

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMAXTEC INC. and
SMAXTEC ANIMAL CARE GMBH,
Petitioners,

v.

ST REPRODUCTIVE TECHNOLOGIES, LLC,
Patent Owner.

Case No. IPR2024-00885
U.S. Patent No. 8,823,515

REPLY TO PATENT OWNER RESPONSE

TABLE OF CONTENTS

	<u>Page</u>
Petitioners' Exhibit List.....	iii
I. Introduction.....	1
II. Trevarthen Was Publicly Available	1
A. Evidence Establishes Accessibility to Interested Persons	1
1. Articles on Research Online Are Indexed by Search Engines	2
2. Patent Owner's Attempted Google Searches Are Flawed	2
3. Trevarthen's Download Counts Confirm Availability.....	4
4. Whether Trevarthen Is "Grey Literature" Is Irrelevant.....	4
B. An Interested POSA Could and Did Find Trevarthen Before the '515 Patent	5
C. Patent Owner's Cases Are Inapposite.....	5
III. Ground 1: Patent Owner's Challenges to the Trevarthen Anticipation and Obviousness Grounds Lack Merit.....	6
A. Trevarthen Clearly Discloses the System Arranged as Claimed	6
B. Trevarthen Discloses and/or Renders Obvious Connecting a Computer to an RFID Reader	10
C. Trevarthen Discloses and/or Renders Obvious Reading an RFID Device Implanted in an Animal	11
IV. Ground 2: Patent Owner's Challenges To the Trevarthen-Brune Grounds Lack Merit	11
A. A POSA Would Have Been Motivated to Combine Trevarthen and Brune.....	11
B. Trevarthen and Brune Render Obvious Claim 4	13

1.	Retrieving “Sensed Animal Information” from “RFID Devices” Was Obvious	13
2.	Integrating “Milk Production” and “Sensed Animal Information” Into an Integrated Animal Tracking Method Was Obvious	15
V.	Ground 3: Patent Owner’s Challenges To the Trevarthen-Rollins Combination Lack Merit	19
VI.	Ground 4: Patent Owner’s Challenges To the Laitinen-Based Grounds Lack Merit	19
A.	A POSA Would Have Been Motivated to Combine Laitinen’s Temperature Detection With Milk Information	19
B.	A POSA Would Have Understood Laitinen to Disclose the Claimed RFID Device Implanted in an Animal	24
1.	Petitioners Identify “an RFID Device Implanted in an Animal”	24
2.	Laitinen Discloses Temperature Readings With an Implanted RFID Device	24
3.	Laitinen Discloses “Retrieving an Amount of Animal Identification”	26
VII.	Ground 5: Patent Owner’s Challenges To the Laitinen-Buchanan-Liao-Brune Grounds Lack Merit	26
VIII.	Ground 6: Patent Owner’s Challenges To the Laitinen-Buchanan-Liao-Rollins Grounds Lack Merit	27

PETITIONERS' EXHIBIT LIST

Exhibit	Description
1001	U.S. Patent No. 8,823,515
1002	Prosecution History of U.S. Patent No. 8,823,515
1003	Declaration of Dr. Tami Brown-Brandl (“Brown-Brandl”)
1004	CV of Dr. Tami Brown-Brandl
1005	Trevarthen, <i>The Importance of Utilising Electronic Identification for Total Farm Management: A Case Study of Dairy Farms on the South Coast of NSW</i> (Oct. 24, 2005) (Bachelor Thesis, University of Wollongong) (“Trevarthen”)
1006	U.S. Patent No. 7,059,275 to Laitinen et al. (“Laitinen”)
1007	[Reserved]
1008	U.S. Patent No. 6,059,733 to Brune et al. (“Brune”)
1009	US Patent App. Pub. No. 2006/0267767 to Pohlkamp et al. (“Pohlkamp”)
1010	International Patent Pub. No. WO2007/089184 to Liao (“Liao”)
1011	International Patent Pub. No. WO 2006/059916 to Buchanan et al. (“Buchanan”)
1012	[Reserved]
1013	International Patent Pub. No. WO 2004/066720 to Cross et al. (“Cross”)
1014	U.S. Patent App. Pub. No. US 2004/0233971 to Meads et al. (“Meads”)
1015	J.M. Bewley et al., <i>Comparison of Reticular and Rectal Core Body Temperature in Lactating Dairy Cows</i> , 91 J. Dairy Sci. 4661 (2008)
1016	L.C. Hicks et al., <i>Comparison of Methods of Measuring Deep Body Temperatures of Dairy Cows</i> , Livestock Environment VI: Proceedings of the 6th International Symposium 432 (May 2001)
1017	K.T. Higgins, <i>Temperature Readings by Remote Control</i> , Food Engineering 63 (May 2003)

Exhibit	Description
1018	T. Mottram et al., <i>Technical Note: A Wireless Telemetric Method of Monitoring Clinical Acidosis in Dairy Cows</i> , 64 Computers and Electronics in Agriculture 45 (November 2008)
1019	[Reserved]
1020	T.M. Brown-Brandl et al., <i>Telemetry System for Measuring Core Body Temperature in Livestock and Poultry</i> , 2001 ASAE International Meeting Sacramento, California, USA, Paper No. 01-4032 (July 30-Aug 1, 2001)
1021	D.J. Prendiville et al., <i>Radiotelemetry Systems for Measuring Body Temperature</i> , Beef Production Series No. 57 (June 2002)
1022	Amended Complaint, D.I. 25, <i>ST Reproductive Technologies, LLC d/b/a STinsight v. Smaxtec Inc. et al.</i> , No. 3:24-cv-00037 (W.D. Wis. Apr. 23, 2024)
1023	U.S. Patent No. 5,568,788 to van den Berg et al.
1024	U.S. Patent App. Pub. No. 2006/0185605 to Renz et al. (“Renz”)
1025	U.S. Patent App. Pub. No. 2007/0271320 to Tsuyuzaki (“Tsuyuzaki”)
1026	U.S. Patent App. Pub. No. 2005/0145187 to Gray (“Gray”)
1027	R. Daly & M. Organ, <i>Research Online: Digital Commons as a Publishing Platform at the University of Wollongong, Australia</i> , 35 Serials Review 149-53 (2009).
1028	International Application No. PCT/NZ2007/000286, International Search Report (March 18, 2008)
1029	International Application No. PCT/NZ2007/000286, Written Opinion of the International Search Authority (March 18, 2008)
1030	Affidavit of Nathaniel E. Frank-White
1031	Declaration of June Munford
1032	R.M. de Mol et al., <i>Results of a Multivariate Approach to Automated Oestrus and Mastitis Detection</i> , 48 Livestock Production Science 219-227 (1997)

Exhibit	Description
1033	R.M. de Mol et al., <i>Description of a Detection Model for Oestrus and Diseases in Dairy Cattle Based on Time Series Analysis Combined with a Kalman Filter</i> , 22 Computers and Electronics in Agriculture 171–185 (1999) (“de Mol”)
1034	J.E. Hillerton, <i>Detecting Mastitis Cow-Side</i> , National Mastitis Council Annual Meeting Proceedings 48-53 (2000)
1035	G.M. Hyde, <i>Milk Yield as a Factor in Dairy Herd Management</i> (1979) (Ph.D. dissertation, University of Illinois at Urbana-Champaign)
1036	U.S. Patent No. 5,724,316 to Brunts
1037	U.S. Patent Pub. No. 2006/0161443 to Rollins (“Rollins”)
1038	U.S. Patent Pub. No. 2005/0177390 to Young et al.
1039	Prosecution History of U.S. Patent No. 9,844,515
1040	Neter et al., <i>APPLIED LINEAR STATISTIC MODELS</i> (4th ed. 1996)
1041	Hair et al., <i>MULTIVARIATE DATA ANALYSIS</i> (5th ed. 1998)
1042	D. Schlünsen et al., <i>Automatic Health and Oestrus Control in Dairy Husbandry through Computer Aided Systems</i> , J. Agric. Engng. Res. 38 (1987)
1043	U.S. Patent Appl. Publ. No. 2003/0121972A1 to Lee et al.
1044	Help Google Search know the best date for your web page, <i>available at</i> https://developers.google.com/search/blog/2019/03/help-google-search-know-best-date-for
1045	U.S. Patent No. 6,342,242 to Allen et al.
1046	U.S. Patent No. 5,069,160 to Street et al.
1047	U.S. Patent No. 3,624,218 to Regelson
1048	J.H. Britt et al., <i>Determinants of Estrous Behavior in Lactating Holstein Cows</i> , J. Dairy Sci. 69 (1986)
1049	H. Lopez et al., <i>Relationship Between Level of Milk Production and Multiple Ovulations in Lactating Dairy Cows</i> , J. Dairy Sci. 88 (2005)

Exhibit	Description
1050	E.H. Shim, <i>Milk Loss and Treatment Costs Associated with Two Treatment Protocols for Clinical Mastitis in Dairy Cows</i> , J. Dairy Sci. 87 (2004)
1051	A. Jamaludin, <i>Economics of feeding pasteurized colostrum and pasteurized waste milk to dairy calves</i> , Food Animal Economics Vol. 209, No. 4 (1996)
1052	A. Oresnik, <i>Effect of Health and Reproductive Disorders on Milk Yield and Fertility in Dairy Cows</i> (Sept. 1995)
1053	J.L. Edwards et al., <i>Using Activity and Milk Yield as Predictors of Fresh Cow Disorders</i> , J. Dairy Sci. 87 (2004)
1054	U.S. Patent No. 7,905,832 to Lau et al.
1055	Reply Declaration of Dr. Tami Brown-Brandl (“Brown-Brandl Reply”)
1056	Deposition Transcript of Timothy J. Bowser, Ph.D.
1057	Deposition Transcript of Meredith Knoff
1058	S. Bagley et al., <i>Logistic regression in the medical literature: Standards for use and reporting, with particular attention to one medical domain</i> , Journal of Clinical Epidemiology 54 (2001)

I. INTRODUCTION

Faced with dead-on disclosures in the prior art, Patent Owner mischaracterizes the art and a POSA's knowledge on these technologies. Patent Owner's arguments should be rejected.

II. TREVARTHEN WAS PUBLICLY AVAILABLE

There is no dispute that Trevarthen was published on the University of Wollongong's institutional repository, Research Online, years before the '515 patent. Pet., 7–9; POR, 8–21. Yet, despite the stated purpose of Research Online to “promot[e] the scholarly output of the University of Wollongong,” including by making papers “freely accessible and [locatable] using Internet search engines” (Ex1030, 6; Ex1027, 149)¹, Patent Owner incorrectly argues that interested persons would not have been able to locate Trevarthen.

A. Evidence Establishes Accessibility to Interested Persons

Patent Owner incorrectly demands “direct support” that a Google search would have turned up Trevarthen. POR, 13. The law is not so rigid. *Voter Verified, Inc. v. Premier Election Sols., Inc.*, 698 F.3d 1374, 1380 (Fed. Cir. 2012). The evidence shows Trevarthen's publication on Research Online, the efforts of Research Online to promote its publications, and hundreds of reported downloads.

¹ Patent Owner's expert admitted that “promote” here means to “market or somehow actively make people aware of it.” Ex1057, 13:22–14:16.

1. Articles on Research Online Are Indexed by Search Engines

“[M]ost hits on papers in [Research Online] come via a Google search.” Ex1030, 10; *see also* Ex1056, 31:8–32:14. While Patent Owner suggests that Research Online’s statement that “[a] paper loaded onto Research Online is usually available on Google the following day” may not always be true (POR, 8, 12–13), there is no dispute that Trevarthen was available for download by October 22, 2006. Ex1031, ¶20. The earliest application for the ’515 patent was not filed until September 15, 2009, providing three years for Research Online to accomplish its objective of promoting Trevarthen through search engines. Indeed, Patent Owner’s librarian, Ms. Knoff, testified that in her experience scholarly research papers at her university’s institutional repository are generally available about a few days after publication. Ex2011, ¶19; *see also* Ex1056, 26:19–28:1.

2. Patent Owner’s Attempted Google Searches Are Flawed

Patent Owner attempts to undercut Petitioners’ evidence by conducting a date-limited search of Google for Trevarthen. POR, 14–15. Patent Owner’s searches are flawed and should be ignored. Brown-Brandl Reply, ¶6

A date-limited search done today on Google is not fully representative of earlier search results. Google explains that only “[s]ometimes, Google shows dates next to listings in its search results, which is merely a “best estimate of when a page was published or significantly updated.” Ex1044. If Trevarthen’s publication

webpage was not assigned a date, or if it was assigned an incorrect date, it may not be included in date-limited search results.

Patent Owner's searches themselves demonstrate flaws in date-limited searching. Petitioners' expert attempted to recreate these exact searches and found that they included search results that are clearly *outside* the date limitations. Brown-Brandl Reply, ¶¶7–10. These findings cast doubt on the accuracy of these date-limited search results as a proxy for a Google search performed back in 2009. Ex1056, 40:20–41:20.

Tellingly, neither Patent Owner nor its experts attempted any searches for Trevarthen on Google Scholar.² Research Online, like many institutional repositories, “increase their visibility” by making their content available via “easy discovery” on Google Scholar. Ex1027, 150. Dr. Brown-Brandl performed the exact same searches on Google Scholar that Patent Owner's expert performed on Google, and in each instance Trevarthen was within the first few pages of search results. Brown-Brandl Reply, ¶¶11–13. While it is not possible to recreate what a search of Google Scholar would have revealed back in 2009, these searches confirm that Trevarthen has been indexed and is locatable on search engines.

² Patent Owner's librarian witness admitted that Google Scholar was available prior to the '515 patent. Ex1057, 26:4–9; Ex1056, 38:8–39:23.

3. Trevarthen's Download Counts Confirm Availability

The evidence shows 324 downloads of Trevarthen by September 7, 2007, and 569 downloads less than a year later on March 22, 2008. Ex1030, 13, 15. These counts are not “unreliable,” as Patent Owner argues. Patent Owner’s expert cites an article that states that some academic journals “double count” when users access both an HTML and PDF version of an article. Ex2011, ¶21 (citing Ex2015). But there is no evidence that Research Online engages in double counting, nor any other evidence that Trevarthen’s download counts are not accurate. Ex1057, 37:2–39:2, 40:10–42:12.

Ms. Knoff speculates that download counts may be artificially inflated because a single person could have downloaded the article between 10 and 15 times. *Id.*, 64:10–16. Even if this speculation were true, this proves Petitioners’ argument—there are not any reasons someone would have downloaded Trevarthen multiple times unless he or she is interested in the art. Brown-Brandl Reply, ¶15.

4. Whether Trevarthen Is “Grey Literature” Is Irrelevant

Patent Owner argues Trevarthen would not be easily located on Google because it is “grey literature,” which is “deprioritized” by Google. POR, 15–16 (citing Ex2011¶28). To the contrary, the evidence cited by Patent Owner’s expert in support of this argument provides “Guidelines for Searching Grey Literature,” which includes “searching Google Scholar.” Ex2020, 5; Ex1057, 25:21–26:9.

B. An Interested POSA Could and Did Find Trevarthen Before the '515 Patent

Trevarthen's public availability is confirmed by the fact that an ISR from the Australian Patent Office relies on it as a reference in 2008. Ex1028; Ex1029. According to the ISR, the examiner searched "DWPI, internet, AusPat, Patent Lens, PCT Gazette, Esp@cenet, [and] GetThePatent." Ex1028, 1. Of these sources, the only one that would include a thesis such as Trevarthen is the internet. Brown-Brandl Reply, ¶¶16–17.

Patent Owner argues the ISR does not "specify the effort required to find Trevarthen." POR, 20. But Patent Owner provides no explanation why an examiner's search for references goes beyond reasonable or ordinary diligence of a POSA. Citation of a reference in an ISR with the full URL of the reference is persuasive evidence of public accessibility. *Incyte Corp. v. Concert Pharms.*, IPR2017-01256 Paper 119 at 16–17 (PTAB Apr. 8, 2019). Furthermore, the citation in the Trevarthen in the ISR is a "research aid" that "can also establish public accessibility." *Id.* at 18 (citing *Blue Calypso*, 815 F.3d at 1350; *In re Cronyn*, 880 F.2d 1158, 1160 (Fed. Cir. 1989)); *Valve Corp. v. Ironburg Inventions Ltd.*, 8 F.4th 1364, 1373–76 (Fed. Cir. 2021); *see also* Ex1056, 33:14–34:12.

C. Patent Owner's Cases Are Inapposite

Decisions rejecting public accessibility cited by Patent Owner (POR, 9–10) bear no resemblance to the record here. *E.g., Acceleration Bay, LLC v. Activision*

Blizzard Inc., 908 F.3d 765, 774 (Fed. Cir. 2018) (article indexed by author and year not meaningfully indexed); *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1349–50 (Fed. Cir. 2016) (Petitioner “provided no evidence that Ratsimor was disseminated ... other than testimony ... that it was ‘publicly available around November 2003.’”); *First Solar v. Rovshan Sade*, IPR2023-00827, Paper 13 at 18-19 (PTAB Nov. 16, 2023) (the “case lacks any testimonial evidence that a [POSA] would be ... aware of [a company’s] web address.”).

MHL Custom does not hold otherwise. In *MHL*, a district court affirmed a jury’s conclusion that a defendant had not shown that a document was publicly accessible through a Google search. *MHL Custom, Inc. v. Waydoo USA, Inc.*, 2023 WL 5748755, at *4 (D. Del. Sept. 6, 2023). But, as a challenge to a jury verdict, the district court considered whether the finding was against the clear weight of the evidence (under a clear and convincing evidence standard, which does not apply here).

III. GROUND 1: PATENT OWNER’S CHALLENGES TO THE TREVARTHEN ANTICIPATION AND OBVIOUSNESS GROUNDS LACK MERIT

A. Trevarthen Clearly Discloses the System Arranged as Claimed

Patent Owner argues Trevarthen does not anticipate the challenged claimed because it “does not clearly and unequivocally disclose any system arranged as claimed.” POR, 22. Patent Owner is incorrect. A POSA, reading Trevarthen, would

“at once envisage” the claimed arrangement because Trevarthen provides a cohesive disclosure. Brown-Brandl Reply, ¶¶18–24; Pet., 7–21.

Trevarthen describes specific proposed improvements to existing farm management systems, which a POSA would understand to describe a single system. Brown-Brandl Reply, ¶¶18–24. The author begins by describing usage of RFID technology in existing farms, like the Cochrane farm, including tagging cattle with RFID tags. Ex1005, 34–98. The Cochran dairy was interested “in further advancing their RFID operations,” including using “milking meters” to obtain “milk production figures for each cow” to detect problems such a “illness.” *Id.*, 98.

In Chapter 6, Trevarthen describes ways to “build upon the current RFID usage” in dairy farms like the Cochrane farm, including “enhancements and ideas which could be considered as future additions to further add value to the utilization of RFID in farm management.” Ex1005, 99; *id.*, ix; Brown-Brandl, ¶¶55–65. The proposed framework for improving these dairy farms includes “RFID readers ... to record a cow[']s milk production (in association with milk meters).” *Id.*, 100, 102, 112–13. Chapter 6 also states that temperature monitoring would aid the Cochrane farm. *Id.*, 122. Trevarthen proposes “a temperature sensing RFID device” that is read by “RFID readers” (*id.*, 103), where the readers are connected to the herd management software via a network (*id.*, 102–03).

Thus, when Trevarthen is read as a whole, a POSA would have understood it to disclose a cohesive “total farm management” system, which improves the farm management system of the Cochrane farm. *Id.*, 99. Trevarthen’s Chapter 6 provides numerous potential improvements to the farm, which are not mutually exclusive and which a POSA would “at once envisage” as part of a single farm management system. Brown-Brandl Reply, ¶23.

In arguing that Petitioners improperly mix and match embodiments, Patent Owner misrepresents the Petition. For example, Patent Owner argues that for element 1[B], Petitioners cite only to Trevarthen’s background “Literature Review.” POR, 22–23 (citing Pet., 13). This is incorrect. In addition to the pages referenced by Patent Owner (Ex1005, 20, 22, 24-25), Petitioners *additionally* cite Trevarthen’s application of RFID devices with temperature sensing capabilities in its proposed improvements to Cochrane’s farm management system. Pet., 13 (citing Ex1005, 99–100, 102).

The Board invited the parties to brief “the application of *In re Arkley* to the present case.” ID, 46. *In re Arkey* does not change the conclusion above. In *In re Arkey*, the CCPA held that a single reference (Flynn) did not disclose the claimed compound because the claimed compound could only be formed if independent examples 4 and 10 were selected and combined in a specific way, and nothing in the reference “‘clearly and unequivocally’ directs those skilled in the art to make this

selection.” *In re Arkley*, 455 F.2d 586, 587–88 (C.C.P.A. 1972). Here, by contrast, the author “clearly and unequivocally” directs the reader to “build upon the current RFID usage” at the Cochrane farm by recording milk production and temperature. Ex1005, 100, 102–03, 112–13, 115, 121.

Kennametal, Inc. v. Ingersoll Cutting Tool Co., 780 F.3d 1376 (Fed. Cir. 2015), is instructive. In *Kennametal*, the claims recited a cutting tool containing ruthenium as a binder and coated using physical vapor deposition (PVD). *Id.* at 1379–80. The Federal Circuit found the claims anticipated by a reference that disclosed cutting tools made with five different chemicals used as a binder (one being ruthenium) and three coating methods (one of which was PVD). *Id.* at 1383. The number of combinations was not so many that each “would not be immediately apparent to one of ordinary skill in the art.” *Id.* at 1382. Trevarthen discloses improvements to existing farm management systems (including measuring milk output and cow temperature), and the combination recited in the challenged claims would be “immediately apparent” to a POSA.

In any event, as explained throughout the Petition, even if Trevarthen does not anticipate the challenged claims, a POSA would have been motivated to combine the disclosures rendering the claims obvious. Pet., 9–21. A POSA would have been motivated to combine disclosures in Trevarthen because Trevarthen itself proposes “a framework for the use of RFID on dairy farms” including “enhancements and

ideas which could be considered as future additions to further add value” for utilizing RFIDs in farm management.” ID, 41–52 (citing Ex1005, 99). Multiple proposed enhancements relate to detecting illness in an improved RFID-integrated farm management system. Pet., 17–19.

B. Trevarthen Discloses and/or Renders Obvious Connecting a Computer to an RFID Reader

Patent Owner is incorrect that Trevarthen does not disclose or render obvious “connecting a computer to an RFID device reader.” POR, 25–27. Trevarthen discloses, in the Cochrane farm, “computer screens” (*i.e.*, part of a *computer*) that display results from an “RFID reader,” which would be connected to the computer to display the results. Ex1005, 78. Petitioners’ reliance on this disclosure of a computer is not “improper mixing and matching” when discussed in connection with Trevarthen’s proposed improvements to the Cochrane farm. The improvements are not “indisputably a separate system” from those discussed earlier in Trevarthen, as discussed above. POR, 25–26; *see supra* § III.A.

Even if not explicitly or inherently disclosed, Trevarthen plainly renders obvious this limitation. For an RFID reader to provide usable information, it would be connected to a computer that interfaces with a database. Pet., 12–13; Ex1005, 77, 92–93. A POSA would have been motivated to connect a computer to the RFID device reader disclosed in Trevarthen. Brown-Brandl, ¶97.

C. Trevarthen Discloses and/or Renders Obvious Reading an RFID Device Implanted in an Animal

Patent Owner’s argument that Trevarthen does not disclose or render obvious reading “an RFID device implanted in an animal” because the “Bio-thermo RFID is not yet applicable to livestock” (POR, 27) is incorrect as a matter of fact and law. Trevarthen has numerous disclosures of RFID devices implanted in animals (such as boluses), one of which is the Bio-thermo RFID. Ex1005, 3, 20, 22, 24–25, 99–100. It also discloses an RFID reader, which a POSA would understand is used to read the RFID devices implanted in animals. *Id.*, 86–87, 102; Brown-Brandl, ¶¶98–100. The fact that one such implantable RFID device had not yet been used on livestock (POR, 27) is irrelevant. “[A]ctual performance” of a system disclosed in a reference “is not required.” *Kennametal*, 780 F.3d at 1383.

IV. GROUND 2: PATENT OWNER’S CHALLENGES TO THE TREVARTHEN-BRUNE GROUNDS LACK MERIT

A. A POSA Would Have Been Motivated to Combine Trevarthen and Brune

Patent Owner next argues that a POSA would not have been motivated to combine Trevarthen and Brune because “Trevarthen already has a time-stamping technique that the experts agree works better for his proposed systems.” POR, 29. This is incorrect. A POSA would have been motivated to use Brune’s time-stamping in Trevarthen. Pet., 22–24; Brown-Brandl Reply, ¶¶25–27. Trevarthen teaches analyzing temperature “fluctuations,” “patterns” and “anomalies.” Ex1005, 121–22.

Doing so requires a time-series of measurements where the date and time of each measurement is known. By having the implanted RFID device perform the time-stamping, multiple measurements can be taken between reads and these multiple measurements can be transmitted at the next read along with their timestamps. Indeed, this is expressly taught by Brune: “it is also possible for a data packet to include data corresponding to multiple sensed temperatures and associated discrete times of sensing.” Ex1008, 4:11–15. Thus, time-stamping by the RFID device facilitates Trevarthen’s goal of analyzing temperature patterns. Ex1005, 121–22; Brown-Brandl Reply, ¶26.

Dr. Brown-Brandl’s testimony relating to advantages of time-date stamps at the reader (Ex2010, 150–52) does not diminish a POSA’s reasons for having the RFID device time-date stamp retrieved data. Dr. Brown-Brandl maintained that, notwithstanding benefits to time-stamping at the reader, there were “other reasons you would want to have the time-date on the device itself.” Ex2010, 150–51; Brown-Brandl Reply, ¶¶25–26. Claim 3 recites “comprising,” and so it does not preclude having the device *and* reader time-stamp data.

Given that there are two time-stamping possibilities (reader and device), having the device time-stamp the measurements would have at least been obvious to try. Brown-Brandl, ¶¶125. Patent Owner argues that Petitioners do not address the requirements for establishing “obvious to try.” POR, 30–31. This is incorrect. As

explained in the Petition, whether time-stamped by the device or the reader, the system needs to time-stamp information retrieved from an implanted bolus, and methods of stamping date-time information were simple and well understood. Pet., 24–25. Thus, incorporating Brune’s device in Trevarthen’s system would have resulted in a system comprising an RFID device and reader connected with a processor running herd management software that would operate predictably in accordance with their known functionalities. *Id.*

Patent Owner alleges that a system with device-based timers would be prone to failures due to battery life and unsynchronized timers. POR, 31. But synchronicity between devices is not required to detect disease in each animal. Brown-Brandl Reply, ¶27; Ex1056, 130:20–131:15. For detecting illness for a given animal, the individual animal’s time-series of measurements are what matter, so the potential of drift between reads would not detract from the illness monitoring. Brown-Brandl Reply, ¶27. Furthermore, Brune makes no mention of battery life being a problem, instead indicating that its bolus provides data over “an extended period of time.” Ex1008, 3:37–43, cls. 4–9.

B. Trevarthen and Brune Render Obvious Claim 4

1. Retrieving “Sensed Animal Information” from “RFID Devices” Was Obvious

Patent Owner makes two incorrect arguments that Trevarthen and Brune do not render obvious this claim.

Patent Owner first argues that Trevarthen’s disclosure of an “under the skin,” temperature sensing RFID microchip is insufficient because “such devices were *not* commercially available” and “none have been approved to date” in Australia. POR, 32. But Trevarthen explicitly discloses that “RFID temperature sensing is a currently available technology,” “the application of which may soon be extended to the livestock industry.” Ex1005, 24, 121, 123. Even if not yet approved or commercially available in Australia at the time of the thesis, Trevarthen’s discussion of these devices is sufficient to disclose this element. *Kennametal*, 780 F.3d at 1383.

Patent Owner then argues the references Petitioners rely on to demonstrate the state of the art “show that temperature-sensing RFID devices were uncommon and that POSAs would not have used them in herd management systems.” POR, 33–34. This argument, again, ignores the express teaching in Trevarthen to use temperature-sensing RFIDs in the livestock industry (Ex1005, 24, 121, 123), as well as many others teaching animal-implantable temperature-sensing RFID devices. Pet., 14 (citing Ex1003, ¶ 95), 29 (citing Ex1008), 44 (citing Ex1009); Ex1003, ¶¶ 33–41; Ex1009, [0002], [0039], [0041]; Ex1008, 2:4–21, Ex1014, FIG. 1, [0058], [0065], [0071]; Ex1021, 4–5; Ex1056, 61:14–62:10, 63:19–64:2, 123:17–124:5. Even if some references discuss improvements that a POSA may want to make to such temperature-sensing RFIDs, that does not negate that a POSA was aware of such devices and their utility in herd management. *Acorda*, 903 F.3d at 1333.

2. Integrating “Milk Production” and “Sensed Animal Information” Into an Integrated Animal Tracking Method Was Obvious

a. Milk Production and Temperature Sensing Are Not Disparate Teachings

Patent Owner first challenges Petitioners’ arguments on this limitation on the basis that Trevarthen’s “discussions of milk production and temperature-sensing devices reflect disparate teachings without providing a reason to combine them.” POR, 35. This is incorrect for the reasons discussed in Section III.A.

Trevarthen’s discussions of milk production are not “completely disconnected from any discussion of retrieving ... temperature.” POR, 35–36. Trevarthen discloses measuring milk production in several places, including the Cochrane farm’s consideration of implementing “milking meters” that “record the amount of milk each cow has provided at every milking session” (Ex1005, 98) and then later, as a proposed improvement to the Cochrane farm, to use “RFID readers ... to record a cow’s milk production,” which can be used to detect illness (*id.*, 102, 115). These teaches are not “disparate” but, rather, a specific proposed improvement. For these same reasons, Patent Owner is incorrect that the disclosure of measuring milk production is “unrelated to RFID technology.” POR, 36.

Patent Owner is wrong that the Cochrane farm’s use of ear tags is incompatible with Trevarthen’s disclosure of boluses. *Id.* Trevarthen explains that ear tags and bolus “provide the same functionality, reliability and accuracy,” and

thus is “a matter of personal preference for the farm owners.” Ex1005, 99. Trevarthen then teaches temperature-sensing boluses as an improvement for the Cochrane farm, thus providing a POSA the motivation to use implanted sensors. *Id.*; Brown-Brandl, ¶¶98–99.

Patent Owner next argues that the disclosure of pattern recognition in milk outputs is “speculating” because Trevarthen says it was “[b]eyond their current abilities.” POR, 37 (citing Ex1005, 109). Patent Owner misinterprets the disclosure of Trevarthen. Trevarthen uses the word “beyond” not to suggest that a POSA would not be capable of implementing those features, only that those features had not *yet* (but could be) implemented. Brown-Brandl Reply, ¶30 (*e.g.*, “beyond their current abilities” could have been written as “in addition to their current abilities”). That these features had not been implement yet in an “actual system” is irrelevant. POR, 37, 39.

Patent Owner similarly tries to erase Trevarthen’s disclosure that milk meters “will also aid to identify any problems that may arise in the herd (such as illness).” POR, 38 (citing Ex1005, 115). Patent Owner argues that this section does not provide any information about how milk meters would have been used to detect illness. *Id.* To the contrary, Trevarthen explains that “a cow producing significantly less milk than her calculated average may be suffering from an illness.” Ex1005, 98; Ex1056, 79:11–80:9, 89:10–24. Furthermore, Petitioners detailed how a POSA

would have understood this disclosure and how it fits into the overall framework of Trevarthen's "total farm management" system, including as part of a logical expression with temperature. Pet., 14–21. A POSA does not read Trevarthen in a vacuum but, rather, in view of what was known in the art about using milk production and temperatures in a logical expression for detecting illness.

b. Petitioners Showed a Reason to Combine Milk Production and Temperature

Patent Owner contends that there is nothing in the record demonstrating a motivation to combine temperature and milk production information. POR, 39–41. Petitioners explained, however, with evidentiary support, why a POSA would have understood that using these two different variables improves illness detection. Pet., 14–21; Brown-Brandl Reply, ¶¶28–33.³

Patent Owner incorrectly argues Petitioners have not shown an expectation of success in combining Trevarthen's teachings on relying on temperature and milk yield. POR, 39. The Petition explained this in detail. For example, de Mol (Ex1033) describes expressions using temperature and milk yield to detect illness and estrus,

³ Patent Owner suggests that Petitioners do not argue for a combination of milk production and temperature for claim 4. POR, 39. This is incorrect. Claim 4 depends on claim 1, for which Petitioners discuss the combination of milk production and temperature.

demonstrating the ability and motivation for a POSA to do so. Pet., 21–22; Ex1056, 113:13–25, 70:2–71:21 (Patent Owner’s expert testifying that “there’s more than one variable” that would need to be analyzed to determine an animal’s health status). It was foundational knowledge that relying on multiple variables, *e.g.*, in a multivariate logical regression, provided better predictions than a single variable. Pet., 21–22; Brandl-Brown Reply, ¶33; Ex1058, 980; Ex1040, 217; Ex1041, 172; Ex1042, 170–74. Patent Owner’s expert admitted it was known that there is “more than one variable” that must be considered to determine an animal’s health status, and that temperature and milk production are each variables that correlates with health. Ex1056, 53:8–55:18, 68:18–71:21, 90:3–91:21, 96:19–99:8, 110:13–111:23.

Patent Owner attempts to undercut de Mol as not supporting a reasonable expectation of success because de Mol supposedly generated too many false positives. POR, 40–41. But a POSA would have understood de Mol to be indicating merely that the disclosed expressions warranted further optimization. Brandl-Brown Reply, ¶32. de Mol, in fact, “implemented and tested” its model and states that “results for [detection of] oestrus are satisfying.” Ex1033, 182. Regardless, the ’515 patent does not require any level of performance, and the law does not require one. *Acorda Therapeutics, Inc. v. Roxane Lab ’ys., Inc.*, 903 F.3d 1310, 1333 (Fed. Cir. 2018) (no “[c]onclusive proof of efficacy” required for obviousness) (citations omitted); *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1364, 1367–68 (Fed. Cir. 2007).

V. GROUND 3: PATENT OWNER’S CHALLENGES TO THE TREVARTHEN-ROLLINS COMBINATION LACK MERIT

For Ground 3, Patent Owner merely reiterates its arguments with respect to Ground 1, with Trevarthen as a primary reference. For the same reasons, explained above, these arguments are incorrect. *Supra* § III.

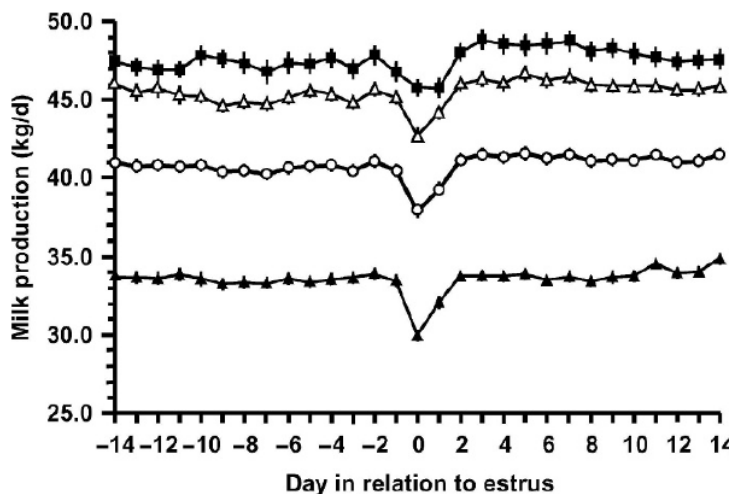
VI. GROUND 4: PATENT OWNER’S CHALLENGES TO THE LAITINEN-BASED GROUNDS LACK MERIT

Patent Owner’s arguments on the Laitinen-based grounds are based on the false propositions that (1) “[o]nly the ‘external’ Laitinent device ... can sense an animal’s body temperature, movements, or location,” and (2) Petitioners “rely solely on Laitinen’s ‘external’ device.” POR, 42–43. Not only can the internal device disclosed in Laitinen track, among other things, body temperature, Petitioners expressly rely on that embodiment. Pet., 36–38, 41–42.

A. A POSA Would Have Been Motivated to Combine Laitinen’s Temperature Detection With Milk Information

Patent Owner argues a POSA would not have modified Laitinen’s heat detection expression to include the days in milk (“DIM”) and/or peak milk yield variables of Liao because Liao describes making an insemination decision rather than detecting heat. POR, 44–45. Heat and insemination decisions, however, are closely related, and Laitinen is *also* concerned with determining when to inseminate. Ex1006, 8:5–38; Ex1056, 141:24–142:10.

Patent Owner’s contention that a POSA would not have used Liao’s milk yield in Laitinen’s heat detection expression is contradicted by a POSA’s knowledge that milk yield was useful for detecting heat. Ex1048, 2195, 2201; Ex1049, 2790. For example, the figure below illustrates the sharp drop in milk production at estrus.



Id., 2792.

Additionally, “whether the animal is in heat” is an “input parameter[]” to Liao’s insemination expression. Ex1010, 9–12. Thus, if Laitinen’s expression for determining whether a cow is in heat (which uses temperature as an input variable) is nested within Liao’s expression to make an insemination determination (which also uses milk information as an input), the resulting expression includes both temperature and milk information. Ex1010, 20–21; Brown-Brandl Reply, ¶¶39–40.

Patent Owner misreads Liao when arguing that Laitinen’s alarm is a Boolean equation that is incompatible with Liao, since Liao allegedly teaches it is impossible to formulate a Boolean decision process. POR, 46–47. The “impossible to

formulate” language is referring to the problem of “the farmer himself/herself” not being able to formulate a Boolean. Brown-Brandl Reply, ¶42. Liao’s rules/decision engines solve this problem. Ex1010, 2–3 (“the present invention ... alleviates the above problems”). The output of Liao’s expression is whether the animal ... should be inseminated within a particular time period.” *Id.*, 5.

For Laitinen’s alternate expression relating to determining medical treatment (which implicitly includes detecting illness), Patent Owner asserts a POSA would not have modified this expression to include milk yield because milk production data for medicated animals would “not have existed.” POR, 48. This is false. Medicated animals must still be milked, with the milk then discarded, and the yield of the discarded milk is still measured. Brown-Brandl Reply, ¶43; Ex1005, 81; Ex1050, 2702–03; Ex1051, 751.

By arguing against an expression that includes temperature and milk production, Patent Owner misses the forest for the trees. Patent Owner focuses on the specifics of Laitinen and Liao’s implementations, but fails to address the Petition’s broader arguments that: (1) Laitinen (and a POSA) was concerned with illness and estrus, (2) Laitinen proposed the use of algorithms and models to analyze animal health, including expressions using temperature for detecting illness and estrus, and (3) it was known to a POSA that milk yield was also correlated with

illness and estrus.⁴ Pet., 43–51; Ex1052, 44 (“[M]ilk production in herds analyzed was significantly reduced in cases of mastitis.”); Ex1053, 528 (“milk yields of sick cows were lower ($P < 0.01$) than milk yields of healthy cows.”).

Therefore, a POSA would also have been motivated to modify Laitinen or “create a new” expression that included both temperature and milk production information as input variables to detect estrus or illness. Pet., 48–51; Brown-Brandl Reply, ¶¶37–40; Ex1033, 172.

Patent Owner argues that “the record does not support that combining temperature and milk production into a logical expression was known prior to the invention to aid in distinguishing between illness and other issues.” POR, 50. Patent Owner is incorrect. Rather, van den Berg (Ex1023) explains that a POSA knew that relying on multiple parameters was more effective for detecting illness:

⁴ Contrary to Patent Owner (POR, 53), milk yield is not “independent of heat,” but correlates with estrus. Brown-Brandl Reply, ¶41; Ex1049, 2792.

... a more reliable indication signal of heat or illness is obtainable from parameters including one *or more* of the following: the milk rate of flow, the *temperature of a milk flow*⁵, the *milk yield*, and/or

4:13–17. This confirms that it was known multiple parameters (“or more”), which would include temperature and yield, generates a more reliable indication of illness. Indeed, Patent Owner’s expert admitted it was known that there is “more than one variable” that must be considered to determine an animal’s health status and that temperature and milk production are each variables that correlates with health. Ex1056, 53:8–55:18, 70:2–71:21, 96:19–99:8, 111:15–23.

Patent Owner again argues that a POSA would not have incorporated the model from de Mol due to “the number of false positive alerts” it generated. POR, 52–53. Petitioners addressed this argument for Ground 2. *Supra* § IV.B.

⁵ van den Berg explains that “milk temperature ... is a good indication measure of the body temperature.” Ex1023, 6:25–29; Brown-Brandl Reply, ¶27. Thus, whether a function uses *milk* temperature instead of sensed temperature is of no moment. POR, 52–53.

B. A POSA Would Have Understood Laitinen to Disclose the Claimed RFID Device Implanted in an Animal

1. Petitioners Identify “an RFID Device Implanted in an Animal”

Patent Owner incorrectly argues that, for this limitation, Petitioners rely solely on Laitinen’s “[s]ensor unit,” which is not “implanted.” POR, 54–55.

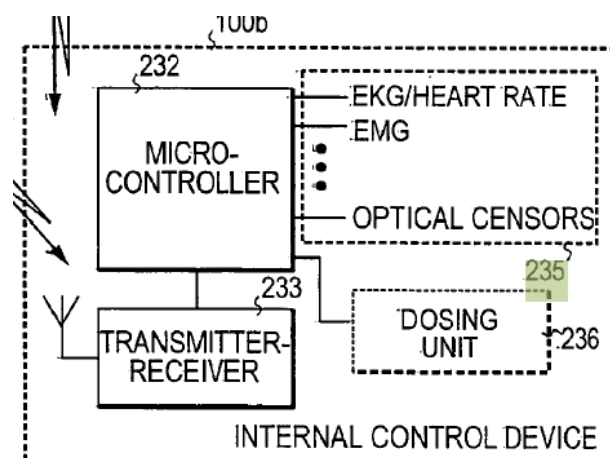
Laitinen describes a “pico level device” with a “Sensor unit connected to the micro controller for the surveillance of the animal’s body temperature, occlusion, muscular action, motion or metabolic level,” where “[t]he sensor unit can also be an implant inside the animal” that transmits RFID signals. Ex1006, 3:33–57. In short, Laitinen expressly discloses an implanted RFID devices that measures, among other things, temperature and movement. Brown-Brandl Reply, ¶¶34–36. This teaching alone is sufficient to disclose this limitation. That Laitinen describes a specific embodiment where the temperature sensor is in an external unit does not nullify the alternate teaching. “A reference does not teach away ... if it merely expresses a general preference for an alternative invention but does not ‘criticize, discredit, or otherwise discourage’ investigation into the invention claimed.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009).

2. Laitinen Discloses Temperature Readings With an Implanted RFID Device

Patent Owner argues that “Laitinen unequivocally states that temperature is measured with the external device, and the external device only,” POR, 56, such

that temperature information is *not* obtained from an RFID device “implanted” within an animal, *id.*, 55–58. This too is incorrect.

Laitinen expressly discloses an implanted RFID devices that measures, among other thing, temperature. Ex1006, 3:33–57. Additionally, the implanted pico level control device of Figure 2 measures temperature. The “internal control device” shown in Figure 2 (100b) includes three placeholders (“...”) in box 235 for additional sensors, and Laitinen discloses that such sensors can be for temperature. *Id.*, 3:51–52, 5:38–55, 8:9–11.



Laitinen, Fig. 2. Because Laitinen’s exemplary internal device measures EKG and EMG and O₂ saturation, with an invitation to include other sensors, a POSA would have understood Laitinen to disclose the internal control device having temperature and movement measuring capabilities. Brown-Brandl, ¶36.

Patent Owner is incorrect that “POSA’s at the time would have had no reason to use Laitinen’s internal devices to measure temperature.” POR, 57. This is

contradicted by the fact that POSAs would have been well-aware of animal-implantable temperature-sensing RFID devices. Ex1003, ¶¶ 33–41; Ex1009, [0002], [0039], [0041]; Ex1008, 2:4–21, Ex1014, FIG. 1, [0058], [0065], [0071]; Ex1021, 4–5; *supra* § IV.B.

3. Laitinen Discloses “Retrieving an Amount of Animal Identification”

Patent Owner alleges Petitioners failed to show in Laitinen that an RFID device reader “retriev[es] an amount of animal identification.” POR, 58. This is belied by the Petition itself. Petitioners explained that Laitinen discloses “a system individual animal identification,” which includes an RFID device that “functions like [a] conventional identification tool.” Pet., 43 (citing Ex1006, 3:28–35, 3:53–57). The Petition cites Dr. Brown-Brandl’s declaration, which explains that “[t]he use of implanted RFID devices for animal identification was well-established.” Ex1003, ¶152 (citing Ex1009). A POSA would thus have understood Laitinen to disclose an RFID system that retrieves animal identification; otherwise, Laitinen would not achieve its objectives of identifying animals.

VII. GROUND 5: PATENT OWNER’S CHALLENGES TO THE LAITINEN-BUCHANAN-LIAO-BRUNE GROUNDS LACK MERIT

Patent Owner’s arguments are addressed above for Ground 4. *Supra* § VI.

VIII. GROUND 6: PATENT OWNER'S CHALLENGES TO THE LAITINEN-BUCHANAN-LIAO-ROLLINS GROUNDS LACK MERIT

Patent Owner's arguments concerning this Ground are addressed above for Ground 4. *Supra* § VI. Patent Owner additionally argues for claim 25 that Petitioners failed to explain why a POSA would have used an ingested RFID device in Laitinen. POR, 60–61. This is incorrect. Laitinen discloses using implanted RFID devices (Ex1006, 5:38–41), and one well-known implantable RFID device at the time of the '515 patent was an ingestible bolus. Pet., 61–62; Brown-Brandl, ¶194 (citing Ex1005, 20, 22). Patent Owner argues that Petitioners fail to cite any art with such bolus, but the Petition refers to Dr. Brown-Brandl's declaration, which cites Trevarthen to confirm that ingested bolus devices were common. *Id.*

DATED: May 16, 2025

Respectfully Submitted,

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CERTIFICATION OF TYPE-VOLUME LIMITATIONS

The Reply complies with the type-volume limitation of 37 C.F.R. § 42.24.
The Reply contains 5,594 words, according to the word count tool in Microsoft Word, excluding the parts of the Reply exempted by of 37 C.F.R. § 42.24(a).

DATED: May 16, 2025

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CERTIFICATE OF SERVICE

A copy of the foregoing document and the accompanying exhibits were served via electronic mail on Patent Owner's counsel of record at the email addresses dmoффett@akingump.com, mmahoney@akingump.com, twlanders@akingump.com, jhernandez@akingump.com, and AG-ST-SMAXTEC@akingump.com, as indicated in Patent Owner's Amended Mandatory Notices, dated October 16, 2024.

DATED: May 16, 2025

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