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Paper 34
Entered: November 26, 2019

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SEABED GEOSOLUTIONS (US), INC.,
Petitioner,

v.

MAGSEIS FF LLC[1],
Patent Owner.

IPR2018-00960
Patent RE45,268 E

Before KRISTINA M. KALAN, KEVIN W. CHERRY, and JON M. JURGOVAN, *Administrative Patent Judges*.

CHERRY, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

[1] On December 17, 2018, the challenged patent was assigned from Fairfield Industries, Inc. to Fairfield Seismic Technologies LLC. *See* Paper 15, 1. On January 9, 2019, Fairfield Seismic Technologies LLC changed its name to Magseis FF LLC d/b/a Magseis Fairfield. *See* Paper 17, 1. We update the caption accordingly.

I. INTRODUCTION

A. Background

Seabed Geosolutions (US) Inc. ("Petitioner") filed a Petition (Paper 2, "Pet.") requesting institution of *inter partes* review of claims 1–3, 5–7, 10, 12, 13, 15–18, 21–30, 32–34, and 38–43 of U.S. Patent No. RE45,268 E (Ex. 1001, "the '268 patent"). Pet. 1. Magseis FF LLC ("Patent Owner") filed a Preliminary Response (Paper 7). Petitioner filed a Reply (Paper 10), and Patent Owner filed a Sur-Reply (Paper 11). The Reply and Sur-Reply were directed to the limited issue of what weight we should give to U.S. Patent No. 7,310,287 (Ex. 2012, "the '287 patent"), which Patent Owner, in its Preliminary Response, had incorrectly asserted was incorporated by reference into the '268 patent. *See* Paper 9.

The Petition challenges the patentability of claims 1–3, 5–7, 10, 12, 13, 15–18, 21–30, 32–34, and 38–43 of the '268 patent under the following grounds:

Reference(s)	35 U.S.C. §	Claim(s) Challenged
Cranford[2]	§ 102(b)[3]	1, 22, 29, 30

[2] M.D. Cranford et al., *A Direct-Recording Ocean-Bottom Seismograph*, BULLETIN OF THE SEISMOLOGICAL SOCIETY OF AMERICA, Vol. 66, No. 2, 607–615 (1976) (Ex. 1005, "Cranford").

[3] Because the claims at issue have an effective filing date prior to March 16, 2013, the effective date of the applicable provisions of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), we apply the pre-AIA versions of 35 U.S.C. §§ 102 and 103 in this Decision.

Mattaboni[4]	§ 102(b)	1–3, 5–7, 15, 18, 22–24, 32
Mattaboni, Carrack[5]	§ 103(a)	10, 25, 26
Mattaboni, Willoughby[6]	§ 103(a)	12, 13, 27, 28, 38
Mattaboni, Willoughby, Jones[7]	§ 103(a)	21
Cranford, Willoughby, Prothero[8]	§ 103(a)	16, 17, 33, 34
Cranford, Johnson[9]	§ 103(a)	39, 40, 41, 42, 43

On November 29, 2018, we instituted an *inter partes* review of all claims challenged in the Petition on all of the asserted grounds. *See* Paper 12, 29 ("Dec. on Inst.").

After institution of trial, Patent Owner filed a Patent Owner Response (Paper 18, "PO Resp."), and Petitioner filed a Reply (Paper 23, "Pet. Reply"). Patent Owner, with Board authorization, filed a Sur-Reply (Paper 25, "PO Sur-Reply") in lieu of Observations on Cross-Examination.

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[4] Mattaboni, Paul J., *MITOBS: A Seismometer System for Ocean-Bottom Earthquake Studies*, MARINE GEOPHYSICAL RESEARCHES 3 (1977) 87–102 (Ex. 1006, "Mattaboni").

[5] Carrack Measurement Technology–Ocean Bottom Systems: miniDOBS Seismometer (1998), http://www.carrack.co.uk/minidobs.htm#Geophones (Ex. 1007, "Carrack").

[6] Willoughby, David F., *A Microprocessor-Based Ocean-Bottom Seismometer*, BULLETIN OF THE SEISMOLOGICAL SOCIETY OF AMERICA, Vol. 83, No. 1, pp. 190–217, February 1993 (Ex. 1008, "Willoughby").

[7] Jones, U.S. Patent No. 6,951,138 B1, filed Nov. 1, 2000, issued Oct. 4, 2005 (Ex. 1011, "Jones").

[8] William A. Prothero, Jr., *First Noise and Teleseismic Recordings on a New Ocean Bottom Seismometer Capsule*, BULLETIN OF THE SEISMOLOGICAL SOCIETY OF AMERICA, Vol. 74, No. 3., 1043–1058 (June 1984) (Ex. 1009, "Prothero").

[9] S.H. Johnson, et al., *A Free-Fall Direct-Recording Ocean Bottom Seismograph*, MARINE GEOPHYSICAL RESEARCHES, Vol. 3, pp. 103-117 (1977) (Ex. 1010, "Johnson").

Petitioner supports its arguments with a declaration by Gerald J. Beaudoin, dated April 27, 2018 (Ex. 1003), and a supplemental declaration by Gerald Beaudoin, dated May 8, 2019 (Ex. 1118). Patent Owner supports its Response with a declaration by Dr. Rocco Detomo, Ph.D., dated February 19, 2019 (Ex. 2056). Oral argument was held on August 9, 2019, a transcript of which is included in the record. Paper 33 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. Petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must prove unpatentability by a preponderance of the evidence. *See* 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). This Final Written Decision is issued 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 not shown by a preponderance of the evidence that claims 1–3, 5–7, 10, 12, 13, 15–18, 21–30, 32–34, and 38–43 of the '268 patent are unpatentable. *See* 35 U.S.C. § 316(e).

B. Related Proceedings

Patent Owner asserted the '268 patent against Petitioner in *Fairfield Industries Inc. v. Seabed Geosolutions (US) Inc.*, Case No. 4:17-cv-01458 (S.D. Tex.). Paper 3, 2.

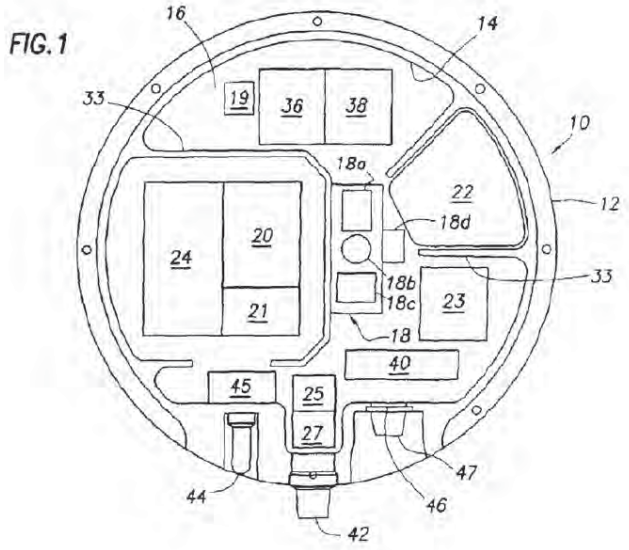
The '268 patent is also related to U.S. Patent No. 8,228,791 B2, which is the subject of the same litigation and IPR2018-00961. *Id.*

The '268 patent is also related to U.S. Patent No. 8,879,362 B2, which is the subject of the same litigation and IPR2018-00962. *Id.*

C. The '268 Patent

The '268 patent is titled "Apparatus for Seismic Data." Ex. 1001, code (54). The '268 patent describes a marine seismic exploration method and system "comprised of continuous recording, self-contained wireless seismometer units or pods." Ex. 1001, Code (57). The pods record acoustic reflections from the geologic formations as seismic data. *Id.* at 1:27–38. Seismic data recorded by the pods can be retrieved and the pod can be charged, tested, and re-synchronized without the need to open the pod. *Id.* at 4:11–14.

Details of pod 10 are provided in Figures 1 and 2 of the '268 patent, reproduced below. *Id.* at 6:9–11.



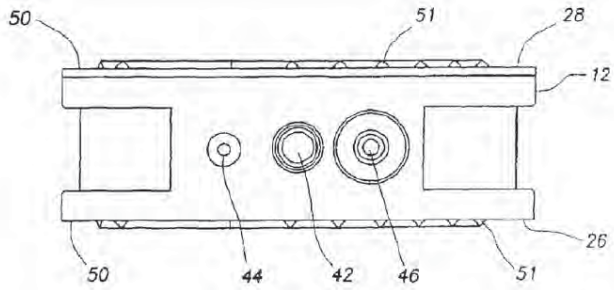


FIG. 2

Figure 1 is a cut-away top view of the seismic data recorder unit and Figure 2 is a front side view of the unit of Figure 1. *Id.* at 6:9–11. In Figure 1, pod 10 comprises case 12 having wall 14 defining internal compartment 16, which contains at least one geophone 18, clock 20, power source 22, control mechanism 23, and seismic data recorder 24. *Id.* at 6:25–34. Pod 10 is self-contained such that power source 22 meets all of its power requirements, and control mechanism 23 provides all of its control functions, eliminating the need for external control communications. *Id.* at 6:34–36. Geophone 18 is internally mounted within pod 10 and thus requires no external wiring or connection. *Id.* at 6:43–45. The '268 patent explains that "[i]t has been determined that utilizing a compact case and positioning geophone 18 adjacent the casing wall, geophone 18 can be effectively coupled to the earth such that seismic data transmitted through pod 10 to geophone 18 is not corrupted by interference." *Id.* at 6:45–49.

D. Illustrative Claim

Independent claims 1, 5, 21, and 22 are challenged in this proceeding. Claims 2, 3, 10, 12, 13, and 15–18 depend, directly or indirectly, from claim 1. Claims 6 and 8 depend, directly or indirectly, from claim 5. Claims 23–30, 32–34, and 38–43 depend, directly or indirectly, from claim 22. Claim 1 is illustrative and is reproduced below:

> 1. A seismic data collection unit comprising:
>
> a. a fully enclosed, single case formed of a housing, said case having a wall defining an internal compartment within said housing;
>
> b. at least one geophone internally fixed within said housing;
>
> c. a clock disposed within said housing;

> d. a power source disposed within said housing; and
>
> e. a seismic data recorder disposed within said housing;
>
> f. wherein each of said elements b-e include an electrical connection and all electrical connections between any elements b-e are contained within said housing; and
>
> g. wherein said geophone is coupled to said seismic data recorder to permit seismic signals detected by said geophones to be recorded on said seismic data recorder,
>
> h. wherein the single case comprises a first plate having a first periphery and a second plate having a second periphery, wherein the plates are joined along their peripheries by a circular wall.

Ex. 1001, 11:58–12:2.

II. LEVEL OF ORDINARY SKILL IN THE ART

"The person of ordinary skill in the art is a hypothetical person who is presumed to know the relevant prior art." *In re GPAC*, 57 F.3d 1573, 1579 (Fed. Cir. 1995).

Petitioner and its expert contend that a person of ordinary skill in the relevant art would have

> a bachelor's degree in electrical or mechanical engineering, geophysics, or a related discipline, and about 4-5 years of experience with autonomous seismic nodes. However, a person with a more advanced degree and/or prior experience with other types of seismic data collection devices, could qualify as a [person of ordinary skill in the art ('POSITA')] with fewer years of experience.

Pet. 11–12 (citing Ex. 1003 ¶¶ 17–19).

Patent Owner contends that a person of ordinary skill in the art would have had:

> a.) at least a bachelor's degree in physics, geophysics, mathematics, engineering, or the equivalent thereof; b.) greater than five (5) years of experience with the conduct of seismic

> surveys with geophones, or the equivalent thereof; and c.) at least two (2) years of experience working specifically with ocean bottom seismic data acquisition technologies, or the equivalent thereof.

PO Resp. 20 (citing Ex. 2056 ¶¶ 53–54).

Patent Owner also submits that "Dr. Detomo is an individual of at least ordinary skill in the art under either standard, and the analysis throughout this Response and [Dr.] Detomo's report would not change whether Petitioner or Patent Owner's level of ordinary skill in the art was adopted." *Id.*

Considering the foregoing, we find that a person of ordinary skill in the art would have had: (i) a bachelor's degree in electrical or mechanical engineering, geophysics, mathematics, general engineering, or equivalent thereof, and five years of experience with the conduct of surveys with geophones, or the equivalent thereof, including two years of work specifically with ocean bottom seismic data acquisition technologies, or the equivalent thereof; or (ii) a bachelor's degree and an advanced degree in electrical or mechanical engineering, geophysics, mathematics, general engineering, or equivalent thereof, and four years of experience with the conduct of surveys with geophones, or the equivalent thereof, including two years of work specifically with ocean bottom seismic data acquisition technologies, or the equivalent thereof.

We adopt these statements as describing the level of ordinary skill in the art pertinent to the '268 patent in our obviousness analysis. We note that the level of skill in the art is reflected by the prior art of record, and that under either definition we have adopted, our analysis would be the same.

See Okajima v. Bourdeau, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d at 1579; *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

III. CLAIM CONSTRUCTION

In an *inter partes* review based on a petition filed prior to November 13, 2018, claim terms in an unexpired patent are construed according to their broadest reasonable interpretation in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b) (2017);[10] *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). There is a presumption that claim terms are given their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art in the context of the specification. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Nonetheless, if the specification "reveal[s] a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess[,] . . . the inventor's lexicography governs." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (en banc) (citing *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002)). Another exception to the general rule that claims are given their ordinary and customary meaning is "when the patentee disavows the full scope of a claim term either in the specification or during prosecution." *Uship Intellectual Props., LLC v. United States*, 714 F.3d 1311, 1313 (Fed. Cir. 2013) (quoting *Thorner v. Sony Comp. Entm't*

[10] A recent amendment to this rule does not apply here because the Petition was filed before November 13, 2018. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective Nov. 13, 2018) (now codified at 37 C.F.R. pt. 42 (2019)).

Am. LLC, 669 F.3d 1362, 1365 (Fed. Cir. 2012)). Additionally, only terms that are in controversy need to be expressly construed, and these need be construed only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

A. "internally fixed"

All of the independent claims of the '268 patent recite the limitation "at least one geophone internally fixed" or a substantially similar limitation.[11] Patent Owner seeks to have us construe "at least one geophone internally fixed within" as "at least one internal geophone that does not move (e.g. is not gimbaled)." PO Resp. 29. Patent Owner, relying on the testimony of its expert, argues that the term "internally fixed" would have been understood by a person of ordinary skill to refer to a geophone that was not gimbaled. *Id.* at 31 (citing Ex. 2056 ¶¶ 72–75). Patent Owner further asserts that Petitioner's expert, Mr. Beaudoin, also supported its position. *Id.* at 32–35 (citing Ex. 2024, 111:14–114:6, 347:6–347:21). In particular, Mr. Beaudoin explained what gimbaling is in the following testimony:

> Q. What is gimbaling?
>
> A. Gimbaling is a way – it goes back to the geophones and how you want to sense the earth. And in the example I gave earlier about land data, one of the things we wanted to do was record what we call the vertical component of the motion of the earth. And, yes, the earth moves up and down in a response to seismic waves, and recording only that single component has been very useful over decades and decades. So that's vertical.
>
> Well, we wanted to record the same quality of data of vertical component on the seafloor. Gimballing allows you to – I'm

[11] Claim 22 recites "at least one geophone internally fixed within said internal compartment." Ex. 1001, 13:8–9.

going to have to hold the table because I want to use my hands and I know gestures are not required.

But think of gimbaling as a way the device, the vertical geophone, is attached to – well, your shoulder is a gimbaling device. It's a ball-and socket. So if you were to roll out of bed in the morning and put your arm under the influence of gravity over the side of the bed, it would naturally come to rest in a vertical position, because this ball-and-socket joint is somewhat universal.

It has its limits as some of us have found out. But that is a ball-and-socket arrangement. You can put a geophone on a ball-and-socket arrangement like that. There are other ways of doing it, and when the device comes to rest on the seafloor, let's say it comes to rest on a seafloor that's tilting 10 degrees. The whole device is tilted 10 degrees, but the geophone, which you want to record vertical information is on a ball and socket, which under the influence of gravity causes the geophone to come to risk – rest in a vertical position. It's 10 degrees off from the tilt of the surface. So it's in a vertical position.

Gimbaling is – is one of the things that folks had to do because they didn't understand where these selflanding and ascending devices would land. So gimbaling was their solution to what was otherwise good devices for their time. I'll leave it at that. The question was gimbaling. That's how I describe gimbaling.

Q. So what are the alternatives to gimbaling?

A. The alternative – well, our alternative was how can we mimic the land approach. We wanted to use geophones that did not have gimbaling. There are other problems with gimbaling in terms of noise and instability. There are other issues than what I described, besides being mechanically complex, subject to failure, all these other issues. We wanted to keep these devices as simple as possible to make them as reliable as possible to reduce failure rates to the bare minimum. So we wanted to fix these geophones basically to the pressure vessel that they were contained in. And I guess—let me think—yeah, that's basically the way you put it. We wanted it fixed to the pressure vessel that it was contained in.

> Q. So what would you refer to those as, if they were not gimbaled and ---
>
> . . . .
>
> A. They were mounted and fixed, yeah, fixed to the casing, that sort of thing.

Ex. 2024, 111:14–114:6.

Mr. Beaudoin also testified regarding the construction of "internally fixed," saying:

> Q. You have read from Lines 49 to 55 in Column 6 [of the '268 patent]?
>
> A. I have read Line 49 to -- through Line 55.
>
> Q. What would this language have suggested, if anything, to a person of ordinary skill in the art in terms of geophones that are mechanically gimbaled?
>
> A. In the context of reading this patent, a POSITA would have understood that geophones and other devices are there, but the geophone is – there is no mention of gimbaling in that – in that sentence. So there is no reference to gimbaling. Therefore, the geophone is not likely to be – is not gimbaled. It's a geophone without any gimbaling.

Ex. 2024, 347:6–347:21 (objections omitted).

Patent Owner also points to other extrinsic evidence (including extrinsic evidence proffered by Petitioner) from after the priority date supporting its contention that "fixed geophones" are a term of art that excludes gimbaling. *Id.* at 35–38 (citing Exs. 2016, 2017, 2028, 2044, 2045, 2046, 2047).

Petitioner argues that Patent Owner's construction has no basis in, and is contrary to, the intrinsic evidence. Pet. Reply 15. In particular, Petitioner notes that "internally fixed" is not found in the original Specification of the '268 patent, and the term was only added during prosecution to

overcome a rejection based on U.S. Patent No. 4,292,861 (Ex. 1119, "Thornhill"). *Id.* at 16. Petitioner contends that Patent Owner added "internally fixed" to distinguish Thornhill's geophone, which is ejected from the case. *Id.* at 18. Petitioner asserts that broadly construing this term to include gimballed geophones is consistent with the Specification, which describes the geophone as "internally mounted" without any "external wiring or connections." *Id.* (citing Ex. 1001, 6:43–45). Petitioner notes that the Specification mentions "a mechanically gimballed clock" and states that "[a]ll references to geophones utilized in the invention include conventional geophones." *Id.* at 18–19 (citing Ex. 1001, Abstract, 4:20–22, 7:66–87, 6:50–55). As for the extrinsic evidence, Petitioner argues that "[w]hile 'fixed' geophones may have had some meaning to a POSITA generally," the claims recite "internally fixed," not "fixed." *Id.* at 19. Petitioner submits that Mr. Beaudoin's testimony to the contrary was merely "confusion." *Id.* at 20.

We agree with Patent Owner that the term "internally fixed" excludes geophones that are gimbaled. While the broadest reasonable interpretation standard is broad, it is also true that "[c]onstruing individual words of a claim without considering the context in which those words appear is simply not 'reasonable.'" *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016). Instead, it is the "use of the words in the context of the written description and customarily by those of skill in the relevant art that accurately reflects both the 'ordinary' and the 'customary' meaning of the terms in the claims." *Ferguson Beauregard/Logic Controls, Div. of Dover Res., Inc. v. Mega Sys., LLC*, 350 F.3d 1327, 1338 (Fed. Cir. 2003).

Here, we do not find the Specification to be dispositive one way or the other. It does not necessarily preclude geophones that are gimbaled, but it does not require them either. The only explanation of the attachment of the geophone to the case is that it is "internally mounted" and that it be positioned adjacent to the casing wall so that the geophone "can be effectively coupled to the earth such that seismic data transmitted through pod 10 to geophone 18 is not corrupted by interference." Ex. 1001, 6:43–49. Petitioner focuses on the statement that "all references to geophones utilized in the invention include conventional geophones." *Id.* at 6:49–51. However, it is not clear whether this passage is referring only to the geophone itself or to the manner in which the geophone is mounted in the case. As for the reference to "a mechanically gimballed clock," *id.* at 4:20–22, 7:66–8:7, this reference relates to the clock and not the geophone and is not particularly informative as to the meaning of "a geophone internally fixed within the housing."

As for Petitioner's contention that the prosecution history supports its broad construction, we do not agree that the prosecution history is unambiguous. Pet. Reply 16–18; *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003) (noting ambiguous language cannot support disavowal). Petitioner is correct that the prior art Thornhill patent involved a device where the geophone is ejected from the housing, but it does not follow that the applicants were using "internally fixed" to refer only to the broad concept that the geophone is mounted within the case (i.e., not ejected). *Id.* at 18. As Patent Owner points out, the claims were also amended in response to the Thornhill rejection to add "fully enclosed." *See* PO Sur-Reply 11. In its remarks accompanying the amendment, Patent

Owner expressly tied the addition of "fully enclosed" to the ejection of the geophone. Ex. 2013, 270–271. With respect to the "internally fixed" language, the remarks only state that in Thornhill, the geophone is not internally fixed inside the case "since this would defeat the fundamental invention claimed therein." *Id.* at 271. Patent Owner contends that the "fundamental invention" of Thornhill is that it is self-orienting, which allowed the geophones to internally move *within* the case. PO Sur-Reply 11. Although the amendment could be read to capture only the idea that the geophone does not leave the case, it could also be read to address the self-orienting aspect of Thornhill's geophone, even when it is within the case. *See id.* at 11–12. Thus, we agree with Patent Owner that, at the very least, the prosecution history is ambiguous and does not preclude Patent Owner's proposed construction.

Finally, we look at the extrinsic evidence offered by the parties. We agree with Patent Owner that this evidence demonstrates that in the context of this field, a person of ordinary skill would understand that the term "fixed" indicates that the geophone is not gimbaled. As Mr. Beaudoin persuasively and comprehensively explains, in this field, a geophone that is "fixed" is one that is attached to the case without gimbaling. Ex. 2024, 111:14–114:6. Moreover, Mr. Beaudoin also testifies that a person of ordinary skill reviewing the Specification would understand that "internally fixed" refers to a geophone that is attached to the case without gimbaling. *Id.* at 347:6–347:21. Mr. Beaudoin's testimony at his deposition is consistent Dr. Detomo's testimony. Ex. 2056 ¶¶ 72–75. It is also consistent with the numerous patents and other publications (including some submitted

by Petitioner itself) that Patent Owner identifies.[12] Exs. 2016, 3:12–20; 2017, 1; 2028, 4; 2044, 9; 2045, 19; 2046, 5; 2047, 2.

Petitioner raises several arguments regarding why we should not give weight to this extrinsic evidence. First, Petitioner argues that we should not give weight to Mr. Beaudoin's testimony because it is internally inconsistent with other testimony at his deposition. *See* Pet. Reply 20. We note that Mr. Beaudoin did initially respond that he agreed with Petitioner's construction that included gimbaling. *See* Ex. 2024, 345:22–346:8. However, we do not find this initial answer to be entitled to much weight because it is conclusory. *See id.* Mr. Beaudoin's subsequent answers are far more detailed and include his review of the Specification as directed by Petitioner's counsel. *See id.* at 346:9–348:16. We agree with Patent Owner that Mr. Beaudoin's more detailed answers are entitled to more weight. *See* PO Sur-Reply 14–15. Moreover, weighing the totality of his testimony, including his earlier answers explaining gimbaling and the alternatives to gimbaling used in the project he worked on with Patent Owner, we determine that Mr. Beaudoin's answers explaining that the claims of the '268 patent do not include gimbaling are entitled to the most weight in our analysis, because they provide the most detail and the most relevant analysis of the claims at issue.

Second, Petitioner argues that Mr. Beaudoin "corrected" his testimony in his Reply Declaration. *See* Pet. Reply 20. We begin by finding that Mr. Beaudoin did not change his testimony that a geophone that is "fixed" to the

[12] Because these patents and articles are after the priority date of the '268 patent, we do not rely on them to directly define the term "internally fixed." Instead, we cite them merely to show that Mr. Beaudoin's deposition testimony is consistent with nearly contemporaneous usage in the art.

casing is the alternative to gimbaling in this field. *See* Ex. 1118 ¶¶ 8–10 (only seeking to change the testimony on Ex. 2024, 346:9–348:16); *see also* Ex. 2102, 65:8–20 (explaining what a gimbal is similar to); Ex. 2024, 111:14–114:6. The testimony that Mr. Beaudoin attempted to correct was his testimony on re-direct that he agreed with Patent Owner's contention that the claims of the '268 patent excluded gimbaling. *See* Ex. 1118 ¶¶ 8–10. We determine that Mr. Beaudoin's explanation for the change—that he was confused by the questions—is unpersuasive. *See id.*; Ex. 2102, 59:25–65:7. As the original transcript (Ex. 2024) reflects, Mr. Beaudoin gave the testimony in question on re-direct by Petitioner's counsel. Ex. 2024, 346:9–348:16. Specifically, Mr. Beaudoin provided the following testimony on re-direct:

> Q. Why do you say that?
>
> A. The term – "gimbaling" in the patent is used exclusively with respect to the clock that's used. Everywhere I see "gimbaling" in the patent in the same sentence, it's associated with the clock. Gimbaling is never used associated with the geophone in the pressure vessel. It's -- the only way -- yeah. That's – that's it.
>
> Q. Can I turn your attention to Column 6 in 18 the '268 patent that's been marked as Exhibit 1001.
>
> A. I see Column 6.
>
> Q. Do you see starting there at Line 49 it says, "all references to geophones utilized in the 22 invention" and it goes on from there until about Line 55.
>
> A. Yes. Uh-huh.
>
> Q. Can you review for yourself what's stated here in Lines, about, 49 to 55 in Column 6.
>
> A. Okay. 4 (Pause.) I have read that sentence, yes.
>
> Q. You have read from Lines 49 to 55 in Column 6?
>
> A. I have read Line 49 to -- through Line 55.

> Q. What would this language have suggested, if anything, to a person of ordinary skill in the art in terms of geophones that are mechanically gimbaled?
>
> A. In the context of reading this patent, a POSITA would have understood that geophones and other devices are there, but the geophone is -- there is no mention of gimbaling in that -- in that sentence. So there is no reference to gimbaling. Therefore, the geophone is not likely to be -- is not gimbaled. It's a geophone without any gimbaling.
>
> Q. What would that language there in Column 6, Lines 49 to 55, have suggested, if anything, to a person of ordinary skill in the art about whether internally fixed, as that term is used in the patent's claims, includes geophones that are mechanically gimbaled?
>
> A. I look at this sentence and imagine a hypothetical POSITA looking at this and the sentence -- the plain language says that this is about conventional geophones. There is no reference to gimbaling in this -- say this -- there is no reference to gimbaling associated with geophones in here. It doesn't specifically -- to a POSITA, it's just about geophones. It doesn't talk about gimbaling.

Ex. 2024, 346:10–348:16.

Moreover, Mr. Beaudoin's answers were not short responses where someone accidently answers "yes," when they meant "no." Instead, they are multi-page answers explaining in detail why he believed that the claims did not include gimbaling. *Id.* Indeed, Petitioner's counsel asked the question several times and directed Mr. Beaudoin to a portion of the Specification, which the transcript reflects Mr. Beaudoin paused and reviewed. *Id.* Also, the testimony Mr. Beaudoin seeks to recant is consistent with his earlier testimony that fixing a geophone to the case was the alternative to gimbaling used in the project he worked with Patent Owner on. *See id.* at 111:14–114:6. Thus, considering the totality of his testimony, Mr. Beaudoin's

testimony in his Reply Declaration that he was confused is unpersuasive and we decline to give significant weight to this later testimony seeking to rescind his earlier answers.

Finally, Petitioner argues that whatever meaning this art assigns to the term "fixed," the claims recite "internally fixed," which is different. We do not agree that the slight variation in the term "fixed" versus the term "internally fixed" makes any difference on the key point of contention between the parties—whether gimbaling is included in the meaning of "internally fixed." Petitioner provides no explanation—and we can discern none independently—why the addition of the word "internally" would transform the established meaning in the art for "fixed" geophones, i.e., transform it from a meaning that excludes gimbaling into a meaning that includes gimbaling. The natural reading of the addition of "internally" is that it merely serves to identify specifically where the "fixing" is occurring, but does not serve to broaden the term to include additional methods of attachment to the casing. Thus, we disagree that the claims' recitation of "internally fixed" changes the established meaning in the art for the term "fixed" as excluding gimbaling.

Accordingly, weighing all of the evidence together, we determine that Patent Owner has established that the meaning of "internally fixed" excludes geophones that are gimbaled. No further construction of the term is necessary at this time. We find that the intrinsic evidence is not inconsistent with this construction. We further find that Patent Owner has shown that this construction is also most consistent with the context of how this term is understood in this field based on the extrinsic evidence provided.

B. Remaining Terms

At this time, we determine that no further express construction of other terms is necessary for purposes of this Decision. *See Vivid Techs.*, 200 F.3d at 803.

IV. ANALYSIS

A. Asserted Anticipation by Cranford

Petitioner contends that claims 1, 22, 29, and 30 are anticipated by Cranford. Pet. 12–23. Petitioner supports its contentions with the testimony of Mr. Beaudoin. Ex. 1003 ¶¶ 52–71.

1. Cranford (Ex. 1005)

Cranford is titled "A Direct-Recording Ocean-Bottom Seismograph," and describes "[a] direct-recording ocean-bottom seismograph featuring small size and low cost [that] has been constructed and operated in the deep ocean." Ex. 1005, Abstract. The ocean-bottom seismograph of Cranford includes a geophone and hydrophone that are amplified and direct recorded on three channels of a magnetic tape. *Id.* Time pulses, generated from a crystal oscillator signal are recorded on a fourth channel of the magnetic tape. *Id.* The device is powered by nine D-cell alkaline batteries enclosed in the package. *Id.* For retrieval, an expendable base plate is released by a cable cutter on command from a clock comparator circuit. *Id.* The data can be played back once the device is retrieved. *Id.* Figure 2 of Cranford is reproduced below.

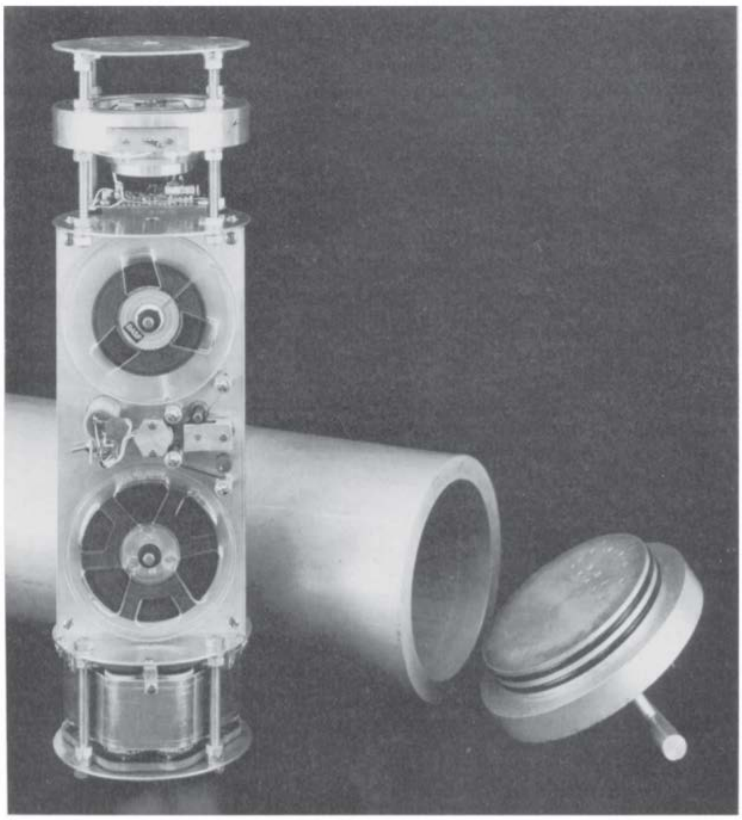


FIG. 2. Instrument and pressure case. Components from *top* to *bottom*: gimbal-mounted 2-Hz vertical geophone, tape deck, and battery pack. Electronic circuit boards are mounted behind the tape deck. Dimensions are 15-cm diameter by 53 cm.

Figure 2 of Cranford shows the instrument and water-tight pressure case. Ex. 1005, 609. From top to bottom the instrument includes a geophone, tape deck, and battery pack. *Id.* Figure 5 of Cranford is reproduced below.

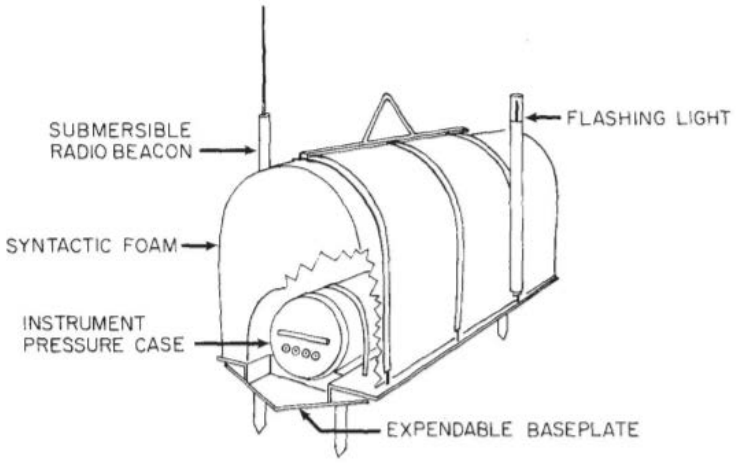


FIG. 5. External components of the seismograph. A single cable holds the baseplate to an aluminum frame while stainless steel straps secure the pressure vessel and syntactic foam flotation. The package measures 1.0 m in length by 0.7 m in height and weighs 114 kg. The float is painted with irridescent paint while a radio beacon and flashing light aid in locating the package on the surface.

Figure 5 of Cranford, reproduced above, shows the external components of the seismograph with a single cable holding the baseplate to an aluminum frame.

2. Analysis

Claims 1 and 22 are both independent claims. Claims 29 and 30 depend from claim 22. Petitioner maps elements from Cranford to each limitation of claims 1, 22, 29, and 30, with support from the testimony of Mr. Beaudoin. Pet. 13–23. In particular, Petitioner submits that Cranford discloses "a seismic data collection unit," Ex. 1005, Abstract. Pet. 13. For claim 1, for example, Petitioner further submits that Cranford discloses (a) "a fully enclosed, single case formed of a housing, said case having a wall defining an internal compartment within said housing," Ex. 1005, 611, Fig. 2; (b) "at least one geophone internally fixed within said housing," *id.* at 608, Fig. 2; (c) "a clock disposed within said housing," *id.* at 611, Fig. 1; (d) "a power source disposed within said housing," *id.* at 611, Fig. 2; (e) "a seismic data recorder disposed within said housing," *id.* at Abstract, 610,

Fig. 2; (f) "wherein each of said elements b-e include an electrical connection and all electrical connections between any elements b-e are contained within said housing," *id.* at Abstract, 608–611, Fig. 1; (g) "wherein said geophone is coupled to said seismic data recorder to permit seismic signals detected by said geophones to be recorded on said seismic data recorder," *id.* at Abstract; and (h) "wherein the single case comprises a first plate having a first periphery and a second plate having a second periphery, wherein the plates are joined along their peripheries by a circular wall," *id.* at 611–613, Fig. 2. *See* Pet. 13–17. Claim 22 is very similar to claim 1, and Petitioner relies on its analysis of claim 1 for claim 22, except for limitation (a) of claim 22, which differs from limitation (a) of claim 1 principally by requiring that the "single housing" be "non-spherical." Petitioner contends that Cranford meets even this "non-spherical" limitation. *See* Pet. 19–20 (citing Ex. 1005, 611, Fig. 2; Ex. 1003 ¶¶ 62, 71). Petitioner further contends that Cranford discloses the additional limitations of claims 29 and 30. Pet. 22–23 (citing Ex. 1005, 611–613, Figs. 2, 5; Ex. 1003 ¶¶ 69–71).

Patent Owner argues that Cranford fails to disclose a geophone that is "internally fixed" because Cranford's geophone is gimbaled. PO Resp. 45–46. We agree. There is no dispute that Cranford's geophone is gimbaled. *See* Pet. 14 (discussing how the geophone of Cranford is "mounted on a specially designed gimbal"); Ex. 1005, 2 ("A Mark Products L1-G 2.0 Hz geophone, the main sensing element, is mounted in a specially designed gimbal capable of 360° rotation (Figure 2)."). Because we have determined that the limitation "geophone internally fixed within said housing" does not include gimbaled geophones, we determine that Petitioner has not shown

that Cranford discloses this limitation. *See* Ex. 2056 ¶ 98. Thus, we determine that Petitioner has not proven by a preponderance of the evidence that claims 1, 22, 29, and 30 are anticipated by Cranford.

B. Anticipation by Mattaboni

Petitioner contends that claims 1–3, 5–7, 15, 18, 22–24, and 32 are anticipated by Mattaboni. Pet. 23–39. Petitioner supports its contentions with the testimony of Mr. Beaudoin. Ex. 1003 ¶¶ 73–101.

1. Mattaboni (Ex. 1006)

Mattaboni is titled "MITOBS: A SEISMOMETER SYSTEM FOR OCEAN-BOTTOM EARTHQUAKE STUDIES." Ex. 1006, 1. "MITOBS" appears to be an acronym for "MIT ocean-bottom seismometer." *Id.* Mattaboni describes the MITOBS as "a free-fall, pop-up instrument capable of recording seismic data on the ocean floor." *Id.* at 2. Mattaboni states that sensors and recording electronics are housed in an aluminum cylinder attached to three glass spheres to provide positive buoyancy to return the device to the sea surface. *Id.* The cylinder sits vertically atop a steel base, which serves as ballast and as a platform to couple ground motion to seismometers. *Id.* After a pre-set time interval, a motor drives a mechanical latch release. *Id.* The capsule then floats to the surface, leaving the base on the sea floor. *Id.* Mattaboni's Figure 1, shown below, shows these features of MITOBS.

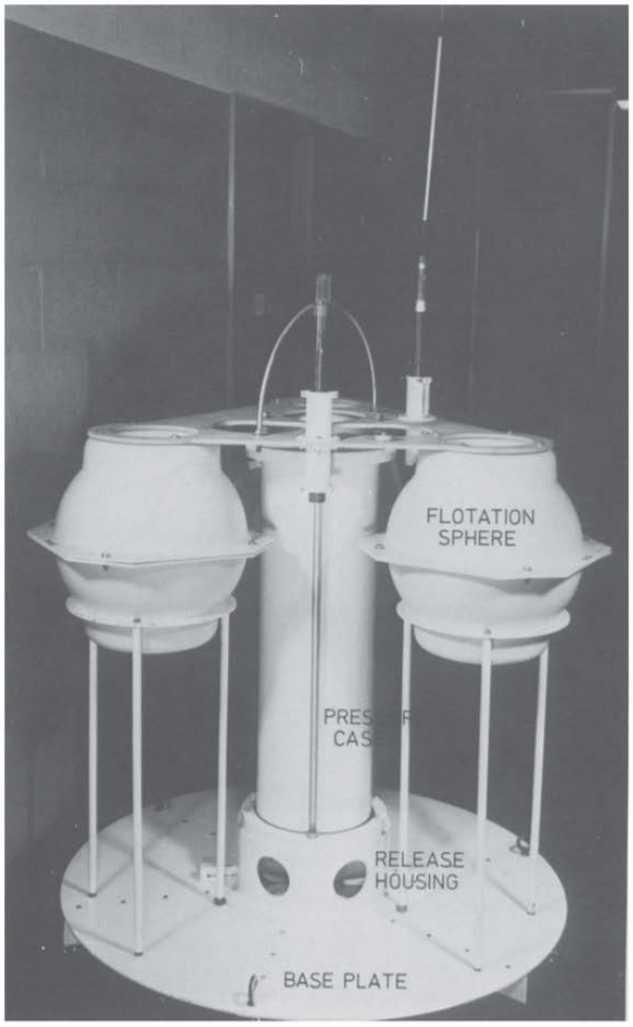


Fig. 1. MITOBS, external view. Visible are the pressure case, the flotation assembly and recovery aids, the lever arms and mechanical dogs of the release assembly, and the expendable base plate.

Mattaboni's Figure 1 above shows an external view of MITOBS. Mattaboni states MITOBS includes sensors, i.e., three geophones, and a recording system that uses both magnetic tape and semiconductor memories to record seismic activity when detected. *Id.* at 5. These components are housed within a cylindrical pressure vessel, as shown above in Mattaboni's Figure 1. *Id.* at 8. Mattaboni uses a cylinder, rather than a sphere, for lower cost and ease of operation at sea. *Id.*

2. Analysis

Claims 1, 5, and 22 are independent claims. Petitioner maps elements from Mattaboni to each limitation of claims 1, 5, and 22, with support from the testimony of Mr. Beaudoin. Pet. 24–39. In particular, Petitioner submits that Mattaboni discloses "a seismic data collection unit," Ex. 1006, Abstract. Pet. 24. For claim 1, for example, Petitioner further submits that Mattaboni discloses (a) "a fully enclosed, single case formed of a housing, said case having a wall defining an internal compartment within said housing," Ex. 1006, 94–95, Fig. 1; (b) "at least one geophone internally fixed within said housing," *id.* at 91, Fig. 2; (c) "a clock disposed within said housing," *id.* at 94, Figs. 1, 3; (d) "a power source disposed within said housing," *id.* at 96; (e) "a seismic data recorder disposed within said housing," *id.* at 96; (f) "wherein each of said elements b-e include an electrical connection and all electrical connections between any elements b-e are contained within said housing," *id.* at 91, 92, 94, Table 1, Figs. 2–3; (g) "wherein said geophone is coupled to said seismic data recorder to permit seismic signals detected by said geophones to be recorded on said seismic data recorder," *id.* at 88, Fig. 3; and (h) "wherein the single case comprises a first plate having a first periphery and a second plate having a second periphery, wherein the plates are joined along their peripheries by a circular wall," *id.* at 94, Fig. 1. *See* Pet. 24–31. Claim 5 features limitations that are almost identical to limitations (a)–(e) of claim 1, and Petitioner therefore relies on its analysis of claim 1 for claim 5. *See* Pet. 32–33. Claim 22 is very similar to claim 1, and Petitioner relies on its analysis of claim 1 for claim 22, except for limitation (a) of claim 22, which differs from limitation (a) of claim 1 principally by requiring that the "single housing" be "non-spherical."

Petitioner contends that Mattaboni meets even this "non-spherical" limitation. *See* Pet. 36–37 (citing Ex. 1005, 611, Fig. 2; Ex. 1003 ¶¶ 62, 71). Petitioner further contends that Mattaboni discloses the additional limitations of claims 2, 3, 6, 7, 15, 18, 23, 24, and 32. *See* Pet. 31–39.

Patent Owner argues that Mattaboni fails to disclose a geophone that is "internally fixed." PO Resp. 50. We agree. We find that the evidence shows that Mattaboni's geophone is gimbaled. *See* Ex. 2056 ¶ 121; Ex. 1006, 5 (discussing how the geophone of Mattaboni is "suspended from a gimbal joint mounted in oil"); Ex. 2102, 66:14–67:15 (explaining the operation of Mattaboni's gimbal). Because we have determined that the limitation "geophone internally fixed within said housing" does not include gimbaled geophones, we determine that Petitioner has not shown that Mattaboni discloses this limitation. *See* Ex. 2056 ¶ 89. Thus, we determine that Petitioner has not proven by a preponderance of the evidence that claims 1–3, 5–7, 15, 18, 22–24 and 32 are anticipated by Mattaboni.

C. Remaining Claims and Grounds

The "geophone that is internally fixed" limitation is present in all of the challenged claims. Petitioner relies on the same flawed contentions regarding "a geophone that is internally fixed" discussed above in our analysis of claim 1 as anticipated by Cranford and Mattaboni for all of the remaining claims and obviousness grounds. Petitioner does not attempt to use any of the other asserted references to compensate for the failure of Cranford or Mattaboni to account for this element. Accordingly, we determine that all of the remaining grounds fail for the reasons discussed above.

V. CONCLUSION

For the foregoing reasons, on this record, Petitioner has not established by a preponderance of the evidence that claims 1–3, 5–7, 10, 12, 13, 15–18, 21–30, 32–34, and 38–43 of the '268 patent are unpatentable.

VI. ORDER

Accordingly, it is:

ORDERED that claims 1–3, 5–7, 10, 12, 13, 15–18, 21–30, 32–34, and 38–43 of U.S. Patent No. RE45,268 E ("the '268 patent") *have not been* shown to be unpatentable; and

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

Claim(s)	35 U.S.C. §	Reference(s)	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1, 22, 29, 30	§ 102(b)	Cranford		1, 22, 29, 30
1–3, 5–7, 15, 18, 22–24, 32	§ 102(b)	Mattaboni		1–3, 5–7, 15, 18, 22–24, 32
10, 25, 26	§ 103(a)	Mattaboni, Carrack		10, 25, 26
12, 13, 27, 28, 38	§ 103(a)	Mattaboni, Willoughby		12, 13, 27, 28, 38
21	§ 103(a)	Mattaboni, Willoughby, Jones		21
16, 17, 33, 34	§ 103(a)	Cranford, Willoughby, Prothero		16, 17, 33, 34

Claim(s)	35 U.S.C. §	Reference(s)	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
39, 40, 41, 42, 43	§ 103(a)	Cranford, Johnson		39, 40, 41, 42, 43

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