminating the need of any movable surfaces. The flotation device, strut, and hydrofoil may be permanently interconnected or may be detachable.

**22 Claims, 4 Drawing Sheets**



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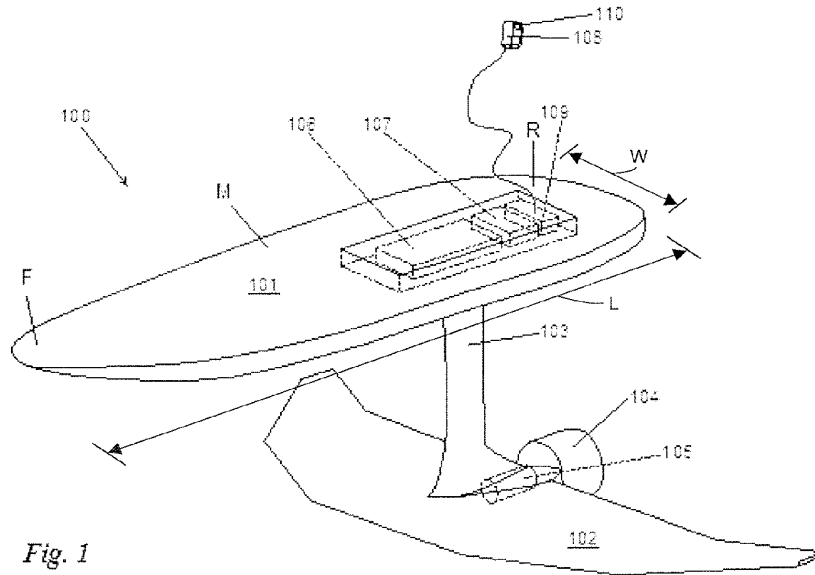


Fig. 1

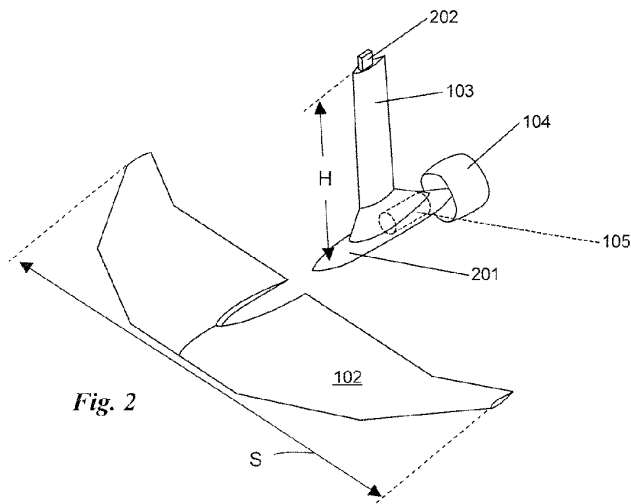
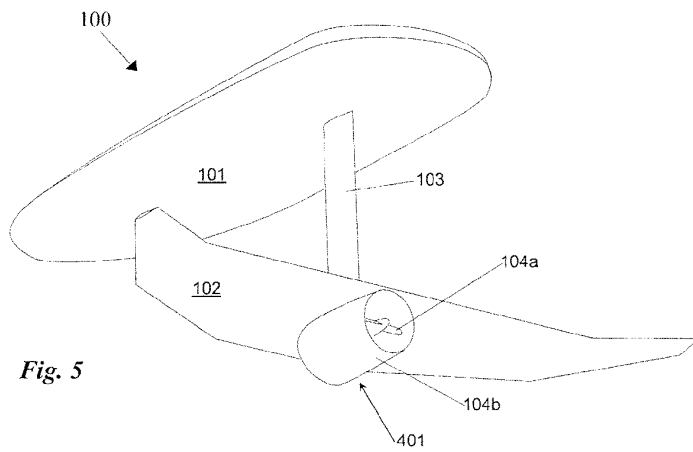
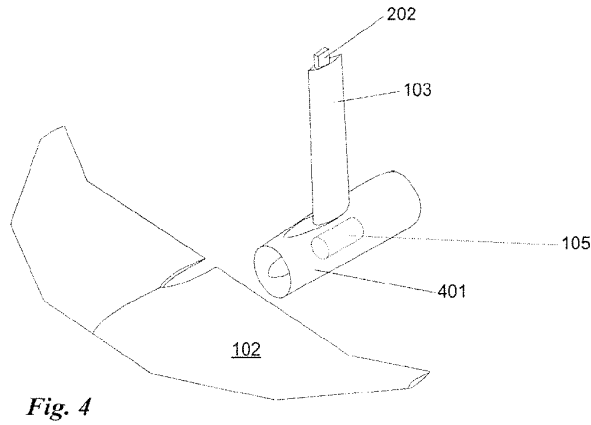
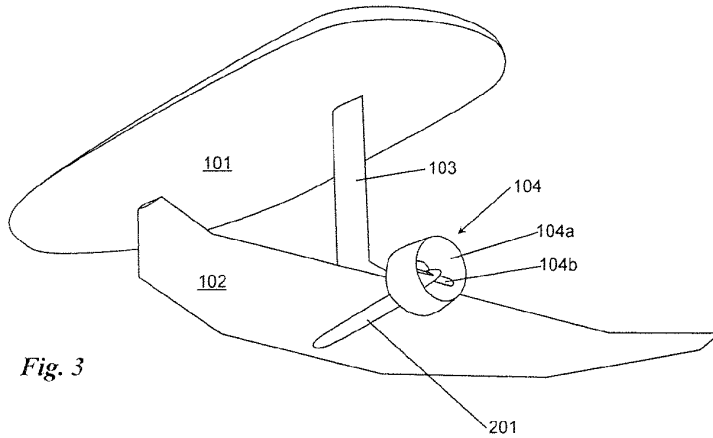


Fig. 2



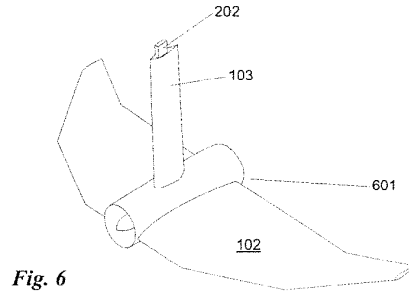


Fig. 6

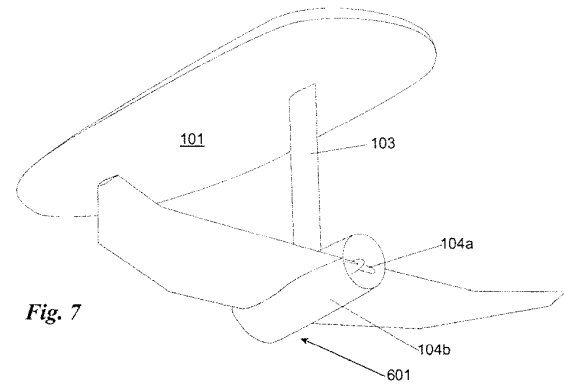


Fig. 7

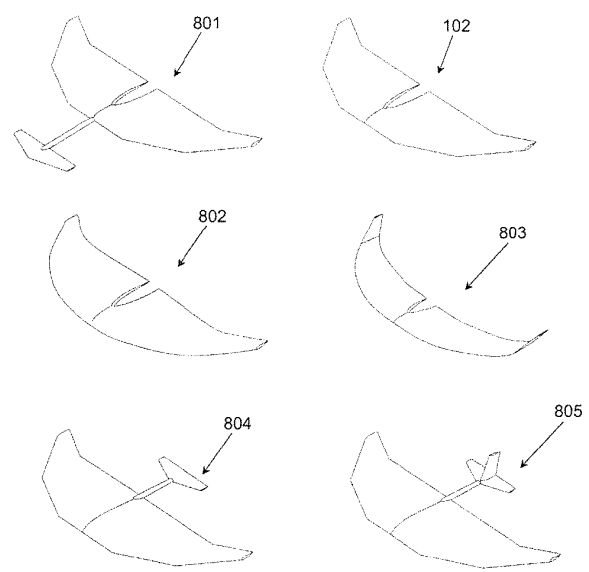


Fig. 8

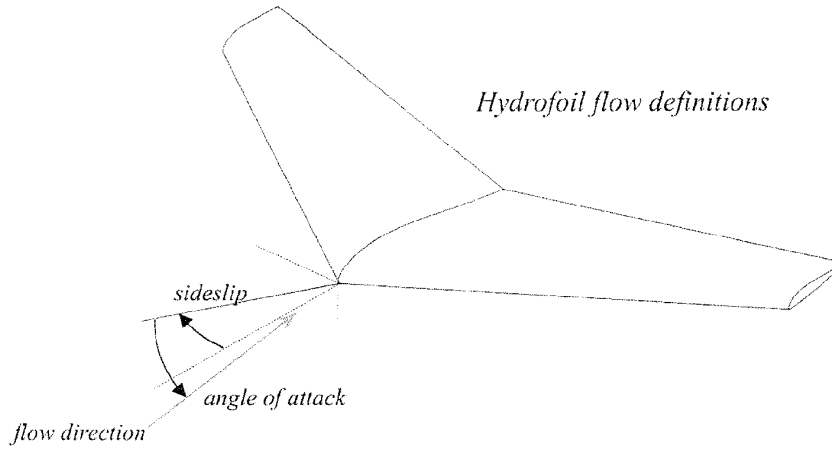


Fig. 9

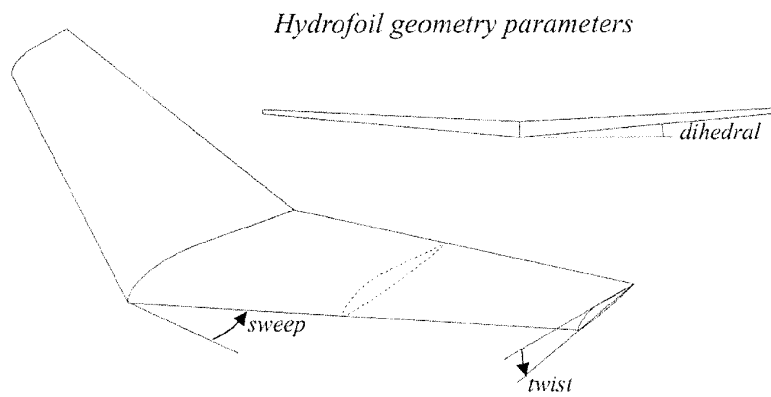


Fig. 10

US 9,359,044 B2

1

**WEIGHT-SHIFT CONTROLLED PERSONAL  
HYDROFOIL WATERCRAFT****CROSS-REFERENCE TO RELATED  
APPLICATION**

This application claims priority to U.S. Provisional Patent Application Ser. No. 61/889,071, filed Oct. 10, 2013, the contents of which are incorporated herein in their entirety.

**FIELD OF THE INVENTION**

The present invention relates to personal watercraft; specifically, an electrically powered hydrofoil surfboard that is controlled by weight shift.

**BACKGROUND OF THE INVENTION**

Hydrofoils have been used on surfboards (U.S. Pat. No. 5,062,378, Bateman; U.S. Pat. No. 3,747,138, Morgan; U.S. Pat. No. 7,144,285 B1, Tareah), sailboards (U.S. Pat. No. 4,508,046 Shannon), water skis (U.S. Pat. No. 7,232,355, Woolley), and devices for swimmers (U.S. Pat. No. 2,931,332, Hebrank) as well as ships and boats (e.g. U.S. Pat. No. 3,227,123 Voigt). The purpose of hydrofoils on surfboards is typically to enable higher speeds and to lift the surfboard above the choppy, turbulent surface of the water, thus enabling surfing on larger waves. On sailboards and kiteboards, hydrofoils enable higher speeds; and on water skis hydrofoils enable new forms of trick skiing.

Powered surfboards have been developed for reducing the effort required in paddling (U.S. Pat. No. 7,731,555 B2 Railey) and as personal watercraft (U.S. Pat. No. 6,702,634 B2 Jung, U.S. Pat. No. 3,262,413 Bloomingdale et al., U.S. Pat. No. 6,192,817 B1 Dec, U.S. Pat. No. 4,971,586 Walsh, U.S. Pat. No. 4,274,357 Dawson). A particularly well-designed example of this type is the Jet-Surf (<http://www.jet-surf.es>). However, significant power is required to achieve speeds typical of surfing (up to ten horsepower to achieve thirty miles per hour), precluding the use of battery-powered motors for operationally useful periods.

A major factor that distinguishes surfboards from other watercraft is that control (both speed and directional) is affected via weight shift rather than by moveable surfaces (such as rudders) or thrust vectoring. Indeed, other methods of transport (skateboards and snowboards) also rely heavily on weight shift, and this method of control is central to the experience of surfing, snowboarding, and skateboarding.

An electrically powered hydrofoil device is described in Chen (U.S. Pat. No. 7,047,901 B2). The watercraft in that disclosure has two main disadvantages. First, the device in Chen requires a stabilizing component that controls the depth of the hydrofoil. Second, a steering mechanism is used for directional control. Therefore it does not (and cannot) accurately mimic the experience of surfing or snow boarding.

A need therefore exists for a personal watercraft that provides improved control and performance while providing a "surfing feel." In addition, this personal watercraft should be mechanically simple, easy to transport, and easy to maintain.

**SUMMARY OF THE INVENTION**

Embodiments of the present invention improve upon the powered surfboard by incorporating a hydrofoil. The hydrofoil greatly reduces the power required to travel at "fun" speeds (ranging from twenty to thirty miles per hour, but can be higher or lower depending on the user), so that a battery-

2

powered electric motor (rather than an internal combustion engine) can be used to power the propulsion system. This results in reduced noise and vibration as well as reduced environmental impact.

Embodiments of the present invention also improve upon the powered hydrofoil surfboard. The hydrofoil of the present invention has been designed to provide passive stability in the longitudinal direction, making traditional altitude control systems based on moveable surfaces unnecessary. Further, both longitudinal and directional control of the board is via weight shift, so that riding the board is similar in feel to surfing or snowboarding, and the lack of a mechanical steering system makes the craft lighter, reduces parts count, and reduces the likelihood of a mechanical failure. Speed control is provided through a combination of throttle and weight shift.

The prior art in powered hydrofoil surfboards have all relied on moveable surfaces for control, and have ignored the possibility of designing the hydrofoil for passive static stability. The watercraft of the present invention is specifically designed to achieve desired levels of stability and controllability without the need for moveable surfaces. This is done through a combination of airfoil design, planform design, and tailoring the span-wise twist distribution to achieve desired outcomes.

Specific hydrofoils can be designed for different purposes: a larger foil results in lower speeds, more suitable for training; smaller foils operate at higher speeds for more advanced user; and tuning of the specific profile, twist, and dihedral can also be used to tailor the board to the user. A fixed canard or horizontal tail surface can also be added to further improve passive longitudinal stability as a training aid while still requiring the use of weight shift for control. A fixed vertical tail can be added to improve lateral stability as a training aid while still requiring the use of weight shift for control.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a perspective view of a personal hydrofoil watercraft in accordance with the present invention;

FIG. 2 is an exploded perspective view showing one embodiment of the hydrofoil and propulsion system assembly;

FIG. 3 is a perspective view from underneath a personal hydrofoil watercraft in accordance with the present invention;

FIG. 4 is an exploded perspective view showing an alternate embodiment of the hydrofoil and propulsion system assembly;

FIG. 5 is a perspective view from underneath a personal hydrofoil watercraft with the hydrofoil and propulsion system of FIG. 4;

FIG. 6 is a perspective view of an embodiment of the hydrofoil and propulsion system as an integrated body;

FIG. 7 is a perspective view from underneath a personal hydrofoil watercraft with the hydrofoil and propulsion system of FIG. 6;

FIG. 8 shows perspective views of alternate examples of hydrofoil planform designs;

FIG. 9 is a schematic illustrating hydrofoil flow definitions; and

FIG. 10 is a schematic showing hydrofoil geometry parameters

**DETAILED DESCRIPTION OF THE INVENTION**

Referring to FIG. 1, a perspective view of a hydrofoil watercraft **100** in accordance with an embodiment of the

## US 9,359,044 B2

3

present invention is shown. Watercraft **100** may include a flotation board **101**, a hydrofoil **102** spaced below the flotation board, a strut **103** connecting the hydrofoil to the board, a propulsion system **104**, an electric motor **105**, a battery **106**, a motor speed controller **107**, a throttle system **108**, a throttle interface **109**, and a spring-loaded trigger **110**.

The flotation board **101** of FIG. 1 is similar to those used in surfing or sailboarding. In the illustrated embodiment, the flotation board has a fore-aft length  $L$  that is greater than its lateral width  $W$ . Generally, the ratio of lateral width  $W$  to length  $L$  may be between 0.2 and 0.5. The length  $L$  will generally be in the range of 5 to 8 feet and the width  $W$  will generally be in the range of 1.5 to 2 feet. The primary function of the flotation board is to provide flotation at low speeds, and it is preferentially configured with a flat upper surface to allow an adult human to lie prone, sit, kneel or stand on it and an opposed bottom surface facing the water. The lower surface may be almost flat to permit good hydroplaning.

The flotation board **101** can be made of foam, fiber-reinforced epoxy (using glass, carbon, or Kevlar fibers), or other suitable materials known to those of skill in the art. It may have a watertight compartment defined therein to contain the battery **106**, motor speed controller **107** and throttle interface **109**. The flotation board **101** provides an attachment structure for attaching the strut **103**. The attachment structure may be a releasable mechanism to permit easy assembly and dis-assembly for transport. The flotation board **101** may be said to have a forward section  $F$  at the front end, a rear section  $R$  at the rear end and a middle section  $M$  intermediate the front and rear ends. Element  $M$  may also represent a midpoint that is halfway between the front and rear ends. As shown, the strut **103** is connected to the flotation board between the middle section  $M$  and the rear section  $R$ . The connection is behind the midpoint  $M$  and centered side to side. A throttle cable may connect the throttle module **108** to the throttle interface **109** or wireless communication may be provided between the throttle module **108** and throttle interface **109**. In an alternate arrangement, the batteries **106** may be contained in the strut **103** or embedded in the hydrofoil **102**. Each configuration has advantages and disadvantages ranging from ease of access for charging (in the case of a compartment in the flotation board) to reduction in the length of wires needed to connect the battery to the motor (in the case of containment in the strut or hydrofoil).

The strut **103** can be made of extruded aluminum, fiber-reinforced epoxy (using glass, carbon, or Kevlar fibers), or other suitable materials known to those of skill in the art. As shown, the strut is streamlined in cross-section to minimize drag. The strut may be constructed so as to allow passage of electrical wires from the motor speed controller **107** to the electric motor **105**, such as inside or attached to the strut. The primary function of the strut is to rigidly connect the hydrofoil **102** at a fixed distance  $H$  from the board **101**. The distance  $H$  will generally be in the range of 1 to 4 feet. In an alternative embodiment, more than one strut may be used or the strut may be shaped differently than shown.

The hydrofoil **102** of FIG. 1 is specifically designed to be statically stable in the longitudinal degrees of freedom via a combination of airfoil design, planform design and span-wise twist distribution. The hydrofoil **102** has a wingspan  $S$  (see FIG. 2). The wingspan will generally be in the range of 1 to 4 feet. It is also designed to be stable in sideslip ("weathercock stability") either via planform design or via the addition of small vertical foils (winglets or fins). In some cases it may be advantageous to add a fixed canard or horizontal tail to further enhance static longitudinal stability (for example, for training purposes). The fixed distance  $H$  (see FIG. 2) of the strut **103**

4

may be greater than the wingspan  $S$  of the hydrofoil **102** so that the hydrofoil remains fully submerged even when the user is leaning to turn.

The propulsion system **104** (discussed in more detail below) may comprise a ducted propeller or pump-jet, or may be of another type. The propulsion system is driven by the electric motor **105**.

The electric motor **105** is connected to the motor speed controller **107** using wires sized to carry the required voltage and current. The motor speed controller **107** may include other functionality such as a low-voltage alarm or other protective circuitry for the battery **106**; alternately, such circuitry may be included in the throttle interface **109**. The main function of the throttle interface is to connect the motor speed controller **107** to the throttle module **108**.

The throttle module **108** may be a hand-held device with a spring-loaded trigger **110** (so the throttle disengages automatically when it is released). Pulling or depressing the trigger causes the motor to turn a propeller or impeller in the propulsion system **104**, with motor speed being proportional to the degree the trigger is pulled or depressed. The throttle module communicates the degree of trigger pull/depression to the throttle interface **109** via a cable or wirelessly. The throttle module may take other forms, such as being operated by other body parts.

The throttle interface **109** may in addition include circuitry and connections to permit charging of the battery **106**. This would include battery protection circuits. The throttle interface may also include a means to display battery information to the user (for example, via LEDs to indicate charge state). Alternately, such information may be displayed on the throttle module **108**.

To operate the watercraft **100**, a user initially lies prone on the flotation board **101**. The throttle is engaged, causing the craft to accelerate. As the craft gains speed the user may move to a kneeling or standing position. As the craft further gains speed the hydrofoil generates sufficient lift to raise the board above the water. The user controls altitude of the board by leaning back (to go up) and forward (to go down). The user can steer left or right by leaning in the appropriate direction. Releasing the throttle causes the motor to stop, reducing speed. The watercraft **100** may have other safety devices and features which causes the electric motor **105** to stop when the rider falls off the flotation board **101**. These devices may monitor the presence of a user on the flotation board **101**.

FIG. 2 shows an exploded perspective view of one embodiment of the hydrofoil **102**, strut **103**, propulsion system **104**, and electric motor **105**. The electric motor **105** and propulsion system **104** are integrated into a waterproof, streamlined pod **201** that is designed to be embedded in the hydrofoil **102**. The pod **201** also defines the lower end of the strut **103**. The streamlined pod performs two main structural functions: it transmits propulsion forces to the strut **103** and it transmits lift forces from the hydrofoil **102** to the strut **103**. It may also contain provisions for cooling the electric motor **105**. The pod **201** is connected to the hydrofoil **102** either by a fitting (so that the hydrofoil can be easily removed) or it is integrally manufactured with the hydrofoil **102**.

In its preferential form the electric motor **105** is a high efficiency brushless motor. A gearbox may be provided to ensure that the propeller or impeller of the propulsion system **104** operates over an appropriate range of speeds.

The strut **103** contains at its upper end a fitting **202** to attach the strut to the flotation board **101** of FIG. 1. This fitting fits into a complementary slot in flotation board **101** and may use one of several methods to attach the strut **103** to the flotation board **101**: examples include bolts, pins, or latches. Any other

US 9,359,044 B2

5

attachment approach may be used, or the strut and/or foil and/or flotation board may be integrally formed or permanently interconnected.

FIG. 3 shows a perspective view of the watercraft 100 from below. In its preferred form the propulsion system 104 comprises a propeller 104a and a duct 104b. The duct has two purposes: it acts as a propeller guard and it is designed to increase propeller thrust. In an alternate form the propulsion system may comprise a pump-jet.

FIG. 4 shows an exploded perspective view of an alternative embodiment of the hydrofoil 102, strut 103, electric motor 105 and propulsion system 401. In this embodiment the propulsion system comprises a long duct and may contain a stator assembly. The duct functions both as a guard for the propeller (shown in FIG. 3) and to improve hydrodynamic efficiency. A stator (not shown) aft of the propeller can also be included to improve propulsive efficiency. In this embodiment the electric motor 105 is enclosed in a streamlined pod embedded in the propulsion system. In the embodiment of FIG. 4, the propulsion system is mounted below the hydrofoil 102. FIG. 5 shows a perspective view of the watercraft 100 from below with the propulsion system 401 mounted below the hydrofoil 102.

FIG. 6 shows a perspective view of an alternative embodiment of the hydrofoil 102, strut 103, and propulsion system 601. In this embodiment the propulsion system is integrated in the hydrofoil so that the inlet is at or near the forward (leading) edge of the hydrofoil and the outlet is at or near the rear (trailing) edge of the hydrofoil. As in the embodiments of FIG. 2, FIG. 3, FIG. 4 and FIG. 5, the propulsion system comprises a duct, a propeller, electric motor, and may include a stator.

FIG. 7 shows a perspective view of the watercraft 100 from below with the propulsion system of FIG. 6 integrated in the hydrofoil.

FIG. 8 shows perspective views of alternative embodiments of the hydrofoil planform. Hydrofoil 801 includes a fixed canard that increases stability (suitable for training). Note that this canard is fixed, not movable: control still occurs through weight shift. Hydrofoil 102 is shown in earlier drawings, and can be considered a baseline “all around” hydrofoil (suitable for a wide range of abilities). Foils 802 and 803 are progressively higher performance, permitting higher speeds and/or greater maneuverability. Foil 803 includes winglets, which increase directional stability and decrease drag. Foil 804 includes a horizontal tail, which improves longitudinal stability (similar to 801, it is suitable for training). Foil 805 includes both a horizontal tail and a vertical tail, improving longitudinal stability and directional stability (suitable for training). These tails may be considered a secondary hydrofoil. Note that other versions of the hydrofoil are possible: the key is designing the hydrofoil for passive static stability via planform design, airfoil design, and span-wise twist distribution.

Preferred embodiments of the present invention provide a hydrofoil watercraft with a fixed hydrofoil connected to a flotation board by one or more struts, with the fixed hydrofoil having no movable or adjustable surfaces. No movable hydrofoil is provided, but secondary hydrofoils on one or more struts (as shown in 801, 804, and 805) may be included. Additionally, no movable steering system is provided, as the watercraft is maneuvered by weight shifts.

This invention exploits passive stability to obviate the necessity for mechanisms or active control systems to provide stability. This passive stability allows the watercraft to be controlled by weight shift rather than by mechanical systems. FIG. 9 and FIG. 10 show the hydrofoil flow definitions and

6

hydrofoil geometry parameters respectively. For the hydrofoil, longitudinally trimmed motion occurs when the total pitching moment is zero. This trim condition is stable if a disturbance results in a restoring moment that returns the hydrofoil to its original condition. The pitching moment coefficient can be written as  $C_m = C_{m0} + C_{m\alpha}\alpha + C_{mQ}Q$  where  $C_{m0}$  is the pitching moment coefficient at zero angle of attack and zero pitch rate,  $C_{m\alpha}$  is the derivative of pitching moment coefficient with respect to angle of attack (called pitch stiffness),  $\alpha$  is the angle of attack (the angle between the flow direction and the chord of the hydrofoil),  $C_{mQ}$  is the derivative of pitching moment coefficient with respect to pitch rate (called pitch damping), and  $Q$  is the pitch rate. To ensure a trimmable, stable hydrofoil, the following conditions must be true:  $C_{m0} > 0$ ,  $C_{m\alpha} < 0$ ,  $C_{mQ} < 0$ . This is achieved with a combination of airfoil selection, hydrofoil sweep and span-wise twist. The exact ratios of wing sweep and twist are dependent on the degree of stability desired and are also affected by the pitching moment characteristics of the airfoil. The derivative  $C_{mQ}$  determines the “quickness” of the longitudinal response. Typically it will lie between  $-2$  and  $-20$ , with more negative values leading to a “sluggish” feel. In the steady state (when  $Q=0$ ) the angle of attack (and thus speed) at which trim occurs is a function of  $C_{m0}$  and  $C_{m\alpha}$ .

$$\alpha_{trim} = -\frac{C_{m0}}{C_{m\alpha}}$$

$C_{m0}$  is defined entirely by hydrofoil design parameters;  $C_{m\alpha}$  is defined by a combination of hydrofoil design parameters and the location of the center of gravity: this is the means by which weight shift enables longitudinal control of the hydrofoil watercraft.

Similarly for lateral motion, trim occurs when the yawing moment and rolling moment are zero. It is further desirable that this occurs at zero sideslip angle, so the hydrofoil “tracks straight” through the water. When the yaw rate is zero, rolling moment coefficient and yawing moment coefficient can be written as

$$C_l = C_{l0} + C_{l\beta}\beta + C_{lP}P$$

$$C_n = C_{n0} + C_{n\beta}\beta + C_{nP}P$$

where  $C_{l0}$  and  $C_{n0}$  are the roll rate and yaw rate at zero sideslip, respectively,  $C_{l\beta}$  and  $C_{n\beta}$  are the derivatives of roll rate and yaw rate with respect to sideslip angle, respectively,  $C_{lP}$  and  $C_{nP}$  are the derivatives of roll rate and yaw rate with respect to roll rate, respectively. Note that  $C_{n\beta}$  is sometimes called weathercock stiffness and  $C_{lP}$  is sometimes called roll damping. Trimmable, stable motion at zero sideslip is achieved by ensuring that the following conditions are true:

$$C_{l0} = 0$$

$$C_{n0} = 0$$

$$C_{l\beta} < 0$$

$$C_{n\beta} < 0$$

$$C_{lP} < 0$$

This is achieved through a combination of sweep and dihedral and can also be influenced with the addition of winglets or a fin. The practical upper limit of  $C_{n\beta}$  and practical lower limits of  $C_{l\beta}$  and  $C_{lP}$  are determined by the practicality of hydrofoil design. For example, sweep angles greater than 60

US 9,359,044 B2

7

degrees are unlikely to lead to useable designs and twist of greater than 15 degrees is unlikely to lead to useable designs. Given these geometric limits and the subjective judgment of "ride quality" on the part of a user, bounds on the roll and yaw derivatives exist but are not quantifiable to a useful degree of precision.

Directional control is achieved by the weight shift and the weathercock stability stiffness. Shifting weight to one side causes the watercraft to roll to that side; this causes sideslip in the direction of the weight shift, and the  $C_{r\dot{\theta}}$  term causes the vehicle to turn in the direction of the lean. It should be noted that there is a trade-off between stability and maneuverability. More experienced users generally want a watercraft that is somewhat less stable to provide greater maneuverability. In contrast, less experienced users may want a watercraft that has more stability, and this may be done through appropriate design of the hydrofoil to give the desired stability and maneuverability characteristics.

As will be clear to those of skill in the art, the herein described embodiments of the present invention may be altered in various ways without departing from the scope or teaching of the present invention. It is the following claims, including all equivalents, which define the scope of the invention.

I claim:

1. A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:
  - a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section, and the flotation device being controlled via weight shift of the user;
  - a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;
  - a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface and designed to provide passive static stability controlled solely by weight shift of the user;
  - a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; and
  - the watercraft having no movable steering system.
2. A watercraft in accordance with claim 1, wherein the propulsion system comprises a battery, an electric motor, a motor speed controller, and a propulsor, the propulsor selected from a propeller, a ducted propeller, or a pump-jet.
3. A watercraft in accordance with claim 2, wherein the propulsor is disposed below the hydrofoil.
4. A watercraft in accordance with claim 1, wherein the propulsion system is integrated in a first hydrofoil wing of the hydrofoil and has an inlet near a leading end of the first hydrofoil wing and an outlet near a trailing edge of the first hydrofoil wing.

8

5. A watercraft in accordance with claim 1, wherein the design for providing the passive static stability is achieved through a combination of airfoil design, planform design and tailoring of span-wise twist distribution.

6. A watercraft in accordance with claim 1, wherein the hydrofoil is wing shaped with a front edge and a rear edge that both curve rearwardly.

7. A watercraft in accordance with claim 1, wherein the hydrofoil is indirectly connected to the strut.

8. A watercraft in accordance with claim 7, wherein the strut is directly connected to the propulsion system.

9. A watercraft in accordance with claim 8, wherein a first hydrofoil wing of the hydrofoil is indirectly connected to the strut through the propulsion system.

10. A watercraft in accordance with claim 7, wherein the hydrofoil comprises a plurality of wings that are interconnected by way of a strut.

11. A watercraft in accordance with claim 2, wherein the battery and motor speed controller are contained in a waterproof compartment integrated into the flotation device.

12. A watercraft in accordance with claim 2, wherein the electric motor is integrated into a waterproof, streamlined pod and the watercraft comprises a cooling system.

13. A watercraft in accordance with claim 2, wherein the electric motor is removably interconnected with the hydrofoil through a fitting.

14. A watercraft in accordance with claim 10, wherein the first hydrofoil wing includes winglets extending at an angle to a main body of the first hydrofoil wing.

15. A watercraft in accordance with claim 11, further comprising a wireless handheld controller having a transmitter, and a throttle interface having a receiver, wherein the transmitter is adapted to send wireless signals to the receiver that cause an output of the propulsion system to change.

16. A watercraft in accordance with claim 1, wherein a first hydrofoil wing of the hydrofoil is directly connected to the strut.

17. A watercraft in accordance with claim 1, wherein the hydrofoil is spaced a fixed distance apart from the flotation device.

18. A watercraft in accordance with claim 15, wherein the strut has an internal passage and electrical wires extend from the electric motor to the waterproof compartment inside the strut through the internal passage for controlling the electric motor.

19. A watercraft in accordance with claim 2, wherein the flotation device has a detector adapted to detect a user's presence on the flotation device and cease operation of the electric motor if the detector detects that the user is not on the flotation device.

20. A watercraft in accordance with claim 11, wherein the electric motor is a brushless motor.

21. A watercraft in accordance with claim 1, wherein the propulsion system is directly or indirectly connected to the hydrofoil.

22. A watercraft in accordance with claim 21, wherein the hydrofoil is directly connected to the strut, and the strut is directly connected to the propulsion system.

\* \* \* \* \*



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**Langelaan**

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(54) **POWERED HYDROFOIL BOARD**

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See application file for complete search history.

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**B63H 21/17** (2006.01)  
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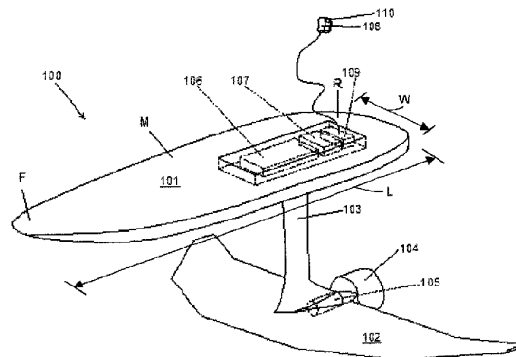
(57) **ABSTRACT**

A passively stable personal hydrofoil watercraft that has a flotation device, wherein a user can ride in a prone, kneeling, or standing position. The watercraft includes a strut having an upper end interconnected with the flotation device and lower end connected with a hydrofoil. The hydrofoil greatly reduces the power required to travel at higher speed. The watercraft also includes a propulsion system connected to the hydrofoil. Both longitudinal and directional control of the watercraft is via weight shift, eliminating the need of any movable surfaces. The flotation device, strut, and hydrofoil may be permanently interconnected or may be detachable.

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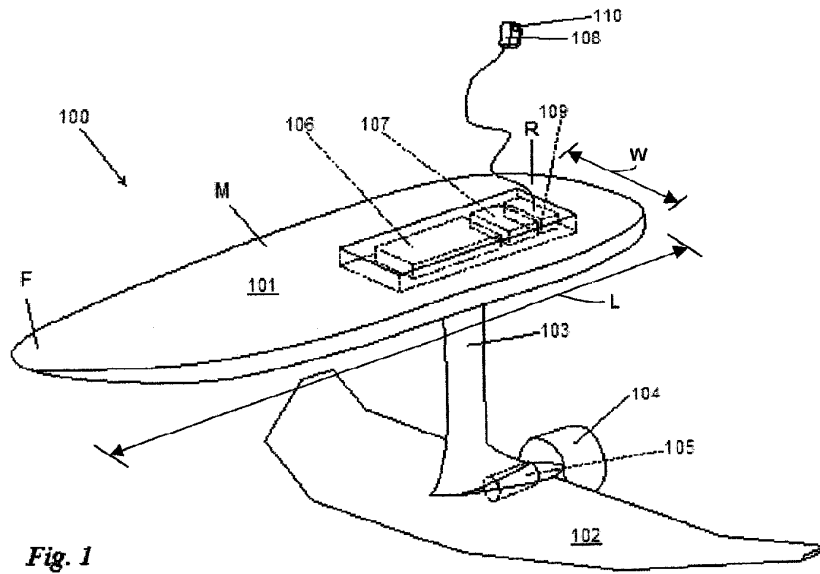


Fig. 1

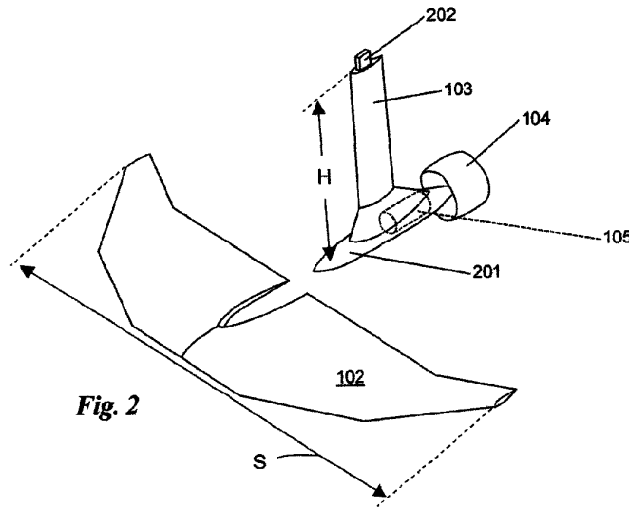
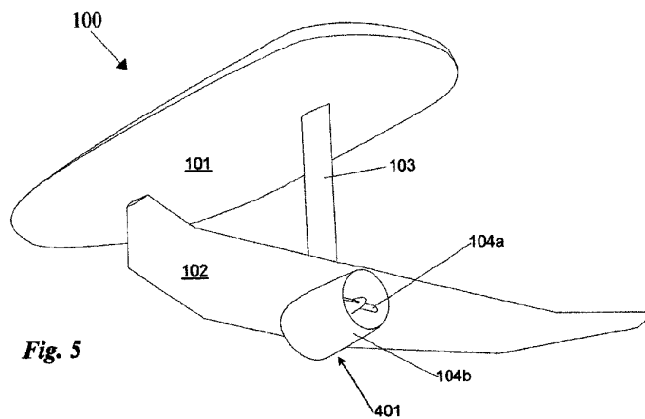
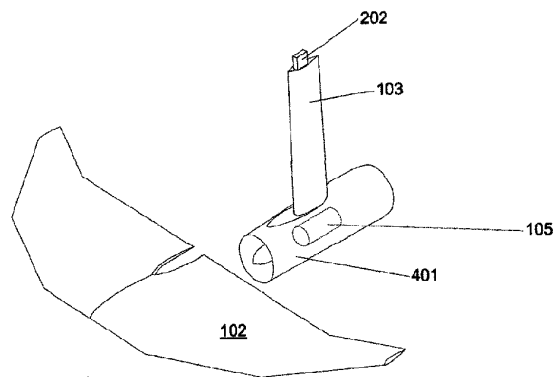
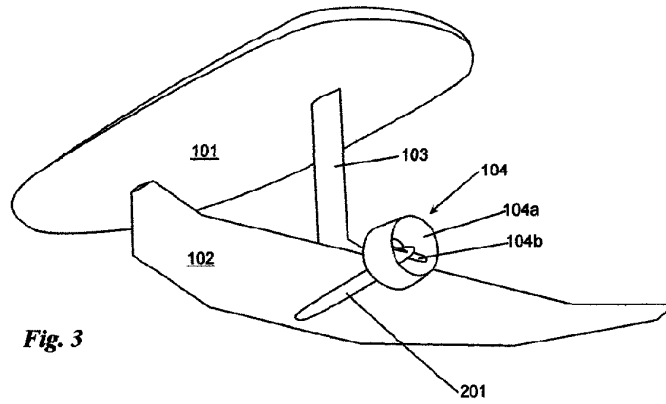
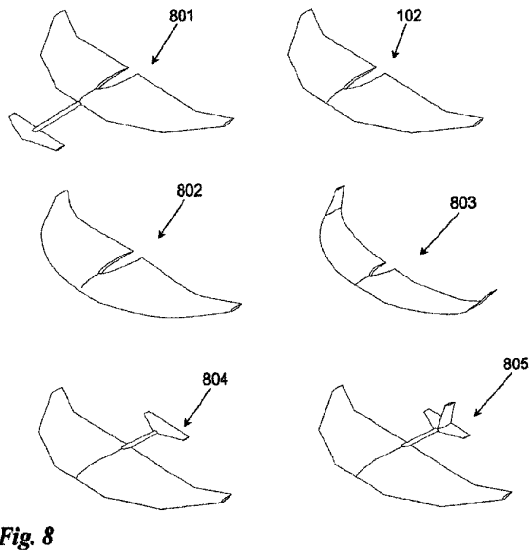
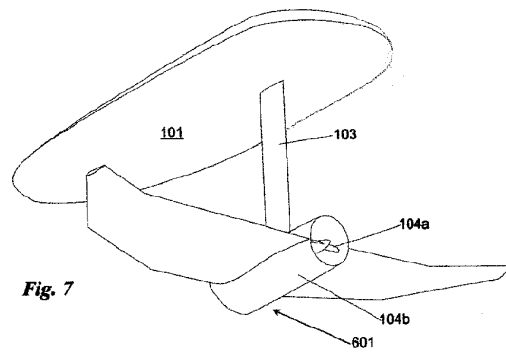
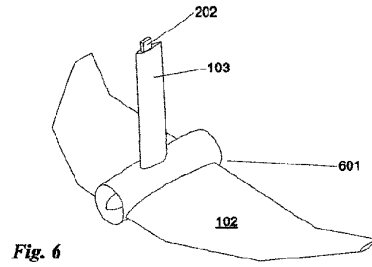


Fig. 2





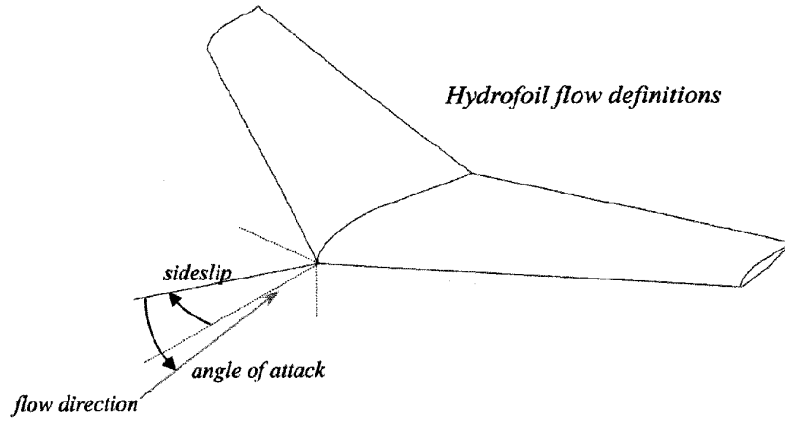


Fig. 9

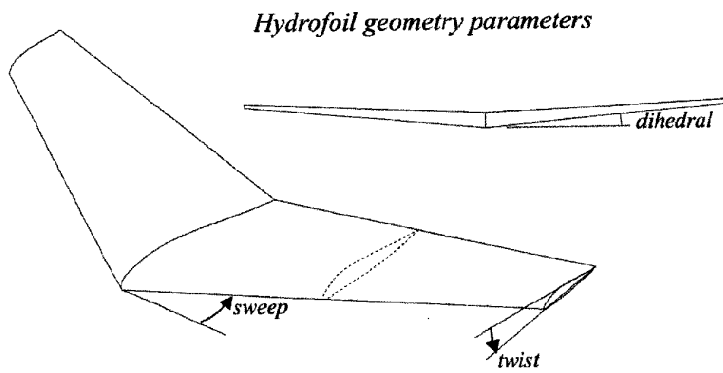


Fig. 10

US 9,586,659 B2

1

**POWERED HYDROFOIL BOARD**CROSS-REFERENCE TO RELATED  
APPLICATION

This application is a continuation of U.S. Ser. No. 14/509,289, filed Oct. 8, 2014, which claims priority to U.S. Provisional Patent Application Ser. No. 61/889,071, filed Oct. 10, 2013, the contents of which are incorporated herein in their entireties.

## FIELD OF THE INVENTION

The present invention relates to personal watercraft; specifically, an electrically powered hydrofoil surfboard that is controlled by weight shift.

## BACKGROUND OF THE INVENTION

Hydrofoils have been used on surfboards (U.S. Pat. No. 5,062,378 A, Bateman; U.S. Pat. No. 3,747,138, Morgan; U.S. Pat. No. 7,144,285 B1, Tareah), sailboards (U.S. Pat. No. 4,508,046 Shannon), water skis (U.S. Pat. No. 7,232,355, Woolley), and devices for swimmers (U.S. Pat. No. 2,931,332, Hebrank) as well as ships and boats (e.g. U.S. Pat. No. 3,227,123 A Voigt). The purpose of hydrofoils on surfboards is typically to enable higher speeds and to lift the surfboard above the choppy, turbulent surface of the water, thus enabling surfing on larger waves. On sailboards and kiteboards, hydrofoils enable higher speeds; and on water skis hydrofoils enable new forms of trick skiing.

Powered surfboards have been developed for reducing the effort required in paddling (U.S. Pat. No. 7,731,555 B2 Railey) and as personal watercraft (U.S. Pat. No. 6,702,634 B2 Jung, U.S. Pat. No. 3,262,413 A Bloomingdale et al., U.S. Pat. No. 6,192,817 B1 Dec, U.S. Pat. No. 4,971,586 A Walsh, U.S. Pat. No. 4,274,357 A Dawson). A particularly well-designed example of this type is the Jet-Surf (<http://www.jet-surf.cs>). However, significant power is required to achieve speeds typical of surfing (up to ten horsepower to achieve thirty miles per hour), precluding the use of battery-powered motors for operationally useful periods.

A major factor that distinguishes surfboards from other watercraft is that control (both speed and directional) is affected via weight shift rather than by moveable surfaces (such as rudders) or thrust vectoring. Indeed, other methods of transport (skateboards and snowboards) also rely heavily on weight shift, and this method of control is central to the experience of surfing, snowboarding, and skateboarding.

An electrically powered hydrofoil device is described in Chen (U.S. Pat. No. 7,047,901 B2). The watercraft in that disclosure has two main disadvantages. First, the device in Chen requires a stabilizing component that controls the depth of the hydrofoil. Second, a steering mechanism is used for directional control. Therefore it does not (and cannot) accurately mimic the experience of surfing or snowboarding.

A need therefore exists for a personal watercraft that provides improved control and performance while providing a "surfing feel." In addition, this personal watercraft should be mechanically simple, easy to transport, and easy to maintain.

## SUMMARY OF THE INVENTION

Embodiments of the present invention improve upon the powered surfboard by incorporating a hydrofoil. The hydrofoil greatly reduces the power required to travel at "fun"

2

speeds (ranging from twenty to thirty miles per hour, but can be higher or lower depending on the user), so that a battery-powered electric motor (rather than an internal combustion engine) can be used to power the propulsion system. This results in reduced noise and vibration as well as reduced environmental impact.

Embodiments of the present invention also improve upon the powered hydrofoil surfboard. The hydrofoil of the present invention has been designed to provide passive stability in the longitudinal direction, making traditional altitude control systems based on moveable surfaces unnecessary. Further, both longitudinal and directional control of the board is via weight shift, so that riding the board is similar in feel to surfing or snowboarding, and the lack of a mechanical steering system makes the craft lighter, reduces parts count, and reduces the likelihood of a mechanical failure. Speed control is provided through a combination of throttle and weight shift.

The prior art in powered hydrofoil surfboards have all relied on moveable surfaces for control, and have ignored the possibility of designing the hydrofoil for passive static stability. The watercraft of the present invention is specifically designed to achieve desired levels of stability and controllability without the need for moveable surfaces. This is done through a combination of airfoil design, planform design, and tailoring the span-wise twist distribution to achieve desired outcomes.

Specific hydrofoils can be designed for different purposes: a larger foil results in lower speeds, more suitable for training; smaller foils operate at higher speeds for more advanced user; and tuning of the specific profile, twist, and dihedral can also be used to tailor the board to the user. A fixed canard or horizontal tail surface can also be added to further improve passive longitudinal stability as a training aid while still requiring the use of weight shift for control. A fixed vertical tail can be added to improve lateral stability as a training aid while still requiring the use of weight shift for control.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a personal hydrofoil watercraft in accordance with the present invention;

FIG. 2 is an exploded perspective view showing one embodiment of the hydrofoil and propulsion system assembly;

FIG. 3 is a perspective view from underneath a personal hydrofoil watercraft in accordance with the present invention;

FIG. 4 is an exploded perspective view showing an alternate embodiment of the hydrofoil and propulsion system assembly;

FIG. 5 is a perspective view from underneath a personal hydrofoil watercraft with the hydrofoil and propulsion system of FIG. 4;

FIG. 6 is a perspective view of an embodiment of the hydrofoil and propulsion system as an integrated body;

FIG. 7 is a perspective view from underneath a personal hydrofoil watercraft with the hydrofoil and propulsion system of FIG. 6;

FIG. 8 shows perspective views of alternate examples of hydrofoil planform designs;

FIG. 9 is a schematic illustrating hydrofoil flow definitions; and

US 9,586,659 B2

3

FIG. 10 is a schematic showing hydrofoil geometry parameters

#### DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1, a perspective view of a hydrofoil watercraft 100 in accordance with an embodiment of the present invention is shown. Watercraft 100 may include a flotation board 101, a hydrofoil 102 spaced below the flotation board, a strut 103 connecting the hydrofoil to the board, a propulsion system 104, an electric motor 105, a battery 106, a motor speed controller 107, a throttle system 108, a throttle interface 109, and a spring-loaded trigger 110.

The flotation board 101 of FIG. 1 is similar to those used in surfing or sailboarding. In the illustrated embodiment, the flotation board has a fore-aft length L that is greater than its lateral width W. Generally, the ratio of lateral width W to length L may be between 0.2 and 0.5. The length L will generally be in the range of 5 to 8 feet and the width W will generally be in the range of 1.5 to 2 feet. The primary function of the flotation board is to provide flotation at low speeds, and it is preferentially configured with a flat upper surface to allow an adult human to lie prone, sit, kneel or stand on it and an opposed bottom surface facing the water. The lower surface may be almost flat to permit good hydroplaning.

The flotation board 101 can be made of foam, fiber-reinforced epoxy (using glass, carbon, or Kevlar fibers), or other suitable materials known to those of skill in the art. It may have a watertight compartment defined therein to contain the battery 106, motor speed controller 107 and throttle interface 109. The flotation board 101 provides an attachment structure for attaching the strut 103. The attachment structure may be a releasable mechanism to permit easy assembly and dis-assembly for transport. The flotation board 101 may be said to have a forward section F at the front end, a rear section R at the rear end and a middle section M intermediate the front and rear ends. Element M may also represent a midpoint that is halfway between the front and rear ends. As shown, the strut 103 is connected to the flotation board between the middle section M and the rear section R. The connection is behind the midpoint M and centered side to side. A throttle cable may connect the throttle module 108 to the throttle interface 109 or wireless communication may be provided between the throttle module 108 and throttle interface 109. In an alternate arrangement, the batteries 106 may be contained in the strut 103 or embedded in the hydrofoil 102. Each configuration has advantages and disadvantages ranging from ease of access for charging (in the case of a compartment in the flotation board) to reduction in the length of wires needed to connect the battery to the motor (in the case of containment in the strut or hydrofoil).

The strut 103 can be made of extruded aluminum, fiber-reinforced epoxy (using glass, carbon, or Kevlar fibers), or other suitable materials known to those of skill in the art. As shown, the strut is streamlined in cross-section to minimize drag. The strut may be constructed so as to allow passage of electrical wires from the motor speed controller 107 to the electric motor 105, such as inside or attached to the strut. The primary function of the strut is to rigidly connect the hydrofoil 102 at a fixed distance H from the board 101. The distance H will generally be in the range of 1 to 4 feet. In an alternative embodiment, more than one strut may be used or the strut may be shaped differently than shown.

The hydrofoil 102 of FIG. 1 is specifically designed to be statically stable in the longitudinal degrees of freedom via a

4

combination of airfoil design, planform design and spanwise twist distribution. The hydrofoil 102 has a wingspan S (see FIG. 2). The wingspan will generally be in the range of 1 to 4 feet. It is also designed to be stable in sideslip ("weathercock stability") either via planform design or via the addition of small vertical foils (winglets or fins). In some cases it may be advantageous to add a fixed canard or horizontal tail to further enhance static longitudinal stability (for example, for training purposes). The fixed distance H (see FIG. 2) of the strut 103 may be greater than the wingspan S of the hydrofoil 102 so that the hydrofoil remains fully submerged even when the user is leaning to turn.

The propulsion system 104 (discussed in more detail below) may comprise a ducted propeller or pump-jet, or may be of another type. The propulsion system is driven by the electric motor 105.

The electric motor 105 is connected to the motor speed controller 107 using wires sized to carry the required voltage and current. The motor speed controller 107 may include other functionality such as a low-voltage alarm or other protective circuitry for the battery 106; alternately, such circuitry may be included in the throttle interface 109. The main function of the throttle interface is to connect the motor speed controller 107 to the throttle module 108.

The throttle module 108 may be a hand-held device with a spring-loaded trigger 110 (so the throttle disengages automatically when it is released). Pulling or depressing the trigger causes the motor to turn a propeller or impeller in the propulsion system 104, with motor speed being proportional to the degree the trigger is pulled or depressed. The throttle module communicates the degree of trigger pull/depression to the throttle interface 109 via a cable or wirelessly. The throttle module may take other forms, such as being operated by other body parts.

The throttle interface 109 may in addition include circuitry and connections to permit charging of the battery 106. This would include battery protection circuits. The throttle interface may also include a means to display battery information to the user (for example, via LEDs to indicate charge state). Alternately, such information may be displayed on the throttle module 108.

To operate the watercraft 100, a user initially lies prone on the flotation board 101. The throttle is engaged, causing the craft to accelerate. As the craft gains speed the user may move to a kneeling or standing position. As the craft further gains speed the hydrofoil generates sufficient lift to raise the board above the water. The user controls altitude of the board by leaning back (to go up) and forward (to go down). The user can steer left or right by leaning in the appropriate direction. Releasing the throttle causes the motor to stop, reducing speed. The watercraft 100 may have other safety devices and features which causes the electric motor 105 to stop when the rider falls off the flotation board 101. These devices may monitor the presence of a user on the flotation board 101.

FIG. 2 shows an exploded perspective view of one embodiment of the hydrofoil 102, strut 103, propulsion system 104, and electric motor 105. The electric motor 105 and propulsion system 104 are integrated into a waterproof, streamlined pod 201 that is designed to be embedded in the hydrofoil 102. The pod 201 also defines the lower end of the strut 103. The streamlined pod performs two main structural functions: it transmits propulsion forces to the strut 103 and it transmits lift forces from the hydrofoil 102 to the strut 103. It may also contain provisions for cooling the electric motor 105. The pod 201 is connected to the hydrofoil 102 either by

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## US 9,586,659 B2

5

a fitting (so that the hydrofoil can be easily removed) or it is integrally manufactured with the hydrofoil 102.

In its preferential form the electric motor 105 is a high efficiency brushless motor. A gearbox may be provided to ensure that the propeller or impeller of the propulsion system 104 operates over an appropriate range of speeds.

The strut 103 contains at its upper end a fitting 202 to attach the strut to the flotation board 101 of FIG. 1. This fitting fits into a complementary slot in flotation board 101 and may use one of several methods to attach the strut 103 to the flotation board 101: examples include bolts, pins, or latches. Any other attachment approach may be used, or the strut and/or foil and/or flotation board may be integrally formed or permanently interconnected.

FIG. 3 shows a perspective view of the watercraft 100 from below. In its preferred form the propulsion system 104 comprises a propeller 104a and a duct 104b. The duct has two purposes: it acts as a propeller guard and it is designed to increase propeller thrust. In an alternate form the propulsion system may comprise a pump-jet.

FIG. 4 shows an exploded perspective view of an alternative embodiment of the hydrofoil 102, strut 103, electric motor 105 and propulsion system 401. In this embodiment the propulsion system comprises a long duct and may contain a stator assembly. The duct functions both as a guard for the propeller (shown in FIG. 3) and to improve hydrodynamic efficiency. A stator (not shown) aft of the propeller can also be included to improve propulsive efficiency. In this embodiment the electric motor 105 is enclosed in a streamlined pod embedded in the propulsion system. In the embodiment of FIG. 4, the propulsion system is mounted below the hydrofoil 102. FIG. 5 shows a perspective view of the watercraft 100 from below with the propulsion system 401 mounted below the hydrofoil 102.

FIG. 6 shows a perspective view of an alternative embodiment of the hydrofoil 102, strut 103, and propulsion system 601. In this embodiment the propulsion system is integrated in the hydrofoil so that the inlet is at or near the forward (leading) edge of the hydrofoil and the outlet is at or near the rear (trailing) edge of the hydrofoil. As in the embodiments of FIG. 2, FIG. 3, FIG. 4 and FIG. 5, the propulsion system comprises a duct, a propeller, electric motor, and may include a stator.

FIG. 7 shows a perspective view of the watercraft 100 from below with the propulsion system of FIG. 6 integrated in the hydrofoil.

FIG. 8 shows perspective views of alternative embodiments of the hydrofoil planform. Hydrofoil 801 includes a fixed canard that increases stability (suitable for training). Note that this canard is fixed, not movable: control still occurs through weight shift. Hydrofoil 102 is shown in earlier drawings, and can be considered a baseline "all around" hydrofoil (suitable for a wide range of abilities). Foils 802 and 803 are progressively higher performance, permitting higher speeds and/or greater maneuverability. Foil 803 includes winglets, which increase directional stability and decrease drag. Foil 804 includes a horizontal tail, which improves longitudinal stability (similar to 801, it is suitable for training). Foil 805 includes both a horizontal tail and a vertical tail, improving longitudinal stability and directional stability (suitable for training). These tails may be considered a secondary hydrofoil. Note that other versions of the hydrofoil are possible: the key is designing the hydrofoil for passive static stability via planform design, airfoil design, and span-wise twist distribution.

Preferred embodiments of the present invention provide a hydrofoil watercraft with a fixed hydrofoil connected to a

6

flotation board by one or more struts, with the fixed hydrofoil having no movable or adjustable surfaces. No movable hydrofoil is provided, but secondary hydrofoils on one or more struts (as shown in 801, 804, and 805) may be included. Additionally, no movable steering system is provided, as the watercraft is maneuvered by weight shifts.

This invention exploits passive stability to obviate the necessity for mechanisms or active control systems to provide stability. This passive stability allows the watercraft to be controlled by weight shift rather than by mechanical systems. FIG. 9 and FIG. 10 show the hydrofoil flow definitions and hydrofoil geometry parameters respectively. For the hydrofoil, longitudinally trimmed motion occurs when the total pitching moment is zero. This trim condition is stable if a disturbance results in a restoring moment that returns the hydrofoil to its original condition. The pitching moment coefficient can be written as  $C_m = C_{m0} + C_{m\alpha}\alpha + C_{mQ}Q$  where  $C_{m0}$  is the pitching moment coefficient at zero angle of attack and zero pitch rate,  $C_{m\alpha}$  is the derivative of pitching moment coefficient with respect to angle of attack (called pitch stiffness),  $\alpha$  is the angle of attack (the angle between the flow direction and the chord of the hydrofoil),  $C_{mQ}$  is the derivative of pitching moment coefficient with respect to pitch rate (called pitch damping), and  $Q$  is the pitch rate. To ensure a trimmable, stable hydrofoil, the following conditions must be true:  $C_{m0} > 0$ ,  $C_{m\alpha} < 0$ ,  $C_{mQ} < 0$ . This is achieved with a combination of airfoil selection, hydrofoil sweep and span-wise twist. The exact ratios of wing sweep and twist are dependent on the degree of stability desired and are also affected by the pitching moment characteristics of the airfoil. The derivative  $C_{mQ}$  determines the "quickness" of the longitudinal response. Typically it will lie between -2 and -20, with more negative values leading to a "sluggish" feel. In the steady state (when  $Q=0$ ) the angle of attack (and thus speed) at which trim occurs is a function of  $C_{m0}$  and  $C_{m\alpha}$ .

$$\alpha_{trim} = -\frac{C_{m0}}{C_{m\alpha}}$$

$C_{m0}$  is defined entirely by hydrofoil design parameters;  $C_{m\alpha}$  is defined by a combination of hydrofoil design parameters and the location of the center of gravity: this is the means by which weight shift enables longitudinal control of the hydrofoil watercraft.

Similarly for lateral motion, trim occurs when the yawing moment and rolling moment are zero. It is further desirable that this occurs at zero sideslip angle, so the hydrofoil "tracks straight" through the water. When the yaw rate is zero, rolling moment coefficient and yawing moment coefficient can be written as

$$C_l = C_{l0} + C_{l\beta}\beta + C_{l\dot{\beta}}\dot{\beta}$$

$$C_n = C_{n0} + C_{n\beta}\beta + C_{n\dot{\beta}}\dot{\beta}$$

where  $C_{l0}$  and  $C_{n0}$  are the roll rate and yaw rate at zero sideslip, respectively,  $C_{l\beta}$  and  $C_{n\beta}$  are the derivatives of roll rate and yaw rate with respect to sideslip angle, respectively,  $C_{l\dot{\beta}}$  and  $C_{n\dot{\beta}}$  are the derivatives of roll rate and yaw rate with respect to roll rate, respectively. Note that  $C_{n\beta}$  is sometimes called weathercock stiffness and  $C_{l\dot{\beta}}$  is sometimes called roll damping. Trimmable, stable motion at zero sideslip is achieved by ensuring that the following conditions are true:

$$C_{l0} = 0$$

$$C_{n0} = 0$$

US 9,586,659 B2

7

$$C_{\dot{\beta}} < 0$$

$$C_{\dot{\eta}} > 0$$

$$C_{\dot{\gamma}} < 0$$

This is achieved through a combination of sweep and dihedral and can also be influenced with the addition of winglets or a fin. The practical upper limit of  $C_{\dot{\eta}}$  and practical lower limits of  $C_{\dot{\beta}}$  and  $C_{\dot{\gamma}}$  are determined by the practicality of hydrofoil design. For example, sweep angles greater than 60 degrees are unlikely to lead to useable designs and twist of greater than 15 degrees is unlikely to lead to useable designs. Given these geometric limits and the subjective judgment of "ride quality" on the part of a user, bounds on the roll and yaw derivatives exist but are not quantifiable to a useful degree of precision.

Directional control is achieved by the weight shift and the weathercock stability stiffness. Shifting weight to one side causes the watercraft to roll to that side; this causes sideslip in the direction of the weight shift, and the  $C_{\dot{\eta}}$  term causes the vehicle to turn in the direction of the lean. It should be noted that there is a trade-off between stability and maneuverability. More experienced users generally want a watercraft that is somewhat less stable to provide greater maneuverability. In contrast, less experienced users may want a watercraft that has more stability, and this may be done through appropriate design of the hydrofoil to give the desired stability and maneuverability characteristics.

As will be clear to those of skill in the art, the herein described embodiments of the present invention may be altered in various ways without departing from the scope or teaching of the present invention. It is the following claims, including all equivalents, which define the scope of the invention.

I claim:

1. A passively stable, weight-shift controlled personal hydrofoil watercraft, comprising:

a flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein a user can be disposed on the top surface of the flotation device in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section;

a strut having an upper end and a lower end, the upper end fixedly interconnected with the flotation device between the middle section and the rear section of the flotation device;

a hydrofoil fixedly interconnected with the lower end of the strut, the hydrofoil having no movable surface;

a propulsion system for propelling the watercraft in a body of water, wherein the propulsion system is connected to the hydrofoil; and

the watercraft having no movable steering system.

2. A watercraft in accordance with claim 1, wherein the propulsion system comprises a battery, an electric motor, a motor speed controller, and a propulsor, the propulsor selected from a propeller, a ducted propeller, or a pump-jet.

3. A watercraft in accordance with claim 2, wherein the propulsor is disposed below the hydrofoil.

4. A watercraft in accordance with claim 1, wherein the hydrofoil is indirectly connected to the strut.

5. A watercraft in accordance with claim 4, wherein the strut is directly connected to the propulsion system.

6. A watercraft in accordance with claim 5, wherein a first hydrofoil wing of the hydrofoil is indirectly connected to the strut through the propulsion system.

8

7. A watercraft in accordance with claim 4, wherein the hydrofoil comprises a plurality of wings that are interconnected by way of a strut.

8. A watercraft in accordance with claim 2, wherein the battery and motor speed controller are contained in a watertight compartment integrated into the flotation device.

9. A watercraft in accordance with claim 2, wherein the electric motor is integrated into a waterproof, streamlined pod and the watercraft comprises a cooling system for cooling the electric motor.

10. A watercraft in accordance with claim 9, wherein the waterproof, streamlined pod is removably interconnected with the hydrofoil through a fitting.

11. A watercraft in accordance with claim 8, further comprising a wireless handheld controller having a transmitter, and a throttle interface having a receiver, wherein the transmitter is adapted to send wireless signals to the receiver that cause an output of the propulsion system to change.

12. A watercraft in accordance with claim 1, wherein a first hydrofoil wing of the hydrofoil is directly connected to the strut.

13. A watercraft in accordance with claim 8, wherein the strut has an internal passage and electrical wires extend from the electric motor to the watertight compartment inside the strut through the internal passage for controlling the electric motor.

14. A watercraft in accordance with claim 13, wherein the flotation device has a detector adapted to detect a user's presence on the flotation device and cease operation of the electric motor if the detector detects that the user is not on the flotation device.

15. A watercraft in accordance with claim 1, wherein the propulsion system is directly or indirectly connected to the hydrofoil.

16. A personal hydrofoil watercraft, comprising:

a surfboard-shaped flotation device that has a fore-aft length greater than a lateral width, the flotation device having a top surface and a bottom surface, wherein the top surface has a substantially horizontal supporting surface configured to support a user in a prone, kneeling, or standing position, the flotation device having a forward section, a middle section, and a rear section;

a hydrofoil interconnected with the surfboard-shaped flotation device, the hydrofoil having a strut and a first hydrofoil wing, an upper end of the strut being fixedly interconnected with the surfboard-shaped flotation device;

a propulsion system attached to the surfboard-shaped flotation device for propelling the watercraft in a body of water, the propulsion system comprising a battery, an electric motor, a motor speed controller, and a propulsor, wherein the propulsor is selected from a propeller, a ducted propeller, or a pump-jet, and the battery and motor speed controller are contained in a watertight compartment integrated into the flotation device;

the watercraft having no movable steering system;

a handheld controller having a throttle; and

a throttle interface, wherein the throttle is adapted to send electronic signals to the throttle interface that cause an output of the propulsion system to change.

17. A watercraft in accordance with claim 16, wherein the hydrofoil comprises a plurality of hydrofoil wings including the first hydrofoil wing and a second hydrofoil wing, the first and second hydrofoil wings being connected by way of a strut.

US 9,586,659 B2

9

10

18. A watercraft in accordance with claim 16, wherein the watercraft comprises a cooling system for cooling the electric motor.

19. A watercraft in accordance with claim 16, wherein the strut has an internal passage and electrical wires extend from the electric motor to the watertight compartment inside the strut through the internal passage for controlling electric motor.

20. A watercraft in accordance with claim 16, wherein the handheld controller comprises a wireless transmitter operatively coupled to the throttle and the throttle interface includes a receiver, the transmitter being adapted to send wireless signals to the receiver in response to actuation of the throttle that cause an output of the propulsion system to change.

\* \* \* \* \*

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 9,586,659 B2  
APPLICATION NO. : 15/064521  
DATED : March 7, 2017  
INVENTOR(S) : Jacob Willem Langelaan

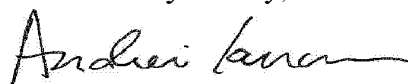
Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

In Column 9, Line 4, in Claim 19, after “controlling”, insert --the--

Signed and Sealed this  
First Day of May, 2018



Andrei Iancu  
*Director of the United States Patent and Trademark Office*

## CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITATIONS

**Case Number:** 2024-2116, 2024-2151

**Short Case Caption:** *MHL Custom, Inc. v. Waydoo USA, Inc.*

The foregoing filing complies with the relevant type-volume limitation of the Federal Rules of Appellate Procedure and Federal Circuit Rules because it meets one of the following:

- The filing has been prepared using a proportionally-spaced typeface and includes 12,757 words.
- The filing has been prepared using a monospaced typeface and includes \_\_\_\_\_ lines of text.
- The filing contains \_\_\_\_\_ pages / \_\_\_\_\_ words / \_\_\_\_\_ lines of text, which does not exceed the maximum authorized by this court's order (ECF No. \_\_\_\_\_).

/s/ Julie S. Goldemberg  
Julie S. Goldemberg  
*Counsel for Appellants Waydoo USA,  
Inc. and Shenzhen Waydoo Intelligence  
Technology Co., Ltd.*

Dated: November 20, 2024