

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ABB INC.,
Petitioner,

v.

NORTHWESTERN UNIVERSITY,
Patent Owner.

IPR2022-00521
Patent 6,928,336 B2

Before KEN B. BARRETT, MEREDITH C. PETRAVICK, and
PAUL J. KORNICZKY, *Administrative Patent Judges*.

KORNICZKY, *Administrative Patent Judge*.

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

I. INTRODUCTION

Petitioner, ABB Inc., filed a Petition for *inter partes* review of claims 1, 4–10, 13–16, 18–23, 25, and 26 of U.S. Patent No. 6,928,336 B2 (Ex. 1001, “the ’336 patent”). Paper 1 (“Pet.”). Patent Owner, Northwestern University, filed a Preliminary Response opposing institution. Paper 6 (“Prelim. Resp.”).

Under 35 U.S.C. §§ 6(b)(4), 314 and 37 C.F.R. § 42.4(a), we have authority to institute an *inter partes* review if “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2018). After considering the Petition, Preliminary Response, and other evidence of record, we determine that Petitioner has demonstrated a reasonable likelihood of showing the unpatentability of at least one of the challenged claims. Thus, we grant Petitioner’s request to institute an *inter partes* review of claims 1, 4–10, 13–16, 18–23, 25, and 26 of the ’336 patent on all grounds in the Petition.

II. BACKGROUND

A. *Real Parties-in-Interest*

As required by 37 C.F.R. § 42.8(b)(1), each party identifies the real party-in-interest. Petitioner identifies itself and ABB Ltd. as real parties-in-interest. Pet. 2. Patent Owner identifies itself as the real party-in-interest. Paper 3, 1.

B. Related Proceedings

As required by 37 C.F.R. § 42.8(b)(2), Petitioner and Patent Owner identify the judicial or administrative matters that would affect or be affected by a decision in this proceeding. Petitioner and Patent Owner state the '336 patent is the subject matter of the following proceedings:

(1) *Northwestern University v. ABB Ltd. and ABB Inc.*, Case No. 1:21-cv-00150 (D. Del.);

(2) *Northwestern University v. KUKA AG and Reis Robotics USA Inc.*, Case No. 1:21-cv-00599 (N.D. Ill.);

(3) *Northwestern University v. Universal Robots A/S and Universal Robots USA, Inc.*, Case No. 1:21-cv-00149 (D. Del.);

(4) *Northwestern University v. Fanuc Corporation and Fanuc America Corp.*, Case No. 1:21-cv-00596 (N.D. Ill.), which was dismissed on December 15, 2021;

(5) *Northwestern University v. Mitsubishi Electric Corp., et al.*, Case 1:21-cv-00607 (N.D. Ill.), which was dismissed on September 7, 2021; and

(6) *Northwestern University v. Yaskawa Electric Corporation, et al.*, Case No. 1:21-cv-00603 (N.D. Ill.), which was dismissed on September 15, 2021. Pet. 2–3; Paper 3, 1.

The parties also identified the following *inter partes* reviews:

(1) *ABB Inc., KUKA AG, and Reis Robotics USA Inc. v. Northwestern University*, IPR2022-00216 (PTAB Nov. 23, 2021), regarding US Patent 6,907,317 B2, which Petitioner asserts contains substantially the same content as the '336 patent; and

(2) *ABB Inc., KUKA AG, and Reis Robotics USA Inc. v. Northwestern University*, IPR2022-00296 (PTAB Dec. 10, 2021), regarding US Patent

7,120,508 B2, which Petitioner asserts is a divisional of the '336 patent. Pet. 3–4; Paper 3, 1.

C. Overview of the '336 Patent (Ex. 1001)

The '336 patent is titled “System and Architecture for Providing a Modular Intelligent Assist System.” Ex. 1001, code (54). The '336 patent “relates to the field of programmable robotic manipulators and assist devices, and in particular, robotic manipulators and assist devices that can interact with human operators.” *Id.* at 1:7–10. The '336 patent explains that, for example, in manufacturing assembly line and material handling situations, mechanical assistance to a human operator may be desirable because a payload may be too heavy for the operator, to allow more rapid movement, or to avoid strain, fatigue, and repetitive motion injuries. *Id.* at 1:14–21. In the Background of the Invention, the '336 patent describes Intelligent Assist Devices. *See id.* at 1:63–2:67.

Intelligent Assist Devices (“IADs”) are a class of computer-controlled machines that interact with a human operator to assist in moving a payload. IADs may provide a human operator a variety of types of assistance, including supporting payload weight, helping to overcome friction or other resistive forces, helping to guide and direct the payload motion, or moving the payload without human guidance. The Robotics Industries Association T15 Committee on Safety Standards for Intelligent Assist Devices describes IADs as a single or multiple axis device that employs a hybrid programmable computer-human control system to provide human strength amplification, guiding surfaces, or both. These multifunctional assist devices are designed for material handling, process and assembly tasks that in normal operation involve a human presence in its workspace. Typically, Intelligent Assist Devices (IADs) are force-based control devices that range from single

axis payload balancing to multiple degree of freedom articulated manipulators.

Id. at 1:63–2:13. The Specification, explaining the benefits of the computer interface in an IAD, states:

Currently, assist devices are immobile when not driven by a worker. In contrast, a device that performs autonomous programmable motion is called a robot and if an operation is to be performed by a robot, human workers must be excluded from the vicinity for their own safety. So a particular task is generally either robotic or non-robotic, and with few options in between. IADs, however, by virtue of their computer interface can make mixed tasks possible, which may be termed “semi-autonomous behavior”. IADs make semi-autonomous behaviors possible in proximity and collaboration with human workers.

Id. at 3:54–64.

According to the ’336 patent, “[n]eeded is the ability to connect and integrate a number of IAD components to work together, and a computer interface design that allows [a] technician or system integrator to easily program, operate and monitor the status of an IAD system made up of a plurality of components.” Ex. 1001, 2:51–57. To that end, the ’336 patent describes a multi-functional hub, “which serves as a communication center for the operator, integrator and for system components . . . [and] can also act as a mechanical component of the system to support a tooling or payload and integrate electrical and pneumatic components of the system.” *Id.* at 3:33–38.

Reproduced below is Figure 1 of the '336 patent.

Figure 1

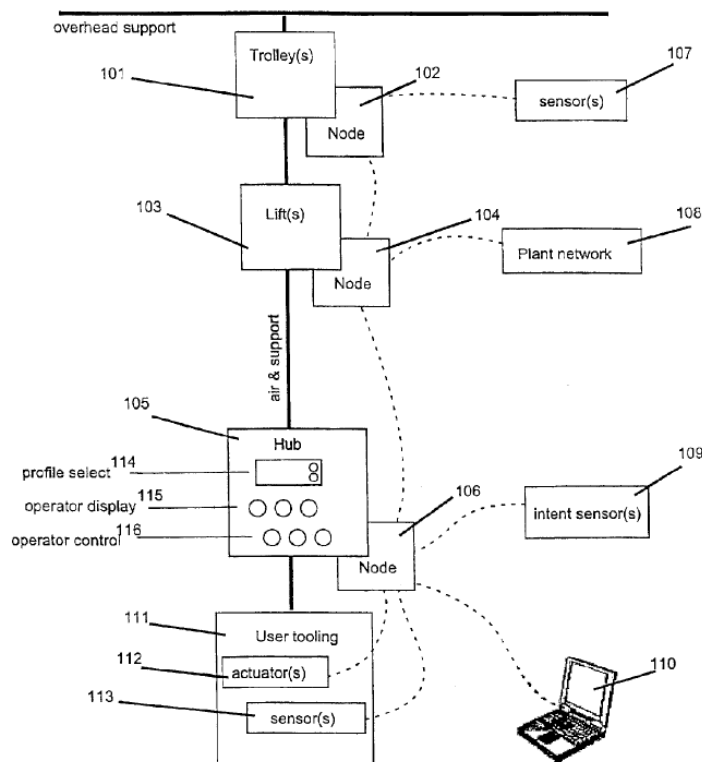


Figure 1 depicts a high-level block diagram illustrating an exemplary modular architecture for an overhead rail system. *See id.* at 4:64–65, 6:36–37. “The described modular architecture includes the interconnection of modules such as a trolley 101, lift 103, sensor 107, hub 105, intent sensor 109, and user tooling 111 via computational nodes 102, 104, and 106 to plant information systems such as a plant network 108 and user-supplied or system-integrator-supplied components such as computer 110.” *Id.* at 6:37–43.

Computational nodes 102, 104, 106 generally include a central processing unit (CPU) or digital signal processing (DSP) unit or microcontroller, or other computational device capable of running a stored program and capable of

communication with modules, and also having digital and analog inputs and outputs in order to receive signals from sensors and switches and to control motors and other actuators and indicators.

Id. at 8:11–18.

[A]n exemplary hub logic panel . . . relates to programming of the logic functions of the IAD, such as conditions under which the IAD may move beyond a particular height. It also relates to programming of the digital and analog inputs and outputs which are available to the system integrator or installer via connector in hub 105. The system integrator or installer may take advantage of programmable logic to reduce the need for discrete logic components, or even, as is common practice, for pneumatic logic components.

Id. at 17:1–10.

D. Illustrative Claim

The '336 patent contains 30 claims. As mentioned above, Petitioner challenges claims 1, 4–10, 13–16, 18–23, 25, and 26. Claim 1, the only challenged independent claim, is reproduced below.¹

1. [a] An intelligent assist system having a modular architecture, comprising:

[b] a motion module for supporting and moving a payload;

[c] a plurality of computational nodes, at least one of the plurality of computational nodes being configured to control the motion module; and

[d] a plurality of communication links, at least one of the plurality of communication links being between two of the plurality of computational nodes to carry information between the nodes to actuate the motion module.

Ex. 1001, 19:31–41.

¹ For ease of reference, we use Petitioner's claim numbering scheme.

E. Evidence and Asserted Grounds

Petitioner relies upon the following evidence:

- (1) U.S. Patent 5,341,459, issued August 23, 1994 (Ex. 1006, “Backes”);
- (2) Michael Peshkin and J. Edward Colgate, “Cobots,” *Industrial Robot: An International Journal*, Vol. 26, No. 5, 1999 (Ex. 1005, “Peshkin”);
and
- (3) Shimon Y. Nof, *Handbook of Industrial Robotics*, Second Edition, John Wiley & Sons, Inc., 1999 (Ex. 1004, “The Handbook”).

Petitioner submits a declaration of David Alan Bourne (Ex. 1003) in support of its contentions.

Patent Owner, at this stage, does not submit any supporting declarations.

Petitioner challenges the patentability of the '336 patent claims on the following grounds:

Ground ²	Claim(s) Challenged	35 U.S.C. § ³	Reference(s)/Basis
1	1, 4–10, 13–16, 18–23, 25, 26	102	The Handbook
2	1, 4–10, 13–16, 18–23, 25, 26	103	The Handbook, Peshkin
3	1, 4–10, 13, 18–23, 25	102	Backes
4	1, 4–10, 13, 18–23, 25	103	Backes, Peshkin
5	14–16	103	Backes, The Handbook
6	14–16	103	Backes, The Handbook, Peshkin

Pet. 7.

III. ANALYSIS

A. Legal Standards

Petitioner bears the burden of persuasion to prove unpatentability, by a preponderance of the evidence, of the claims challenged in the Petition. 35 U.S.C. § 316(e). This burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). The Board may authorize an *inter partes* review if we determine that the information presented in the Petition and Patent Owner’s Preliminary Response shows that there is a reasonable likelihood that Petitioner will

² For ease of reference, we use Petitioner’s numbering scheme.

³ The '336 patent was filed before the effective date (i.e., March 16, 2013) of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), and we apply the pre-AIA versions of 35 U.S.C. §§ 102 and 103. Our decision is not impacted, however, by which version of the statute applies.

prevail with respect to at least one of the claims challenged in the Petition.
35 U.S.C. § 314(a).

As mentioned above, Petitioner’s challenge is based on anticipation and obviousness. Pet. 9. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. Inc., v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987); *see also Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008) (to anticipate a patent claim under 35 U.S.C. § 102, “a single prior art reference must expressly or inherently disclose each claim limitation”). Moreover, “[b]ecause the hallmark of anticipation is prior invention, the prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008). Whether a reference anticipates is assessed from the perspective of one of ordinary skill in the art. *See Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368–69 (Fed. Cir. 2003) (“[T]he dispositive question regarding anticipation [i]s whether *one skilled in the art* would reasonably understand or infer from the [prior art reference’s] teaching’ that every claim element was disclosed in that single reference.” (second and third alterations in original) (quoting *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991))).

A claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing

date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved based on underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in the record, objective evidence of nonobviousness.⁴ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the art is “a prism or lens” through which we view the prior art and the claimed invention. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). The person of ordinary skill in the art is a hypothetical person presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of ordinary skill in the art, we may consider certain factors, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *Id.*

Petitioner, with supporting declaration testimony, asserts that a person of ordinary skill in the art would have had “a Bachelor’s degree in robotics, mechanical engineering, computer engineering, computer science or a similar discipline, with at least three years of relevant industry or research

⁴ At this stage of the proceeding, Patent Owner has not directed us to any objective evidence of non-obviousness.

experience, including experience designing or implementing intelligent assist devices or robots” and “[a]dditional work or research experience can substitute for less or different education, and vice-versa.” Pet. 12–13 (citing Ex. 1003 ¶ 39). Patent Owner does not dispute Petitioner’s proposal or offer a different definition. Prelim. Resp. 3.

For purposes of this Decision, we adopt Petitioner’s unopposed, proposed definition of the level of ordinary skill in the art.

C. Claim Construction

In an *inter partes* review, the claims are construed using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b) (2021). This claim construction standard includes construing the claim in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art. *Id.*; *see Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). In construing claims in accordance with their ordinary and customary meaning, we consider intrinsic evidence such as the specification and the prosecution history of the patent. *Phillips*, 415 F.3d at 1315–17. Extrinsic evidence, including expert and inventor testimony, dictionaries, and treatises, may also be used but is less significant than the intrinsic record. *Id.* at 1315. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* Any special definitions for claim terms must be set forth in the specification with reasonable clarity, deliberateness, and precision. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

Additionally, only terms that are in controversy need to be construed, and these need be construed only to the extent necessary to resolve the controversy. *See Realtime Data LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’”)

Independent claim 1 begins with the recitation: “An intelligent assist system having a modular architecture” Ex. 1001, 19:31–32. Petitioner contends the claim’s preamble is limiting, arguing that “the specification indicates that the use of an ‘intelligent assist device’ is a critical part of the alleged invention” and “it was clearly relied upon during prosecution to distinguish over prior art.” Pet. 13 (citations omitted).

Petitioner describes two possible constructions for the term “intelligent assist system.” Petitioner asserts that Patent Owner has taken a broad construction in its litigations: an intelligent assist system is “a system that can interact with a human operator through semi-autonomous behavior as well as through fully autonomous operation safely around humans.” Pet. 14–15. Petitioner argues that we should adopt its “narrower” construction: an intelligent assist system is “a single or multiple axis computer controlled machine with a hybrid programmable computer-human control system that interacts with a human operator to assist in moving a payload and provide human strength amplification, guiding surfaces, or both.” *Id.* at 15 (citing Ex. 1003 ¶ 63). Petitioner, however, also argues that “the [challenged] claims are invalid under both the broader and narrower constructions.” *Id.* at 17.

In response, Patent Owner states that it “does not take a position” and that, “[u]nder either construction, Petitioner cannot meet its burden to prove unpatentability.” Prelim. Resp. 7.

For the reasons discussed below, we determine that Petitioner has demonstrated that there is a reasonable likelihood of prevailing in its challenge to at least one claim. Therefore, we need not and do not reach Petitioner’s claim construction contentions.

D. Ground 3: Asserted Anticipation of Claims 1, 4–10, 13, 18–23, and 25 by Backes

Petitioner asserts that claims 1, 4–10, 13, 18–23, and 25 are unpatentable under 35 U.S.C. § 102 as being anticipated by Backes under the broader construction of “intelligent assist system.” Pet. 50–69. Petitioner provides a limitation-by-limitation comparison of Backes to the challenged claims, citing the declaration of Mr. Bourne as supporting evidence. *Id.* Patent Owner opposes. Prelim. Resp. 10–14, 17–19, 23–28. Based on the evidence of record, we conclude Petitioner has shown a reasonable likelihood of prevailing at least on its anticipation assertion as to independent claim 1. We present an overview of Backes and then address the parties’ contentions below.

1. Backes (Ex. 1006)

Backes is a patent titled “Generalized Compliant Motion Primitive.” Ex. 1006, code (54). Backes relates “to robotic control systems and, in particular, to task primitives, that is, preprogrammed programs for controlling a robot to accomplish a task based on a set of input parameters which may be designated before, at the start time of, or during task execution.” *Id.* at 1:18–23.

Figure 1 of Backes is reproduced below.

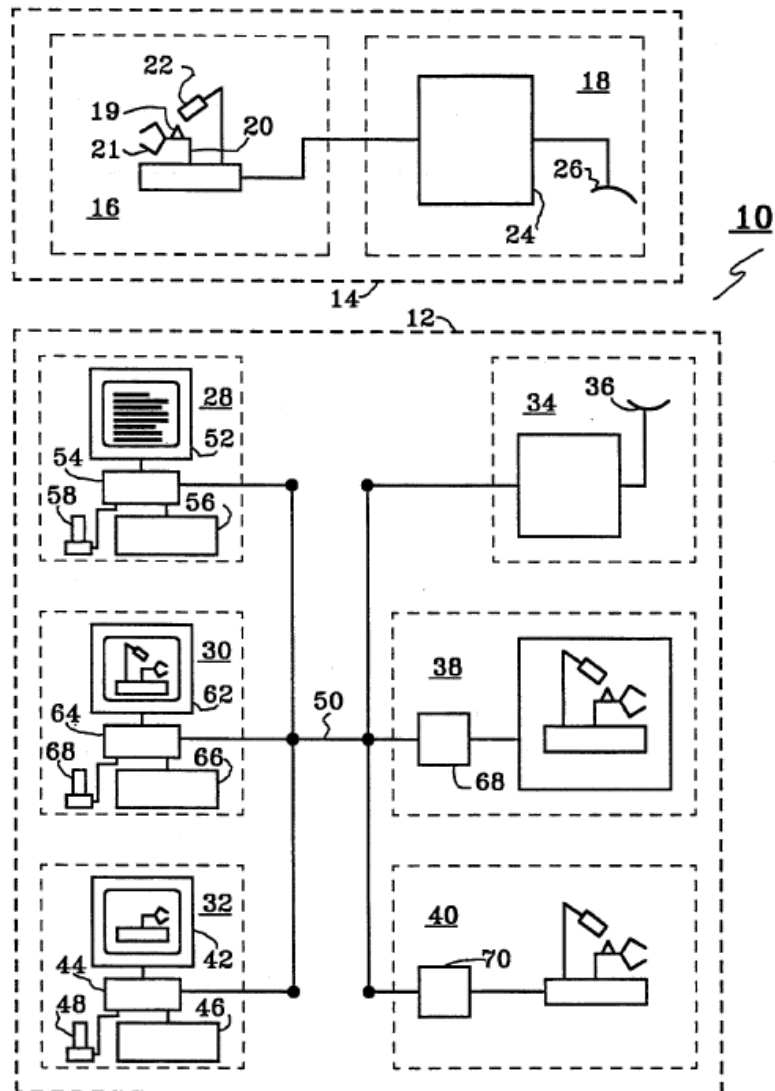


Figure 1

Figure 1 is a block diagram schematic of a telerobot control system 10 utilizing a task execution primitive. *Id.* at 4:15–17. Telerobot control system 10 includes operator interface 12 and remote task execution system 14. *Id.* at 4:30–41. Remote task execution system 14 includes robot manipulator 16 suitable for the tasks to be performed and communication link 18 for providing bidirectional communication with operator interface 12. *Id.* Robot manipulator 16 includes remotely controllable devices such

as robot arm 20, end effector 21, and remote sensors, such as force-torque sensor 19 and video camera 22. *Id.* Communication link 18 includes communication and control system processor 24 as well as a suitable linkage device, such as antenna 26. *Id.*

Operator interface 12 includes one or more separate or combined operator terminals, including setup, simulation and execution terminals 28, 30, and 32. Ex. 1006, 4:42–49. Operator interface 12 also includes operator interface communication processor 34, including a suitable linkage device such as antenna 36, as well as graphics simulator 38 and local robot manipulator 40. *Id.*

Telerobot control system 10 is operable in a conventional telerobot control mode in which pure teleoperation control is employed. Ex. 1006, 4:66–5:9. During such operation, an operator working at execution terminal 32 is directly connected in real time, or near real time, to remote task execution system 14 via operator interface communication processor 34. *Id.* Commands entered via terminal entry device 46 and/or hand controller 48 are implemented by robot manipulator 16 while information is made available to the operator from remote sensors, such as force-torque sensor 19 and/or video camera 22, via monitor 42 and/or hand controller 48. *Id.*

Backes' Abstract summarizes the operation of telerobotic operation system 10 as follows:

A generalized compliant motion with sensor fusion primitive uses a set of input parameters provided from a local control site to a remote execution site to control a telerobot with a combination of a priori trajectory motion and real and virtual local and remote sensor inputs. The set of input parameters specify the desired telerobot behavior based on a combination of local and remote information. This general motion primitive requires less computer memory size, and provides more

capabilities, than the task specific primitives it replaces because redundancies are eliminated while permutations of capabilities are available. Trajectory motion occurs during a nominal motion time segment while termination conditions are monitored during an ending time segment to stop motion when a termination condition occurs. Force and compliant motion, teleoperation, dither, virtual springs restoration and joint limit control are combined with the trajectory motion at the remote site.

Ex. 1006, code (57).

2. *Independent Claim 1*

Petitioner begins by discussing Backes and how it teaches each limitation of independent claim 1. Pet. 50–56.

As to the preamble of claim 1 — an “**intelligent assist system having a modular architecture**” — Petitioner asserts Backes’ remote task execution system 14 is the recited “intelligent assist system” under the broader construction and has a “modular architecture.” Pet. 50 (citing Ex. 1003 ¶ 156–157). Petitioner explains that Backes’ remote task execution system 14 is “a system that can interact safely with a human operator through operator interface 12” and “can operate in a semi-autonomous mode as well as an autonomous mode.” *Id.* (citing Ex. 1003 ¶ 158); *see id.* at 51–52.

As to claim limitation 1b — “**a motion module for supporting and moving a payload**” — Petitioner asserts that Backes teaches this limitation by disclosing “robot 16 which is a motion module for supporting *and* moving a payload.” Pet. 52 (emphasis added). According to Petitioner, Backes teaches a “task execution system 14 which includes robot manipulator 16, suitable for the tasks to be performed.” *Id.* at 53–54 (citing

Ex. 1006, 4:26–41 (“Referring now to FIG. 1, telerobot control system 10 includes operator interface 12 and remote task execution system 14 which includes robot manipulator 16, suitable for the tasks to be performed, and communication link 18 for providing bidirectional communication with operator interface 12.”); Ex. 1003 ¶ 163). This task execution system 14 is the motion module. *Id.* Backes further teaches that “the payload that is moved or supported can be for instance doors, cranks, bolts, or pins.” *Id.* at 54 (citing Ex. 1006, 8:28–32; Ex. 1003 ¶ 164).

As to claim limitation 1c — **“a plurality of computational nodes, at least one of the plurality of computational nodes being configured to control the motion module”** — Petitioner asserts that Backes teaches this limitation by disclosing that “the task execution system has one or more CPUs (computational nodes) that control the motion module” (i.e., remote task execution system 14). Pet. 54 (citing Ex. 1006, 5:47 (“These executives control one or more central processing units, or CPU’s, within remote task execution system 14 and/or operator interface 12, which sequentially call, operate and execute task primitives, provide status and sensor feedback to operator interface 12 and run other programs in sequence or in parallel with the task primitives, such as embedded safety and monitoring primitives.”); Ex. 1003 ¶¶ 167–169). Petitioner explains that Backes teaches a “communication and control system processor 24 to control robot manipulator 16” (*id.* (citing Ex. 1006, 6:63–67)) and “numerous operator terminals, such as ‘execution terminal 32’ each containing ‘central processor 44’ which are additional computational nodes” (*id.* (citing Ex. 1006, 4:51–62; Ex. 1003 ¶ 168)).

Finally, as to claim limitation 1d — **“a plurality of communication links, at least one of the plurality of communication links being between two of the plurality of computational nodes to carry information between the nodes to actuate the motion module”** — Petitioner asserts that Backes teaches this limitation. Pet. 55. Referring to Figure 1 of Backes (reproduced above), Petitioner explains that Backes teaches a plurality of communication links, including communication links between: (1) operator terminals 28, 30, and 32 which program and operate the robot, and (2) the terminals and communication processor 34, graphics simulator 38, and local robot manipulator 40 through interconnect system 50. *Id.* (citing Ex. 1006, 4:42–48; Ex. 1003 ¶ 170).

Patent Owner argues that Petitioner’s challenge based on Backes is fundamentally flawed for several reasons. First, Patent Owner argues that Backes does not disclose an “intelligent assist system” under Petitioner’s broader construction — “a system that can interact with a human operator through semi-autonomous behavior as well as through fully autonomous operation safely around humans.” Prelim. Resp. 23–28. According to Patent Owner, Backes — a system in which the robot arm is many miles away from the human operator — cannot operate safely around human operators. *Id.* at 24.

Based on the present record, we do not need to resolve at this stage of the proceeding whether the preamble is limiting because, regardless of whether the preamble is limiting, Petitioner shows sufficiently for purposes of institution that the prior art satisfies the recitation in the preamble. We do not agree with Patent Owner’s arguments that Backes does not disclose the intelligent assist system. Petitioner explains that Backes’ “remote task

execution system 14 is an ‘intelligent assist system’ under the broader construction.” Pet. 50. According to Petitioner, “[r]emote task execution system 14 is a system that can interact safely with a human operator through operator interface 12” and “can operate in a semi-autonomous mode as well as an autonomous mode.” *Id.* (citing Ex. 1003 ¶ 158). Based on the present record, Petitioner’s arguments (*see, e.g.*, Pet. 50–52), supported by Mr. Bourne’s unrebutted testimony (*see, e.g.*, Ex. 1003 ¶¶ 156–161), adequately demonstrate that Backes’ discloses the recited “intelligent assist system” under the broader construction. We encourage the parties to address the construction of “intelligent assist system” and to support their arguments regarding Backes with evidence, not attorney argument. *See In re Geisler*, 116 F.3d 1465, 1471 (Fed. Cir. 1997) (argument by counsel cannot take the place of evidence).

Second, Patent Owner argues that Petitioner does not demonstrate that Backes discloses claim limitation 1b — a “motion module for supporting and moving a payload.” Prelim. Resp. 10–14. Patent Owner argues that Petitioner is unclear about whether robot manipulator 16 (called robot by the parties) or remote task execution system 14 is the recited “motion module.”

We do not agree with Patent Owner that Petitioner is unclear about what teaches the recited “motion module,” i.e., the robot manipulator 16 or the remote task execution system 14. As we understand Backes, remote task execution system 14 “includes robot manipulator 16, suitable for the tasks to be performed” and “[r]obot manipulator 16 includes one or more remotely controllable devices such as robot arm 20 [and] end effector 21.” Ex. 1006, 4:30–38. Referring to Figure 1 of Backes (reproduced above), we also note the robot manipulator 16 is part of remote task execution system 14.

Patent Owner also argues that Petitioner does not show that Backes' motion module supports *and* moves a payload. Prelim. Resp. 11. According to Patent Owner, Petitioner merely argues that Backes' robot manipulator 14 is "suitable for the tasks to be performed" without "explain[ing] or analyz[ing] what the 'tasks to be performed' are and whether they include supporting and moving a payload." *Id.* at 11–12. Patent Owner argues that Backes, at best, describes moving a payload, not supporting a payload. *Id.* at 13.

We do not agree. Referring to Figure 2 of Backes, which is an illustration of an example of a task to be performed, Backes "provides for the execution of tasks such as door opening, crank turning, bolt seating and turning, pushing, sliding, pin insertion and removal, and leveling." Ex. 1006, 8:29–32, 4:18–20. We understand that, to perform these tasks, Backes robot manipulator 16 must support and move a payload; if it cannot support the payload, then it cannot move the payload. If there is any meaningful difference between "moving" a payload as opposed to "supporting" a payload, we encourage the parties to address this issue as part of claim construction and to identify supporting evidence.

Third, Patent Owner argues that Petitioner does not demonstrate that Backes discloses claim limitation 1d — "at least one of the plurality of communication links being between two of the plurality of computational nodes to carry information between the nodes to actuate the motion module." Prelim. Resp. 17–19. Patent Owner argues that Petitioner does not provide "any explanation identifying which communication link is between two computational nodes 'to carry information between the nodes to actuate the motion module'" or any explanation "how two computational

nodes communicate information through a communication link to actuate the motion module.” *Id.* at 18.

We do not agree. Petitioner, referring to Figure 1 of Backes (reproduced above), adequately explains that “Backes teaches a plurality of communication links, including, . . . communication links between operator terminals 28, 30, and 32 which program and operate the robot and between the terminals and communication processor 34, graphics simulator 38, and local robot manipulator 40 through interconnect system 50.” Pet. 55 (citing Ex. 1006, 4:42–48; Ex. 1003 ¶ 170). Backes also discloses that remote task executor system 14 and robot manipulators 16 have communication link 14 for bidirectional communication with operator interface 12 to control the robot manipulators 16 and communication link 18 includes communication and a control system processor 24 as well as a suitable linkage device, such as antenna 26. Ex. 1006, 4:30–41; *see also id.* at 4:44–58 (“Operator interface 12 also includes operator interface communication processor 34, including a suitable linkage device such as antenna 36, as well as graphics simulator 38 and local robot manipulator 40.”).

For the reasons above, we find that Petitioner demonstrates a reasonable likelihood of showing the unpatentability of independent claim 1.

3. *Dependent Claims 4–10, 13–16, 18–23, 25, and 26*

Regarding claims 4–10, 13–16, 18–23, 25, and 26, which depend from independent claim 1, Petitioner provides a limitation-by-limitation comparison of Backes to these dependent claims, citing the declaration of Mr. Bourne as supporting evidence. Pet. 56–69. Other than its arguments for independent claim 1, Patent Owner does not separately address

Petitioner's challenges to these dependent claims. *See generally* Prelim. Resp. 7–23 (limiting Patent Owner's arguments to independent claim 1). We find that Petitioner demonstrates a reasonable likelihood of showing the unpatentability of dependent claims 4–10, 13–16, 18–23, 25, and 26.

E. Grounds 1, 2, and 4–6: Asserted Unpatentability of Claims 1, 4–10, 13–16, 18–23, 25, and 26

Petitioner asserts that certain challenged claims are unpatentable under 35 U.S.C. §§ 102 and 103 as follows:

- (1) claims 1, 4–10, 13–16, 18–23, 25, and 26 as anticipated by The Handbook (Ground 1),⁵
- (2) claims 1, 4–10, 13–16, 18–23, 25, and 26 as being obvious over The Handbook and Peshkin (Ground 2),
- (3) claims 1, 4–10, 13, 18–23, 25, and 26 as being obvious over Backes⁶ and Peshkin (Ground 4),

⁵ We encourage Petitioner to address Patent Owner's arguments that Petitioner's anticipation arguments are based on disparate portions of The Handbook, which do not disclose claim elements "arranged as in the claim." *See, e.g.,* Prelim. Resp. 37 (citing *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008)).

⁶ Patent Owner argues that Backes is not prior art for Petitioner's obviousness challenges because it is non-analogous art as "[i]t involves robots used in deep sea and outer space, which are quite literally miles apart from the manufacturing facility robots of the '336 patent that collaborate with humans." Prelim. Resp. 45; *see id.* at 42 (citing *In re Klein*, 647 F.3d 1343, 1348 (Fed. Cir. 2011) ("A reference qualifies as prior art for an obviousness determination under § 103 only when it is analogous to the claimed invention.")), 43–45. For Petitioner's anticipation challenge, the "question of whether [Backes] is analogous art is irrelevant to whether that reference anticipates." *State Contracting & Eng'g Corp. v. Condotte America, Inc.*, 346 F.3d 1057, 1068 (Fed. Cir. 2003).

(4) claim 14–16 as being obvious over Backes and The Handbook (Ground 5); and

(5) claim 14–16 as being obvious over Backes, The Handbook, and Peshkin (Ground 6). Pet. 9.

Because we have decided to grant institution on Petitioner’s challenge in Ground 3, we do the same for the claims challenged in Grounds 1, 2, and 4–6. 37 C.F.R. § 42.108(a) (“When instituting *inter partes* review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”); *see also SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348 (2018) (holding that a final written decision in an *inter partes* review must decide the patentability of all claims challenged in the corresponding petition); *see Guidance on the Impact of*

Based on the present record, we do not agree with Patent Owner’s arguments that Backes is non-analogous art for Petitioner’s obviousness challenges. In its Field of Invention, the ’336 patent states the “present invention relates to the field of programmable robotic manipulators and assist devices, and in particular, robotic manipulators and assist devices that can interact with human operators.” Ex. 1001, 1:7–10. Similarly, Backes states the “present invention relates to robotic control systems and, in particular, to task primitives, that is, preprogrammed programs for controlling a robot to accomplish a task based on a set of input parameters which may be designated before, at the start time of, or during task execution.” Ex. 1006, 1:18–23. Based on the present record, we find that Backes is analogous art to the ’336 patent because they occupy the same field of endeavor and reasonably address the same problems with which the inventors of the ’336 patent are involved. *K-TEC, Inc. v. Vita-Mix Corp.*, 696 F.3d 1364, 1375 (Fed. Cir. 2012) (“To qualify as prior art for an obviousness analysis, a reference must qualify as “analogous art,” i.e., it must satisfy one of the following conditions: (1) the reference must be from the same field of [the inventor’s] endeavor; or (2) the reference must be reasonably pertinent to the particular problem with which the inventor is involved.”).

SAS on AIA Trial Proceedings (Apr. 26, 2018),
<https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial> (“As required by [*SAS*] decision, the PTAB will institute as to all claims or none,” and “if the PTAB institutes a trial, the PTAB will institute on all challenges raised in the petition.”); PTAB Consolidated Trial Practice Guide 5–6 (Nov. 2019), *available at* <https://www.uspto.gov/sites/default/files/documents/tpgnov.pdf?MURL=>.

IV. ORDER

For the foregoing reasons, it is

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1, 4–10, 13–16, 18–23, 25, and 26 of the ’336 patent with respect to all grounds is hereby instituted; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial commencing on the entry date of this Decision.

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For PETITIONER:

Brent Yamashita
Lisa Lint
DLA PIPER LLP (US)
brent.yamashita@dlapiper.com
lisa.lint@dlapiper.com

For PATENT OWNER:

Joseph Micallef
SIDLEY AUSTIN LLP
jmicallef@sidley.com

Meg Fasulo
BARTLIT BECK LLP
meg.fasulo@bartlitbeck.com