

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

FLIR SYSTEMS, INC. and
FLIR MARITIME US, INC. (F/K/A RAYMARINE, INC.),
Petitioner,

v.

GARMIN SWITZERLAND GmbH,
Patent Owner.

Case IPR2017-00946
Patent 7,268,703 B1

Before JUSTIN T. ARBES, THOMAS L. GIANNETTI, and
SCOTT B. HOWARD, *Administrative Patent Judges*.

HOWARD, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318 and 37 C.F.R. § 42.73
ORDER ON MOTION TO AMEND
35 U.S.C. § 316(d) and 37 C.F.R. § 42.121

I. INTRODUCTION

FLIR Systems, Inc. and FLIR Maritime US, Inc. (f/k/a Raymarine, Inc.) (collectively, “Petitioner”) filed a Petition to institute an *inter partes* review of claims 1–7, 12–23, 25–29, and 41–45 of U.S. Patent No. 7,268,703 B1 (Ex. 1001, “the ’703 patent”) pursuant to 35 U.S.C. §§ 311–319. Paper 1 (“Pet.”). After Garmin Switzerland GmbH (“Patent Owner”) filed a Patent Owner Preliminary Response (Paper 6 (“Prelim. Resp.”)), we instituted *inter partes* review of the challenged claims on all asserted grounds (Paper 7 (“Institution Decision” or “Inst. Dec.”)).

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 16, “PO Resp.”) and a Contingent Motion to Amend under 37 C.F.R. § 42.121 (Paper 15, “Motion to Amend”); Petitioner filed a Reply (Paper 22, “Pet. Reply”) and an Opposition to Patent Owner’s Contingent Motion to Amend under 37 C.F.R. § 42.121 (Paper 23 “Opposition” or “Opp.”); and Patent Owner filed a Reply in Support of its Motion to Amend (Paper 28, “Reply to Petitioner’s Opposition” or “Reply to Opp.”).

Additionally, Patent Owner filed a Motion for Observation Regarding Cross-Examination of Reply Witness (Paper 31) and Petitioner filed a Response to Patent Owner’s Motion for Observation Regarding Cross-Examination of Reply Witness (Paper 34).

Petitioner relies on, *inter alia*, Declarations by Michael S. Braasch, Ph.D. (Ex. 1003, 1025), Christine Middleton (Ex. 1014), Scott Bennett, Ph.D. (Ex. 1015), and Martinus van der Drift (Ex. 1016). Patent Owner relies on, *inter alia*, Declarations by Captain Steven Browne. Ex. 2003, 2007.

The Board filed a transcription of the Oral Hearing held on April 11, 2018. Paper 37 (“Tr.”).

The Board has jurisdiction under 35 U.S.C. § 6(b). This Final Written Decision issues pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that challenged claims 28, 29, and 45 are unpatentable, Petitioner has not shown by a preponderance of the evidence that challenged claims 1–7, 12–23, 25–27, and 41–44 are unpatentable, Patent Owner’s contingent motion to amend is dismissed as moot with respect to proposed claims 51–71, and Patent Owner’s contingent motion to amend is granted with respect to cancelling claim 45 and substituting proposed claims 72 and 73 for claims 28 and 29.

A. Related Proceedings

The parties identify the following patent litigation proceedings in which the ’703 patent is or has been asserted: (1) *Garmin Switzerland GmbH v. Navico, Inc.*, Case No. 16-2706 (D. Kan.);¹ and (2) *Garmin Switzerland GmbH v. FLIR Maritime US, Inc. (f/k/a Raymarine, Inc.)*, Case No. 16-2806 (D. Kan.). Pet. 1; Paper 3, 2.

B. The ’703 Patent

The ’703 patent “relates generally to navigational devices, and in particular to marine navigational devices with cartographic alert capabilities.” Ex. 1001, 1:6–8. The invention of the ’703 patent is directed

¹ Although neither Petitioner nor Patent Owner updated its Mandatory Notices as required by 37 C.F.R. § 42.8(a)(3), Patent Owner stated it has entered into a Settlement and Patent License Agreement that terminated this proceeding. Paper 25, 2–3.

to devices and methods of marine navigation. *Id.* at 1:45–47. More specifically, the '703 patent uses a “marine route calculation algorithm to analyze a course between the first location and [a] potential waypoint in view of preselected conditions of the cartographic data, including the marine craft data.” *Id.* at 5:20–23.

Figure 4A of the '703 patent is reproduced below.

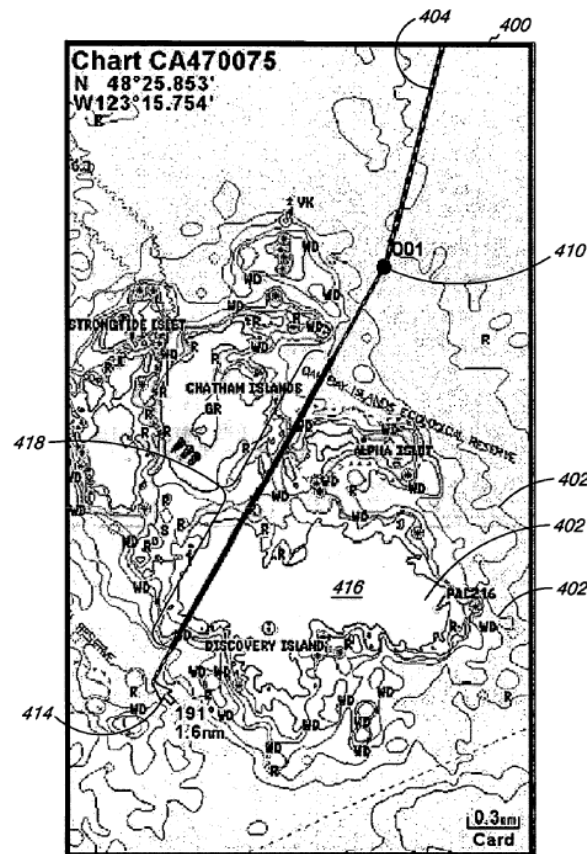


Fig. 4A

Figure 4A is “a map display 400 showing cartographic data 402, including the marine craft data,” and “include[s] a portion of a course 404 . . . between a first location 410 and a potential waypoint 414 that passes through land 416.” *Id.* at 8:25–26, 8:36–42. As shown in Figure 4A, the course is a

straight line between first location 410 and potential waypoint 414 regardless of conditions, such as land, along the route. *Id.*, Fig. 4A.

The '703 patent further describes how, if one or more of the preselected conditions is present on the route, “the processor 310 operates on the route calculating algorithm to re-route the course to avoid the preselected conditions.” *Id.* at 5:42–46. In doing so, “the processor operates on the route calculating algorithm to identify one or more non-user waypoints between the first location and the potential waypoint.” *Id.* at 5:46-51.

Figure 4B of the '703 patent is reproduced below.

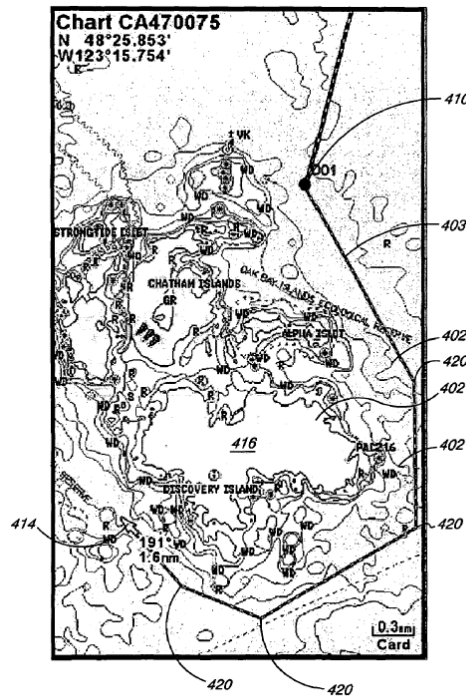


Fig. 4B

Figure 4B shows “map display 400 having course 403 recalculated to avoid the one or more preselected conditions (e.g., avoid the land in region 418 of the previous course 404).” *Id.* at 8:52–55. Recalculated course 403 shown in Figure 4B “is relative to the original calculation of course 404 shown in FIG. 4A” above “with one or more additional waypoints, shown as 420. The

additional waypoints 420 have been included to allow the course 403 to avoid the preselected conditions. . . . In other words, waypoints 420 were determined by the system, and not the user.” *Id.* at 8:55–62.

C. The Challenged Claims

Petitioner challenges claims 1–7, 12–23, 25–29, and 41–45. Claims 1, 12, 20, 27, and 28 are independent claims. Claim 1 is illustrative of the challenged claims and is reproduced below:

1. A method for marine navigation, comprising:
receiving one or more preselected conditions from a user;
identifying a potential waypoint; and
performing a marine route calculation algorithm to route a course between a first location and the potential waypoint avoiding the preselected conditions, including analyzing cartographic data between the first location and the potential waypoint and re-routing the course to avoid the preselected conditions by identifying one or more non-user selected waypoints.

Id. at 13:2–11.

D. Asserted Grounds of Unpatentability

We instituted trial based on the following grounds of unpatentability:

Reference(s)	Basis ²	Challenged Claims
de Jong ³	§ 102(b)	1, 7, 12, 19, 27, and 28

² The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 100 *et seq.* effective on March 16, 2013. Because the ’703 patent issued from an application filed before March 16, 2013, we apply the pre-AIA versions of the statutory bases for unpatentability.

³ W.J. de Jong, *Automated Route Planning – A Network-Based Route Planning Solution for Marine Navigation*, University of Nottingham (December 2001) (Ex. 1005, “de Jong”).

Reference(s)	Basis ²	Challenged Claims
de Jong and Tetley ⁴	§ 103(a)	2–6, 13–18, 20–23, 25, 26, 29, and 41–45

II. ANALYSIS

A. *Constitutionality of Inter Partes Review Proceedings*

As a preliminary matter, Patent Owner argues that *inter partes* review proceedings are unconstitutional. PO Resp. 54–55 (citing *Oil States Energy Servs., LLC v. Greene’s Energy Group, LLC*, 137 S. Ct. 2239 (2017) (grant of petition for writ of certiorari)). However, the Supreme Court held that *inter partes* review does not violate Article III or the Seventh Amendment to the Constitution. *Oil States Energy Servs., LLC v. Greene’s Energy Group, LLC*, 138 S. Ct. 1365 (2018).

B. *Claim Construction*

We interpret claim terms using “the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant’s specification.” *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997). “Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history.” *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016). Any special definitions for claim terms or phrases must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480

⁴ Tetley *et al.*, ELECTRONIC NAVIGATION SYSTEMS (3d ed. Butterworth-Heinemann 2001) (Ex. 1006, “Tetley”).

(Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read from the specification into the claims. *See In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

We need only construe those claim limitations “that are in controversy, and only to the extent necessary to resolve the controversy.” *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner proposed constructions of two terms: “waypoint” and “marine route calculation algorithm.” Pet. 15–17. In the Preliminary Response, Patent Owner proposed constructions for those terms, as well as the term “navigation,” as used in the preamble of the claims. Prelim. Resp. 23–28, 49–52. In its Response, Patent Owner proposed the construction of two additional terms, “re-route”/“re-routing” and “course.” PO Resp. 14–28. Petitioner disagreed with those constructions and proposed alternate constructions. Pet. Reply 2–16. Based on the parties’ arguments presented during trial, we construe the terms as follows.

1. “*Re-route the Course*” / “*Re-Routing the Course*”
(*Claims 1, 12, 20, and 27*)

Patent Owner asserts that the broadest reasonable construction of the “term ‘re-routing the course’ (independent claims 1 and 12) and ‘re-route the course’ (independent claims 20 and 27) is ‘to change at least a portion of the route of the course relative to a previous routing.’” PO Resp. 15 (emphasis omitted). According to Patent Owner, this construction is supported by the specification, which shows an initial route (404) in Figure 4A and, in Figure 4B, a re-routed course (403) that avoids the pre-selected user conditions. PO. Resp. 16–18 (citing Ex. 1001, Fig. 4A, Fig. 4B, 5:41–51, 8:40–63); *see*

also Paper 31, 1–3 (citing Ex. 2008, 38:25–40:2, 40:22–41:9). Patent Owner further discusses how the ’703 patent describes an iterative process in which the course is re-routed relative to a previous course. PO Resp. 18–19 (citing Ex. 1001, Fig. 4C, 8:52–55, 9:9–23, 12:16–18, 12:23–34). Patent Owner also asserts that the ’703 patent draws a distinction between analyzing a course and re-routing the course. *Id.* at 20–21 (citing Ex. 1001, 5:42–51, 7:43–50, 7:60–8:7, 8:43–51, 11:48–53).

Petitioner argues Patent Owner’s proposed claim construction should be rejected “as it improperly introduces an additional ‘routing’ step that is inconsistent with the broadest reasonable interpretation (BRI) in light of the specification.” Pet. Reply 2–3. According to Petitioner, Patent Owner’s “proposed construction is inconsistent with the claim language itself.” *Id.* at 3. Petitioner also argues, based on the words of the claims, that re-routing “does not occur after or modify some initial ‘routing;’ instead, ‘re-routing’ is simply the mechanism by which the algorithm ‘rout[es] a course’ that avoids the preselected conditions.” *Id.* Because the claims do not recite distinct routing and re-routing steps, Petitioner asserts “it is clear that ‘routing’ and ‘re-routing’ are used synonymously.” *Id.* at 4 (citing Ex. 2025 ¶¶ 19–20); *see also* Paper 34, 1–4.

Petitioner further argues that its construction of “the mechanism by which the algorithm ‘rout[es] a course’ that avoids the preselected conditions” is confirmed by the specification. *See* Pet. Reply 3–5. Petitioner asserts that “Figure 4A cannot represent a ‘route’ calculated by the claimed ‘marine route calculation algorithm,’ . . . as it fails to account for preselected conditions.” *Id.* at 4 (emphases omitted). Therefore, Petitioner states, Patent Owner’s attempt to require a two-step process “is not claim

construction, but impermissible claim re-writing.” *Id.* at 4–5 (citing *Chef Am., Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371, 1374 (Fed. Cir. 2004)).

Moreover, Petitioner argues, the specification does not unambiguously delineate between re-routing and routing. *Id.* at 5 (citing Ex. 1001, 5:46–51, 11:11–16, 12:28–30; Ex. 2025 ¶ 22).

Finally, Petitioner contends that Patent Owner’s proposed construction “is directly contrary to its litigation position” in the related district court case involving the ’703 patent. *Id.* According to Petitioner, Patent Owner’s infringement contentions in that case do not show a previous route that was changed. *Id.* at 5–7 (citing Ex. 1021, 25; Ex. 1030, 28; Ex. 1026, 31–32, 105). Petitioner further asserts that Patent Owner opposed a materially identical construction to the one Patent Owner proposes in this proceeding. *Id.* at 7–9 (citing Ex. 1027, 17; Ex. 1028, 15–17).

We have reviewed the parties’ contentions and supporting evidence and agree with Patent Owner that the terms “re-routing the course” and “re-route the course” mean “to change at least a portion of the route of the course relative to a previous routing.” That is, there must be a first routing of a course and that routing must be changed by performance of the marine route calculation algorithm to avoid preselected conditions by identifying one or more non-user selected waypoints.

The construction is consistent with the words of the claims. The claims do not merely require routing a course, but “*re*-routing the course.” The ordinary meaning of the prefix “re” is that something is being done again. *See* Tr. 18 (Petitioner agreeing that “if you put R-E in front of a word, normally that means it’s occurring a second time”). Although the claims do not explicitly recite both an original “routing” of a course that is

changed by “re-routing the course,” the original “routing” is implicitly required by the use of the prefix “re.” See Tr. 34 (Patent Owner agreeing that although the claims do not explicitly require an initial routing, the initial routing is implicit in the use of “re-routing”), 44–45 (Petitioner agreeing that “re-routing” ordinarily implies an initial routing).

Although Petitioner asserts that “routing” and “re-routing” are synonymous, two different words are used. The use of two different words in the same limitation persuades us that the limitations are not synonymous. See *Ethicon Endo–Surgery, Inc. v. U.S. Surgical Corp.*, 93 F.3d 1572, 1579 (Fed. Cir. 1996) (“If the terms ‘pusher assembly’ and ‘pusher bar’ described a single element, one would expect the claim to consistently refer to this element as *either* a ‘pusher bar’ or a ‘pusher assembly,’ but not both, especially not within the same clause. Therefore, in our view, the plain meaning of the claim will not bear a reading that ‘pusher assembly’ and ‘pusher bar’ are synonyms.”). Instead, we conclude that “routing” and “re-routing” refer to two different things.

Patent Owner’s proposed construction also is consistent with the description of the invention in the specification. The specification describes how initial course 404 is generated between first location 410 and user selected waypoint 414. Ex. 1001, 8:20–51, Fig. 4A. Initial course 404 is shown as a straight line between first location 410 and user selected waypoint 414 and passes over unnavigable conditions, such as land 416. *Id.* Figure 4B then shows recalculated course 403 that avoids preselected user conditions, such as land, that is generated “relative to the original calculation of course 404 shown in FIG. 4A . . . with one or more additional waypoints.” *Id.* at 8:52–65, Fig. 4B; see also *id.* at 12:23–34 (disclosing that “the present

invention provides a system, device and method by which information received for a course and a reroute calculation can be maintained,” and “calculating the re-route can include calculating the re-route with a preference for avoiding one or more preselected conditions in any previous course”). The specification’s description of recalculating a course “relative to” an original course mirrors Patent Owner’s proposed construction.

We also are not persuaded by Petitioner’s argument that Patent Owner is asserting a different interpretation in this proceeding than it is advocating in the district court. For example, the claim chart relied on by Petitioner addresses the claim term at a high level of abstraction and consists primarily of repeating the language of the claims, including “re-routing.” See Ex. 1026, 31–32⁵. Although some of the description of the accused instrumentalities in that document mentions “autoroute,” Petitioner has not offered any explanation of the details of the autoroute function. Without more details, such as expert reports or depositions describing the functionality of the autoroute feature in more detail, we are not persuaded that Patent Owner is taking inconsistent positions. Moreover, “extrinsic evidence may be used only to assist in the proper understanding of the disputed limitation; it may not be used to vary, contradict, expand, or limit the claim language from how it is defined, even by implication, in the specification or file history.” *Bell Atl. Network Servs., Inc. v. Covad Commc’ns Group, Inc.* 262 F.3d 1258, 1269 (Fed. Cir. 2001).

For similar reasons, we are not persuaded that Patent Owner’s identification of the same functionality to show infringement of both claim

⁵ All pincites to pages in exhibits are to the page numbers added by the parties.

1—which requires “re-routing”—and claim 28—which does not recite “re-routing”—shows that “routing” and “re-routing” have the same meaning, as Petitioner contends. See Pet. Reply 7. Further, although claim 28 does not require “re-routing the course,” there is nothing in the language of the claim that appears to preclude it. Accordingly, we are not persuaded the Patent Owner’s claim charts from the district court case are inconsistent with its proposed claim construction in this proceeding.

We also are not persuaded by Petitioner’s argument that Patent Owner’s proposed construction is inconsistent with the one it propounded during claim construction briefing in the district court case. To the contrary, reviewing the briefing in its entirety—as opposed to focusing on a few words of the proposed constructions without context—it appears that, contrary to Petitioner’s argument, Patent Owner’s proposed constructions in the district court litigation and this proceeding are consistent. For example, Patent Owner begins its claim construction argument in the district court case by stating that the claim requires “re-routing the course” and showing Figures 4A and 4B as an example:

The ‘703 Patent uses that term in its plain and ordinary sense, which is just that the route is changed by creating a route through non-user selected waypoints “to avoid preselected conditions.” For example, Claim 12 recites that a marine route calculation algorithm “analyze[s] a course between a first location and the potential waypoint.” [Ex. 1, ‘703 Patent at Claim 12.] If the analyzed course includes preselected conditions, it is re-routed “to avoid the preselected conditions by identifying one or more non-user selected waypoints.” [*Id.*; see also *id.* at 11:17-20; Ex. 3, Michalson Decl. at ¶¶ 95-104.] Illustrated graphically in connection with Figures 4A and 4B, the patent thus contemplates analyzing a potential route (shown in red) and, where a portion of the analyzed course includes a preselected condition (e.g., the land shown in green), changing impacted portions of the course

through a route that includes non-user selected waypoints (the portion shown in purple). [See *id.* at 8:40-65. FIGS. 4A, 4B.]

Ex. 1027, 17–18 (emphasis and color omitted); *see also* Ex. 1028, 15 (“On the contrary, the claims and specification make clear that ‘re-routing’ refers to the concept of making certain corrections during course analysis and routing—namely, ‘performing a marine route calculation algorithm to analyze a course’ and, based on that analysis, ‘re-routing the course’ through ‘one or more non-user selected waypoints’ in order ‘to avoid the preselected conditions.’ See Doc. 95-2 (‘703 Patent) at Claim 1.”), 16 (arguing that “re-routing inherently implies some iteration to the process”); Tr. 32–33. That description is consistent with the claim construction proposed in this proceeding.

Moreover, the briefing in the district court litigation shows that the issue in dispute there bears no relation to the issue being disputed here. See Ex. 1027, 17–18; Ex. 1028, 15–17; Tr. 32–33. That is, it appears that the parties’ dispute before the district court was whether the re-routing step must begin anew and re-route the entire course. See Ex. 1027, 18 (“Nothing in the intrinsic evidence requires that the course calculation process must start anew, which is what Defendants’ proposed construction would entail.”); Ex. 1028, 16 (“While re-routing inherently implies some iteration to the process, there is no requirement that the routing start over ‘again’ every time, as Defendants argue.”). By contrast, in this proceeding, the parties dispute whether the claim language requires an initial routing at all and then a “re-routing.” Because the focus of the dispute in the district court litigation involved an issue not relevant to this proceeding and Patent Owner’s description of the scope of the claim language is consistent in both, we are not persuaded by Petitioner’s argument that there is any inconsistency.

Accordingly, we interpret “re-routing the course” and “re-route the course” to mean “to change at least a portion of the route of the course relative to a previous routing.”

2. “Course” (*Claims 1, 12, 20, 27, and 28*)

Patent Owner argues “course” means “the path of intended travel of a craft with respect to the earth.” PO Resp. 21 (emphasis omitted). Patent Owner explains that “a course is not merely an outline of the areas where the craft is intended to pass but rather, the actual path of intended travel.” *Id.* That is, Patent Owner’s construction includes both a positive and a negative limitation.

In support of its construction, Patent Owner asserts that “the [s]pecification includes several disclosures related to routing a course that is the path of intended travel of the marine craft with respect to the earth.” *Id.* For example, the specification discusses a buffer zone around the calculated course. *Id.* at 21–24 (citing Ex. 1001, 5:28–41; Ex. 2003 ¶¶ 32–37). According to Captain Browne, a person of ordinary skill in the art “would understand that establishing a zone ‘on either side of the calculated course’ means that the course is the intended path of travel” and that “[i]t would not make sense to establish a zone on either side of an outline, e.g., intermittent points, of an area to pass.” *Id.* at 22 (citing Ex. 2003 ¶¶ 33, 34).

Patent Owner further contends that the ’703 patent “discusses the marine navigational device traveling along a course” and that a person of ordinary skill in the art would have understood that “the course is the intended path of travel of the marine craft carrying the marine navigational device.” *Id.* 24–25 (citing Ex. 1001, 5:52–66); *see also* Ex. 2003 ¶ 38. As Captain Browne testified, “[m]erely providing an outline of a path of

intended travel, as opposed to the actual path of intended travel, raises the possibility of encountering an obstacle or unsafe area within the outline delineations” and “[n]o prudent mariner would set out to travel along a mere outline of a path out of concern that the outline does not establish a safe path of travel.” PO Resp. 25 (citing Ex. 2003 ¶ 38). Moreover, the ’703 patent teaches displaying a “plotted course” which alerts the user of preselected conditions. *Id.* (citing Ex. 1001, 7:60–81). According to Captain Browne, such features would not be helpful “[i]f the ‘line of the plotted course’ on the map display was merely an outline of the path of intended travel.” Ex. 2003 ¶ 37; *see also* PO Resp. 25–26.

Patent Owner further argues that the ’703 patent uses the term “course” in a manner different from in ordinary use by a professional mariner. PO Resp. 26–27. According to Captain Browne, the ordinary usage of “course” would be “the horizontal direction in which a vessel is intended to be steered, expressed as angular distance from north clockwise through 360 degrees.” Ex. 2003 ¶ 28 (quoting Ex. 2001, 16). Instead, based on dependent claim 41, which recites “displaying the course from the first location to the potential waypoint via the non-user selected waypoints,” Captain Browne testifies that “course” as used in the ’703 patent “is ‘the path of intended travel of a craft with respect to the earth,’ rather than the direction of travel.” PO Resp. 26–27 (citing Ex. 2003 ¶ 28) (emphases omitted). Relying on Captain Browne’s testimony, Patent Owner argues that instead of using the ordinary meaning of the term “course,” “course” is used in the ’703 patent in a manner similar to the word “track,” which means “1. The intended or desired horizontal direction of travel with respect to the earth. . . . 2. The path of intended travel with respect to the earth as drawn

on the chart.” *Id.* at 28 (quoting Ex. 2001, 855); *see also id.* (noting that “de Jong’s definition of ‘track’ is very similar to the manner in which the ’703 Patent uses the term ‘course’”) (citing Ex. 1005, 101; Ex. 2003 ¶ 30).

For the reasons explained below, we do not adopt Patent Owner’s proposed construction of “course” as “the path of intended travel of a craft with respect to the earth.” Instead, we need only focus on the words recited in the claim. Claim 1, which is representative, recites that performing the marine route calculation algorithm to “route a course between a first location and the potential waypoint avoiding the preselected conditions,” where such performance includes “identifying one or more non-user selected waypoints.” Ex. 1001, claim 1. The other independent claims recite similar limitations. *See* Ex. 1001, claims 12, 20, 27. Based on the limitation recited in the claim, the broadest reasonable interpretation of routing a “course” encompasses the identification of one or more non-user selected waypoints between a first location and a potential waypoint. No further construction is necessary for purposes of this Decision.

Petitioner asserts that Patent Owner’s analysis does not “comport[] with recognized canons of claim construction.” Pet. Reply 10. Specifically, Petitioner argues that although Patent Owner proposes a construction that is inconsistent with the ordinary meaning of “course,” “it offers no evidence of claim scope disavowal or indication that the applicant acted as his own lexicographer.” *Id.* (citing *GE Lighting Sols., LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014)). Petitioner also argues Patent Owner’s “construction introduces a negative limitation that is clearly not supported by the intrinsic evidence—a practice the Board has repeatedly criticized.” *Id.* at 11 (citing *CBS Interactive Inc. v. Helferich Patent Licensing, LLC*,

Case IPR2013-00033, slip op. at 9 (PTAB March 3, 2014) (Paper 122); *Canon Inc. v. Papst Licensing GMBH & Co. KG*, Case IPR2016-01199, slip op. at 46 (PTAB December 11, 2017) (Paper 20)).

With regard to Patent Owner’s discussion of the specification and the use of the buffer zone, Petitioner argues none of the claims of the ’703 patent recite the use of a buffer zone. *Id.* at 11–12. Moreover, even if the buffer zone embodiment were relevant, Petitioner asserts that Patent Owner “proffers no persuasive reason for why it justifies the proposed negative limitation.” *Id.* at 12.

Additionally, Petitioner argues Patent Owner’s proposed construction is improper because it is a “‘post hoc attempt[] to redefine the claimed invention’ in order ‘to avoid the anticipating disclosure’ of the prior art,” an approach which the Federal Circuit has rejected. *Id.* at 13 (quoting *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994)).

Instead, Petitioner argues that, to the extent a construction of “course” is necessary, “the Board should construe it to mean ‘route,’ in view of the overwhelming evidence showing that ‘course’ and ‘route’ are used interchangeably in [the ’703 patent].” *Id.* at 14 (citing *Wasica Fin. GmbH v. Cont’l Auto. Sys.*, 853 F.3d 1272, 1282 (Fed. Cir. 2017)). According to Petitioner, because “[a]ll challenged claims make clear that the ‘course’ is ‘re-route[d]’ (or, in the context of claim 28, ‘route[d]’) by a marine route calculation algorithm,” a person of ordinary skill in the art would have understood “that the output of this marine route calculation algorithm is, in fact, a ‘route.’” *Id.* at 14 (citing Ex. 1025 ¶¶ 18–20, 35–36) (emphases omitted). Similarly, Petitioner asserts that this construction is consistent with the specification, which “repeatedly equat[es] the operation of the

marine route calculation algorithm with ‘course’ calculation.” *Id.* (citing Ex. 1001, Abstract, 11:44–46, Fig. 5, 6). Petitioner further contends the construction is consistent with Patent Owner’s construction of the term “navigation” in its Preliminary Response, Motion to Amend, and claim construction briefing in the district court case. *Id.* at 15–16 (citing Paper 6, 24; Ex. 2003 ¶ 30; Paper 15, 5; Ex. 1027, 5, 14; Ex. 1029, 31; Ex. 1030, 12; Ex. 1021, 11; Ex. 1031, 28).

We are persuaded by Petitioner’s arguments that Patent Owner’s proposed construction is not consistent with the broadest reasonable interpretation of the claims. Although the ’703 patent describes the advantages of using a buffer zone, none of the claims recite using such a buffer zone.

Though understanding the claim language may be aided by the explanations contained in the written description, it is important not to import into a claim limitations that are not a part of the claim. For example, a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment.

SuperGuide Corp. v. DirecTV Enters., Inc., 358 F.3d 870, 875 (Fed. Cir. 2004) (citing *Electro Med. Sys. S.A. v. Cooper Life Sci., Inc.*, 34 F.3d 1048, 1054 (Fed. Cir. 1994)). “[C]laims may embrace ‘different subject matter than is illustrated in the specific embodiments in the specification.’”

Phillips v. AWH Corp., 415 F.3d 1303, 1323 (Fed. Cir. 2005) (en banc) (citations omitted). Although the buffer zone may be a feature that could be incorporated into the claimed invention, it is not required. Thus, we are not persuaded that the specification’s description of a “buffer zone” supports Patent Owner’s proposed construction.

For the same reason, we also are not persuaded by Patent Owner's arguments regarding traveling along a course and the display of the plotted course. Although these are optional features discussed in the '703 patent, they are not recited in the claims.

Nor are we persuaded by Captain Browne's testimony that the '703 patent uses a non-standard definition of "course" and that that construction is confirmed by dependent claim 41. Although an inventor may be his or her own lexicographer and define claim limitations inconsistent with their ordinary and customary meaning, such definitions "must be sufficiently clear in the specification that any departure from common usage would be so understood by a person of experience in the field of the invention."

Multiform Desiccants, Inc. v. Medzam, Ltd., 133 F.3d 1473, 1477 (Fed. Cir. 1998); *see also Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527 F.3d 1379, 1381 (Fed. Cir. 2008) ("A patentee may act as its own lexicographer and assign to a term a unique definition that is different from its ordinary and customary meaning; however, a patentee must clearly express that intent in the written description."). Patent Owner has not identified a sufficiently clear intent to use an alternate definition in either the specification or the prosecution history. To the contrary, Patent Owner agrees that nowhere in the '703 patent or the prosecution history do the inventors state that they are using a nonstandard definition of "course." Tr. 40–41. Accordingly, we decline to adopt a construction inconsistent with the ordinary meaning of the term "course."

Similarly, we are not persuaded to construe the term to mean "track." Neither Patent Owner nor Captain Browne have identified anywhere in the intrinsic evidence where the inventors indicated an intent for the terms

“course” and “track” to be used interchangeably. Indeed, the word “track” appears only once in the specification, and that usage does not show the terms being used interchangeably. *See* Ex. 1001, 7:23–27 (“In one embodiment, the size of the area can be defined by radii extending along the course from the first location (e.g., a present location), such as a heading determined through the use of a track log.”).

Based on the record presented during trial, we do not adopt Patent Owner’s proposed interpretation of “course,” and conclude that the broadest reasonable interpretation of routing a “course” encompasses the identification of one or more non-user selected waypoints between a first location and a potential waypoint. No further construction is necessary for purposes of this Decision.

3. *“Navigation” (Claims 1, 12, 20, 27, and 28)*

In our Decision on Institution, we concluded that the term “navigation,” which appears only in the preamble of the claims, “is not limiting and the claims do not require directing a craft or vehicle along the route from one place to another.” Inst. Dec. 10. Neither party has challenged that interpretation during the trial. *See* PO Resp. 14–28; Pet. Reply 2–16. We have further considered that construction in light of the arguments and evidence adduced at trial. In light of the foregoing, and for the reasons stated in our Institution Decision, we maintain that determination based on the full record.

4. *Other Limitations*

Having considered the evidence presented, for all other terms we conclude that no express claim construction is necessary to resolve the issues presented in this trial. *See Vivid*, 200 F.3d at 803 (“[O]nly those terms need

be construed that are in controversy, and only to the extent necessary to resolve the controversy.”).

C. Legal Principles

1. Anticipation

A patent claim is unpatentable under 35 U.S.C. § 102 if “the four corners of a single, prior art document describe every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation.”

Advanced Display Sys., Inc. v. Kent State Univ., 212 F.3d 1272, 1282 (Fed. Cir. 2000). “A single prior art reference may anticipate without disclosing a feature of the claimed invention if such feature is necessarily present, or inherent, in that reference.” *Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 958 (citing *Schering Corp. v. Geneva Pharm.*, 339 F.3d 1373, 1377 (Fed. Cir. 2003)). Moreover, the reference must also “disclose[] within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited in the claim.” *Net MoneyIN, Inc. v. Verisign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). However, “the reference need not satisfy an *ipsissimis verbis* test.” *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009). We analyze the ground based on anticipation in accordance with the above-stated principles.

2. Obviousness

An invention is not patentable as obvious “if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a). The question of obviousness is

resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and, (4) where in evidence, objective evidence of nonobviousness such as commercial success, long-felt but unsolved needs, and failure of others.⁶ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). When evaluating a combination of teachings, we also must “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441, F.3d 977, 988 (Fed. Cir. 2006)). We analyze the ground based on obviousness in accordance with the above-stated principles.

D. Level of Ordinary Skill in the Art

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)). In a given case, “one or more factors may predominate.” *Id.*

Petitioner asserts that a person having ordinary skill in the art at the time of the invention would have had the following level of skill: “a B.S. degree in Electrical Engineering (or related discipline) and 3 to 5 years of

⁶ Neither Petitioner nor Patent Owner propounds any objective evidence of nonobviousness. Accordingly, we do not address that factor in deciding the issues in this trial.

experience in navigation engineering, or a person holding a more advanced degree but less experience (*e.g.*, a Master’s degree and 1 to 2 years of experience).” Pet. 12 n. 3 (citing Ex. 1003 ¶ 3). Patent Owner proposes an overlapping level of skill:

a bachelor’s degree in electrical engineering, computer engineering, or an equivalent science or engineering field; (2) a working knowledge of marine navigation devices and their associated hardware and software; and (3) at least two years of experience designing marine navigation systems. Additional industry experience or technical training may offset less formal education, while advanced degrees or additional formal education may offset lesser levels of industry experience.

PO Resp. 10 (citing Paper 6, 19). Neither Petitioner nor Patent Owner has explained how the different proposals for level of ordinary skill in the art would impact, if at all, the analysis of whether or not the claims are unpatentable. Instead, Patent Owner’s argument simply focuses on whether or not Dr. Braasch meets the level of ordinary skill in the art. *See id.* at 11–14. According to Patent Owner, Dr. Braasch lacks experience in marine navigation and therefore is not a person of ordinary skill in the relevant art. *Id.* at 11–13.

We are persuaded by Petitioner’s argument that the person of ordinary skill in the art need not have first-hand experience with marine navigation devices and systems. Pet. Reply 25–26. The ’703 patent explicitly defines “marine navigation” broadly, noting that “the use of the word ‘marine’ in the embodiments of the present invention (*including the claims*) could be replaced with the phrase ‘non-street based.’” Ex. 1001, 1:57–67 (emphasis added). Such non-street based navigation is broad enough to encompass avionic navigation. *See* Pet. Reply 25–26; *cf.* Ex. 1003, 4–7 (demonstrating Dr. Braasch’s experience in avionic navigation).

We find that Petitioner’s definition is supported by the testimony of its expert, Dr. Braasch, and, for the reasons stated above, we are not persuaded that the person of ordinary skill in the art necessarily would have had first-hand experience in marine—as opposed to non-street based—navigation. We, therefore, determine, based on the complete record, that Petitioner’s proposed definition correctly states the level of ordinary skill in the art, and we apply it for purposes of this Decision.^{7, 8}

E. Anticipation Based on de Jong

Petitioner asserts that claims 1, 7, 12, 19, 27, and 28 are anticipated by de Jong. Petitioner relies on de Jong (Ex. 1005), the Declaration of Dr. Michael S. Braasch (Ex. 1003), the Declaration of Christine Middleton (Ex. 1014), and the Declaration of Martinus van der Drift (Ex. 1016). Based on the trial record, we are not persuaded that Petitioner has met its burden of

⁷ Even if the person of ordinary skill in the art has to have some marine navigation experience, to testify as an expert under Federal Rule of Evidence 702, a person need not be a person of ordinary skill in the art, but rather may be “qualified in the pertinent art.” *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1363–64 (Fed. Cir. 2008); *Mytee Prods., Inc. v. Harris Research, Inc.*, 439 F. App’x 882, 886–87 (Fed. Cir. 2011) (non-precedential) (upholding admission of the testimony of an expert who “had experience relevant to the field of the invention,” despite admission that he was not a person of ordinary skill in the art). Accordingly, we would still consider the testimony of Dr. Braasch and Captain Browne and our ultimate conclusions regarding the claims would not change.

⁸ Although we have not adopted Patent Owner’s proposed level of ordinary skill in the art, we find Captain Browne’s testimony regarding certain aspects of the asserted prior art directed to marine navigation more credible than that of Dr. Braasch, given Captain Browne’s marine navigation experience, as explained herein. See *infra* Section II.E.2; Ex. 2003 ¶¶ 4–19, Appx. 1 (curriculum vitae).

proving claims 1, 7, 12, 19, and 27 are unpatentable, but has met its burden with respect to claim 28.

1. *Summary of de Jong*

In the Institution Decision, we determined that Petitioner had shown sufficiently for purposes of institution of this *inter partes* review that de Jong is a printed publication and prior art under pre-AIA 35 U.S.C. § 102(b). Inst. Dec. 14–15. Patent Owner did not challenge the prior art status of de Jong in the Patent Owner’s Response. Based on the complete record, we are persuaded that de Jong is a prior art printed publication under 35 U.S.C. § 102(b). *See id.*

De Jong is titled “A Network Route Planning Solution for Marine Navigation” and presents “a solution . . . for automating a part of the voyage planning process in marine navigation, namely route planning.” Ex. 1005, .001, .003. De Jong’s solution is “a network-based route finding solution” that can be used to select an optimal route. *Id.* at .003. The route planning unit is designed to be fitted in the ECDIS⁹ data structure. *Id.*

De Jong discloses various items of information used to perform its route planning. First, a sailing order is created which “contains all the initial conditions, demands and constraints that apply for the oncoming journey.” *Id.* at .043. The sailing order contains information relating to two different types of characteristics: “mission and ship’s characteristics.” *Id.* Mission characteristics include destination characteristics, time characteristics, task

⁹ ECDIS stands for Electronic Chart Display and Information System and “is a navigational information system comprising hardware, display software and official vector charts and must conform to the ECDIS performance standards.” Ex. 1003 ¶ 35 (quoting Ex. 1006, .107).

characteristics, and navigator's demands. *Id.* at .043–.045. Ship's characteristics includes size, draught, maneuverability, propulsion, equipment, crew, cargo class, and ice class. *Id.* at .045–.046.

In addition to the sailing order, the de Jong route planning algorithm requires a route network dataset. *Id.* at .063; *see also id.* at .047–.049. This route network dataset should include information on water and passages, such as distances, depths, speed restrictions, cargo class prohibitions, and storm probabilities. *Id.* at .015, .047, .049–.055.

De Jong's route planning algorithm consists of two algorithms, the filtering algorithm and the route calculation algorithm. *Id.* at .063–.064. The filtering algorithm eliminates from all potential routes between the starting location and the destination those routes that cannot or may not be conducted due to the characteristics given in the sailing order. *Id.* at .055–.057. For example, a route would be eliminated “when [the] depth of the passage is not enough. This occurs when the water depth (which is chart depth plus tidal rise) is less than the required depth, which is the ship's draught increased by the appropriate safety margin (UKC).” *Id.* at .056. Other potential routes are eliminated due to regulatory restrictions such as cargo or tonnage. *Id.*

After the filtering algorithm is used to generate a list of all navigable passages based on the sailing order, the route calculation algorithm/module “actually generates route alternatives.” *Id.* at .063–.064. The route calculation algorithm uses the Dijkstra algorithm, a shortest path algorithm, and a multiple criteria decision algorithm. The output of the route calculation algorithm generates “a set of the best route-alternatives, ranked in order of preference.” *Id.* at .066.

De Jong Figure V-2 is shown below.

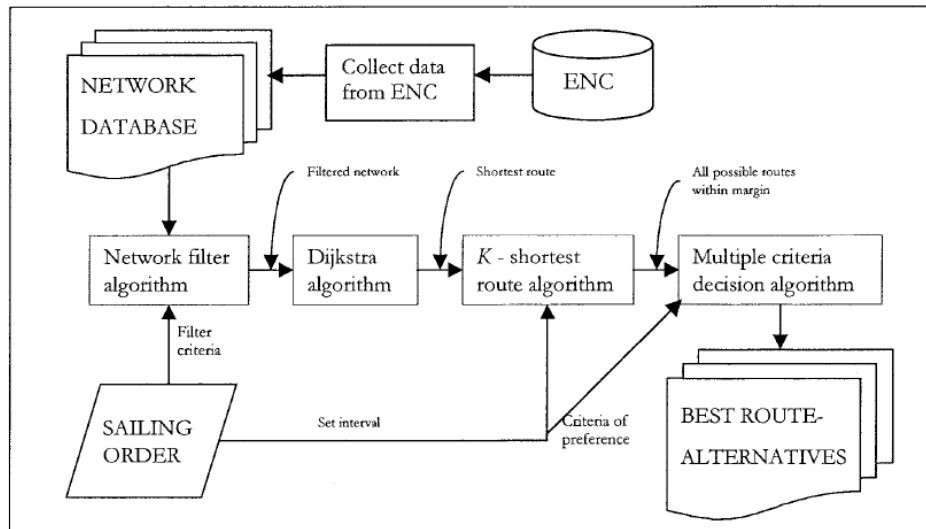


Figure V-2: Sequence of the route planning algorithm.

De Jong Figure V-2 shows the sequence of the route planning algorithm. *Id.* at .066. The figure shows the information from the sailing order and the network database being fed into the filtering algorithm and the route calculation algorithm to generate the best route-alternatives.

2. Claims 1, 7, 12, 19 and 27¹⁰

Petitioner argues de Jong discloses the “performing a marine route calculation algorithm” step, including the “re-routing the course” limitation, recited in claim 1. *See* Pet. 28–35. According to Petitioner, de Jong’s route planning algorithm is a marine route calculation algorithm that computes a course between a first location and a potential waypoint. *Id.* at 28–30. Specifically, Petitioner relies on all aspects of the route planning

¹⁰ Petitioner relies on the same evidence and arguments presented for claim 1 to show that the prior art discloses the “re-routing” limitations recited in claims 12 and 27. *See* Pet. 38, 39; Pet. Reply 16–20 (arguing claims as a group). Because Petitioner does not argue separately the “re-routing” limitation and our analysis of the limitation in the various independent claims is substantially the same, we focus on claim 1.

algorithm—including both the filtering algorithm and the route calculation algorithm—as the claimed marine route calculation algorithm. *See id.* at 34. Petitioner further contends that the filtering algorithm of the route planning tool will avoid preselected conditions, such as water that is not sufficiently deep or a clearance that is insufficient for the height of the vessel. *See id.* at 30–32. Petitioner also avers de Jong automatically identifies non-user selected waypoints, such as those shown in de Jong Testcase 3.1, shown below.

TESTCASE 3.1: Testing the ranking algorithm on all aspects

Sailing order:	
Ship's characteristics:	
Type of vessel	Navy vessel (frigate)
Maximum speed	30
Draught	6
UKC	2
Cargo class	no
Ice class	no
Mission characteristics:	
Start Route-point	27
End Route-point	68
Via Route-point	-

Optimal Route: shortest distance					
Rank	Route	Distance	Time	g-value	Comments
1	27-38-44-47-52-55-58-59-60-63-67-68	226	452	0.99671	10d fog instead of 5d fog + piracy, better 5d fog then 0 navais
2	27-38-44-47-52-55-54-58-59-60-63-67-68	241	482	0.99614	detour instead of 10d fog, better 5d fog then 0 navais
3	27-38-44-43-47-52-55-58-59-60-63-67-68	234	468	0.99614	
4	27-38-44-43-47-52-55-54-58-59-60-63-67-68	249	498	0.99539	
16	27-38-44-47-52-55-58-59-60-63-67-68	219	436	0.91604	0 navais
37	27-36-42-43-47-52-55-58-59-60-63-67-68	228	456	0.89295	TZ
91	27-38-44-43-46-51-47-52-55-58-59-60-63-66	252	504	0.85448	DWR met omweg+recom
96	27-38-44-47-52-51-53-54-58-59-60-63-67-68	246	492	0.84722	Ze stuk DWR met omweg
900	27-38-44-47-51-53-54-55-58-59-60-63-67-68	229	458	0.84574	hele DWR
1565	27-36-42-45-53-51-52-57-60-59-63-64-65-68	247	494	0.14313	

Testcase 3.1 shows various characteristics in a sailing order and a listing of optimal routes ranked according to preferences. *Id.* at 33; *see also* Ex. 1005, .132. The figure has been annotated by Petitioner to identify the starting point, the end point, and various routes identified by intermediate route points. Pet. 33. For example, Petitioner states that “the route ranked most optimal (rank 1) between the starting route-point 27 and the end-route point 68 uses intermediate route-points 38, 44, 47, 52, 55, 58, 59, 60, 63, and 67.” *Id.* (citation omitted).

Petitioner also argues de Jong discloses “re-routing the course” under Patent Owner’s proposed claim construction, which we adopt in this Decision. *See* Pet. Reply 16–20. Petitioner focuses on De Jong Testcases 1_1 and 1_4. *Id.* According to Petitioner, “in test case 1_1, de Jong used his algorithm to find the shortest path between route-point 1 and route-point 68.” *Id.* at 17 (citing Ex. 1005, 80–84, 121; Ex. 1025 ¶¶ 38–40). Under the condition of Testcase 1_1, Petitioner states that the algorithm identified route “1-2-4-7-12-17-22-27-36-42-46-53-54-58-59-63-65-68” as the optimal shortest route. *Id.* (citing Ex. 1005, 121).

Petitioner further contends that in Testcase 1_4, “de Jong re-routed the course to avoid the preselected condition of water depth.” *Id.* (citing Ex. 1005, 122). Under the conditions of Testcase 1_4, Petitioner states this resulted in a different course with additional waypoints: “1-2-4-7-10-15-20-27-36-42-46-53-54-58-59-63-65-68.” *Id.* (citing Ex. 1005, 122) (color omitted). According to Petitioner, “the portion of the re-route between waypoints 7 and 27 was changed to include waypoints 10, 15, and 20 because the prior route included segments 12, 17 and 22, which violated the depth restriction; the algorithm successfully avoided these segments in the second iteration.” *Id.* (citing Ex. 1005, 122). Thus, according to Petitioner, “[a]s a result of the elimination or re-ranking of sub-optimal routes, at least a portion of the optimal route changes with respect to the prior optimal route – exactly as [Patent Owner]’s construction requires.” *Id.* at 18–19 (citing Ex. 1025 ¶¶ 41–42); *see also id.* at 19–20 (“In other words, the final route is a ‘re-routed’ version of the optimal routes generated during the earlier iterations of the algorithm.”).

Patent Owner argues de Jong does not disclose “re-routing the course” as recited in claim 1. *See* PO Resp. 28–39; Reply to Opp. 4–10.

Specifically, Patent Owner argues that de Jong involves an iterative process in which the number of routes in the originally determined set is narrowed, but none of the routes are ever re-routed:

de Jong generates three sets of routes in applying its route planning algorithm, namely the route network data set, the filtered route network, and the set of route alternatives. Each set of routes is a subset of a prior set of routes, such that the filtered route network is a subset of the route network data set, and the set of route alternatives is a subset of the filtered route network. In each step of de Jong’s route planning algorithm, the set of all possible routes, i.e., the route network data set, is further narrowed. Importantly, however, none of the routes in any of the sets is ever re-routed relative to a previously-calculated route. Instead, de Jong’s algorithm successively narrows the routes from the universal set consisting of the route network data set to obtain the set of route alternatives, which is the optimized set of routes.

PO Resp. 28–29.

More specifically, Patent Owner argues, with respect to Testcase 1, “[t]here is no teaching in de Jong that the route generated in Testcase 1_4 is a re-route of Testcase 1_1 (or any other Testcase 1).” Reply to Opp. 7 (citing Ex. 2007 ¶¶ 6–11, 14–16). According to Patent Owner, “Testcase 1_4 is a test performed on a physically different geography than Testcase 1_1 because certain route segments have been modified by de Jong to have different physical characteristics than the same route segments in Testcase 1_1.” *Id.* (citing Ex. 2007 ¶¶ 11, 15–16). Therefore, Patent Owner argues, “[r]ather than a re-routed version of Testcase 1_1, Testcase 1_4 is a newly-selected route developed using an independent run of the algorithm to evaluate its accuracy for water of different depths.” *Id.* at 8 (citing Ex. 2007

¶¶ 11, 15–16). And although Patent Owner agrees that the route in Testcase 1_1 is different than the one in Testcase 1_4, Patent Owner contends that it “is not a *re-route* as claimed; de Jong changed the test environment for Testcase 1_4 and ran the filter and Dijkstra’s algorithms to test the revised restrictions.” *Id.* at 10.

Having reviewed the record, we determine that Petitioner has not shown by a preponderance of the evidence that de Jong discloses “re-rout[ing] the course” as recited in independent claims 1, 12, and 27. As discussed above in Section II.E.1, de Jong’s route planning algorithm starts with a set of all possible routes and then uses the filtering algorithm and the route planning algorithm to eliminate possible routes that cannot be followed due to the characteristics given in the sailing order. *See* Ex. 1005, .055–.057, .063–.064. Once the filtering algorithm generates the list of all navigable passages, the route calculation algorithm uses the Dijkstra algorithm, a shortest path algorithm, and a multiple criteria decision algorithm to generate “a set of the best route-alternatives, ranked in order of preference.” *Id.* at .063–.064, .066. As Petitioner agreed at the hearing, although this process results in the *elimination* of routes, no route is *changed* once it is generated:

[THE BOARD]: So I have a large set of routes and I filter that down into a smaller set. I’m not changing any of the original routes. I’m just picking and choosing certain ones from among the original dataset, right?

[PETITIONER’S COUNSEL]: You are choosing one route over the other, that’s correct. . . .

Tr. 8. Accordingly, de Jong does not disclose changing at least a portion of the route of a course relative to a previous routing, as required by our construction of the claim language.

Nor has Petitioner shown that the Testcase 1 examples—specifically Testcases 1_1 and 1_4—disclose changing at least a portion of the route of the course relative to a previous routing. Petitioner argues that Testcase 1_4 is “a reroute [of Testcase 1_1] because it starts at the same point; it ends at the same point; but there are certain segments within it that are different from the previous route.” *Id.* at 10; *see also id.* at 10–11 (Petitioner arguing Patent Owner’s proposed claim construction simply requires a “route that is different from a previous route”).

However, as Petitioner conceded during the oral hearing, the route in Testcase 1_4 was not generated by starting with the route in Testcase 1_1 and changing it, as would be required by our claim construction. *Id.* at 11–12. Petitioner further agrees that there was no need to run any of the other cases before running Testcase 1_4, further demonstrating that Testcase 1_4 is not the result of a *change* to any of the courses generated in Testcase 1_1:

[THE BOARD]: But I could perform the algorithm under test case 1.4 without doing any of the other test cases, right?

[PETITIONER’S COUNSEL]: Correct. Yes.

[THE BOARD]: In other words, the performance of test case 1.4 is not contingent or reliant on doing any of the other test cases, right?

[PETITIONER’S COUNSEL]: It is not. Although I don’t think that that is relevant to the scope of the claims.

Id. at 13; *see also id.* at 15–16. Instead, the route for Testcase 1_4 is generated by changing the conditions (adding shallow areas) and starting the de Jong program over from the beginning; that is, starting with all possible routes, eliminating the routes that cannot be taken, and ranking the remaining routes. We find Captain Browne’s testimony persuasive, and supported by the disclosure of de Jong, in that regard. *See* Ex. 2007 ¶ 15

(“Rather than a modified or otherwise changed version of Testcase 1_1, Testcase 1_4 is a completely new route, selected using a different test environment and an independent run of the algorithm to evaluate its accuracy for water of different depths.”).¹¹

For the foregoing reasons, we determine Petitioner has not shown by a preponderance of the evidence that independent claims 1, 12, and 27, or claims 7 and 19, which depend from claims 1 and 12, respectively, are anticipated by de Jong. See *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) (“[D]ependent claims are nonobvious if the independent claims from which they depend are nonobvious.”).

3. Claim 28

We have reviewed Petitioner’s contentions and supporting evidence of record in this trial. For the reasons given below, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claim 28 of the ’703 patent (which, unlike the other challenged independent claims, does not recite “re-routing”) is anticipated by de Jong.

Petitioner contends that de Jong discloses all of the limitations recited in claim 28. See Pet. 39–42. Specifically, Petitioner contends de Jong discloses “receiving indication of a minimum water depth from a user,” as recited in claim 28. *Id.* at 40 (citing Ex 1003 ¶¶ 146–147). According to Petitioner, the sailing order in de Jong includes “information on the size of the ship as well as its ‘draught’ and the ‘minimum Under Keel Clearance (UKC)’” and that information “determines the *minimum waterdepth* needed

¹¹ Because we find Testcase 1_4 does not start with a route from Testcase 1_1 and change it, we need not consider the impact of the environmental differences between Testcase 1_1 and Testcase 1_4.

for the conduct of a passage, setting the depth safety contours.” *Id.* (quoting Ex. 1005, .045). Petitioner further asserts that de Jong discloses that the information in the sailing order is entered by the user. *Id.* (citing Ex. 1005, .016, .044, .046).

Petitioner also argues de Jong discloses “identifying a potential waypoint” as recited in claim 1. *See id.* (incorporating arguments for claim 1); *see CRFD Research, Inc. v. Matal*, 876 F.3d 1330, 1345–46 (Fed. Cir. 2017) (agreeing with the petitioner that it “incorporated [an] argument into other grounds of unpatentability . . . by direct citation to [the] argument in the petition”). According to Petitioner, the user identifies the point of arrival or destination in the sailing order. *Id.* at 27 (citing Ex. 1005, .015, .044, .059, .083, .086). Petitioner further contends de Jong associates route points, including the destination route point, as waypoints. *Id.* (citing Ex. 1003 ¶¶ 117–118).

Petitioner further argues de Jong discloses the “performing a marine route calculation algorithm” step recited in claim 28. *See id.* at 28–35, 40–42. According to Petitioner, the first location is the point of departure, the potential waypoint is the destination, and the de Jong algorithm calculates routes between the first location and the potential waypoint by identifying additional non-user selected waypoints that avoid, for example, insufficient water depth. *Id.* at 29–35 (citing Ex 1005; Ex. 1003 ¶¶ 122–132), 40–42. Petitioner points to Testcase 3_1 as an example of the output of the de Jong algorithm, which indicates a first location (waypoint 27), a potential waypoint (waypoint 68), and a route that identifies one or more non-user selected waypoints and avoids water depth less than the minimum water

depth (waypoints 38-44-47-52-55-58-59-60-63-67). *Id.* at 32–34 (citing Ex. 1005, .132; Ex. 1003 ¶ 129), 40–42.

Patent Owner argues “de Jong does not teach routing . . . a ‘course,’ where the claimed ‘course’ is properly construed to be ‘the path of intended travel of a craft with respect to the earth.’” PO Resp. 49; *see id.* at 49–54 (setting forth Patent Owner’s argument based on Patent Owner’s proposed claim construction).

We are persuaded by Petitioner’s arguments and the evidence at trial, including the supporting testimony of Dr. Braasch, that de Jong discloses each of the limitations recited in claim 28. As discussed above, the de Jong sailing order includes information describing the minimum water depth the user desires. Ex. 1005, .043, .045. Additionally, as described in Section II.E.1, the sailing order includes an end point (the potential waypoint) and de Jong uses the routing algorithm to compute a course including non-user selected waypoints. *See* Tr. 42 (Patent Owner acknowledging that “[d]e Jong teaches that its route planning algorithm selects a route and that that route is comprised of what de Jong calls route points which are, for all intents and purposes, waypoints”).

We are also not persuaded by Patent Owner’s argument that Petitioner did not prove that de Jong teaches “rout[ing] a course.” Patent Owner’s argument is premised on a claim construction we reject. Because Patent Owner’s arguments are not commensurate with the scope of the claims, they are unpersuasive. *See In re Self*, 671 F.2d 1344, 1348 (CCPA 1982). Instead, applying the construction of routing a course that we adopted, Petitioner persuades us that de Jong generates a “course” including non-user

selected waypoints—waypoints 38-44-47-52-55-58-59-60-63-67. *See* Ex. 1005, .132; Pet. 32–34, 40–42.

Accordingly, based on a review of the entire record, we find that Petitioner has demonstrated by a preponderance of the evidence that de Jong discloses each of the limitations recited in claim 28, and therefore anticipates the claim.

F. Obviousness over de Jong and Tetley

Petitioner asserts that the subject matter of claims 2–6, 13–18, 20–23, 25, 26, 29, and 41–45 would have been obvious to a person of ordinary skill in the art at the time of the invention in light of the teachings of de Jong and Tetley. Petitioner relies on de Jong (Ex. 1005), Tetley (Ex. 1006), the Declaration of Dr. Michael S. Braasch (Ex. 1003), the Declaration of Christine Middleton (Ex. 1014), the Declaration of Scott Bennett, Ph.D. (Ex. 1015), and the Declaration of Martinus van der Drift (Ex. 1016).

1. Summary of Tetley

In the Institution Decision, we determined that Petitioner had shown sufficiently for purposes of institution of this *inter partes* review that Tetley is a printed publication and prior art under pre-AIA 35 U.S.C. § 102(b). Inst. Dec. 24–25. Patent Owner did not challenge the prior art status of Tetley in the Patent Owner’s Response. Based on the complete record, we are persuaded that Tetley is a prior art printed publication under 35 U.S.C. § 102(b).

Tetley is titled “Electronic Navigation Systems.” Ex. 1006, .001. According to the introduction, the edition submitted by Petitioner “has been extensively rewritten to provide navigators with a detailed manual covering the principles and applications of modern systems.” *Id.* at .012. Tetley

potential waypoint . . . and re-route the course to avoid the preselected conditions by identifying one or more non-user selected waypoints.” *Id.* at 14:31–40. Claim 21 depends from claim 20 and further recites a receiver for a global positioning system which is used to determine the first location. *Id.* at 14:41–47. Claim 22 depends from claim 21 and further recites that the processor provides an alert signal when the cartographic data includes preselected conditions around the first location. *Id.* at 14:48–56. Claim 43 depends from claim 20 and further includes a display that is used to display the course. *Id.* at 16:35–39.

Petitioner relies on substantially the same evidence and arguments for claim 20 as for claims 1 and 12, discussed above. *See* Pet. 53–62. In addition to the previously relied upon evidence, Petitioner argues that Tetley discloses that ECDIS is implemented on a computer which requires a processor. *Id.* at 54–55; *see also* Ex. 1003 ¶ 184. Petitioner further argues that a person of ordinary skill in the art would have understood that de Jong’s and Tetley’s user interfaces would be operatively coupled with a processor. Pet. 55–56; *see also* Ex. 1003 ¶¶ 185–189. Petitioner also contends that both Tetley and de Jong teach “a location input operatively coupled to the processor” and the “memory operatively coupled to the processor and the location input” as recited in claim 20. Pet. 57–62; *see also* Ex. 1003 ¶¶ 190–197. Petitioner also avers that a person of ordinary skill in the art would have had a reason to combine the relevant teachings of de Jong and Tetley. Pet. 45–46; *see also infra* Section II.F.4 (discussing Petitioner’s argument to combine the references in more detail).

Because Petitioner did not establish that de Jong discloses “re-rout[ing] the course,” as recited in claim 20, and does not rely on Tetley

to remedy this deficiency, we determine, for the same reasons discussed above in Section II.E.2, Petitioner has not established by a preponderance of the evidence that claim 20 or dependent claims 21–23 and 43, which depend from claim 20, would have been obvious over the combined teachings of de Jong and Tetley.

3. *Claims 2–6, 13–18, 25, 26, 41, 42, and 44*

Claims 2–6, 13–18, 25, 26, 41, 42, and 44 depend, directly or indirectly, from claims 1, 12, and 27. Claims 2 and 13 depend from claims 1 and 12, respectively, and further recite using a signal from a GPS to determine the first location and analyzing cartographic data to determine if there is a preselected condition around the first location. Ex. 1001, 13:12–16, 13:65–14:2. Claims 3, 4, 14, and 16 depend from claims 2, 1, 13, and 12, respectively, and further recite providing an alert signal when the cartographic data includes preselected conditions around the first location. *Id.* at 13:17–24; 14:3–6, 14:10–13. Claim 15 depends from claim 12 and recites that “analyzing cartographic data further comprises acquiring cartographic data from a [GPS].” *Id.* at 14:7–9. Claims 5, 6, 17, and 18 depend from either claim 4 or claim 16 and further recite that the alert signal is an audio alert (claims 5 and 17) or a visual alert (claims 6 and 18). *Id.* at 13:25–28, 14:14–18. Claims 25 and 26 both depend from claim 1 and require that the first location and the potential waypoint are independent of the current location (claim 25) or that a portion of the course is unrelated to the current heading (claim 26). *Id.* at 14:65–15:3. Claims 41, 42, and 44 depend from claims 1, 12, and 27, respectively, and recite “displaying the course from the first location to the potential waypoint via the non-user selected waypoints.” *Id.* at 16:28–24, 16:40–43.

As discussed above in Section II.E.2, Petitioner did not prove by a preponderance of the evidence that de Jong discloses “re-rout[ing] the course,” as recited in the independent claims. Because Petitioner does not rely on Tetley to remedy that deficiency, we determine, for the same reasons, that Petitioner has not established by a preponderance of the evidence that dependent claims 2–6, 13–18, 25, 26, 41, 42, and 44 would have been obvious over the combined teachings of de Jong and Tetley. *See Fritch*, 972 F.2d at 1266 (“[D]ependent claims are nonobvious if the independent claims from which they depend are nonobvious.”).

4. *Claims 29 and 45*

Petitioner relies on the combination of de Jong and Tetley for the limitations recited in claims 29 and 45, which depend from claim 28. *See* Pet. 68–70, 74.

Claim 29 recites the additional limitation of “displaying a visual indication of places along the calculated course where the water depth is expected to approach the minimum water depth.” According to Petitioner, “Tetley shows a calculated route overlaid on an ENC^[12] in Fig. 7.17.” *Id.* at 69 (citing Ex. 1006, .128; Ex. 1003 ¶¶ 212–213). Petitioner further asserts that having ENCs indicate water depth was common prior to the filing date of the ’703 patent. *Id.* (citing Ex. 1003 ¶ 213); *see also* Ex. 1006, .129. Therefore, according to Petitioner, “de Jong in view of Tetley teaches displaying calculated routes on an ENC, and further discloses that such ENCs contain visual indications of water depth.” Pet. 70.

¹² ENC stands for Electronic Navigational Chart. Ex. 1006, .090.

Claim 45 recites “the step of displaying the course from the first location to the potential waypoint via the non-user selected waypoints.” According to Petitioner, “de Jong discloses that the calculated routes[, including the non-user selected waypoints,] may be displayed on top of ENC’s” and Tetley “teaches that calculated courses, such as the type calculated by de Jong, are displayed as overlaid on an ENC.” *Id.* at 70–71 (citing Ex. 1005, .006, .016, .094; Ex. 1006, .128; Ex. 1003 ¶¶ 214–215).

Petitioner also contends that a person of ordinary skill in the art would have had a reason to combine the relevant teachings of de Jong and Tetley. Pet. 45–46. Specifically, Petitioner argues that de Jong states that its disclosed route planning algorithm should be implemented in ECDIS while Tetley describes “what ECDIS is, how it works, and how ENC’s are used in ECDIS.” *Id.* (citing Ex. 1005, .002, .003, .006, .090, .093; Ex. 1003 ¶ 160; Ex. 1006, .107–.108). Petitioner further contends that a person of ordinary skill in the art “interested in implementing de Jong’s route planning algorithm in ECDIS as recommended, would [have been] motivated to look to Tetley’s teachings regarding the features, capabilities, and requirements of ECDIS.” *Id.* at 46. Also, according to Petitioner, a person of ordinary skill in the art would have been interested in looking “for ways to enhance the performance capabilities of ECDIS” and de Jong teaches such an improvement. *Id.* (citing Ex. 1003 ¶ 162). Additionally, Petitioner argues that “[t]here would have been no technical barriers that would have discouraged a [person of ordinary skill in the art] from making the combination, and the combination would have yielded predictable, expected results.” *Id.* (citing Ex. 1003 ¶ 162).

Patent Owner does not argue separately claims 29 and 45. We have reviewed Petitioner's contentions and supporting evidence. For the reasons given by Petitioner in the Petition and discussed above, we find that the limitations of claims 29 and 45 are taught by the prior art references.

Similarly, we are persuaded by Petitioner's un rebutted evidence and argument that provides "articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *Kahn*, 441 F.3d at 988, *cited with approval in KSR*, 550 U.S. at 418. For example, because de Jong states that its disclosed route planning algorithm should be implemented in ECDIS and Tetley describes what an ECDIS is, how it works, and how ENC's are used in an ECDIS, we find that a person of ordinary skill in the art would have been able and motivated to combine their teachings in order to follow the instructions in de Jong, with a reasonable expectation of success. *See KSR*, 550 U.S. at 417 ("[I]f a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.").

In view of the foregoing, we conclude that Petitioner has established by a preponderance of the evidence that claims 29 and 45 of the '703 patent are unpatentable under 35 U.S.C. § 103(a) as obvious in view of de Jong and Tetley.

III. PATENT OWNER'S CONTINGENT MOTION TO AMEND

As discussed above, we determine that Petitioner has not demonstrated by a preponderance of the evidence that claims 1–7, 12–23, 25–27, and 41–44 are unpatentable. Accordingly, Patent Owner's

contingent Motion to Amend claims 1–7, 12–23, 25–27 and replace them with substitute claims 51–72, and cancel claims 41–44, is dismissed as moot.

Additionally, Patent Owner contingently moves to cancel dependent claim 45 if the claim from which it depends, claim 28, was found unpatentable. Motion to Amend 1–2. Because we determine that Petitioner has proven by a preponderance of the evidence that independent claim 28 is unpatentable, we grant Patent Owner’s Motion to Amend to the extent it requests cancellation of claim 45.

As we find claims 28 and 29 to be unpatentable, we address Patent Owner’s Motion to Amend to the extent it seeks to replace claims 28 and 29 with substitute claims 73 and 74 below.

A. Analysis of the 37 C.F.R. § 42.121 Requirements

In an *inter partes* review, amended claims are not added to a patent as of right, but rather must be proposed as a part of a motion to amend. 35 U.S.C. § 316(d). The Board must assess the patentability of proposed substitute claims “without placing the burden of persuasion on the patent owner.” *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1328 (Fed. Cir. 2017) (en banc). However, Patent Owner’s proposed substitute claims must meet the statutory requirements of 35 U.S.C. § 316(d) and the procedural requirements of 37 C.F.R. § 42.121. See “Guidance on Motions to Amend in view of *Aqua Products*” (Nov. 21, 2017) (https://www.uspto.gov/sites/default/files/documents/guidance_on_motions_to_amend_11_2017.pdf) (last accessed July 9, 2018) (“Guidance”). Accordingly, Patent Owner must demonstrate (1) the amendment responds to a ground of unpatentability involved in the trial; (2) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new

subject matter; (3) the amendment proposes a reasonable number of substitute claims; and (4) the proposed claims are supported in the original disclosure. *See* 35 U.S.C. § 316(d); 37 C.F.R. § 42.121.

For reasons set forth below, we determine Patent Owner has met the above-discussed requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. Patent Owner seeks to add two substitute claims to replace the three challenged claims found unpatentable and each substitute claim adds limitations that narrow the scope of the original claim it replaces. *See* Mot. 1–6, Claim Appendix, i–xiv. Patent Owner also identifies disclosures in the originally-filed application that support proposed substitute claims 73 and 74. *Id.* at 6–17 (citing the written description of the issued patent, Ex. 1001, which appears to be identical to the written description as filed, Ex. 1002, .502–.520). Based on the citations providing in the motion and for the additional reasons discussed below in Section III.B.3, we find sufficient written description support for Patent Owner’s proposed substitute claims 73 and 74. Moreover, Patent Owner proposes a narrowing limitation in each proposed substitute claim in direct response to the grounds of unpatentability involved in this trial. Therefore, Patent Owner has satisfied the requirements of 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121. Accordingly, we now focus on the patentability of proposed substitute claims 73 and 74.

B. Analysis of the Patentability of Proposed Claims 73 and 74

As discussed above, Patent Owner does not have the burden of persuasion with respect to the patentability of the substitute claims presented in its Motion to Amend. *See Aqua Prods.*, 872 F.3d at 1327; Guidance 2. “The petitioner bears the burden of proving that proposed amended claims are unpatentable.” *Sirona Dental Sys. GmbH v. Institut Straumann AG*,

No. 2017-1341, -- F.3d --, 2018 WL 3028693, at *6 (Fed. Cir. June 19, 2018). For the reasons explained below, considering the record before us, we determine that Petitioner has not shown by a preponderance of the evidence that proposed substitute claims 73 and 74 are unpatentable.

1. *Claim Construction*

In its Motion to Amend, Patent Owner proposes a construction of the claim term “navigation,” including the variations of the term, which appear in the body of the claim rather than just the preamble. Motion to Amend 18–22. According to Patent Owner, the broadest reasonable interpretation of the term “navigation” is “the process of planning a course and directing a craft or vehicle along the course from one place to another.” *Id.* at 18–19 (emphasis omitted). Patent Owner argues its claim construction is supported by the written description of the ’703 patent, which draws a distinction between the planning and navigating stages, *see id.* at 19–20, consistent with well-understood navigational aids in marine navigation, *see id.* at 20–21, and consistent with the ordinary meaning of “navigation,” *see id.* at 21–22.

Petitioner argues that because Patent Owner “relies extensively on definitions in the prior art of record, such as de Jong, Tetley, and Bowditch [Ex. 2001], which [Patent Owner] contends evidences the commonly-understood meaning,” Patent Owner “must concede that the same prior art – including de Jong and Tetley – uses the term ‘navigation’ as [Patent Owner] itself proposes.” Opp. 5. According, Petitioner contends because the “proposed construction is not material to [patentability], the Board need not construe the term.” *Id.*

In light of Petitioner’s argument that the construction of the limitation is unnecessary, we conclude that we need not construe the term to determine

whether Petitioner has proven the unpatentability of claims 73 and 74. *See Vivid Techs.*, 200 F.3d at 803 (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”).

2. *Analysis of the Patentability of Proposed Substitute Claims 73 and 74 Over the Cited Prior Art*

As a replacement for independent claim 28, Patent Owner proposes claim 73. Mot. To Amend 1. Proposed substitute claim 73, with amendments indicated with underlining and double brackets, is shown below:

73. (Proposed Substitute for Claim 28) A method for marine navigation performed by a marine navigational device including a display screen that presents a re-routed course along which the navigational device is traveling, comprising:

receiving indication of a minimum water depth from a user;

identifying a potential waypoint; [[and]]

performing a marine route calculation algorithm to route a course between a first location and the potential waypoint avoiding water depth less than the minimum water depth, including:

routing the course between the first location and the potential waypoint;

analyzing cartographic data for a water depth between the first location and the potential waypoint; and

re-routing the course to avoid water depths less than the received minimum water depth by identifying one or more non-user selected waypoints; and

navigating the user by presenting, on the display screen of the marine navigational device, the re-routed course along which the navigational device is traveling.

Id. at Claim App., xiii. Relevant to the analysis of patentability over the prior art, proposed substitute claim 73 affirmatively recites both “routing the course between the first location and the potential waypoint” and then “re-routing the course to avoid water depths less than the received minimum water depth by identifying one or more non-user selected waypoints.”

Petitioner asserts that claim 73 would have been obvious over de Jong and Tetley under 35 U.S.C. § 103. Opp. 12.

As discussed above in Section II.E.3, unlike the other independent claims, original claim 28 did not require re-routing the course, a limitation we found not disclosed by de Jong. By this proposed amendment, Patent Owner’s claim 73 affirmatively recites both an initial “routing” and then a “re-routing” step. *See id.* at 2–3; *id.* at Claims App. xiii. For the reasons discussed above, with regard to the re-routing step in the original claims, we find that de Jong does not teach such re-routing. *See* Motion to Amend 4–6; Reply to Opp. 1–10.

Petitioner contends de Jong discloses the routing and re-routing limitations. *See* Opp. 14–16, 20. Petitioner’s argument is substantially the same as that asserted in the Petitioner’s Reply. *Compare* Opp. 14–16 (discussing how Testcases 1_1 and 1_4 demonstrate re-routing), *with* Pet. Reply 16–20 (discussing how Testcases 1_1 and 1_4 demonstrate re-routing). Specifically, Petitioner asserts de Jong Testcase 1_1 shows an initial route and Testcase 1_4 shows a different, re-routed course that avoids a preselected condition of water depth. Opp. 14–16.

For the reasons discussed above, we disagree with Petitioner’s description of de Jong and Testcases 1_1 and 1_4. As discussed earlier in Section II.E.2, the Testcase 1 examples in de Jong—specifically, Testcases

1_1 and 1_4—do not disclose changing at least a portion of the route of the course relative to a previous routing. Accordingly, for the same reason that we find de Jong does not disclose “re-routing the course” as recited in claim 1, we find de Jong does not disclose “re-routing the course” as recited in substitute claim 73.

Additionally, Petitioner does not assert, either in the Petition or in the Opposition to the Motion to Amend, that Tetley remedies this deficiency. Petitioner also does not argue that the limitation would have been an obvious extension of the references, alone or in combination, or rely on any other prior art. Petitioner has not shown, by a preponderance of the evidence, that claim 73 is unpatentable under 35 U.S.C. § 103.

Additionally, neither Patent Owner nor Petitioner proffers different arguments or evidence for proposed claim 74, which depends from claim 73 and is identical to original claim 29 other than the change in dependency. Accordingly, for the same reasons set forth above with respect to proposed substitute independent claim 73, we find that Petitioner has not shown, by a preponderance of the evidence, that claim 74 is unpatentable under 35 U.S.C. § 103.

3. *Analysis of Proposed Claims 73 and 74 for Compliance with 35 U.S.C. § 112, ¶¶ 1, 2*

a. Indefiniteness

Petitioner argues that proposed substitute claims 73 and 74 are unpatentable as indefinite. Opp. 24–25. According to Petitioner, “[t]he phrase ‘navigating a user’ is not commonly used in vehicular navigation science.” *Id.* at 24 (citing Ex. 1025 ¶¶ 57–67). Thus, according to Petitioner, it is understood that navigation devices do not navigate the user;

“[i]nstead, a user employs such devices as an *aid* in navigating the vehicle (or, in the case of auto-pilot functionality, is completely relieved from navigational duties).” *Id.* at 24–25 (citing Ex. 1025 ¶¶ 60–64). Petitioner further asserts that substituting Patent Owner’s proposed construction of “navigation” and its variants renders the claim “nonsensical” and indefinite. *Id.* at 25 (citing Ex. 1025 ¶ 66; *Haemonetics Corp. v. Baxter Healthcare Corp.*, 607 F.3d 776, 781 (Fed. Cir. 2010)).

Patent Owner argues Petitioner has not explained how a person of ordinary skill in the art would find the claim phrase “navigating the user by presenting, on the display screen of the marine navigational device, the re-routed course along which the navigational device is traveling” ambiguous, vague or unclear. Reply to Opp. 10–11. Instead, Patent Owner asserts Petitioner has merely presented the unsupported testimony of Dr. Braasch that the claim term is not “commonly used” or “highly irregular.” *Id.* at 10–11 (citing Ex. 1025 ¶¶ 58–59). Moreover, Patent Owner contends that because Dr. Braasch is able to provide alternative claim language for the phrase, then Dr. Braasch “understands it well enough for it to be clear and understand the metes and bounds of the claim.” *Id.*

Patent Owner also argues the meaning of the claim limitation is clear:

It is the user who uses the navigation device to navigate, with the navigation device presenting the navigation functionality to the user. (EX_2007, ¶ 20). The navigation device is navigating the user by presenting the re-routed course on the display. The claims are not to an autonomous navigation device. A [person of ordinary skill in the art] would well understand the concept of the user using the navigation device, such that the device is navigating the user who is using the device to direct the vessel. *Id.*

Id.

A claim may be indefinite if it is “ambiguous, vague, incoherent, opaque, or otherwise unclear in describing and defining the claimed invention” and the applicant “fails to provide a satisfactory response.” *In re Packard*, 751 F.3d 1307, 1311 (Fed. Cir. 2014). The Supreme Court has also instructed that “a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2124 (2014).

Although Petitioner focuses on the first phrase of the limitation, we consider the entirety of the limitation: “navigating the user by presenting, on the display screen of the marine navigational device, the re-routed course along which the navigational device is traveling.” To the extent there is any ambiguity in the first phrase—“nagivating the user”—the remainder of the limitation clearly sets forth how that is accomplished. That is, the claim limitation requires the marine navigational device to present on its display screen “the re-routed course along which the navigational device is traveling.” *See* Ex. 1025 (Dr. Braasch testifying that “[p]erhaps what [Patent Owner] intended was to claim ‘presenting, on the display screen of the marine navigational device, the re-routed course along which the navigational device is traveling to aid the user in navigating a craft containing the marine navigational device along the re-routed course’” (emphasis omitted)). In light of the entirety of the limitation, we conclude that the claim limitation, taken as a whole, is not so “ambiguous, vague, incoherent, opaque, or otherwise unclear in describing and defining the claimed invention.” *See Packard*, 751 F.3d at 1311. Further, claims 73 and

74, read in light of the specification and the prosecution history, inform, with reasonable certainty, those skilled in the art about the scope of the invention. *See Nautilus*, 134 S. Ct. at 2124.

We determine, based on the record of this proceeding, that Petitioner has not shown, by a preponderance of the evidence, that proposed claims 73 and 74 are unpatentable as indefinite under 35 U.S.C. § 112, ¶ 2, under either *Packard* or *Nautilus*.

b. Written Description

Petitioner asserts that proposed substitute claims 73 and 74 do not satisfy the written description requirement of 35 U.S.C. § 112, ¶ 2. Opp. 25. According to Petitioner, none of Patent Owner’s specific citations to the specification of the ’703 patent “describe methods or devices for ‘directing a craft along a course,’” as required by Patent Owner’s proposed construction. Instead, according to Petitioner, “they merely describe *display* of a calculated route with related information” and “displaying a route is not ‘directing a craft’ along it.” *Id.* (citing Ex. 1025 ¶¶ 68–74).

Patent Owner argues it identifies in the Motion to Amend “display screen 214 and the various information presented on display screen for written description [as] support of the ‘navigating’ limitation in the substitute independent claims.” Reply to Opp. 12 (citing Motion to Amend 10). More specifically, Patent Owner asserts:

The ’703 Patent discloses providing the user with various information for the navigation functionality, including the re-routed course, navigation display, map display, and other information. See [Ex. 1001,] 4:4-23, 14-23, Figs. 4A-4B. As opined by Capt. Browne, these items of information provide navigation information to the user for directing the craft along the course. ([Ex. 2007] ¶ 22).

Reply to Opp. 12.

To satisfy the written description requirement, the disclosure must reasonably convey to ordinarily skilled artisans that the inventors possessed the claimed invention as of the filing date. *See Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). The description must “clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.” *Id.* (alteration in original) (quoting *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991)).

[T]he test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed. *Id.* “[T]he hallmark of written description is disclosure.” *Id.* “This inquiry . . . is a question of fact,” which “var[ies] depending on the context” and “requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art.” *Id.* (citations omitted). Demonstrating adequate written description “requires a precise definition” of the invention. *Id.* at 1350. However, the claimed invention need not be recited *in haec verba* in the original specification in order to satisfy the written description requirement. *Id.* at 1352.

We are not persuaded that the original specification does not provide sufficient written description support for the amended claim language. The sections cited by Patent Owner demonstrate that the inventors possessed the claimed invention as of the filing date. For example, the ’703 patent discusses having a display screen which can present different displays, including a “map display” and a “navigation display.” Ex. 1001, 4:4–23.

The '703 patent further describes how the map display shows the re-routed course, including the additional waypoints, that avoids preselected conditions. *Id.* at 12:26–31, Figs. 4B, 4C.

Moreover, the original specification is replete with variations of the word “navigation.” *See, e.g., id.* at 1:6–8 (“The present invention relates generally to navigational devices, and in particular to marine *navigational* devices with cartographic alert capabilities.”) (emphasis added), 1:18–20 (“The boater can then use the information from these devices in planning and *navigating* a course for the boat.”) (emphasis added). To the extent that “navigating” as used in the '703 patent includes “directing a craft or vehicle along the course from one place to another,” the use of the words “navigating” and “navigational” in the specification provide sufficient written description for the same words (and variations) in the claims. *Cf.* Opp. 5 (arguing that the prior art that was used by Patent Owner to construe “navigation” necessarily discloses “navigation” under Patent Owner’s proposed claim construction). Although there is no requirement “that the specification recite the claimed invention *in haec verba*” to satisfy the written description requirement, *Ariad*, 598 F.3d at 1352 (citing *Lockwood v. Am. Airlines*, 107 F.3d 1565, 1571–72 (Fed. Cir. 1997)), the use of the claim term in the specification can provide a sufficient written description for its use in the claim. *Cf. Crown Packaging Tech., Inc. v. Ball Metal Beverage Container Corp.*, 635 F.3d 1373, 1380 (Fed. Cir. 2011) (citing *Ariad*, 598 F.3d at 1349) (“Original claims are part of the specification and in many cases will satisfy the written description requirement.”); *see also* Ex. 1002, .521–.527 (original claims reciting “navigation”).

Moreover, at Petitioner's urging, we did not construe the claim limitation "navigation" to include "directing a craft or vehicle along the course from one place to another." See Opp. 5 ("Because [Patent Owner's] proposed construction is not material to [patentability], the Board need not construe the term."). As Petitioner agreed at the hearing, if that is not a requirement of the claims, the written description issue is "avoid[ed]." Tr. 21:13–18. Because we do not interpret the claim to require such directing, there is no requirement for there to be written description of directing a craft.

Therefore, we determine, based on the record of this proceeding, that Petitioner has not shown, by a preponderance of the evidence, that proposed substitute claims 73 and 74 are unpatentable for failing to comply with the written description requirement of 35 U.S.C. § 112, ¶ 2.¹³

C. Conclusion on Motion Amend

As explained above, the Motion to Amend claims 51–72 is denied as moot and the Motion to cancel claim 45 is granted.

As to claims 73 and 74, they are responsive to a ground of unpatentability in the trial, the amendments do not constitute new matter, there is written description support for the claims, and Petitioner has not shown by a preponderance of the evidence that the subject matter of claims 73 and 74 is unpatentable. Accordingly, we grant Patent Owner's Motion to Amend to the extent it seeks to substitute claims 73 and 74 for original claims 28 and 29.

¹³ Our determination is the same regardless of whether or not Patent Owner has the burden to establish the proposed amendment does not "introduce new matter." See 35 U.S.C. § 316(d)(3). Proposed substitute claims 73 and 74 have sufficient written description support in the original specification of the '703 patent, and do not introduce new matter.

IV. MOTION FOR OBSERVATION

Patent Owner filed a Motion for Observation regarding the cross-examination of Dr. Braasch. *See* Paper 31. Petitioner, in turn, filed a Response to the Motion for Observation. *See* Paper 34.

We have considered Patent Owner's Observations and Petitioner's responses in rendering this Final Written Decision, and we have accorded the cited testimony of Dr. Braasch appropriate weight, as explained herein.

V. CONCLUSION

For the foregoing reasons, we conclude that Petitioner has demonstrated by a preponderance of the evidence the unpatentability of claims 28, 29, and 45 of the '703 patent, but has not demonstrated by a preponderance of the evidence that claims 1–7, 12–23, 25–27, and 41–44 are unpatentable. Specifically, Petitioner has demonstrated by a preponderance of the evidence that (1) claim 28 is anticipated under 35 U.S.C. § 102 by de Jong and (2) claims 29 and 45 would have been obvious under 35 U.S.C. § 103 in light of de Jong and Tetley. Petitioner has not demonstrated by a preponderance of the evidence that (1) claims 1, 7, 12, 19, and 27 are anticipated under 35 U.S.C. § 102 by de Jong or that (2) claims 2–6, 13–18, 20–23, 25, 26, and 41–44 would have been obvious under 35 U.S.C. § 103 in light of de Jong and Tetley.

Additionally, we grant Patent Owner's Motion to Amend to replace claims 28 and 29 with substitute claims 73 and 74 and to cancel claim 45, and dismiss the Motion to Amend as moot with respect to substitute claims 51–72.

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has not shown by a preponderance of the evidence that claims 1–7, 12–23, 25–27, and 41–44 of the '703 patent are unpatentable;

FURTHER ORDERED that Petitioner has shown by a preponderance of the evidence that claim 28 is anticipated by de Jong;

FURTHER ORDERED that Petitioner has shown by a preponderance of the evidence that claims 29 and 45 are unpatentable over de Jong and Tetley;

FURTHER ORDERED that Patent Owner's Motion to Amend is *dismissed-in-part* as moot with respect to substitute claims 51–72;

FURTHER ORDERED that Patent Owner's Motion to Amend is *granted-in-part* with respect to cancelling claim 45;

FURTHER ORDERED that Patent Owner's Motion to Amend is *granted-in-part* with respect to proposed substitute claims 73 and 74; and

FURTHER ORDERED that because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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Patent 7,268,703 B1

PETITIONER:

Brian Ferguson
Brian.ferguson@weil.com
Anish Desai
Anish.desai@weil.com
Christopher Pepe
Christopher.pepe@weil.com

PATENT OWNER:

Jennifer Bailey
Jennifer.bailey@eriseip.com
Adam Seitz
Adam.seitz@eriseip.com