

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMAXTEC INC. and
SMAXTEC ANIMAL CARE GMBH,
Petitioner,

v.

ST REPRODUCTIVE TECHNOLOGIES, LLC,
Patent Owner.

IPR2024-00875
Patent 9,844,206 B2

Before SHARON FENICK, JAMIE T. WISZ, and
ANDREAS BALTATZIS, *Administrative Patent Judges*.

BALTATZIS, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

smaXtec Inc. and smaXtec Animal Care GmbH (collectively, “Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–4, 6, and 17–20 (the “challenged claims”) of U.S. Patent No. 9,844,206 B2 (Ex. 1001, “the ’206 patent”). Paper 1 (“Pet.”). ST Reproductive Technologies, LLC (“Patent Owner”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply (Paper 12, “Prelim. Reply”) and Patent Owner filed a Preliminary Sur-Reply (Paper 15, “Prelim. Sur-Reply”).

Under 35 U.S.C. § 314(a), the Board “may not authorize an *inter partes* review to be instituted unless . . . the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” After considering the Petition, the Preliminary Response, the Preliminary Reply and Sur-Reply, and the evidence of record, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to at least one claim challenged in the Petition. Accordingly, we institute an *inter partes* review of claims 1–4, 6, and 17–20 of the ’206 patent, based on all of the grounds identified in the Petition.

The following findings of fact and conclusions of law are not final but are made for the sole purpose of determining whether Petitioner meets the threshold for instituting review. Any final decision shall be based on the full trial record, including any response timely filed by Patent Owner. Any arguments not raised by Patent Owner in a timely-filed Response may be deemed waived, even if they were presented in the Preliminary Response.

II. BACKGROUND

A. *Real Parties-in-Interest*

Petitioner identifies smaXtec Inc. and smaXtec Animal Care GmbH as the real parties-in-interest. *See* Pet. xiii. Patent Owner identifies ST Reproductive Technologies, LLC and Inguran, LLC as the real parties-in-interest. Paper 3, 1.

B. *Related Matters*

The parties identify the following district court litigation involving the '206 patent: *ST Reproductive Technologies, LLC d/b/a STInsight v. Smaxtec Inc. and smaXtec Animal Care GmbH*, No. 24-cv-00037 (W.D. Wis.), filed on January 18, 2024. Pet. xiii; Paper 3, 1.

Petitioner further identifies “a concurrent *Inter Partes* Review Petition challenging the patentability of U.S. Patent No. 8,823,515, from which [the '206 patent] was filed as a continuation.” Pet. xiii; *see also* IPR2024-00885, Paper 1.

C. *The '206 Patent (Ex. 1001)*

The '206 patent relates to “a computer implemented animal management method which matches animal information retrieved from a radiofrequency identification device implanted in an animal with animal information retrieved from a database of at least one computer.” Ex. 1001, 1:16–21. The '206 patent describes the “radiofrequency identification device ('RFID' or 'RFID device')” as “an object that can be attached to or incorporated into a product, animal, or person typically for the purpose of locating and identif[ying] . . . that object using radio waves.” *Id.* at 1:25–29. According to the '206 patent, conventional RFID devices contain at least “an integrated circuit for storing and processing information, modulating and demodulating a radio frequency (RF) signal and perhaps other specialized

functions,” and “an antenna for receiving and transmitting the radio signal.”
Id. at 1:36–41.

Figure 1 of the '206 patent illustrates a system including an RFID device and is reproduced below.

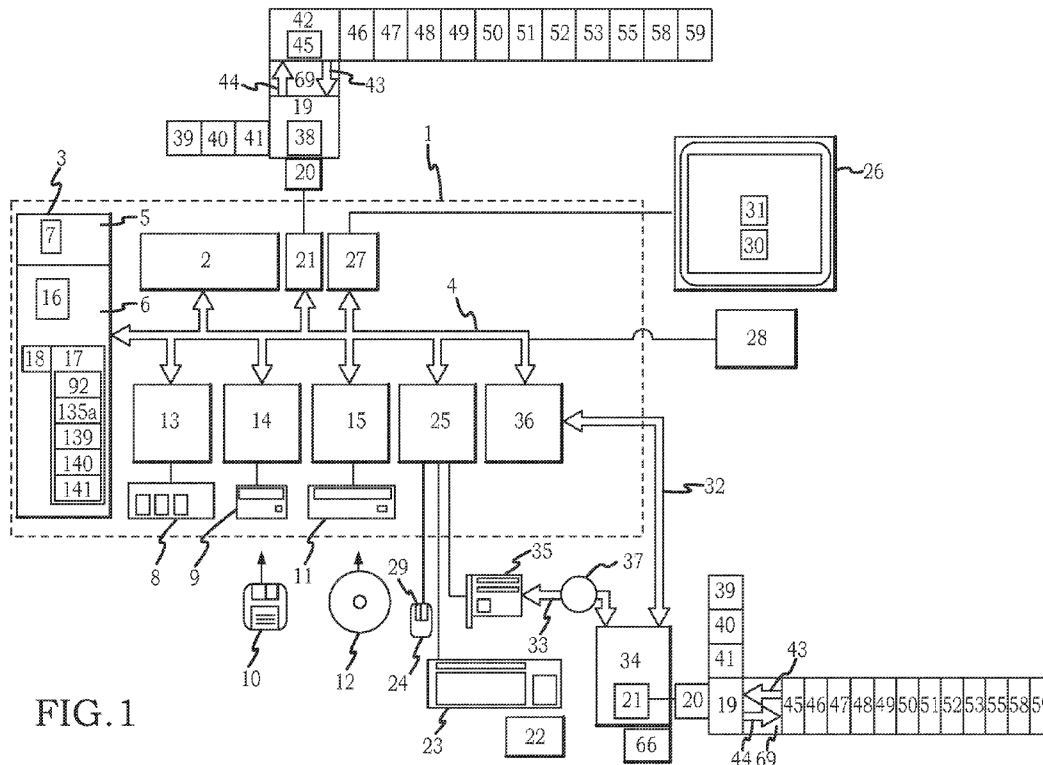


Figure 1 shows a block diagram of an animal management system including an RFID. *Id.* at 3:10–12.

The animal management system is shown as server computer (1) interacting with two RFIDs (19). *Id.* at 6:31–37. Server computer (1) includes at least one processing unit (2) and memory element (3). *Id.* at 5:51–59. Server computer (1) also includes “animal management application (17) which . . . can include a radiofrequency identification (‘RFID’) encoder-decoder application (18) which functions to encode and decode RFID data (38) to and from a RFID device (19).” *Id.* at 6:31–47. “The term RFID (19) for the purposes of this invention can be any type of

radiofrequency identification device as [above-]described or otherwise which can be attached, incorporated, implanted, imprinted, or held (individually and collectively referred to herein as ‘implanted’) on or within an RFID object (39).” *Id.* at 8:8–13.

The animal management system also includes RFID reader (42), which may transmit radio-frequency carrier signal (43) to RFID (19). *Id.* at 8:29–34. RFID (19) “may respond to the radio-frequency carrier signal (43) with a RFID data signal (44) to send and receive an amount of RFID information (45) from the RFID (19), or the like.” *Id.* at 8:34–37.

Figure 3 illustrates further details of the system and is reproduced below.

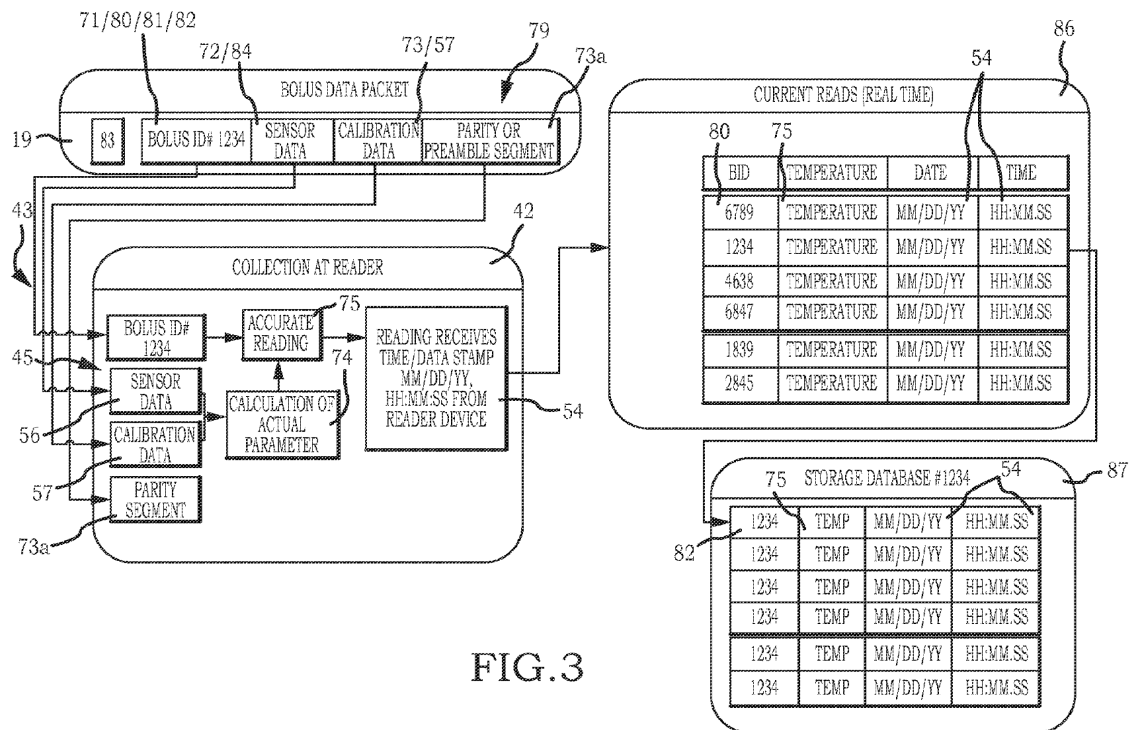


Figure 3 shows a block diagram including an RFID and an RFID reader. *Id.* at 3:16–21.

RFID (19) is “located in the hollow inside of a bolus (79).” *Id.* at 10:30–33. “Certain configurations of the bolus (79) can be ingested by . . . cattle and be retained in a part of the stomach.” *Id.* at 10:33–35. According to the ’206 patent:

A first bit segment (71) of the RFID device (19) implanted in an animal (40) can be encoded or re-encoded with an amount of RFID object identification information (80) (which can be a bolus identification number (81), animal identification number (82), or the like). A second bit segment (72) of the RFID (19) can be encoded or re-encoded from time to time with sensed RFID object characteristics (84) received from a sensor (83) which can be located within the bolus (79) or otherwise implanted within the RFID object (39) whether an animal (40) or an asset (41). For the purposes of this invention, sensed RFID object characteristics (84) can include without limitation a sensed characteristic of the RFID object (39), animal (40) or asset (41), for example, any one or more of location, temperature, pH, or the like, or any one or more of physiological characteristics of an animal (40) such as temperature, pH, heart rate, blood pressure, partial pressures of dissolved gases, or the like.

Id. at 10:36–53. RFID object identification information (80) and sensed RFID object characteristics (84) can be collected from RFID (19) by RFID reader (42) “when the RFID object (39) passes within sufficiently close proximity of the RFID reader (42).” *Id.* at 11:3–9. The RFID information and sensed object characteristics are then “separated, sorted and loaded into a current reads database table (86) stored in the first RFID memory (52) or in the server computer (1) or in the remote computer (34) memory (as to certain embodiments).” *Id.* at 11:25–30.

D. Illustrative Claims

Petitioner challenges claims 1–4, 6, and 17–20 of the '206 patent. Pet. 1–3. Claims 1 and 17, the challenged independent claims of the '206 patent, are illustrative of the challenged claims, and are reproduced below¹:

1. [Pre] A computer implemented animal management system, comprising:
 - [A] a processor communicatively coupled to a non-transitory computer readable media containing program instructions executable to:
 - [B] retrieve animal identification information from an RFID device;
 - [C] retrieve sensed animal information from said RFID device, said sensed animal information generated by a sensor coupled to said RFID device;
 - [D] match said sensed animal information retrieved from said RFID device to animal information of said animal stored in a database including an amount of milk production or a number of days in milk;
 - [E] enter said sensed animal information retrieved from said RFID device and said animal information stored in said database as logical variables into at least one logical expression; and
 - [F] solve said at least one logical expression to obtain a corresponding at least one logical value.

Ex. 1001, 18:22–41.

17. [Pre] A computer implemented animal management system, comprising:

¹ We adopt Petitioner's bracketed identifiers.

- [A] a processor communicatively coupled to a non-transitory computer readable media containing program instructions executable to:
- [B] retrieve animal identification information from an RFID device implanted in an animal;
- [C] retrieve sensed animal information from said RFID device;
- [D] retrieve date-time information from said RFID device;
- [E] match said sensed animal information retrieved from said RFID device to animal information stored in a database;
- [F] enter said sensed animal information retrieved from said RFID device and said animal information stored in said database as logical variables into at least one logical expression; and
- [G] solve said at least one logical expression to obtain a corresponding at least one logical value.

Id. at 20:23–41.

Challenged claims 2–4 and 6 depend from claim 1, either directly or indirectly. Challenged claims 18–20 depend from claim 17, either directly or indirectly.

E. Asserted References

Petitioner relies on the following references in its asserted grounds of unpatentability:

Name	Reference	Ex. No.
Brune	US 6,059,733 (May 9, 2000)	1008
Laitinen	US 7,059,275 B2 (June 13, 2006)	1006
Buchanan	WO 2006/059916 A2 (June 8, 2006)	1011
Liao	WO 2007/089184 A1 (Aug. 9, 2007)	1010
Trevarthen	Trevarthen, <i>The Importance of Utilising Electronic Identification for Total Farm Management: A Case Study of Dairy Farms</i>	1005

Name	Reference	Ex. No.
	<i>on the South Coast of NSW</i> (Bachelor Thesis, University of Wollongong) (Oct. 24, 2005)	

F. Asserted Grounds of Unpatentability

Petitioner asserts that claims 1–4, 6, and 17–20 of the ’206 patent are unpatentable in view of the following grounds. Pet. 2–3.

Ground	Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
1	1–4, 6	103(a)	Trevarthen
2	17–20	103(a)	Trevarthen, Brune
3	1–4, 6	103(a)	Laitinen, Buchanan, Liao
4	17–20	103(a)	Laitinen, Brune

Petitioner relies on the Declaration of Tami M. Brown-Brandl, Ph.D. (Ex. 1003) in support of its contentions. Patent Owner relies on the Declaration of Timothy J. Bowser, Ph.D. (Ex. 2001) in support of its Preliminary Response.

G. Overview of the Asserted References

1. Trevarthen (Ex. 1005)

Trevarthen relates to utilizing RFID technology on dairy farms “to enhance total farm management.” Ex. 1005, Abstr. As an example, Trevarthen describes a case study of the Cochrane dairy farm, which “has a

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011), amended 35 U.S.C. §§ 102 and 103, was effective on March 16, 2013. The ’206 patent claims priority to an application that has a filing date before March 16, 2013, and Petitioner applies the pre-AIA versions of §§ 102 and 103. *See* Pet. 7, 29, 37, 39, 40 (arguing that the asserted references are prior art under pre-AIA § 102(b)). Thus, for purposes of this Decision, we apply the pre-AIA versions of §§ 102 and 103. We note that our analysis in this Decision would not change under AIA law.

strong use of RFID technology” and “is well known in the region as one of the most advanced RFID setups.” *Id.* at 69.³ According to Trevarthen, each cow in the farm’s herd has an RFID tag attached to its right ear and “[t]his RFID tag is utilised to aid in farm management operations from early in a cow[’]s life.” *Id.* The Cochrane dairy farm uses a software package to aid in herd management and “to also provide the basis for their RFID operations.” *Id.* at 71. For example, “[a]s each cow passes through the RFID reader,” its individual information “is drawn from the central herd management database.” *Id.* at 78. The individual information identifies cows with specific attributes, e.g., “slow milking cows,” and “freshly calved cows.” *Id.* at 78–79. Trevarthen discloses that the Cochrane farm is considering implementing “milking meters for every milking bail . . . to record the amount of milk each cow has provided at every milking session” because “[a]ttaining milk production figures for every cow from every milking session will provide vastly more information for the farmers to utilise in their farm management decisions.” *Id.* at 98.

Beyond the case study, Trevarthen proposes future enhancements for RFID use at dairy farms. *Id.* at 99. RFIDs may include “RFID tags, boluses, or microchips” that “provide the same functionality, reliability and accuracy” so that individual farmers can select the device that best suits their requirements. *Id.* As to RFID enhancements, Trevarthen discloses “that it is possible to incorporate temperature sensing abilities into RFID microchips currently . . . which may soon be extended to the livestock industry. Such a

³ Petitioner’s exhibits include Bates Numbering, but both parties cite to the original pagination of the documents. For consistency with the parties’ citations, we refer to the documents’ page numbers.

device will provide the temperature of the cow along with the cow[']s unique identification number every time the tag is read by an RFID reader.” *Id.* at 121. According to Trevarthen, “reading this temperature will allow a more rapid response to aid in detection and subsequent treatment of any illnesses that a cow may have attracted.” *Id.* Trevarthen discloses that “when temperature fluctuations are recognised by the system, functionality could be incorporated to allow the system to alert the farmer of such fluctuations via means such as a beeper device that the farmer may carry, sending a text message to their mobile phone, or by similar rapid alert device.” *Id.* at 122.

2. *Brune (Ex. 1008)*

Brune relates to “a method of determining a physiological state of a ruminant animal by mathematically analyzing at least one portion of a history of data representing sensed temperatures within a stomach of the ruminant animal.” Ex. 1008, 1:63–67. Brune describes measuring animal temperature by placing a bolus, including a temperature sensor and a transmitter, in the ruminant animal’s stomach. *Id.* at 2:1–5. The bolus senses a plurality of temperatures in the stomach, “with each temperature representing a temperature at a respective discrete point in time over a time period.” *Id.* at 2:5–9. The bolus then transmits a plurality of air-borne signals to a remote receiver, “with each air-borne signal representing at least one of the sensed temperatures.” *Id.* at 2:9–11. The sensed “temperatures are mathematically analyzed at discrete points in time over the time period” to determine the ruminant animal’s physiological state. *Id.* at 2:12–16.

3. *Laitinen (Ex. 1006)*

Laitinen relates to a surveillance system used in animal husbandry. Ex. 1006, 2:32–34. “The system consists of three technology levels . . . referred to as local, global and pico level.” *Id.* at 3:21–27.

The three levels are shown in Laitinen Figure 1, reproduced below.

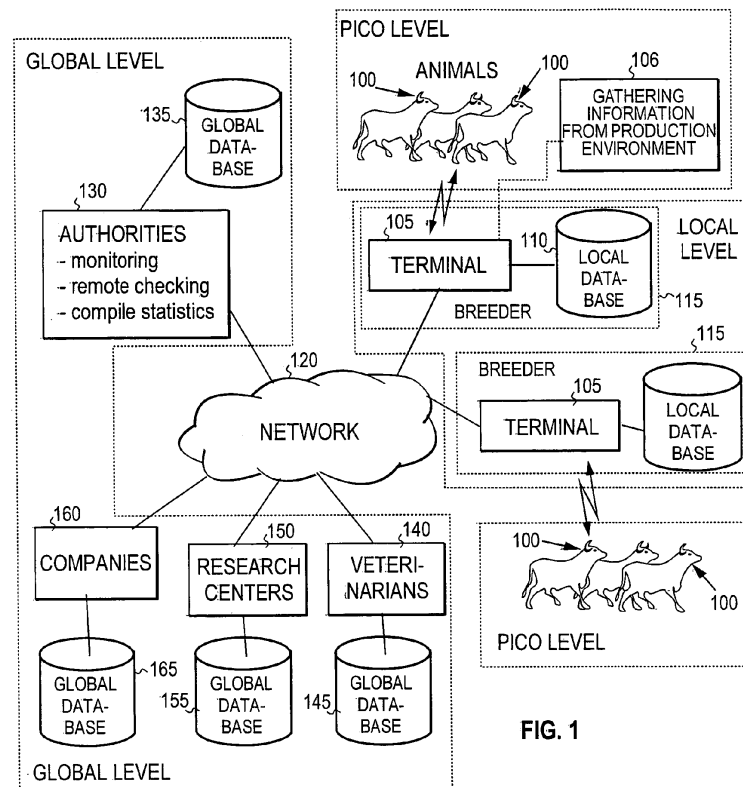


FIG. 1

Figure 1 illustrates the overall architecture of a surveillance system connected to a network, including a pico level, local level, and global level.

Id. at 3:5–6.

Laitinen's pico level is illustrated with pico level device 100 that includes, *inter alia*, the following components:

RF transmitter/receiver used in the creation of a (programmable) radio network with the local level's terminal unit. This component can also be a mere RF transmitter.

....

Micro controller that coordinates radio transmissions between the pico and the local level and gathers parameter values from the [s]ensors attached to the animals. When necessary, the micro controller protects data saved in the device. As a part of

the micro controller or as a separate component, the pico level also features an identifier.

[S]ensor unit connected to the micro controller for the surveillance of the animal's body temperature, occlusion, muscular action, motion or metabolic level. The [s]ensor unit can also be an implant inside the animal, in which case the data it provides can be, for instance, read/transcribed by the pico level equipment using the so-called Radio Frequency Identification Technology. It is also possible the [s]ensor unit includes components suitable for the dispersing of medicaments which enable the individual treatment of animals via a communications network, or detectors which alarm if the pico level device is detached from the animal.

Id. at 3:36–62.

Laitinen describes the “local level” as consisting of “one or more local 115 information systems, located in the farm of one farmer or breeder and tailored to meet its requirements by modifying a normal personal computer, for instance.” *Id.* at 4:5–9. Local information system 115 comprises terminal unit 105, typically featuring database 110 into which the terminal compiles information from pico and local levels, as well as from possible other devices 106. *Id.* at 4:9–17.

“[T]he highest, global, level consists of a computer or computers linked to the communications network 120 and of software in the databases of which information sent by the local level is gathered, organized and refined.” *Id.* at 4:42–45. “Based on the collected animal and farm information and expert knowledge, recommendations, treatment measures and management decisions are taken and prognosticated on the global level.” *Id.* at 4:50–53.

Laitinen describes feeding locally-collected data into “algorithms and knowledge models upheld in the global level systems.” *Id.* at 6:29–31. In one example, Laitinen describes an algorithm for monitoring medication effects using information about the animal’s present condition. *See id.* at 7:4–13, 35–56. In another example, Laitinen describes applying a pico level device to monitor whether the animal is in heat by measuring body temperature and movement. *Id.* at 8:5–11.

Laitinen further describes “two different pico level devices connected to a local information system. The pico level control device can be either external (100a) or implanted inside the animal’s tissue (100b).” *Id.* at 5:38–43. “The external device can, for instance, measure the animal’s body temperature (with a temperature [s]ensor) or movements . . . , or determine the animal[’]s location.” *Id.* at 5:44–47. “The internal device enables, for example, the use of an EKG analysis for the surveillance of the animal[’]s heart rate or an EMG (Electromyography) conveying its muscular tension or level of fatigue.” *Id.* at 5:50–53.

4. *Buchanan (Ex. 1011)*

Buchanan relates to “a farm management system for providing different levels of access and control to different users.” Ex. 1011, 1:5–6.

Figure 1 of Buchanan illustrates the system and is reproduced below.

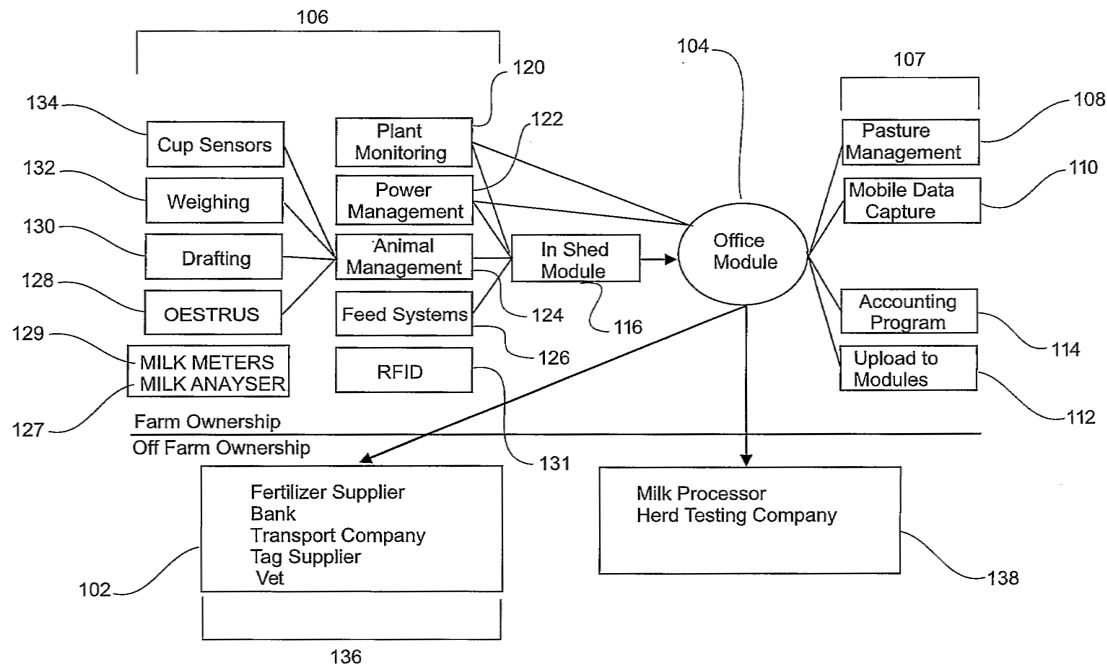


FIGURE 1

Figure 1 is a block diagram of a farm management system implemented for a single farm unit. *Id.* at 10:14–15.

Figure 1 illustrates central office module 104 that communicates with in-shed module 116, located in a milking parlor. *Id.* at 10:15–17. “[I]n-shed module 116 includes data input interfaces to communicate with plant and equipment 106 located in and around the milking shed,” including “physical plant (including vats and coolers) 120, power systems 122, feed systems 126, weigh scales 132, milking cup sensors 134, milk meters 129, in line milk analysers 127 and oestrus detectors 128.” *Id.* at 10:19–20, 10:25–27. Equipment 106 includes an animal identification device 131, which “may, for example, be an RFID scanner reading animal identifying data from animal ID tags moving into vicinity of the scanner.” *Id.* at 10:29–11:2.

Buchanan describes cup sensors that detect somatic cell count and milk meters that read milk volume and/or flow rate. *Id.* at 19:28–29. “The

program stores these readings to be associated with the particular animal being milked” and “determines if any of the received values are outside of a preset range.” *Id.* at 19:29–32.

According to Buchanan, “[d]etecting when a cow is on heat can be done through the cup sensors checking the milk or alternatively the sensors or camera taking a temperature reading from the cow[']s stomach, or an external sensor taking a temperature reading of the cow to determine if the cow is on heat.” *Id.* at 21:3–5. “The management system may be programmed to automatically draft cows for artificial breeding when the cows are on heat.” *Id.* at 21:6–8.

5. *Liao (Ex. 1010)*

Liao relates to a system for assisting in managing a dairy farm herd. Ex. 1010, 2:23–30. According to Liao, the described system “is capable of modeling decision processes that cannot be explicitly formulated” and “can provide valuable support to the farmer” in “very complex farm management decision making.” *Id.* at 3:15–18. “[T]he proposed dairy farm decisions relate to insemination, dry-cow states, determining individual animal energy demands, ketosis testing and/or mastitis testing.” *Id.* at 5:10–13.

For example, Liao explains the systems assists with insemination decisions by combining animal identity with other inputs, including:

a respective number of days in milk, a peak milk yield in a latest lactation, a conception rate of any previous lactations (i.e. the average number of inseminations required for the previous conceptions), a heat-detection status, a time period since a last heat date, a number of lactation periods, a body condition scoring, whether the animal has been selected for culling, and/or an activity status.

Id. at 5:14–23. According to Liao, the output data reflects “whether the animal having this identity should be inseminated within a particular time period.” *Id.* at 5:23–27.

As another example, Liao describes mastitis testing, in which the dairy farm data includes one or more parameters reflecting “a status of a low-activity alarm, a milk conductivity, a relative milk yield, a somatic cell count and a number of days in milk.” *Id.* at 6:32–7:2. According to Liao, the output data reflects “whether the animal with this identity should be tested for mastitis within a particular time period.” *Id.* at 7:2–6.

III. ANALYSIS

A. *Legal Standards*

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review). Furthermore, Petitioner must explain with particularity how the prior art would have rendered the challenged claims unpatentable. 35 U.S.C. § 312(a)(3); 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”).

A claim is unpatentable under 35 U.S.C. § 103 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 to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). 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) objective evidence of nonobviousness, i.e., secondary considerations.⁴ *See Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18 (1966).

B. Person of Ordinary Skill in the Art

“The level of skill in the art is a factual determination” that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

Petitioner asserts that a person of ordinary skill in the art (“POSA”) as of the claimed priority date would have “had at least a bachelor’s degree in animal science, biological engineering, electrical engineering, or computer science, or a related or equivalent field, and three or more years of experience researching, developing, designing and/or evaluating RFID tracking and sensor systems for livestock management.” Pet. 6 (citing

⁴ In the present record, neither party presents arguments or evidence relating to secondary considerations.

Ex. 1003 ¶¶ 24–25). Patent Owner does not contest Petitioner’s characterization. *See* Prelim. Resp. 13.

On this record and for the purposes of institution, we determine this level of skill, with the exception of the open-ended phrases “at least” and “or more,” which we remove from Petitioner’s proposal, comports with the qualifications a person would have needed to understand and implement the teachings of the ’206 patent and the prior art of record.

C. Claim Construction

We construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc), i.e., as construed in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R.

§ 42.100(b). Under *Phillips*, claim terms are afforded “their ordinary and customary meaning.” *Phillips*, 415 F.3d at 1312. “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Phillips*, 415 F.3d at 1313. “Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Phillips*, 415 F.3d at 1313.

Although neither party expressly seeks a specific claim construction or definition for any claim term, *see* Pet. 7; Prelim. Resp. 13 (citing Ex. 2001 ¶¶ 20–22), the parties raise two potential claim construction issues prior to our Decision whether or not to institute. First, Petitioner presents arguments based on possible alternative constructions for limitations 1[E] and 17[F]. Pet. 16–22. Second, Patent Owner argues that Petitioner attempts to broaden “implanted in an animal” (as recited in limitation 17[B] and as substantially similarly recited in certain dependent claims, as discussed below) beyond the

plain and ordinary meaning. *See* Prelim. Sur-Reply 2–3. We address these issues in turn below.

1. Petitioner’s Alternative Constructions for Limitations 1[E] and 17[F]

a) Petitioner’s Position

Petitioner presents arguments relating to two possible constructions for limitation 1[E], “enter said sensed animal information retrieved from said RFID device and said animal information stored in said database as logical variables into at least one logical expression.”⁵ Pet. 16–22. In the first construction, Petitioner asserts limitation 1[E] might be broadly construed as permitting “sensed and stored animal information to be entered into *separate* logical expression[s].” *Id.* at 17. Petitioner argues that this construction is consistent with Patent Owner’s assertion in the concurrent litigation “that 1[E] covers an ‘illness detection alert feature’ where ‘the animal’s temperature readings are entered into the system to determine whether the current temperature deviates from the animal’s regular temperature.’” *Id.* at 18 (citing Ex. 1022 ¶ 106; Ex. 1003 ¶ 107).

In the second construction, Petitioner makes an argument regarding a more-narrow construction of limitation 1[E] as requiring sensed and stored animal information to be entered into the *same* logical expression. *See* Pet. 19–20. Petitioner argues that the second construction is not disclosed in the ’206 patent. *See id.* at 19 (citing Ex. 1003 ¶¶ 110–111).

⁵ Petitioner applies the same argument for limitation 17[F]. *See* Pet. 33 (citing Ex. 1003 ¶¶ 157–159).

b) Patent Owner's Position

Patent Owner does not address the merits of Petitioner's arguments regarding alternative constructions of limitation 1[E].⁶ *See* Prelim. Resp. 13–15. Instead, Patent Owner asserts that Petitioner's presentation of arguments relating to alternative constructions is an independent reason to deny the Petition under 37 C.F.R. § 42.104(b). *Id.* at 14–15 (citing 37 C.F.R. §42.104(b)(3)–(4) (“[E]very petition must identify ‘[h]ow the challenged claim is to be construed’ and ‘[h]ow the construed claim is unpatentable.’”)). Patent Owner argues that Petitioner does “not inform the Board which of the two constructions they believe to be correct, nor do they provide any substantive argument as to how the Board should proceed with construing the terms.” *Id.* at 14.

c) Analysis

We are not persuaded by Patent Owner's argument to deny the Petition under 37 C.F.R. § 42.104(b). Rule 42.104(b) requires identifying how the challenged claims are to be construed and how the construed claims are unpatentable. Petitioner presents arguments and evidence alleging claims 1 and 17 are unpatentable under either of the constructions it discusses.⁷ Accordingly, on this record and for the purposes of institution, Petitioner has met the requirements of Rule 42.104(b).

⁶ Patent Owner applies the same argument for limitation 17[F]. *See* Prelim. Resp. 14.

⁷ It is common for Petitioners to present alternative claim constructions in their Petition. *See e.g., General Electric Co. v. Vestas Wind Systems A/S*, IPR2018-00928, Paper 9 at 12–17 (PTAB Nov. 5, 2018); *10X Genomics, Inc. v. Bio-Rad Labs, Inc.*, IPR2020-00086, Paper 8 at 18 (PTAB Apr. 27, 2020); *Lewis Machine & Tool Company v. WHG Properties*, IPR2020-00373, Paper 6 at 33–34 (PTAB July 27, 2020).

To the extent Patent Owner disagrees with Petitioner’s proposed claim constructions for limitations 1[E] and 17[F], for example because they are unreasonable or because they conflict with the intrinsic evidence, we encourage Patent Owner to present those arguments in the Patent Owner Response.⁸

We address Petitioner’s arguments regarding the alternative constructions of limitations 1[E] and 17[F] in the merits discussion below.

2. Implanted in an Animal

a) Patent Owner’s Position

Patent Owner asserts “[i]n all but two of the 24 claims of the ’206 Patent, the ‘sensed animal information’ must be retrieved from an ‘RFID device’ that is ‘implanted in an animal’ or ‘implanted in a plurality of animals.’” Prelim. Resp. 51; *see e.g.*, Ex. 1001, 18:45 (claim 2), 20:29 (claim 17). Patent Owner asserts that “‘implanted in an animal’” requires “‘implantation *inside* of an animal.” Prelim. Sur-Reply 2. Patent Owner argues that this interpretation is consistent with the plain meaning of the claims and the ’206 patent Specification. *See id.* at 2–3. For example, Patent Owner argues that the ’206 patent Specification “distinguishes between implanted ‘on’” and “‘implanted ‘within’ (i.e., ‘in,’ as recited in the claims).” *Id.* at 3 (citing Ex. 1001, 8:8–13).

⁸ We request that any claim construction arguments the parties rely upon during trial appear in a clearly designated section of briefing and note that such arguments should “point out the specific portions of the specification, prosecution history, and relevant extrinsic evidence” to be considered, with explanations of the relevancy of that evidence to the arguments presented. *See Patent Trial and Appeal Board Consolidated Trial Practice Guide*, at 46, 49 (Nov. 2019) (available at <https://www.uspto.gov/TrialPracticeGuide> Consolidated).

b) *Petitioner's Position*

Petitioner asserts that the '206 patent Specification defines “implanted in” to encompass “attached.” *See* Prelim. Reply 3. As support, Petitioner quotes the '206 patent Specification (*id.*), which states “[t]he term RFID (19) for the purposes of this invention can be any type of radiofrequency identification device as [above-]described or otherwise which can be attached, incorporated, implanted, imprinted, or held (individually and collectively referred to herein as ‘implanted’) on or within an RFID object (39)” (Ex. 1001, 8:8–13). According to Petitioner, one skilled in the art “would understand from the [S]pecification that being ‘attached’ to the ear is being ‘implanted;’ further, the device is ‘in’ the ear in the same sense that an earring is also placed ‘in’ the ear.” Prelim. Reply 3.

c) *Analysis*

At this preliminary stage, we agree with Patent Owner’s arguments as to the plain and ordinary meaning of “implanted in an animal,” meaning implanted *within* the animal rather than *on* the animal. Although we agree with Petitioner that the '206 patent Specification defines implanted as encompassing RFIDs attached or implanted “on or within” an animal, the plain language of the claim expressly recites “in,” which, on the present record, we determine corresponds to “within” as described by the '206 patent Specification. We apply that understanding to our discussion of Petitioner’s challenge based on Laitinen below.⁹

⁹ Patent Owner does not argue the “implanted” limitation as to Grounds 1 and 2 based on Trevvarthen. *See* Prelim. Resp. 29–48.

3. *Conclusion on Claim Construction*

For purposes of this Decision, we determine that no other claim terms require express construction. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”)).

D. *Asserted Obviousness of Claims 1–4 and 6 over Trevarthen*

Petitioner contends that claims 1–4 and 6 are rendered obvious by Trevarthen. Pet. 11–28. Patent Owner disputes Petitioner’s contentions, arguing that Trevarthen does not qualify as a printed publication under 35 U.S.C. § 102(b) (pre-AIA) (Prelim. Resp. 15–24) and Trevarthen does not render obvious the challenged claims (Prelim. Resp. 29–47). We address these issues in turn below.

1. *Whether Trevarthen Is a Prior Art Printed Publication*

Petitioner asserts that Trevarthen qualifies as pre-AIA 35 U.S.C. § 102(b) art because it was publicly available as a printed publication before September 15, 2008. Pet. 7–9. Patent Owner argues that Petitioner does not establish sufficiently for purposes of institution that Trevarthen qualifies as a printed publication. Prelim. Resp. 15–24. For the reasons explained below, we determine that Petitioner has shown a reasonable likelihood that Trevarthen qualifies as a printed publication before the earliest priority date of the ’206 patent and therefore qualifies as prior art as of its publication date.

a) *Legal Standards for Printed Publications*

“[A]t the institution stage, the petition must identify, with particularity, evidence sufficient to establish a reasonable likelihood that the

reference was publicly accessible before the critical date of the challenged patent and therefore that there is a reasonable likelihood that it qualifies as a printed publication.” *Hulu LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 13 (PTAB Dec. 20, 2019) (precedential). “[T]here is no presumption in favor of institution or in favor of finding a reference to be a printed publication” *Id.* at 16.

For a reference to qualify as a printed publication, it “must have been sufficiently accessible to the public interested in the art.” *In re Lister*, 583 F.3d 1307, 1311 (Fed. Cir. 2009) (quoting *In re Cronyn*, 890 F.2d 1158, 1160 (Fed. Cir. 1989)). The touchstone is “public accessibility,” and this “is determined on a case-by-case basis based on the ‘facts and circumstances surrounding the reference’s disclosure to members of the public.’” *Id.* (quoting *In re Klopfenstein*, 380 F.3d 1345, 1350 (Fed. Cir. 2004); *In re Hall*, 781 F.2d 897, 898–99 (Fed. Cir. 1986)). “A given reference is ‘publicly accessible’ upon a satisfactory showing that such document has been disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art[,] exercising reasonable diligence, can locate it.” *SRI Int’l, Inc. v. Internet Sec. Sys., Inc.*, 511 F.3d 1186, 1194 (Fed. Cir. 2008) (quoting *Bruckelmyer v. Ground Heaters, Inc.*, 445 F.3d 1374, 1378 (Fed. Cir. 2006)).

“When a reference is uploaded to a website or deposited in a library, the fact that the reference is indexed or cataloged in some way can indicate that it is publicly accessible.” *Samsung Elecs. Co. v. Infobridge Pte. Ltd.*, 929 F.3d 1363, 1369 (Fed. Cir. 2019). “But indexing is not ‘a necessary condition for a reference to be publicly accessible’; it is but one among many factors that may bear on public accessibility.” *Voter Verified, Inc. v. Premier Election Sols., Inc.*, 698 F.3d 1374, 1380 (Fed. Cir. 2012) (quoting

Lister, 583 F.3d at 1312). “[W]hile often relevant to public accessibility, evidence of indexing is not an absolute prerequisite to establishing online references . . . as printed publications within the prior art.” *Id.*

b) Petitioner’s Position

Petitioner contends that “Trevarthen was published and available for download on October 22, 2006” in the University of Wollongong’s Research Online (“Research Online”) digital archive. Pet. 7–8. Petitioner supports its contention with the declaration of Dr. Brown-Brandl (Ex. 1003); the declaration of June Munford (Ex. 1031), a library information scientist; and the declaration of Nathaniel Frank-White (Ex. 1030), a records request processor at the Internet Archive. *Id.*

Petitioner contends that “Research Online ensures that ‘a digital copy’ of each reference . . . published in the digital repository ‘is available universally on the Internet and located through search engines such as Google and Yahoo.’” *Id.* at 8 (citing Ex. 1031 ¶¶ 16–20; *see also* Ex. 1027, 149). Specifically, Petitioner contends that “[o]nce a publication, like Trevarthen, is ‘loaded onto Research Online [it] is usually available on Google the following day.’” *Id.* (citing Ex. 1031 ¶ 19; *see also* Ex. 1030, Ex. A). Petitioner argues that the Internet Archive shows that Trevarthen was available on “Research Online on September 7 and 12, 2007, and March 22, 2008.” *Id.* (citing Ex. 1031 ¶¶ 27–33; *see also* Ex. 1030, Ex. B). Citing statistics listed on these archived webpages, Petitioner asserts that “Trevarthen was downloaded hundreds of times before September 2008.” *Id.* (citing Ex. 1031 ¶¶ 21–26; *see also* Ex. 1030, Ex. A).

Petitioner further argues that other evidence corroborates “Trevarthen’s public accessibility.” *Id.* at 9. Specifically, Petitioner cites an International Search Report dated March 18, 2008 in PCT/NZ2007/000286

that lists Trevvarthen as a relevant document. *Id.* (citing Exs. 1028, 1029). Petitioner asserts that the International Search Report “confirms the pre-September 2008 public accessibility of Trevvarthen to the POSA searching publicly available databases using keywords including ‘cattle’ and ‘RFID.’” *Id.* (citing Ex. 1028; Ex. 1030 ¶¶ 34–39; Ex. 1003 ¶ 68).

c) Patent Owner’s Position

Patent Owner argues that Petitioner fails to show that Trevvarthen was publicly accessible before the critical date of the ’206 patent. Prelim. Resp. 17. Specifically, Patent Owner contends that Petitioner does “not provide any evidence as to how Trevvarthen was indexed by a search engine, let alone how Trevvarthen was *meaningfully indexed* such that a POSA would find it with reasonable diligence.” *Id.* at 18. For example, Patent Owner argues that Petitioner’s declarant, Ms. Munford, “did not conduct any keyword searches, identify any search terms that successfully located Trevvarthen, or otherwise verify that Trevvarthen would have been ‘available’ on a commercial search engine prior to September 15, 2008.” *Id.* at 19.

In contrast, Patent Owner argues that its declarant, Dr. Bowser, “*did* attempt to recreate a search on Google, but could not locate Trevvarthen.” *Id.* at 20 (citing Ex. 2001 ¶¶ 60–80). According to Patent Owner, “Dr. Bowser’s inability to locate Trevvarthen on Google prior to September 15, 2008, as Petitioners[] claim a POSA would have done, illustrates that Trevvarthen was not locatable before the critical date by a POSA exercising reasonable diligence.” *Id.*

Patent Owner further argues that Petitioner’s evidence “demonstrates no more than technical accessibility of Trevvarthen, which critically is not the same as public accessibility.” *Id.* at 21 (citing *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 773 (Fed. Cir. 2024)). For example,

Patent Owner argues that “Trevarthen’s existence on Research Online fails to show how a POSA would have found Trevarthen in the first place. The Wayback Machine archives thus only serve to establish that Trevarthen was technically accessible, *i.e.*, that the reference existed on the Internet, not that it was publicly accessible.” *Id.* at 22 (citing *Samsung Elecs.*, 929 F.3d at 1369). Patent Owner also argues that we should disregard the number of downloads shown by Research Online because, there is “no evidence regarding how many unique individuals downloaded the reference, who those individuals are, or whether the download count is even reliable. Indeed, all downloads could have been initiated by the author, his friends and family, or his faculty advisors.” *Id.* at 23 (citing Ex. 2001 ¶ 84).

Patent Owner makes similar arguments as to the International Search Report. *See id.* at 23–24. For example, Patent Owner argues that “the search report does not specify which database or search terms, if any, actually led the examiner to Trevarthen.” *Id.* at 24 (citing Ex. 1028, 1). Patent Owner argues that Petitioner further does not “address whether an Australian examiner’s ability to locate a reference from an Australian university stems from personal knowledge that a POSA would not have.” *Id.* (citing Ex. 2001 ¶¶ 88–90).

d) Printed Publication Analysis

On this record for the purposes of institution, we determine that Petitioner has demonstrated a reasonable likelihood that Trevarthen qualifies as a printed publication and prior art to the ’206 patent. *See Hulu*, IPR2018-01039, Paper 29 at 21.

First, we consider Trevarthen’s publication via Research Online. As Petitioner explains, the purpose of Research Online is to “promote[] the scholarly output of the University of Wollongong,” allowing “easy

discovery’ of uploaded publications ‘via Google and Google Scholar’” thereby increasing their visibility. Pet. 8 (citing Ex. 1027, 150). Petitioner’s argument is supported by declaratory testimony (e.g., Exs. 1030, 1031) and documentary evidence (Exs. 1027, 1028, 1029). Our reviewing court has held “that where a publication’s purpose is ‘dialogue with the intended audience,’ that purpose indicates public accessibility.” *Valve Corp. v. Ironburg Inventions Ltd.*, 8 F.4th 1364, 1374 (Fed. Cir. 2021) (quoting *Suffolk Techs., LLC v. AOL Inc.*, 752 F.3d 1358, 1365 (Fed. Cir. 2014)). Petitioner further explains that Trevarthen’s visibility may be verified by the associated download statistics, indicating “Trevarthen was downloaded hundreds of times before September 2008.” Pet. 8 (citing Ex. 1027, 150; Ex. 1031 ¶¶ 21–26).

We weigh Petitioner’s showing against Patent Owner’s arguments that there is no evidence of indexing, as supported by Dr. Bowser’s competing search, and no evidence of unique downloads. Prelim. Resp. 21–23; Ex. 2001 ¶¶ 64–80. On this record, we find Petitioner’s evidence to establish a reasonable likelihood of public accessibility, that the purpose of Research Online was to make publications like Trevarthen available to the public, and that the download statistics indicate public accessibility. *See Voter Verified*, 698 F.3d at 1380–81 (weighing evidence supporting public accessibility against a record “devoid of evidence” indicating whether or not a website had been actually indexed by “commercial internet search engines”).

Second, we consider Trevarthen’s listing in an International Search Report. In *Valve*, our reviewing court held that a patent examiner’s identification of a reference through a search for the purposes of locating prior art “is highly probative evidence of public accessibility.” 8 F.4th at 1376. Petitioner’s evidence shows that the Australian Patent Office

identified Trevarthen using an internet search with some combination of the search terms, “cattle, rfid, gate, etc.” as of March 2008, before the earliest priority date of the ’206 patent. Ex. 1028, 1. On this record, we find this evidence more persuasive than Patent Owner’s speculation that “an Australian examiner’s ability to locate a reference from an Australian university stems from personal knowledge that a POSA would not have.” Prelim. Resp. 24 (citing Ex. 2001 ¶¶ 88–90); *see also Valve* at 1376 (“If an examiner could access the article before the priority date, so could the general public.”).

On this record and for the purposes of institution, we determine that Petitioner has established a reasonable likelihood that Trevarthen was publicly accessible prior to the earliest priority date of the ’206 patent and therefore qualifies as a printed publication under 35 U.S.C. § 102(b) (pre-AIA).

2. Independent Claim 1

a) Preamble

The preamble of claim 1 recites “[a] computer implemented animal management system.” Ex. 1001, 18:22–23.

Petitioner asserts that “Trevarthen describes a system using herd management software, which the POSA would have understood to be a computer-implemented animal management system.” Pet. 11–12 (citing Ex. 1003 ¶ 89; Ex. 1005, 100).

Patent Owner does not dispute that Trevarthen teaches the preamble of claim 1. On this record and for the purposes of institution, we are

sufficiently persuaded by Petitioner’s argument and evidence that Trevarthen teaches the preamble of claim 1.¹⁰

b) *Limitation 1[A] (a processor, computer readable media, and program instructions)*

Claim 1 recites “a processor communicatively coupled to a non-transitory computer readable media containing program instructions executable to.” Ex. 1001, 18:24–26.

Petitioner asserts that Trevarthen teaches that an operator may interface with the herd management software using a computer, which one skilled in the art would have understood to meet the processor element. Pet. 12 (citing Ex. 1005, 101, 104). Petitioner further asserts that one of ordinary skill in the art “would have understood that Trevarthen’s herd management ‘software’ . . . *necessarily* comprises executable program instructions stored on computer-readable media that runs on a processor.” *Id.* (citing Ex. 1003 ¶¶ 90–91 (citing Ex. 1013, 13:6–9; Ex. 1014 ¶¶ 44–45, 81)) (emphasis added).

Patent Owner argues that Petitioner has “not pointed to any disclosure in Trevarthen describing or suggesting ‘a non-transitory computer readable media containing program instructions,’ as recited in every challenged claim.” Prelim. Resp. 29. Patent Owner identifies non-precedential Board decisions that allegedly “require[d] petitioners to show that *each* of the recited instructions are stored in or executable by the computer or processor that they identify.” *Id.* at 30–31 (citing *AOL Inc. v. Coho Licensing LLC*, IPR2014-00966, Paper 6 at 3–4, 14 (PTAB Nov. 20, 2014); *Garmin Int’l*,

¹⁰ Because Petitioner has sufficiently shown that the prior art teaches the preamble, we need not determine at this time whether the preamble is limiting. *See Nidec*, 868 F.3d at 1017.

Inc. v. LoganTree, LP, IPR2018-00565, Paper 24 at 25–27 (PTAB Aug. 28, 2019)). As applied to this proceeding, Patent Owner argues that Petitioner “never argue[s] that the alleged ‘software’ or ‘computer’ in Trevarthen contains program instructions ‘executable to’ perform ‘retrieve,’ ‘match,’ ‘enter,’ or ‘solve’ as recited in claim elements 1[B] through 1[F].” *Id.* at 32 (citing Pet. 12–23; Ex. 1003 ¶¶ 94–95).

Patent Owner further argues that Petitioner also does “not rely on inherency” by, e.g., arguing “that Trevarthen inherently discloses that its ‘computer’ or ‘software’ necessarily ‘contain[] program instructions executable to’ perform any of the claimed instructions.” *Id.* at 34 (alteration by Patent Owner).

We determine that, on this record, Petitioner establishes sufficiently for the purposes of institution that Trevarthen teaches or suggests a processor communicatively coupled to a non-transitory computer readable media containing program instructions. *See* Pet. 12 (citing Ex. 1003 ¶¶ 90–91; Ex. 1005, 100, 101, 104). Contrary to Patent Owner’s argument, Petitioner does argue that Trevarthen inherently, i.e., “necessarily comprises executable program instructions stored on computer-readable media that runs on a processor.” *See* Pet. 12. Petitioner’s argument is further supported by declaratory testimony, with additional supporting evidence and reasoning, that one skilled in the art would have understood Trevarthen’s computer with software to teach this limitation. *See* Ex. 1003 ¶ 91 (citing Ex. 1013, 13:6–9; Ex. 1014 ¶¶ 44–45, 81).

c) Limitation 1[B] (retrieve identification information from an RFID)

Claim 1 recites “retrieve animal identification information from an RFID device.” Ex. 1001, 18:27–28.

Petitioner asserts that Trevarthen discloses a dairy farm RFID system including an RFID reader for identifying every cow with RFID tags. Pet. 13 (citing Ex. 1005, 102; Ex. 1003 ¶ 93). Petitioner argues that the devices may include RFID tags, boluses, or microchips. *Id.* (citing Ex. 1005, 99–100; Ex. 1003 ¶ 92). According to Petitioner, Trevarthen further discloses the RFID reader is placed at the dairy entrance “to serve as the basis for a wide range of optional operations to be conducted within the dairy that require ***individual identification of cows.***” *Id.* (citing Ex. 1005, 103, 106, 121).

Patent Owner does not dispute that Trevarthen teaches limitation 1[B], apart from its arguments as to limitation 1[A] that Trevarthen does not teach a computer or software containing program instructions to “retrieve.” *See* Prelim. Resp. 33. On this record and for the purposes of institution, we are sufficiently persuaded by Petitioner’s argument and evidence that Trevarthen teaches limitation 1[B].

d) Limitation 1[C] (retrieve sensed information from said RFID)

Claim 1 recites “retrieve sensed animal information from said RFID device, said sensed animal information generated by a sensor coupled to said RFID device.” Ex. 1001, 18:29–31.

Petitioner asserts that “Trevarthen discloses retrieving sensed animal temperature from an RFID device coupled to a temperature sensor.” Pet. 14–15 (citing Ex. 1003 ¶ 96). Petitioner relies on Trevarthen’s disclosure “that it is possible to incorporate temperature sensing abilities into RFID microchips currently . . . Such a device will provide the temperature of the cow along with the cow[’]s unique identification number every time the tag is read by an RFID reader.” *Id.* at 13–14 (citing Ex. 1005, 121) (emphasis omitted). Petitioner further argues that Trevarthen “discloses that ‘RFID temperature

sensing is a currently available technology” citing “the Bio-thermo RFID as an example of an implanted RFID device with temperature sensing capability.” *Id.* at 14 (citing Ex. 1005, 123, 24–25).

Patent Owner argues that Trevarthen does not teach retrieving “sensed” animal information in an animal management system. Prelim. Resp. 34–35. Instead, Patent Owner cites Trevarthen’s acknowledgement that “while temperature sensing abilities could be incorporated into RFID microchips, that practice had not been ‘extended to the livestock industry’ as of October 2005.” *Id.* at 35 (citing Ex. 1005, 121, 123). Dr. Bowser testifies that “there are good reasons why POSAs had not successfully incorporated sensed animal information obtained from RFID devices into herd management systems at the time of the invention.” Ex. 2001 ¶ 101 (cited at Prelim. Resp. 35). For example, “internal microchips could result in tissue damage, infection, or discomfort to the animal,” and be damaged by the animal. Ex. 2001 ¶ 102 (cited at Prelim. Resp. 25).

Patent Owner further argues that it would not have been obvious to “reconfigure Trevarthen to ‘retrieve sensed animal information from said RFID.’” Prelim. Resp. 36. Patent Owner argues that we should disregard Dr. Brown-Brandl’s citations to other “background references” as an improper incorporated argument, and citations to the ’206 patent as improper hindsight. *See id.* at 36–37.

We determine that, on this record, Petitioner establishes sufficiently for the purposes of institution that Trevarthen teaches or suggests retrieving sensed information, e.g., temperature, from an RFID. *See* Pet. 45–47 (citing Ex. 1005, 121–123, 24–25). Although Trevarthen does not disclose actually incorporating a temperature sensing RFID, e.g., in the Cochrane case study, Trevarthen suggests incorporating commercially available RFID-compatible

temperature sensors into an existing RFID system to detect an animal's temperature variations. *See* Ex. 1005, 122–123. Contrary to Patent Owner's argument that this would require reconfiguring Trevarthen's RFID, the modification appears to be no more than the combination of familiar elements according to known methods yielding predictable results. *See KSR*, 550 U.S. at 416. Moreover, Trevarthen alone appears to suggest the combination, without considering the '206 patent or hindsight. *See* Ex. 1005, 121–122 (“The temperature of a cow is certainly a valuable attribute for a farmer to utilise in managing their herd.”).

e) Limitation 1[D] (match sensed information to information stored in a database)

Claim 1 recites “match said sensed animal information retrieved from said RFID device to animal information of said animal stored in a database including an amount of milk production or a number of days in milk.” Ex. 1001, 18:32–35.

Petitioner asserts that “Trevarthen discloses retrieving sensed temperature information from the RFID device ‘along with the cow[']s unique identification number every time the tag is read by an RFID reader,’” as discussed above. Pet. 16 (citing Ex. 1005, 121). Accordingly, Petitioner asserts that Trevarthen discloses storing temperature readings, associated with the cow's identification number, in a herd management software database. *Id.* (citing Ex. 1005, 100; Ex. 1003 ¶ 99).

Petitioner further asserts that Trevarthen discloses recording milk production for each individual cow using milk meters and storing that information in the herd management system database. *Id.* at 15 (citing Ex. 1005, 102, 112, 100, 109; Ex. 1003 ¶¶ 97–98). According to Petitioner, “[b]ecause Trevarthen discloses that its database stores both milk production

and temperature information for each cow, the POSA would have understood that the sensed temperature information for a cow would have been matched to the stored milk production information for that cow using the cow's identification information." *Id.* at 16 (citing Ex. 1003 ¶ 100).

Patent Owner does not dispute that Trevarthen teaches limitation 1[D], apart from its arguments as to limitation 1[A] that Trevarthen does not teach a computer or software containing program instructions to "match," and to the extent Petitioner's argument relies on limitation 1[C]). *See* Prelim. Resp. 33–35. On this record and for the purposes of institution, we are sufficiently persuaded by Petitioner's argument and evidence that Trevarthen teaches limitation 1[D].

f) Limitation 1[E] (enter information as variables into at least one logical expression)

Claim 1 recites "enter said sensed animal information retrieved from said RFID device and said animal information stored in said database as logical variables into at least one logical expression." Ex. 1001, 18:36–39.

As discussed above in the claim construction section (III.C.1), Petitioner presents arguments for two alternative claim constructions and why the claims are unpatentable under each construction. We discuss those arguments in detail below.

Before addressing Petitioner's unpatentability arguments under each construction, Patent Owner argues that Petitioner engages "in improper mixing and matching of disparate teachings from a single reference, without providing a reason to combine those teachings." Prelim. Resp. 38 (citing *In re Stepan Co.*, 868 F.3d 1342, 1346 n.1 (Fed. Cir. 2017)). Specifically, Patent Owner argues that Petitioner improperly combines Trevarthen's various disclosures from the Cochrane Dairy case study and the author's

own “theoretical framework.” *See id.* at 38–42. For example, Patent Owner argues that Trevarthen’s discussion of “the Cochrane’s potential ‘implementation of milking meters for every milking bail’ at their farm” is “a system unrelated to RFID technology.” *Id.* at 39 (citing Ex. 1005, 98; Ex. 2001 ¶ 108). And Patent Owner argues “even if the milking meters were implemented at Cochrane Dairy, they never could or would have been used with an RFID device that ‘sensed animal information’ as claimed because the Cochranes employed basic ear tags without sensors of any kind.” *Id.* (citing Ex. 1005, 69; Ex. 2001 ¶ 109). Patent Owner further contends Trevarthen’s disclosures of tracking milk production are “not part of an alert or logical expression” and thus “there would have been no reasonable expectation of success in incorporating the disclosure into a method arranged as claimed.” *Id.* at 40–42 (citing Ex. 1005, 98, 108–109, 115; Ex. 2001 ¶¶ 109–112).

We address Patent Owner’s arguments about “mixing and matching of disparate teachings from a single reference” before turning to Patent Owner’s arguments about Petitioner’s application of the art to limitation 1[E]. Patent Owner cites to *Stepan* for the proposition that when “combining multiple embodiments from a single reference . . . there must be a motivation to make the combination and a reasonable expectation that such a combination would be successful.” *Stepan*, 868 F.3d at 1346 n.1, *cited in* Prelim. Resp. 38–39. Although *Stepan* provides the proper framework for single-reference obviousness, the absence of a reason to combine in that case distinguishes Petitioner’s argument in this proceeding. Unlike *Stepan*, Petitioner provides an express motivation to combine Trevarthen’s separate disclosures, e.g., to detect illness in livestock. *See* Pet. 19–20 (citing Ex. 1005, 98, 115, 121; Ex. 1003 ¶¶ 111–116). Moreover, 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. Ex. 1005, 99. The enhancements include RFID boluses (Ex. 1005, 99), milk meters to detect illness (*id.* at 115), and temperature monitoring by RFID (*id.* at 121–122). On this record, each of Petitioner’s proposed improvements appears to apply “the predictable use of prior art elements according to their established functions.” *See KSR*, 550 U.S. at 417. Accordingly, on this record, Petitioner has shown a reasonable likelihood of success that one skilled in the art would have been motivated to combine Trevarthen’s teachings in an improved RFID-integrated farm management system.

(1) Entering Information into Separate Logical Expressions

Petitioner argues “[t]o the extent 1[E] could broadly permit sensed and stored animal information to be entered into *separate* logical expression[s], then Trevarthen discloses every element of claim 1.” Pet. 17 (citing Ex. 1003 ¶¶ 101, 104). First, for “sensed” animal information, Petitioner argues that “Trevarthen discloses entering logical variables of sensed temperatures into a logical expression designed to detect ‘fluctuations in the body temperature of a cow [that] can indicate that the cow may be *falling ill*’ and to issue an appropriate ‘alert.’” *Id.* (alteration by Petitioner; citing Ex. 1003 ¶¶ 121–122). Petitioner further argues that one skilled in the art would have understood that detecting illness with temperature information would include entering sensed temperature information as logical variables into a logical expression, e.g., “an expression that determines the magnitude, rate of change, or variability of a sequence of

temperature measurements and compares these values to corresponding thresholds.” *Id.* at 18 (citing Ex. 1003 ¶ 105; Ex. 1005, 122).

Second, for “stored” animal information, Petitioner argues that “Trevarthen describes a logical expression that can detect issues with a cow’s milk production that may indicate illness or another issue.” *Id.* at 18 (citing Ex. 1003 ¶¶ 108–109). Specifically, Petitioner argues that Trevarthen describes correlating changes in calculated milk average to illness, deriving an average milk production, and analyzing milk production history to recognize certain patterns. *Id.* at 18–19 (citing Ex. 1005, 98, 115, 109). Petitioner argues that one skilled in the art “would have understood Trevarthen’s calculation of a milk production average, the comparison of recent production to usual output, and the recognition of patterns, necessarily required use of one or more logical expressions having milk production information as logical input variables.” *Id.* at 19 (citing Ex. 1003 ¶ 109).

In addressing Petitioner’s arguments relating to this “separate logical expressions” construction, Patent Owner argues that the “Cochrane Dairy was seeking to potentially use milk meters” and “[t]here is no disclosure or suggestion of using information from milk meters in any logical expression.” Prelim. Resp. 42 (citing Ex. 1005, 98; Ex. 2001 ¶¶ 113–115). Additionally, Patent Owner argues that the Cochrane Dairy “used basic ear tags to identify cows, which are not sensors allowing for the system to ‘retrieve sensed animal information from said RFID device,’” e.g., “temperature or any other sensed data.” *Id.* (citing Ex. 1005, 69–70; Ex. 2001 ¶ 116). Finally, Patent Owner argues that Trevarthen does not describe the Cochrane Dairy’s herd management software as “performing any of the recited instructions, including entering milk production information and/or temperature data as

‘logical variables into at least one logical expression.’” *Id.* at 43 (citing Ex. 2001 ¶ 117).

We determine that, on this record, Petitioner establishes sufficiently for the purposes of institution that Trevarthen teaches or suggests entering sensed temperature information and stored milk information as logical variables into separate logical expressions. Pet. 16–19 (citing Ex. 1003 ¶¶ 45–54, 101–109; Ex. 1005, 98, 100, 109, 115, 121–122). On this record, we are persuaded by Petitioner’s argument that Trevarthen teaches or suggests incorporating temperature-sensing RFIDs into a farm management system to monitor individual cow temperature for illness and heat. Ex. 1005, 121–122. In doing so, Trevarthen teaches or suggests a system that includes program instructions to monitor temperatures (logical variables), recognize fluctuations (via a first logical expression) and send an alert (solve the logical expression). *See* Ex. 1003 ¶¶ 105–107. Likewise, we are persuaded by Petitioner’s argument that Trevarthen teaches or suggests incorporating milk meters into a farm management system to monitor individual cows’ milk production for illness. Ex. 1005, 112, 115. In doing so, Trevarthen teaches or suggests a system that includes program instructions to monitor milk output (logical variables), identify a disparity (via a second, separate logical expression) and identify illness (solve the logical expression). *See* Ex. 1003 ¶¶ 108–109.

(2) *Entering Information into the Same Logical Expression*

Petitioner argues “[u]nder a construction in which 1[E] requires *both* sensed temperature and stored milk production information to be entered as logical variables into the *same* logical expression, the POSA would have been motivated to do so in Trevarthen to enhance the system’s ability to

detect illness.” Pet. 17 (citing Ex. 1003 ¶¶ 102–103). Petitioner first argues that “Trevarthen expressly teaches that *both* temperature and reduced milk production are indicators of illness.” *Id.* at 20 (citing Ex. 1005, 98, 115, 121). Petitioner then argues that one skilled in the art “would have been motivated to modify Trevarthen’s logical expression to input both temperature and milk production information as logical variables.” *Id.* (citing Ex. 1003 ¶ 113; Ex. 1023, 4:13–25).

Petitioner asserts that combining two different logical variables “would improve Trevarthen’s illness detection capabilities.” *Id.* (citing Ex. 1003 ¶¶ 114–116). Petitioner further asserts that modifying “Trevarthen’s expressions, or introduc[ing] . . . an entirely new expression, to include both temperature and milk production as input variables would have been easily accomplished” by applying “straightforward algebra that was well within the skill of the POSA.” *Id.* at 20–21 (citing Ex. 1003 ¶¶ 117–118).

In addressing this possible construction, Patent Owner argues that “[n]othing in the Petition nor the supporting declaration demonstrates that a POSA would have any reason to modify an alleged ‘logical expression’ in Trevarthen to ‘input both temperature and milk production information as logical variables,’ regardless of whether temperature and milk are indicators of illness.” Prelim. Resp. 44. Patent Owner argues that Petitioner relies on “Trevarthen’s discussion of hypothetical ‘functionality’” that “cannot serve as a disclosure of a claim element.” *Id.* (citing *PersonalWeb Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 993 (Fed. Cir. 2017)). Patent Owner further argues that Petitioner’s supporting documents “cannot supply a reason to modify Trevarthen to include a logical expression that integrates milk and sensed temperature information,” because those documents at most disclose

sensing milk temperature and not animal temperature. *Id.* at 45–46 (citing Ex. 1023, 4:13–18, 4:20–24, 4:29–34; Ex. 1033, Abstr., 173; Ex. 1003 ¶¶ 122–123).

We determine that, on this record, Petitioner establishes sufficiently for the purposes of institution that Trevarthen teaches or suggests entering sensed temperature information and stored milk information as logical variables into the same logical expression. Pet. 19–22 (citing Ex. 1003 ¶¶ 110–119; Ex. 1005, 1, 18, 80–81, 98, 114, 115, 121). We agree with Petitioner that Trevarthen teaches measuring sensed cow temperatures and stored milk outputs to identify illness. *See* Ex. 1005, 98, 115, 121. We also agree with Petitioner that a person of ordinary skill in the art would have had a reason to combine these values into a logical expression to more accurately predict illness. Ex. 1003 ¶¶ 113–118; *KSR*, 550 U.S. at 416 (“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”).

g) Limitation 1[F] (solve logical expression to obtain logical value)

Claim 1 recites “solve said at least one logical expression to obtain a corresponding at least one logical value.” Ex. 1001, 18:40–41.

Petitioner asserts that “Trevarthen discloses solving its logical expressions, wherein the solutions comprise values indicating whether the animal is ill so that an alert may be generated.” Pet. 22 (citing Ex. 1005, 122, 115). Petitioner specifically identifies Trevarthen’s alerts based on “temperature fluctuations” and significantly lower milk output. *Id.* According to Petitioner, “[i]t follows that if sensed temperature and stored milk production for a cow are outside the range of the expected values (e.g., higher than expected temperature and lower than expected milk production),

Trevarthen's system identifies a potential illness and alerts the operator." *Id.* at 22–23 (citing Ex. 1003 ¶¶ 123–124).

Patent Owner does not dispute that Trevarthen teaches limitation 1[F], apart from its arguments as to limitation 1[A] that Trevarthen does not teach a computer or software containing program instructions to “solve,” and to the extent Petitioner's argument relies on limitation 1[E]. *See* Prelim. Resp. 33. On this record and for the purposes of institution, we are sufficiently persuaded by Petitioner's argument and evidence that Trevarthen teaches limitation 1[F].

h) Conclusion as to Claim 1

Based on the current record, there is a reasonable likelihood that Petitioner will prevail in demonstrating that claim 1 is unpatentable as obvious in view of Trevarthen.

3. Claims 2–4 and 6

Petitioner presents evidence that Trevarthen teaches the limitations of claims 2–4 and 6. Pet. 23–28. Patent Owner does not separately argue these claims at this stage of the proceeding. Patent Owner may raise any arguments regarding these claims in its Patent Owner Response after institution. On the present record, Petitioner shows sufficiently that Trevarthen teaches the limitations of claims 2–4 and 6.

E. Asserted Obviousness of Claims 17–20 over Trevarthen and Brune

Petitioner contends that claims 17–20 are rendered obvious by the combination of Trevarthen and Brune. Pet. 28–37. Patent Owner disputes Petitioner's contentions. Prelim. Resp. 47–49.

1. Claim 17

Claim 17 recites similar limitations to claim 1. *See* Ex. 1001, 20:23–41. Accordingly, Petitioner cites Trevarthen for teaching the preamble of claim 17 and limitations 17[A]–17[C] and 17[E]–17[G]. Pet. 30–34 (citing Pet. 11–23, Ex. 1003 ¶¶ 146–161; Ex. 1005, 102, 121–122). Petitioner cites Brune, in combination with Trevarthen, to address limitation 17[D], “retrieve date-time information from said RFID device.” *Id.* at 31–33.

Petitioner asserts Trevarthen discloses fixed readers for “identifying a cow as she enters the milking parlour, and subsequently **recording the time and date** of this read to the central herd management database.” *Id.* at 31 (citing Ex. 1005, 102, 103). Petitioner further asserts that “Trevarthen discloses identifying ‘fluctuations’ and ‘anomalies’ in temperature,” whereby one skilled in the art “would therefore have understood that a time-series of time-date stamped temperature measurements are needed.” *Id.* (citing Ex. 1005, 121–122; Ex. 1003 ¶ 150).

Petitioner asserts that “[g]iven the importance of time-stamping to Trevarthen, it would have been obvious for the POSA to modify the RFID device of Trevarthen to include the date-time stamping capability disclosed in Brune.” *Id.* at 32 (citing Ex. 1003 ¶¶ 150–151). Specifically, Petitioner argues that Brune discloses transmitting a data packet from a bolus implant within the stomach of a cow. *Id.* at 31–32 (citing Ex. 1008, 4:1–11). Brune discloses that “the data packet includes temperature data representing the sensed temperature within the stomach, identification data such as an identification number which is unique to the specific cow, and date and/or time stamp data corresponding to the discrete point in time at which the temperature was sensed by the bolus.” Ex. 1008, 4:1–11; 2:1–16 (cited at Prelim. Resp. 31–32). Accordingly, Petitioner asserts that Brune teaches

retrieving “identification information (element 17[B]), sensed temperature information (element 17[C]), and time-date information (element 17[D]).” *Id.* at 32 (citing Ex. 1003 ¶¶ 152–153).

Petitioner further argues that one of ordinary skill in the art “would have reasonably expected Brune[]’s device to work with Trevarthen’s herd management system, at least because the same types of information are being retrieved from a similar implanted bolus.” *Id.* (citing Ex. 1005, 99; Ex. 1003 ¶ 154).

Patent Owner argues that Petitioner’s challenge of claims 17–20 based on Trevarthen and Brune fails for similar reasons as Petitioner’s challenge of claim 1 based on obviousness by Trevarthen. Prelim. Resp. 47–49. Patent Owner argues that Petitioner does not rely on Brune to cure any of Trevarthen’s deficiencies identified in connection with the challenge of claim 1. *Id.* at 47. Specifically, Patent Owner argues that Petitioner relies solely on Trevarthen to teach limitation 17[A], a processor programmed to perform the recited instructions, and element 17[C], retrieving sensed animal information from said RFID. *Id.* (citing Ex. 2001 ¶¶ 126–127).

Patent Owner raises an additional argument against Petitioner’s challenge to claim 17. *Id.* at 47–48. Patent Owner argues that Petitioner relies on the discussion for limitation 1[E] to teach limitation 17[F] “enter said sensed animal information retrieved from said RFID device and said animal information stored in said database as logical variables into at least one logical expression.” *Id.* (citing Pet. 33). According to Patent Owner, “nothing in the referenced discussion of 1[E] identifies a disclosure of *stored* temperature information.” *Id.* at 48 (emphasis added). Patent Owner argues that instead, Petitioner refers to “*sensed* temperature information” and “stored milk production information.” *Id.* (citing Pet. 16–22).

On this record and for the purposes of institution, we determine Petitioner has shown a reasonable likelihood that claim 17 would have been obvious over the combination of Trevarthen and Brune. First, we are persuaded by Petitioner’s argument that a person of ordinary skill in the art would have been motivated to combine Brune’s RFID bolus, including a date and time stamp with its sensed temperature information, with Trevarthen’s suggestion to incorporate temperature-sensing RFIDs into a farm management system. Pet. 31–32; Ex. 1003 ¶¶ 150–155. Second, we are persuaded that the combination of Trevarthen and Brune teaches or suggests limitations 17[A]–17[G] for the reasons provided above as to claim 1, combined with Brune’s teachings for limitation 17[D]. *See* above Section III.D.2. Third, as to Patent Owner’s argument that Petitioner’s reference to “stored temperature information” in limitation 17[F] does not correspond to stored milk information when discussing limitation 1[E], on the present record, we determine this to be a typographical error, as Petitioner consistently refers to stored milk information throughout the Petition.

Based on the current record there is a reasonable likelihood that Petitioner will prevail in demonstrating that claim 17 is unpatentable as obvious in view of Trevarthen and Brune.

2. Claims 18–20

Petitioner presents evidence that the combination of Trevarthen and Brune teaches the limitations of claims 18–20. Pet. 34–37. Patent Owner does not separately argue these claims at this stage of the proceeding. Patent Owner may raise any arguments regarding these claims in its Patent Owner Response after institution. On this record, Petitioner shows sufficiently that Trevarthen teaches the limitations of claims 18–20.

F. Asserted Obviousness of Claims 1–4 and 6 over Laitinen, Buchanan, and Liao

Petitioner contends that claims 1–4 and 6 would have been obvious over Laitinen, Buchanan, and Liao. Pet. 37–56. Patent Owner disputes Petitioner’s contentions. Prelim. Resp. 49–61.

1. Independent Claim 1

a) Preamble

The preamble of claim 1 recites “[a] computer implemented animal management system.” Ex. 1001, 18:22–23.

Petitioner asserts that Laitinen discloses a “system for the surveillance of a group of animals” that comprises “computers” and collects animal and farm information to take “management decisions.” Pet. 41–42 (citing Ex. 1006, 1:12–18, 4:5–9, 4:23–25, 4:40–53).

Patent Owner does not dispute that Laitinen teaches the preamble of claim 1. On this record and for the purposes of institution, we are sufficiently persuaded by Petitioner’s argument and evidence that Laitinen teaches the preamble of claim 1.¹¹

b) Limitation 1[A] (a processor, computer readable media, and program instructions)

Claim 1 recites “a processor communicatively coupled to a non-transitory computer readable media containing program instructions executable to.” Ex. 1001, 18:24–26.

Petitioner asserts that Laitinen discloses the use of a computer, which “necessarily indicates the inclusion of a processor.” Pet. 42 (citing Ex. 1006,

¹¹ Because Petitioner has sufficiently shown that the prior art teaches the preamble, we need not determine at this time whether the preamble is limiting. *See Nidec*, 868 F.3d at 1017.

4:5–9, 4:23–25, 4:42–45, Fig. 2; Ex. 1003 ¶ 171). Petitioner argues that Laitinen discloses “gathering, assessing, and presenting data concerning the animal’s health” and “implementing ‘algorithms and knowledge models’” that “would have required program instructions, i.e., software.” *Id.* at 42–43 (citing Ex. 1006, 4:15–15, 4:40–45, 6:29–32; Ex. 1003 ¶ 171). Petitioner argues that one skilled in the art “would have understood that such program instructions were necessarily stored on some computer-readable media, such as a hard drive so they could be accessed and executed by the processor.” *Id.* at 43 (citing Ex. 1003 ¶ 172).

Patent Owner argues that Petitioner never asserts that Laitinen’s computers “contain program instructions ‘executable to’ perform all of the specific instructions recited in claim elements 1[B] through 1[F].” Prelim. Resp. 49 (citing Pet. 12; *AOL*, IPR2014-00966, Paper 6 at 3–4, 14; *Garmin*, IPR2018-00565, Paper 24 at 25; Ex. 2001 ¶¶ 129–130).

We determine that, on this record, Petitioner establishes sufficiently for the purposes of institution that Laitinen teaches or suggests a processor communicatively coupled to a non-transitory computer readable media containing program instructions. *See* Pet. 42–43 (citing Ex. 1003 ¶¶ 171–172; Ex. 1006, 4:5–9, 12–15, 23–25, 40–45, 6:29–32, Fig. 2). Contrary to Patent Owner’s arguments, Petitioner asserts that one skilled in the art would have understood Laitinen’s steps for gathering, assessing, and presenting data concerning animal health require program instructions executed by a computer including a processor. *Id.* (citing Ex. 1006, 4:12–15; Ex. 1003 ¶ 171). As to the individual steps, we address these below.

c) Limitation 1[B] (retrieve identification information from an RFID)

Claim 1 recites “retrieve animal identification information from an RFID device.” Ex. 1001, 18:27–28.

Petitioner asserts that Laitinen discloses retrieving information from a “pico level device” permanently attached to an animal that functions like a conventional identification tool. Pet. 43 (citing Ex. 1006, 3:28–35, 6:2–4). Petitioner further asserts that Laitinen discloses the device can be an implant read using Radio Frequency Identification Technology. *Id.* (citing Ex. 1006, 3:53–57; Ex. 1003 ¶ 174 (citing Ex. 1009)).

Patent Owner argues that Laitinen does not teach retrieving animal identification information from an RFID device. *See* Prelim. Resp. 50. For example, Patent Owner argues that Petitioner does not identify instructions to retrieve animal identification from an RFID, particularly failing to identify such features in the discussion of “pico level device.” *Id.* (citing Pet. 43–44; Ex. 1003 ¶ 174; Ex. 2001 ¶¶ 131–132).

We determine that, on this record, Petitioner establishes sufficiently for the purposes of institution that Laitinen teaches or suggests retrieving identification information from an RFID. Pet. 43 (citing Ex. 1006, 3:28–35, 53–57, 6:2–4). Specifically, Laitinen teaches the pico level device generally functions like a conventional identification tool and includes additional components, such as an RF transmitter/receiver. *See* Ex. 1006, 3:28–35.

d) Limitation 1[C] (retrieve sensed information from said RFID)

Claim 1 recites “retrieve sensed animal information from said RFID device, said sensed animal information generated by a sensor coupled to said RFID device.” Ex. 1001, 18:29–31.

Petitioner asserts that Laitinen discloses an RFID implant that acts as a sensor for measuring an animal's body temperature (sensed information). Pet. 44 (citing Ex. 1006, 3:51–57, 8:9–11). Petitioner further asserts that “[t]he pico RFID device can provide location information using GPS.” *Id.* (citing Ex. 1006, 3:63–67).

Patent Owner argues that Laitinen does not teach entering sensed animal information into a logical expression using an RFID implanted in an animal. Prelim. Resp. 51. Claim 1 does not recite an implanted RFID. *Contra*, claims 2, 6, and 17; *see also* Prelim. Resp. 51 (“In all but two of the 24 claims of the ’206 Patent, the ‘sensed animal information’ must be retrieved from an ‘RFID device’ that is ‘implanted in an animal’ or ‘implanted in a plurality of animals.’”). Nevertheless, Petitioner asserts that Laitinen teaches an implanted RFID as to limitation 1[C], and we address Patent Owner's argument as presented.

Patent Owner contends “Laitinen is explicit: temperature and movement are obtained solely from an ‘external’ pico device, and *not* any RFID device implanted in an animal.” Prelim. Resp. 51–52 (citing Ex. 1006, 5:44–47, Fig.2; Ex. 2001 ¶¶ 133–137). For example, Patent Owner argues that Petitioner relies on Laitinen's sensor that “is explicitly separate from the RFID.” *Id.* at 52 (citing Pet. 44 (citing Ex. 1006, 3:51–57), 36–37 (citing Ex. 1006, 3:51–62), 52 (citing Ex. 1006, 3:53–57)). And Patent Owner argues that Petitioner cites Laitinen's teaching “that the ‘pico level device is attached permanently to, e.g., the animal's ear after its birth’ and that the separate ‘[s]ensor unit’ can be ‘an implant inside the animal, in which case the data it provides can be, for instance, read/transcribed by the pico level equipment.’” *Id.* (citing Ex. 1006, 3:28–62; Ex. 2001 ¶ 138). Accordingly,

Patent Owner argues that Laitinen’s temperature and movement measures are “only acquired with *external* devices.” *Id.* at 52.

We determine that, on this record, Petitioner establishes sufficiently for the purposes of institution that Laitinen teaches or suggests retrieving sensed information from an implanted RFID. Pet. 44 (citing Ex. 1006, 3:51–57, 8:9–11; Ex. 1003 ¶ 175); *see also id.* at 52–53 (citing Ex. 1006, 3:53–57, 5:38–43; Ex. 1003 ¶¶ 193–195). Laitinen teaches the pico level device may include a sensor with RF identification technology and may be an implant inside the animal for sensing internal temperature. Ex. 1006, 3:28–57.

Laitinen also teaches a specific embodiment with two different pico level devices including an external device for measuring temperature and an internal device for surveilling the animal’s heart. *Id.* at 5:44–53. Dr. Brown-Brandl testifies that one skilled in the art would not have considered the specific external RFID a limiting embodiment and provides a reason why one of ordinary skill in the art would have been motivated to use an internal device to detect temperature, e.g., “to avoid . . . the risk of detachment.” *See* Ex. 1003 ¶ 194. We are persuaded, for the purposes of institution, by this testimony, given Laitinen’s broader disclosure of an implanted temperature sensor. *See* Ex. 1006, 3:51–57.

e) Limitation 1[D] (match sensed information to information stored in a database)

Claim 1 recites “match said sensed animal information retrieved from said RFID device to animal information of said animal stored in a database including an amount of milk production or a number of days in milk.” Ex. 1001, 18:32–35.

Petitioner asserts that “Laitinen discloses retrieving animal identification and temperature information from the RFID device,” i.e.,

sensed information, and storing the information in a database. Pet. 44–45 (citing Ex. 1006, 9:30–33, 6:10–13, 6:36–39, 7:6–25; Ex. 1003 ¶ 176). Petitioner argues that it would have been obvious “to configure Laitinen’s database to match a cow’s sensed temperature readings to its stored milk production and/or [days in milk (DIM)] information” in view of Buchanan and Liao. *Id.* at 47 (citing Ex. 1006, 3:28–31, 6:2–4; Ex. 1003 ¶ 182).

First, Petitioner asserts Laitinen would have expressly motivated one skilled in the art to track milk production by identifying a “vital” need for real-time information about milk production. *Id.* at 45 (citing Ex. 1006, 1:36–38; Ex. 1003 ¶ 177). Petitioner asserts that “Buchanan discloses a farm management system that stores milk production information that satisfies the motivation presented in Laitinen.” *Id.* (citing Ex. 1003 ¶ 178). According to Petitioner, Buchanan describes milk meters that take milk volume readings of particular animals and store those readings in a database where the readings are “associated with ‘animal identifiers.’” *Id.* (citing Ex. 1011, 19:17–31, 11:18–22).

Second, Petitioner asserts that one skilled in the art “would have been additionally motivated to store milk production information in Laitinen’s database, because Laitinen and Liao were both concerned with detecting when a cow was in heat for purposes of artificial insemination” and detecting disease. *Id.* at 46. For example, “Liao expressly teaches that both peak yield of milk and DIM information are ‘applicable to insemination decisions.’” *Id.* (citing Ex. 1010, 9:34–11:10). Likewise, “Liao teaches that milk production information and DIM information are ‘input parameters’ for deciding whether to test a cow for mastitis.” *Id.* at 46–47 (citing Ex. 1010, 15:16–29, 29:15–35).

Petitioner concludes that one skilled in the art would have been able to combine Laitinen’s disclosure of “storing sensed animal temperature data for each animal” with Buchanan’s and Liao’s disclosures of “storing milk production for each animal . . . according to each animal’s identity.” *Id.* at 47 (citing Ex. 1003 ¶ 182).

Patent Owner does not dispute that the combination of Laitinen, Buchanan, and Liao, teaches limitation 1[D] (except to the extent Petitioner’s argument relies on limitation 1[C]). *See* Prelim. Resp. 51–53. On this record and for the purposes of institution, we are sufficiently persuaded by Petitioner’s argument and evidence that the combination of Laitinen, Buchanan, and Liao teaches limitation 1[D].

f) Limitation 1[E] (enter information as variables into at least one logical expression)

Claim 1 recites “enter said sensed animal information retrieved from said RFID device and said animal information stored in said database as logical variables into at least one logical expression.” Ex. 1001, 18:36–39.

Petitioner asserts that Laitinen discloses a first logical expression to determine if a cow is in heat, where “[a] cow’s temperature and movement are used as the input variables, and the expression determines whether ‘alarm limit(s) have been reached.’” Pet. 48 (citing Ex. 1006, 8:5–15; Ex. 1003 ¶ 184). Petitioner further asserts that “Liao teaches that milk production and DIM information are also useful for determining whether a cow is in heat and ready for artificial insemination.” *Id.* (citing Ex. 1010, 12:3–15). Petitioner argues that one skilled in the art “would have been motivated to modify Laitinen’s logical expression, or create a new expression, to include milk production and/or DIM information as input variables, along with the temperature and movement information, to improve

its accuracy and reliability at determining whether a cow is in heat.” *Id.* (citing Ex. 1003 ¶ 185).¹²

Petitioner further asserts that “Laitinen discloses a second logical expression that determines the appropriate ‘medical treatment’ for an animal.” *Id.* at 49 (citing Ex. 1003 ¶ 186). According to Petitioner, Laitinen’s “second logical expression” is “ $x=f^{-1}(y,z)$, wherein the treatment x is a function of initial state vector y and present state vector z ,” and “[t]he state vectors include the animal’s temperature at different times.” *Id.* at 49 (citing Ex. 1006, 7:6–13, 7:35–37). Petitioner asserts that one of ordinary skill would have been “aware that lowered milk production was also an indicator of illness.” *Id.* (citing Ex. 1010, 6:31–7:6; Ex. 1023, 4:12–18; Ex. 1008, 16:48–50). Accordingly, Petitioner asserts that the person of ordinary skill “would have been motivated to modify the second logical expression of Laitinen, or create a new expression, to include milk production as an input variable, along with temperature, to improve the reliability of its logical expression determining whether a cow is ill and advising on medical treatments.” *Id.* at 49–50 (Ex. 1003 ¶ 187).

Petitioner concludes that “[m]odifying Laitinen’s logical expressions, or creating a new one, to include both sensed temperature and stored milk production information for the detection of heat or illness would have involved the application of algebra, which was well within the capabilities of the POSA.” *Id.* at 50 (citing *KSR*, 550 U.S. at 416–17). Accordingly, Petitioner argues that “there was a high probability of success given that the

¹² Unlike the Trevarthen-based grounds, Petitioner appears to present one claim construction in which both sensed temperature and stored milk production are entered into the same logical expression. *See* Pet. 48–51.

POSA could have used known techniques to implement an expression that uses both temperature and milk yield as input variables that improved oestrus and illness detection.” *Id.* at 51 (citing Ex. 1003 ¶ 189; *KSR*, 550 U.S. at 416–17).

Patent Owner argues that “there would have been no reason for a POSA to modify either of [Petitioner’s] alleged ‘logical expressions’ to include the milk information required by the claims.” Prelim. Resp. 53 (citing Ex. 2001 ¶ 141). As to Petitioner’s proposed first logical expression, combining sensed temperature information with stored milk information to identify cows in heat, Patent Owner argues that Liao does not support Petitioner’s combination. *Id.* at 54. Patent Owner argues, “[t]o the contrary, Liao teaches that milk production and DIM information are *independent* of whether a cow is in heat.” *Id.* at 54 (citing Ex. 2001 ¶¶ 142–143). Specifically, Patent Owner argues that Liao’s tables show “‘heat’ is a separate ‘input parameter’ from milk production for recommending whether to inseminate a cow.” *Id.* (citing Ex. 1010, 9:27–11:1, 12:3–15, 20:16–21:10; Ex. 2001 ¶¶ 142–143).

Patent Owner further argues that Petitioner does not explain how one skilled in the art “would have expected success in incorporating milk information from a database into Laitinen’s heat control application.” *Id.* at 55. Patent Owner argues that Laitinen teaches “the ‘heat alarm’ is calculated by the pico level system based on the temperature and movement data that it measures, and the local system merely ‘notifies’ and relays the alarm.” *Id.* (citing Ex. 1006, 5:60–64, 8:9–14, Fig. 2). By differentiating between the “pico level” and “local level,” Patent Owner implies that Laitinen’s pico level device must function as an RFID, retrieve information from an RFID,

include a database with milk information, and generate a logical expression, to meet the claimed limitation. *See id.* at 55–56.

As to Petitioner’s proposed second logical expression, combining sensed temperature information with stored milk information to identify illness, Patent Owner argues that there was no reason to include milk information in Laitinen’s “inverse function.” *Id.* at 56.¹³ More specifically, Patent Owner argues that, unlike temperature and movement information that involve “a series of data acquired from numerous animals that could respond to medication over time,” milk information involves “single data points that would not respond to medication over time and thus cannot be implemented into Laitinen’s inverse function.” *Id.* at 57–58 (citing Ex. 2001 ¶¶ 148–149). Moreover, according to Dr. Bowser, using peak yield and days in milk to “assess the efficacy of medication makes no sense,” whereby Petitioner does not explain how “Laitinen could incorporate such information in its inverse function to achieve the claimed invention.” *Id.* at 58 (citing Ex. 2001 ¶¶ 150–152).

¹³ Patent Owner argues that Petitioner “amended Laitinen’s function to recite “ f^{-1} ” instead “ f^1 ” as recited in Laitinen,” whereby the function as written “is not necessarily an ‘inverse function.’” Prelim. Resp. 56 (citing Ex. 2001 ¶ 147). According to Patent Owner, Dr. Bowser explains as “written, Laitinen’s function is not necessarily an ‘inverse function,’ which POSAs would have understood as ‘undoing’ or reversing the effect of a separate operation.” *Id.* (citing Ex. 2001 ¶ 147). Whether or not the logical expression is an inverse function does not appear to be determinative as in either case the logical expression includes initial state vector y and present state vector z , both of which include animal temperature (sensed data). Accordingly, we do not address whether Laitinen’s equation is an inverse function in this Decision, and we invite the parties to brief this issue at trial.

Finally, Patent Owner argues that Laitinen’s “three hierarchical levels,” including a pico level, local level, and global level, could not be reconfigured without changing “Laitinen’s basic principle of operation.” *Id.* at 59 (citing Ex. 1006, 3:21–4:49, 6:29–46). Specifically, Patent Owner argues that Petitioner’s modification would require “[r]econfiguring Laitinen such that the local level system generates a database independent of the pico level measurements.” *Id.* (citing Ex. 2001 ¶ 153).

We determine that, on this record, Petitioner establishes sufficiently for the purposes of institution that the combination of Laitinen, Buchanan, and Liao, teaches or suggests entering sensed and stored animal information as logical variables into at least one logical expression. Pet. 47–51 (citing Ex. 1006, 1:33–35, 4:60–64, 5:24–30, 6:29–32, 7:6–13, 7:35–37, 8:5–15, Fig. 4; Ex. 1010, 6:31–7:6, 12:3–15; Ex. 1003 ¶¶ 183–189). First, we agree with Petitioner that Laitinen and Liao teach logical expressions for determining whether cows are in heat (*see* Ex. 1006, 8:5–15; *see also* Ex. 1010, 12:3–15) and for monitoring cow health (*see* Ex. 1006, 7:4–13; *see also* Ex. 1010, 6:31–7:6). Laitinen teaches temperature as a logical variable to be entered into its logical expressions. Ex. 1006, 8:5–15. Liao teaches milk production and days in milk as logical variables to be entered into its logical expressions. Ex. 1010, 12:3–15. On this record, Dr. Brown-Brandl proposes a reason to combine the teachings and their logical variables, e.g., to improve accuracy and reliability of the logical expressions, supported by evidence and reasoning. *See* Ex. 1003 ¶¶ 183–189.

We consider Patent Owner’s arguments but are not persuaded, on this record, that Laitinen’s hierarchy of pico, local, and global levels could not compute the claimed logical expression, either at the local level or considering the three levels as one overall system. Likewise, we are not

persuaded, on this record, that Liao would not include whether a cow is in heat as an input parameter in a logical expression, along with milk production, for making insemination decisions. *See* Ex. 1010, 9:31–10:15 (“The first set of input parameters D_{rand} constitute a decision basis for a particular type of dairy farm decisions, e.g. with respect to insemination the first parameter indicates the number of days in milk . . . the fourth parameter indicates whether the animal is in heat . . .”).

g) Limitation 1[F] (solve logical expression to obtain logical value)

Claim 1 recites “solve said at least one logical expression to obtain a corresponding at least one logical value.” Ex. 1001, 18:40–41.

As discussed above, Petitioner asserts that Laitinen describes two logical expressions, a first expression “used for purposes of artificial insemination” and a second expression “for purposes of detecting illness and identifying appropriate medical treatment.” Pet. 51 (citing Ex. 1006, 8:12–15, 7:35–37). Petitioner asserts that “the first logical expression is being solved to determine whether the alarm limit is reached, and if so, a value is obtained that corresponds to this determination and is used to generate the heat alarm signal.” *Id.* (citing Ex. 1003 ¶ 190). Petitioner asserts that the second logical expression, $x=f^1(y,z)$, is being solved for the value x , “wherein x is the appropriate medical treatment for a sick animal.” *Id.* (citing Ex. 1006, 7:35–37; Ex. 1003 ¶ 191). While we acknowledge the issues raised by the parties with respect to the proper statement of the second logical expression (see *supra* note 13), we rely on Laitinen’s second logical expression as one that obtains a logical value and includes initial vector y and present vector z representing temperature (sensed information).

Patent Owner does not dispute that the Laitinen, Buchanan, and Liao combination teaches limitation 1[F], apart from its arguments against Petitioner's showing for limitation 1[E]. *See* Prelim. Resp. 53–61. On this record and for the purposes of institution, we are sufficiently persuaded by Petitioner's argument and evidence that the Laitinen, Buchanan, and Liao combination teaches limitation 1[F].

h) Conclusion as to Claim 1

Based on the current record, there is a reasonable likelihood that Petitioner will prevail in demonstrating that claim 1 is unpatentable as obvious over Laitinen, Buchanan, and Liao.

2. Claims 2–4 and 6

Petitioner presents evidence that the Laitinen, Buchanan, and Liao combination teaches the limitations of claims 2–4 and 6. Pet. 52–56. We address Patent Owner's argument that Laitinen does not teach an implant, as recited by claim 2, above. Patent Owner does not separately argue claims 3, 4, and 6 at this stage of the proceeding. Patent Owner may raise any arguments regarding these claims in its Patent Owner Response after institution. On the present record, Petitioner shows sufficiently that the Laitinen, Buchanan, and Liao combination teaches the limitations of claims 2–4 and 6.

G. Asserted Obviousness of Claims 17–20 over Laitinen and Brune

Petitioner contends that claims 17–20 are rendered obvious by the combination of Laitinen and Brune. Pet. 56–64. Patent Owner disputes Petitioner's contentions. Prelim. Resp. 61–62.

1. Claim 17

Claim 17 recites similar limitations to claim 1. *See* Ex. 1001, 20:23–41. Accordingly, Petitioner cites Laitinen for teaching the preamble of claim 17, and limitations 17[A]–17[C] and 17[E]–17[G]. Pet. 56–62 (citing Pet. 41–52; Ex. 1003 ¶¶ 205–222; Ex. 1006, 2:4–11, 2:46–47, 3:29–31, 3:51–67, 3:66–67, 4:1–15, 4:45–49, 5:26–28, 5:50–55, 6:2–46:62–64, 7:35–37). Petitioner cites Brune, in combination with Laitinen, to address limitation 17[D], “retrieve date-time information from said RFID device.” *Id.* at 57–59.

Petitioner asserts Laitinen stores “date-time information” in its databases. *Id.* at 57–58 (citing Ex. 1003 ¶ 209). As examples, Petitioner asserts: (1) “Laitinen stores the time of administration of medicaments” to calculate “time elapsed,” and (2) “Laitinen generates an *initial* state vector and a *present* state vector containing temperatures at different points in time,” thereby storing the dates and times of those measurements. *Id.* (citing Ex. 1006, 7:1–3, 7:6–11). Additionally, Petitioner asserts that “Laitinen teaches monitoring temperature and movement to determine if a cow is in heat” where one of ordinary skill would store “several measurements over a period of time to filter out anomalies and increase reliability.” *Id.* at 58 (citing Ex. 1006, 8:5–15; Ex. 1003 ¶ 210).

Petitioner asserts that “[i]n view of Laitinen’s use of date-time information, and Brune’s explicit disclosure of transmitting date/time-stamped animal temperature data from an implanted bolus, the POSA would have been motivated to modify Laitinen’s RFID system to retrieve from the bolus date-time stamp data associated with each retrieved temperature measurement.” *Id.* at 58–59 (citing Ex. 1003 ¶ 212). Specifically, Petitioner argues that Brune discloses transmitting a message from a bolus implant within the stomach of a cow to a remote receiver. *Id.* at 58 (citing Ex. 1008,

4:1–3, 2:4–11). According to Petitioner, Brune discloses that “[e]ach transmitted message includes the temperature data, identification n data unique to a specific cow, and “*date and/or time stamp data* corresponding to the *discrete point in time at which the temperature was sensed* by the bolus.” *Id.* (citing Ex. 1008, 4:1–11).

Petitioner further argues that one skilled in the art would have a reasonable likelihood of success in the combination “because both Laitinen and Brune are retrieving similar data from an implanted animal sensor.” *Id.* at 59 (citing Ex. 1003 ¶ 213). As to the specific modification, Petitioner argues that it would have been relatively easy to add “a simple time clock to generate time-stamps” to Laitinen’s RFID that already includes GPS and “can accommodate a wide variety of sensors and hardware components.” *Id.* (citing Ex. 1006, 3:51–67, 5:50–55; Ex. 1003 ¶ 214).

Patent Owner argues that Petitioner’s challenge of claims 17–20 based on Laitinen and Brune fails for similar reasons as Petitioner’s challenge of claim 1 based on obviousness by Laitinen. Prelim. Resp. 61–62. Patent Owner argues that Petitioner does not rely on Brune to cure any of Laitinen’s deficiencies identified in connection with the challenge of claim 1. *Id.* at 61. Specifically, Patent Owner argues that Petitioner relies solely on Laitinen to teach limitation 17[A], a processor programmed to perform the recited instructions, limitation 17[C], “‘sensed animal information’ from an RFID device ‘implanted in an animal,’” and 17[F] entering “such information into a logical expression.” *Id.* at 61 (citing Ex. 2001 ¶¶ 156–158).

On this record and for the purposes of institution, we determine Petitioner has shown a reasonable likelihood that claim 17 would have been obvious over the combination of Laitinen and Brune. First, we are persuaded

by Petitioner's argument that a person of ordinary skill in the art would have been motivated to combine Brune's RFID bolus, including a date and time stamp with its sensed temperature information, with Laitinen's use of date-time information. Pet. 57–59; Ex. 1003 ¶¶ 209–212. Second, we are persuaded that the combination of Laitinen and Brune teaches or suggests limitations 17[A]–17[G] for the reasons provided above as to claim 1, combined with Brune's teachings for limitation 17[D]. *See* above Section III.F.1.

Based on the current record, there is a reasonable likelihood that Petitioner will prevail in demonstrating that claim 17 is unpatentable as obvious in view of Laitinen and Brune.

2. Claims 18–20

Petitioner presents evidence that the combination of Laitinen and Brune teaches the limitations of claims 18–20. Pet. 62–64. Patent Owner does not separately argue these claims at this stage of the proceeding. Patent Owner may raise any arguments regarding these claims in its Patent Owner Response after institution. On the present record, Petitioner shows sufficiently that the combination of Laitinen and Brune teaches the limitations of claims 18–20.

IV. CONCLUSION

For the forgoing reasons, Petitioner has demonstrated a reasonable likelihood that at least one challenged claim of the '206 patent would have been obvious over the prior art of record. Accordingly, we institute an *inter partes* review on claims 1–4, 6, and 17–20 for all grounds set forth in the Petition.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314, an *inter partes* review is instituted on claims 1–4, 6, and 17–20 of the '206 patent for all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, *inter partes* review of the '206 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

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