

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AURIS HEALTH, INC.,
Petitioner,

v.

INTUITIVE SURGICAL OPERATIONS, INC.,
Patent Owner.

IPR2019-01547
Patent 6,522,906 B1

Before ERICA A. FRANKLIN, ULRIKE W. JENKS, and
JAMES A. WORTH, *Administrative Patent Judges*.

JENKS, *Administrative Patent Judge*.

JUDGEMENT

Final Written Decision
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318

I. INTRODUCTION

This is a Final Written Decision in an *inter partes* review challenging the patentability of claims 16, 22, 23, 25, 26, 51, and 53 of U.S. Patent No. 6,522,906 B1 (“the ’906 patent,” Ex. 1001). We have jurisdiction under 35 U.S.C. § 6.

Petitioner has the burden of proving unpatentability of a claim by a preponderance of the evidence. 35 U.S.C. § 316(e) (2018). Having reviewed the arguments of the parties and the supporting evidence, we find that Petitioner has not demonstrated by a preponderance of the evidence that the challenged claims are unpatentable.

A. Procedural Background

Auris Health, Inc., (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 16, 22, 23, 25, 26, 51, and 53 of the ’906 patent. Paper 1 (“Pet.”). Intuitive Surgical Operations, Inc. (“Patent Owner”) timely filed a Preliminary Response to the Petition. Paper 9 (“Prelim. Resp.”). With Board authorization, Petitioner filed a supplemental brief addressing the Markman Transcript from the related district court proceeding, and Patent Owner filed a response. Paper 10 (“Pet. Supp. Br.”); Paper 11 (“PO Supp. Br.”). In view of the then-available, preliminary record, we concluded that Petitioner satisfied the burden, under 35 U.S.C. § 314(a), to show that there was a reasonable likelihood that Petitioner would prevail with respect to at least one of the challenged claims. Accordingly, on behalf of the Director (37 C.F.R. § 42.4(a) (2018)), and in accordance with *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1353 (2018) and the Office’s Guidance on the Impact of

SAS on AIA Trial Proceedings (Apr. 26, 2018),¹ we instituted an *inter partes* review of claims 16, 22, 23, 25, 26, 51, and 53 of the '906 patent on all the asserted grounds. Paper 12 ("Dec."), 40. Patent Owner timely filed a Response. Paper 14 ("PO Resp."). Petitioner filed a Reply ("Pet. Reply," Paper 18) and Patent Owner filed a Sur-reply ("Sur-reply," Paper 21). A hearing was held on December 4, 2020, and a transcript was entered into the record. Paper 27 ("Tr.").

B. Real Parties-in-Interest

Petitioner identifies Auris Health Inc., Ethicon, Inc., and Johnson & Johnson as real parties-in-interest to this proceeding. Pet. 1. Patent Owner identifies Intuitive Surgical Operations, Inc. and Intuitive Surgical, Inc. as the real parties-in-interest. Paper 4, 1.

C. Related Proceedings

Petitioner identifies several issued patents and pending applications that are related to the '906 patent. Pet. 1. The parties also state the '906 patent has been asserted in the copending district court proceeding, *Intuitive Surgical, Inc. v. Auris Health, Inc.*, No. 18-1359-MN (D. Del.). Pet. 1; Paper 4, 1.

D. The '906 Patent (Ex. 1001)

The '906 patent is titled "[d]evices and methods for presenting and regulating auxiliary information on an image display of a telesurgical system to assist an operator in performing a surgical procedure." Ex. 1001, code

¹ <https://www.uspto.gov/patents-application-process/patent-trial-and-appeal-board/trials/guidance-impact-sas-aia-trial>.

(54). The '906 patent issued from Application No. 09/464,455 (“the '455 application”), filed December 14, 1999, which ultimately claims the benefit of U.S. Provisional Application No. 60/111,711, filed December 8, 1998. *Id.* at code (60).

The '906 patent relates to performing robotically assisted surgical procedures on a patient while providing an operator with auxiliary information pertaining to the surgical procedure. Ex. 1001, code (57). Laparoscopic surgery generally uses tools to view the surgical field and uses end effectors to perform the procedure. *Id.* at 2:10–12. The tools are generally inserted through cannulas to access the internal surgical site. *See id.* at 2:22–40. “Typical surgical end effectors include clamps, graspers, scissors, staplers, and needle holders, for example.” *Id.* at 2:13–15, *see id.* at 8:14–23.

“Telesurgery is a general term for surgical systems where the surgeon uses some form of remote control, e.g., a servomechanism, or the like, to manipulate surgical instrument movements, rather than directly holding and moving the tools by hand.” *Id.* at 2:63–67. This involves viewing the surgical site on a visual display while performing the surgery using master control devices, one for each of the surgeon’s hands, to manipulate the remotely controlled robotic instruments. *See id.* at 3:5–15.

The '906 patent describes a method that allows the surgeon to access auxiliary information from the control station.

The master control is typically operatively linked with the source of auxiliary information, enabling the operator selectively to access the source of auxiliary information then including permitting the operator selectively to disassociate the master control from the surgical instrument and to use the

master control to access the source of []auxiliary information so as to enable the auxiliary information to be displayed on the display area of the image display.

Id. at 4:16–23

Figure 1 of the '906 patent, reproduced below, shows a robotic surgical system.

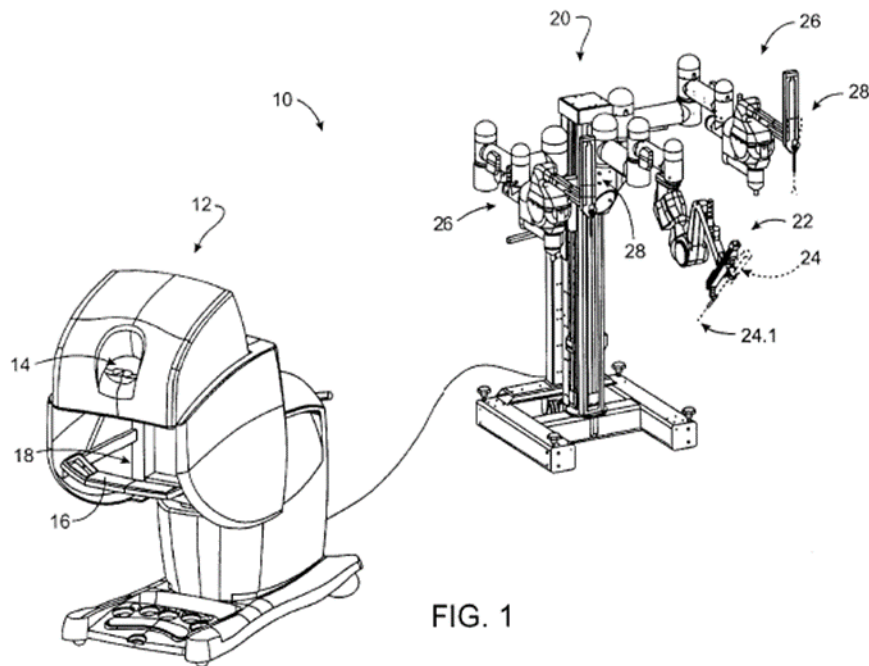


Figure 1 shows a telesurgical system 10, containing a surgeon control station 12, and a cart containing three robotically controlled arms 20. *Id.* at 4:40–45.

“The [surgeon control] station 12 includes an image display or viewer 14 where an image of a surgical site is displayed in use.” *Id.* at 6:1–3. “Each robotic arm assembly 26, 26 [that is part of the cart] is normally operatively connected to one of the master controls.” *Id.* at 6:37–38. “[T]he surgeon views the surgical site through the viewer 14. The end effector 60 carried on each arm 26 is caused to perform positional and orientational movements in response to movement and action inputs on its associated master control.”

Id. at 9:43–46.

Displaying auxiliary information, such as EKG signals or preoperative reference information, at the viewer 14 allows the surgeon to access the information without having to look to another display. *See id.* at 12:49–13:16. The auxiliary information may be displayed in a discrete window, in an overlaid window, or “being selectively displayable in the image at the viewer alternately with the image of the surgical site.” *Id.* at 13:11–13, *see id.* at 16:45–46 (“a ‘picture in picture’ arrangement.”). “It will be appreciated that the auxiliary information can be displayed on a separate image display or viewer where appropriate.” *Id.* at 13:14–16. Auxiliary information can include models, “the image of [a preoperative] model can be positionally and orientationally adjusted, and typically scaled, so as to enable the surgeon to bring the preoperative image into register with the actual image of the surgical site.” *Id.* at 16:7–10.

“Selection of a desired source [of information] typically takes place at the operator console 12. Such selection can be made in any appropriate manner, such as by using buttons, foot pedals, a mouse, and/or the like. . . . [The master control] can serve as a two-dimensional or three-dimensional mouse.” *Id.* at 19:16–24. “[W]hen one, or both, or either, of the masters are to be used selectively to place an image corresponding to auxiliary information from a selected source . . . the slaves [i.e. robotic arms] are typically held or locked in stationary positions at the surgical site.” *Id.* at 23:2–9.

E. Illustrative Claims

Claims 16, 51, and 53 of the '906 patent are independent claims and reproduced below:

16. A method of performing a surgical procedure on a patient, the method comprising:
- manipulating a linkage of a master control in three dimensions whilst viewing a real time image of a surgical site on an image display;
 - moving an end effector in response to the manipulation of the linkage of the master control, said end effector visible on said image display, so as to perform at least part of a surgical procedure at the surgical site;
 - selectively accessing a source of auxiliary information in response to the manipulation of the linkage of the master control; and
 - displaying the auxiliary information on the image display, wherein the master control is operatively associated with the end effector to cause the end effector to move in response to the manipulating of the master control, and wherein the selectively accessing the source of auxiliary information comprises disassociating the master control from the end effector.

Ex. 1001, 30:17–35.

51. A method for preparing for or performing a robotic surgical procedure at a surgical site on a patient, the method comprising:
- displaying information relevant to the surgical procedure on an image display of the robotic surgical system;
 - manipulating a linkage of a master control of the robotic surgical system in three dimensions while viewing the image display;
 - moving an end effector of the robotic surgical system in response to the manipulation of the linkage of the master control so as to prepare for or perform at least part of a surgical procedure at the surgical site when the robotic surgical system is in a first operating mode; and
 - changing the displayed information on the image display of the robotic surgical system in response to the manipulation of the linkage

of the master control when the robotic surgical system is in a second operating mode.

Id. at 32:65–33:15.

53. A system for performing a surgical procedure at a surgical site on a patient, the system comprising:

a master having an input device, a linkage of the input device configured for manipulation by a hand of a system operator so as to define a manipulation in three dimensions;

a surgical end effector;

an image display for displaying information relevant to the surgical procedure; and

a processor coupling the input device to the end effector and the image display, the processor having first and second operating modes, the processor in the first operating mode effecting movement of the end effector in response to the manipulation of the input device, the processor in the second operating mode changing the displayed information in response to the manipulation of the input device.

Id. at 34:3–19

F. Prior art

Petitioner relies upon the following prior art references (Pet. 6):

References	Patent / Publication	Exhibits
Borst	WO 95/01757 published Jan. 19, 1995	Ex. 1004
Salvati	US 5,373,317 issued Dec. 13, 1994	Ex. 1005
Wang '099	US 6,496,099 B2 issued Dec. 17, 2002	Ex. 1006
Wang '850	US 6,102,850 issued Aug. 15, 2000	Ex. 1007

G. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 16, 22, 23, 25, 26, 51, and 53 of the '906 patent on the following six grounds (Pet. 6):

Claims Challenged	35 U.S.C. §²	References/Basis
51, 53	103(a)	Borst, Salvati
51, 53	103(a)	Borst, Salvati, Wang '850
16, 22, 23, 25, 26	103(a)	Borst, Wang '099
16, 22, 23, 25, 26	103(a)	Borst, Wang '099, Wang '850
51, 53	103(a)	Borst, Wang '099
51, 53	103(a)	Borst, Wang '099, Wang '850

Petitioner also relies on the Declaration of Blake Hannaford (Ex. 1003) to support its challenge. Patent Owner relies on the Declarations of Dr. Mark Rentschler (Ex. 2003) and Dr. Eugene Grossi (Ex. 2004) to support its positions.

II. ANALYSIS

A. Person of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art would have had at least an undergraduate degree in electrical engineering, mechanical engineering, robotics, biomedical engineering, or a related field of study, along with about two years of experience in academia or industry. Pet. 16–17 (citing Ex. 1003 ¶ 38). Patent Owner does not address Petitioner's

² The relevant sections of the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (Sept. 16, 2011), took effect on March 16, 2013. Because the application from which the '906 patent issued was filed before that date, our citations to Title 35 are to its pre-AIA version. *See* MPEP § 2159 (Rev. 08.2017).

definition of one of ordinary skill in the art or provide its own proposed definition. *See generally* PO Resp.

Because Petitioner’s definition of one of ordinary skill in the art is reasonable and consistent with the ’906 patent and the prior art of record, we adopt Petitioner’s definition. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (explaining that specific findings regarding ordinary skill level are not required “where the prior art itself reflects an appropriate level and a need for testimony is not shown” (quoting *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985))).

B. Claim Construction

Where, as here, a petition is filed on or after November 13, 2018, the Board applies the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 100(b) (2019). Under that standard, claim terms “are generally given their ordinary and customary meaning” as understood by a person of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

Petitioner proposes construction of three claim terms: “end effector,” “master control / master,” and “changing the displayed information.” Pet. 18–22. Patent Owner agrees with the Board’s preliminary construction for “master” / “master control” and “changing displayed information” but finds that “end effector” or any other claim term does not need construction. PO Resp. 6–8.

1. *“master control /master”*

In the Institution Decision we adopted the district court’s claim construction of the term “master control / master” as our preliminary construction for the claim term because we found it consistent with the disclosure of the specification. Dec. 11–12. Neither Petitioner nor Patent Owner challenged that preliminary construction. PO Resp. 6–7; Pet. Reply 2. Accordingly, we determine here again the claim term “master control / master” to mean “input device of a master-slave configuration.” Dec. 12 (citing Ex. 1014, 123:12–13).

2. *“changing the displayed information”*

In the Institution Decision we adopted the district court’s claim construction of the term “changing the displayed information” as our preliminary construction for the claim term because we found it consistent with the disclosure of the specification. Dec. 12–13. Neither Petitioner nor Patent Owner challenges the construction. PO Resp. 6–7; Pet. Reply 2. Accordingly, we determine here again the claim term “changing the displayed information” to mean “adding information under operator control relevant to the surgical procedure on or alongside a live image of the surgical site.” Dec. 13 (citing Ex. 1014, 122:24–123:1.).

3. *all remaining terms*

In the Institution Decision we determined that no other claims required construction. Neither Petitioner nor Patent Owner challenge that position. See Dec. 13; PO Resp. 7–8; Pet. Reply 2; see *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed ‘to the extent necessary to resolve the controversy.’”

Figure 1 shows an endoscopic stereoscopic (3-D) video imaging of a surgical target, together with an arrangement of an entire operation field. *Id.* at 16:34–17:1. The system includes at least two CCD cameras 1, 2 that view the same target 22 (*id.* at 19:18–20:13), and produce stereoscopic vision in the operating spectacles (*id.* at 20:7–8). “A primary surgeon 101 has a microphone 12 which allows voice activation of the digital zoom capability of the images from the CCD cameras 1, 2 by a voice control unit 13 through the image processor 8.” *Id.* at 20:25–28. “[T]he zooming may be provided by other means than by voice activation, e.g. by a foot switch.” *Id.* at 20:36–21:1. “In addition to the stereoscopic video image in the operating spectacles system, the entire surgical area of interest is monitored by a standard thoracoscope 107 which has a CCD camera 19 mounted on a ball bearing 18 to allow vision in all directions.” *Id.* at 21:14–17. The output of the thoracoscope is displayed on a different video system. *Id.* at 21:20. “In this way all members [] of the surgical team have both an overview of the entire surgical field within the thorax and a magnified stereoscopic view of the grafting area.” *Id.* at 21:25–28. The surgeon can concentrate on the target through the spectacles while keeping the other monitors within the peripheral vision. Peripheral vision allows visual contact with the monitor that displays “the general view of the heart and chest cavity, with the monitors displaying the EKG and haemodynamic parameters of the patient, with his hands and the instruments outside the body, and with the other people in the operating room.” *Id.* at 22:1–4.

The system allows for virtual cardiac image arrest of a beating heart. “In the vicinity of the target area 22, beacons 24 are identified. The beacons 24 may be clearly identifiable anatomic structures or clips placed on the

surface of the heart 20 or e.g. tiny LED's which are temporarily attached to the surface of the heart 20." *Id.* at 22:19–23. "At end-diastole one video image (left and right) is frozen, preferably, by voice command. . . . Beacons 24 are defined interactively (mouse or joy stick controlled cursor in video image) on the surface of the heart near the edge of the target area." *Id.* at 22:32–23:2.

"The surgeon 101 manually handles control robotic instruments 36a, 36b (with left hand and right hand, respectively) (e.g. tweezers) which control a robotic computer system 37." *Id.* at 25:30–32. The robot arms receive tracking signals from tracking control that allows the target to be tracked in real time. *Id.* at 25:2–8.

2. *Salvati (Ex. 1005)*

Salvati is directed to a dual function device that can be toggled between steering control and moving a cursor on a screen. "[A] borescope or endoscope, in which a joystick, trackball, or other manually actuable device can serve a dual function; in a first mode controlling the bending of the endoscope or borescope articulation neck; and in a second mode controlling the cursor position of the viewing screen." Salvati 2:29–34. Figure 3, reproduced below, shows the device.

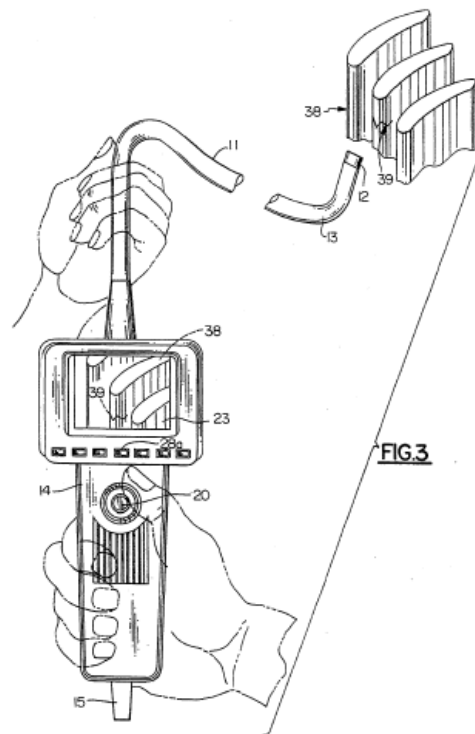


Figure 3 shows the handheld device with joystick that allows the operator to switch back and forth between steering the device and steering a cursor on a screen. *Id.* at 5:7–15.

[T]he operator can manipulate the joystick device 20, here using the thumb of the same hand that is holding the assembly 14, to steer the viewing head 12 as need be for an optimal position to view the crack 39 on the viewing screen 23. When the operator . . . actuates the freeze-frame keyswitch 28a, which causes the microprocessor 33 to switch over to a freeze-frame mode.

Id. The dual function of the joystick device “avoids the need for a second similar device and eliminates the need for a separate keypad.” *Id.* 5:43–44.

3. Wang '099 (Ex. 1006)

Wang '099 is directed to a medical system for performing surgical procedures that can also retrieve patient data stored at a remote location. Ex. 1006, code (57). Wang '099 describes that operating multiple devices

requires multiple user interfaces and that may be distracting to a surgeon. The solution is to provide a general-purpose platform for controlling a plurality of devices. *See id.* at 1:33–61. Figure 1 of Wang '099 is reproduced below:

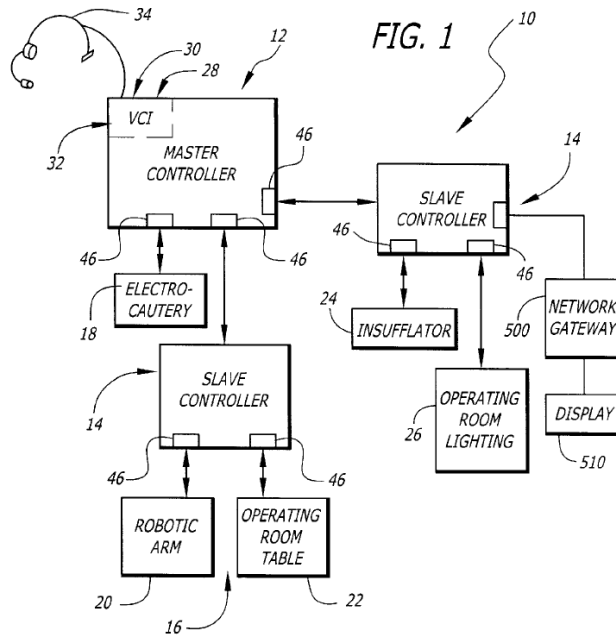


Figure 1 shows a block diagram of a general purpose master controller platform in electrical communication with slave controllers and operating room devices. *Id.* at 3:63–65. The general-purpose platform allows the doctor to manipulate the environment, and surroundings in order to keep movement in the operating room to a minimum. *Id.* at 4:49–5:4.

Wang '099 describes a master controller that can be activated by voice control interface, the system additionally may employ a foot pedal, a handheld device, or some other device, which receives selection of control commands or inputs from user. *Id.* at 2:31–39. Wang '099 describes that when one of these alternative devices is used, the voice control interface (VCI) “is not utilized [to control the device] as the inputs are already in the form of electrical signals as opposed to voice input.” *Id.* at 2:45–46. “The

VCI provides signals indicative of a user's selection of a specific device and signals indicative of control commands the user wishes to supply to the device specified by a specific selection command. These are known, respectively, as selection signals and control signals.” *Id.* at 2:39–43, 10:57–59 (“patient data may be accessed via voice commands and displayed on a monitor or a display coupled to the gateway 500”).

Wang '099 describes that the master control has access to a network. *Id.* at Fig. 1. Wang '099 describes that any patient information available at a hospital computer terminal can also be available in the operating room, and such patient data can be directly displayed on a monitor. *Id.* at 10:31–44. “The data that may be provided includes, but is not limited to x-rays, patient history, MRIs, angiography and CAT scans.” *Id.* at 10:38–40, *see id.* at 10:57–59 (“patient data may be accessed via voice commands and displayed on a monitor or a display coupled to the gateway 500”).

4. Wang '850 (*Ex. 1007*)

Wang '850 is directed to a robotic surgical system that has robotic arms coupled to a pair of master controllers. *Ex. 1007*, code (57). Each handle of the robotic arm has multiple degrees of freedom provided by joints. The joints allow the surgeon to open or close the gripper. In addition, each joint has one or more position sensors to provide feedback with respect to the position of the handle. *Id.* at 8:32–50. The joint may also include tachometers, accelerometers, and force sensing load cells to provide additional feedback. *Id.* at 8:51–52.

D. Ground 1: Obviousness over Borst and Salvati (Claims 51, 53)

Petitioner asserts that claims 51 and 53 are unpatentable as obvious over Borst and Salvati. Pet. 38–54. Patent Owner opposes. PO Resp. 18–36. Having reviewed the arguments of the parties and the supporting evidence, we find that Petitioner has not demonstrated by a preponderance of the evidence that the challenged claims are unpatentable.

Obviousness asserted over a combination of references must be supported by a reason to combine that is based on rational underpinnings. *See In re NuVasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016); *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (cited with approval in *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007)). That requirement is a safeguard against hindsight bias, which is characterized by the “temptation to read into the prior art the teachings of the invention in issue.” *KSR*, 550 U.S. at 421 (quoting *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 36 (1966)).

“[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR*, 550 U.S. at 418. “[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine elements in the way the claimed new invention does.” *Id.*

1. Claim 53

Petitioner asserts that Borst teaches most of the elements recited in claim 53. Pet. 38–45; Pet. Reply 2. Petitioner acknowledges that Borst “does not explicitly disclose that [changing the image on the display] can be done by the manipulation of the linkage of the master control when the robotic surgical system is in a second operating mode.” Pet. 48. Petitioner relies on

Salvati for teaching the use of a system having two operating modes with the same controller. Specifically, “in a first mode [Salvati is] controlling the bending of the endoscope or borescope articulation neck; and in a second mode controlling the cursor position of the viewing screen.” *Id.* at 48.

(emphasis removed) (citing Ex. 1005, 2:29–34; Ex. 1003 ¶ 118). Petitioner asserts that Salvati teaches that the operator can hold Salvati’s device in one hand and use the thumb to operate the joystick to maneuver the viewing head of the device into an optimal position. *Id.* at 49 (Ex. 1005, 4:62–5:45; Ex. 1003 ¶ 119). Petitioner asserts that Salvati teaches that the operator can actuate “the freeze-frame keyswitch 28a” with the thumb “which causes the microprocessor 33 to switch” the video screen display to a static image. Pet. 49–50 (Ex. 1005, 4:62–5:45). Regarding the reason to combine Borst and Salvati, Petitioner asserts:

Salvati expressly recognizes that benefits of combining two sets of functionality into the same controller: “The dual function of the joystick device as described here avoids the need for a second similar device and eliminates the need for a separate keypad.” Ex. 1005, 4:62–5:45. Incorporating this functionality into Borst to achieve the exact benefit described by Salvati would have been obvious to a POSA.⁴

Id. at 51 (citing Ex. 1003 ¶ 122). Petitioner also questions Patent Owner’s declarants’ qualifications as experts. Pet. Reply 10.

Patent Owner opposes. *See generally* PO Resp. 18–36. Specifically, Patent Owner contends: that Petitioner has not established that either Borst or Salvati discloses or suggests “adding information . . . on or alongside a live image of the surgical site” (PO Resp. 18 (Ex. 2003 ¶ 50)); that Petitioner

⁴ Person of ordinary skill in the art (“POSA”).

has not articulated a sufficient “motivation or rationale for ‘adding information under operator control . . . on or alongside a live image of the surgical site’ using the dual-mode controller” (*id.* at 27–28 (Ex. 2003 ¶ 71); and that Petitioner’s combination lacks reasonable expectation for successfully modifying Borst to disengage/reengage the master controls (*id.* at 34).

Patent Owner supports its arguments with the testimony of Drs. Rentschler and Grossi and Petitioner challenges the expert qualifications of both declarants. Thus, we begin our analysis by considering those challenges.

a) Dr. Rentschler’s Qualifications

Petitioner argues that Dr. Rentschler was not a person of ordinary skill in the art in 1999, and lacks knowledge of the state of the art at that time. Pet. Reply 10. Petitioner seeks to disqualify Rentschler’s testimony, but has not filed a motion to exclude or a motion to strike such testimony. Patent Owner opposes. Sur-reply 23–24.

i. Timing of acquired knowledge

Patent Owner responds that Dr. Rentschler did not need to have acquired the requisite knowledge as of the critical date. Dr. Rentschler only needed to have familiarized himself with the information in order to testify about what a person of ordinary skill in the art would have understood at the time of the invention. Sur-reply 23–24.

An expert’s knowledge about the state of the art at the time of the invention does not have to be obtained at the same time of the invention but can be acquired later. “[A]n ‘expert must be qualified to testify about what a person with ordinary skill in the art must have understood at the time of the

invention, but the expert's knowledge of that may have come later.'" *Disney Enterprises, Inc. v. Kappos*, 923 F.Supp.2d 788 (2013) (citing *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 2006 WL 3718074, at *1 (N.D.Ill. Dec. 14, 2006)). To testify as an expert under Federal Rule of Evidence 702, a person need not be a person of ordinary skill in the art, but rather must be "qualified in the pertinent art." *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1363–64 (Fed. Cir. 2008); see *SEB S.A. v. Montgomery Ward & Co.*, 594 F.3d 1360, 1372–73 (Fed. Cir. 2010) (upholding a district court's ruling to allow an expert to provide testimony at trial because the expert "had sufficient relevant technical expertise" and the expert's "knowledge, skill, experience, training [and] education . . . [wa]s likely to assist the trier of fact to understand the evidence"); *Mytee Prods., Inc. v. Harris Research, Inc.*, 439 F. App'x 882, 886–87 (Fed. Cir. 2011) (non-precedential) (upholding admission of the testimony of an expert who "had experience relevant to the field of the invention," despite admission that he was not a person of ordinary skill in the art).

Patent Owner contends that Dr. Rentschler did familiarize himself with the state of the art in robotic surgery in 1999, and thereby is well qualified to testify about the field of robotic surgery in 1999. Sur-reply 24 (Ex. 1016, 15:13–16:5, 87:4–25; Ex. 2003 ¶¶ 5–18). In his deposition, Dr. Rentschler explained that he familiarized himself with the state of the art in 1999 based on reviewing written documents and conversations.

Q. Is it fair to say that your knowledge of the state of the art in December 1999 is based on written documents and things that people told you?

A. I would say written documents, conversations that I had, but also having attended conferences and seeing, sort of, the

technical trade shows a few years after and putting in context what devices were basically being shown at that time and understanding which ones of those and modifications of those were earlier versions that were available a few years earlier in 1999.

Ex. 1016, 15:13–23. In addition, Dr. Rentschler testified that he studied general robotics during his undergraduate and master’s studies. *Id.* at 87:16–20; Ex. 2003 ¶ 6 (noting that expert received his Bachelor’s degree in 2001, a Master’s degree in 2003, and Ph.D. in 2006), ¶ 15 (“I consider myself to be an expert in the field of master-slave surgical robotics. I have also reviewed and familiarized myself with the state of the art in surgical robotics in 1999.”), ¶ 19.

Based on these disclosures, we determine that Dr. Rentschler had a baseline knowledge of robotics and further the evidence in the record sufficiently supports a finding that Dr. Rentschler familiarized himself with the state of the art at the time of the invention to testify about surgical robotics in that time frame.

ii. Knowledge of a surgery system with a single master controlling multiple devices

Petitioner contends that “Dr. Rentschler admitted he did not know that references from 1999 described robotic surgery systems with a single master that could alternatively control multiple surgical devices.” Pet. Reply 10 (citing Ex.1016, 20:13–22, 46:5–24, 78:3–21; *see id.* at 22:2–10, 24:16–25:24, 46:5–24, 76:6–77:8, 79:9–23).

We have reviewed the various portions of Dr. Rentschler’s deposition testimony cited by Petitioner, but do not find support there for Petitioner’s assertions. In his declaration, Dr. Rentschler was clear that his review was

limited to the art cited by Petitioner for its grounds of unpatentability. *See* Ex. 2003 ¶ 49 (“I have been asked to consider the explanations provided by Petitioner in its Petition for *inter partes* review of the ’906 patent and the prior art references serving as grounds of unpatentability for those claims.”). In the deposition, Dr. Rentschler repeatedly pointed out that he did not need to consider whether a master could control multiple slave devices because his focus was on the claims of the ’906 patent that do not recite a slave device. *See, e.g.*, Ex. 1016, 25:14–17 (“[A]s I said, my analysis was of the 906 regarding validity to specific claims and those claims didn’t include a second mode that would have been used to manipulate a second slave manipulator.”). Instead, to address the challenged claims, he focused on the second mode “of adding auxiliary information or additional information on or alongside the live image.” *Id.* at 25:19–20.

iii. Conclusion

We have considered Petitioner’s arguments and evidence, as well as Dr. Rentschler’s qualifications⁵ to testify and the relevance his opinions presented. We find that Dr. Rentschler’s acquired knowledge, along with his education and experience, qualifies him to testify about what a person with ordinary skill in the art would have understood at the time of the invention. Further, we find that his opinions are properly tailored to the challenged claims. Insofar as Petitioner’s arguments go to the weight that should be given to Dr. Rentschler’s testimony, we have weighed the evidence of record as discussed herein.

⁵ Our determination with respect to the sufficiency of Dr. Rentschler’s qualifications are equally applicable to our discussions in Grounds 2–6.

b) Dr. Grossi's Qualifications

Petitioner contends that Dr. Grossi's testimony about not wanting to "relinquish[] control of the surgical instruments by disconnecting the master" should be disqualified because multiple references show systems at that time allowed a surgeon to do exactly that. Pet. Reply 10 (citing Ex.1005, 4:62–5:45; Ex.1007, 3:2–5, 7:29–34; Ex.1004, 9:22–26). Additionally, Petitioner contends that Dr. Grossi used the Zeus robotic system in 2000, a system described in Wang '850, that allows the surgeon to disengage and re-engage a master from the end effector — "the same functionality Dr. Grossi asserted a surgeon would not have wanted." *Id.* at 10–11 (citing Ex.1017, 25:4–13).

Petitioner seeks to disqualify Dr. Grossi's testimony, but has not filed a motion to exclude or a motion to strike such testimony. Thus, we consider Petitioner's argument only in terms of what weight to give the testimony. We have considered and weighed Dr. Grossi's testimony as set forth below in our analysis. Here, we note that Dr. Grossi's use of the Zeus system in 2000, a system that has the capability of disengaging and reengaging the end effectors does not discredit his testimony about what a surgeon would have wanted in such a surgical system in 1999. Dr. Grossi's education and experience qualify⁶ him to provide testimony regarding cardiothoracic surgery including robotic-assisted intracardiac surgical procedures the subject matter of the Borst reference. Ex. 2003 ¶¶ 2–8. Further, we find that his testimony is properly directed to the challenged claims.

⁶ Our determination with respect to Dr. Grossi's qualifications are equally applicable to our discussions in Grounds 2–6.

Now we proceed to a discussion of the combined prior art. In particular, we begin with the parties dispute regarding whether the combined art teaches or suggests “adding information relevant to a surgical procedure” “on or alongside” a live image.

c) *“adding information relevant to a surgical procedure” “on or alongside” a live image*

Petitioner identifies displaying EKG readings on a monitor, zooming and freezing on an image, as well as identifying beacons as meeting the claim element of “adding information . . . on or alongside” a live image. *See, e.g.,* Pet. 44–45; Pet. Reply 3–5. In addition, Petitioner contends that including position coordinates and measurements as described in Salvati also meets the limitation of “adding and information . . . on or alongside” a live image as recited in the claims. *See, e.g.,* Pet. Reply 8.

Patent Owner disagrees, contending that Petitioner’s reliance on position coordinates and measurements for adding information element is a new argument presented in Petitioner’s Reply and should be disregarded. *See, e.g.,* PO Resp. 19–24; Sur-reply 9.

We discuss the insufficiency of each of Petitioner’s identified elements below.

i. *EKG as added information*

Petitioner contends that Borst teaches a robotic surgical system including monitors. “The monitors also display EKG and haemodynamic parameters superimposed on the live image. . . . These data are one form of ‘information . . . relevant to the surgical procedure.’” Pet. Reply 3. We do not disagree with Petitioner that this information is relevant to a surgical procedure. As Patent Owner’s experts explain, this type of information is not

added during surgery; instead, this type of information is supplied to the surgeon from the beginning of the surgery. PO Resp. 23 (Ex. 2003 ¶¶ 57 (

Given that Borst's system is designed for coronary artery bypass graft (CABG) surgery, a person of ordinary skill in the art would have understood that the patient's EKG and other h[a]emodynamic parameters are continuously displayed on a monitor from the beginning of the procedure, and that such vital information is not selectively added to a monitor by the operator during the surgery.),

58 ("no disclosure in Borst that such information is added by the primary surgeon 101 (i.e., the operator) using any instruments or mechanisms associated with Borst's robotic surgical system, such as the master control 36a/36b, the foot pedal, or voice control unit"); Ex. 2004 ¶ 21 ("The 'EKG and haemodynamic parameters' are constantly provided by the anesthesiologist from the beginning of the surgical procedure.")); *see* Sur-reply 14.

We credit Patent Owner's un rebutted and persuasive expert testimonies, from Dr. Rentschler (Ex. 2003 ¶¶ 57, 59) and Dr. Grossi (Ex. 2004 ¶ 21) that EKG and other haemodynamic parameters are continuously provided to the surgeon during surgery and are not the type of information that is added by the surgeon during a procedure.

Accordingly, we determine that peripherally viewing EKG and haemodynamic parameters alongside a surgical view image is not adding information "on or alongside" as required by the claim.

ii. Freezing and zooming as added information

Petitioner contends that the frozen images and the beacons (identified with annotations) are added under operator control. Pet. 45; Pet. Reply 5 ("These are displayed on one of Borst's monitors, and thus, appear "*on or*

alongside” the live image displayed on those monitors.”). Petitioner contends that Borst’s virtual arrested image is information that is added on or alongside the live image. Pet. Reply 7.⁷

Borst teaches using several cameras to monitor the entire surgical area. Ex. 1004, 16:34–17:1, 19:18–22, Figure 1; Pet. 46–48. Borst’s system allows

the surgeon [to] concentrate on the target, us[ing] zooming in if necessary, and at the same time, keep visual contact with a monitor 16 displaying, for instance, the general view of the heart and chest cavity, with the monitors displaying the EKG and haemodynamic parameters of the patient, with his hands and the instruments outside the body, and with the other people in the operating room.

Ex. 1004, 21:34–22:4. “The surgeon 101 . . . experiences the procedure in his operating spectacles 111 as operating on the arrested target, whereas one look over the rim of the operating spectacles 111 at the video monitor 16 will tell him that he is working on the moving target 22.” *Id.* at 26:6–11. Borst teaches that the surgeon can modify the display by freezing and zooming on an image. *Id.* at 24:32–33, 13:2–3. Borst recognizes the advantage of using hands-free for zooming (*id.* at 13:2–3), however, this zooming action may be provided by means other than voice activation such as a foot switch (*id.* at 20:36–21:1).

Patent Owner argues that neither freezing nor zooming of a video image adds any information. PO Resp. 20–21 (Ex, 2003 ¶¶ 53, 55). Patent Owner argues that a virtual arrested image is a live image and is not added

⁷ Patent Owner contends that this is a new argument and should be disregarded. Sur-reply 7.

information, thus, zooming and panning is merely manipulating existing information. Sur-reply 8. Patent Owner's expert attests that "zooming on a live image of the surgical site does not add any new information 'on or alongside the live image of the surgical site'; instead, zooming at best simply magnifies the existing information provided by the live image on the display screen." Ex. 2003 ¶ 53, *see also* ¶ 55 ("Similarly, freezing an image on the display screen does not add any information 'on or alongside a live image of the surgical site.' Nor does adding a cursor to the freeze-frame or moving a cursor on the display screen, as taught by Salvati, add any information to the live image.").

We credit Patent Owner's unrebutted and persuasive expert testimony that freezing and zooming on an image is not adding information as required by the claim. Accordingly, we determine that freezing and zooming images is not adding information "on or alongside" as required by the claim.

iii. Beacons as added information

Contrary to Petitioner's position that the beacons are added under operator control, *see* Pet. 45, Patent Owner argues that interactively defining beacons does not add information under operator control on or alongside a live image. PO Resp. 21; Sur-reply 9 (Ex. 1004, 20:35–21:2 ("beacons are not defined on the 'virtual arrested images' on the operating spectacles 111; instead, the beacons are defined on frozen video images on an unspecified monitor.")). Patent Owner asserts that "beacons 24 are 'clearly identifiable anatomic structures or clips placed on the surface of the heart 20 or e.g. tiny LED's [sic] which are temporarily attached to the surface of the heart 20.'" PO Resp. 21 (Ex. 1004, 20:19–23, Fig. 3). According to Patent Owner, beacons are not information but are physical structures. *Id.* at 22 (Ex. 2003

¶ 55 (“freezing an image on the display screen does not add any information ‘on or alongside a live image of the surgical site.’ Nor does adding a cursor to the freeze-frame or moving a cursor on the display screen, as taught by Salvati, add any information to the live image.”), ¶ 60 (“Borst’s beacons 24 are anatomic structures, or synthetic materials that serve the same purpose as the anatomic structure, that are either present or not in the operative field”); Ex. 2004 ¶ 22 (“The beacons are not information, rather they are synthetic or anatomic structures near the surgical target that provide a frame of reference for the camera and allow for virtual image stabilization”).

We credit Patent Owner’s un rebutted and persuasive expert testimony that defining beacons is not adding information as required by the claim. Accordingly, we determine that defining beacons is not adding information “on or alongside” as required by the claim.

iv. Position coordinates and measurements as added information

Petitioner argues that Patent Owner “overlooks that Salvati also adds information to the screen, including position coordinates and measurements.” Pet. Reply. 8; Tr. 52:4–13.

Patent Owner contends that Petitioner’s argument that “‘Salvati also adds information to the screen, including position coordinates and measurements’ is another new argument raised for the first time in the Reply, and must therefore be excluded.” Sur-reply 9.

Petitioner may not bolster its original case-in-chief with new theories and evidence on Reply. To do so would violate 37 C.F.R. § 42.23(b), which forbids the introduction of new arguments on reply. *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016) (“It is of the utmost importance that petitioners in the IPR proceedings adhere to the

requirement that the initial petition identify ‘with particularity’ the ‘evidence that supports the grounds for the challenge to each claim.’”). The Petition describes Salvati and acknowledges that the system can measure cracks when in the second operating mode. *See* Pet. 50. The Petition, however, relies on Salvati’s “benefits of combining two sets of functionality into the same controller” and it is that functionality that is being combined with Borst. *Id.* at 51. Because the Petition does not rely on Salvati’s measurements as “adding information under operator control relevant to the surgical procedure on or alongside a live image of the surgical site,” we agree with Patent Owner that this is a new argument and, therefore, will not further consider it.

v. *Conclusion*

Accordingly, on our consideration of the record as a whole, we determine that the Petitioner has not sufficiently demonstrated that the combination of Borst and Salvati adds information onto a monitor in the operating room to meet the requirement “adding information under operator control relevant to the surgical procedure on or alongside a live image of the surgical site.”

d) *Motivation to Combine*

Petitioner acknowledges that Borst does not disclose all the elements recited in claim 53 and relies on Salvati for teaching the “first and second operating modes.” Pet. 48. Petitioner contends that in 1999 a person of ordinary skill in the art “would have been motivated to configure Borst’s master to be used for multiple purposes.” Pet. Reply 9 (Ex. 1003 ¶¶ 121–124). Borst discloses changing the display using a voice command, and recognizes that using a voice command frees up the surgeon’s hands for

zooming in and out of a desired target area of interest associated with the surgical site. Ex. 1004, 13:1–3. Although Borst teaches that voice commands are preferred for freeing up the surgeon’s hands, Borst also discloses that the zooming action may be provided by means other than voice activation, for example by a foot switch. Ex. 1004, 20:36–21:1.

Salvati recognizes the benefit of combining two sets of functionalities into the same controller which reduces the need for a second similar device or a second separate keypad. Pet. 51 (citing Ex. 1005, 4:62–5:45).

Petitioner’s expert explains that incorporating the same functionality into Borst’s device would achieve the same benefit, i.e., “[t]he dual function of the joystick device as described here avoids the need for a second similar device and eliminates the need for a separate keypad.” Ex. 1003 ¶ 122 (citing Ex. 1005, 4:62–5:45).

The obviousness inquiry is “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.” *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (emphases in original).

Patent Owner argues, and we agree, that Petitioner has not established a reason to modify Borst in view of Salvati. PO Resp. 27–34. Patent Owner argues that combining two functionalities into the same controller without more does not provide an articulated rationale. *Id.* at 27 (Ex. 2003 ¶ 71). “Petitioner has not articulated any motivation for using Borst’s master controls 36a, 36b to ‘add[] information’ on a display screen of Borst’s robotic surgical system.” *Id.* at 28. “[M]odifying Borst’s master controls 36a, 36b to have zooming, freezing, defining beacons, or other

functionalities would 1) not simplify Borst's robotic system, and 2) change Borst's principle of operation." *Id.* at 29.

Patent Owner argues that the "skilled artisan would not have been motivated to reconfigure Borst's master control 36a, 36b to have a second operating mode for 'adding information.'" Sur-reply 10. Patent Owner's expert, "Dr. Grossi explains, [that] a surgeon performing a procedure would keep his hands focused on manipulating the surgical instruments at all times during the surgery, and would not have relinquished control of the surgical instruments to perform additional tasks, such as zooming, freezing, etc., using his hands." PO Resp. 30 (Ex. 2004 ¶ 23). Patent Owner explains that Borst's disclosure supports the position that the surgeon would be reluctant to relinquish control to use his hands for zooming, freezing, or other functions. *Id.* at 31 (Ex. 2004 ¶¶ 20, 23). Specifically, Borst teaches the use of voice command control or foot pedal to avoid the need for the surgeon to relinquish control. Ex. 2004 ¶¶ 20 (citing Ex. 1004, 10:34–11:3, 18:25–19:1; 20:32–33), 23 ("the surgeon would not give up control of the surgical instruments at any point during the surgery to transition to a second mode of operation" because the surgical target (e.g., the beating heart) and the surgical instruments are in constant motion (because the instruments are following the moving target)). Patent Owner argues that Petitioner has not addressed Dr. Grossi's testimony "that [a] surgeon would not have disassociated Borst's master control 36a, 36b, and thus 'relinquish[ed] control' of Borst's surgical instruments 34, 35 which are in 'constant motion (because the instruments are following the moving target).'" Sur-reply 10–11 (Ex. 2004 ¶ 23).

We accord persuasive weight to Dr. Grossi's un rebutted testimony that a surgeon would not have relinquished control of Borst's master handles in order to add information onto the screen, as this is consistent with the teaching in Borst to use voice commands allowing the surgeon to focus on their task. Ex. 2004 ¶ 24; Ex. 1004, 10:34–11:3.

In addition, Patent Owner contends, and we agree, that Petitioner has not explained why one of skill in the art would have changed the principle of operation of Borst. Sur-reply 12. Patent Owner's expert, Dr. Rentschler, explains that at least five different steps would be necessary in order to disassociate the master controller in order to use the same controllers in a second mode of operation, and then reposition the master controller so that they can engage with the end effectors at the original end effector location. *See* Ex. 2003 ¶ 81. Therefore, we agree with Patent Owner's position that adding a second operating mode into Borst's master controller would introduce disadvantages into the system further supporting the position that there is no motivation for making these changes. Sur-Reply 12 (citing Ex. Ex. 2003 ¶¶ 78–81; Ex. 2004 ¶ 25).

Accordingly, on our consideration of the record as a whole, we determine that the Petitioner has not demonstrated by a preponderance of the evidence that there would have been sufficient motivation to modify Borst's system to incorporate a dual functioning master, especially when weighed against Patent Owner's un rebutted expert testimony and Borst's express teaching of using voice command to avoid the need for the surgeon to use their hands for zooming.

e) Reasonable Expectation of Success

Petitioner contends that, contrary to Patent Owner's assertions, a person of ordinary skill in the art at the time the invention was made would have known how to disengage and reengage Borst's masters and end effectors. Pet. Reply 11. "As Dr. Hannaford explained, disengaging and reengaging a master with an end effector was well-known in 1999 and described in multiple references." *Id.* at 11 (Ex. 1003 ¶ 133). According to Dr. Hannaford, "Borst discloses a control surgical instrument but does not describe the mechanical and electrical features that allow the system to measure its movements and translate those to movements of an output surgical instrument." Ex. 1003 ¶ 133. Petitioner's expert Dr. Hannaford acknowledges that Borst does not provide detailed explanation of how the system operates and from that concludes that the disassociation and reassociation is something that is known to the ordinarily skilled artisan. *See Id.* ¶ 133.

We are not persuaded by Petitioner's reasoning and agree with Patent Owner that simply asserting that a skilled artisan would know how to disassociate and reassociate a master controller does not explain how Borst's system would have been modified. Sur-reply 13. Conclusory assertions and citations, without meaningful explanation, are inadequate to support a determination of obviousness. *See TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1359 (Fed. Cir. 2019) (noting that the Federal Circuit has "repeatedly recognized that conclusory expert testimony is inadequate to support an obviousness determination on substantial evidence review.").

Patent Owner explains that a skilled artisan would not have reasonably expected success in modifying Borst's master control to have a

second mode. PO Resp. 34–36. Even though claim 53 does not recite dissociating the master control from the surgical instrument Patent Owner argues that this step is still necessary. “A skilled artisan would have recognized that Borst’s master controls 36a, 36b would have to be disassociated from the surgical instruments 34, 35 if the master controls were to be used in a second mode of operation, otherwise the surgical instruments could injure patients when the master controls are being operated in the second mode.” *Id.* at 34 (Ex. 2004 ¶ 24). “Borst does not explain how to disengage/reengage the master controls 36a, 36b with the surgical instruments when transitioning between the two modes of operation” and Petitioner has not explained how to make such modifications. *Id.* at 34–35 (Ex. 2003 ¶ 81).

Dr. Rentschler, Patent Owner’s expert, explains that Petitioner’s proposed modifications of Borst would require at least five significant reconfigurations in the robotic system. PO Resp. 35 (Ex. 2003 ¶ 81); *see also In re Ratti*, 270 F.2d 810, 813 (CCPA 1959)(a combination that requires “a substantial reconstruction and redesign of the elements” in a reference does not support obviousness). In addition, “Dr. Grossi [Patent Owner’s other expert] explains, because Borst’s surgical instruments are in constant motion, disassociation and reassociation of the master controls 36a, 36b with the surgical instruments 34, 35 would have been difficult, and so a skilled artisan would not have been motivated to disassociate the master controls from the surgical instruments to transition to a second mode of operation.” PO Resp. 35 (Ex. 2004 ¶ 25); Tr. 30 (“As Dr. Grossi, who is a cardiac surgeon and is a robotic surgeon, he explained to me reengaging the

master controllers to the end effectors would be like jumping onto a running horse.”).

We agree with Patent Owner that “[n]othing in the art suggests that a skilled artisan would have had a reasonable expectation of success, particularly given Borst’s complexities with the automated tracking system.” Sur-reply 13 (Ex. 2003, ¶¶ 78–81; Ex. 2004, ¶¶ 24, 25; Ex. 1016, 43:10–45:13).

Accordingly, on our consideration of the record as a whole, we determine that the Petitioner has not demonstrated by a preponderance of the evidence that there would have been a reasonable expectation of success in modifying Borst’s system to incorporate a dual functioning master, especially when weighed against Patent Owner’s unrebutted and persuasive expert testimony.

2. Claim 51

Petitioner asserts that Borst teaches most of the elements recited in claim 51. Pet. 53–54. Petitioner relies on Salvati for teaching the use of a single controller having two operating modes. *Id.* at 54 (citing Ex. 1003 ¶ 128).

For the same reasons discussed above with respect to claim 53 (*see* II.D.1), we determine that Petitioner has not shown by a preponderance of the evidence that the challenged claim is unpatentable as obvious over Borst and Salvati.

3. Conclusion

For the foregoing reasons, we determine that Petitioner has not shown by a preponderance of the evidence that the challenged claims 51 and 53 are unpatentable as obvious over Borst and Salvati.

*E. Ground 2: Obviousness over Borst, Salvati, and Wang '850
(Claims 51, 53)*

Petitioner asserts that a person of ordinary skill in the art would have found it obvious “to modify Borst to include a master control in view of Wang ’850.” Pet. 54 (citing Ex. 1003 ¶ 129). Specifically, Petitioner asserts that Wang ’850 teaches a robotic surgical system that has master handles 50 and 52 that are manipulated by the surgeon to control the surgical instrument. *Id.* at 55 (citing Ex. 1007, 7:21–40, Figure 1), 57 (citing Ex. 1003 ¶ 133). According to Petitioner, “Wang ’850 explains that each handle has multiple joints, sensors, and links that allow the handle to be moved in multiple degrees of freedom.” *Id.* at 56. In the Petition, Petitioner relies on Wang ’850 for teaching a master control containing a plurality of links and joints for manipulation in three dimensions. *Id.* at 57; Ex. 1003 ¶¶ 132, 133. In the Reply, Petitioner contends that Wang ’850 “teaches disengaging/reengaging its masters with end effectors” and when the mechanical and electrical components are incorporated into Borst, Borst’s master control could “disengage/reengaged from the surgical instruments.” Pet. Reply 19–20.

Wang ’850 teaches that the surgeon can switch between various surgical instruments by incorporating a switch

in the system 10. The switch 51 may be used by the surgeon to allow positioning of the fourth arm 29. This is accomplished because the position of the switch 51 allows the surgeon to select which of the arms a specific handle 50 or 52 controls. In this way, a pair of handles 50 and 52 may be used to control a plurality of robotic arms.

Ex. 1007, 7:24–40. Wang ’850 also teaches the use of a button to engage the surgical instrument.

Each handle may have an input button 58 which enables the instrument to move with the handle. When the input button 58 is depressed the surgical instrument follows the movement of the handle. When the button 58 is released the instrument does not track the movement of the handle. In this manner the surgeon can adjust or “ratchet” the position of the handle without creating a corresponding undesirable movement of the instrument.

Id. at 9:14–22.

Patent Owner asserts that Wang ’850 does not overcome the fundamental deficiencies in the combination of Borst and Salvati. PO Resp. 64. Patent Owner asserts that “Wang ’850 only discloses repositioning of its master handles 50, 52 without altering the positions of the slave arms.” Sur-reply 23 (citing Ex. 1007, 9:17–25). According to Patent Owner, even if the components of Wang ’850 could be incorporated into the combination of Borst and Salvati, the combination “still does not provide for the same master control to manipulate both the end effector (in a first mode) and to ‘add[] information’ to the image display (in a second mode).” Sur-reply 23. Additionally, Patent Owner contends that Petitioner has not addressed the testimony of Patent Owner’s expert Dr. Grossi, who “testified that a surgeon performing Borst’s procedure would not have relinquished control of the surgical instruments to perform additional tasks, such as zooming, freezing, etc., using his hands.” Sur-reply 10 (Ex. 2004 ¶¶ 20, 23).

We agree with Patent Owner, that the evidence relied on by Petitioner does not persuade us that the claims are obvious. The combination of references as proposed still does not provide “changing the displayed information” as recited in the claims. For the same reasons discussed above

(*see* II.D.1), we credit Patent Owner’s unrebutted and persuasive expert opinion that EKG or other haemodynamic information is not the type of information that is added by the surgeon, that defining beacons are also not adding information as required by the claim, and that zooming on an image is also not adding information as required by the claim. *See* Ex. 2003 ¶¶ 53, 55, 60. Furthermore, we agree with Patent Owner that Petitioner has not addressed “Dr. Grossi’s testimony that a surgeon would not have disassociated Borst’s master control 36a, 36b, and thus ‘relinquish[ed] control’ of Borst’s surgical instruments 34, 35 which are in ‘constant motion (because the instruments are following the moving target).’” Sur-reply 10–11 (citing Ex. 2004 ¶ 23).

Patent Owner contends, and we agree, that Petitioner has not articulated a sufficient reason why one of ordinary skill in the art would have modified Borst’s separate controls to add a second operating mode that would introduce disadvantages into Borst’s system. Sur-reply 12 (*citing See Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019) (affirming no motivation to combine because “a reasonable fact finder could have found these tradeoffs to yield an unappetizing combination”); *Arctic Cat Inc. v. Polaris Indus., Inc.*, 795 F. App’x 827, 834 (Fed. Cir. 2019) (non-precedential) (“[A] person of ordinary skill in the art, weighing the putative benefits of the modifications . . . against the drawbacks of the modification would not have been motivated to combine the two prior art references.”)).

Accordingly, on the full record we find that the Petitioner has not demonstrated by a preponderance of the evidence that the challenged claims 51 and 53 are unpatentable.

F. Ground 3: Obviousness over Borst and Wang '099 (Claims 16, 22, 23, 25, 26)

Petitioner asserts that claims 16, 22, 23, 25, and 26 are unpatentable as obvious over Borst and Wang '099. Pet. 57–68. Patent Owner opposes. PO Resp. 60–64. Having reviewed the arguments of the parties and the supporting evidence, we find that Petitioner has not demonstrated by a preponderance of the evidence that the challenged claims are unpatentable.

1. Claim 16

Petitioner argues that Borst discloses most of the elements of claim 16 (Pet. 57), that Borst discloses moving the end effectors to perform surgery (*id.* at 58 (citing Ex. 1004, 13:20–24:11; Ex. 1003 ¶ 136)), and that Borst discloses displaying different types of information relevant to the surgical procedure (*id.* at 59 (citing Ex. 1004, 10:25–32, 19:14–21, 20:2–3)). Petitioner argues that Borst discloses displaying relevant patient information such as “EKG and haemodynamic parameters of the patient” and based on that disclosure one of skill in the art would have recognized that other relevant information could be displayed as well. *Id.*

Petitioner relies on Wang '099 for teaching a medical system that includes a master controller that can interface with other electrical devices. Pet. 59. Petitioner asserts that Wang '099 teaches using one master control to operate multiple devices and “simplifies the procedure by allowing the surgeon to more easily manipulate and observe the operating room environment.” *Id.* at 61. Petitioner asserts that one of ordinary skill in the art would have been motivated to display any auxiliary information “on the image display so that the surgeon can easily and efficiently review the information during the surgery so that he or she can use the information in

making surgical decisions.” *Id.* at 62 (citing Ex. 1003 ¶ 144). Petitioner asserts that Wang ’099 discloses that a user using the selection commands determines which devices the user wants to control at any one time. *Id.* at 63. Petitioner asserts that “[t]his user selection ‘rout[es] control signals’ to a specified device, and thus, it dissociates the master control from other devices.” *Id.* at 64 (citing Ex. 1003 ¶ 146). Petitioner relies on Wang ’099’s “user selection” to conclude that the device “dissociates the master control from other devices.” *Id.* (citing Ex. 1003 ¶ 146.).

Petitioner further argues that Wang ’099 “enables multiple slave devices to be controlled by a single master.” Pet. Reply 20 (citing Pet. 59). Petitioner argues that although multiple devices can remain connected to Wang ’099’s master at one time, “the software allows the master to only be ‘operatively associated’ with (controlling) only one device at a time—the device identified by the selection command.” Pet. Reply 22–23 (Ex.1006, 4:35–48, 7:26–28, 8:2–11). According to Petitioner, selecting the network gateway electronically dissociates the master from the surgical instrument. Pet. Reply 23. Petitioner’s expert attests that a person of ordinary skill in the art would have known how to disengage/reengage a master with an end effector, as many references describe robotic surgery systems with that functionality. Pet. Reply 24 (Ex.1003 ¶¶ 133, 146–147; Ex.1005, 5:16–27; Ex.1007, 2:62–3:5, 7:29–40, 9:15–25; Ex.1008, 2).

Patent Owner argues that neither Borst nor Wang ’099 disclose dissociation of the master controller from the end effectors. PO Resp. 60; Ex. 2003 ¶ 106. Patent Owner argues that “[s]election’ of a device [in Wang ’099] simply means that master controller 12 routes control signals to

the device specified by the selection command.” PO Resp. 61 (Ex. 2003 ¶ 103; Ex. 1006, 2:50–3:1).

The issue between the parties is whether Wang ’099 reasonably teaches disassociating the master control from the end effector when selectively accessing a source of auxiliary information.

Wang ’099 describes a master controller that can be activated by a voice control interface (VCI) that allows for the selection of components attached to the master and slave controllers. Ex. 1006, 2:31–60. Wang ’099 discloses that the VCI distinguishes between “selection signals and control signals.” *Id.* at 2:42–43. Wang ’099 describes that once a selection is made with the master controller any other voice commands are routed to the other slave controllers so that devices attached to the slave controllers can be selected. *Id.* at 6:38–53. Wang ’099 thereby discloses that this set up allows for multiple devices to be active at the same time.

Wang ’099 teaches that the VCI activates a port on the master controller to a particular instrument but once the port is active it remains active until another selection is made. Ex. 1006, 6:40–45 (“once the master controller or master 12 receives a selection command, all speech received at the VCI 32 of the master 12 that is not a new selection command is fed to the feature extractor of the appropriately attached slave 14”). Wang ’099 also explains that “[i]f the user is using a foot pedal, hand controller or some other input device [that is attached to a port], the VCI is not utilized as the inputs are already in the form of electrical signals as opposed to voice input.” *Id.* at 2:43–46. Wang ’099 teaches that the system may also include a connection to a hospital computer network, to access patient information that

can be made available in the operating room on a monitor or display. *See id.* at 10:21–64.

Patent Owner argues that “access of auxiliary information via network gateway 500 [in Wang ’099] does not require operative disassociation of master controller 12 from all other slave controllers 14 (and their associated operating room devices 16).” PO Resp. 61 (Ex. 2003 ¶ 104 (“Operative disassociation of master controller 12 from other slave controllers 14 (and their operating room devices 16) is therefore not required when accessing information via network gateway 500.”)). Here, Wang ’099 teaches that “[i]f the user is using a foot pedal, hand controller or some other input device [that is attached to a port], the VCI is not utilized as the inputs are already in the form of electrical signals as opposed to voice input.” Ex. 1006, 2:43–46. This disclosure in Wang ’099 reasonably suggests that selecting a “device for operation does not mean that master controller 14 is operatively ‘disassociated’ from the other devices.” Ex. 2003 ¶ 103. Thus, there is no indication that the communication is even temporarily interrupted. Based on these disclosures, we agree with Patent Owner, that the combination of Borst and Wang ’099 is missing the element of disassociating the master control from the end effector.

Accordingly, we determine that Petitioner has not shown by a preponderance of the evidence that the challenged claims are unpatentable as obvious over Borst and Wang ’099.

2. Claims 22, 23, 25, 26

Because Petitioner’s assertions with respect to dependent claims 22, 23, 25, and 26 do not cure the deficiency identified above for claim 16 (*see above* II.F.1), we determine that Petitioner has also not shown by a

preponderance of the evidence that the combination of Borst and Wang '099 renders these claims obvious.

3. Conclusion

For the foregoing reasons, we determine that Petitioner has not shown by a preponderance of the evidence that the challenged claims 16, 22, 23, 25, and 26 are unpatentable as obvious over Borst and Wang '099.

G. Ground 4: Obviousness over Borst, Wang '099, and Wang '850 (Claims 16, 22, 23, 25, 26)

Petitioner asserts that Wang '850 discloses a master control, and that based on the reasons set out for the combination of Borst and Wang '099 the claims are rendered obvious. Pet. 68. Petitioner contends that even if the Board finds that Borst and Wang '099 do not teach disassociating the master, “Wang-850 teaches a master that can be disengaged with an end effector, moved around to reposition the master or to control another end effector, and then reengaged with the original end effector.” Pet. Reply 25; Ex. 1007, 9:14–22.

Patent Owner opposes. PO Resp. 64–65; Sur-reply 21 (“Wang '850 provides no disclosure about accessing auxiliary information using master handles 50, 52, or disassociating the master handles 50, 52 from the slave arms when doing so.”).

In the Petition, Petitioner relies on Wang '850 for teaching a master control with a plurality of links. Pet. 57. Petitioner does not persuasively identify how Wang '850's master control could be integrated into Borst's system to arrive at the limitation of dissociating a master controller. *Id.* (citing Ex. 1003 ¶ 133). Conclusory assertions and citations, without

meaningful explanation, are inadequate to support a determination of obviousness. *See TQ Delta*, 942 F.3d at 1359 (noting that the Federal Circuit has “repeatedly recognized that conclusory expert testimony is inadequate to support an obviousness determination on substantial evidence review.”).

Patent Owner’s expert, Dr. Rentschler, asserts that modifying Borst’s master controller would alter the principle operation. Ex. 2003 ¶ 51. Patent Owner’s expert avers that Wang ’850 does not teach dissociating the master controller from the end effector. *Id.* ¶¶ 100–106; Sur-reply 21.

Petitioner has the burden of articulating the specific reasoning why the evidence in the record support the conclusion of obviousness. *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Petitioner’s meager explanation that merely states that one could integrate Wang ’850’s master controller into Borst’s system does not satisfy the specific reasoning requirement. *See* Pet. 57. Petitioner’s expert, Dr. Hannaford, similarly does not explain how the integration would be achieved and thereby does not help bolster Petitioner’s arguments. Ex. 1003 ¶ 133.

On balance, when weighing Petitioner’s threadbare explanation on how the references are combined, in light of Patent Owner’s expert assertion that just like Borst and Wang ’099, Wang ’850 also does not teach disassociating; we determine that the Petitioner has not demonstrated by a preponderance of the evidence that the combination would have resulted in a master controller that is disassociated as required by the claims.

H. Ground 5: Obviousness over Borst and Wang ’099 (Claims 51, 53)

Petitioner asserts that “Borst discloses all of the elements of claims 51 and 53 except for the limitation requiring a first and second mode of

operation.” Pet. 68. Petitioner asserts that Wang ’099 teaches changing the image display in response to “manipulation of the linkage of the master control.” *Id.* Petitioner asserts that it would have been obvious to a skilled artisan to modify Borst in view of Wang ’099 to arrive at the limitation of “changing the displayed information” in response to manipulating the input device. *Id.* at 68–69 (citing Ex. 1003 ¶ 162). Specifically, Petitioner asserts that given the similarities between Borst and Wang ’099, a person of ordinary skill in the art at the time of the invention “would have understood that Borst’s system could have been modified to incorporate the dual mode functionality controlled by a master controller with a high degree of predictability and that the modified system would have worked as expected.” *Id.* at 72 (citing Ex. 1003 ¶ 167).

Patent Owner asserts that neither Borst nor Wang ’099 discloses or suggests adding information “on or alongside a live image” (PO Resp. 52–54); and that the Petition has not established a motivation to combine the references nor established a reasonable expectation of success (*id.* at 55–57).

Having reviewed the arguments of the parties and the supporting evidence, we find that Petitioner has not demonstrated by a preponderance of the evidence that the challenged claims are unpatentable.

1. Claims 51 and 53

a) “adding information relevant to a surgical procedure” “on or alongside” a live image

Patent Owner asserts that the combination of references as proposed by Petitioner does not disclose adding information relevant to the surgical procedure “on or alongside” a live image of the surgical site. PO Resp. 52. “While freezing or zooming may change or modify the displayed image,

they do not add any information to the live image of the surgical site.” *Id.* (Ex. 2003 ¶ 87). Similarly, Patent Owner argues that defining physical features also does not add information under operator control. *Id.* (Ex. 2003 ¶ 88).

We determined that the claim term “changing the displayed information” means “adding information under operator control relevant to the surgical procedure on or alongside a live image of the surgical site.” *See above* II.B.2. According to Patent Owner, EKG or haemodynamic information is not something that is added by the surgeon because “this information is provided to the surgeons from the beginning of the procedure, and is not added to the display monitors during the procedure.” PO Resp. 52 (Ex. 2003 ¶ 88). Borst teaches that the surgeon has peripheral visual contact with the monitors that displays “the general view of the heart and chest cavity, with the [other] monitors displaying the EKG and haemodynamic parameters of the patient, with his hands and the instruments outside the body, and with the other people in the operating room.” Ex. 1004, 22:1–4. There is no indication in Borst that EKG and haemodynamic parameters are added at any time, supporting Patent Owner’s position that EKG and haemodynamic parameters are the kind of information that is continually provided to the primary surgeon throughout a procedure. Ex. 2003 ¶ 88. We note that Petitioner does not dispute that Borst does not teach adding information on or alongside a live image. Pet. Reply 14.

Patent Owner contends that Wang ’099 also does not add information under operator control relevant to the surgical procedure on or alongside a live image of the surgical site. According to Patent Owner, “[a]ll that Wang ’099 discloses is that the accessed patient data is displayed either on a

monitor 510 connected to gateway 500, or directly on the main system monitor.” PO Resp. 53 (Ex. 1006, 10:40–44, 10:53–59, Fig. 1). Patent Owner argues that even assuming that Wang ’099 displays a live image of the laparoscopic site, the reference still does not disclose adding patient information alongside the surgical view. Sur-reply 15.

We are not persuaded by Patent Owner’s contention that Wang ’099 does not disclose adding information on or alongside a live image. Wang ’099 teaches retrieving “x-rays, patient history, MRIs, angiography and CAT scans” and displaying the information on a monitor connected to the gateway. Ex. 1006, 10:38–39. “By connecting to the hospital network, patient information that is available at computer terminals in the hospital would also be made available in the operating room.” *Id.* at 10:31–33. As Petitioner points out, Wang ’099 “discloses a robotic surgical system that can perform a laparoscopy, which is a minimally invasive procedure that uses, for example, an endoscopic camera” that would require displaying the image on a video monitor. Pet. Reply 15–16 (Ex. 1006, 1:19–25, 4:35–41, 9:66–67); Ex. 1016, 26:25–27:3 (both endoscopy and laparoscopy involve placing a camera inside the body “for viewing the surgical field and working tools”). Having two monitors that can be viewed simultaneously is sufficient for meeting the on or alongside requirement as claimed. Therefore, we agree with Petitioner, that retrieving patient information in Wang ’099 while performing laparoscopic surgery, reasonably supports the position that the patient information is “added ‘*on or alongside*’ a live image.” Pet. Reply. 16.

Accordingly, on our consideration of the record as a whole, we determine that the Petitioner has sufficiently demonstrated that Wang ’099

teaches adding patient information onto a monitor in the operating room meeting the requirement “adding information under operator control relevant to the surgical procedure on or alongside a live image of the surgical site.” However, establishing that all the elements are found in the individual references is not sufficient to arrive at the conclusion that the claims are obvious. *See also Belden*, 805 F.3d at 1073 (The obviousness inquiry is “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.”) (emphases in original)).

b) Motivation to Combine and Reasonable Expectation of Success

Petitioner acknowledges that Borst does not disclose changing information on the image display of the system by “manipulation of the linkage of the master control” when the system is in an operating mode. Pet. 68. Petitioner is relying on Wang ’099 for disclosing a “master controller [that] is operating in a different mode when it is controlling a different device.” *Id.* at 69 (citing Ex. 1003 ¶ 163). Petitioner asserts that Wang ’099’s master control can be used to operate a surgical instrument and also interface with a web browser. *Id.* at 71–72. Petitioner explains that Wang ’099’s “user selection ‘rout[es] control signals’ to a specified device.” *Id.* at 71 (citing Ex. 1003 ¶ 166). Petitioner identifies that one such routing includes a connection to the hospital computer network from which to access hospital electronic storage of patient records. This network can retrieve and display data on a monitor. *Id.* at 70 (citing Ex. 1006, 10:21–59). Petitioner identifies that one of the advantages of incorporating multiple controllers into a single interface rather than relying on multiple interfaces “reduces movement in the operating room, and increases sterility.” *Id.* at 51–52

(citing Ex. 1006, 4:49–5:4); Ex. 1006, 4:62–67 (“keep[s] movement in the operating room to a minimum to increase sterility, and because direct control by the doctor of the operating room environment and the devices he or she is using ensures the highest degree of safety with the smallest amount of error due to miscommunication between people in the operating room”).

Petitioner concludes that

[g]iven the similarities between Borst and Wang ’099, the prevalence of master controls with multiple functions, and that nothing about the Borst system prevents such a modification, a POSA would have understood that Borst’s system could have been modified to incorporate the dual mode functionality controlled by a master controller with a high degree of predictability and that the modified system would have worked as expected.

Pet. 72 (Ex. 1003 ¶ 167).

Patent Owner argues that Petitioner has not explained why one skilled in the art would have been motivated to modify Borst’s control instruments in view of Wang ’099’s master controller. PO Resp. 56. Patent Owner explains “that Borst’s instruments 34, 35 are in constant, automated motion to track the moving target, which would have made reengagement of the master control with the instruments difficult.” Sur-reply 19 (Ex. 2004 ¶ 25). Patent Owner contends that Petitioner has not explained “why a skilled artisan would have been motivated to use the second operating mode to ‘add[] information.’” *Id.* at 16 (Ex. 2003 ¶ 71). Furthermore, “there is no reason why a skilled artisan would have eliminated Borst’s voice control based on Wang ’099.” *Id.* at 17. The burden is on Petitioner to adequately explain how a skilled artisan would have made the requisite modifications.

PO Resp. 63 (citing *Personal Web Techs., Inc. v. Apple Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017)).

Patent Owner argues that “Petitioner has not addressed at all how Borst’s master controls 36a, 36b would have been modified to add information in a second mode without disengaging from the end effectors (which is not required by claims 51 and 53).” *Id.* at 58 (Ex. 2003 ¶ 98).

Patent Owner’s expert, Dr. Rentschler, opines that

neither Borst nor Wang ’099 discloses disassociating the master device from the slave device in a second mode of operation. And without such operative disassociation, Borst’s master control 36a, 36b cannot be used to add information on a display screen without inadvertently harming the patient, and without affecting Borst’s surgical procedure when transitioning back to the first mode of surgical operation.

Ex. 2003 ¶ 99. In addition, Dr. Rentschler explains that five different steps would be required to modify Borst and that [g]iven the complexity and associated risks of the modification proposed by Petitioner, a person skilled in the art would not reasonably have expected success from the modification of Borst.” *Id.* ¶ 99. Patent Owner contends that Petitioner has not provided any expert testimony to rebut Dr. Rentschler’s position that there is no motivation to combine the references and no expectation of success. Tr. 47:14–19. While Petitioner argues that there are multiple references that purport to have the benefit of using a single master controller and, therefore, we should “credit the statement in these references over Dr. Rentschler.” *Id.* at 15:20–24. We decline Petitioner’s request to dig through the references in order to discredit Dr. Rentschler testimony. *See e.g., DeSilva v. DiLeonardi*, 181 F.3d 865, 866–67 (7th Cir. 1999) (“A brief must make all arguments accessible to the judges, rather than ask them to play archaeologist with the

record.”). We credit Patent Owner’s unrebutted and persuasive expert testimony by Dr. Rentschler in view of Petitioner not having adequately explained how an ordinarily skilled artisan would have made the requisite modifications in Borst to arrive at the claimed invention.

In addition to not having adequately explained how one of ordinary skill in the art would have made the requisite modifications in Borst, Patent Owner contends that a surgeon would not have relinquished control of the operating instrument. Sur-reply 10.

As Dr. Grossi explains, a skilled artisan would not have been motivated to disengage/reengage Borst’s master controls 36a, 36b from the surgical instruments because the instruments are in constant, automated motion to track the moving target, which would have made reengagement of the master controls with the instruments difficult. Ex. 2004, ¶ 25. But at the same time, using the master controls in a second mode of operation, without disengaging from the surgical instruments, could have inadvertently harmed the patient. *Id.* at ¶ 24.

PO Resp. 59; *see* Sur-reply 10–11; Ex. 2004 ¶ 25 (“a surgeon would be disinclined to disengage Borst’s master controls 36a, 36b from the surgical instruments 34, 35 to control other peripheral functionalities, such as adding information on the screen, because Borst’s surgical instruments are in constant motion which would make re-engagement of the master controls with the instruments difficult.”).

We accord persuasive weight to Dr. Grossi’s unrebutted testimony that a surgeon would not have relinquished control of Borst’s master handles in order to add information onto the screen. Ex. 2004 ¶ 24.

Accordingly, on our consideration of the record as a whole, we determine that the Petitioner has not demonstrated by a preponderance of the evidence that the challenged claims are unpatentable.

2. Conclusion

For the foregoing reasons, we determine that Petitioner has not demonstrated by a preponderance of the evidence that the challenged claims 51 and 53 are unpatentable obvious over Borst and Wang '099.

I. Ground 6: Obviousness over Borst, Wang '099, and Wang '850 (Claims 51, 53)

Petitioner asserts that a person of ordinary skill in the art would have found it obvious to “modify the system to include such ‘master’ control in view of Wang '850 for the same reasons as provided above for Ground II.” Pet. 72 (citing Ex. 1003 ¶ 168). Specifically, Petitioner asserts that Wang '850 teaches a robotic surgical system that has master handles 50 and 52 that are manipulated by the surgeon to control the surgical instrument. *Id.* at 55 (citing Ex. 1007, 7:21–40, Figure 1), 57(citing Ex. 1003 ¶ 133).

Patent Owner asserts that Wang '850 does not overcome the fundamental deficiencies in the combination of Borst and Wang '099. PO Resp. 64; *See* Sur-reply 23.

For the same reasons discussed above for Ground 2 (*see above* II.E), considering the full record, we find that the Petitioner has not demonstrated by a preponderance of the evidence that the challenged claims are unpatentable.

III. CONCLUSION

We determine that the preponderance of the evidence of record does not support Petitioner's contention that claims 16, 22, 23, 25, 26, 51, and 53 of the '906 patent are unpatentable under 35 U.S.C. § 103(a), as summarized in the table below:

Claims	35 U.S.C. §	References/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
51, 53	103(a)	Borst, Salvati		51, 53
51, 53	103(a)	Borst, Salvati, Wang '850		51, 53
16, 22, 23, 25, 26	103(a)	Borst, Wang '099		16, 22, 23, 25, 26
16, 22, 23, 25, 26	103(a)	Borst, Wang '099, Wang '850		16, 22, 23, 25, 26
51, 53	103(a)	Borst, Wang '099		51, 53
51, 53	103(a)	Borst, Wang '099, Wang '850		51, 53
Overall Outcome				16, 22, 23, 25, 26, 51, 53

IV. ORDER

It is hereby:

ORDERED that claims 16, 22, 23, 25, 26, 51, and 53 of the '906 patent are not determined to be unpatentable; and

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

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