

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMAXTEC INC. and
SMAXTEC ANIMAL CARE GMBH,
Petitioners,

v.

ST REPRODUCTIVE TECHNOLOGIES, LLC,
Patent Owner.

Case No. IPR2024-01067
U.S. Patent No. 10,231,644 B2

REPLY TO PATENT OWNER RESPONSE

TABLE OF CONTENTS

I.	Introduction.....	1
II.	Ground 1: Patent Owner’s Challenges to the Harvey Anticipation Ground Lacks Merit.....	1
A.	Harvey discloses XPDR 5000 as a component of an intelligent Active Tag that can be a bolus.	2
B.	Harvey discloses encoding physiological data.....	4
C.	Harvey discloses predetermined intervals.....	7
III.	Ground 2: Patent Owner’s Challenges to the Risky Anticipation Ground Lack Merit	9
A.	Risky discloses encoding.....	10
B.	Risky discloses preprogrammed intervals.....	13
IV.	Ground 3: Patent Owner’s Challenges to the combination of Harvey and Risky Obviousness Ground Lack Merit.....	15
V.	Ground 4: Patent Owner’s Challenges to the Harvey/Rettedal Obviousness Ground Lack Merit.....	17
A.	Disclosure of Claim 7.....	17
B.	Motivation to Combine and Reasonable Expectation of Success.....	22
VI.	Ground 5: Patent Owner’s Challenges to the Harvey/Kunda Obviousness Ground Lack Merit.....	23
A.	Disclosure of Claims 9 and 10	23
B.	Motivation to Combine and a Reasonable Expectation of Success	24
VII.	Conclusion	25

}

TABLE OF AUTHORITIES

Cases

<i>In re Fulton</i> , 391 F.3d 1195 (Fed. Cir. 2004)	25
<i>Process Control Corp. v. HydReclaim Corp.</i> , 190 F.3d 1350 (Fed. Cir. 1999)	19
<i>Rembrandt Data Techs., LP v. AOL, LLC</i> , 641 F.3d 1331 (Fed. Cir. 2011)	21

PETITIONERS' EXHIBIT LIST

Exhibit	Description
1001	U.S. Patent No. 10,231,644
1002	Declaration of Professor Darrin J. Young
1003	CV of Professor Darrin J. Young
1004	Int'l Appln. No. PCT/US2007/020918, Pub. No. WO 2008/108816 ("Harvey")
1005	U.S. Patent Appln. Pub. No. 2009/0187392 ("Riskey")
1006	U.S. Patent Appln. Pub. No. 2013/0197323 ("Rettedal")
1007	Japanese Patent Appln. No. 2004-215061 A ("Kunda")
1008	U.S. Patent No. 6,371,927 B1 ("Brune")
1009	U.S. Patent Appln. Pub. No. 2009/0030279 A1 ("Zander")
1010	U.S. Patent No. 10,231,644 Prosecution History
1011	U.S. Patent No. 5,482,008 ("Stafford")
1012	U.S. Patent No. 8,640,712 B2 ("Ardrey, Jr.")

Exhibit	Description
1013	“RUM_023 Administration of a Rumen Bolus”, UQ Animal Ethics Committee – Standard Operating Procedure
1014	U.S. Patent 9,413,585 B2 (“Schulzrinne”)
1015	U.S. Patent 10,594,335 (“Zrilic”)
1016	U.S. Patent Appln. Pub. No. 2023/0274893 A1 (“Andree”)
1017	2024-05-15 Preliminary Pretrial Conference Order (D.I. 034)
1018	2024-04-23 Plaintiff's First Amended Complaint (D.I. 025)
1019	U.S. Patent Appln. Pub. No. 2003/0096637 A1 (“Keller”)
1020	Excerpt of Oxford Advanced Learner's Dictionary of Current English, 9 th ed. (2015)
1021	U.S. Patent No. 11,755,484 B2 (“Gray”)
1022	Int'l Appln. No. PCT/AU88/00225, Pub. No. WO 89/00024 (“Platt”)
1023	U.S. Appln. Pub. No. 2015/0277885 (“Kimoto”)
1024	Deposition Transcript of Professor Edwin C. Kan (July 22, 2025)
1025	Reply Declaration of Professor Darrin J. Young

TABLE OF ABBREVIATIONS

Abbrev.	Description
Pet.	Petition for Inter Partes Review of U.S. Patent No. 10,231,644
PO	Patent Owner
POPR	Patent Owner Preliminary Response
Resp.	Patent Owner Response
ID	Institution Decision
Challenged Claims	Claims 5, 6, 7, 9 and 10.
POSA	Person of ordinary skill in the art

I. Introduction

The Challenged Claims of the '644 Patent do nothing more than gather together well-known aspects of remote animal monitors. For example, the Risky reference invalidates claims 5 and 6 as the Institution Decision preliminarily found for Ground 2. Patent Owner fails to counter the Board's analysis of Risky. Further, all of the Harvey-based Grounds (Grounds 1, 3-5)¹ should also be held in Petitioner's favor because Harvey disclosed to a POSA all of the elements Patent Owner contends are missing. Patent Owner argues that Harvey's transponder (XPDR 5000) has no connection to Harvey's disclosure of a bolus sensor. But Harvey explicitly discloses that its Intelligent Active Tag (1110) can be a bolus, and that it can incorporate the XPDR 5000 transponder. Patent Owner's other challenges are also belied by Harvey, which teaches use of digital data (which is thus encoded data as required by the claims) and activating a radio signal generator at predetermined intervals. Patent Owner's challenges to the obviousness grounds also fail because they do not establish that the Petition's clear explanation for obviousness is wrong.

II. Ground 1: Patent Owner's Challenges to the Harvey Anticipation Ground Lacks Merit

Patent Owner's Response challenges Ground 1 on three basis, each of which is wrong. First, it argues Harvey does not disclose a bolus, but Harvey teaches

¹ Grounds 6 and 7 are moot as Claim 13 was disclaimed. ID, 10.

exactly that – using its IAT as a digestive track bolus. Ex. 1004 (Harvey), 11:5-14. Second, the Response argues Harvey does not disclose the claimed encoding of data, but again, Harvey discloses storing of data in digital form, which is thus encoded from the analog sensor signals. Third, the Response argues Harvey does not disclose activating a radio signal generator at predetermined intervals that carries encoded physiological data. That too is wrong because claim does not require what Response argues and even under that interpretation, Harvey discloses this element.

A. Harvey discloses XPDR 5000 as a component of an intelligent Active Tag that can be a bolus.

Patent Owner's Response mischaracterizes Harvey's teachings, and the Petitioner's reliance on Harvey. In Patent Owner's telling, Harvey is a mishmash of various embodiments. But the actual disclosure is much simpler. The subject matter of Harvey concerns the monitoring of animals through the use of intelligent active tags ("IAT"). Harvey teaches that an IAT includes, at a minimum, a transponder and a power source. Ex. 2006, ¶62 (citing Ex. 1004, 18:3-17, 34-19:9).

The focus of Ground 1 is Harvey's transponder "XPDR 5000", as a component of Harvey's intelligent active tag "IAT 1110." Pet., 16-27. Harvey teaches that the IAT 1110 can be coupled to the monitored subject in a number of "non-limiting implementations" including as a digestive tract bolus. Ex. 1004 (Harvey) at 11:4-19. The transponder XPDR 5000 then contains the sensors and

radio signal generator that generates the signal that carries the animal data to the receiver. Ex. 1002, ¶44-45.

Patent Owner's asserts the Havery does not suggest that its bolus "could or would be used in connection with other disclosures in Harvey, including XPDR 5000." Resp., 9 and 13 ("Petitioners point to a particular 'intelligent active tag' or 'IAT' in Harvey to satisfy the 'bolus' limitation, but rely on a separate 'intelligent transponder' embodiment identified as 'XPDR 5000' for the sensor and radio signal functionality."); 12-20. This is false. As described in the Petition:

- Harvey teaches that *IAT 1110 can be a digestive tract bolus device*, including one retained indefinitely within ruminant animal. Ex. 1004, 11:10-14; Pet., 17.
- Harvey teaches *XPDR 5000 as a constituent of IAT 1110*. Ex. 1004, 70:22-23 ("XPDR 5000 may be a constituent of an intelligent active tag, such as IAT 1110 in FIG. 1, and tag 2000 in FIG. 2C and FIG. 3B."); Pet., 11.

Patent Owner ignores this latter citation, which expressly connects XPDR 5000 with IAT 1110, as well as a second instance where Harvey connects XPDR 5000 with IAT 1110. Ex. 1004, 48:31-33 ("*Like XPDR 5000 in FIG. 5, XPDR 7020 may be included in an embodiment of an intelligent active tag, such as IAT 1110* in FIG. 1, and may be additionally described with respect to tag 2000 in FIGS. 2A-2C and

FIG. 4.”); Pet., 11; Ex. 1025, ¶¶6-7. Patent Owner cannot escape that Harvey explicitly discloses using IAT 1110 as an orally administer bolus that includes XPDR 5000, and therefore a single embodiment. Ex. 1025, ¶¶6-7.

Patent Owner also argues that an IAT that is a bolus will require different considerations than an ear tag. Resp., 18-20. Indeed, there may be some types of sensors that are appropriate for an ear tag but not a bolus, and vice versa. *Id.* PO also argues that there may be different antenna design or power considerations. Resp., 18-20, 61-66. But PO fails to tie any such differences to the Challenged Claims. For example, the Challenged Claims are agnostic to sensor type. Ex. 1001, Claim 5 (“a sensor signal from one or more sensors”). Likewise, XPDR 5000 does not require any particular sensor type. Ex. 1004, Fig. 5; Ex. 1025, ¶¶8. PO’s expert testified that a POSA would have been able to decide on appropriate sensor types for a particular application. Ex. 1024 (Kan Depo. Tr.), 233:5-233:19; Ex. 1025, ¶¶8-9; Ex. 1004, 41:7-15 (explaining that sensors used with XPDR 5000 could be chosen pragmatically based on a number of factors, including “intended transponder environment.”).

B. Harvey discloses encoding physiological data

Patent Owner next argues that the Petition failed to show that Harvey discloses

the encoding requirements of Element 5[C]² but that too is incorrect. Resp., 20-23.

A POSA would have understood that Harvey teaches, in multiple places, the generation, storage and transmission of digital data. Ex. 1002, ¶¶62-63. The Petition explains that Harvey's discussion of XPDR includes some digital storage and transmission methods that would *necessarily* require that the analog signals from the sensors are converted into digital data. Pet., 20-21; Ex. 1025, ¶¶10-11. Patent Owner argues that the Petition is contending that this feature is inherent and responds that encoding analog data into digital form is not "necessarily present in Harvey." Resp., 22. Petitioner's argument, however, is that Harvey discloses the use of digital (and otherwise encoded) data in XPDR 5000 embodiments and applications, not that every embodiment and application is digital. Ex. 1025, ¶11.

Claim 5 requires that physiological data is stored and transmitted as encoded data. As explained in the petition, Harvey disclosed to a POSA that the XPDR 5000 transponder stores and transmits digitized data. Pet., 20-23, citing Ex. 1004, 39:4–5; 10:3–11:3, 24:20–23, 42:36–43:20, 11:20–24, 29:16–24, 30:6–9. Digital data is encoded data, because it has been encoded from the analog signal received from the sensor, and Patent Owner does not argue otherwise. Ex. 1025, ¶10.

A significant portion of the Response is spent arguing that the EEPROM

² Element 5[C] reads: "encoding said sensor signal from said one or more sensors as encoded physiological data corresponding to said one or more physiological parameters of said ruminant animal."

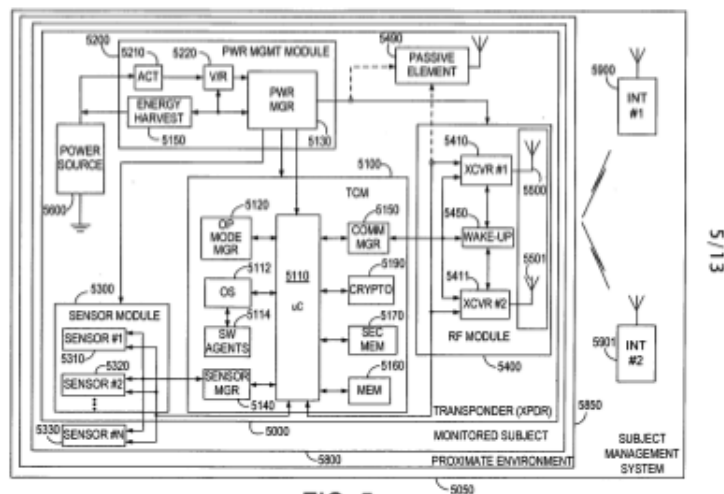
storage option disclosed in Harvey can store analog signals instead of digital data. Resp., 21-22. Patent Owner's expert, however, only identifies neurological computing as an application using analog EEPROM:

An alternative view can be rationalized by the multi-level EEPROM, where one cell stores more than 1 bit (e.g., 4 bits by $2^4 = 16$ levels). The continuous state of floating-gate charges can be mapped to nearly continuous multiple levels, instead of binary classification. For example, ultra-low-power neuromorphic computing systems can use floating-gate analog memory as analog synapses, mimicking biological neural learning through continuous weight adjustments.

Ex. 2006, ¶86. Neuromorphic computing is completely unrelated to the animal monitoring systems that are the subject of the '644 patent and Harvey. Ex. 1024, 84:9-85:19 (Patent Owner's expert stating that he was unaware of any uses relating in animal monitoring systems); Ex. 1025, ¶13. And he offers no statements or references asserting that EEPROM were used to store analog data in animal sensor systems or that a POSA in this field would have considered EEPROM to be an analog storage device. On the contrary, a POSA in this field would have understood Harvey's use of EEPROM as a disclosure of stored digital data. Ex. 1025, ¶12-13.

Harvey also discloses encoding methods *other* than analog to digital conversion. For example, Harvey teaches that Sensor 5310 of XPDR 5000 may produce "a sensed thermal parametric signal when a predetermined temperature threshold is met or surpassed, as may indicate hyper- or hypo-thermia of monitored subject 5800." Ex. 1004, 40:30-33. In that disclosure, the sensor must first measure

a signal that corresponds to the temperature of the subject (such as the thermocouple voltage), but the sensor then encodes that result as a signal indicating whether that temperature is above, below or within a defined range. Ex. 1025, ¶¶14-15. Harvey teaches that this encoding result is provided by Sensor 5310, which would then pass the result to be stored and then transmitted, as shown in Figure 5 (XPDR 5000), meeting both claim element 5C and 5D:



C. Harvey discloses predetermined intervals

Harvey discloses claim element 5[F] by explaining, *inter alia*, that “[i]n an example implementation of a selected collision avoidance protocol, XPDR 5000 may initiate communication by transmitting an outbound IAT message to INT 5900 on a preselected tag transmission interval, which may be periodic or aperiodic.” Ex. 1004, 26:6-11; Pet., 26.

Patent Owner disputes claim element 5[F] is met by this disclosure by improperly narrowing the claim language. Resp., 23-31. According to Patent

Owner, claim element 5[F] requires a radio signal that is both generated at “pre-determined intervals” and also carries “encoded physiological data.” Resp., 23-24; Ex. 2006, ¶129; Ex. 1024, 235:14-22. Claim element 5[F], however, requires only that the radio signal generator is activated at pre-determined intervals to send encoded physiological data. The plain language of element 5[F] requires that the purpose or result of the activation is to “generate a radio signal to carry said encoded physiological data,” but the element does not require a single signal that is generated at pre-determined intervals and carries encoded physiological data. Ex. 1025, ¶17.

Further, Harvey discloses element 5[F] even under Patent Owner's proposed interpretation. Harvey indicates that “an outbound IAT message” is transmitted at the preselected tag transmission interval. Ex. 1004, 26:6-11. Harvey explains that “[a]n IAT message may selectively include an SID, a TID, subject data, subject dynamic information, a predetermined monitored subject state, or a predetermined subject state alert.” Ex. 1004, 14:7-9. Even under Patent Owner's proposed interpretation, an IAT message sent at a predetermined (“preselected”) transmission interval containing encoded subject data or subject dynamic information (*i.e.*, physiological data) meets element 5[F]. *See* Ex. 1025, ¶16, 18.

Patent Owner, however, argues that Harvey's teaching that “XPDR 5000 may initiate communication by transmitting an outbound IAT message to INT 5900 on a preselected tag transmission interval” would necessarily be transmitting an outbound

IAT message with *only* a subject identifier, without physiological data. Resp., 25-26. Yet, there is no suggestion in Harvey that this outbound IAT message should omit physiological data. Ex. 1025, ¶16. But Patent Owner applies its improperly narrowed interpretation of element 5[F] to argue it is not met. Resp., 25-27. Patent Owner also argues it would make no sense to have a bolus transmit physiological data every two seconds, as in Harvey's example. Resp., 26-27. But that disclosure of two seconds is just that, an example, and a POSA would have been able to choose an appropriate interval based on factors such as the needs of the animal, the tag form, and power requirements for a particular period. Ex. 1025, ¶20.

Yet Patent Owner's interpretation of Harvey's collision avoidance protocol would still meet claim element 5[F] according to the plain language of that element. As Patent Owner acknowledges, the purpose of sending an IAT message in this protocol, even without physiological data, is to determine whether a channel is clear so that physiological data can be sent. Resp., 26 (explaining animal data is sent if the channel is clear). Thus, Harvey is disclosing that the radio signal generator is activated at pre-determined intervals, followed by the generation of a signal carrying encoded physiological data. Ex. 1025, ¶17-20.

III. Ground 2: Patent Owner's Challenges to the Risky Anticipation Ground Lack Merit

Patent Owner raises two primary challenges to the Risky anticipation ground; both are flawed. First, it argues that Risky does not disclose encoding

data, but as with Harvey, Risky discloses storing of digital data that has been encoded from analog signals. Second, it argues that Risky does not disclose the predetermined interval requirement, again based on an improper reading of the claim language. Yet under any interpretation, Risky discloses the required activation at predetermined intervals.

A. Risky discloses encoding

A POSA would have understood that Risky teaches, in multiple places, the generation, storage and transmission of digital data, which is encoded data. As with Harvey, Petitioner's argument is that the disclosures in Risky would have disclosed the use of digital data to a POSA. Ex. 1025, ¶21.

Risky, for example, discloses the use of EEPROM storage of animal physiological data. Ex. 1002, ¶86-90. A POSA would have understood that using EEPROM to store physiological data in this field would be a digital storage, which would mean that the analog signals from the sensors are encoded as digital data. Ex. 1002, ¶88-89; Ex. 1025, ¶11-13, 21-22. As with its argument related to Harvey's EEPROM, Patent Owner argues that EEPROM can store analog data and so the EEPROM in Risky could be analog. Resp., 32-35. But the only application it identifies for analog EEPROM is a neuromorphic computing system, which is irrelevant here. Ex. 2006, ¶146; Ex. 1025, ¶12-13. Regardless, Risky discloses a

number of other storage and transmission methodologies that use digital data, as explained by the Petition:

Yet, the measurements are: (1) stored in the transponder's memory, *see infra* Element 5[D]; (2) organized into an "Animal Information Data Structure"; and (3) transmitted wirelessly as data—i.e., digital information, *see* Ex. 1005, Abstract ("The bolus may comprise a data transmitter in wireless communication with a base station."), [0021], [0023], [0037], [0049]-[0051], [0058], Fig. 2 ("Active Data Transmitter 232").

Pet., 32.

Patent Owner argues that these disclosures do not require digital data. But a POSA would have understood that Risky is clearly discussing digital data in many instances. For example, Risky discusses the pre-processing of measurement data by element 240, before storage in memory unit 250.

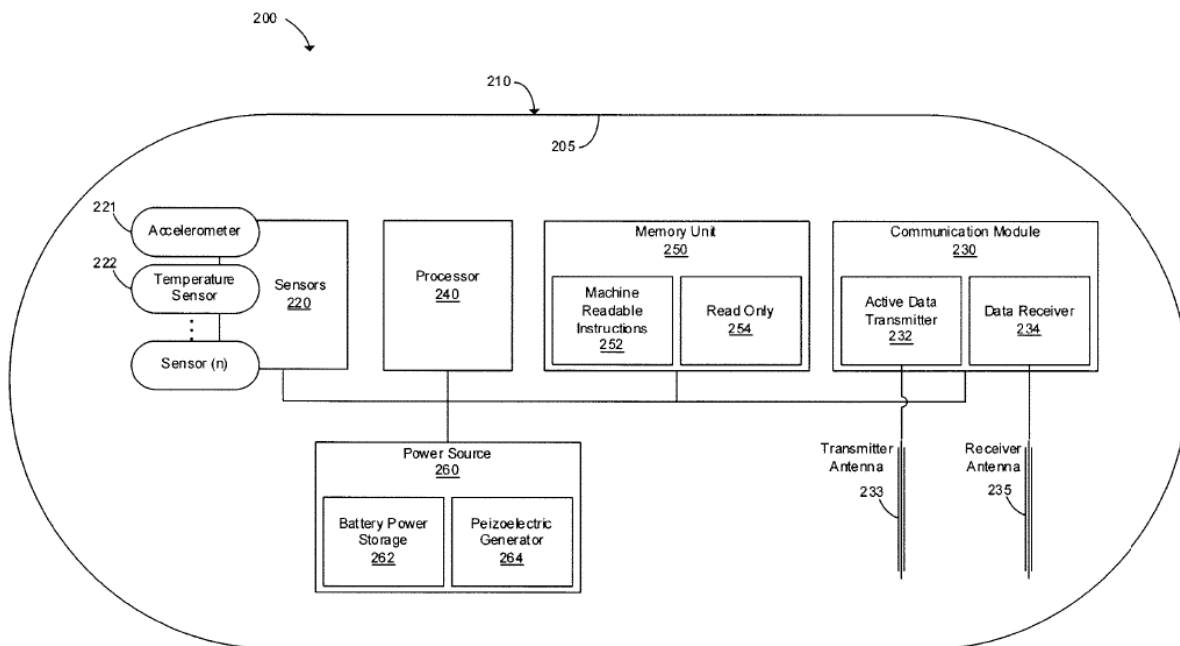


Figure 2

Ex. 1005, Fig. 2, [0044]-[0045]. Risky discloses that measurement data is obtained from a sensor, and then pre-processed. Ex. 1005, [0044]-[0045]:

Such preprocessing may comprise calculating a measurement characteristics, such as mean, standard deviation, etc., compressing the data, and the like. As such, the preprocessing may reduce the amount of data transmitted to the base station (not shown) and thereby reduce power and RF transmission requirements.

A POSA would have understood that compressing data to reduce the amount of data is a reference to digital data. Ex. 1025, ¶23. Compression of digital data results in fewer bits to be transmitted, thus reducing the amount of data. Risky also discloses the use of stored calibration data with the sensor, which is an application of digital data. *Id.*; Ex. 1005, [0041, 0057].

Patent Owner argues that Risky's EEPROM disclosure is limited to storage of a UBID value. Resp., 34-35. But as POSA would have understood, Risky discloses EEPROM for use as memory unit 250, and then explains that a UBID is one item that can be stored there. The primary purpose of the erasable memory unit is to store animal data. Ex. 1025, ¶22.

As with Harvey, Risky discloses examples of encoding data outside of digital conversion. For example, Risky discloses that sensor 222 may return the current animal temperature based on a thermistor, which changes its resistance value as the temperature changes. Ex. 1005, [0035, 0043]; Ex. 1025, ¶24. The temperature sensor would then report a signal such as a current or voltage, which would be

converted into a temperature, *e.g.*, °C. Ex. 1024, 156:15-157:24. Each step is an encoding, and the encoded data (the voltage or current corresponding to temperature) would be stored in memory unit 250, and transmitted by communication module 230. Ex. 1025, ¶24. Temperature is just one example. *See, e.g.*, Ex. 1005, [0025] (discussing characteristics such as pH, heart rate, and respiration). Furthermore, as in Harvey, the data may be encoded as an indication of whether a characteristic falls within a certain threshold. *Id.*, [0118].

B. Risky discloses preprogrammed intervals

Risky discloses at least two bolus operations that meet claim element 5[F]. Patent Owner's Response attempts to avoid those disclosures by again narrowing the claim element and mischaracterizing Risky's disclosures. Resp., 39-44.

In Risky's "burst mode", "machine readable instructions 252 may specify a transmission interval [sic: interval], wherein processor 240 may transmit an animal characteristics message comprising some or all of the measurements stored in memory unit 250 at each transmission interval." Ex. 1005, [0049]. This disclosure meets claim element 5[F] even under Patent Owner's construction that the transmission at each activation requires encoded physiological data. Ex. 1025, ¶25. Patent Owner, however, disputes that the transmission interval is pre-determined by the machine readable instructions, relying on separate embodiments in the preceding paragraph. Resp., 40-41. Paragraph [0048] of Risky says that "[i]n one

embodiment, machine readable instructions 252 may define conditions under which the polling frequency associated with one or more sensors 220 may change.” Ex. 1025, ¶26. But this separate embodiment cannot alter the plain meaning of the teaching that, in the burst mode, the machine readable instructions specify a transmission interval, without any mention of changeability. Ex. 1005, [0047]. Ex. 1025, ¶26. It is improper for Patent Owner to rewrite that teaching based on a separate embodiment.

Likewise, Risky teaches an “on-line” mode, where “bolus 210 may transmit animal characteristics messages at the online transmission frequency specified by the machine readable instructions.” Ex. 1005, [0055]; Ex. 1025, ¶27. Patent Owner disputes that this mode meets the claim element because the bolus only enters “on-line” mode after determining, for example, if it is within range of a receiver. Resp., 41-42 (discussing Ex. 1005, [0037], [0053]). But it cannot dispute that once the bolus has entered “on-line” mode, it is transmitting at predetermined intervals. There is no claim requirement that the bolus is activating the generator at pre-determined intervals at all times. That the bolus may sometimes be in offline mode is not relevant to whether the on-line mode anticipates. Ex. 1025, ¶27.

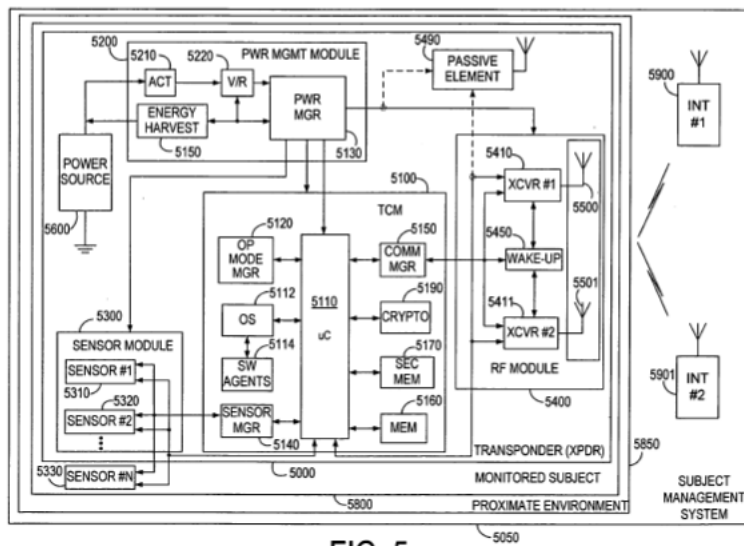
Patent Owner also argues that Risky fails to expressly disclosing “generating a sensor signal from one or more sensors” that “varies based on a corresponding change” in “physiological parameters”. Resp., 45-47. This argument is specious,

as it would defy common sense to rely on sensors that do not vary based on changes in physiological parameters. Ex. 1025, ¶28. It is difficult to even imagine a system, that, for example, includes a temperature sensor that does not produce a varied signal in response to changes in temperature. Such an approach would be nonsensical, and defeat the entire purpose of the systems as described in Risky, which is to “monitor the animal” and “detect a change in the health condition of the animal.” Ex. 1005, Abstract; *see also*, Ex. 1024, 35:18-37:25 (describing the goal of monitoring how vital signs of an animal change over time); Ex. 1025, ¶28.

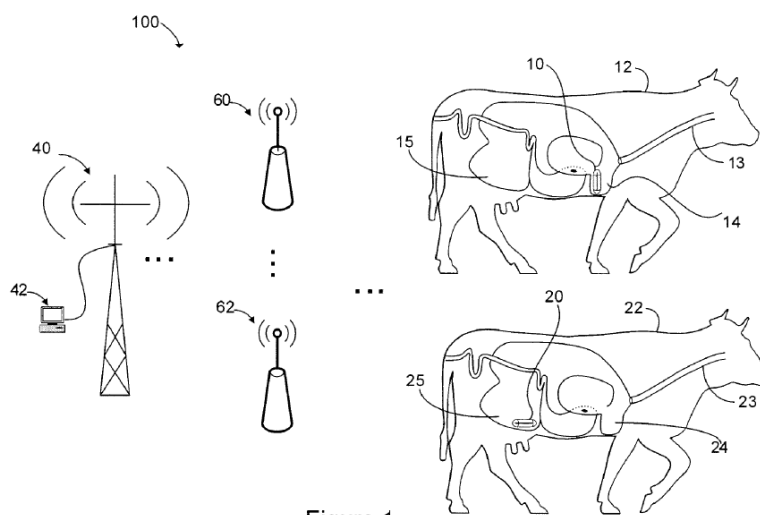
IV. Ground 3: Patent Owner's Challenges to the combination of Harvey and Risky Obviousness Ground Lack Merit

Ground 3 asserts that Claims 5 and 6 are rendered obvious by Harvey in light of Risky. As explained in the Petition, each of Harvey and Risky discloses each element of Claims 5 and 6. Further, their combination as proposed in Ground 3 renders Claims 5 and 6 obvious.

Harvey and Risky are complementary references that both disclose animal monitoring sensors that can be placed in a bolus as well as storing and transmitting encoded animal physiological data wirelessly. Harvey describes the components of the transponder (XPDR 5000). *See, e.g.*, Ex. 1004, Fig. 5:



This figure, and the accompanying text, contains added detail for the POSA regarding the transponder of Risky. Ex. 1025, ¶31. In contrast, while Harvey teaches that XPDR can be included in a tag that can be in the form of a bolus (*see* Ground 1 discussion), Risky discloses additional details about the bolus form. For example, Risky shows the bolus in various positions inside a cow:



Ex. 1005, Fig. 1. As discussed above, both references disclose data processors, storage units and transmission protocols that would have informed a POSA that the sensor signals are encoded. A POSA would have been motivated to include Risky's further teachings about the compression of the animal measurement data to reduce the amount of data, to save power. Ex. 1025, ¶30; *see also* Ground 2 discussion, above.

It would have been obvious for a POSA to have supplemented Harvey's disclosure of its XPDR 5000 transponder with additional detail of the bolus form from Risky, and to further incorporate Risky's teaching regarding compression of the animal measurement data. Ex. 1025, ¶30.

V. Ground 4: Patent Owner's Challenges to the Harvey/Rettedal Obviousness Ground Lack Merit

A. Disclosure of Claim 7

The Petition demonstrates that Claim 7, as written, is rendered obvious by Harvey in view of Rettedal. Claim 7 depends from Claims 5 and 6 and reads as follows:

“The method of claim 6, wherein said bolus further comprises matching elements which adjusts said frequency of said radio signal to compensate for a change in said frequency of said radio signal due to passing through a mass of said ruminant animal.”

In response, Patent Owner improperly attempts to change the meaning of Claim 7.³

The parties agree the purpose of Claim 7 is to address a problem caused the bolus being located inside a large animal. When the radio signal that is generated at the bolus passes through the mass of the animal, the frequency is altered or shifted to a lower frequency. Pet., 45-46 (citing Ex. 1001, 6:25-32); Resp., 56. Because of this shift, the frequency of the generated radio signal no longer matches the center frequency of the antenna. Generally, this mismatch can be addressed in one of two ways, by adjusting the frequency of the generated radio signal, or by changing the center frequency of the antenna. Ex. 1024, 192:17-193:2.⁴ Claim 7 unequivocally prescribes the first approach, yet Patent Owner seeks to rewrite the claim such that it only encompasses the second approach. Resp., 56 (“The claimed ‘matching elements’ therefore adjust the antenna’s center frequency to match the radio signal generator’s output frequency.”). Patent Owner then attempts to distinguish Rettedal as disclosing the first approach than the second approach. *Id.*, 58 (“Rather than raising the antenna’s center frequency, Rettedal’s match element attempts to lower

³ Patent Owner also challenges Ground 4 based on alleged deficiencies in Harvey repeated from its Ground 1 challenges. Those arguments are wrong for the reasons discussed above for Ground 1.

⁴Q. It seems if they don’t match, we can change one or the other so they do match -
A. Yes.

Q. Correct? We can change what radio signal is being generated, or we can change the - we can adjust the antenna center frequency?

A. Yes.

the oscillator's generated frequency, presumably to more closely match the expected center frequency of the antenna—but the center frequency itself is not adjusted.”).

Claim 7 is not ambiguous. It claims that the “matching elements” “adjust[] said frequency of said radio signal.” Ex. 1025, ¶32. The use of the term “said” in patent claims indicates a reference back to an antecedent use of the same term earlier in the claim, with the understanding that the term is used consistently throughout. *See, e.g., Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1356-57 (Fed. Cir. 1999). Patent Owner's expert agreed. Ex. 1024, 186:11-15. With regard to the “said frequency of said radio signal,” it is necessary to go back to Claim 5, where the term “radio signal” is introduced:

activating said radio signal generator at pre-determined intervals to generate a radio signal to carry said encoded physiological data

The term “frequency” is introduced in the next element:

generating said radio signal having a frequency of between about 700 MHz to about 1 GHz.

As seen, the “said radio signal” of Claim 7 refers to the radio signal generated by the radio signal generator of Claim 5. The “said frequency” of Claim 7 refers to the frequency of that same generated radio signal. Claim 7 then requires that there are “matching elements” which adjust the frequency of the generated radio signal generated “to compensate for a change in said frequency of said radio signal due to passing through a mass of said ruminant animal.” Ex. 1001, Claim 7. Patent

Owner's expert agreed that the "said radio signal" in Claim 7 is the radio signal that is generated to carry the encoded physiological data. Ex. 1024, 188:3-22.⁵ Yet, when asked about the claim requirement that the "matching elements adjust[] said frequency of said radio signal," Patent Owner's expert *disputed* that this element required adjusting the frequency of that same radio signal. *Id.*, 188:23-189:3. Instead, the Patent Owner and its expert asserted that the claim required an adjustment of the center frequency of the antenna, and would not be met by an adjustment of radio signal generator's output frequency. Pet., 56; Ex. 2006, ¶188-191; Ex. 1025, ¶34.

Patent Owner's proposed rewriting of Claim 7 is wrong. There is no mention of the antenna or its center frequency in Claim 7 (or 5 or 6). Ex. 2025, ¶34. Patent Owner's justification for its reconstruction of the claim is the belief that the "matching elements" discussed in the specification of the '644 patent would not have allowed a POSA to adjust the frequency of the signal from the radio signal generator.

⁵ Q. And if we look also in claim 7, there is a reference to "said radio signal." Do you see that?

A. Yes.

Q. And, again, if we go all the way back up to claim 5, the first time we see the term "radio signal" is in the second-to-last one where you have a radio signal generator activating to generate activate a radio signal. Do you see that?

A. Yes.

Q. So just to make sure I understand here, in this claim 7, it's talking about the frequency of a radio signal and it's talking about the radio signal that's generated to carry the encoded physiological data, correct?

A. Yes.

Ex. 2006, ¶190 (citing Ex. 1001, 6:33-40). According to Patent Owner's expert, it would be "impossible" to adjust the radio signal generator's output frequency with the claimed matching elements. Ex. 1024, 201:16-202:22. Petitioner's expert, Dr. Young, disputes that a POSA, reading the '644 patent, would have been unable to adjust the frequency of generated radio signal using matching elements. Ex. 1025, ¶35. Even if Patent Owner's expert is correct that it is impossible to use the claimed matching elements as claimed, it is improper for the Patent Owner to "fix" the claim by substituting various components of the claim language. *E.g., Rembrandt Data Techs., LP v. AOL, LLC*, 641 F.3d 1331, 1339 (Fed. Cir. 2011) (explain that the Federal Circuit "repeatedly and consistently has recognized that courts may not redraft claims, whether to make them operable or to sustain their validity."); Ex. 1025, ¶36.

Rettedal likewise discloses using matching elements to adjust the radio signal generator's output frequency, as required by Claim 7. Ex. 1006, [0064] (Network frequency match element 118 "detune[s]" a "first radio frequency signal" to generate a signal at the desired frequency: "The detuned signal can compensate for demodulation of the radio frequency signal (13) due to interaction with the mass of animal (3)."); Ex. 1025, ¶ 33. Rettedal's approach is the same as Claim 7: using matching elements to adjust the frequency of the generated radio signal. But according to the Response, the approaches are different, because the Patent Owner

rewrote Claim 7. *E.g.*, Resp., 57-58 (“Rettedal’s alleged ‘network frequency match element’ relied on by Petitioners does not meet the ‘matching elements’ limitation because it does not adjust the center frequency of the antenna as claimed.”); Ex. 2006, ¶¶192-193. To be clear, Patent Owner’s expert asserts that matching elements disclosed in Rettedal *are also insufficient* to adjust the radio signal generator’s output frequency. Ex. 2006, ¶197. But the Response uses that assertion to argue against a motivation to combine, rather than rewriting Rettedal. In summary, Claim 7 and Rettedal teach the same method. The Patent Owner and its expert argue that this method, in both cases, is unfeasible. But even if that unsupported position is true, it cannot save the validity of Claim 7.⁶

B. Motivation to Combine and Reasonable Expectation of Success

The Patent Owner argues that there is a lack of motivation to combine and no reasonable expectation of success in the combination on the allegation that XPDR 5000 “is an ear tag.” Resp., 58-59. As discussed above, XPDR 5000 is not a tag, it is a transponder. Harvey teaches XPDR 5000 should be incorporated in its IAT 1110, and that IAT 1110 can take many forms – including an ear tag, a collar, an implant, and a digestive tract bolus. Ex. 1004, 11:4-14, 48:31-33, 70:22-23. Patent Owner’s assertion that XPDR 5000 is an ear tag, or only useful in an ear tag, is

⁶ Patent Owner cannot argue that Rettedal enables a POSA to use matching elements to shift the generated radio signal, but the ’644 patent does not, because the Rettedal reference (2013/0197323) is incorporated into the ’644 patent.

incorrect, and thus does not undermine Ground 4.

Patent Owner also argues that a POSA would not have been motivated or had an expectation of success because he/she would have understood that it was impossible to employ Rettedal's matching elements to shift the frequency of the generated radio signal. Resp., 59-61; Ex. 2006, ¶197-198. Again, Dr. Young disagrees with the assertion. Ex. 1002, ¶109; Ex. 1025, ¶35. Patent Owner claims that Dr. Young's explanation is without support. Resp., 59. But in fact, Dr. Young's explanation is consistent with teachings of Rettedal and the '644 patent claims – it is Patent Owner's expert's position that is offered without support. Ex. 2006, ¶197-198.

VI. Ground 5: Patent Owner's Challenges to the Harvey/Kunda Obviousness Ground Lack Merit

A. Disclosure of Claims 9 and 10

Claims 9 and 10 are obvious over the combination of Harvey and Kunda. In particular, Kunda discloses an antenna having a pair of electrically conductive loops, with each comprising a loop of conductive sheet material having an inner annular edge and an outer annular edge which join opposed loop faces." Pet., 49-54.

Patent Owner's challenge to Ground 5 relies on its flawed challenges to the disclosure in Harvey that are wrong for all of the reasons discussed above in Grounds 1 and 4. The Patent Owner does not argue that any of the elements of Claim 7 provided by Kunda in Ground 5 are missing.

B. Motivation to Combine and a Reasonable Expectation of Success

Patent Owner first argues that there is a lack of motivation to combine and reasonable expectation of success in combining Harvey with Kunda because there is no express teaching that a bolus and its antenna must be small. But, as Dr. Young explains, a POSA would understand that “a digest tract bolus tag”, as disclosed by Harvey, would necessarily be small to be orally administered and fit within the digestive tract. Ex. 1002; Ex. 1025, ¶37.

Patent Owner and its expert next assert that a POSA would not have wanted to include Kunda's antenna in a small bolus, and would not have a reasonable expectation of success, because Kunda teaches that antennas should not be placed close to a printed circuit board. Resp., 64; Ex. 2006, ¶206 (citing Ex. 1007, [0005]). But Kunda's statements about that complication, as well as problems with small antennas generally, were concerns about *prior art antennas*. Ex. 1007, [0005]; Ex. 1025, ¶38. The next paragraph states:

The present invention was achieved to resolve the above-mentioned problems in the prior art and, therefore, is intended to provide a small antenna with satisfactory characteristics.

Id., [0006]. Thus, Kunda does not assert that its antenna should not be used near printed circuit boards or in small devices. Ex. 1025, ¶38.

The Patent Owner also alleges that the Kunda antenna does not solve a number of problems that arise from wirelessly transmitting data from a bolus inside of

animal, and thus there would be no reasonable expectation of success. Resp., 65-66. Among the problems discussed in the Response are the shifted radio signal as it passes through the body mass,⁷ the need for a biocompatible coating on the bolus, and size and weight of the bolus. *Id.* But Kunda's antenna need not provide the ideal solution for every sensor design challenge. A prior art combination need not be the preferred combination described in the prior art to provide a motivation to combine. *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004). Kunda teaches, at a minimum, that its double loop antenna with an insulting core allows for a smaller antenna with reduced interference, as described also in the '644 patent. Ex. 1002, ¶¶115-118. Kunda's antenna addressed those problems with a reasonable expectation of success, which is not undercut by the Patent Owner's speculations about general design issues for a bolus sensor.

VII. Conclusion

Petitioners request that the Challenged Claims be cancelled as unpatentable.

⁷ This is the problem addressed by Rettedal. *See* Ground 4.

DATED: July 29, 2025

Respectfully Submitted,

/Brian M. Buroker/

Brian M. Buroker (Reg. No. 39,125)
GIBSON, DUNN & CRUTCHER LLP
1700 M Street, NW
Washington, DC 20036
Phone: (202) 955-8500
Fax: (202) 467-0539
Email: bburoker@gibsondunn.com

Attorney for Petitioners

CERTIFICATION OF TYPE-VOLUME LIMITATIONS

The Reply complies with the type-volume limitation of 37 C.F.R. § 42.24.
The Reply contains 5597 words, according to the word count tool in Microsoft Word, excluding the parts of the Reply exempted by of 37 C.F.R. § 42.24(a).

DATED: July 29, 2025

Respectfully Submitted,

/Brian M. Buroker/

Brian M. Buroker (Reg. No. 39,125)
GIBSON, DUNN & CRUTCHER LLP
1700 M Street, NW
Washington, DC 20036
Phone: (202) 955-8500
Fax: (202) 467-0539
Email: bburoker@gibsondunn.com

CERTIFICATE OF SERVICE

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

DATED: July 29, 2025

/Brian M. Buroker/

Brian M. Buroker (Reg. No. 39,125)
GIBSON, DUNN & CRUTCHER LLP
1700 M Street, NW
Washington, DC 20036
Phone: (202) 955-8500
Fax: (202) 467-0539
Email: bburoker@gibsondunn.com

Attorney for Petitioners