

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NINTENDO OF AMERICA, INC. and NINTENDO CO., LTD.,
Petitioner,

v.

iLIFE TECHNOLOGIES, INC.,
Patent Owner.

Case IPR2015-00113
Patent 7,145,461 B2

Before JACQUELINE WRIGHT BONILLA, MICHELLE R. OSINSKI, and
HYUN J. JUNG, *Administrative Patent Judges*.

BONILLA, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Nintendo of America Inc. and Nintendo Co., Ltd. (“Petitioner”) filed a Corrected Petition requesting *inter partes* review of claims 1–18, 21–38, 41, 43, 44, 56, 61, 62, and 64 of U.S. Patent No. 7,145,461 B2 (Ex. 1001, “the ’461 patent”). Paper 4 (“Pet.”). iLife Technologies, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 9 (“Prelim. Resp.”). Upon considering those submissions, we instituted *inter partes* review of claims 1–18, 21–38, 41, 43, 44, 56, 61, 62, and 64 of the ’461 patent based on six obviousness grounds. Paper 12 (“Dec. on Inst.”).

After institution, Patent Owner filed a Response (Paper 14, “PO Resp.”), and Petitioner filed a Reply (Paper 21, “Reply”). Petitioner proffered a Declaration of Gregory Francis Welch, Ph.D. (Ex. 1002, “Welch Declaration”) with its Petition and a Reply Declaration of Gregory Francis Welch, Ph.D. (Ex. 1016, “Welch Reply Declaration”) with its Reply. Patent Owner proffered the Declaration of Dr. Robert H. Sturges (Ex. 2006, “the Sturges Declaration”) with its Response. Petitioner also filed a transcript from the deposition of Dr. Sturges (Ex. 1015).

In addition, Patent Owner also filed a Motion to Exclude seeking to exclude certain evidence. Paper 27. Petitioner filed an Opposition to Patent Owner’s Motion to Exclude (Paper 29), and Patent Owner filed a Reply (Paper 32).

Patent Owner also filed a Notice Regarding New Arguments and Belated Support (Paper 28), to which Petitioner filed a Response (Paper 30).

A combined oral hearing in this proceeding and Cases IPR2015-00105, IPR2015-00106, IPR2015-00109, IPR2015-00112, and IPR2015-

00115 was held on January 27, 2016; a transcript of the hearing is included in the record (Paper 34, “Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c). We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–18, 21–38, 41, 43, 44, 56, 61, 62, and 64 of the ’461 patent are unpatentable. We also deny Patent Owner’s Motion to Exclude.

A. Grounds of Unpatentability at Issue

Petitioner contends that the challenged claims are unpatentable under 35 U.S.C. § 103 based on the following six grounds.

Claims Challenged	Basis	Reference(s)
1–4, 8–12, 21–24, and 28–32	§ 103	Unuma (Ex. 1003) ¹
5–7, and 25–27	§ 103	Unuma in view of Hubert (Ex. 1004) ²
13 and 33	§ 103	Unuma in view of Sellers (Ex. 1005) ³
14, 15, 34, and 35	§ 103	Unuma in view of Kurokawa (Ex. 1006) ⁴
16, 17, 36, and 37	§ 103	Unuma in view of Okuno (Ex. 1007) ⁵

¹ Unuma et al, European Patent Application EP 0 816 986 A2, published Jan. 7, 1998 (Ex. 1003).

² Hubert et al., U.S. Patent No. 4,110,741, issued Aug. 29, 1978 (Ex. 1004).

³ Sellers, U.S. Patent No. 5,678,562, issued Oct. 21, 1997 (Ex.1005).

⁴ Kurokawa et al., Japanese Patent Application JP H10-165395, published Jun. 23, 1998 (Ex. 1006).

⁵ Okuno et al., Japanese Patent Application JP H10-40483, published Feb. 13, 1998 (Ex. 1007).

Claims Challenged	Basis	Reference(s)
18, 38, 41, 43, 44, 56, 61, 62, and 64	§ 103	Unuma in view of Nitta (Ex. 1008) ⁶

Pet. 3–4, 11–60.

B. Related Proceedings

The parties indicate that district court cases involving the '461 patent include *iLife Technologies, Inc. v. Nintendo of America Inc.*, No. 3:13-cv-04987 (N.D. Tex.), as well as other cases involving other defendants including *iLife Technologies Inc. v. AliphCom*, No. 3:14-cv-03345 (N.D. Cal.); *iLife Technologies Inc. v. Body Media, Inc.*, No. 2:2014-cv-00990 (W.D. Pa.); and *iLife Technologies Inc. v. Fitbit, Inc.*, No. 3:2014-cv-03338 (N.D. Cal.). Pet. 1; Paper 7, 1.

Upon considering other Petitions filed by the same Petitioner on the same day, we also instituted *inter partes* review of claims in related U.S. Patent Nos. 6,307,481 B2 (Case IPR2015-00105), 6,703,939 B2 (IPR2015-00106), 6,864,796 B2 (Case IPR2015-00109), 7,095,331 B2 (Case IPR2015-00112), and 7,479,890 B2 (Case IPR2015-00115).

C. The '461 Patent (Ex. 1001)

The '461 patent relates to systems, and methods of operation thereof, for evaluating movement of a body relative to an environment, such as falls, irregular movement, inactivity, etc. Ex. 1001, 1:27–32, 2:47–50. The '461 patent indicates that prior art methods fail to discern normal, acceptable, or unacceptable changes in levels of body activity. *Id.* at 1:57–62. The

⁶ Nitta et al., U.S. Patent No. 5,757,360 (“Nitta”), issued May 26, 1998 (Ex. 1008).

specification acknowledges that “accelerometers that measure both static and dynamic acceleration are known,” but states that “their primary use has heretofore been substantially confined to applications directed to measuring one or the other, but not both.” *Id.* at 2:23–26.

The specification distinguishes between “static acceleration, or gravity,” which is “a gauge of position,” versus “dynamic acceleration (i.e., vibration, body movement, and the like).” *Id.* at 2:20–23. The system of the ’461 patent includes a sensor associated with the body that operates to repeatedly sense dynamic and static accelerative phenomena of the body. *Id.* at 2:61–63. The sensor “senses one or more absolute values, changes in value, or some combination of the same” and may be “a plural-axis sensor” that “generates an output signal to the processor indicative of measurements of both dynamic and static acceleration of the body in plural axes.” *Id.* at 3:7–15, 6:41–49. In one embodiment, the sensor generates voltage signals that include “an alternating current (ac) voltage component proportional to G forces (i.e., dynamic acceleration component related to vibrations of sensor layer 31),” as well as “a direct current (dc) voltage component proportional to an angle relative to earth (i.e., static acceleration component related to gravity).” *Id.* at 7:16–28.

The system further includes a processor that processes “sensed dynamic and static accelerative phenomena as a function of at least one accelerative event characteristic and an environmental representation” to determine whether evaluated body activity is within “environmental tolerance.” *Id.* at 2:63–3:1. The ’461 patent defines “accelerative events” as “occurrences of change in velocity of the body (or acceleration), whether in magnitude, direction or both, and including cessation of activity or

inactivity.” *Id.* at 6:16–20. The ’461 patent states that an accelerative event characteristic “will largely be defined by the specific application.” *Id.* at 10:64–11:2. The specification also defines “environmental representation” as “any mathematical or other suitable depiction, delineation, model or like measured description of the environment associated with the body.” *Id.* at 3:15–19.

The processor “generates state indicia relative the environment of interest, and determines whether the evaluated body movement is within tolerance in the context of that environment.” *Id.* at 11:2–6. The ’461 patent describes that “‘tolerance’ would . . . be very different for a monitored body of an elderly person . . . , a toddler, a box in a freight car, a container of combustible gas, etc.” *Id.* at 11:6–9.

Figure 4 of the ’461 patent is reproduced below.

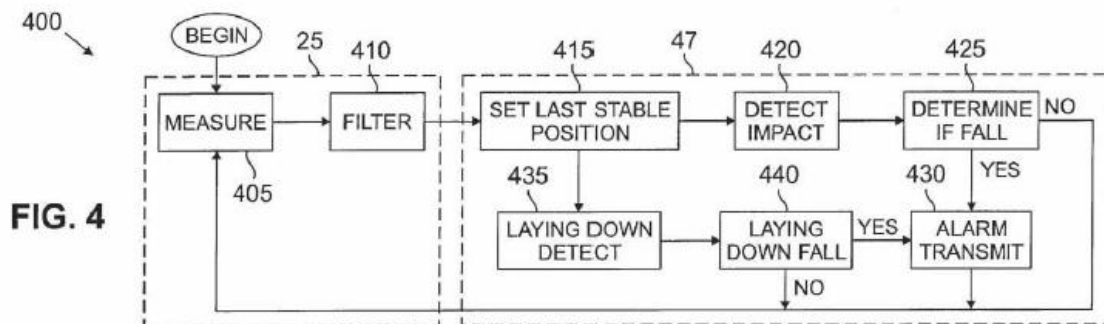


Figure 4 depicts an operational flow diagram of exemplary method 400 of programming processor 47 in accordance with a fall detection application of the principles of the ’481 patent. *Id.* at 5:29–32, 9:42–55. Step 405 involves generating a request for sampling measurements, either in response to an executing operations program or upon initiation by a user. *Id.* at 9:56–60. Sensor 25 senses x and y acceleration values and outputs measurement signals that are filtered in step 410 to reduce the probability that an out-of-

tolerance abnormal movement will be determined incorrectly in response to a single sharp impact. *Id.* at 9:61–10:2. Step 415 involves processor 47 using the outputs from sensor 25 to determine a last stable position of the body. *Id.* at 10:3–6. In Step 420, processor 47 uses ac voltage components of each output from sensor 25 to check against a G force threshold value to see if the threshold is exceeded, and thus, qualifies as a potential fall. *Id.* at 10:22–27. In Step 425, processor 47 determines a fall by testing a post-impact stream of samples against a tolerance. *Id.* at 10:32–35. In Step 430, a change of body position greater than 45° or more from the last stable position may lead to classification of the event as a debilitating fall. *Id.* at 10:41–45.

In Step 435, processor 47 adds the absolute values of the x and y last stable positions and then determines whether the body is lying down if the added value exceeds a value corresponding to 90° plus or minus 25%, after setting the last stable position. *Id.* at 10:48–53. In Step 440, any impact that exceeds a G force threshold is treated as a debilitating fall. *Id.* at 10:53–57. “Exemplary processor 47 is programmed to distinguish between normal and abnormal accelerative events (e.g., walking, sitting, lying down, etc. versus tripping, falling down, inactivity over time, etc.), and, when an abnormal event is identified, indicates whether the abnormal event is tolerable, or within tolerance.” *Id.* at 13:53–58.

D. Illustrative Claims

Petitioner challenges claims 1–18, 21–38, 41, 43, 44, 56, 61, 62, and 64 of the ’461 patent. Claims 1, 21, 41, and 62 are independent, and are reproduced below.

1. A system that evaluates body activity relative to an environment, said system comprising

a processor that is associable with a sensor for sensing dynamic and static accelerative phenomena of said body,

said processor operable to process said sensed dynamic and static accelerative phenomena as a function of at least one accelerative event characteristic and an environmental representation

to thereby determine whether said evaluated body activity is within environmental tolerance.

21. A method of operating a system to evaluate body activity relative an environment wherein a sensor is associated with said body, said method of operation comprising the step of

processing, with a processor, repeatedly sensed dynamic and static accelerative phenomena of said body as a function of at least one accelerative event characteristic and an environmental representation

to thereby determine whether said evaluated body activity is within environmental tolerance.

41. A system that evaluates movement of a body relative to an environment, said system comprising:

a sensor, associable with said body, that senses accelerative phenomena of said body relative to a three dimensional frame of reference in said environment, said sensor comprising a plurality of acceleration measuring devices; and

a processor, associated with said sensor, that processes said sensed accelerative phenomena of said body as a function of at least one accelerative event characteristic

to thereby determine whether said evaluated body movement is within an environmental tolerance, and

to thereby determine whether said body has experienced dynamic acceleration due to external forces by subtracting a value of gravitational acceleration from the total acceleration experienced by said body.

62. A method of operating a system to evaluate movement of a body relative an environment wherein a sensor is associated with said body, said method of operation comprising the steps of:

processing, with a processor, repeatedly sensed accelerative phenomena of said body as a function of at least one accelerative event characteristic

to thereby determine whether said evaluated body movement is within environmental tolerance; and

determining whether said body has experienced dynamic acceleration due to external forces by subtracting a value of gravitational acceleration from the total acceleration experienced by said body.

Ex. 1001, 22:14–26:7 (paragraph indentations added). Challenged dependent claims recite, for example, additional aspects of the accelerative phenomena or processor.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, “[a] claim in an unexpired patent 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); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1275–79 (Fed. Cir. 2015), *cert. granted sub nom. Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 890 (mem.) (2016).

There is a presumption that a claim term carries its ordinary and customary meaning. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002); *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). A patentee may rebut this presumption, however, by acting as his own lexicographer, providing a definition of the term in the specification with “reasonable clarity, deliberateness, and precision.” *In re Paulsen*, 30

F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, limitations are not to be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

In the Decision on Institution, we interpreted various claim terms of the '461 patent as follows:

Term	Interpretation
“dynamic accelerative phenomena”	“acceleration indicating vibration or movement”
“static accelerative phenomena”	“acceleration indicating position of the body relative to the earth”
“within environmental tolerance”	“acceptable based on criteria including a specified value given the environment for which body movement is being evaluated”
“environmental representation”	“any mathematical or other suitable depiction, delineation, model or like measured description of the environment associated with the body”
“tolerance indicia”	“information indicating whether evaluated body movement is within environmental tolerance”

Dec. to Inst. 9-15.

Patent Owner states that “for purposes of this Response, the preliminary claim constructions from the Board’s Decision to institute trial (Paper 12) are used.” PO Resp. 9. Also, Petitioner presents no arguments disputing these preliminary claim constructions in its Reply. Based on our review of the complete record, we do not perceive any reason or evidence

that now compels any deviation from these interpretations. In addition to the above, we provide two other claim constructions below.

1. “*processor*”

The specification of the ’461 patent defines “processor” to mean “any device, system or part thereof that controls at least one operation, such a device may be implemented in hardware, firmware or software, or some suitable combination of at least two of the same.” Ex. 1001, 5:1–7. Both parties cite the definition and propose it as the construction for “processor.” Pet. 5–6 (citing Ex. 1001, 5:1–5); PO Resp. 10 (citing Ex. 1001, 5:1–5). We adopt that claim construction here.

2. “*accelerative event characteristic*”

The specification defines “accelerative events” or “accelerative phenomena” as “occurrences of change in velocity of the body (or acceleration), whether in magnitude, direction or both, and including cessation of activity or inactivity.” Ex. 1001, 6:16–20. Both parties cite the definition and propose it as the construction for “accelerative event” or “accelerative phenomena.” Pet. 5 (citing Ex. 1001, 4:36–40); PO Resp. 10 (citing Ex. 1001, 6:16–20). Consistent with that definition, we construe an “accelerative event characteristic” as a characteristic of an accelerative event, as defined above.

B. Obviousness over Unuma

Petitioner contends that claims 1–4, 8–12, 21–24, and 28–32 of the ’461 patent would have been obvious over Unuma. Pet. 11–28, 44–60. In its Petition, Petitioner provides a claim chart, and relies on a Declaration by Dr. Gregory Francis Welch (Ex. 1002). *Id.*

1. Unuma (Ex. 1003)

Unuma discloses a method and system for automatically recognizing motions and actions of moving objects, such as humans. Ex. 1003, Abstract, 2:3–6. Figures 1 and 2 of Unuma are reproduced below.

FIG. 1

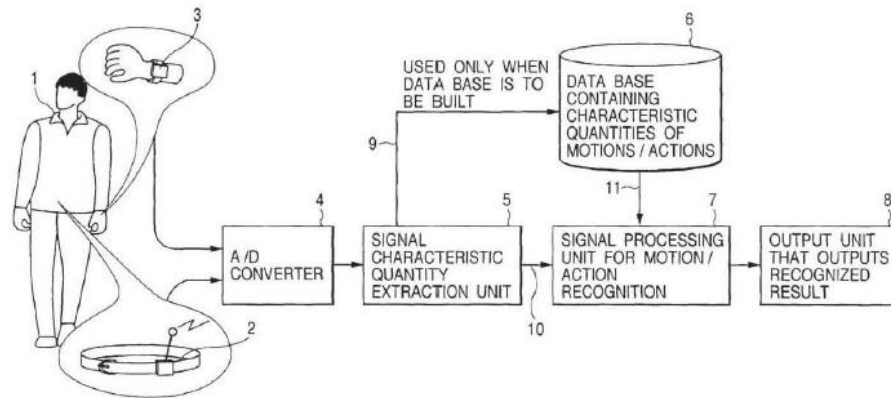


FIG. 2

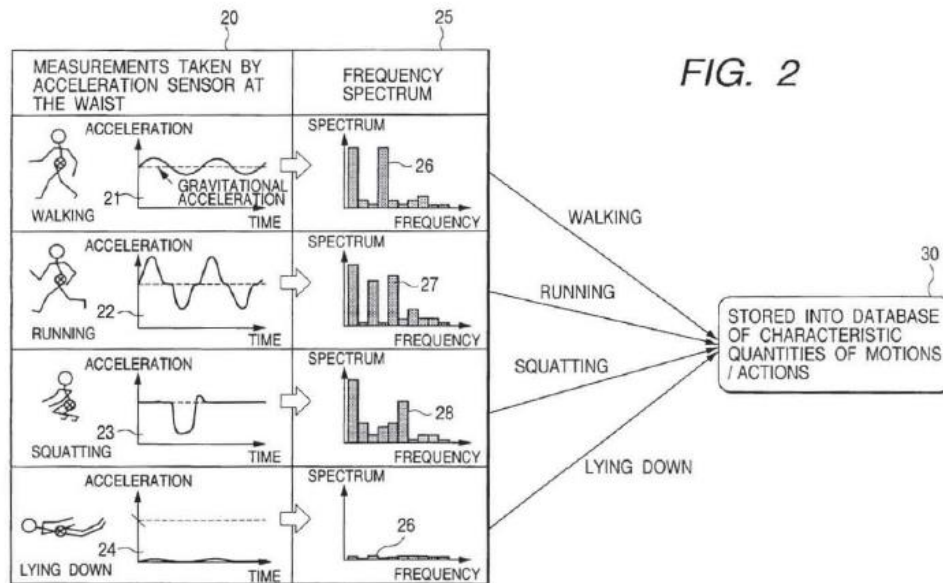


Figure 1 provides a block diagram of a motion and action recognition device, and Figure 2 depicts a view of outputs from an acceleration sensor attached to the waist of an object under observation. *Id.* at 4:23–25. The sensor in Figure 2 “takes measurements of acceleration applied to the human

body in the direction of its height,” and output results 20 indicate time series data derived from human motions, where “data items 21 and 22 denote cyclic acceleration changes during walking or running, data item 23 represents a single acceleration change, and data item 24 stands for a state of no acceleration in which gravitational acceleration is not detected because the object is lying down.” *Id.* at 6:31–37.

When discussing Figure 2, Unuma explains that “[a]fter the above data items [21-24] are digitized by the A/D converter 4 [shown in Figure 1], the digitized data are subjected to time-frequency analysis (e.g., Fourier transformation), which is a typical technique of signal analysis.” *Id.* at 6:38–39. The result of that time-frequency analysis “is a frequency spectrum body 25,” such that “data items 21 through 24 are matched with frequency spectra 26, 27, 28 and 29 respectively.” *Id.* at 6:39–41; Fig. 2. Unuma states that “[b]ar graphs of the analyzed result represent spectrum intensities of the frequency components acquired through Fourier transformation,” where “[t]he frequency characteristic differs from one motion to another,” and “[t]he differences constitute the characteristic quantities of the motions involved.” *Id.* at 6:41–43.

Unuma goes on to state:

With this embodiment, the characteristic quantities that serve as reference data used by the signal processing unit 7 for motion/action recognition are extracted and saved in advance from the motions and actions whose characteristic quantities are known. The reference data thus saved are stored into the characteristic quantity database 6 via a path 9 in Fig. 1 (process 30 in Fig. 2).

The signal processing unit 7 for motion/action recognition continuously receives characteristic quantity data 10 from the characteristic quantity extraction unit 5, the data 10

being derived from the ongoing motions/actions of the object 1 under observation. The data 10 are compared with the reference data 11 made up of the stored characteristic quantities of various motions/actions in the database 6. That is, the currently incoming characteristic quantity is correlated with the stored characteristic quantities in the database 6. At any point in time, the motion/action corresponding to the characteristic quantity having the highest level of correlation is judged to be the motion/action currently performed by the object 1 under observation. The judged result is output by the output unit 8.

Id. at 6:44–54.

Unuma also teaches that “[o]ne way of correlating measurements with reference data is shown illustratively in Fig. 29, but is not limited thereto.”

Id. at 6:55. That correlation involves “acquiring a frequency component $F(m)$ which corresponds to characteristic quantity data 10 in the form of measured waveform spectra representing the motions/actions of the object 1,” where data 10 is “normalized so as to satisfy” a particular expression (i.e., equation), as presented on page 7 of Unuma. *Id.* at 6:55–7:54 (referring to frequency component $F(m)$, corresponding to data 10, and frequency component $G(m)$, corresponding to reference data 11, and that both are “normalized”).

Figure 3 of Unuma is reproduced below:

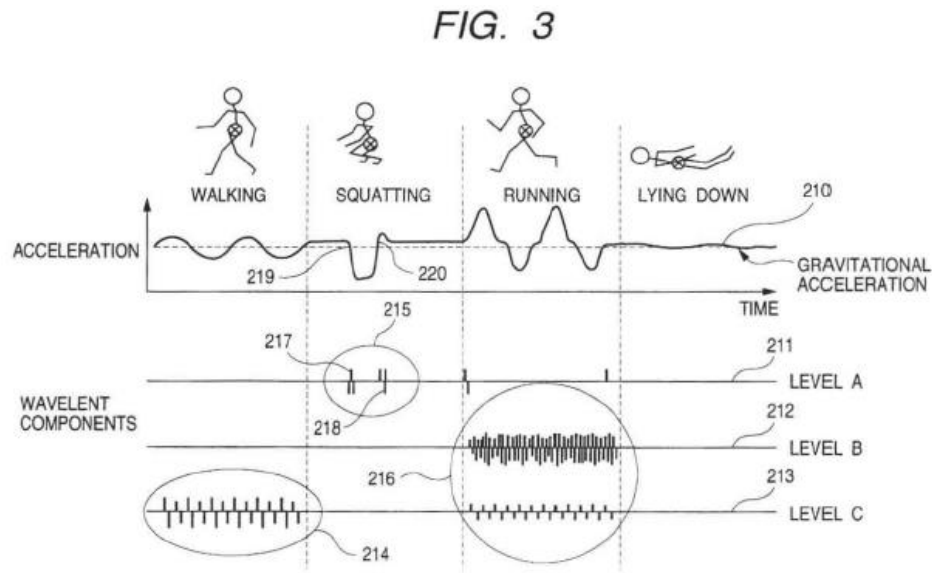


Figure 3 depicts “an explanatory view of typical results of time frequency analysis based on wavelet transformation.” Ex. 1003, 4:26. As presented in Figure 1, processing unit 7 compares data 10 with reference data 11 made up of “stored characteristic quantities of various motions/actions in . . . database 6.” *Id.* at 6:50–51. In accordance with a wavelet transformation analysis method illustrated in Figure 3, “a motion of ‘walk’ yields characteristic values 214 on level C (213),” “a ‘squatting’ motion produces characteristic values 215 on level A (211),” and “a ‘running’ motion generates characteristic values 216 on levels B (212) and C (213).” *Id.* at 8:14–16.

Unuma states that its system applies “to a setup where supervisors or custodians in charge of people who are socially vulnerable and need protection or of workers working in isolation are automatically notified of a dangerous situation into which their charge may fall for whatever reason.” *Id.* at 16:5–7. Unuma discloses that a processing unit stores and continuously monitors “history data” in reference to “motion patterns” held

in a specific motion pattern storage unit. *Id.* at 16:22–23. In this context, Unuma explains that:

A specific motion pattern is a combination of multiple motions necessary for recognizing a specific action such as “a sudden collapse onto the ground” or “a fall from an elevated location.”

For example, the action of “a sudden collapse onto the ground” is recognized as a motion pattern made up of a motion of “a walking or standing still posture” followed by a motion of “reaching the ground in a short time” which in turn is followed by a motion “lying still on the ground.” Similarly, the action of “a fall from an elevated location” is recognized as a motion pattern constituted by motions of “climbing,” “falling,” “hitting obstacles,” “reaching the ground” and “lying still,” occurring in that order.

Id. at 16:23–30.

In addition, Unuma discloses that its system allows “reporting or not reporting the recognized motion pattern depending on where the incident is observed,” which is “useful in averting a false alarm provoked by an apparent collapsing motion of the object under observation when in fact the object is lying on a couch for examination at a hospital or climbing onto the bed at home.” *Id.* at 17:3–7.

Unuma also presents Figures 33–36. Figures 33 and 36 are depicted below.

FIG. 33

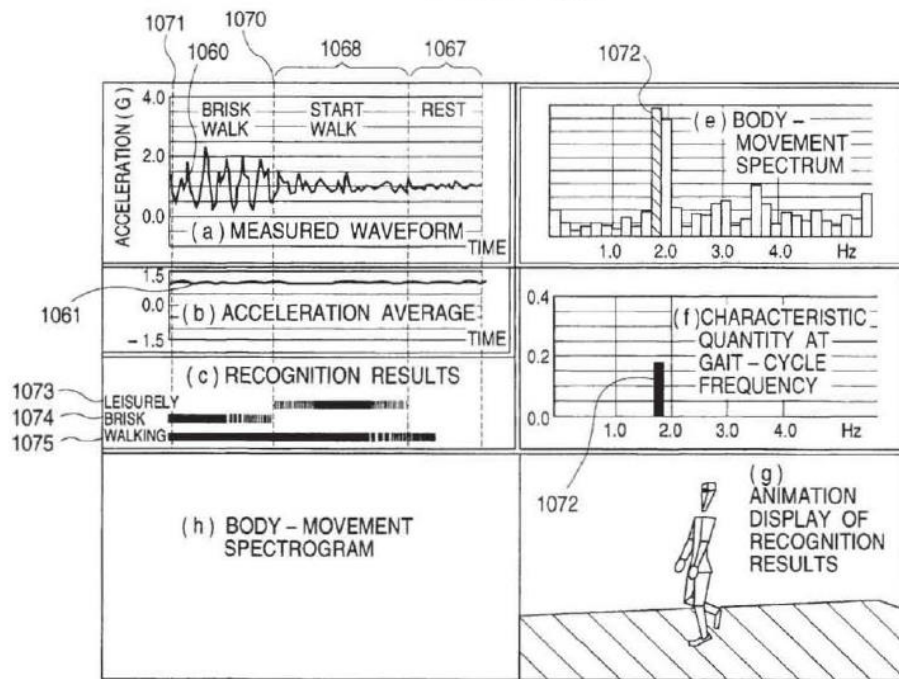
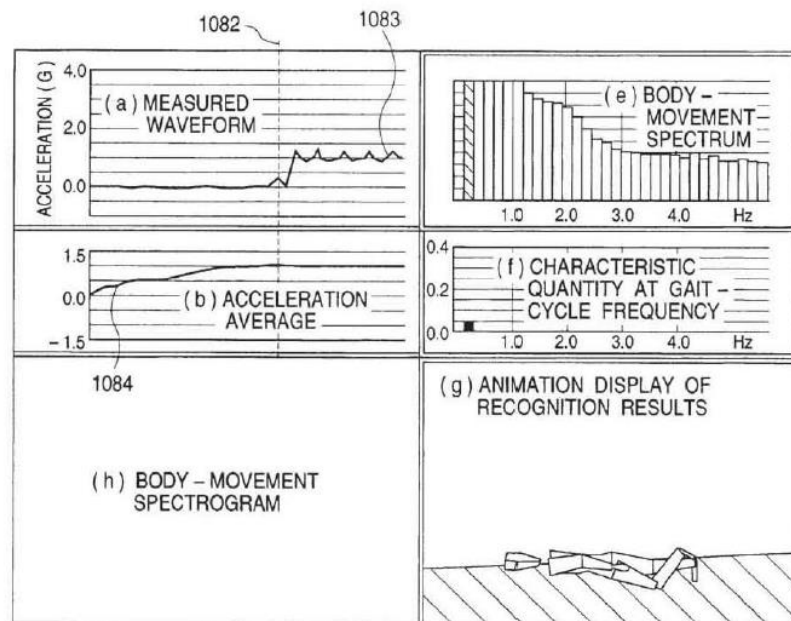


FIG. 36



Figures 33 and 36 each show “an example wherein a motion is recognized by using the method of recognition provided by the present invention,” where “a result of the recognition is displayed by animation using computer graphics.” *Id.* at 27:45–47. Specifically, diagram (a) in each figure shows a “measured waveform,” where the horizontal and vertical axes represent time and acceleration, respectively. *Id.* at 27:53–55. “[D]iagram (b) shows an average value of the measured waveform shown in the diagram (a) or the direct-current component of the waveform.” *Id.* at 27:56–58. Diagram (e) presents a body-movement spectrum “obtained as a result of carrying out a frequency analysis of the measured waveform shown in the diagram (a),” and diagram (g) “shows the result of the recognition by animation using computer graphics.” *Id.* at 28:1–30. In Figure 33, diagram (g) depicts a computer animation of a subject in a briskly walking motion; in Figure 36, diagram (g) depicts a subject in a state of a lying-down posture. *Id.* at Figs. 33, 36.

Unuma further presents Figure 43, shown below.

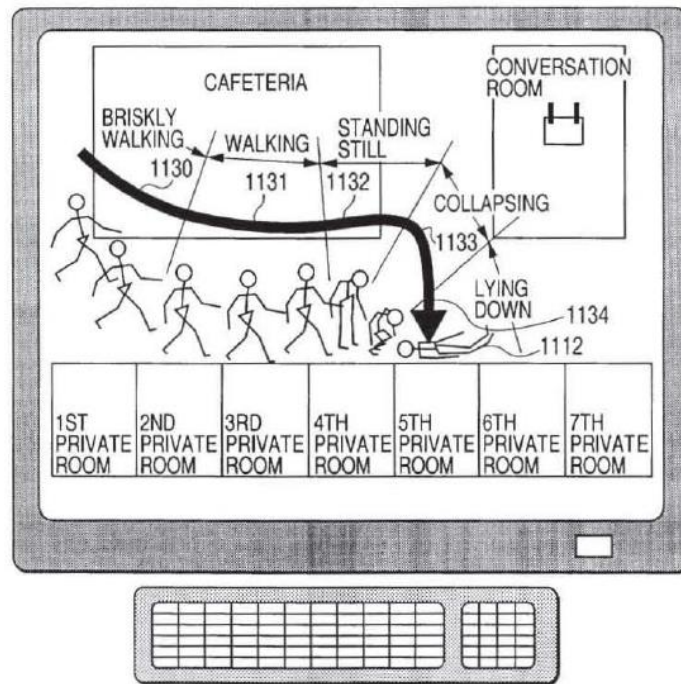


Figure 43 depicts a diagram showing a display of a sequence of motion states leading to an emergency. *Id.* at 5:47–48; 31:28–45. Figure 43 depicts time period 1130, during which a patient walks briskly; period 1131, during which the patient walks more slowly; period 1132, during which the patient stands still; period 1133, during which the patient collapses; and period 1134, during which the patient is “lying down and does not move any more.” *Id.* at 31:36–39. Unuma states that, by repeating the process, “a sequence of motion states leading to the event of an emergency can be displayed repeatedly.” *Id.* at 31:39–41.

In relation to Figures 47–49, Unuma teaches that the “state of a motion is recognized” (*id.* at 24:58) and, “[i]n addition, the gradient of a human body, that is, the state of the upright/leaning posture of the human body, can be recognized from an average value of variations in acceleration observed by an acceleration sensor. . . . The magnitude of the direct-current

component is used to find the gradient of the human body which is, in turn, utilized for forming a judgment on the state of the upright/leaning posture of the human body. *Id.* at 24:58–25:26.

2. *Analysis—claims 1–4, 8–12, 21–24, and 28–32*

Petitioner contends that claims 1–4, 8–12, 21–24, and 28–32 of the '461 patent would have been obvious over Unuma. Pet. 14–27, 44–60. Petitioner argues that all recited elements are disclosed in Unuma. *Id.* at 14. For example, Petitioner argues that Unuma discloses a system that evaluates movement of a body relative to an environment, e.g., a particular motion, action, and/or work of a patient. *Id.* at 14–15 (citing Ex. 1003, 30:30–32, 2:3–6, 13:47–49, Fig. 1; Ex. 1002 ¶ 43, App. C). Petitioner also contends that “signal processing unit 7” in Unuma corresponds to the “processor” of the challenged claims, and the “acceleration sensor,” associated with processing unit 7 in Unuma, corresponds to the recited “sensor for sensing dynamic and static accelerative phenomena” of the body. *Id.* at 15. We discuss particular claim limitations below.

a. *“processor operable to process said sensed dynamic and static accelerative phenomena as a function of at least one accelerative event characteristic”*

Petitioner argues that Unuma discloses continuous measurement of both dynamic and static acceleration of the body. *Id.* at 12–13 (citing Ex. 1003, 16:18–19, 16:26–30, 31:36–41, Figs. 3, 39, and 43). Petitioner contends the sensor in Figure 2, for example, “takes measurements of acceleration applied to the human body in the direction of its height.” *Id.* at 15. In addition, “[o]utput results 20 from the acceleration sensor indicate specific time series data items 21 through 24 derived from human motions of ‘walking,’ ‘running,’ ‘squatting’ and ‘lying down.’” *Id.* Petitioner also

points to “data item 24” as indicating “a state of no acceleration in which gravitational acceleration is not detected because the object is lying down.” *Id.*

Petitioner further contends that Unuma’s processing unit 7 senses the above-mentioned “dynamic and static (gravitational) acceleration of the body as a function of at least one accelerative event characteristic, as illustrated in Figs 2 and 3.” Pet. 16. As noted above, “accelerative event” means “occurrences of change in velocity of the body (or acceleration), whether in magnitude, direction or both, and including cessation or activity or inactivity.” Petitioner argues that Unuma’s processing unit 7 continuously receives characteristic quantity data 10 from characteristic quantity extraction unit 5, “the data 10 being derived from the ongoing motions/actions of the object” under observation. Pet. 16 (citing Ex. 1003, 6:48–50); Ex. 1003, Fig. 1. In relation to “ongoing motions/actions” data, the sensor in Unuma, as depicted in Figure 2, for example, “takes measurements of acceleration applied to the human body in the direction of its height,” and generates output results 20 that indicate the motions of “walking,” “running,” “squatting,” and “lying down.” *Id.* at 16–17 (citing Ex. 1003, 6:31–37, 16:31–34).

Patent Owner responds that the processor of Unuma only processes sensed dynamic acceleration information, but not both dynamic and static accelerative information/phenomena, as required in challenged independent claims 1 and 21. Specifically, Patent Owner asserts “[i]n using the accelerometer output illustrated in Figures 2 and 3, *Unuma* processes **only** dynamic acceleration to recognize motion patterns and disregards or filters out static acceleration.” PO Resp. 15. In support, Patent Owner relies on

teachings in Unuma and a declaration by Dr. Sturges (Ex. 2006). *Id.* at 14–23.

Patent Owner contends that the time frequency analysis used in Unuma, such as Fourier or wavelet transformation, uses “only the dynamic (vibration) component of the sensed total acceleration” to create the frequency spectrum shown in Figure 2 or the wavelet components shown in Figure 3. *Id.* at 16, 15–23 (citing Ex. 2006 ¶¶ 37–51, 56–58, 60–64, 72).

In support, in relation to Figure 3, for example, Patent Owner contends that “frequency components $F(m)$ and $G(m)$ form the sole basis for the comparison of the observed and reference motion using a correlation function $H(m)$.” *Id.* at 16–17 (referring to Ex. 1003, 6:55–7:50). According to Patent Owner, that comparison is what the processor 7 does when it processes data, and Unuma only processes frequency components generated from the dynamic acceleration information, and “does not suggest using any aspect of the sensed static acceleration data to correlate or recognize motions.” *Id.* at 16–17 (citing Ex. 2006 ¶¶ 48–50), 20 (stating that “static acceleration information is effectively filtered out, and is not employed”) (citing Ex. 2006 ¶¶ 39–42, 48). Patent Owner contends that “[e]ven with respect to lying down, the absence of wavelet components in Figure 3 merely indicates the absence of dynamic acceleration.” *Id.* at 17 (citing Ex. 2006 ¶ 49).

Patent Owner presents similar arguments regarding the “frequency analysis” depicted in Figure 2. PO Resp. 18–20. In relation to both Figures 2 and 3, Patent Owner repeats its contention that Unuma “teaches and encourages use of methods that filter out and disregard static acceleration.” PO Resp. 21 (Ex. 2006 ¶¶ 42, 47). According to Patent Owner (*id.* at 21–

23), Unuma does not “disclose or teach processing both dynamic and static acceleration to thereby determine whether motion is within environmental tolerance.” *Id.* at 23.

In a related fashion, Patent Owner further contends that Unuma does not teach or suggest “process[ing] . . . sensed dynamic and static accelerative phenomena *as a function of at least one accelerative event characteristic* to thereby determine whether said evaluated body movement is *within environmental tolerance*,” as recited in claims 1 and 21. *Id.* at 23. Patent Owner discusses how the claim term “accelerative events” refers to “occurrences of change in velocity of the body (or acceleration), whether in magnitude, direction or both.” *Id.* at 23–24. Patent Owner then argues that when Unuma normalizes “both the frequency components $F(m)$ of observed motion and the frequency components $G(m)$ of the reference motion,” that normalization removes “magnitude information” for the sensed dynamic acceleration. *Id.* at 24–25 (citing Ex. 1003, 6:55–7:15). Patent Owner also argues that Unuma’s “use of absolute values of the frequency component differences removes direction information from the sensed dynamic acceleration.” *Id.* at 25–28 (referring to Ex. 1003, 6:55–7:24, Fig. 29). Thus, according to Patent Owner, Unuma does not process the recited phenomena “as a function of at least one accelerative event characteristic.” Ex. 1001, claims 1 and 21.

The analysis by Patent Owner and its expert, Dr. Sturges, however, does not persuade us that Unuma fails to teach processing of sensed dynamic and static accelerative phenomena as a function of at least one accelerative event characteristic. For example, Unuma’s system obtains data from an acceleration sensor, such as data items 21–24 in Figure 2, or acceleration

changes 210 in Figure 3, for example—which include gravitational (static) acceleration information—and such data “are digitized by the A/D converter 4” and “subjected to time-frequency analysis.” Ex. 1003, 6:31–39. Patent Owner proposes that the digitation and/or time-frequency analysis causes all static data to be “effectively filtered out” before any comparison/processing step takes place. PO Resp. 20; *see also, id.* at 15, 17, 21.

In support, Patent Owner and its expert rely on disclosures in Unuma regarding “[o]ne way of correlating measurements with reference data [that] is shown illustratively in Fig. 29.” Ex. 1003, 6:55–7:54; PO Resp. 15, 17, 20, 21–28 (referring to Ex. 1003, 6:55–7:54); Ex. 2006 ¶¶ 42, 49. Patent Owner also cites to paragraphs in Dr. Sturges’ Declaration discussing an “average value T (denoted by reference numeral 2003) of the powers of all spectrum components excluding the direct-current component (that is, the 0th-order harmonic),” as depicted in Figure 47C. Exhibit 1003, 21:22–34; PO Resp. 19–20 (referring to Ex. 2006 ¶ 42, which cites Exhibit 1003, 21:22–34).

We agree with Petitioner, however, that other disclosures in Unuma describe processing both “static and dynamic components of the acceleration signal to determine both movement of the body and the ‘gradient’ (position) of the body relative to earth.” Reply 1–2. For instance, when discussing Figures 47–49, Unuma indicates that the “state of a motion is recognized” (Ex. 1003, 24:58), but also that “the gradient of a human body, that is, the state of the upright/leaning posture of the human body, can be recognized from an average value of variations in acceleration observed by an acceleration sensor.” Ex. 1003, 24:58–25:26. Unuma states that “[t]he magnitude of the direct-current component is used to find the gradient of the

human body which is, in turn, utilized for forming a judgment on the state of the upright/leaning posture of the human body.” Ex. 1003, 25:24–26; *see also* Ex. 1001, 7:16–28 (describing a “direct current (dc) voltage component” as corresponding “to an angle relative to earth (i.e., static acceleration component related to gravity”); Reply 2.

In addition, in Figures 33–36 of Unuma, “diagram (b) shows an average value of the measured waveform shown in the diagram (a) or the direct-current component of the waveform.” Ex. 1003, 27:56–28:1. We agree with Petitioner that Unuma’s teachings in relation to Figure 33 indicate “that an ‘acceleration average’, as shown in [diagram] (b), of the measured waveform can be calculated in order to analyze the static component of the waveform for purposes of determining the posture of the body relative to earth,” as depicted in diagram (g), which shows “the result of the recognition by animation using computer graphics,” i.e., body movement (dynamic acceleration) and posture (static acceleration). Reply 4; Ex. 1003, 28:1–30. Figure 36 depicts similar processing of such information, but presents a lying-down posture in diagram (g), rather than a brisk upright walking motion, as shown in diagram (g) in Figure 33.

Moreover, even to the extent that we were to agree that Unuma filters out static acceleration as part of its wavelet or frequency analysis, this in and of itself is an indication of processing, in that the processor would subject the static acceleration data to examination so as to filter it out. *See Merriam-Webster Dictionary* (defining “process” as “to subject to examination or analysis <computers *process* data>.”) (Ex. 3008). Accordingly, even if “the absence of wavelet components in Figure 3 merely indicates the absence of dynamic acceleration” “[e]ven with respect to lying down” (PO Resp. 17, 21

(citing Ex. 2006 ¶ 49)), for example, Unuma's processor would examine the static acceleration data so as to filter it out. Thus, even accepting the "filter out" argument by Petitioner, we find that Unuma processes both "sensed dynamic and static accelerative phenomena," as required in claims 1 and 21.

In addition, we agree with Petitioner that Unuma teaches or suggests, when discussing Figures 33–36, for example, processing "sensed dynamic and static accelerative phenomena as a function of at least one accelerative event characteristic" as recited in claim 1 and similarly recited in claim 21, i.e., teaches or suggests processing relevant accelerative phenomena as a function of magnitude and direction. Ex. 1003, 27:45–28:55; Reply 9.

As discussed above, in relation to its "normalization" position, Patent Owner refers us to "[o]ne way of correlating measurements with reference data [that] is shown illustratively in Fig. 29." Ex. 1003, 6:55–7:54; PO Resp. 16–17, 21–28 (referring to Ex. 1003, 6:55–7:54). Even assuming such "normalization" "scales all of the frequency component magnitudes so that the sum of all frequency components $F(m)$ is equal to 1 and the sum of all frequency components $G(m)$ is equal to 1" (PO Resp. 24), we are not persuaded that doing so eliminates any and all information regarding magnitude and direction from the sensed accelerations.

Petitioner presents responsive evidence that "the normalization data used by Unuma still has a magnitude, it is just in the form of a normalized magnitude." Reply 10 (citing Ex. 1015, 151:1–153:8) (Dr. Sturges agreeing "the sine is clearly used to get that average"); Ex. 1016 ¶¶ 24–26 (indicating that a "proper average cannot be calculated without using the magnitude and direction (up and down) of the waveform"). Petitioner also presents

evidence that the normalized magnitudes “distinguish between similarly normalized accelerative events.” Reply 10 (citing Ex. 1003, 16:26–30).

Moreover, the processing of such “normalized” information results in an output corresponding to dynamic and static accelerative information, as depicted by computer graphics or pictures of sensed objects, as shown in Figures 1, 33–36 and 43 in Unuma. Because the processing results in such an output, Unuma’s system must, at least in some capacity, “process” dynamic and static accelerative information as a function of occurrences of change in velocity or acceleration of the sensed body, in magnitude and/or direction. See Merriam-Webster Dictionary, available at <http://www.merriam-webster.com/dictionary/process> (defining “process” as “to take in and organize for use <Computers *process* data>”) (Ex. 3009).

We determine that Petitioner establishes sufficiently that Unuma teaches or suggests a “processor operable to process said sensed dynamic and static accelerative phenomena as a function of at least one accelerative event characteristic,” as recited in claim 1, and similarly recited in claim 21.

b. *“processor operable to process . . . accelerative phenomena as a function of . . . an environmental representation”*

We determine that Petitioner establishes sufficiently that Unuma discloses a processor operable to process the above-mentioned dynamic and static accelerative phenomena as a function of an environmental representation (e.g., a hospital), as recited in claims 1 and 21. Pet. 17 (citing Ex. 1003, 29:43–45); 12–13 (citing Ex. 1003, Figs. 39 and 43).

c. *“to thereby determine whether said evaluated body activity is within environmental tolerance”*

Petitioner contends that Unuma’s processor processes the recited phenomena, sensed as a function of an accelerative event characteristic and

an environmental representation, to determine “whether said evaluated body activity is within environmental tolerance” as recited in the challenged claims, “or, conversely, in an emergency state of collapse.” Pet. 17.

As Petitioner points out, Unuma’s system recognizes “a motion pattern made up of a motion of ‘a walking or standing still posture’ followed by a motion of ‘reaching the ground in a short time’ . . . followed by a motion ‘lying still on the ground’” as “the action of ‘a sudden collapse onto the ground.’” Pet. 17, 24–25 (citing Ex. 1003, 16:26–30, 13:26–34, Figs 39, 42 and 43). We agree with Petitioner that Unuma’s system makes a determination (in a hospital environment, for example) as to whether the body movement is indicative of an emergency state of collapse or, conversely, within environmental tolerance. *Id.* at 17–18. We also agree with Petitioner that the recognized motion pattern may, or may not, be reported as an emergency state of collapse “depending on where the incident is observed.” *Id.* at 17–18, 46 (citing Ex. 1003, 17:3–7).

Patent Owner contends that Unuma “merely attempts to recognize different types of motions through pattern matching, without regard for whether that body movement is within tolerance.” PO Resp. 28–30. Patent Owner contends that “mere recognition of movement as consistent with a fall is insufficient to determine whether such movement is acceptable, or within tolerance.” *Id.* at 29. Patent Owner also argues that Unuma indicates that some collapses result in false alarms, and that Unuma “suggests various techniques for verifying that an apparent collapse” is a state of emergency. *Id.* Thus, according to Patent Owner, Unuma fails to teach or suggest determining tolerability based on processing sensed static and dynamic acceleration. *Id.*

Patent Owner's contentions do not persuade us. In Figure 39, for example, Unuma discloses detecting whether a collapse corresponds to a state of emergency, which also involves determining whether body activity is within environmental tolerance, i.e., not in a state of emergency. Ex. 1003, 30:24–42, Fig. 39. When considering disclosures in Unuma regarding Figures 39 and 42, for example, we agree with Petitioner that “[a]t a minimum[,] a person of ordinary skill in the art would have found it obvious in view of Unuma's disclosed determinations regarding body movements within particular environments that trigger, for example, alarms and reports, to provide a determination of whether said evaluated body movement is within an environmental tolerance.” Pet. 18; *see also* Ex. 1003, 17:3–7 (discussing “reporting”). Moreover, we are persuaded that a determination of whether an evaluated body movement is “within an environmental tolerance” results from the previously described processing of sensed dynamic and static accelerative phenomena as a function of at least one accelerative event characteristic, as taught Unuma. Thus, we are persuaded that Unuma teaches or suggests the subject matter recited in the “thereby” language of the claims. *See* Oxford Dictionaries, available at http://www.oxforddictionaries.com/us/definition/american_english/thereby (defining “thereby” as “By that means; as a result of that”) (Ex. 3007).

We determine that Petitioner establishes sufficiently that Unuma teaches or suggests “to thereby determine whether said evaluated body activity is within environmental tolerance,” as recited in claims 1 and 21.

d. Conclusion regarding claims 1–4, 8–12, 21–24, and 28–32

We determine that Petitioner has shown by a preponderance of the evidence that Unuma teaches or suggests a system comprising all limitations

of independent claims 1 and 21. Claim 21 includes certain limitations also recited in claim 1, but claim 21 recites processing “*repeatedly* sensed dynamic and static accelerative phenomena of said body as a function of at least one accelerative event characteristic and an environmental representation.” Ex. 1001, 23:19–27 (emphasis added). In addition to the above, Petitioner points us to where Unuma teaches that “processing unit 7 for motion/action recognition *continuously receives characteristic quantity data 10* from the characteristic quantity extraction unit 5, the data 10 being *derived from the ongoing motions/actions* of the object 1 under observation.” Pet 23 (citing Ex. 1003, 6:48–50, 6:31–37, 16:31–34) (emphasis added). Petitioner adequately establishes that Unuma discloses the “repeatedly” component in claim 21.

In view of the foregoing, we determine Petitioner has established by a preponderance of the evidence that independent claims 1 and 21 would have been obvious over Unuma under 35 U.S.C. § 103(a).

We further determine that Petitioner has established by a preponderance of the evidence that that dependent claims 2–4, 8–12, 22–24, and 28–32 would have been obvious over Unuma under 35 U.S.C. § 103(a) for the reasons set forth in the Petition. See Pet. 11–27 (citing Ex. 1003, 8:41–45; 11:53–54, 6:31–37, Figs. 2, 3, 8 (claims 2, 22), 31:36–41, 4:26, Figs. 39, 43 (claims 3, 4, 9, 10, 23, 24, 29, 30), 23:51–56, 14:17–32, 13:26–33, 10:39–43, Fig. 42, 43 (claims 8, 28), 18:50–51, 31:36–41, Figs. 24, 39, 43 (claims 11, 31), 18:49–56, Fig. 24 (claims 12, 32); Ex. 1002 ¶¶ 49, 50, 52–69, App. C). Patent Owner does not present sufficient arguments to the contrary in relation to any of dependent claims 2–4, 8–12, 22–24, and 28–32

in particular, but rather focuses on limitations recited in the independent claims, as discussed and addressed above. PO Resp. 14–30.

C. Obviousness over Unuma in View of Hubert

Petitioner contends that dependent claims 5–7 and 25–27 would have been obvious over Unuma in view of Hubert. Pet. 27–31, 44–55.

1. Hubert (Ex. 1004)

Hubert discloses an individual monitoring device comprising a displacement detector, which supplies a “continuously variable signal dependent on positional changes of the device,” and an alarm device that is “activated in the absence of the signal supplied by the displacement detector.” Ex. 1004, 1:12–23. The alarm device is operatively connected to a processor “to provide an alarm in the absence for longer than a predetermined time of a signal due to the monitored person’s ‘normal’ movements.” *Id.* at Abstract.

Thus, the device transmits signals to a receiver while detected movements are “normal.” If such movements stop, after a certain amount of time (e.g., 10 seconds), the device transmits a signal warning the person that a central alarm will sound unless they move. If the person still does not react after another amount of time (e.g., 5 seconds), signal transmission to the receiver stops. When a receiver detects an absence of signals, it activates an alarm “with an indication of the place, for example, the working sector, where first aid must be given.” *Id.* at Abstract; 2:1–20; *see also id.* at 5:15–39 (describing the receiver circuit and activation of an alarm).

2. Analysis

Petitioner contends that Hubert provides the “warning signal” and “alarm signal” limitations of claims 5–7 and 25–27 lacking in Unuma’s

system. Pet. 28–31, 48–49, 54–55. Petitioner further contends that both Hubert and Unuma relate to systems using accelerometers for analyzing body activity relative to an environment for monitoring a person’s movements, and therefore, are analogous references relating to the same field of endeavor and particular problem. *Id.* at 27.

According to Petitioner, “[e]ach reference describes at least some of the advantages and features it provides such that a POSA [person of ordinary skill in the art] would have looked to one reference in order to modify or improve the other.” *Id.* at 27–28. Petitioner further contends that adding the recited warning and alarm features, as disclosed in Hubert, to Unuma’s system “would have been obvious to a POSA and provided the predic[t]able and beneficial result of [those features] in Unuma.” *Id.* at 28–30 (citing Ex. 1002 ¶¶ 91–98, App. C).

Patent Owner responds that Unuma does not disclose or teach one or more elements of independent claims 1 and 21, as discussed above, and, therefore, does not render the subject matter of any of their dependent claims obvious. PO Resp. 30.

We determine that Petitioner establishes by a preponderance of the evidence that Hubert and Unuma relate to similar systems, and that an ordinary artisan, reading both references, would have had reason to provide Hubert’s warning/alarm signals, as well as an ability to restart a time period of inactivity in relation to those signals, as recited in claims 5–7 and 25–27, to the system of Unuma. Pet. 27–31, 48–49, 54–55. For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that dependent claims 5–7 and 25–27 would have been obvious over Unuma in view of Hubert.

D. Obviousness over Unuma in View of Sellers

Petitioner contends that dependent claims 13 and 33 would have been obvious over Unuma in view of Sellers. Pet. 31–32, 44–57.

1. Sellers (Ex. 1005)

Sellers discloses an “ambulatory physiological monitor” that includes a disk cartridge for storing physiological data and analysis software. Ex. 1005, Abstract, 2:24–37. The monitor may include a wireless data modem for communicating with a remote computer system as to the patient’s condition through a cellular telephone. *Id.* at Abstract, 3:29–35, 8:1–16. Figure 7 in Sellers illustrates wireless data modem 28 and a cellular telephone site communicating with remote computer 110 through telephone network 120. Sellers discloses that “[c]ommunication through the telephone network 120 may utilize a dial-up line or may utilize the Internet.” *Id.* at 8:12–14.

2. Analysis

Petitioner contends that Sellers discloses communicating information on a monitored patient to a monitoring controller using the Internet. Pet. 31–32 (citing Ex. 1005, 8:11–16, Abstract, Figs. 1 and 7). Petitioner further contends that both Sellers and Unuma relate to monitoring systems using portable monitoring devices that monitor the state of a patient and communicate with a remote monitoring controller. *Id.* at 31. Thus, according to Petitioner, Sellers and Unuma are analogous references relating to the same field of endeavor and problem, and both disclose “at least some of the advantages and features,” such that an ordinary artisan “would have looked to one reference in order to modify or improve the other.” *Id.* Petitioner also contends that “adding communication through the Internet to

Unuma, as taught by Sellers,” would have provided “the predic[t]able and beneficial result of sending the information using an available and reliable communication system.” *Id.* at 32.

Patent Owner responds that Unuma does not disclose or teach one or more elements of independent claims 1 and 21, and, therefore, does not render the subject matter of any of their dependent claims obvious. PO Resp. 30–31.

Upon consideration of teachings identified by Petitioner in both cited references, we determine that Petitioner establishes by a preponderance of the evidence that that Sellers and Unuma relate to similar systems, and that an ordinary artisan, reading both references, would have had reason to provide Seller’s ability to communicate information relating to “tolerance indicia,” e.g., information relating to a patient falling, through the Internet, as recited in claims 13 and 33, to the system of Unuma. Pet. 31–32, 51, 56–57.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that that claims 13 and 33 would have been obvious over Unuma in view of Sellers.

E. Obviousness over Unuma in View of Kurokawa

Petitioner contends that dependent claims 14, 15, 34, and 35 would have been obvious over Unuma in view of Kurokawa. Pet. 32–36, 44–57.

1. Kurokawa (Ex. 1006)

Kurokawa discloses a “walking observation method” that comprises detecting acceleration during walking using a sensor worn by an individual, judging output signals from the sensor “or their processed data” according to preset judgment conditions, and “affirming abnormal walking,” e.g.,

staggering, stumbling, and/or falling, if judgment conditions are all satisfied. Ex. 1006, 2:2–6, 4:14–26. Kurokawa discloses that the number and type of occurrences of abnormal walking can be stored in a memory card. *Id.* at 6:15–27. In this context, Kurokawa discloses that “statistical processing and/or analytical processing can be conducted and even printout can be made if necessary by demounting the memory card 40c and transferring the stored data to a computer.” *Id.* at 10:25–11:3. Kurokawa further discloses that “depending on whether the absolute value of the number of occurrences is great” or has “a tendency to relatively increase, it is possible to catch abnormal signs characteristic . . . and predict dementia, weakened legs/hips, and/or the like beforehand, and treat the aged properly.” *Id.*

2. Analysis

Petitioner contends that Kurokawa discloses a monitoring system that generates statistics, as recited in claims 14 and 34. Pet. 33 (citing Ex. 1006, 10:25–11:3, 6:15–27). Petitioner further contends that “Kurokawa and Unuma are both directed to monitoring bodies using accelerometers,” and adding the feature of generating statistics to Unuma “would have provided the predic[t]able result of a monitoring controller that provides statistics for use in further analyzing the activity of the body.” *Id.* at 33–34.

In relation to claims 15 and 35, Petitioner contends that it would have been obvious to use statistical information to modify the environmental representation, for example, to “treat the aged properly,” as disclosed in Kurokawa. *Id.* at 34; Ex. 1006, 10:25–11:3, 6:15–27. According to Petitioner, it would have been obvious to do so “by customizing the rehabilitation applications of Unuma to match the progress/lack of progress of the person being treated, or by adjusting an athlete’s training program

based on statistical training data ‘with reference to desired performance levels,’” as disclosed in Unuma. Pet. 34; Ex. 1003, 14:17–32. Petitioner contends that the modification would have been obvious because Unuma discloses “modifying the environmental representation based on the movement of the body under observation,” for example, where it discloses “the recognized motion of ‘climbing the ladder’ allows the environment in which the subject (i.e., service engineer at the plant) is placed to be estimated as an elevated location.” Pet. 34–35 (quoting Ex. 1003, 13:26–33). Petitioner also contends that adding features disclosed in Kurokawa to Unuma would have provided a predictable result, for example, “to suit a particular patient’s rehabilitation program or a particular athlete’s training program based on the individual’s progress/lack of progress.” *Id.* at 35 (citing 1003, 14:17–32; Ex. 1002 ¶ 118).

Patent Owner responds that Unuma does not disclose or teach one or more elements of independent claims 1 and 21, and, therefore, does not render the subject matter of any of their dependent claims obvious. PO Resp. 31.

As discussed above, the ’461 patent defines “environmental representation” to mean “any mathematical or other suitable depiction, delineation, model or like measured description of the environment associated with the body.” Ex. 1001, 3:15–19. We determine that Petitioner establishes by a preponderance of the evidence that Kurokawa and Unuma relate to similar systems, and that an ordinary artisan, reading both references, would have had reason to provide Kurokawa’s ability to generate statistics, as recited in claims 14 and 34, and modify an “environmental representation” based on those statistics, as recited in claims 15 and 35, to

the system of Unuma. Pet. 32–36, 51, 56–57 (citing Kurokawa, 4:14–26, 6:15–27, 10:25–11:3, Fig. 5).

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claims 14, 15, 34, and 35 would have been obvious over Unuma in view of Kurokawa.

F. Obviousness over Unuma in View of Okuno

Petitioner contends that dependent claims 16, 17, 36, and 37 would have been obvious over Unuma in view of Okuno. Pet. 36–38, 44–58.

1. Okuno (Ex. 1007)

Okuno discloses a “whereabouts detection system.” Ex. 1007, Abstract, ¶¶ 4–6. The system is a mobile remote handset apparatus that comprises a GPS receiver for receiving signals to detect current position information, a sensor that detects “emergency situation information,” e.g., that a person is falling down, a control apparatus into which information detected by the GPS receiver and sensor are input, and a wireless communication apparatus that transmits information to the control apparatus. *Id.* In addition, Okuno discloses that the sensor comprises acceleration sensors. *Id.* at ¶ 5. Okuno further discloses that “power supply 15 such as a lithium rechargeable battery and/or the like is housed in the body housing 16 of the remote handset apparatus 5.” *Id.* at ¶ 19. Voltage is measured, and results of those measurements are provided to the control apparatus, which can modify function to extend life of the power supply. *Id.*

2. Analysis

Petitioner contends that Okuno discloses a mobile handset for monitoring the activity of a person and transmitting wirelessly “emergency situation information.” Pet. 36. Petitioner contends that Okuno’s device

includes a sensor that comprises acceleration sensors for detecting emergency situations, such as a person falling down. *Id.* (citing Ex. 1007, Abstract, ¶ 5, Fig. 4). Petitioner argues that Okuno and Unuma generally relate to similar devices comprising accelerometers to monitor body activity, and therefore are analogous. *Id.* Petitioner contends that each reference describes at least some advantages and features it provides, so that an ordinary artisan “would have looked to one reference in order to modify or improve the other.” *Id.* at 36–38.

Patent Owner responds that Unuma does not disclose or teach one or more elements of independent claims 1 and 21, and, therefore, does not render the subject matter of any of their dependent claims obvious. PO Resp. 32.

Upon consideration of teachings identified by Petitioner in both cited references, we determine that Petitioner sufficiently establishes that Okuno and Unuma relate to similar systems, and that an ordinary artisan, reading both references, would have had reason to provide Okuno’s power supply and a processor’s ability to manage power supply consumption, as recited in claims 16, 17, 36, and 37, to the system of Unuma. Pet. 36–38, 52, 57.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claims 16, 17, 36, and 37 would have been obvious over Unuma in view of Okuno.

G. Obviousness over Unuma in View of Nitta

Petitioner contends that claims 18, 38, 41, 43, 44, 56, 61, 62, and 64 would have been obvious over Unuma in view of Nitta. Pet. 38–60.

1. Nitta (Ex. 1008)

Nitta discloses a hand-held, accelerometer-based device used to control on-screen animated characters presented on a computer display. Ex. 1008, Abstract, 1:5–11. Nitta teaches an embodiment that is “orientation irrelevant,” where “accelerations are normalized to the local gravitational field vector both to provide a stationary reference for the analysis of the accelerations regardless of the orientation of the device within the hand, and also to resolve any aliasing or 180 degree ambiguity.” *Id.* at 3:60–65. In one embodiment, “accelerations in the X and Y directions are referenced to the local gravity vector, making it unnecessary to ascertain the orientation” of the device. *Id.* at 4:52–58, 6:61–65, Fig. 2. In relation to an embodiment, Nitta describes that “data below 0.1 hertz is deemed to be gravitational data, whereas the data above 0.1 hertz is deemed to be user data,” and that “all the data can be represented as an X, Y vector with the gravity information being in a given direction and the user data in another direction.” *Id.* at 8:32–33.

2. Analysis

Petitioner contends that Nitta teaches how to determine whether an evaluated body activity is within environmental tolerance, independent of a starting attitude of the sensor, as recited in claims 18, 38, and 61. Pet. 39. Petitioner also contends that “Nitta and Unuma generally relate to similar technology involving portable electronic devices comprising accelerometers to detect and evaluate a user’s movement,” and therefore are analogous art, and an ordinary artisan “would have looked to one reference in order to modify or improve the other.” *Id.* For example, according to Petitioner, it would have been obvious to an ordinary artisan to provide Unuma’s processor with Nitta’s feature of making a device orientation irrelevant “so

that environmental tolerance determinations can be made without the need to consider and account for the starting attitude of the sensor worn by the user.” *Id.* at 39–40.

In relation to independent claims 41 and 62, and corresponding challenged dependent claims, Petitioner persuades us that Unuma discloses nearly all elements of the claims, as discussed above in relation to claims 1 and 21. Pet. 39–44. For example, Petitioner discusses sensing accelerative phenomena of a body “relative to a three dimensional frame of reference” in the environment, as recited in claim 41. *Id.* at 40. In relation to this limitation, Petitioner points us to where Unuma discloses an embodiment “using measurements taken on a single axis in the object’s vertical direction for purpose of simplification and illustration,” but also that “[m]easurements taken in other directions, such as acceleration changes measured in the crosswise and lengthwise directions, may also be subjected to the process of characteristic quantity extraction.” Ex. 1003, 8:41–45; Pet. 18–19 (citing Ex. 1003, 8:41–45, 11:53–54, Fig. 8), 25–26, 40–41.

Petitioner further contends that Nitta discloses the feature of determining whether a body “has experienced dynamic acceleration due to external forces by subtracting a value of gravitational acceleration from the total acceleration experienced by said body,” as recited in the last clauses of independent claims 41 and 62. Pet. 41, 43–44, 58–60 (citing Ex. 1008, 8:32–43; 10:9–13, Figs. 5 and 6).

Patent Owner responds that claim 18 depends from claim 1 and claim 38 depends from claim 21, and “therefore each include all limitations of its respective base claim.” PO Resp. 32. Patent Owner further contends that, like claims 1 and 21, claims 41, 43, 44, 56, 61, 62, and 64 “all require that

the claimed systems and methods process sensed accelerative data as a function of an accelerative event characteristic (based on magnitude and/or direction of acceleration) to determine whether evaluated body movement is within environmental tolerance.” *Id.* at 32–33. Citing the same arguments discussed above regarding magnitude and directional information from the sensed dynamic acceleration (*id.* at 23–28), Patent Owner contends that Unuma fails to teach or suggest the processing accelerative phenomena “as a function of at least one accelerative event characteristic,” as recited in claims 41, 43, 44, 56, 61, 62, and 64.

For the reasons discussed above in relation to claims 1 and 21, Petitioner sufficiently establishes that Unuma teaches or suggests the processing of accelerative phenomena “as a function of at least one accelerative event characteristic.” In addition, Petitioner sufficiently establishes that Nitta and Unuma both relate to accelerometer-based devices. As Petitioner points out (Pet. 39–40), Nitta discloses mechanisms to make movement detection by the device “independent of device orientation” (Ex. 1008, 3:60–65, 4:52–58, 8:32–48), which would be “independent of a starting attitude” of a sensor, as recited in claims 18, 38, and 61. Petitioner establishes adequately that an ordinary artisan would have had reason to include such mechanisms in Unuma’s device.

As further noted by Petitioner, Nitta discloses, as part of such a mechanism, that gravity is “subtracted off via a high-pass filter function 112 to reference the accelerations to the local gravitational field.” Ex. 1008, 10:9–13, Pet. 41–42.

We determine that Petitioner establishes by a preponderance of the evidence that this teaching in Nitta corresponds to “subtracting a value of

gravitational acceleration from the total acceleration experienced by said body,” as recited in claims 41 and 62, and that an ordinary artisan, reading both references, would have had reason to provide such a mechanism, as taught in Nitta, to the system of Unuma. Pet. 40–43, 58, 59–60; Ex. 1002, ¶¶ 137–166, App. C.

For the reasons discussed above, Petitioner has shown by a preponderance of the evidence that claims 18, 38, 41, 43, 44, 56, 61, 62, and 64 would have been obvious over Unuma in view of Nitta.

III. PATENT OWNER’S MOTION TO EXCLUDE EVIDENCE

The party moving to exclude evidence bears the burden of proof to establish that it is entitled to the relief requested, e.g., that the material sought to be excluded is inadmissible under the Federal Rules of Evidence. See 37 C.F.R. §§ 42.20(c), 42.62(a).

Patent Owner moves to exclude paragraphs 10–11 of Exhibit 1016 (Reply declaration testimony of Petitioner’s expert, Dr. Welch) as presenting “legal arguments, not technical ones; therefore, this witness is not qualified to offer them.” Mot. Excl. 2. Patent Owner also argues that those paragraphs comprise new claim construction arguments regarding “what is required to ‘process’ sensed static and dynamic accelerative phenomena in the context of claim 1.” *Id.* at 1. According to Patent Owner, the paragraphs Petitioner should have presented such arguments in the Petition. Mot. Excl. 1–2 (citing 37 C.F.R. § 42.104(b)(3); 77 Fed. Reg. 48,756, 48,768; *The Scotts Co. v. Encap, LLC*, IPR2013-00110, Paper 79, 5–6 (PTAB June 24, 2014)).

Petitioner opposes and argues that “[a] motion to exclude is not a mechanism to argue that a reply contains new arguments.” Opp. Mot. Excl.

2 (citing *Vibrant Media, Inc. v. General Electric Co.*, IPR2013-00170, Paper 56, 31 (PTAB June 26, 2014)). Petitioner further argues that it properly submitted Dr. Welch’s Reply declaration testimony in direct response to arguments and evidence raised by Patent Owner in its Response. *Id.* More particularly, Petitioner points out that Patent Owner affirmatively asserts, in its Patent Owner Response, that Unuma “does not teach processing dynamic and static acceleration using criteria including specified values for magnitude or direction of accelerative events to evaluate body movement.” *Id.* 2–3 (quoting PO Resp. 24).

Patent Owner also moves to exclude paragraphs 12–16, 18, 22, 24–27, and 36 of Exhibit 1016 as comprising new arguments discussing new portions of Unuma that were not presented in the Petition nor Dr. Welch’s opening declaration (Exhibit 1002). Mot. Excl. 3. More particularly, Patent Owner argues that those paragraphs discuss Figs. 5(b), 33–36, and 48 along with their accompanying text in Unuma, but neither the Petition nor Patent Owner’s Response examine those portions of Unuma. *Id.*

Petitioner opposes and argues that Dr. Welch’s Reply declaration testimony is directly responsive to Patent Owner’s assertion that Unuma “does not ‘disclose or teach processing static acceleration’” (Opp. Mot. Excl. at 3 (quoting PO Resp. 1)) or “teach processing dynamic and static acceleration using criteria including specified values for magnitude or direction of accelerative events to evaluate body movement” (*id.* (quoting PO Resp. 24)).

As Petitioner points out, normally, a motion to exclude is available to parties to explain why certain evidence is inadmissible, and is not the proper place to raise arguments regarding the scope of a reply. Trial Practice

Guide, 77 Fed. Reg. 48756, 48767 (Aug. 14, 2012); *Liberty Mutual Insurance Co. v. Progressive Casualty Insurance Co.*, Case No. CBM2012-00002, Paper 66, slip op. at 62 (PTAB Jan. 23, 2014) (stating that a motion to exclude “is not a mechanism to argue that a reply contains new arguments or relies on evidence necessary to make out a prima facie case”). That said, rather than deny Patent Owner’s motion on that basis, we address the points raised in the Motion to Exclude to clarify the issues raised therein.

As an initial matter, we do not rely on paragraphs 10 and 11 of Ex. 1016 when making our decision here. Moreover, we determine that Patent Owner’s Response contains affirmative contentions that Unuma fails to disclose sensing static acceleration, processing an acceleration phenomenon as a function of an accelerative event characteristic, or determining whether body movement is within environmental tolerance (*see, e.g.*, PO Resp. 1–2, 14–30). Such contentions differ from mere argument that Petitioner has failed to offer adequate evidence in its Petition to establish that Unuma discloses the subject matter of recited elements in the challenged claims. Thus, we determine that Petitioner properly submitted paragraphs 12–16, 18, 22, 24–27 of Dr. Welch’s Reply declaration to rebut Patent Owner’s arguments made in its Patent Owner Response. Accordingly, we deny Patent Owner’s Motion to Exclude.

IV. NOTICE REGARDING NEW ARGUMENTS AND BELATED SUPPORT

Patent Owner filed a “Notice Regarding New Arguments and Belated Support.” Paper 28. Patent Owner contends that certain pages of Petitioner’s Reply include new arguments regarding how Petitioner contends Unuma (i) “processes static acceleration;” (ii) “discloses processing

magnitude and direction of acceleration” and (iii) “discloses using tolerances.” *Id.* at 1. Patent Owner further contends that certain pages of Petitioner’s Reply rely on certain portions of Unuma “not cited or mentioned in their Petition or supporting declaration.” *Id.* Patent Owner contends that it “had no opportunity to respond [to] or address in its Response or responsive evidence” these new arguments and evidence. *Id.* at 1.

Petitioner filed a Response to Patent Owner’s Notice, in which Petitioner asserts that its arguments “are directly responsive to PO’s assertion that Unuma does not ‘disclose or teach processing static acceleration,’” and “‘does not teach processing dynamic and static acceleration using criteria including specified values for magnitude and/or direction of accelerative events to evaluate body movement.’” Paper 30, 1–2 (quoting PO Resp. 1, 24).

During trial, we stated that “[i]n rendering its Final Written Decision, the Board will determine what weight, if any, is to be given to all of the presented evidence and arguments in accordance with the rules of the Board.” Paper 23, 3.

The mere fact that a petitioner submits rebuttal testimony that relies on new evidence not previously identified in the petition does not suffice to establish its impropriety. The very nature of a reply is to rebut the patent owner’s response. 37 C.F.R. § 42.23(b). As described above in connection with our analysis of Patent Owner’s Motion to Exclude, we determine that Petitioner’s reliance on the identified arguments and evidence was responsive to arguments raised in the Patent Owner Response as to the entirety of the teachings of Unuma, and accordingly, have given appropriate

consideration to the identified arguments and evidence relating to contentions regarding Unuma.

V. CONCLUSION

Taking account of the arguments and evidence presented during trial, we determine that Petitioner establishes by a preponderance of the evidence that claims 1–18, 21–38, 41, 43, 44, 56, 61, 62, and 64 of the '461 patent are unpatentable based on the following grounds of obviousness under 35 U.S.C. § 103(a):

- A. Claims 1–4, 8–12, 21–24 and 28–32 are unpatentable as obvious over Unuma;
- B. Claims 5–7 and 25–27 are unpatentable as obvious over Unuma and Hubert;
- C. Claims 13 and 33 are unpatentable as obvious over Unuma and Sellers;
- D. Claims 14, 15, 34 and 35 are unpatentable as obvious over Unuma and Kurokawa;
- E. Claims 16, 17, 36, and 37 are unpatentable as obvious over Unuma and Okuno; and
- F. Claims 18, 38, 41, 43, 44, 56, 61, 62 and 64 are unpatentable as obvious over Unuma and Nitta.

VI. ORDER

For the foregoing reasons, it is

ORDERED that claims 1–18, 21–38, 41, 43, 44, 56, 61, 62, and 64 of the '461 patent are unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude is denied; and

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

IPR2015-00113
Patent 7,145,461 B2

PETITIONER:

Joseph S. Presta
Robert W. Faris
Nixon & Vanderhye, P.C.
jsp@nixonvan.com
rfaris@nixonvan.com

PATENT OWNER:

Daniel Venglarik
David Doyle
Munck, Wilson, Mandala, LLP
dvenglarik@munckwilson.com
ddoyle@munckwilson.com