

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

AMERICAN GNC CORPORATION,
Patent Owner

IPR2024-00668
U.S. Patent No. 6,671,648 B1

**PATENT OWNER AMERICAN GNC'S RESPONSE
UNDER 37 C.F.R. §42.107**

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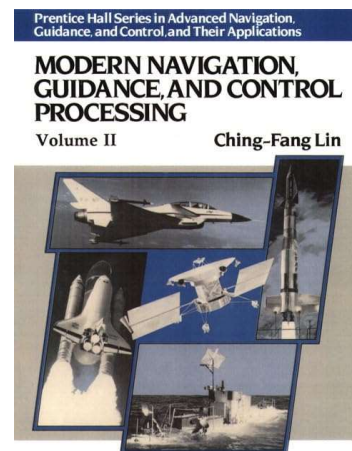
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EX2001	Declaration of Corey Johanningmeier in Support of Motion for <i>Pro Hac Vice</i> Admission
EX2002	Brochure, American GNC Corporation
EX2003	Webpage, AGNC Founder, <i>available at</i> https://www.americangnc.com/ceo/Founder.htm (accessed June 6, 2024)
EX2004	Excerpts from Ching-Fang Lin, “Modern Navigation, Guidance, and Control Processing,” Prentice Hall, 1991
EX2005	Excerpts from Inventor Notebook of Hiram McCall, Feb. 6, 1999 to Dec. 14, 1999
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EX2008	Declaration of Professor Lawrence Larson, Ph.D. under 37 C.F.R. § 1.68 in support of Patent Owner's Preliminary Responses in IPR2024-00667 & -00668.
EX2009	<i>Curriculum Vitae</i> of Professor Larson
EX2010	Marco Cassis, “Intelligent Sensing: Enabling the Next ‘Automation Age,’” ISSCC 2022, Feb. 21, 2022
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EX2019 (new)	Declaration of Professor Lawrence Larson, Ph.D. in support of Patent Owner's Response in IPR2023-00697 and -00698
EX2020 (new)	Deposition Transcript of Dr. Darrin Young – December 13, 2024
EX2021 (new)	Exhibit 6 from Deposition of Dr. Darrin Young – U.S. Patent No. 8,634,924
EX2022 (new)	Exhibit 7 from Deposition of Dr. Darrin Young – Image of Laser Ring Gyroscope
EX2023 (new)	Declaration of Hiram McCall in support of Patent Owner's Response in IPR2023-00697 and -00698
EX2024 (new)	Excerpts from Weekly Status Reports of Hiram McCall
EX2025 (new)	Image of MEMS gyroscope in ST Microelectronics IMU chip from disassembled Nintendo Switch product

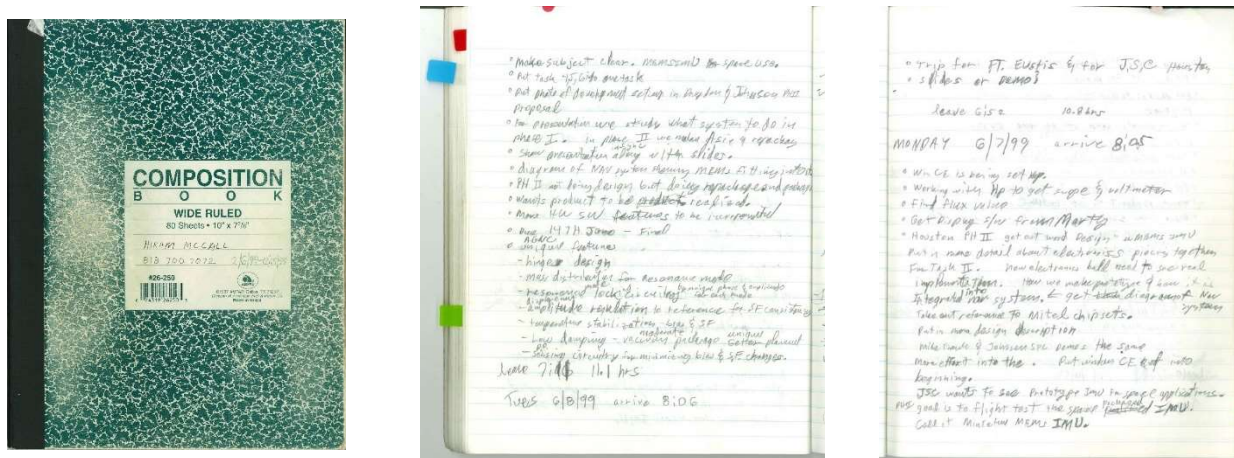
Patent Owner American GNC Corp. (“American GNC”) respectfully submits this Response to Nintendo Co., Ltd.’s and Nintendo of America Inc.’s (“Nintendo” or “Petitioner”) above-captioned Petition for *Inter Partes* Review of United States Patent No. 6,671,648 (“the ’648 Patent”).

I. Introduction

Twenty-five years ago, American GNC, and its Founder and Co-inventors, were at the forefront of integrating microelectromechanical systems (MEMS) sensor technology into working, commercially and technically viable guidance and navigation products. EX2002. Founder and Co-inventor Dr. Ching-Fang Lin was an acknowledged expert in the field, who taught at the Universities of Michigan and Wisconsin, published hundreds of technical papers, invented and filed over one hundred patent applications, and wrote highly regarded books about guidance, navigation, and control systems. EX2003; EX2004:



In 1999, Engineer and Co-inventor Hiram McCall was working at American GNC as a specialist in embedded control systems electronics. EX2023. His inventor notebooks from the time reflect the development of specialized electronic control circuitry for MEMS inertial sensors, and what would become the world's first MEMS rate-integrating gyroscope product, and a complete, technically and commercially viable MEMS Inertial Measurement Unit. EX2005:



This foundational work by American GNC in the electronic control of MEMS sensors solved the problem of poor performance of such sensors due to circuit limitations—for example, the angular rate output signal had been unstable and would drift beyond what is tolerable for most applications. Major research institutions and corporations—such as NASA Jet Propulsion Laboratories, Draper Laboratory, Hughes, Boeing, Lockheed Martin, Honeywell, and others—were working on aspects of this problem. See, e.g., EX2023, ¶¶21-23. But American

GNC's expertise helped it to discover and patent solutions others had not yet found or disclosed. *Id.*, ¶¶5-14.

American GNC worked diligently to patent its innovative techniques, thereby disclosing them to the public, and to develop and commercialize products based on the inventions. *Id.*, ¶¶15-20. American GNC filed its first patent applications for its gyroscope and Inertial Measurement Unit (IMU) inventions beginning in the late summer and early fall of 1999. *See, e.g.*, EX2006.

The application that became the '648 Patent was among the first, foundational patents in the field. Since it was filed, the '648 Patent has been cited by Examiners and inventors over seventy times—across the industry in the patent applications of STMicroelectronics, Raytheon, Honeywell, TDK/Invensense, Motorola, Northrop Grumman, Draper Labs, and others. *See* <https://patents.google.com/patent/US6671648B2/en?q=6671648#citedBy>.¹

Commercialization of MEMS Inertial Measurement Unit technology continued from American GNC's early technological successes. Decades later, the technology is commonly found in consumer electronics such as watches, fitness monitors, guidance and navigation devices, drones, smartphones and tablets—as well as in video game consoles and controllers such as Nintendo's, where it enables motion sensing capability critical to customer experience of those

¹ American GNC has 79 patents that together are cited over 1600 times. EX2002.

systems and of many of Nintendo's most popular game titles. EX2007, ¶¶16-38.

The '648 Patent—along with the '122 Patent also asserted against Nintendo and subject to co-pending Petition numbered IPR2024-00667—has been successfully licensed to numerous companies and industry associations, both with and without litigation to demonstrate its validity and infringement. The '648 Patent has been asserted in litigation against GoPro, Bosch, LG, ZTE Corp., OnePlus, and STMicroelectronics. *See, e.g.,* Petition, 1. None of those companies, nor any other potential licensee, ever filed an IPR or other Patent Office challenge to the '648 Patent.

American GNC first put Nintendo on notice of its infringement in early 2017. *See* EX2007, ¶¶39-44. Nintendo continued to use American GNC's inventions claimed in the '648 Patent, without royalty or license, until the patent expired. *Id.; see also id.*, ¶¶84-102 (demonstrating evidence of infringement). After American GNC brought its lawsuit seeking a royalty for that use, Nintendo waited as long as possible under the statute, and then filed the present Petition.

Nintendo's Petition completely ignores the twenty-five years of evidence of inventiveness and non-obviousness of the presumptively valid '648 Patent summarized above and in American GNC's Complaint. *See* EX2007, ¶¶16-38; EX2023, ¶¶19-23. Nintendo now asks the Board to go back twenty-five years and invalidate the long-expired patent—alleging hindsight-infected obviousness, with

a Frankenstein collection of parts from eight different prior art references arranged four different ways, and improperly relying on the patent itself as a roadmap. Petition, 4.

As explained below in Sections III-V, Nintendo’s obviousness analysis is fundamentally flawed in multiple ways. Nintendo assembles pieces of references into a mosaic modeled after the claims, but fails to demonstrate the required motivations to combine those disparate components. The arguments in the Petition/Declaration are, in critical portions, entirely conclusory and unsupported—and have been rebutted by testimony, including from Dr. Young.

For example, none of the base references for Nintendo’s four grounds, *Smith*, *Tingleff*, or *Yamawaki*, have any disclosure or teaching of micro-machined MEMS sensors. As discussed below, the “*micro inertial measurement unit*” of the claims is a MEMS-based IMU. Nintendo’s tacked-on references *Chan* and *Bernstein*—cited only for the proposition, admitted in the ’648 Patent, that MEMS sensors existed—do not make the complicated and difficult substitution of MEMS sensors obvious to a person of ordinary skill. ’648 Patent, 6:6-43 (“difficulties” of “building a micro IMU” with MEMS sensors), 17:19-36 (“insufficient accuracy, sensitivity, and stability”); EX2019, ¶¶51-55, 73-76; EX2023, ¶¶3, 7-8, 10-12, 24-25.

The Federal Circuit has held that it is error to apply a combination based only on the conclusory assertion, as here, that the elements existed and were known. *Virtek Vision International ULC v. Assembly Guidance Systems, Inc.*, 97 F. 4th 882, 887-88 (Fed. Cir. 2024) (“That is an error as a matter of law. It does not suffice to simply be known. A reason for combining must exist”).

Neither hindsight, nor recasting the results of the inventive process as a motivation to combine, can operate to invalidate patent claims. “[T]he inventor’s own path itself never leads to a conclusion of obviousness; that is hindsight.” *Univ. of Strathclyde v. Clear-Vu Lighting LLC*, 17 F.4th 155, 165 (Fed. Cir. 2021). The Petition attempts exactly this, relying on the ’648 Patent to explain why Nintendo’s pieced-together mosaic of bits of references would be a successful combination. This is improper hindsight, not cured by vague references to the “knowledge of one of skill in the art.”² *See, e.g., Arendi S.A.R.L.*

² The Institution Decision cites to *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971)—a decision that has been cited by the Federal Circuit for the quoted language only once in this century, and by the Board more than 800 times. *McLaughlin* does not provide an excuse to apply hindsight or background knowledge to combine references—specific motivation from the references themselves is always required. *See, e.g., Virtek*, 97 F. 4th at 888; *NuVasive, Inc. v.*

v. Apple Inc., 832 F.3d 1355, 1362-63 (Fed. Cir. 2016).

The relied-upon references lack any suggestion to rip out their existing base sensor solutions and redesign with MEMS sensors. Nintendo instead improperly relies on its experts’ unsupported claim that such a substitution effort—admittedly requiring a change in manufacturing process and redesign of the critical control electronics, see EX2020 at 72:17-74:7—would be “routine” for a person of ordinary skill, without requiring undue experimentation. EX1002, ¶¶99. American GNC disputes this as a matter of common sense, fact, and expert experience. EX2023, ¶¶3, 7-8, 11-12, 24-25; EX2019, ¶¶76-80.

The Board’s Institution Decision identified this as an area for further development at trial. Paper at 34-35. Subsequently, Dr. Young provided testimony on cross-examination that rebuts his own unsupported conclusion—describing two different projects, undertaken years after American GNC’s inventions, where *Dr. Young and his graduate students took years to try to implement a solution* using then-available capacitive MEMS sensors. EX2020 at 31:24-36:2 (describing ten years of work unsuccessfully integrating “*commercially-available* MEMS sensors, accelerometers, gyroscopes” into a

Hirshfeld, 2021 WL 3661208 at *5 (Fed. Cir. Aug. 18, 2021) (quoting *McLaughlin* but further finding specific motivation in references).

navigation application), 66:22-70:3, 77:7-81:13. This work was not “routine” for ordinary artisans and their professors even ten years after American GNC’s patents. *See also* EX2021 (Dr. Young’s patent, filed in 2010, for an application of capacitive MEMS sensors).

Further, because the systems of *Smith*, *Tingleff*, and *Yamawaki* use other types of sensors, they fail to teach or suggest multiple elements of the claims, as further detailed below. Even if combined, claim elements are missing from the combined teaching of the references. For example, combinations with *Smith* and other references lack the “angular rate electrical signals” of claim 1 and the “angular rate voltage signals” of claim 4. *See* Sections III.C, IV.C, and V.D below. And combinations with *Yamawaki* also lack the “digital velocity increments” of the claims. *See* Section V.C below.

Finally, as explained below in Section VI, the Petition should not have been instituted, and should now be dismissed, including because this Petition is time barred due to Nintendo’s failure to name real parties in interest who would be so barred under §315(b).

Each of Nintendo’s grounds fail to meet Petitioners’ evidentiary burden to show teaching or suggestion of every claimed element in the references—as well as a motivation to combine them *that does not arise from the hindsight knowledge that the combination was successful*. Nintendo has the burden of proof here. 35

U.S.C. § 316(e):

In an inter partes review . . . , the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence.

Harmonic Inc. v. Avid Tech., Inc., 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable”) (*citing* 35 U.S.C. §312(a)(3) (2012) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). If Nintendo fails its burden to provide evidence that proves invalidity, it loses the instituted trial, even if American GNC were to offer no response beyond identifying that failure. *Apple Inc. v. Zipit Wireless, Inc.*, IPR2021-01124 *et al.*, 2022 WL 18108215, Paper 14, Decision on Director Review, (PTAB Dec. 21, 2022) (designated precedential: Jan. 4, 2023). Here, American GNC offers both fact and expert testimony contrary to Petitioner’s conclusory assertions.

As shown below, Nintendo’s Grounds each fail to properly interpret, or to show any disclosure of, key elements of the challenged claims. Nintendo failed its burden of proof here, as explained in more detail in the arguments herein and in the testimony attached. The challenged claims are valid and should be upheld.

II. Overview, History, and Construction of the ’648 Patent

A. The ’648 Patent

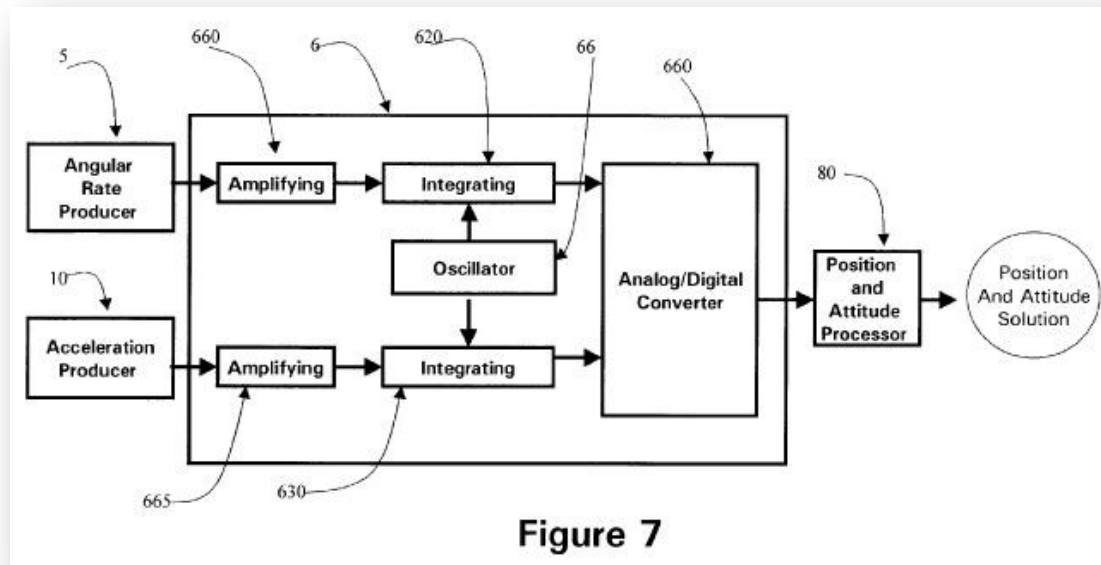
The '646 Patent describes and claims a “micro inertial measurement unit” which uses microelectromechanical system “*MEMS* rate and acceleration sensors.” '648 Patent at Abstract, 2:62-64. The '648 patent describes the use of MEMS sensors as among the “unique features” of the claimed “micro IMU.” *Id.*, 3:15-28.

MEMS angular rate sensors, in particular, were not very good at the time. *See, e.g., id.*, 17:19-36 (“insufficient accuracy, sensitivity, and stability.”); EX2023, ¶¶8, 11-12, 21-23. American GNC disclosed and claimed several specific aspects that had proven successful in their development work (described above) to “obtain highly accurate motion measurements” using imperfect available MEMS rate and acceleration sensors. EX2023, ¶¶13-14; '648 Patent at Abstract.

For example, American GNC taught the need for “signal integration” and “signal digitizing,” as part of a “processing scheme to obtain highly accurate motion measurements.” '648 Patent at Abstract, 2:62-3:13. These key aspects are disclosed as part of the “Angular Increment Producer” and “Velocity Increment Producer” of the Figures and description. *See, e.g., id.*, 8:29-54. The “converted into digital angular increments and digital velocity increments” elements of the claims capture and require aspects of American GNC’s innovation here. *See, e.g., id.*, 24:17-21 (claim 1).

The systems disclosed and claimed in the '648 patent provide significant advantages, including dramatically shrinking “the size of mechanical and electronic hardware and power consumption,” while “obtain[ing] highly accurate motion measurements,” as compared to prior IMU solutions. *See, e.g., id.* at Abstract, 2:10-14 (“MEMS (MicroElectronicMechanicalSystem) inertial sensors offer tremendous cost, size, and reliability improvements for guidance, navigation, and control systems, compared with conventional inertial sensors”). Prior to the inventions disclosed in the '648 Patent, existing MEMS angular rate sensors and MEMS accelerometers had not been successfully integrated into an Inertial Measurement Unit with sufficiently “high performance, small size, and low power consumption. *See, e.g., id.* at 2:46-50. This was in large part because, as mentioned, the existing available MEMS angular rate sensors were unstable and noisy. *Id.*, 17:19-36; EX2023, ¶¶8, 11-12.

An example configuration of the invented MEMS Inertial Measurement Unit sensor device, as built by American GNC and as shown in Figure 19 of the '648 Patent below, contains X, Y, and Z axis angular rate detecting units (numbered 21, 41, 71), and X, Y, and Z axis accelerometers (22, 42, 72). *See, e.g., '648 Patent at 17:64-18:6, 21:63-22:10.* The IMU also contains a circuit (*e.g.*, “ASIC chip 92”) connected to the sensors and to digital signal processing, for providing digital angular and velocity increment signals. *Id.* at 21:63-22:10, Figure 19:



The use of signal increments instead of raw angular rate or velocity signals, and the digitizing of those increments to enable digital processing, represented an important and non-obvious advance over existing conventional IMUs—contributing accuracy and stability to the operation of the device. *Id.* at Abstract, 2:54-61, 17:19-28. Despite the existence of commercial MEMS angular rate sensors and MEMS accelerometers, no one had successfully integrated them into a successful IMU. *See, e.g., id.* at 2:47-51, 2:62-64; EX2023, ¶¶8, 21-23.

The '648 Patent describes and claims groundbreaking advances in the field of MEMS Inertial Measurement Units. By solving these problems, Dr. Lin, Hiram McCall, and American GNC enabled Inertial Measurement Units based on MEMS technology to become commercially and technically viable. The inventions of the '648 patent allowed continued development and

commercialization—appearing in American GNC’s own coremicro® IMU products and in the products of others—until today small and inexpensive IMU devices are ubiquitous. Today IMUs using American GNC’s inventions are in nearly everyone’s vehicle or personal navigation systems, in their smartphones and tablets, and in their Nintendo video game consoles and controllers.

In a recent presentation, Marco Cassis, President of ST Microelectronics’ Analog, MEMS and Sensors Group, identified the year 2000 as “a paradigm shift” in “Motion MEMS Sensors.” *See, e.g.,* EX2010 at 2, Figure 1.2.7 (“Continuous performance improvement” and “Data processing capability increase”):

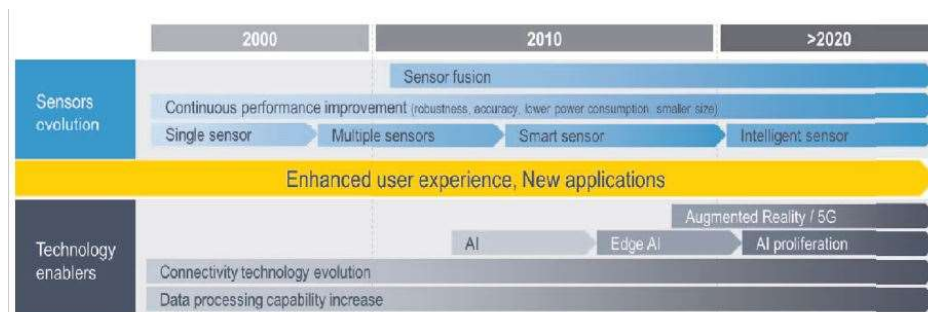


Figure 1.2.7: Key MEMS sensor development milestones.

American GNC’s 1999/2000 incorporation of signal increment components and digital signal processing technology to make the first viable MEMS-based IMUs was not only non-obvious at the time, it turned out to be an enabling

innovation and a leap forward for practical applications of MEMS sensor technology. *Id.*; *see also* Introduction above (highlighting recognition, citation, use and licensing by others of the '648 Patent). American GNC was the first to patent this combined solution, and Nintendo's weak and improper mosaic of alleged obviousness references is nothing more than hindsight being employed, in an attempt to avoid licensing American GNC's inventions as others have.

B. The '648 Patent Challenged Claims

American GNC asserted, and Nintendo challenged, independent claim 1 and its dependent claim 4. '648 Patent, 23:43-24:21 (claim 1), 24:36-44 (claim 4). Challenged claim 1 recites (emphases added):

1. A *micro inertial measurement unit*, comprising:

an angular rate producer comprising a X axis angular rate detecting unit which produces a X axis *angular rate electrical signal*, a Y axis angular rate detecting unit which produces a Y axis angular rate electrical signal, and a Z axis angular rate detecting unit which produces a Z axis angular rate electrical signal;

an acceleration producer comprising a X axis accelerometer which produces a X axis acceleration electrical signal, a Y axis accelerometer which produces a Y axis acceleration electrical signal, and a Z axis accelerometer which produces a Z axis acceleration electrical signal; and

an angular increment and velocity increment producer, which is electrically connected with said X axis, Y axis and Z axis angular rate detecting units and said X axis, Y axis and Z axis accelerometers, receiving said X axis, Y axis and Z axis angular rate electrical signals and said X axis, Y axis and Z axis acceleration electrical signals from said angular rate producer and said acceleration producer respectively, wherein said X axis, Y axis and Z axis angular rate electrical signals and said X axis, Y axis and Z axis acceleration electrical signals are converted into are ***digital angular increments and digital velocity increments*** respectively.

Claim 4 depends from claim 1, adding the requirement that the “angular rate electrical signals” and “acceleration electrical signals” of claim 1 are “analog ... voltage signals” that are directly proportional to the angular rates or accelerations of a carrier. *Id.* at 24:36-44 (claim 4).

4. A micro inertial measurement unit, as recited in claim 1, wherein said X axis, Y axis and Z axis angular rate electrical signals produced from said angular producer are analog ***angular rate voltage signals directly proportional to angular rates of a carrier*** carrying said micro inertial measurement unit, and said X axis, Y axis and Z axis acceleration electrical signals produced from said acceleration producer are analog acceleration

voltage signals directly proportional to accelerations of said vehicle.

The emphasized elements above are among those for which Nintendo relies on complex combinations of references. For example, none of the base references for Nintendo’s four grounds, *Smith*, *Tingleff*, or *Yamawaki*, have any disclosure or teaching of micro-machined MEMS sensors. As discussed below, and construed by the Board, the “***micro inertial measurement unit***” of the claims is a MEMS-based IMU. Paper 10 at 21-24. Nintendo’s tacked-on references *Chan* and *Bernstein*—cited only for the proposition, admitted in the ’648 Patent, that MEMS sensors existed—do not make the claimed combination obvious to a person of ordinary skill. See Petition, 15 (“does not depend on the particulars”).

Because the systems of *Smith*, *Tingleff*, and *Yamawaki* use other types of sensors, they fail to teach or suggest multiple elements of the claims. For example, and as Nintendo’s own *Merhav* reference confirms, the signals output from *Smith*’s laser ring gyros aren’t “***angular rate electrical signals***” at all. See EX1008, 23 (signals instead “whose frequency is directly proportional to Ω ”). And as explained further below, *Yamawaki* is not alleged to disclose or suggest “***digital velocity increments***,” and the proposed combination with *Saubolle* does nothing to fill the gap in Nintendo’s proof.

C. Claim Construction and Person of Ordinary Skill in the Art

For purposes of *inter partes* review disputed claim terms are construed to give them “the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *See* 83 Fed. Reg. 51341 (Oct. 11, 2018) (adopting the standard of *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005)). The proper construction is considered in the context of, and must be consistent with, the specification—and the claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art. *See, e.g., Phillips*, 415 F.3d at 1313.

A person of ordinary skill in the art with respect to the ’648 Patent would have at least a “Master’s Degree in Electrical or Electronics Engineering, and approximately five years of relevant experience in the development of control systems for inertial navigation, MEMS semiconductor processing, and analog circuit design.” EX2019, ¶57.

Other than for the preamble limitation discussed below, Nintendo asserts that construction of claim terms is not necessary to the resolution of any issues presented in the Petition—and thus the Board needn’t weigh in on them. Petition at 7. *See, e.g., Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”). But then Nintendo’s

Petition repeatedly refers to proposed constructions in prior cases, and also makes implicit or explicit interpretations of terms. Nintendo was required to identify any terms that require construction in the Petition. 37 C.F.R. §42.104(b)(2) (“The statement must identify... [h]ow the challenged claim is to be construed.”).

As further discussed below in subsection 1, the Board correctly construed “a micro inertial measurement unit” as a limitation of the preamble, requiring the claimed angular rate and acceleration structures to be implemented using MEMS technology. Paper 10 at 21-24. And as discussed below in subsection 2, the Board should also interpret the “angular rate electrical signals” and “angular rate voltage signals” of the claims as a person of ordinary skill would—to be signals directly measuring angular rate. See *id.* at 36, 37-38 (identifying issue).

1. “A micro inertial measurement unit” of the preamble is a limitation, and requires MEMS elements

The claim element “a micro inertial measurement unit” is a fundamental characteristic of the claims and micro refers to *micro*electromechanical systems (MEMS) devices. See, e.g., ’648 Patent, Abstract (“A micro inertial measurement unit ... is employed with MEMS rate and acceleration sensors.”), 2:62-3:3 (“Another objective of the present invention is to provide a micro inertial measurement unit (IMU) which successfully incorporates the MEMS technology”); 3:5-28 (“the present invention specifically selects MEMS angular

rate devices and acceleration devices to assemble a micro IMU”), 6:41-47 (“MEMS angular rate device array or gyro array”); 16:31-39 (“the micro-size angular rate producer with MEMS technologies ... of the micro IMU of the present invention”); 16:46-49 (“Existing MEMS technologies, which are employed into the micro size angular rate producer”); 17:19-36 (“critical for the whole performance of a MEMS angular rate producer”).

In American GNC’s litigation against Nintendo, American GNC told the district court that “a micro inertial measurement unit” should be construed as an “inertial measurement unit that uses micro-electrical-mechanical (MEMS) sensors.” EX2016, 2-3. In denying Nintendo’s Section 101 ineligibility Motion, the district court applied this construction. EX2017, 11 (“At this stage, the Court accepts Plaintiff’s plausible construction”). The district court also found that: “The ’648 Patent relates to the utilization of micro electronic mechanical systems (“MEMS”), also referred to as “micromachines,” in the construction of inertial measurement units (“IMU”).” *Id.*, 2 (“The patent recites a “micro inertial measurement unit” that uses MEMS technology”). The district court also found that: “Based on the language of the claim, the Court finds that Claim 1 of the ’648 Patent is directed to a tangible, non-abstract machine that incorporates MEMS technology.” *Id.*, 7.

The passages of the specification above, and these findings by the district court, are directly contrary to Nintendo’s assertion here that the preamble is only the purpose or function of the claims. Petition, 10; EX2017, 10 (“Claim 1 does not use functional language, but rather recites a specific inventive technology—‘micro’ or MEMS technology”).

“A preamble is a claim limitation if it recites essential structure or steps, or if it is ‘necessary to give life, meaning, and vitality’ to the claim.” *Poly-America, L.P. v. GSE Lining Technology, Inc.*, 383 F.3d 1303, 1309-10 (Fed. Cir. 2004) (“discloses a fundamental characteristic of the claimed invention that is properly construed as a limitation of the claim itself”). As here, “when reciting additional structure ... underscored as important by the specification, the preamble may operate as a claim limitation.” *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002).

As shown above, and as found by the district court, and the Board in its decision on institution, the specification clearly identifies a MEMS-based inertial measurement unit as the fundamental structure of the claims. It is also, quite literally, what American GNC built. EX2002, 2; ’648 Patent, 17:37-42 (“the micro IMU of the present invention”), Fig 17:

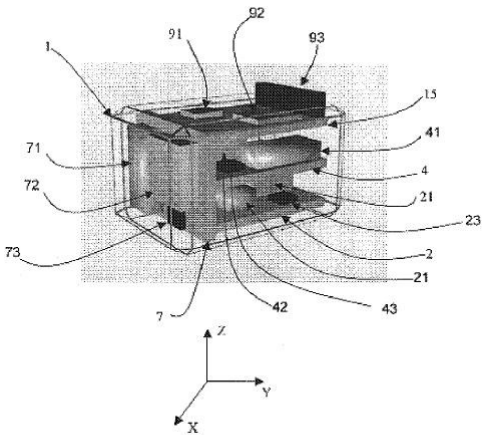


Figure 17



Nintendo apparently also believes that MEMS sensors are required by the claims, as it added the *Chan* MEMS Accelerometer and the *Bernstein* MEMS gyroscope patents to every Ground in its Petition. *See* Petition, 4. Also, in Nintendo's Petition in co-pending IPR2023-00667, Nintendo argued that “micrometers” meant MEMS. IPR2023-00667, Petition, 44-45. Also, to the extent that Nintendo argues American GNC never distinguished these claims during prosecution history on the basis of requiring MEMS (*see* Petition, 10-11), American GNC has now done so. *See THX, Ltd. v. Apple, Inc.*, 2016 WL 6563340, at *10 (N.D. Cal. Nov. 4, 2016) (preamble limiting where patentee “explicitly relied” on it during IPR proceedings to distinguish prior art).

More than two decades ago, during Examination of the application that issued as the '648 Patent, the Examiner cited and considered prior art including

“Micro-machining” a sensor on silicon. EX1015, 116 (*citing* U.S. Patent No. 6,276,205). Nintendo admits that micro-machining on silicon is MEMS technology. *See* Petition, 13. The Examiner was also aware of existing MEMS sensors because the inventors of the ’648 Patent discussed them. ’648 Patent, 2:6-50, 6:6-43 (discussing the state of MEMS art, their selection for the present invention, and “difficulties” of “building a micro IMU” with them), 17:19-36 (same).

Here, the claims, specification, prosecution history, extrinsic evidence, and prior treatment of the claims by the district court all demonstrate that “a micro inertial measurement unit” using MEMS sensor technology is the fundamental structure and characteristic of the claims—“necessary to give life, meaning, and vitality” to the claimed invention. *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305-6 (Fed. Cir. 1999).

For all of the reasons given above, the Board correctly treated the preamble of claim 1 as a limitation. The Board also correctly interpreted the limitation consistent with American GNC’s proposal, finding that “a micro inertial measurement unit” requires employing MEMS technology in implementation of the angular rate and acceleration sensing elements of the asserted claims. Paper 10 at 23-24. Construing the term to require the use of MEMS technology is consistent with the claims, entirety of the specification, prosecution history, and

other evidence cited above. Nintendo failed to provide an alternative construction, and cannot do so now. *See* 37 C.F.R. §42.104(b)(2). The Board's construction should control for these proceedings.

2. “angular rate electrical signals” and “angular rate voltage signals” directly measure and reflect angular rate

Claim 1 requires that its “angular rate detecting unit” elements produce “angular rate electrical signals. ’648 Patent, 23:43-24:21. Claim 4 requires that the angular rate electrical signals specifically be “angular rate voltage signals,” and that they be “directly proportional to angular rates of a carrier.” *Id.*, 24:36-44.

A person of ordinary skill in the art would understand the claimed angular rate electrical signals to directly measure and reflect angular rate. The plain claim language itself gives this understanding, requiring that the angular rate electrical signals be produced by an “angular rate detecting unit” that detects (*e.g.*, measures) angular rate. *Id.*, 23:44-46.

In addition to the claim language, the descriptions of the preferred embodiment in the specification also support this interpretation. For example, the patent describes the use of a “vibrating” type sensor, producing Coriolis forces that are “proportional to the applied angular rate, which then can be measured.” *Id.*, 16:46-59; *see also id.*, 17:19-36 (“obtain angular rate sensing signals from a

vibrating type angular rate detecting unit”), 17:63-65 (“vibrating type angular rate detecting unit 21”), 18:56-61, 19:3-10 (“detects the angular motion” and outputs “angular motion-induced signals, including rate displacement signals”).

Accordingly, a person of ordinary skill reading the claim 1 and 4 language, on its face and in the context of these specification disclosures, would understand “angular rate electrical [or voltage] signals” produced by an “angular rate detecting unit” to directly reflect the measured angular rate.

American GNC respectfully disagrees with the Board’s preliminary comments concerning the plain reading of claim 1. Paper 10 at 36. The claim 1 language of “angular rate detecting” does limit the detected output signals to those directly reflecting angular rate—consistent with but not exclusively derived from specification disclosures of “vibrating type” or “Coriolis force” sensors of the preferred embodiment. The fact that claim 4 expressly recites the requirement that the signals be “directly proportional to the angular rates,” does not preclude claim 1 from being plainly read in context to require directly detecting angular rate as well. Claim differentiation for dependent claim 4 is separately met—for example claim 4 narrows the “electrical” signals of claim 1, which could be analog or digital, voltage- or current-varying, to those that are analog and voltage-varying. ’648 Patent, 24:36-44.

Again, the plain language of the challenged claims, read in the context of

the specification by a person of ordinary skill, requires directly detecting angular rate and outputting angular rate electrical signals that reflect it. Nintendo failed to explain or suggest this claim interpretation—but has offered Grounds that are incompatible with it. For example, Nintendo’s Grounds 1 and 2 based on *Smith* fail to identify any angular rate electrical signals that directly reflect angular rate—instead pointing to pulses from a laser ring gyroscope used to indirectly infer angular rate from a pulse count. *See* Petition at 19 (identifying a signal for which the “pulse repetition rate,” *not the signal itself*, is proportional to angular rate). For claim 4, Nintendo misdirects and argues about lack of distinction between the disclosed “digital” pulse train of *Smith* and an alleged underlying analog signal understood from two additional references (Petition, 37-42)—but the challenged claims make a more fundamental distinction. Whether analog or digital, the claimed “angular rate electrical signals” produced by the “angular rate detecting unit” must directly reflect angular rate—which the outputs of a laser ring gyroscope do not. *See also* Section III.C below.

D. Effective priority date

Nintendo does not dispute that the ’648 Patent is entitled to at least the effective priority date of U.S. Patent Application No. 09/477,151, filed January 4, 2000, from which the ’648 Patent is a division. Petition, 8-9; EX1002, ¶12.

III. Nintendo failed to prove that the challenged claims are obvious over

Smith* in combination with *Chan* and *Bernstein

Smith, the base reference for Grounds 1 and 2, admittedly fails to disclose multiple elements of the claims. There is no disclosure or suggestion in *Smith* of using MEMS sensors—for example, *Smith* uses Ring “Laser Gyros” instead. Petition, 11-13; EX1003, Fig. 2 (“X-AXIS LASER GYRO”). Further, *Smith* is not properly combined with *Chan* and *Bernstein* with respect to “a micro inertial measurement unit” employing MEMS sensors.

Also, because *Smith*’s laser gyros are a fundamentally different technology than the MEMS gyroscopes employed by the ’648 Patent, and a technology that uses different signals to output information, *Smith* fails to disclose at least the “angular rate electrical signals” (claim 1) and “angular rate voltage signals” (claim 4) of the claims.

In sum, Petitioner’s *Smith* arguments are facially deficient, and fail to prove that *Smith* in combination could render obvious any challenged claim. There is simply no teaching or suggestion in *Smith* of the claimed MEMS accelerometers or gyroscopes, or the claimed angular rate electrical [voltage] signals detected from those gyroscopes. Petitioner’s Grounds 1 and 2, each of which rely on *Smith* and the missing motivation to combine it with *Chan* and *Bernstein*, must fail. *See, e.g., In re Smith Int’l, Inc.*, 871 F.3d 1375, 1381 (Fed. Cir. 2017) (all claim elements must be shown).

A. Petitioner failed to show that *Smith* in combination with *Chan* and *Bernstein* discloses or renders obvious “a micro inertial measurement unit” using MEMS sensors according to the challenged claims

Nintendo failed to show that the *Smith* reference discloses or suggests the “a micro inertial measurement unit” using MEMS sensors elements—as disclosed and claimed. *See, e.g.*, ’648 Patent, 23:43 (claim 1), 24:36 (dependent claim 4).

Nintendo admits that *Smith* “does not expressly disclose that it uses MEMS components. Petition, 14. It does not. Nor does Nintendo identify any suggestion in *Smith* to do so. *Id.*, 14-18.

Instead, Nintendo relies—for each of its four Grounds—on an alleged combination with *Chan*, disclosing a MEMS acceleration sensor, and *Bernstein*, disclosing a “micromechanical,” single-axis gyroscope. *See, e.g.*, Petition, 14-15; EX1002, ¶¶96-97 (verbatim).

Chan and *Bernstein* are only used by Nintendo to show the existence of MEMS sensors generally. Nintendo admits as much. Petition, 15:

Petitioner’s reliance on *Chan* and *Bernstein* ***does not depend on the particular details*** of their allegedly inventive accelerometers and gyroscopes, but on their general disclosures confirming that MEMS-based sensors for sensing acceleration and angular rotation were well-known.

American GNC *already said as much* in the background disclosures of the '648 Patent. Petition, 15-16 (*citing* '648 Patent, 2:47-51: "MEMS angular rate sensors and MEMS accelerometers are available commercially"). Also, "micro-machining" sensor art was before the Examiner when the claims were allowed. EX1015, 116. Adding patents like *Chan* and *Bernstein*, and then only using them to say what the '648 Patent already said, does not make Nintendo's reliance on the inventors' own disclosures as a roadmap here less improper.

Nintendo's entire obviousness analysis is simply stated, and simply incorrect. *See, e.g.*, Petition, 15:

The accelerometers and gyroscopes in Smith would have been replaced with *MEMS accelerometers and gyroscopes*, which as confirmed in Chan, Bernstein, and the '648 patent itself, *were known* and commercially available.

See also EX1002, ¶99 (*citing* '648 Patent, 2:47-51: "MEMS angular rate sensors and MEMS accelerometers are available commercially"); EX2020, 72:17-74:7.

It is not enough for obviousness that a component was known. A reason for combining must exist. *See, e.g., Virtek*, 97 F.4th at 888 ("It does not suffice to simply be known. A reason for combining must exist.").

This rule is just as true for substitutions of one technology for another. *See, e.g., In re Beasley*, 117 Fed. Appx. 739, 743-44 (Fed. Cir. 2004); *see also KSR*

International Co. v. Teleflex Inc., 550 U.S. at 401 (“a reason that would have prompted a person of ordinary skill in the art to combine the elements.”); *Belden*, 805 F.3d at 1073 (Fed. Cir. 2015) (“not only could have made but **would have been motivated to make** the combinations or modifications”) (emphasis added).

When attempting to justify a substitution of one technology for another in a combination, “conclusory statements of generalized advantages” are also not enough. *In re Beasley*, 117 Fed. Appx. at 744. Nor are “convenient assumptions about skilled artisans.” *Id.*

Nintendo relies extensively on both here, and offers no support for the assumptions it makes. *See, e.g.,* Petition, 15 (“would have been straightforward”); EX1002, ¶99 (“would have been regarded as a routine implementation well within the skill of a POSITA”); Petition, 17-18 (“could have implemented the combination using conventional techniques without undue experimentation”); EX1002, ¶104 (verbatim).

Over and over again, Nintendo / Dr. Young cite to the “commercial availability” of MEMS sensors—an undisputed fact, admitted to the Examiner and the world by American GNC in the ’648 Patent. And a fact that says nothing about whether those MEMS sensors were “straightforward” to work with, or could be integrated into an IMU “without undue experimentation.” All of the actual evidence—including the disclosures of the ’648 Patent that Nintendo

ignores—shows that working with these MEMS sensors was not straightforward, and required extensive experimentation and redesign.

For example, as the '648 Patent stated—immediately after noting the availability of the sensors, a successful integration of MEMS angular rate sensors and MEMS accelerometers into a “small size” IMU had not been accomplished, and such an IMU was “not yet available.” '648 Patent, 2:47-50. As shown above, providing this IMU employing MEMS sensors was the purpose and achieved goal of the patent. *See, e.g., id.*, 2:53-64, 3:5-28 (“the present invention specifically selects MEMS angular rate devices and acceleration devices to assemble a micro IMU”), Fig 17.

The '648 patent also explained that this was difficult at the time. *See, e.g., id.*, 6:6-43 (“difficulties” of “building a micro IMU” with MEMS sensors), 17:19-36 (“insufficient accuracy, sensitivity, and stability”).

The '648 patent also taught, and claimed, techniques for dealing with challenges raised by the use of MEMS sensors in an IMU, including the need for “signal integration” and “signal digitizing,” as part of a “processing scheme to obtain highly accurate motion measurements.” *Id.*, Abstract, 2:62-3:13; *see also* Section II.A above.

Nintendo’s analysis ignores all of these teachings, citing only the availability and potential advantage disclosures from the '648 Patent. *See*

Petition, 13, 16, 17, 18 (*citing* '648 Patent). Nintendo uses the '648 Patent as a roadmap to its unsupported obviousness story—which is completely improper under the law, as discussed above. *See, e.g., Strathclyde*, 17 F.4th at 165 (“[T]he inventor’s own path itself never leads to a conclusion of obviousness; that is hindsight.”). It is even more unfair, and improper, for Nintendo to do so selectively—ignoring all of the evidence that contradicts Nintendo’s / Dr. Young’s cursory pronouncements that the task would be “straightforward” to one of ordinary skill.

Obviousness analysis requires that “the prior art must be considered for all its teachings, not selectively.” *Henny Penny Corporation v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019) (affirming Board’s finding of non-obviousness). Disadvantages and challenges must be considered. *Id.*

At the end of its short, conclusory argument, Nintendo acknowledges that switching *Smith* to MEMS sensors “would have required a change to the manufacturing process” and “a change to the signal conditioning electronics.” Petition, 18; *see also* EX2020, 73:7-21. Nintendo then simply says that this would be “a routine implementation to a[n ordinarily] skilled artisan.” Petition, 18. The Petition cites nothing for this conclusion but Dr. Young. *Id.* Dr. Young

cites only to the admitted availability of the sensors. EX1002, ¶99; EX2020, 73:24-74:7.³

Again, the Petition’s argument reduces to: “this is all obvious because those sensors were known”—vitiating the entire invention story, disclosures and teachings of the ’648 Patent, allowance by the Examiner over two decades ago, citation and license to the patent, and all of the other “secondary” evidence of non-obviousness presented herein. *See, e.g.*, Section I above, noting recognition, citation, use, and license by others.

Before and at the time of the invention of the ’648 Patent, Professor Larson was also working in the field of MEMS, researching, developing, and patenting RF MEMS solutions while at Hughes and Univ. of California, San Diego. EX2019, ¶¶14-15, 42. He reviewed the ’648 Patent and American GNC’s invention story, as well as Professor Young’s declaration. *Id.*, ¶¶51-55.

As Professor Larson explained: “During the period of these disclosures, the technological development of this field—MEMS inertial sensors—was still in its early research stages” and “there was no established industry or large body of

³ In declaration and testimony, Dr. Young briefly mentions other references that are not part of Nintendo’s Grounds, but again only uses them to allege that MEMS sensors were known in the art. EX1002, ¶104; EX2020, 74:8-75:1.

academic work in MEMS devices” for persons of ordinary skill to refer to. *Id.*, ¶¶57-58. Consistent with his own experience, and American GNC’s in the ’648 Patent, Professor Larson concluded that designing available MEMS sensors into an IMU would have been a “non-trivial design and development task” in part because there was “little available knowledge and literature to guide the application of MEMS technology. *Id.*, ¶54.

Professor Larson disagreed with Nintendo’s arguments concerning the potential substitution of MEMS sensors into the systems of *Smith*, *Tingleff*, or *Yamawaki*—concluding that “Professor Young severely underestimates the knowledge, skill, and level of re-design that would be required to make this substitution of sensor technology type.” EX2019, ¶79. The need for redesign that Nintendo and Professor Young acknowledge, would have been “non-trivial” and “complicated,” including because—and the ’648 Patent also teaches—“MEMS sensors at the time required complicated electronic circuitry to reliably control.” *Id.*, ¶77.

Professor Larson concluded that a person of ordinary skill would not have found this “complicated substitution of MEMS technology to be obvious,” and would not have been motivated to make the combination. “The design challenges involved ... would have been substantial.” *Id.*, ¶79. In short, “integration of MEMS rate and acceleration sensors into an IMU at the time of the American

GNC Patents was a difficult challenge beyond the capabilities of one of only ordinary skill, in what was a rapidly developing art.” *Id.*, ¶78.

Nintendo failed its burden here, for all of the reasons explained herein. Instead of citing to *Smith*, *Chan*, or *Bernstein* to suggest obviousness or a motivation to combine the references, Nintendo extracted pieces of the invention from them and relied only on the '648 Patent itself and the conclusory say-so if its counsel and/or expert. The availability of MEMS sensors is not a suggestion or motivation to completely redesign an IMU to use them—particularly when that IMU already works well in a “small enclosure” (EX1003, 2:55-65), and the MEMS sensors are difficult to work with and lack “accuracy, stability, and sensitivity” ('648 Patent, 6:6-43, 17:19-36).

Nintendo’s improper arguments and unsupported “assumptions about skilled artisans” fail to meet Nintendo’s burden to demonstrate obviousness. If treated as argument, the Petition fails, including because: “Attorney argument is not evidence.” *Icon Health*, 849 F.3d at 1043. To the extent the Board attributes to Professor Young the arguments copied into his declaration, they are still entirely too conclusory and unsupported to be *credited* by the Board. *See, e.g., Rohm and Haas*, 127 F.3d at 1092 (the Board needn’t “credit the unsupported assertions of an expert witness”); 37 C.F.R. § 42.65(a).

And the cross-examination testimony of Dr. Young, discussed above,

further proves with two examples from his own work that designing with “commercially available” MEMS gyroscopes was a complicated endeavor beyond the capabilities of ordinary artisans even a decade after the ’648 Patent was filed. EX2020, 31:24-36:2 (describing ten years of work unsuccessfully integrating “*commercially-available* MEMS sensors, accelerometers, gyroscopes” into a navigation application), 66:22-70:3, 77:7-81:13. These facts cannot be squared with Dr. Young’s conclusory assertion that such work would be “routine” for an engineering graduate with a couple years of practical experience, “using conventional techniques without undue experimentation.” EX1002, ¶¶14, 99, 104; EX2020, 33:2-35:19 (“I worked on it for about ten years”).

Nintendo bears the evidentiary burden here. In instituting, the Board noted the opportunity to further develop evidence at trial on the issue of whether replacing sensors with MEMS accelerometers and gyroscopes would be obvious and motivated to a POSITA. Paper 10, 34-35. Cross-examination has further developed this evidence, and debunked Nintendo’s conclusory statements about what would be “routine.” EX2020, 31:24-36:2, 66:22-70:3, 77:7-81:13

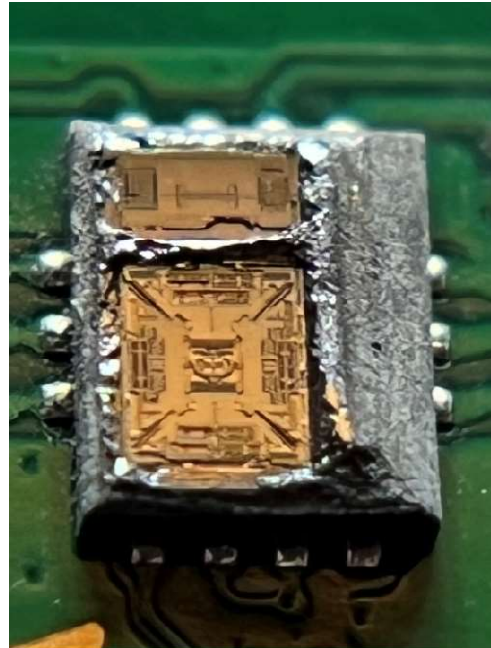
In sum, Nintendo’s arguments are facially deficient, supported only by improper hindsight reasoning, and do not show that the *Smith* combination could render obvious any challenged claim. There is simply no teaching or suggestion in the *Smith* combination of the claimed “micro inertial measurement unit”

employing MEMS sensors, and Nintendo’s improper arguments based on the ’648 patent are too conclusory and selective to be credited. The challenged claims should be upheld.

B. Petitioner failed to show that *Smith* would be combined with *Chan* and *Bernstein*

For all of the reasons given above, Nintendo failed to show that *Smith*, which discloses conventional ring laser gyros, would be combined with MEMS sensors of *Chan* and *Bernstein*—such that those ring laser gyros would be removed, along with all of the sensing and control circuitry specialized to them, and MEMS angular rate sensors would be put in, along with re-designed sensing and control circuitry specialized to them, also requiring “a change in the manufacturing processes of the IMU in *Smith*.” Petition, 18, EX1002, ¶99.

It is instructive to visualize Nintendo’s argument—that it would be “routine” to replace laser ring gyroscopes with MEMS gyroscopes, such as those shown below:



See EX2022 (image of laser ring gyroscope); EX2025 (MEMS gyroscope in ST Microelectronics IMU chip from disassembled Nintendo Switch product). Nintendo’s unsupported suggestion, that this kind of substitution would be “routine” or even possible for a person of ordinary skill with available technology in 2000, is simply not credible—particularly when Professor Young, the source of this suggestion, and his graduate students spent ten years trying to integrate “commercially-available MEMS ... gyroscopes” into a product *ten years later*. EX2020, 31:24-36:2; EX2019, ¶¶54, 76-79.

Nintendo’s argument oversimplifies and ignores differences between *Smith*’s laser-ring gyros and, *e.g.*, a vibrating mass capacitive MEMS sensor. See Petition, 15 (“gyroscopes serve the same purposes”). In fact, the differences in technical operation are numerous and significant. For instance, *Smith*’s laser-ring

gyros use a generated “dither” signal for a completely different technical reason than the precise, complicated feedback loop American GNC invented and patented. *Compare* EX1003, Fig. 3, 6:1:5-8 (describing application of an asynchronous sinusoidal signal to prevent “lock-in” and cross-coupling), *with* EX2023, ¶¶10, 11-14 (describing critical design of dither motion control loop). A person of ordinary skill would not learn anything from the different design disclosed in *Smith* that would motivate or assist in building a MEMS sensor dither control loop. EX2023, ¶¶24-25 (“Changing one sensor technology for another is not less work than designing from scratch with a MEMS sensor.”). Nintendo’s argument that they are both gyroscopes is reductionist, and fails to provide a teaching or motivation to undertake this complicated substitution and redesign.

The difficulties with existing MEMS gyroscopes and the extensive work and experimentation needed to integrate them into a product at the time is also shown from the fact testimony of inventor Hiram McCall. EX2023, ¶¶5-20. Many researchers were working on this problem at the time without success at achieving the required integration and commercially viable performance. *Id.*, ¶¶8, 21-23. And once American GNC successfully demonstrated and patented its solution, many companies cited to, used, and licensed that patented solution. *Id.*, ¶¶19-23. All of this provides additional evidence of non-obviousness of the claimed inventions.

As also discussed in the section above, Nintendo's purported motivation repeatedly refers back to the fact that the MEMS sensors were known and available—which is not a motivation to combine. *See, e.g., Virtek*, 97 F.4th at 888 (“It does not suffice to simply be known. A reason for combining must exist.”). What is almost completely missing from Nintendo's motivation analysis is any relevant citation to the disclosures of *Smith*, *Chan*, or *Bernstein*—the very place from which a motivation to combine must be shown. Petition, 15-18.

Nintendo refers to a passage of *Bernstein* discussing similarities of its gyroscopes to some (unspecified) prior art gyroscopes. *Id.*, 15. But Nintendo doesn't tie this to *Smith*, and couldn't because *Bernstein*'s gyros are made from a vibrating inertial mass, while *Smith*'s are made from laser rings. EX1006, 2:59-3:5; EX1003, Fig. 2. These are different sensor technologies, as further explained herein. There is nothing in *Smith* to motivate a person of ordinary skill to abandon laser ring gyroscopes and make a complicated substitution of a completely different (MEMS) gyroscope technology.

Nintendo also refers to passages of *Smith* discussing enclosure size, without mentioning that those passages are praising the small size of *Smith*'s own invention and discussing how it can fit on a private airplane. Petition, 16. This kind of “conclusory statements of generalized advantages” is insufficient to show a motivation to combine. *In re Beasley*, 117 Fed. Appx. at 744. Nor is it

significant that *Chan* also mentions aircraft. *See* Petition, 17; *see also* EX2023, ¶12 (noting practical inapplicability of gyros at the time). It also mentions “air-bags” and “anti-lock braking systems.” EX1005, 1:33-38. Again, generalized statements of possible applications in background sections cannot outweigh the substantial evidence of non-obviousness and the lack of specific statements motivating a complicated, years-long substitution process.

All of Nintendo’s other cites are to “the ’648 patent itself”—again improperly road mapping its analysis from American GNC’s own invention disclosures. *Id.*, 15-18.

In sum, Nintendo’s arguments are facially deficient, supported only by improper hindsight reasoning, and do not show that the *Smith* combination could render obvious any challenged claim. There is simply no teaching or suggestion in the *Smith* combination of the claimed “micro inertial measurement unit” using MEMS sensors, and no motivation for a person of ordinary skill to undertake the complicated and difficult technology substitution that would have been involved in using MEMS sensors. *See, e.g.*, EX2019, ¶¶76-79. Nintendo has failed its burden to prove this element obvious in the claimed combinations, and the claims should be upheld.

C. Petitioner failed to show that *Smith* discloses or renders obvious “angular rate electrical signals” according to the challenged claims

MEMS sensors are not the only claim elements lacking any teaching or suggestion in *Smith*’s disclosures. For example, Nintendo failed to show that *Smith* discloses or suggests the “angular rate electrical [voltage] signal” elements as disclosed and claimed. *See, e.g.*, ’648 Patent, 23:44-24:3 (claim 1); 24:36-44 (claim 4).

Nintendo points to the output of *Smith*’s “laser ring gyros.” Petition, 19. These laser ring gyros are very different from, and work differently from, the vibrating inertial mass MEMS gyroscopes discussed in the ’648 Patent, which rely on calculation of Coriolis force. ’648 Patent, 16:46-17:17. As discussed in Section II.C.2 above, the plain claim language requires that the output signals directly detect/measure angular rate, which the signals of *Smith* do not.

Vibrating inertial mass gyroscopes output an electrical signal that is a measure of force directly proportional to the angular rate. *Id.*, 16:54-59 (“These forces are proportional to the applied angular rate, which then can be measured.”). The patent confirms that the angular rate electrical signals that output from the angle rate producer are “[i]n most applications ... analog voltage signals,” and that they are “directly proportional to carrier angular rates.” *Id.*, 8:11-16. Claim 4 requires the output signals be “*analog* angular rate *voltage* signals.” *Id.*, 24:36-44

(emphasis added). Claim 1 requires only “analog rate electrical signals.” But the angular rate electrical signals must be proportional to angular rate in a Coriolis force sensor, as a person of ordinary skill would understand. *See, e.g., id.*, 23:44-24:3 (claim 1: “**angular rate detecting unit which produces** a X axis angular rate electrical signal”), 8:11-16, 8:34-54 (teaching that the signals can be integrated to accumulated over time to obtain “increments,” and that integration removes “noise signals that are non-directly proportional to the carrier angular rate); *see also* Section II.C.2 above.

Laser Ring gyroscopes work on a completely different principle than Coriolis force sensors. They use interference between two beams of light, producing fringe patterns of different frequencies based on the angular rate. EX1008, 21-23, Figure 8.2:

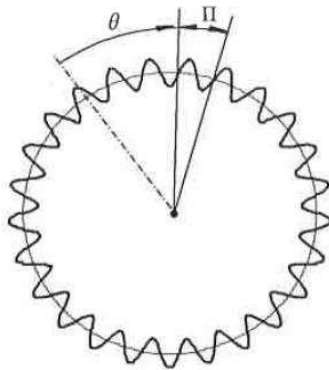


Figure 8.2. Annular standing wave interpretation of the RLG.

In a laser ring gyroscope, the output signal is a wave, converted to square “digital” pulses by electronic circuitry. *Id.*, 23. ***The frequency, not the signal***

level, is the angular rate. Id. (“angular rate Ω ” and “*a train of pulses whose frequency is directly proportional to Ω* ”).

Smith’s cited disclosures are consistent with this understanding—substituting “pulse repetition rate” for “frequency.” EX1003, 8:3-6 (“Each ring laser gyro ... produces an output digital signal having a *pulse repetition rate proportional* to the rate of angular displacement”). This is the only disclosure of *Smith* relied on by Nintendo to show or suggest the “angular rate electrical signals” elements. Petition, 19.

Because the electrical signal outputs of *Smith*’s “laser ring gyros” are not directly reflective of, or proportional to, the angular rate, they are not the “angular rate electrical signals” of challenged claim 1, or the “angular rate voltage signals directly proportional to angular rates” of challenged claim 4.

Nintendo has failed its burden to establish teaching or suggestion of this element in *Smith*, for both Grounds 1 and 2. In addition, as discussed above, Grounds 1 and 2 depend entirely on the alleged obviousness combination of *Smith* with *Chan* and *Bernstein*, which is not obvious and would not be combined. Again, Nintendo has failed its burden to support the alleged combination, and for all of these reasons, the challenged claims should be upheld.

IV. Nintendo failed to prove that the challenged claims are obvious over *Tingleff* in combination with *Chan* and *Bernstein*

Tingleff, the base reference for Ground 3, fails to disclose at least the “a micro inertial measurement unit” employing MEMS sensors, and the “angular rate electrical signal” elements of the challenged claims. Further, for reasons similar to those discussed above, *Tingleff* is not properly combined with *Chan* and *Bernstein* with respect to “a micro inertial measurement unit” employing MEMS sensors.

Petitioner’s *Tingleff* arguments are facially deficient, and fail to prove that *Tingleff* in combination could render obvious any challenged claim. There is simply no teaching or suggestion in *Tingleff* of the claimed MEMS accelerometers or gyroscopes, or the claimed angular rate electrical [voltage] signals detected from those gyroscopes. Petitioner’s Ground 3, relying on *Tingleff* and the missing motivation to combine it with *Chan* and *Bernstein*, must also fail.

A. Petitioner failed to show that the *Tingleff* combination discloses or renders obvious “a micro inertial measurement unit” using MEMS sensors according to the challenged claims

Nintendo failed to show that the *Tingleff* reference discloses or suggests the “a micro inertial measurement unit” using MEMS sensors elements—as disclosed and claimed. *See, e.g.*, ’648 Patent, 23:43 (claim 1), 24:36 (dependent claim 4).

Nintendo does not assert that *Tingleff* discloses that it uses MEMS components. Petition, 45. Nor does Nintendo identify any suggestion in *Tingleff* to do so. *Id.* Nintendo, and the reference itself, fails to identify the type of gyroscopes used in *Tingleff*. In fact, Nintendo provides no additional obviousness analysis at all, referring only to its discussion in Ground 1. *Id.*

As explained subsection III.A above, and for the same reasons, Nintendo’s arguments are facially deficient, supported only by improper hindsight reasoning, and do not show that the *Tingleff* combination could render obvious any challenged claim. There is simply no teaching or suggestion in the *Tingleff* combination of the claimed “micro inertial measurement unit” employing MEMS sensors, and Nintendo’s improper arguments based on the ’648 patent are too conclusory and selective to be credited. Nintendo failed its burden to establish this element to be obvious in the claimed combinations.

B. Petitioner failed to show that *Tingleff* would be combined with *Chan* and *Bernstein*

As with its proposed combination of *Smith* with *Chan* and *Bernstein*, Nintendo’s cursory motivation to combine argument here—taking up all of one paragraph—fails to provide the required motivation for a person of ordinary skill to combine the references, to substitute MEMS sensors into the alleged IMU of *Tingleff*. Petition, 45-46.

As in subsection III.B above, and for the same reasons, Nintendo has failed its burden to show a motivation in the *Tingleff* reference to combine.

In its lone paragraph, Nintendo makes reference only to the purported general advantage of smaller size—here again, to fit in an aircraft. Petition, 45. As above, this kind of non-specific reference to a general characteristic like “size” is not a sufficient motivation. *In re Beasley*, 117 Fed. Appx. at 744. This is particularly true when these disclosures are praising features of their own invention, rather than expressing any need to further improve. EX1004, 3:11-13. Nintendo again points to mention of aircraft as a common application. Petition, 46. But MEMS gyroscopes at the time of the invention did not have the performance for effective use in aircraft. EX2023, ¶¶8, 12. A skilled artisan would not be motivated to insert existing MEMS sensors that have “insufficient accuracy, sensitivity, and stability” for the application involved. ’648 Patent, 17:19-36.

As with the other Grounds, Nintendo’s arguments here are facially deficient, supported only by improper hindsight reasoning, and do not show that the *Tingleff* combination could render obvious any challenged claim. There is simply no teaching or suggestion in the *Tingleff* combination of the claimed “micro inertial measurement unit” using MEMS sensors, and no motivation for a person of ordinary skill to undertake the complicated and difficult technology

substitution that would have been involved in using MEMS sensors. EX2020, 31:24-36:2; EX2019, ¶¶54, 76-79; EX2023, ¶¶3, 7-8, 10-12, 24-25. Nintendo has failed to show this element to be obvious in the claimed combinations, and the challenged claims should be upheld.

C. Petitioner failed to show that *Tingleff* discloses or renders obvious “angular rate electrical signals” according to the challenged claims

Nintendo’s cursory discussion of this element as it relates to *Tingleff* does not provide any relevant detail about the workings of the references’ black box “GYROS 22” and fails to show teaching or suggestion of the “angular rate electrical [voltage] signals” properly interpreted. Petition, 47-48. Nintendo—and Dr. Young in verbatim copied testimony—merely argue that the disclosed “error signal” from the gyros somehow is used to indicate angular rate. *Id.* But as shown above with respect to laser ring gyros and their signals’ indirect relation to angular rate, not all indications meet the claim language requiring “detecting” angular rate electrical signals or angular rate voltage signals that are directly proportional to the angular rates. *See* Section III.C above. Without more detail, which *Tingleff*, and Nintendo, fail to provide, the reference does not teach or suggest these claim elements.

V. Nintendo failed to prove that the challenged claims are obvious over *Yamawaki* in combination with *Chan* and *Bernstein*

Yamawaki, the base reference for Ground 4, fails to disclose at least the “a

micro inertial measurement unit” employing MEMS sensors, and the “digital velocity increments” or the “angular rate electrical signal” elements of the challenged claims. Nintendo’s arguments and proposed combinations each fail to render obvious these elements, for reasons similar to those discussed above, and as further detailed below.

Further, for reasons similar to those discussed above, *Yamawaki* is not properly combined with *Chan* and *Bernstein* with respect to “a micro inertial measurement unit” employing MEMS sensors.

Petitioner’s *Yamawaki* arguments are facially deficient, and fail to prove that *Yamawaki* in combination could render obvious any challenged claim. There is simply no teaching or suggestion in *Yamawaki* of the claimed MEMS accelerometers or gyroscopes, or the claimed digital velocity increments or angular rate electrical signals. Petitioner’s Ground 4, relying on *Yamawaki* and the missing motivation to combine it with *Chan and Bernstein*, or with *Saubolle*, must also fail.

A. Petitioner failed to show that the *Yamawaki* combination discloses or renders obvious “a micro inertial measurement unit” using MEMS sensors according to the challenged claims

Nintendo failed to show that the *Yamawaki* reference discloses or suggests the “a micro inertial measurement unit” using MEMS sensors elements—as

disclosed and claimed. *See, e.g.*, '648 Patent, 23:43 (claim 1), 24:36 (dependent claim 4).

Nintendo does not assert that *Yamawaki* discloses that it uses MEMS components. Petition, 59. Nor does Nintendo identify any suggestion in *Yamawaki* to do so. *Id.* Again here, Nintendo, and the reference itself, fails to identify the type of gyroscopes used in *Yamawaki*. Again here, Nintendo provides no additional obviousness analysis at all, referring only to its discussion in Ground 1. *Id.*

As explained subsection III.A and IV.A above, and for the same reasons, Nintendo's arguments are facially deficient, supported only by improper hindsight reasoning, and do not show a reasonable likelihood that the *Yamawaki* combination could render obvious any challenged claim. There is simply no teaching or suggestion in the *Yamawaki* combination of the claimed "micro inertial measurement unit" employing MEMS sensors, and Nintendo's improper arguments based on the '648 patent are too conclusory and selective to be credited. Nintendo failed its burden to establish this element to be obvious in the claimed combinations.

B. Petitioner failed to show that *Yamawaki* would be combined with *Chan* and *Bernstein*

As with its proposed combination of *Smith* or *Tingleff* with *Chan* and *Bernstein*, Nintendo's cursory motivation to combine—taking up all of one paragraph—argument fails to provide the required motivation for a person of ordinary skill to combine the references to substitute MEMS sensors into the alleged IMU of *Yamawaki*. Petition, 59.

As in subsection III.A and IV.A above, and for the same reasons, Nintendo has failed its burden to show even a reasonable likelihood of establishing a motivation to combine.

In its lone paragraph, Nintendo again refers to disclosures referencing a generalized need for small size. *Id.* Nintendo again omits mention that the disclosures are discussing achieved advantages of *Yamawaki*, rather than motivation for further improvement. EX1010, [0014] (“the DT1 *is* a portable device” ... “with all components compactly accommodated”) (emphasis added).

This disclosure does not provide a motivation to rip out the sensors of the DT1, replace them with then existing MEMS sensors that are “difficult” and have “insufficient accuracy, sensitivity, and stability” ('648 Patent, 6:6-43, 17:19-36), and undertake a complicated redesign of the sensing and control electronics and the manufacturing process. Petition, 18; EX2019, ¶¶76-79. As discussed in the

sections above, Nintendo cannot succeed here with its unsupported argument that “this would have been regarded as a routine implementation to a skilled artisan.” Petition, 18; 37 C.F.R. §42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

As with the other Grounds, Nintendo’s arguments here are facially deficient, supported only by improper hindsight reasoning, and do not show a reasonable likelihood that the *Yamawaki* combination could render obvious any challenged claim. There is simply no teaching or suggestion in the *Yamawaki* combination of the claimed “micro inertial measurement unit” using MEMS sensors, and no motivation for a person of ordinary skill to undertake the complicated and difficult technology substitution that would have been involved in using MEMS sensors. EX2020, 31:24-36:2; EX2019, ¶¶54, 76-79; EX2023, ¶¶3, 7-8, 11-12, 24-25. Nintendo has failed to show this element to be obvious in the claimed combinations, and the challenged claims should be upheld.

C. Petitioner failed to show that the *Yamawaki* and *Saubolle* combination discloses or renders obvious “digital velocity increments” according to the challenged claims

MEMS sensors are not the only claim elements lacking any teaching or suggestion in *Yamawaki*’s disclosures. For example, Nintendo failed to show that *Yamawaki* in combination with *Saubolle* discloses or suggests the “digital velocity

increments” elements as disclosed and claimed. *See, e.g.*, ’648 Patent, 24:10-21 (claim 1).

Nintendo admits that *Yamawaki* “does not expressly” disclose “**digital** velocity increments.” Petition, 68. It does not. Nor does Nintendo identify any suggestion in *Yamawaki* to do so. *Id.*, 67-68. As discussed above, “signal digitizing” to enable digital signal processing was disclosed by American GNC in the ’648 Patent as a key element of its success integrating its MEMS sensor based IMU. *See, e.g.*, ’648 Patent, Abstract, 2:62-3:13; Section II.A above.

Instead, Nintendo relies on an alleged combination with *Saubolle*. Petition, 69-72. Nintendo says almost nothing about *Saubolle*, other than that it mentions rate of ascent and is related to “diving.” *Id.*, 69. This is for good reason, because *Saubolle* is a completely non-analogous device, based on a using a “threshold detector” to sense a binary alert when the rate of pressure change has grown too high. EX1011, Abstract.

Nintendo doesn’t rely on *Saubolle* for “the particular details” of its system. Petition, 69. This is also for good reason, because they are not relevant. Instead, Nintendo argues that *Saubolle* would somehow inspire an ordinary artisan to “adapt” *Yamawaki* to record velocity changes digitally, so that divers won’t get “the ‘bends.’” Petition, 70. And also to do so in all directions, even though the

bends only comes from going up, and *Yamawaki*'s device presumably knows which way is up. *Id.*, 71.

Saubolle is not an analogous reference, nor reasonably pertinent, and Nintendo's conclusory statements to the contrary don't meet its burden of proof. *Id.*, 70.

But perhaps the biggest problem with the alleged combination is that *Saubolle*'s system is entirely analog, and its function could be performed with a "threshold detector" on an analog velocity signal. EX1011, Abstract, Fig. 3. There is no need for digital conversion suggested in *Saubolle* or *Yamawaki*. In fact, *Saubolle* disparages a prior art "digital" system as "complex," and unfavorably compared to its "surprisingly simple" solution. *Id.*, 1:43-52, 2:15-21. Even if a reader of *Yamawaki* were somehow interested in digitizing its 3-axis analog signals—which is nowhere suggested by the reference itself—the single-axis, analog solution of *Saubolle* would not be pertinent or helpful. Nintendo has failed its burden to establish a reasonable likelihood of showing obviousness, or a motivation to combine, here.

For all of these reasons, Nintendo has failed its burden to show obviousness of this element for any challenged claim, and institution should be denied. .

D. Petitioner failed to show that *Yamawaki* discloses or renders obvious “angular rate electrical signals” according to the challenged claims

Nintendo’s cursory discussion of this element as it relates to *Yamawaki* does not provide any relevant detail about the workings of the references’ black box “3D gyroscope 13” and fails to show teaching or suggestion of the “angular rate electrical [voltage] signals” properly interpreted. Petition, 60-61. Nintendo—and Dr. Young in verbatim copied testimony—merely argue that the elements would be understood from the “boxes for providing rotational velocity information.” *Id.* But as shown above with respect to laser ring gyros and their signals’ indirect relation to angular rate, not all such “information” meets the claim language requiring “detecting” angular rate electrical signals or angular rate voltage signals that are directly proportional to the angular rates. *See* Section III.C above. Without more detail, which *Yamawaki*, and Nintendo, fail to provide, the reference does not teach or suggest these claim elements.

VI. The Petition should not have been instituted and should be dismissed.

As discussed in American GNC’s Preliminary Response and above, each of the grounds are improperly based on hindsight and on attorney argument disguised as conclusory expert testimony. The reasons that this analysis is improper and unfair to patent owners like American GNC are further summarized

below. In addition, the Petition is time-barred, for failing to name a real party in interest that would be barred under §315(b) from bringing the Petition.

A. The Petition is entirely founded on impermissible hindsight

In the Petition, Nintendo relies heavily on the disclosures of the '648 Patent to explain its allegations of obviousness, improperly using American GNC's own patent disclosure against its allowed claims. This reliance on the disclosures of American GNC's inventors to explain Nintendo's Grounds is improper. *Univ. of Strathclyde*, 17 F.4th at 165 (“[T]he inventor’s own path itself never leads to a conclusion of obviousness; that is hindsight.”).

As discussed further above, Nintendo's various statements about alleged “Rationale and Motivation to Combine” are almost exclusively limited to descriptions of what the references disclose. This fails to provide the required motivation to make the combination—because it is not enough to simply say what is known from the references. *Virtek*, 97 F.4th at 888 (“It does not suffice to simply be known. A reason for combining must exist.”). “[C]onclusory statements of generalized advantages” are also not enough. *In re Beasley*, 117 Fed. Appx. at 744.

Both of these tactics of Nintendo in the Petition run afoul of the prohibition against using hindsight to invalidate claims. This is something that courts have long, and often, warned against. And this case shows precisely why it is no

answer merely to say that a concept, like a MEMS gyroscope, is “known”—as in Nintendo’s Petition or the Board’s institution decision (Paper 10 at 34). It could also be, and here was, known that MEMS gyroscopes of the time had performance problems, making them difficult and unsuitable for the claimed use—without the further inventive elements of the claim. *See, e.g.*, EX2019, ¶¶53-54; EX2023, ¶¶7-8, 10-11. An ordinary engineer is not motivated to substitute and combine technologies known to be difficult or unsuitable to integrate. Focusing only on knowledge that a technology *exists* improperly ignores and devalues innovation required to *make that technology work* in a new, valuable application. *See, e.g.*, EX2020, 31:24-36:2 (“I worked on it for about ten years”).

The claimed invention is not to be “used as a frame” on which “individual, naked parts of separate prior art references were employed as a mosaic to recreate a facsimile of the claimed invention.” *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1552-53 (Fed. Cir. 1983) (“To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.”).

The main guardrail against hindsight in obviousness analysis is the requirement of showing a motivation, discussed or taught in the prior art references, to combine what is known from them. “Given the ‘subtle but powerful attraction of a hindsight-based obviousness analysis,’ [the Federal Circuit] require[s] a ‘rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.’” *In re Beasley*, 117 Fed. Appx. at 743.

Because “claimed discoveries almost necessarily will be combinations of what, in some sense, is already known,” finding obviousness based on a combination of references requires “a reason that would have prompted a person of ordinary skill in the art to combine the elements.” *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 401 (2007); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only could have made but would have been motivated to make the combinations or modifications of prior art to arrive at the claimed invention.”).

As shown above, Nintendo’s obviousness analysis, and assertions concerning motivations to make the combinations in question, run afoul of all of these precedents—inviting the Board to engage in hindsight analysis from a perspective twenty-five years after the proper one.

But considering the available guidance from courts and prior decisions about the necessity to guard against such hindsight—and the ways to avoid it—the Board should conclude that there is no merit in the Petition. *See, e.g., Apple Inc. v. Contentguard Holdings, Inc.*, IPR2015-00442, Paper 9 at 11-12, 17 (P.T.A.B. July 13, 2015) (“analysis infected with impermissible hindsight cannot form the basis of an obviousness finding”); *see also, e.g., Graham v. John Deere Co.*, 383 U.S. 1, 36 (1966); *Pers. Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 993-94 (Fed. Cir. 2017) (“[T]hat reasoning seems to say no more than that a skilled artisan, once presented with the two references, would have understood that they could be combined. And that is not enough: it does not imply a motivation to pick out those two references and combine them to arrive at the claimed invention.”).

For all of these reasons, in addition to the lack of merit in the obviousness arguments themselves, the Board should give no weight to the Petition’s alleged motivations to combine. Nintendo’s arguments are solely based in hindsight, using the ’648 Patent as a roadmap and failing to specify any particular reason arising from the references themselves to assemble the piecemeal mosaic of elements that Nintendo suggests. Again, “[a] reason for combining must exist,” and “conclusory statements of generalized advantages” like size are not enough. *Virtek*, 97 F.4th at 888; *In re Beasley*, 117 Fed. Appx. at 744.

B. The Petition and Declaration present only conclusory attorney argument

Nintendo's Petition provides nothing but conclusory say-so and attorney argument on the central questions of what would be obvious to a POSITA and whether they would be motivated to seek combinations. What a POSITA would or wouldn't have found obvious—i.e., their knowledge and skill level—is a *fact question* to be determined based on *evidence*. See, e.g., *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); see also *Circuit Check Inc. v. QXQ Inc.*, 795 F.3d 1331, 1335 (Fed. Cir. 2015) (fact question whether art is analogous). “Attorney argument is not evidence.” *Icon Health and Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017) (reversing Board for relying on argument); MPEP §2145 (“arguments of counsel cannot take the place of factually supported objective evidence”).

Here Nintendo alleges only obviousness, and does so via complicated prior art combinations. Petition, 4. Accordingly, Nintendo must prove, *inter alia*: the level of ordinary skill in the art; that a person of ordinary skill in the art would be motivated to and would combine those references; and that the references disclose or render obvious to a person of ordinary skill in the art each and every element.

Each of Nintendo's core arguments that it must prove depends on what a person of ordinary skill—according to Nintendo someone with at least a Bachelor

of Science degree in Electrical Engineering and two or three years of experience working in motion sensor systems, see Petition, 5—would understand or find obvious in 2000. On each of Nintendo’s core obviousness arguments, Nintendo offers only the Declaration of Dr. Darrin Young as “evidence.” *See, e.g.*, Petition, 18: EX1002, ¶99.

The Declaration of Dr. Young is not properly evidence here, because these opinions of Dr. Young are merely attorney argument from the Petition affixed with the signature and CV of Dr. Young. IPR expert declarations are meant to be independent *testimony*—see 37 C.F.R. §42.53—not unsupported argument and conclusion copied in large part verbatim from the Petition. When Dr. Young was asked to describe his own work in his own words on cross-examination, he gave factual examples completely incompatible with the “routine implementation” argument above. EX2020, 31:24-36:2 (“I worked on it for about ten years”), 66:22-70:3, 77:7-81:13.

As noted in American GNC’s Preliminary Response, The Board should give such conclusory, unsupported assertions by experts little or no weight. *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004); *Rohm and Haas Co. v. Brotech Corp.*, 127 F.3d 1089, 1092 (Fed. Cir. 1997); 37 C.F.R. §42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). The Board

should reject this manufactured “testimony” and not credit the obviousness and level of skill opinions in the declaration. *See, e.g., Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321 (Fed. Cir. 2020) (upholding finding that copied testimony “did not ‘add materially to Petitioner's unpersuasive attorney argument’”).

As explained herein Nintendo and Dr. Young offer nothing but conclusory pronouncements about the capabilities of ordinary artisans, and improper roadmap citation to the inventors’ own journey. American GNC’s highly cited and oft licensed patents cannot be invalidated by the bare statement that the key inventive step of integrating MEMS angular rate sensors and MEMS accelerometers into an IMU would have been obvious. “[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). That explanation cannot be “the inventor’s own path” of invention. *Univ. of Strathclyde*, 17 F.4th at 165. Experts cannot offer opinions based solely on their say-so, as Dr. Young repeatedly does here. *Gen. Elec. Co. v. Joiner*, 522 U.S. 136, 146 (1997) (courts not required to “admit opinion evidence that is connected to existing data only by the ipse dixit of the expert.”).

For all of these reasons, in addition to the lack of merit in the arguments themselves, the Board should give no weight to Dr. Young's obviousness opinions and unsupported (and indeed self-contradicted) statements about the knowledge and capabilities of a person of ordinary skill in the art.

C. The Petition is time barred

The Petition is time barred under §315(b) because of an infringement complaint (EX2012) served on a real party in interest more than a year earlier. *See, e.g., Ventex Co., Ltd. v. Columbia Sportswear North America, Inc.*, 2019 WL 764130, *2-6 (P.T.A.B. Jan. 24, 2019) (*designated precedential*, April 16, 2019) (noting that the “burden [is] on IPR petitioners to demonstrate that its petitions are not time-barred”); 35 U.S.C. §315(b).

Nintendo failed to name at least STMicroelectronics N.V. and STMicroelectronics S.r.l. (“STMicro”) as a real party in interest. *See* Petition, 1. If an STMicro entity is a real party in interest here, then this Petition is time-barred. Entities STMicroelectronics N.V. and STMicroelectronics S.r.l. were sued in 2020 and served with a Complaint alleging infringement of patents including the '648 Patent. *See, e.g.,* EX2012, ¶¶164-202; EX2013.⁴

⁴ STMicroelectronics N.V. initially contested domestic and mail service. STMicroelectronics S.r.l. did not contest service. Both parties were subsequently

That Complaint provided STMicro with notice sufficient to trigger application of the time bar statute—because it was “a complaint alleging infringement” of the ’648 Patent against STMicro’s co-defendant and customer. 35 U.S.C. § 315(b); *see also*, *GoPro, Inc. v. 360Heros, Inc.*, IPR2018-01754, 2019 WL 3992792, *6, Paper 38 (P.T.A.B. Aug. 23, 2019) (precedential) (noting time bar triggered by notice, even of a defective complaint); *Facebook, Inc. v. Windy City Innovations, LLC*, 953 F.3d 1313, 1326-28 (Fed. Cir. 2020) (finding bar even as to particular claims for which party was not specifically accused).

STMicro well understood that it had been accused of infringement in the 2020 litigation, and could be again. Indeed, in American GNC’s litigation against Nintendo, STMicro (via U.S. entity STMicroelectronics, Inc.) objected to a subpoena by invoking the accusations of the prior 2020 litigation and suggesting that American GNC was seeking to accuse STMicro “yet again.” EX2014, 1 (“At issue in the 2020 Lawsuit were four U.S. Patents, allegedly owned by American GNC, including U.S. Patent Nos. 6,508,122 and 6,671,648 (‘Asserted Patents’)”), 2 (“leaving the door open for American GNC to attempt to bring improper claims

served under the Hague Convention. *American GNC Corporation v. OnePlus Technology (Shenzhen) Co., Ltd. et al.*, No. 6:20-cv-00171-ADA, D.I. 33 at 7, 2 fn. 2 (W.D. Tex. Aug. 17, 2020).

against ST or a foreign entity yet again”). While STMicro is not a party in American GNC’s litigation against Nintendo, its Complaint implicates STMicro products in Nintendo’s infringement, and discovery is being sought from STMicro’s U.S. and foreign parent and subsidiaries. EX2007, ¶¶46-56, 63-74.

Whether STMicro is a real party in interest here is a fact-specific question. For example, in *Ventex*, the Board noted the central importance of “determining whether the non-party is a clear beneficiary that has a preexisting, established relationship with the petitioner,” and relied on a supplier agreement including indemnification obligations that made the non-party “a clear beneficiary of *Ventex*’s efforts in this *inter partes* review.” 2019 WL 764130, *3. The Board also noted the length of time the parties had done business together. *Id.* Based on the contractual supplier relationship between the parties there, as here, the Board was able to “conclude that [STMicro] will benefit from [Nintendo’s] actions and [Nintendo] represents [STMicro’s] interests in this action.”

Also here, STMicro has expressed its belief that it may be faced with additional infringement actions under the “Asserted Patents.” EX2014, 1-2. It is clear, even on this preliminary record, that STMicro would be a “beneficiary of [Nintendo’s] efforts in this *inter partes* review, and that Nintendo is representing those interests here because its supplier STMicro cannot under §315(b).

Here, the parties also have a long relationship that includes supplier obligations relevant to the precedential *Ventex* analysis. There is no dispute that STMicro supplies components to Nintendo, found in products accused of infringement in district court. *See* EX2007, EX2025. Nor is there a dispute that a supplier agreement exists or that Nintendo and STMicro have discussed indemnification. *See, e.g.,* EX2018, 9:24-13:15 (discussing production of agreement in district court, and Nintendo counsel stating that “STMicro has not agreed to indemnify us” and denying coordination). American GNC has requested authorization from the Board to file a Motion for Discovery seeking the agreement and related communications, *see* EX2018—but has not yet had a response from the Board, and renews its request for authorization here.

The Petition should be dismissed for failure to identify real parties in interest. *See, e.g., Ventex*, 2019 WL 764130, *4-5, 7.

VII. Conclusion

For all of the reasons detailed above, the challenged claims should be upheld.

Dated: January 7, 2025

Respectfully submitted,

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37 C.F.R. §42.24(d) CERTIFICATION

The undersigned hereby certifies that this submission, excluding the tables of contents, certificate of word count, exhibit list, and certificate of service, contains 13,370 words, as determined using the standard word counting feature of the Microsoft Word program.

Dated: January 7, 2025

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CERTIFICATE OF SERVICE

Petitioner has consented to e-mail service in this proceeding. Pursuant to 37 C.F.R. §42.6, the undersigned certifies that on January 7, 2025, a copy of the foregoing document was served by email upon the following counsel at the below email addresses:

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