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Paper No. 58
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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

EMERSON ELECTRIC CO.,
Petitioner,

v.

SIPCO, LLC,
Patent Owner.

Case IPR2017-00359
Patent 6,437,692 B1

Before BRYAN F. MOORE, ROBERT J. WEINSCHENK, and CHRISTA P. ZADO, *Administrative Patent Judges*.

MOORE, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Procedural History

Petitioner, Emerson Electric Co., filed a Petition to institute an *inter partes* review of claims 1, 3–8, 11–14, 24–32, 34, 36–38, 42, 43, 46–49, 51–57, and 59–64 (the "challenged claims") of U.S. Patent No. 6,437,692 B1 ("the '692 patent") pursuant to 35 U.S.C. § 311(a). Paper 2, "Pet." The Petition presented the following three grounds of unpatentability:

Ground	References	Basis[1]	Claims
1	Mason, Jr. et al. (Ex. 1003)[2] and Cunningham et al. (Ex. 1004)[3]	§ 103(a)	1, 3–8, and 11–14
2	Cunningham, McGowan (Ex. 1005),[4] and Mason	§ 103(a)	24–31, 42, 43, 46–49, 51–54, 60–64
3	Cunningham	§ 102(e) / § 103(a)	32, 34, 36–38, 55–57, 59

Pet. 20–21. Patent Owner, Sipco, LLC, filed a Preliminary Response pursuant to 35 U.S.C. § 313. Paper 6, "Prelim. Resp."

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[1] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, which was enacted September 16, 2011, made amendments to 35 U.S.C. §§ 102 and 103. AIA § 3(b)–(c). Those amendments became effective eighteen months later on March 16, 2013. *Id*. at § 3(n). Because the application from which the '692 patent issued was filed before March 16, 2013, any citations herein to 35 U.S.C. §§ 102 and 103 are to their pre-AIA versions.

[2] U.S. Patent No. 6,100,817, issued Aug. 8, 2000.

[3] U.S. Patent No. 6,124,806, issued Sept. 26, 2000.

[4] John J. McGowan, *Direct Digital Control: A Guide to Distributed Building Automation*, 1995.

In a June 1, 2017, Institution Decision, we determined that Petitioner had a reasonable likelihood of prevailing only on Ground 3 but not Grounds 1 and 2. Paper 7, ("Inst. Dec."). Accordingly, we instituted an *inter partes* review on Ground 3 only pursuant to 37 C.F.R. § 42.108. Inst. Dec. 21.

Patent Owner filed a Patent Owner Response (Paper 18, "PO Resp.") to which Petitioner filed a Reply (Paper 24, "Reply"). Patent Owner also filed Observations on Cross-Examination. Paper 29. Petitioner filed a Response to the Observations. Paper 32. Both parties requested a hearing for oral argument (Papers 30 and 31), and a hearing was held January 24, 2018. *See* Paper 38 ("Tr.").

Subsequent to the Supreme Court's decision in *SAS Institute, Inc. v. Iancu*, 138 S. Ct. 1348 (2018), we issued an Order on May 2, 2018, modifying our Institution Decision to institute review of all claims and all grounds and instructed the parties to confer regarding any need for further briefing and changes to the schedule for trial. Paper 39 ("SAS Order"). Responsive to our instructions, a conference call was held in which Petitioner requested additional briefing on the newly added claims and grounds and Patent Owner opposed. Paper 41. Based on the arguments made during the call, we granted additional briefing and amended the scheduling order. *Id.* Specifically, we authorized Patent Owner to file a Supplemental Response addressing the newly instituted claims (claims previously denied review for lack of a reasonable likelihood of prevailing), and authorized Petitioner to file a Supplemental Reply addressing issues raised by Patent Owner's Supplemental Response. *Id.* Petitioner filed its Supplemental Brief which was directed to ground 2 claims 24-26 and 30, (Paper 44, "Supp. Br.") and Patent Owner filed its Supplemental Response

(Paper 47, "Supp. Response"), and Petitioner filed its Supplemental Reply (Paper 48, "Supp. Reply).[5] Due to the additional briefing, the panel requested and was granted an extension of the one-year pendency date for six months until Dec. 1, 2018. Papers 42, 43.

As we allowed in the conference call, Petitioner requested, and received, authorization for a supplemental hearing to address arguments regarding newly added claims and grounds not addressed in the original hearing. Papers 49, 50.

The supplemental oral argument was conducted on September 6, 2018, and a transcript of that hearing is of record. Paper 57 ("Supp. Tr.")

As discussed below, Petitioner has shown by a preponderance of the evidence that claims 32, 34, 37–38, 55–57, and 59 are unpatentable but has not shown by a preponderance of the evidence that any other challenged claims are unpatentable.

B. The '692 Patent

The '692 patent was filed November 12, 1999, and issued August 20, 2002. Ex. 1001, at [22], [45]. It claims priority to multiple related applications, the earliest of which was filed August 2, 1999. *Id*. at [60], [63].

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[5] Petitioner argued in the phone conference that it should be allowed to introduce new evidence with the additional briefing. Paper 41, 2. We denied that request. *Id*. Petitioner, in its supplemental brief, continues this position but does not present new argument except to distinguish a case cited by the panel. Supp. Br. 10. We maintain our position that Petitioner is not allowed to introduce additional evidence for the reasons in our Order in Paper 41 and the additional reasons cited by Patent Owner in its supplemental response. Paper 41, 3–4; Supp. Resp. 2.

The '692 patent "generally relates to remotely operated systems, and more particularly to a computerized system for monitoring, reporting on, and controlling remote systems" such as for "manufacturing processes, inventory systems, and emergency control systems, and the like." *Id*. at 1:25–28, 33–35. It does so "by transferring information signals through a wide area network (WAN) and using software applications hosted on a connected server to appropriately process the information." *Id*. at 1:28–31.

A prior art structure for monitoring, reporting on, and controlling remote systems is illustrated conceptually (via block diagram) in Figure 1, which is reproduced below.

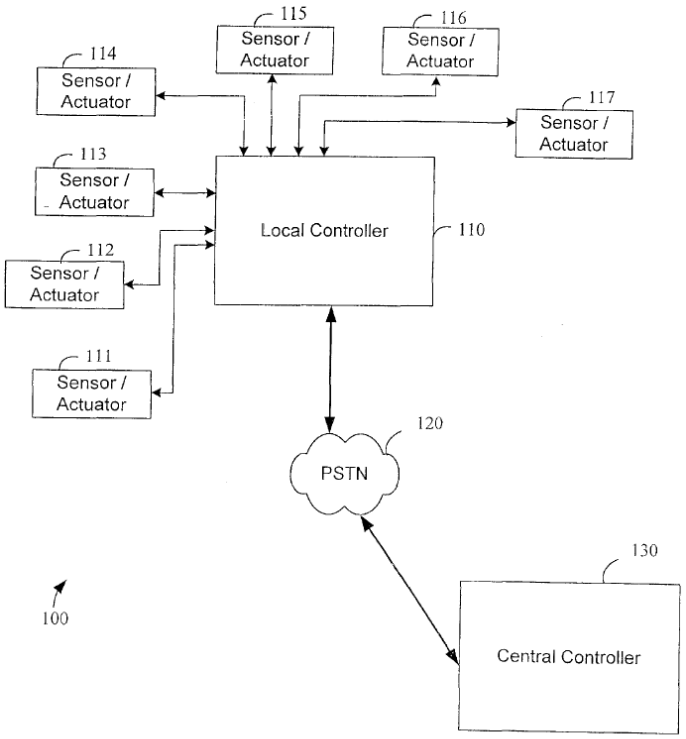

FIG. 1
(PRIOR ART)

Figure 1 shows a plurality of sensors/actuators 111–117 hardwired to local controller 110, which in turn is connected to remotely-located central

controller 130 via publicly switched telephone network (PSTN) 120. Ex. 1001, 5:14–29.

Figure 2 illustrates a block diagram of an embodiment of the invention and is reproduced below.

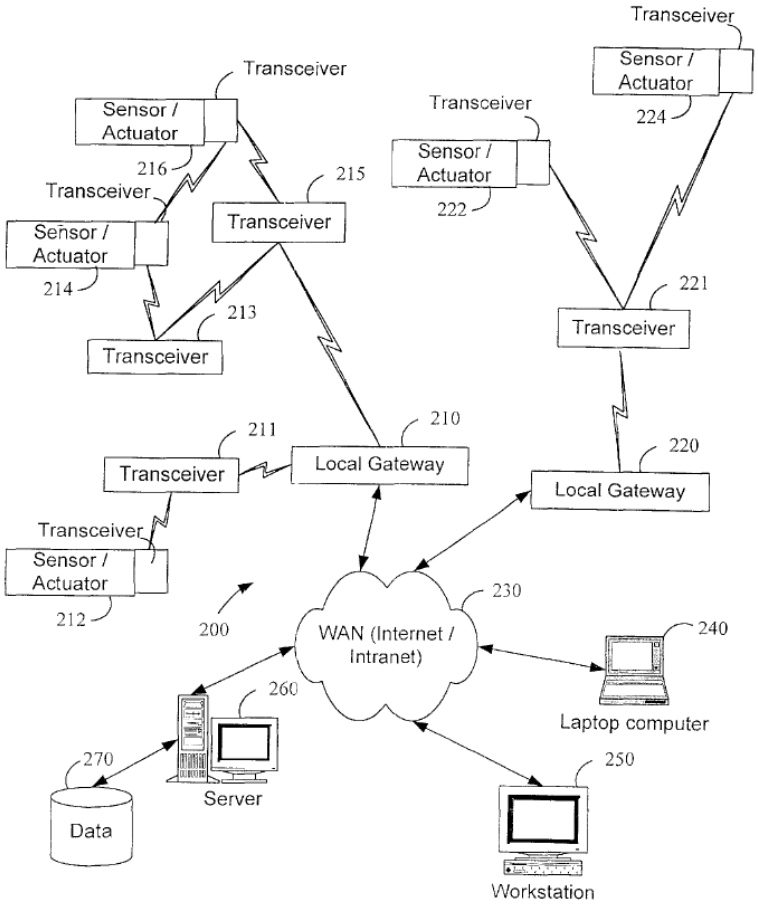

FIG. 2

Figure 2 shows a plurality of sensors/actuators 212, 214, 216, 222, and 224 integrated with transceivers, which are preferably low power radio frequency transceivers. Ex. 1001, 5:45–53. Figure 2 also illustrates stand-alone transceivers 211, 213, 215, and 221, which can receive and transmit signals between the integrated transceivers and local gateways 210 and 220. *Id.* at 5:54–66. The stand-alone transceivers are dispersed sufficiently to provide adequate coverage in, for example, an industrial plant. *Id.* at 6:63–

66. "Local gateways 210 and 220 analyze the transmissions received, convert the transmissions into TCP/IP format and further communicate the remote data signal transmissions via WAN 230." *Id.* at 6:20–23. Thus, the gateways "may communicate information, service requests, control signals, etc. to remote sensor/actuator transceiver combinations 212, 214, 216, 222, and 224 from server 260, laptop computer 240, and workstation 250 across WAN 230." *Id.* at 6:25–29. Gateways 210 and 220 are connected to the various computers 240, 250, and 260 via the WAN.

C. The Challenged Claims

Claims 1, 3–8, 11–14, 24–32, 34, 36–38, 42, 43, 46–49, 51–57, and 59–64 are challenged. Of those, claims 1, 24, 32, 42, 49, 55, and 60 are independent. Claims 1, 24, 32, and 55 are illustrative and reproduced below, with emphasis added to limitations that are of particular discussion in this Decision.

> 1. A system for remote data collection, assembly, and storage comprising:
>
> a computer configured to execute at least one computer program that formats and stores select information for retrieval upon demand from a remotely located device, said computer integrated with a wide area network (WAN);
>
> at least one wireless transmitter configured to transmit select information and transmitter identification information;
>
> a plurality of relatively low-power radio-frequency (RF) transceivers dispersed geographically at defined locations configured to receive select information transmitted from at least one nearby wireless transmitter and further configured to transmit the select information, the transmitter identification information and transceiver identification information; and
>
> *at least one gateway connected to the wide area network configured to receive and translate the select information, the*

transmitter identification information, and transceiver identification information, said gateway further configured to farther transmit the translated information to the computer over the WAN.

24. A method for controlling a system comprising: remotely collecting data from at least one sensor; processing the data into a radio-frequency (RF) signal; transmitting the RF signal, via a relatively low-power RF transceiver, to a gateway;

translating the data in the RF signal into a network transfer protocol;

sending the translated data to a computer, wherein the computer is configured to appropriately respond to the data generated by the at least one sensor by generating an appropriate control signal;

sending the control signal via the network to the gateway;

translating the control signal from a network transfer protocol into a RF control signal;

transmitting the RF control signal;

receiving the RF control signal;

translating the received RF control signal into an analog signal; and

applying the analog signal to an actuator to effect the desired system response.

32. A system for monitoring remote devices comprising:

at least one sensor adapted to generate an electrical signal in response to a physical condition;

at least one wireless transmitter configured to encode the electrical signal, the wireless transmitter further configured to transmit the encoded electrical signal and transmitter identification information in a low-power radio-frequency (RF) signal;

at least one gateway connected a wide area network (WAN) configured to receive and translate the RF signal, the gateway further configured to deliver the encoded electrical signal and transmitter identification information to a computer on the WAN; and

a computer configured to execute at least one computer program that formats and stores select information responsive to the electrical signal for retrieval upon demand from a remotely located device.

55. A method for collecting information and providing data services comprising:

adaptively configuring a data translator at the output of a local controller, wherein the data translator converts the output data stream into an information signal *consisting of* a transmitter code and an information field;

adaptively configuring at least one transmitter with the data translator, wherein the transmitter converts the information signal into a low-power RF signal;

placing a plurality of relatively low-power radio-frequency (RF) transceivers dispersed geographically wherein the low-power RF signal is received and repeated as required to communicate the information signal to a gateway, the gateway providing access to a WAN;

translating the low-power RF signal within the gateway into a WAN compatible data transfer protocol;

transferring the translated low-power RF signal via the WAN to a computer wherein the computer is configured to manipulate and store data provided in said signal; and

granting client access to the computer.

II. ANALYSIS

A. Claim Construction

"A claim in an unexpired patent that will not expire before a final written decision is issued shall be given its broadest reasonable construction in light of the specification of the patent in which it appears." 37 C.F.R. § 42.100(b) (2016). Pursuant to that standard, the claim language should be read in light of the specification, as it would be interpreted by one of ordinary skill in the art. *In re Suitco Surface, Inc.*, 603 F.3d 1255, 1260 (Fed. Cir. 2010). Thus, we generally give claim terms their ordinary and customary meaning. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007) ("The ordinary and customary meaning is the meaning that the term would have to a person of ordinary skill in the art in question.") (internal quotation marks omitted).

Petitioner does not proffer any express constructions. *See* Pet. 26–27. In its Patent Owner Response, Patent Owner proffers express constructions for claim 55's recitation of "an information signal consisting of a transmitter code and an information field" and for several claims' recitations of a low-power radio-frequency (RF) signal. PO Resp. 15–21.

1. "an information signal consisting of a transmitter code and an information field"

Claim 55 is a "method" claim reciting the step of "adaptively configuring a data translator at the output of a local controller, wherein the data translator converts the output data stream into an information signal *consisting of* a transmitter code and an information field." (Emphasis added). Patent Owner proposes that "an information signal consisting of a transmitter code and an information field" means "an information signal containing only a transmitter code and an information field." PO Resp. 15. In support, Patent Owner argues the following:

> This construction is consistent with the well-known principle that the transitional phrase "consisting of" excludes any element, step, or ingredient not specified in the claim. *In re Gray*, 53 F.2d 520, 11 USPQ 255 (CCPA 1931); *Ex parte Davis*, 80 USPQ 448, 450 (Bd. App. 1948) ("consisting of" defined as "closing the claim to the inclusion of materials other than those recited except for impurities ordinarily associated therewith").

Id. at 15–16.

Patent Owner's argument overstates the effect of "consisting of," as that term is used in claim 55. Claim 55's transitional phrase is actually "comprising," which is open-ended. *See* claim 55 ("A method for collecting information and providing data services comprising: . . . ."). Claim 55 uses the phrase "consisting of" within the body of the claim, and specifically within the "adaptively configuring a data translator" step. In that step, the "data translator converts the output data stream into an information signal consisting of a transmitter code and an information field." Petitioner argues that, even though "consisting of" is an exclusionary term, it "'is not absolute,' and it 'does not exclude additional components or steps that are

unrelated to the invention.'" Reply 10 (quoting C*onoco, Inc. v. Energy & Envtl. Int'l, L.C.*, 460 F.3d 1349, 1360 (Fed. Cir. 2006); citing *Norian Corp. v. Stryker Corp.*, 363 F.3d 1321, 1331–32, (Fed. Cir. 2004) (holding that a bone repair kit "consisting of" claimed chemicals was infringed by a bone repair kit including a spatula in addition to the claimed chemicals because the presence of the spatula was unrelated to the claimed invention)).

Indeed, during the hearing, counsel for Patent Owner agreed that "consisting of" did not exclude additional components from the entirety of the transmitted signal.

> JUDGE FITZPATRICK: -- you've taken the position that because of "consisting of" and the traditional interpretation of that phrase, the information signal limitation is not met by Cunningham, because Cunningham's signal has additional components to it. Here's my question: would an information signal having the message structure shown on figure 11 [of the '692 patent], would it read on the information signal of claim 55?
>
> DR. GONSALVES: Sure, because it's just -- claim 55 is restricting what could be in the data field, for example, and what could be in the command field. Now, in Cunningham, there are additional -- those synchronization flags and synchronization fields are in Cunningham and they're not in the 692 patent.

Tr. 31:6–17.

We construe the term "consisting of" within the claim language "data translator converts the output data stream into an information signal consisting of a transmitter code and an information field" as modifying "the information signal," which was converted from "the output data stream." It does not modify the "low-power RF signal" into which "the information signal" ultimately is converted, in the next step of the claimed method. Indeed, and as discussed below in Ground 3, the '692 patent states that the

"Message Structure" of a low-power RF signal contains more than a transmitter code and an information field.

2. The Low-Power RF Signal Limitations

Several challenged claims recite "low-power radio frequency (RF) signal" or "low-power RF signal" limitations. Patent Owner proposes construing these terms to mean "radio frequency signals having a limited transmission range." PO Resp. 16, 42. Patent Owner argues that the claim language supports its construction. *Id.* at 16–17. However, contrary to Patent Owner's assertion, the claim language upon which Patent Owner relies does not mention transmission range. Rather, these claim limitations refer to power. *Id.* Patent Owner also argues that the specification supports its construction because the specification "explains that a low-power RF transmitter has a limited range, which is an advantage of the invention." *Id.* at 17 (citing Ex. 1001, 5:48–57, 6:67–7:4). Although the specification describes a relationship between power and transmission range, the specification does not equate these two distinct transmission properties. The specification explains that in one embodiment transceivers preferably transmit relatively low power RF signal, and as a result the transmission range *may* be relatively limited. Ex. 1001, 5:50–54. The specification also describes stand alone transceivers may be dispersed so that only one transceiver will pick up a transmission from a given integrated transceiver "due *in part* to the low power transmission nature of each transmitter." *Id.* at 6:67–7:4 (emphasis added). Accordingly, the specification describes low power as a property that may impact transmission range, but the specification does not equate these properties. Also, this disclosure supports

Petitioner's argument that a limited transmission range does not necessarily correlate with low power, but instead may depend on multiple factors beyond power, such as frequency, hardware design, and environment. Reply 16–17.

Moreover, we agree with Petitioner that such a construction is "non-specific, vague and unhelpful" in the context of the '692 patent. Reply. 16. Patent Owner's construction limits "low power" to signals having a "limited transmission range," but provides no guidance of what "limited" means, or what its boundaries might be. Petitioner argues correctly that Patent Owner's construction

> fails to address questions its proposed construction raises, such as, what a 'limited' transmission range means and how 'limited' the range must be (*i.e.*, what the range's distance should be), whether the transmission range depends on the particular system or application, and whether other factors should be considered in determining whether the transmission range is limited.

Reply 16.

For the reasons we discussed above, we reject Patent Owner's proposed construction.

Petitioner argues that the low power radio frequency[/RF] signal claim terms should be given their plain and ordinary meaning, or should be construed to encompass transmitters/transceivers that transmit low power signals. Reply 18–19. We agree with Petitioner. The evidence of record suggests a person of ordinary skill in the art would have understood what was meant by a low power RF signal. As we discussed above, the specification does not define the term low power RF signal, and does not expressly limit it. In addition, Cunningham explicitly discloses "low power, radio frequency transmissions." Accordingly, we determine that the low

power radio frequency[/RF] signal claim terms should be given their plain and ordinary meaning, which is to say that they are construed to encompass transmitters/transceivers that transmit low power signals.

B. Asserted Prior Art

1. Mason

Mason was filed March 17, 1998, and issued August 8, 2000. On the record presented, it is prior art to the challenged claims under 35 U.S.C. § 102(e).

Mason discloses an automatic meter-reading ("AMR") system that includes a plurality of utility meters 12 (for metering electricity, gas or water). Ex. 1005, 5:32–34. Each of the meters 12 can send or receive radio-frequency ("RF") communications from a node 18. *Id*. at 5:35–41. The meters 12 can also send or receive RF communications directly from another meter 12 by operating as a repeater. *Id*. at 6:27–35.

Figure 1 of Mason is reproduced below.

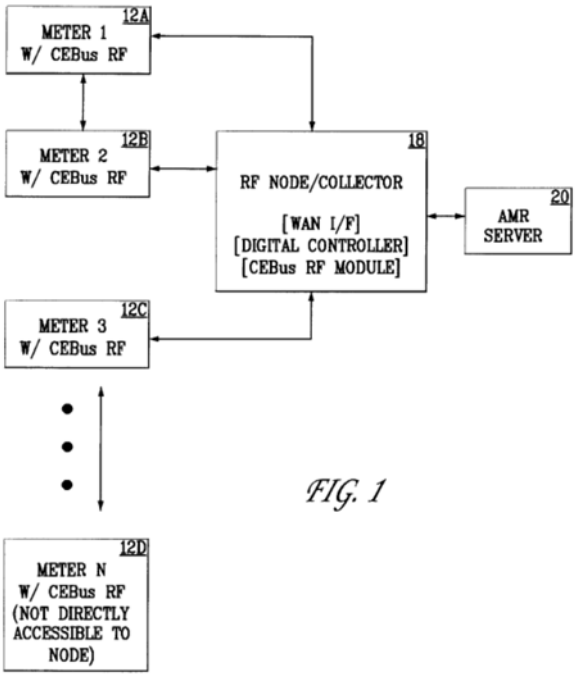

FIG. 1

Figure 1 depicts an AMR system that includes a plurality of utility meters 12A, 12B, 12C, . . . 12D for measuring electricity, gas, or water. *Id*. at 5:33–35. Each meter has a corresponding CEBUS RF module for exchanging RF communications with node 18 and for communicating with a CEBUS local area network within the residence or business with which the meter is associated. *Id*. 5:36–41. Node 18 preferably includes a WAN interface, a digital controller, and a CEBUS RF module, and is coupled with AMR server 20. *Id*. 5:41–43, 6:28–29. TCP and IP protocols may be used for communications among AMR server 20 and multiple nodes 18. *Id*. at 6:3–7.

In the drawing, meter 12D differs from meters 12A–12C in that it is considered "inaccessible" with respect to responsible node 18. By operating another meter within the network as a repeater, such as meter 12C, such an inaccessible meter may be still contacted. *Id*. at 6:27–35.

2. Cunningham

Cunningham was filed September 11, 1998, and issued September 26, 2000. Ex. 1004, at [22], [45]. On the record presented, it is prior art to the challenged claims under 35 U.S.C. § 102(e).

Cunningham discloses a "wide-area remote telemetry system which monitors and controls remote devices by means of a information control system." *Id*. at [57] (Abstract). Figure 1 of Cunningham is reproduced below.

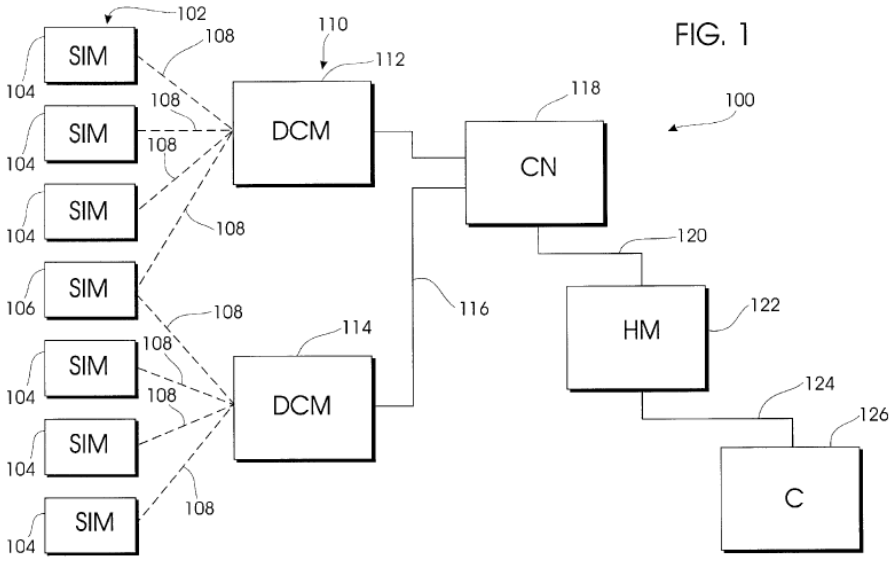

Figure 1 shows a block diagram of a wide-area remote telemetry system. *Id*. at 6:6–8. Multiple sensor interface modules 102 act as data gathering equipment. *Id*. at 6:9–11. The sensor interface modules attach to gas, electric and water meters, and other types of monitored equipment, and include an appropriate hardware sensor for the device being monitored and a transmitter for communicating sensor data to data collection modules using low-power radio-frequency transmissions. *Id*. at 7:30–44. Cunningham discloses that the sensor interface modules can be configured to

communicate with data collection modules 112 and 114 via hardwire or wireless transmission (*id*. at 6:12–14), but it is the wireless embodiment teaching that Petitioner asserts against the challenged claims. *See, e.g.* Pet. 81 (asserting the wireless embodiment teaching of Cunningham against independent claim 32).

The data collection modules transmit the information received from the sensor interface modules to network system 118, which "forwards the transmitted information over a network connection 120 to a host module 122 where the information is stored or processed." *Id*. at 7:19–24. "The stored or processed information may then be transmitted from the host module 122 through a host connection 124 to the customer interface 126." *Id*. at 7:24–27.

"If the data collection module is used in remote areas, access to network connections to the host may be few and far between." *Id*. at 33:16–18. "Thus, it may be necessary for the data collection module to receive information from both sensor interface modules and from other data collection modules and transmit this information towards a data collection module which is connected to the host module through a network system." *Id*. at 33:18–23. "When the data collection module is used in this manner it is also called a data repeater module." *Id*. at 33:24–25.

3. McGowan

McGowan was published in 1995. Ex. 1005, 4. On the record presented, it is prior art to the challenged claims under 35 U.S.C. § 102(b).

McGowan is a book titled *Direct Digital Control: A Guide to Distribute Building Automation*. Ex. 1005. McGowan discloses what is

referred to as a closed-loop control system in which a sensing element provides feedback information to a controller, which in turn processes that information and sends appropriate signals for corrective actions. *Id*. at 103. McGowan discloses digital-to-analog conversion when the device to be controlled—for example, HVAC equipment—is analog. *Id*. at 104. McGowan explains that when data that a digital controller receives from a sensor is in analog form, an analog-to-digital converter is required. *Id*. After the controller processes the converted data, a digital signal is transmitted to a digital-to-analog converter so that the actuator can understand the analog signal and perform the desired response. *Id*.

C. Ground 1: Claims 1, 3–8, and 11–14 as Obvious over Mason and Cunningham

The Petition asserts that claims 1, 3–8, and 11–14 would have been obvious over Mason and Cunningham. Pet. 30.

A claim is unpatentable as obvious:

> if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

35 U.S.C. § 103(a). "Obviousness is a question of law based on underlying facts." *MobileMedia Ideas LLC v. Apple Inc.*, 780 F.3d 1159, 1167 (Fed. Cir. 2015), *cert. denied*, 136 S. Ct. 270 (2015). The underlying facts include (i) the scope and content of the prior art, (ii) the differences between the prior art and the claimed invention, (iii) the level of ordinary skill in the field of the invention, and (iv) any relevant objective considerations of nonobviousness that are presented. *Id.* (citing *Graham v. John Deere*, 383

U.S. 1, 17–18 (1966)). An additional underlying fact is whether there was a reason to combine prior art teachings as asserted. *Id.*

Claim 1 recites, and claims 3–8 and 11–14 incorporate by reference, "a plurality of relatively low-power radio-frequency (RF) transceivers . . . configured to transmit the select information, the transmitter identification information and transceiver identification information." In mapping the prior art to these three recited pieces of information, Petitioner relies on Mason's teaching that a meter may act as a repeater for another meter that is not directly accessible to a node. Pet. 40. With respect to the first recited piece of information, Petitioner argues that "[t]he retransmitted message would include the 'select information' (e.g., C12.18 application layer response information)." *Id*. (citing Ex. 1003, 6:23–35, 12:24–36, 13:14–15:20, 15:37–47). With respect to the second recited piece of information, Petitioner argues that "[b]ecause a meter's responses 'always contain the meter's unique address,' the retransmitted message would also include the 'transmitter identification information'." *Id*. (citing Ex. 1003, 11:11–13). With respect to the third recited piece of information, Petitioner argues that "[w]hen the Source Address field is nonzero, the second meter acts as a repeater to transfer a message between the node and the end meter, with the Source Address field holding information used to identify the second meter." *Id*. at 40–41 (citing Ex. 1003, 7:19–31, 10:28–34). Petitioner contends that this information in the Source Address field corresponds to the "transceiver identification information." *Id*. at 41.

The challenged claims also require a gateway configured to translate all three recited pieces of information and further transmit the translated pieces of information. Specifically, claim 1 recites "at least one gateway

connected to the wide area network configured to receive and translate the select information, the transmitter identification information, and transceiver identification information, said gateway further configured to farther transmit the translated information to the computer over the WAN." In addressing this limitation, Petitioner contends that node 18 shown in Figure 1 of Mason "corresponds to the claimed 'gateway.'" *Id*. Petitioner contends "node 18 receives messages from the meters 12, which when received from a meter acting as a repeater . . . include the claimed 'select information, the transmitter identification information, and transceiver identification information.'" Pet. 41. With respect to the remainder of the limitation, namely the requirement of translation and further transmission to the computer over the WAN, Petitioner argues the following:

> The node 18 also communicates with the AMR server 20 (which corresponds to the claimed "computer") using the TCP/IP protocol, and communicates with meters 12 (which include the claimed transceivers) using the CEBUS RF protocol. [Ex. 1003,] 6:1–13, FIG. 3. In view of this teaching, a [person of ordinary skill in the art] would understand that the node 18 must translate messages in the CEBUS RF protocol received from meters 12 into TCP/IP protocol for transmission to AMR server 20 over the WAN.

Id.

This argument is conclusory and not supported by sufficient evidence. Moreover, the stated conclusion is vague with respect to the limitation at issue. Petitioner argues that "the node 18 must translate *messages*" (*id*. (emphasis added)), but does not explicitly argue that all three recited pieces of information—"the select information, the transmitter identification information, and transceiver identification information"—must be translated. Even assuming Mason's node must translate all three recited pieces of

information, Petitioner does not show that all such translated pieces of information must be further transmitted to the AMR server over the WAN. In particular, Petitioner does not show that transceiver identification information would have to be further transmitted.

Petitioner alternatively relies on Cunningham to teach this limitation. Pet. 42 ("To the extent the Board does not believe that Mason's node 18 performs a translation, Cunningham teaches this feature."). Petitioner argues as follows:

> Because information from a sensor interface module is in a format other than TCP/IP when first received by a data collection module, but later sent to the host module as a TCP/IP signal, a POSITA would understand that the data collection module translates the sensor interface module information into a TCP/IP signal. Moreover the data collection module has an Internet address and is connected to the Internet, which is a WAN.

Id. (citing Ex. 1004, 45:60–46:2, Fig. 49). Although Petitioner's Cunningham argument accounts for some translation, it fails to account for translation of all three pieces of information recited in the challenged claims. Furthermore, even assuming transceiver identification information is received and translated by Cunningham's data collection module, Petitioner has not shown that it is further transmitted to the host module. *Id*. at 42. Likewise, Petitioner has not shown that doing so would have been obvious to a person of ordinary skill in the art based on Mason and/or Cunningham. *Id*. at 42–43.

Petitioner does not show how the asserted prior art renders obvious a:

> system for remote data collection, assembly, and storage comprising . . . at least one gateway connected to the wide area network configured to receive and translate the select information, the transmitter identification information, and transceiver identification information, said gateway further

> configured to farther transmit the translated information to the computer over the WAN.

Accordingly, Petitioner fails to persuade us, based on a preponderance of the evidence, that claims 1, 3–8, and 11–14 would have been obvious over Mason and Cunningham.

D. Ground 2: Claims 24–31, 42, 43, 46–49, 51–54, and 60–64 as Obvious over Cunningham, McGowan, and Mason

The Petition asserts that claims 24–31, 42, 43, 46–49, 51–54, and 60–64 would have been obvious over Cunningham, McGowan, and Mason. Pet. 50.

Independent claim 24 is a method claim and recites "sending the translated data to a computer, wherein the computer is configured to appropriately respond to the data generated by the at least one sensor by generating an appropriate control signal; sending the control signal via the network to the gateway." Independent claim 42 is a system claim and recites "a computer configured to execute at least one computer program that generates at least one control signal responsive to a system input signal; said computer integrated with a wide area network (WAN)." Independent claims 49 and 60 are system and method claims, respectively, that include similar limitations directed to a computer on a WAN issuing a control signal in response to data originating from a sensor on the side of a gateway. Collectively, we refer to these limitations as the "control signal" limitations. The remainder of the claims challenged in this ground—claims 25–31, 43, 46–48, 51–54, and 60–64—depend from one of independent claims 24, 42, 49, and 60 and, thus, incorporate a control signal limitation. *See* 35 U.S.C. § 112 ¶4.

To meet the control signal limitations of independent claims 24, 42, 49, and 60, Petitioner relies on Cunningham. Pet. 52. The relied-upon Cunningham excerpt provides as follows:

> Device adjustment modules are used to monitor and control the operation of various devices and applications according to varying utility prices and the device consumption information. An example of a device control module is a module to control a Johnson Control™ thermostat by attaching a device control module with a power system, processor with associated firmware, and a radio. The module monitors the energy usage by the air conditioning and heating systems controlled by the thermostat and can adjust the operation usage to stay below increased billing increment costs for energy supply and usage. A two-way sensor interface module would be utilized. The device adjustment module transmits information to the system and receives controlling information from system update transmissions.

Ex. 1004, 46:64–47:10. Petitioner argues that this excerpt teaches that "the host module that receives information from the data collection module responds with *controlling information*." Pet. 52 (emphasis added).

1. "Utility Prices"

In the Decision to Institute, we determined Cunningham's alleged "controlling information" does not correspond to the "control signal" as recited in the challenged claims. Inst. Dec. 17–18. Read in context, we determined Cunningham's use of the word "controlling information" refers back to "varying utility prices." *Id.* (comparing Ex. 1004, 46:64–67, with *id.* at 47:8–10. As discussed above, Petitioner did not proffer an express construction for any limitation.

In its supplemental briefing, Petitioner argues that "[u]nder the DI's interpretation of Cunningham, the utility prices to be varied are sent from the host module through the DCM to the DAM, which 'can adjust the operation

usage to stay below increased billing increment costs for energy supply and usage.' Ex. 1004, 46:62-47:10." Supp. Br. 6. Thus, according to Petitioner, "the DAM is sent a control signal to change the 'utility prices' that are used to 'adjust the operation usage'— e.g., turn the thermostat on and off as discussed in the Petition. Pet. 53-58." *Id.* at 6–7. According to Petitioner, the plain and ordinary meaning of control signal should include any signal that controls something, such as, in this case a signal that sends updated prices that ultimately results in a thermostat being turned on or off. *Id.* at 6.[6] Petitioner points to an example from the Specification to support its construction, i.e. the '692 describes control signals that communicate "temperature set points" or "the climate control mode" that are used to adjust the operation usage of the thermostat:

> The addition of actuator 380 to the assembly permits data interface 321 to apply control signals to the manual temperature control for the temperature set point, the climate control mode switch, and the system on/off switch. In this way, a remote workstation 250 or laptop 240 with WAN access (see FIG. 2) could control a home heating system from a remote location.

Supp. Br. 7 (quoting Ex. 1001, 10:5–11). The difference between this example and the disclosure they rely on in Cunningham is that the signals

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[6] As will be explained below, this reference to plain meaning does not account for all the language in the claim. Additionally, Petitioner does not "construe" the claim but rather reorders the words in the claim so no additional claim construction is necessary and as noted in the claim construction section of this decision we do not construe this claim term beyond the explicit language of the claim. For example, Petitioner's counsel testified "control signal, we do think it just has a plain, ordinary meaning. It's a signal that has some type of control information. It relates somehow to control, and it needs no further construction than that, it's just what the terms already say." Supp. Tr. 10:25–11:4.

sent in the '692 patent are used to control specific functions of the device such as temperature settings, and switches on the device.

At the supplemental hearing counsel for Petitioner admitted that such functions occur in the device to be controlled:

> JUDGE MOORE: . . . So I'm trying to figure out where you're saying that that list implies that there needs to be some further translation or further calculation of those modes -- or of those signals.
>
> MR. DAVIS: Yes. And thank you for the question. I think each of those illustrates how further processing would be needed. For example, if you have a temperature set point, you constantly need to do processing to see if you've surpassed that or not, just like –
>
> JUDGE MOORE: And wouldn't that processing be on the device, not in the DAM?
>
> MR. DAVIS: Correct. . . .

Supp. Tr. 39:2–13. Thus, an actuator signal could be sent to the device to change the "temperature set point." Counsel for Petitioner went on to argue that the fact that some processing occurs on the device to be controlled means that "temperature set point" does not directly control the device and is more analogous to "utility prices." Tr. 39:25–40:12. For example, setting the temperature set point may result in the HVAC being turned off at some point when the temperature reaches the right level. Petitioner suggests that under our narrow reading of control signal a signal to turn on/off the device would be the only control signal that meets the limitation in the claims that needs to be sent to the actuator. *Id.* We disagree. Setting the "temperature set point" is itself a function that can be actuated by the "temperature set point" signal. Thus, we find that each of the

examples in the specification, including "temperature set point" involve directly controlling a device rather than information that is processed outside of the device to determine whether to send control signals to the device.

"Utility prices" are at best tangentially related to controlling the device because some calculation must be done on those prices outside of the HVAC device to determine whether a change to a device setting should be made. Ex. 1004, 46:62-47:10. While "utility prices" may be information related to controlling the device or even used in determining whether to control the device they do not cause a controlling action to be done to the device. *See id.*

Patent Owner asserts "it is beyond belief that a utility price could be translated into an analog signal and applied to an actuator." Supp. Resp. 9. Despite the hyperbolic framing of the issue, Patent Owner properly focuses on the language of the claim, i.e. the control signal must be capable of being "translated" into an analog signal. Patent Owner argues further that "Petitioner conflates mere data that may be referenced to determine how to control an actuator as taught by Cunningham with a control signal that is translated into an analog signal to control an actuator, as claimed by the '692 patent." *Id.*

We agree that Petitioner has not shown that "utility prices" is controlling information because it is not of a character that controls the operation of a device such as a thermostat. Additionally, Petitioner has not

explained how "utility prices" can be "translated[7]" "from a network transfer protocol into a RF control signal" and then "an RF control signal into an analog signal" that can be applied ultimately to an actuator. We find that this could not be done because a "utility price" does not indicate any action to be taken by the actuator.

2. U.S. Prov. App. No. 60/058,978 ("the '978 provisional")

Petitioner asserts "the DI does not address Petitioner's arguments concerning the disclosures in Cunningham's provisional that are incorporated by reference into Cunningham and, with respect to Cunningham's other disclosures." Supp. Br. 2. We address the '978 provisional below.

As background it is important to understand that, in Cunningham, the host module—which is on the network (Ex. 1001, 7:21–24)—generates transmissions updating the price of the utility being consumed (e.g., electricity). Ex. 1001, 46:64–47:10. The device adjustment module—which is not on the network but rather on the other side of the asserted gateway (*id*. at 46:67–47:3 (describing "attaching a device control module" to a thermostat)—uses the price information, along with locally-obtained energy usage information, to generate control signals. *Id*. at 46:64–67 ("Device adjustment modules [DAMs] are used to monitor *and control* the operation of various devices and applications according to varying utility prices and

[7] Petitioner does not argue that determining whether the received utility prices should result in some action being performed by an actuator is "translation." Although there is no dispute regarding the meaning of "translation" and we do not need to construe that term, the parties have properly focused on translating as converting a signal from one format to another.

the device consumption information.") (emphasis added). Thus, Cunningham does not meet the limitation to "computer is configured to appropriately respond to the data generated by the at least one sensor by generating an appropriate control signal" and "sending the control signal via the network to the gateway" because the control signal from the DAM is sent on same side of the network as the device to be controlled and not "via the network to the gateway."

Thus, it is the local device adjustment module, not the host module on the network that issues control signals in Cunningham. With that background, in the Petition, after discussing how Cunningham meets the limitation to "computer is configured to appropriately respond to the data generated by the at least one sensor by generating an appropriate control signal," Petitioner states:

> Further evidence of this operation exists in U.S. Provisional Application No. 60/058,978 ("the '978 application"), to which Cunningham claims priority, and which is incorporated by reference[8] into Cunningham. Cunningham at 1:5-11. For example, the '978 application discloses the use of Energy Management Services to control HVAC and lighting based on defined cost parameters and energy usage across the entire systems. Ex1010 at 5. The Energy Management Services are run by a processing center called the Williams Network Control Center (which corresponds to the claimed "computer"). *Id*. at 6. See Kinney, ¶¶61-63.

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[8] Patent Owner does not contest that the relied upon disclosure is not incorporated by reference. Additionally, because we determine that Petitioner has not shown a limitation of the independent claims challenged in Ground 2, we do not need to determine whether the '978 Provisional is properly incorporated by reference into Cunningham based on existing precedent.

Pet. 52–53; *see also* Supp. Reply 3 (restating this contention from the Petition). Thus, Petitioner asserts the "Williams Network Control Center" is the "computer" from the claim and "Energy Management Services" is used to control[s] HVAC and lighting. Also, in describing how the limitation to "computer configured to execute a multiplicity of computer programs, each computer program executed to generate at least one control signal in response to at least one application system input" recited in claim 49 is met, Petitioner states "The '978 application describes Energy Management Services as '*Routines* to reduce the amount of energy used by monitoring and controlling HVAC and lighting usage at customer locations.' (emphasis added). Ex1010 at 6." Pet. 69–70. Petitioner's declarant testifies nearly word for word the same contentions quoted above. Ex. 1003 ¶¶48, 63, 86, 99.

Notably, Petitioner says these contentions are "further evidence" but does not explain how this evidence is to be used to buttress Cunningham's disclosure or how it is to be combined with Cunningham's disclosure. Specifically, given the limited contentions in the Petition detailed above, Petitioner does not explain how Energy Management Services or the "routines" described in the Provisional send control signals from the computer to the actuator as required by the claims. For example, even if we to accept that the "Williams Network Control Center" creates control signals as required by the claim Petitioner has not explained how those signals are translated from network transfer protocol to RF signals and then translated to an analog signal that can be used at an actuator.

Even though the '978 Provisional is allegedly incorporated by reference, an obviousness determination still requires--"[w]hether a

[obviousness challenge] is based on combining disclosures from multiple references, *combining multiple embodiments from a single reference*, or selecting from large lists of elements in a single reference[--] a motivation to make the combination and a reasonable expectation that such a combination would be successful, otherwise a skilled artisan would not arrive at the claimed combination." *In re Stepan Co.*, 868 F.3d 1342, 1346 n. 1 (Fed. Cir. 2017); *c.f. Boston Sci. Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009) (finding obviousness shown despite fact that "all of the limitations are found in two separate embodiments pictured side by side in the patent, not in one embodiment" because the party showed motivation to combine and reasonable likelihood of success). Additionally, "there must be evidence presented on the obviousness of the claim as a whole." *Circuit Check Inc. v. QXQ Inc.*, 795 F.3d 1331, 1337 (Fed. Cir. 2015) (citing *KSR*, 550 U.S. at 420, 127 S.Ct. 1727); *see also Acorda Therapeutics, Inc. v. Roxane Labs., Inc.*, 903 F.3d 1310, 1352 (Fed. Cir. 2018) ("The determination of obviousness is made with respect to the subject matter as a whole, not separate pieces of the claim").

Here, the "routines" described in the '978 Provisional work differently than the "utility prices" embodiment of Cunningham. Petitioner has not explained how those would work together to meet the claim limitations.

In its supplemental briefing, Petitioner asserts:

> [T]he '978 does not limit its description of the 'control' signals to varying utility prices: the 'Energy Management Services' supported by the NCC are used to 'control HVAC and lighting based on defined cost parameters and energy usage across the entire system.' Ex. 1010, 5-6. The NCC/host module thus sends control signals based on energy usage across the entire system—i.e., based on system-wide information that the NCC/host

> module, not the ECM/DAM at an individual customer location, has. Even if the ECM/DAM in Cunningham has additional control capabilities, this does not preclude the NCC/host module from also sending control signals, nor does it limit Cunningham's disclosure of sending "controlling information" to sending changes to the "utility prices."

Supp Br. 5–6. In other words, Petitioner asserts two alternatives: 1) that the "control signals" generated and sent in the '978 Provisional are sent "also," or in addition, to "utility prices;" or 2) that Cunningham could send "controlling information" other than "utility prices," presumably some control information associated with the "routines" disclosed in the Provisional.

In the first alternative, Petitioner is not combining the "utility prices" with the alleged control signals in the '978 Provisional. In that case, Petitioner has not explained, in the Petition, how the Provisional's alleged control signals would meet the other limitations of the claim.[9] In the second alternative, Petitioner has not accounted for the fact that the "routines" allegedly send control signals from the network that can directly control a device such as an HVAC, but, as noted above, in Cunningham, the device adjustment module [DAM]—which is not on the network but rather on the other side of the asserted gateway—uses the price information, along with

[9] In its supplemental briefing and in the supplemental hearing, counsel for Petitioner purports to explain how the structures of the '978 Provisional and Cunningham are related and how the Provisional meets each limitation of the claim. Supp. Br. 3–5; Supp. Tr. 8:1–9:7. However, this description is not found in the Petition and we cannot rely on such substantive contentions as to how the provisional would meet claim limitations from counsel in a supplemental brief or at a hearing in this decision unless it was first presented in the Petition.

locally-obtained energy usage information, to generate control signals. Thus, Petitioner has not explained why or how the DAM would use the alleged control signals from the "routines" rather than its own generated control signals.

In sum, Petitioner does not show how the asserted prior art renders obvious the claimed methods and systems including the control signal limitations. Accordingly, Petitioner fails to persuade us, based on a preponderance of the evidence, that claims 24–31, 42, 43, 46–49, 51–54, and 60–64 would have been obvious over Cunningham, McGowan, and Mason.

E. Ground 3: Claims 32, 34, 36–38, 55–57, and 59 as Anticipated by, or Obvious over, Cunningham

The Petition asserts that claims 32, 34, 36–38, 55–57, and 59 "are anticipated by or rendered obvious over Cunningham." Pet. 80.

Anticipation requires that "each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987).[10]

1. Independent Claim 32

Independent claim 32 is directed to a system for monitoring remote devices. Claim 32 recites "at least one sensor adapted to generate an electrical signal in response to a physical condition." To meet this limitation, Petitioner points to Cunningham's sensor interface modules.

[10] The law with respect to obviousness is discussed above.

Pet. 80–81 (citing various excerpts of Ex. 1004)). In one of the excerpts cited by Petitioner, Cunningham states:

> The sensor interface modules 102 are intelligent communications devices which attach to gas, electric and water meters and other types of monitored equipment. The basic sensor interface modules 102 may be adapted to any number of systems to be monitored, including but not limited to: electrical systems, gas systems, water systems, security systems, temperature control systems, vending machines, and remotely monitored devices of any sort. The sensor interface modules 102 include an appropriate hardware sensor for the device being monitored; a computerized monitoring system with associated firmware; battery power supply and/or a converter for external power; and a transmitter.

Ex. 1004, 7:30–44 (cited at Pet. 80).

Patent Owner does not contest that Cunningham discloses "at least one sensor adapted to generate an electrical signal in response to a physical condition." *See* PO Resp. 22–29, 41–46.

We are persuaded that Cunningham discloses this limitation.

Claim 32 also recites "at least one wireless transmitter configured to encode the electrical signal, the wireless transmitter further configured to transmit the encoded electrical signal and transmitter identification information in a low-power radio-frequency (RF) signal." To meet this limitation, Petitioner cites to Cunningham's disclosure at, among other places, columns 6 and 13. Pet 81 (citing Ex. 6:11–18, 13:29–35, 14:12–31, 29:64–31:2). There, Cunningham discloses the following:

> The sensor interface module 102 receives information from external hardware sensors attached to the device or devices being monitored. This information is interpreted by the module's processing system which processes the information *and then transmits the processed information to a data collection module*.

> . . .
>
> Sensor interface modules 102 communicate with data collection modules 110 through a hardwire or wireless transmission 108. Standard wire connection may be utilized for the hardwire or *wireless transmission* 108, or various types of known, *low-power, radio-frequency transmissions* may be utilized.

Ex. 1004, 13:29–35, 6:11–16 (emphasis added); *see also id*. at 14:12–31, 29:64–31:2; Ex. 1002 ¶36.

Patent Owner does not contest that Cunningham's sensor interface modules include wireless transmitters but it does contest that those transmitters are configured to transmit "in a low-power radio-frequency (RF) signal," as recited in claim 32. PO Resp. 41–46. That argument, however, is premised on Patent Owner's proposed construction that conflates RF transmission *power* with RF transmission *range*. *Id*. at 42. As discussed above, however, Patent Owner's construction is erroneous. Further, Cunningham explicitly discloses that "various types of known, low-power, radio-frequency transmissions may be utilized." Ex. 1004, 6:13–17. In addition, Petitioner points out that the FCC reference upon which Patent Owner relies specifies that FCC regulations limit low power 902–928 MHz transmitters to a maximum power output power of 1 Watt (Ex. 1047, 7, 9, 18 and Ex. 1004), and Cunningham teaches that its transmitter is limited to only 100 mW (Ex. 1004, 18:58–62)—i.e., one tenth the power of what the FCC considers to be low power. Reply 19–20. We find this to be persuasive evidence that the radio frequency transmissions in Cunningham are low power.

We are persuaded that Cunningham discloses "at least one wireless transmitter configured to encode the electrical signal, the wireless transmitter further configured to transmit the encoded electrical signal and

transmitter identification information in a low-power radio-frequency (RF) signal."

Claim 32 also recites "at least one gateway connected a wide area network (WAN) configured to receive and translate the RF signal, the gateway further configured to deliver the encoded electrical signal and transmitter identification information to a computer on the WAN." To meet this limitation, Petitioner relies on Cunningham's data collection module. Pet. 82 (Ex. 1004, 7:19–27, 13:29–35, 14:12–61, 29:63–30:65, 32:27–34, 45:54–67, Fig. 49; Ex. 1002 ¶137). Petitioner correctly points out that the data collection module receives information from sensor interface modules and sends it to a host module over the Internet, which it must do in the form of a TCP/IP signal. Pet. 82 (citing Ex. 1004 at, for example, 7:19–21 ("The data collection modules 110 transmit the information received from the sensor interface modules 102 over a data module connection 116 to a network system 118."), 29:63–30:65 (similar disclosure), 45:60–67 ("In the preferred embodiment, the data collection module will be assigned an Internet address and communicate through a modem as is well known in the prior art. The host module will be assigned an address for transmitting and receiving the data collection module signals. The data collection module will send and receiving [sic] information to and from the host module as an Internet protocol (TCP/IP) Signal.").

Patent Owner argues that the asserted gateway (Cunningham's data collection module) does not receive a "low-power radio-frequency (RF) signal" from the asserted transmitter (a part of Cunningham's sensory interface module) and translate *it*, i.e., the actual low-power radio frequency

(RF) signal that was received. Relying on its declarant, Patent Owner explains as follows:

> Cunningham's data collection module does not perform any express translation/protocol conversion of a signal that it receives from a sensor interface module into TCP/IP format. None of the signals received from sensor interface module by a data collection module is directly forwarded/routed in whole, crossing a network boundary from the sensor interface module format to the host module over WAN. Thus, there is no direct mapping of network address and protocols between the two distinct networks.

PO Resp. 25 (quoting Ex. 2012 ¶118). Patent Owner further explains that Cunningham's "data collection module decodes information from sensor interface modules, processes and accumulates this information over a period of time and then puts the processed/accumulated information in a packet to be transmitted to a host module." PO Resp. 25.

Patent Owner's argument is inapposite, as it is premised on reading a limitation into the claims, namely that the information encoded in the RF signal must be translated in real time. Further, we agree with Petitioner, that even under such an erroneously narrow construction, Cunningham would meet the limitation. In that regard, Petitioner argues that, "although Cunningham discloses sending cumulative data readings, individual signals from the sensor are identified by the gateway and this information is then transmitted (with transmitter identification information) to a computer on the WAN." Reply 6 (citing Ex. 1046 ¶¶31–32; Ex. 1004, 31:6–28). Petitioner argues, and we are persuaded, that "Cunningham explains that the 'most current cumulative reading' is the current absolute 'reading' (i.e., information signal) from the sensor (Ex. 1004, 13:44–46) and that two cumulative readings can be used to 'interpolate' and 'recover' a missed

reading (i.e., a signal from the sensor)." Reply 7 (citing Ex. 1004, 13:44–56; 31:6–27; Pet. 75; Ex. 1002 ¶¶115, 152; Ex. 1046 ¶32).

We are persuaded that Cunningham discloses this limitation.

Lastly, claim 32 also recites "a computer configured to execute at least one computer program that formats and stores select information responsive to the electrical signal for retrieval upon demand from a remotely located device." To meet this limitation, Petitioner accurately points out that "Cunningham discloses that[,] in response to receiving information from the sensor interface module through the data collection modules, the host module compiles the information into a user specified readable format and stores it for later retrieval upon demand from a customer computer or workstation." Pet. 83 (citing Ex. 1004, 7:19–27, 44:12–41, 44:53–64, 46:44–61, 47:44–54, Ex. 1002 ¶¶138–140).

Patent Owner does not contest that Cunningham discloses "a computer configured to execute at least one computer program that formats and stores select information responsive to the electrical signal for retrieval upon demand from a remotely located device." *See* PO Resp. 22–29, 41–46.

We are persuaded that Cunningham discloses this limitation.

For the forgoing reasons, Petitioner has shown by a preponderance of the evidence that claim 32 is anticipated by or rendered obvious by Cunningham.

2. Dependent Claim 34

Claim 34 depends from claim 32 and additionally recites "wherein each wireless transmitter is configured to transmit a relatively low-power radio-frequency (RF) signal." To the extent this is a further limitation (*see*

claim 32 and 35 U.S.C. § 112 ¶4), Cunningham discloses it and Patent Owner does not contest that it does. Pet. 84 (citing Ex. 1004, 6:11–18, Ex. 1002 ¶¶141)

Petitioner has shown by a preponderance of the evidence that claim 34 is anticipated by or rendered obvious by Cunningham.

3. Dependent Claim 36

Claim 36 depends from claim 32 and additionally recites "wherein the gateway translates [1] the encoded electrical signal, [2] the transmitter identification, and [3] the transceiver identification information into TCP/IP for communication over the WAN." Independent claim 32 introduces the term "transmitter identification information," and claim 36's reference to "the transmitter identification" likely refers back to it. However, as Petitioner notes, there is no antecedent basis in claim 32 for claim 36's recitation of "the transceiver identification information." Pet. 84. The lack of antecedent basis is an issue arising under 35 U.S.C. § 112, and Section 112 is not proper subject matter for an *inter partes* review. *See* 35 U.S.C. § 311(b). Neither party has addressed any resulting issues under 35 U.S.C. § 112 beyond pointing out the issue.

Nevertheless, when we construe "transceiver identification information" consistently with how that term is used in claim 1,[11] we are not persuaded that Petitioner has shown sufficiently that Cunningham meets this

[11] Claim 1 recites "a plurality of relatively low-power radio-frequency (RF) transceivers . . . configured to transmit the select information, the transmitter identification information and transceiver identification information."

limitation. Petitioner relies on Cunningham to teach this limitation. Pet. 84. Petitioner argues as follows:

> Cunningham discloses that a data collection module (which corresponds to the claim "gateway") translates the encoded electrical signal and the transmitter identification into TCP/IP for communication over the WAN as detailed in the analysis for claim element [32d].

Id. As explained above in the analysis of claim 1, although Petitioner's Cunningham argument accounts for some translation, it fails to account for translation of all three pieces of information recited in claim 36. *See supra* Section II.C. Petitioner also relies on Mason as teaching identification information for a transceiver, but refers back to its contention regarding claim 1 ("Mason teaches this feature as detailed in the analysis for claim element [1e]"). Pet. 84. As explained above in the analysis of claim 1, we are not persuaded by this contention.

Petitioner has not shown by a preponderance of the evidence that claim 36 is anticipated by or rendered obvious by Cunningham.

4. Dependent Claim 37

Claim 37 depends from claim 32 and additionally recites "wherein the WAN is the Internet." To meet this limitation, Petitioner points out that "the network used by data collection modules and the host module to communicate with each other is the Internet." Pet. 62 (citing Ex. 45:60–46:5, Fig. 49; Ex. 1002 ¶ 81), 85. Patent Owner does not contest that Cunningham discloses this limitation.

Petitioner has shown by a preponderance of the evidence that claim 37 is anticipated by or rendered obvious by Cunningham.

5. Dependent Claim 38

Claim 38 depends from claim 32 and additionally recites "wherein the WAN is a dedicated Intranet." To meet this limitation, Petitioner points out that "one of the provisional applications to which Cunningham claims priority, and which is incorporated by reference into Cunningham, discloses that its energy management operations are accessible over the Williams private frame relay network." Pet. 62 (citing Ex. 1010, 4; Ex. 1002 ¶82). Patent Owner does not contest that the relied upon disclosure is not incorporated by reference or otherwise contest that Cunningham discloses this limitation.

Petitioner has shown by a preponderance of the evidence that claim 38 is anticipated by or rendered obvious by Cunningham.

6. Independent Claim 55

Independent claim 55 is directed to "[a] method for collecting information and providing data services." Claim 55 recites "adaptively configuring a data translator at the output of a local controller, wherein the data translator converts the output data stream into an information signal consisting of a transmitter code and an information field." To meet this limitation, Petitioner points to Cunningham's sensor interface module, and specifically its micro-controller. Pet. 85–87. As argued by Petitioner, Cunningham's sensor interface module includes a micro-controller (1402) that is configured to receive input data from an external hardware sensor (204). *Id.* at 85 (citing Ex. 1004, 12:60–13:3, Fig. 20). And, as further argued by Petitioner, the micro-controller converts the data received from the sensor into an information signal that includes information identifying

the sensor interface module and encoding the sensed data. *Id.* at 86 (citing Ex. 1004, 6:11–18, 13:29–35, 14:12–31, 29:64–31:2, Fig. 21). Cunningham further discloses that its sensory interface modules are adaptable to existing local controllers, stating:

> The sensor interface module may be designed to include meter interface connectors for all of the major residential and commercial gas meters. These connectors may be molded directly into the sensor interface main body casing, or may be accomplished through adapters or various types of sensor interface harnesses. These adaptions allow the sensor interface modules to be installed on new or existing meters and allow monitoring of the entire system or area being monitored regardless of the age of the device being monitored.

Ex. 1004, 10:10–19 (quoted at Pet. 85–86).

Patent Owner argues that Cunningham does not disclose this limitation because, although the asserted data translator (Cunningham's micro-controller) converts the output data stream into an information signal that includes a transmitter code and an information field, the asserted low-power RF signal converted from that information signal includes additional data. PO Resp. 30–33. Patent Owner directs us to a diagram of the asserted low-power RF signal, illustrated in Figure 21 of Cunningham and reproduced below. *Id.* at 30.

FIG. 21

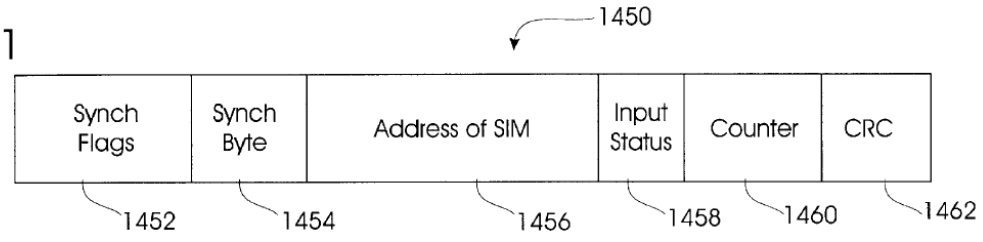

Figure 21, reproduced above, "illustrates the elements of a sensor interface module transmission to a data collection module." Ex. 1004, 27–28. Patent Owner argues that, because this transmission includes "Synch Flags", "Sync

Byte", "Counter" and "CRC" fields, it is not an "information signal *consisting of* a transmitter code and an information field." PO Resp. 30–31 (emphasis added).

We are not persuaded by Patent Owner's argument. Per claim 55, what is "convert[ed] . . . into an information signal consisting of a transmitter code and an information field" is "the output data stream." In our judgment, Cunningham meets this limitation even though it teaches a "transmission" (*see* Ex. 1004, 27–28, Fig. 21) that includes additional fields not derived from the output data stream, such as "Synch Flags," "Sync Byte," "Counter," and "CRC" fields. This is so, first, because those additional fields are not excluded from claim 55 generally. Rather, they are excluded only from the "information signal" that is converted from "the output data stream."

Cunningham's "transmission" is consistent entirely with the '692 patent's disclosure. The '692 patent does not describe a transmission containing only "a transmitter code and an information field." In that regard, the '692 patent states:

> FIG. 11 . . . describes the data structure of messages sent and received using the invention. In this regard, the standard message consists of: to address; from address; packet number; maximum packet number, packet length; command; data; packet check sum (high byte); and packet check sum (low byte).

Ex. 1001, 15:10–16. Figure 11 of the '692 patent is reproduced below.

FIG. 11 Message Structure

To Addr. (1-6)	From Addr. (6)	Pkt. No. (1)	Pkt. Max. (1)	Pkt. Lngth. (1)	Cmd. (1)	Data (0-238)	CkH (1)	CkL (1)

The order of appearance remains fixed although byte position number in each packet may vary due to one or more of the following reasons:

1. Scalability of the "TO ADDRESS" (1 to 6 Bytes).
2. The CMD Byte.
3. Scalability of the Data portion of the message (0 to 238 Bytes).

"To Address" Byte Assignment:

MSB - Byte 1 Device Type	FF-F0 (16) - Broadcast All Devices (1 Byte Address) EF-1F (224) - Device Type Base (2 to 6 Byte Address) 0F-00 (16) - Personal Transceiver Identification (6 Byte Address)
Byte 2 Mfg./Owner ID	FF-F0 (16) - Broadcast all Devices (Byte 1 Type) (2 Byte Broadcast Address) EF-00 (240) - Mfg./Owner Code Identification Number
Byte 3 Mfg./Owner Extension ID	FF-F0 (16) - Broadcast all Devices (Byte 1 & Byte 2 Type) (3 Byte Broadcast Address) EF-00 (240) - Device Type/Mfg./Owner Code ID Number
Byte 4	FF-F0 (16) - Broadcast all Devices (Byte 1 & Byte 2 Type) (4 Byte Broadcast Address) EF-00 (240) - ID Number
Byte 5	(FF-00) 256 - Identification Number
Byte 6	(FF-00) 256 - Identification Number

"From Address" Byte Assignment:

From Address	(FF-00) Full "ID" of Originating Device (up to 6 Bytes)
Packet Number	(FF-00) Packet Number of Msg. longer than 256 Bytes
Packet Max.	(FF-00) Number of Packets in Message over 256 Bytes
Packet Length	(FF-00) Length (in Bytes) of Packet/Message Transmission*
Command	(FF-00) Command Byte
Data	(FF-00) Data as required by specific command
ChkH	(FF-00) Packet Checksum, High Byte
ChkL	(FF-00) Packet Checksum, Low Byte

* Packet Length - 13 Bytes (Min.) / 256 Bytes (Max.)

Figure 11 of the '692 patent, above, illustrates a "Message Structure" having nine fields. *See also* Ex. 1001, 4:61–62 ("FIG. 11 is a table illustrating the message protocol of the present invention.").

We are persuaded that Cunningham discloses "adaptively configuring a data translator at the output of a local controller, wherein the data translator converts the output data stream into an information signal consisting of a transmitter code and an information field."

Claim 55 also recites "adaptively configuring at least one transmitter with the data translator, wherein the transmitter converts the information

signal into a low-power RF signal." To meet this limitation, Petitioner directs us to, among other things, the following disclosure from Cunningham:

> Sensor interface modules 102 communicate with data collection modules 110 through a hardwire or wireless transmission 108. Standard wire connection may be utilized for the hardwire or wireless transmission 108, or various types of known, *low-power, radio-frequency transmissions may be utilized*. The preferred embodiment communicates by using a frequency-hopping spread-spectrum transmission in an unlicensed range, such as 902-928 Mhz.

Ex. 1004, 6:11–18 (cited at Pet. 87).

Patent Owner contests whether Cunningham discloses the "low-power" aspect of this limitation. PO Resp. 41–46. As discussed above, with respect to claim 32, that argument is premised on an erroneous construction that conflates RF transmission power with RF transmission range. *Id*. at 42.

We are persuaded that Cunningham discloses this limitation.

Claim 55 also recites "placing a plurality of relatively low-power radio-frequency (RF) transceivers dispersed geographically wherein the low-power RF signal is received and repeated as required to communicate the information signal to a gateway, the gateway providing access to a WAN." To meet this limitation, Petitioner directs us to the multiple data collection modules. Pet. 88 (citing Ex. 1004, 20:4–10, 31:6–23, Fig. 30, Fig. 49.). As argued by Petitioner, Cunningham explicitly discloses the use of data collection modules with signal repeating capabilities for use in remote areas. Ex. 1004, 33:15–44 (cited at Pet. 88). "When the data collection module is used in this manner it is also called a data repeater module." *Id*. at 33:24–25.

Patent Owner responds that Cunningham does not meet this limitation because it does not disclose the "low power" aspect of it. *See* PO Resp. 41–46. We disagree, as discussed above.

We are persuaded that Cunningham discloses this limitation.

Claim 55 also recites "translating the low-power RF signal within the gateway into a WAN compatible data transfer protocol." To meet this limitation, Petitioner relies on Cunningham's data collection module. Pet. 42, 89. Petitioner correctly points out that the data collection module receives information from sensor interface modules and sends it to a host module over the Internet (a WAN), which it must do by translating the information into the form of a TCP/IP signal. Pet. 42 (citing Ex. 1004 at, for example, 7:19–21 ("The data collection modules 110 transmit the information received from the sensor interface modules 102 over a data module connection 116 to a network system 118."), 29:63–30:65 (similar disclosure), 45:60–67 ("In the preferred embodiment, the data collection module will be assigned an Internet address and communicate through a modem as is well known in the prior art. The host module will be assigned an address for transmitting and receiving the data collection module signals. The data collection module will send and receiving [sic] information to and from the host module as an Internet protocol (TCP/IP) Signal.").

Patent Owner responds that Cunningham does not disclose this limitation because the RF signal that Cunningham's data collection module translates was not converted from an information signal containing only a transmitter code and an information field. We have already rejected that claim construction argument above. Accordingly, we are likewise not persuaded of Patent Owner's application of such a construction here.

We are persuaded that Cunningham discloses "translating the low-power RF signal within the gateway into a WAN compatible data transfer protocol."

Lastly, claim 55 also recites "transferring the translated low-power RF signal via the WAN to a computer wherein the computer is configured to manipulate and store data provided in said signal; and granting client access to the computer." To meet these limitations, Petitioner relies on Cunningham's disclosure that a host module receives data from a plurality of data collection modules, uses software to compile the information into a user-specified readable format, and makes the information available to users on a computer. Pet. 32 (citing Ex. 1004, 7:19–27, 44:12–64, 45:60–46:5, 46:44–61, 47:44–54, Figs. 21, 49), 89.

Patent Owner does not contest that Cunningham discloses these limitations. We are persuaded by the cited evidence that Cunningham discloses these limitations.

Apart from addressing specific limitations, Patent Owner argues that Cunningham does not disclose claim 55 because it allegedly does not disclose Patent Owner's global characterization of the claim as requiring "a data stream to pass 1) from a local controller, 2) through a transmitter, 3) through low-power RF transceivers, 4) through a gateway, 5) through a WAN to 5) [sic, 6)] a computer on the WAN." PO Resp. 37. Patent Owner further states: "In particular, [in Cunningham] 'the RF signal that is alleged to be translated into a WAN compatible data transfer protocol by the data collection module by Petitioner (Petition, p. 88) is not the translated data stream from the sensor interface module.'" *Id*. at 38–39 (quoting Ex. 1002 ¶135). During the hearing, it became apparent that Patent Owner was

attempting to read a limitation into claim 55 that would require that the transitory "output data stream" itself propagate all the way through the steps of the claimed method to the "computer" recited at the end of the claim. For example, counsel for Patent Owner stated:

> The difference between this type of communication [in Cunningham] where it changes drastically is like the difference between night and day when it's compared to what's recited in claim 55 where it talks about, as I said when I opened, that there is a low-power RF signal, there is an information signal, and that *these signals remain the same as they propagate from its origination point* through the plurality of low-power radio frequency transceivers that are dispersed geographically.

Tr. 20:7–14 (emphasis added)

> So the point I'm trying to make is that you see the communication from the SIM [sensory interface module] to the DCM [data collection module], that uses one type of protocol, and then the communication from a DCM 112 to, for example, the DCM that's to the right of that before it gets to the gateway, that uses an entirely different protocol. It doesn't pass the – what's referred to as the low-power RF signal through the network, it receives the low-power RF signal from the SIM and then it starts over with a completely different protocol, a completely different format called the RWB. *There's no propagation of the low-power RF signal. It receives it, ditches it, and then starts over*.

Id. at 22:5–13 (emphasis added).

> Petitioner's expert, Mr. Kinney, testified [on cross-examination] that "[] an RF signal from the SIM is temporal, it exists. When it exists after it exists, so to speak, later, it doesn't; the RF signal doesn't exist anymore. It was received, demodulated and decoded by the receiver, so the RF signal -- the information off the RF signal is stored by the data collection module."

Id. at 28:12–17.

> Oh, it's a completely different signal. It has no resemblance at all to the signal that it receives from the SIM. When it leaves the DCM, it's a completely different signal. It's not any -- it's the signal it has received goes away, it creates a completely different one using the WRB [wireless radio backbone]; it's a completely different protocol. And this is in contrast with the explicit language of *claim 55, which recites the low-power RF signal propagating through the network from the time it's converted from the output stream . . . to the time it gets to the gateway*.

Id. at 24:19–26 (emphasis added).

We are not persuaded by Patent Owner's attempt to distinguish Cunningham from claim 55. First, there is no language in claim 55 to support Patent Owner's construction that the same low-power RF signal must propagate all the way from the data translator to the gateway. In fact, the claim explicitly requires otherwise because, in one step, it requires that "the low-power RF signal is received and repeated." During oral argument, counsel for Patent Owner conceded that when a transceiver repeats an RF signal, it creates a new RF signal; although the new RF signal may be identical to the received RF signal, it is a new signal. *See* Tr. 29:22–30:6.

For the forgoing reasons, Petitioner has shown by a preponderance of the evidence that claim 55 is anticipated by or rendered obvious by Cunningham.

7. Dependent Claim 56

Claim 56 depends from claim 55 and additionally recites "wherein the WAN is the Internet." To meet this limitation, Petitioner points out that "the network used by data collection modules and the host module to communicate with each other is the Internet." Pet. 62 (citing Ex. 45:60–

46:5, Fig. 49; Ex. 1002 ¶81), 89. Patent Owner does not contest that Cunningham discloses this limitation.

Petitioner has shown by a preponderance of the evidence that claim 56 is anticipated by or rendered obvious by Cunningham.

8. Dependent Claim 57

Claim 57 depends from claim 55 and additionally recites "wherein the WAN is an Intranet." To meet this limitation, Petitioner points out that "one of the provisional applications to which Cunningham claims priority, and which is incorporated by reference into Cunningham, discloses that its energy management operations are accessible over the Williams private frame relay network." Pet. 62 (citing Ex. 1010, 4; Ex. 1002 ¶82), 89–90. Patent Owner does not contest that the relied upon disclosure is not incorporated by reference or otherwise contest that Cunningham discloses this limitation.

Petitioner has shown by a preponderance of the evidence that claim 57 is anticipated by or rendered obvious by Cunningham.

9. Dependent Claim 59

Claim 59 depends from claim 55 and additionally recites "wherein clients access the information using a web browser." To meet this limitation, Petitioner points out that "Cunningham discloses that '[a]n Internet or other TCP/IP type of connection allows customers to use software applications which allow the user to graphically view the stored information and their energy consumption rates" and "the Internet connection allows the customer to see their energy consumption . . . by

simply accessing a web site on the Internet.'" Pet. 90 (quoting Ex. 1004, 46:48–58); *see also* Ex. 1002 ¶160.

Petitioner has shown by a preponderance of the evidence that claim 59 is anticipated by or rendered obvious by Cunningham.

III. CONCLUSION

Petitioner has not met its burden to prove, by a preponderance of the evidence, that any claim challenged in Grounds 1 or 2 is unpatentable. However, Petitioner has met that burden with respect to each claim challenged in Ground 3, except claim 36.

IV. ORDER

Accordingly, it is

ORDERED that claims 32, 34, 37–38, 55–57, and 59 of U.S. Patent No. 6,437,692 B1 are unpatentable;

FURTHER ORDERED that claims 1, 3–8, 11–14, 24–31, 36, 42, 43, 46–49, 51–54, and 60–64 of U.S. Patent No. 6,437,692 B1 have not been shown to be unpatentable; and

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

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