

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

HELMERICH & PAYNE INTERNATIONAL DRILLING COMPANY,  
HELMERICH & PAYNE TECHNOLOGIES, LLC, and MOTIVE  
DRILLING TECHNOLOGIES, INC.,  
Petitioner,

v.

NABORS DRILLING TECHNOLOGIES USA, INC.,  
Patent Owner.

---

IPR2021-01018  
Patent 7,802,634 B2

---

Before KEN B. BARRETT, MATTHEW S. MEYERS, and  
SEAN P. O'HANLON, *Administrative Patent Judges*.

O'HANLON, *Administrative Patent Judge*.

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

## I. INTRODUCTION

### A. Background

Helmerich & Payne International Drilling Company, Helmerich & Payne Technologies, LLC, filed a Petition for *inter partes* review of claims 1–12 (“the challenged claims”) of U.S. Patent No. 7,802,634 B2 (Ex. 1001, “the ’634 patent”). Paper 2 (“Pet.”), 1. Nabors Drilling Technologies USA, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). With our authorization (*see* Paper 8), Petitioner filed a Preliminary Reply to the Preliminary Response (Paper 9) and Patent Owner filed a Preliminary Sur-reply to the Preliminary Reply (Paper 10, “Prelim. Sur-reply”).

Institution of an *inter partes* review is authorized by statute only when “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). We have authority, acting on the designation of the Director, to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). For the reasons set forth below, upon considering the Parties’ briefs and evidence of record, we conclude that the information presented in the Petition fails to establish a reasonable likelihood that Petitioner would prevail in showing the unpatentability of any of the challenged claims. Accordingly, we decline to institute *inter partes* review.

#### B. Real Parties in Interest

Petitioner identifies its three constituent entities and Helmerich & Payne, Inc. as sole real parties in interest. Pet. 1. Petitioner asserts that Helmerich & Payne International Drilling Company and Helmerich & Payne Technologies, LLC are subsidiaries of and wholly owned by Helmerich & Payne, Inc. *Id.*

Patent Owner identifies itself and Nabors Corporate Services, Inc. as real parties in interest. Paper 5, 2.

#### C. Related Matters

The parties indicate that the '634 patent is the subject of the following district court proceeding:

*Nabors Drilling Technologies USA Inc. v. Helmerich & Payne International Drilling Co.*, No. 3-20-cv-03126 (N.D. Tex. filed October 14, 2020) (“the Texas litigation”).

Pet. 2; Paper 5, 2. Patent Owner further asserts that one patent, US 8,528,663 B2 (“the '663 patent”), is related to the '634 patent. Paper 5, 2. We note that the '663 patent is the subject of a petition for *inter partes* review filed by Petitioner in IPR2021-01044.

#### D. The Challenged Patent

The '634 patent relates to underground wellbore drilling. Ex. 1001, 1:14–16. There are two modes of drilling: rotary drilling, in which the drill bit is rotated by a rotary drive means at the surface with a quill connecting and transferring torque between the rotary drive means and the drill string, and slide drilling, in which the drill string is not rotated and the drill bit is rotated exclusively by a drilling motor mounted in the drill string proximate

the drill bit. *Id.* at 1:16–22, 1:38–40. Drilling operations can include vertical drilling, in which trajectory of the drill string is inclined at less than about 10° relative to vertical, horizontal drilling, in which the drill string trajectory is inclined about 90° from vertical, and directional drilling, in which the trajectory of the drill string is being deliberately controlled to maintain the wellbore on a planned course. *Id.* at 1:23–33. “Directional drilling requires real-time knowledge of the angular orientation of a fixed reference point on the circumference of the drill string in relation to a reference point on the wellbore.” *Id.* at 2:3–6. “Obtaining, monitoring, and adjusting the drilling direction conventionally requires that the human operator must manually scribe a line or somehow otherwise mark the drill string at the surface to monitor its orientation relative to the down-hole tool orientation.” *Id.* at 2:29–33. “Consequently, the relationship between toolface and the quill position can only be estimated by the human operator.” *Id.* at 2:35–37.

The ’634 patent purports to improve upon known drilling systems by “visibly demonstrating a relationship between toolface orientation and quill position.” Ex. 1001, 2:46–48. Human-machine interface (“HMI”) 100 is presented to the operator during drilling operations to allow the operator to monitor the bottom hole assembly in three-dimensional space. *Id.* at 5:67–6:3, 6:29–31. Figure 1 illustrates the HMI and is reproduced below.

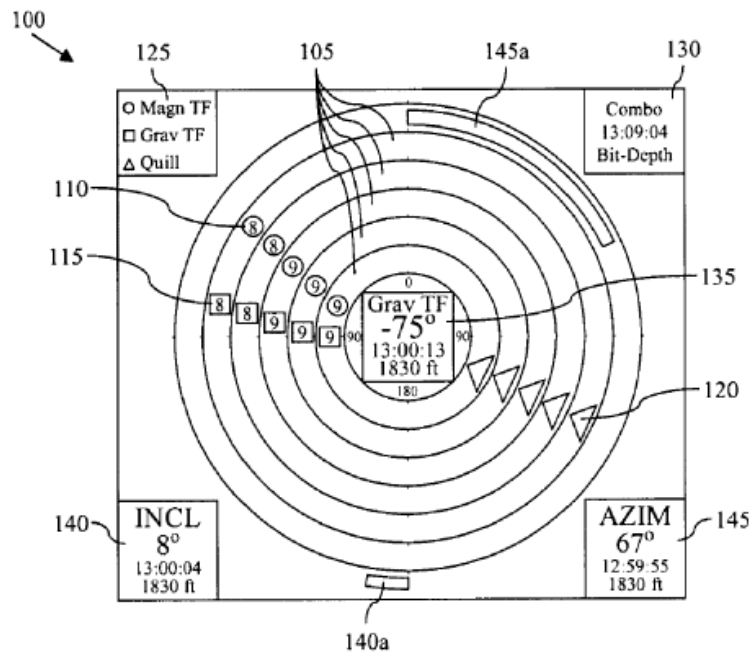


**Fig. 1**

Figure 1 is a schematic view of HMI 100. *Id.* at 5:22–23. The HMI includes “a dial or target shape having a plurality of concentric nested rings 105.” *Id.* at 6:62–64. The rings display current data measurements and a history of recent prior measurements with each ring representing a data measurement iteration. *Id.* at 7:13–25. The most recent data measurements are depicted closest to the edge of the dial, and older measurements step toward the middle of the dial. *Id.* at 8:37–41. A variety of symbols are positioned on the rings. *Id.* at 6:64–7:7. Circular symbols 110 represent magnetic-based toolface orientation data, rectangular symbols 115 represent gravity-based toolface orientation data, and triangular symbols 120 represent quill position. *Id.* The HMI also includes indicators to display data from a variety of sensors, including toolface mode indicator 130, toolface orientation indicator 135, inclination indicator 140, and azimuth indicator 145. *Id.* at 7:34–8:35.

#### E. The Challenged Claims

Petitioner challenges claims 1–12 of the '634 patent. Pet. 1. Claim 1 is the sole independent challenged claim and is reproduced below.

1. A method of visibly demonstrating a relationship between toolface orientation and quill position, such method comprising:
  - operating a drilling apparatus comprising a bit with a steerable motor with toolface and a top drive;
  - steering the steerable motor and bit with the top drive;
  - receiving electronic data on a recurring basis, wherein the electronic data includes quill position data and at least one of gravity-based toolface orientation data and magnetic-based toolface orientation data; and
  - displaying the electronic data on a user-viewable display in a historical format depicting data resulting from a most recent measurement and a plurality of immediately prior measurements.

#### F. Asserted Grounds of Unpatentability

The Petition relies on the following prior art references:

| Name   | Reference                                                                                                                                           | Exhibit |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| Haci   | US 7,810,584 B2, issued October 12, 2010                                                                                                            | 1006    |
| Jones  | US 7,152,696 B2, issued December 26, 2006                                                                                                           | 1007    |
| Maidla | <i>Step Change in Directional Drilling Control and Efficiency When Using Motor Steerable System</i> , U.S. Dept. of Energy, June 2006               | 1008    |
| Leder  | <i>New Real-Time Anticollision Alarm Improves Drilling Safety</i> , 1995 SPE Annual Technical Conference and Exhibition 507–15, October 22–25, 1995 | 1009    |
| Cobern | US 4,761,889 issued August 9, 1988                                                                                                                  | 1010    |

Petitioner asserts the following grounds of unpatentability:

| Claim(s) Challenged | 35 U.S.C. §         | Reference(s)                |
|---------------------|---------------------|-----------------------------|
| 1, 4–7, 9, 10, 12   | 103(a) <sup>1</sup> | Haci, Cobern, Jones         |
| 2–3                 | 103(a)              | Haci, Cobern, Jones, Leder  |
| 8, 11               | 103(a)              | Haci, Cobern, Jones, Maidla |

Pet. 10. Petitioner submits a declaration of Robert Schaaf (Ex. 1005, “Schaaf Declaration”) in support of its contentions.

## II. ANALYSIS

### A. Principles of Law

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

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the

---

<sup>1</sup> The application resulting in the ’634 patent was filed prior to the date when the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011), took effect. Thus, we refer to the pre-AIA version of section 103.

invention was made to a person having ordinary skill in the art to which the subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of 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 skill in the art, and (4) when in evidence, any objective evidence of nonobviousness.<sup>2</sup> *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.* (internal quotation marks and citation omitted).

Petitioner contends that a person having ordinary skill in the art at the time of the invention (“POSITA”) “would have had a Bachelor’s of Science degree in engineering (e.g., mechanical, petroleum, or chemical engineering) or an equivalent degree” and through education or experience, would have

---

<sup>2</sup> The parties have not directed us to any such objective evidence.

“familiarity with directional drilling principles.” Pet. 16 (citing Ex. 1005 ¶ 71).

Patent Owner does not contest Petitioner’s definition or offer a definition of its own. *See generally* Prelim. Resp.

We find Petitioner’s description to be consistent with the problems and solutions disclosed in the ’593 patent and prior art of record, and adopt it as our own for purposes of this Decision. *See, e.g., In re GPAC Inc.*, 57 F.3d at 1579 (approving the determination of the level of ordinary skill in the art by appeal to the references of record).

### C. Claim Construction

In an *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b), including construing the claims in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b). Thus, we apply the claim construction standard as set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). In addition to the specification and prosecution history, we also consider use of the terms in other claims and extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic record. *Id.* at 1312–17. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* at 1315.

The specification may reveal a special definition given to a claim term by the patentee, or the specification may reveal an intentional disclaimer or

disavowal of claim scope by the inventor. *Phillips*, 415 F.3d at 1316. If an inventor acts as his or her own lexicographer, the definition must be set forth in the specification with reasonable clarity, deliberateness, and precision. *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998). A disavowal, if any, can be effectuated by language in the specification or the prosecution history. *Poly-America, L.P. v. API Indus., Inc.*, 839 F.3d 1131, 1136 (Fed. Cir. 2016). “In either case, the standard for disavowal is exacting, requiring clear and unequivocal evidence that the claimed invention includes or does not include a particular feature.” *Id.* “Ambiguous language cannot support disavowal.” *Id.* (citing *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003)).

Only those terms that are in controversy need be construed, and only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner argues that “[t]he ’634 Patent defines the term ‘quill position’ by broadly stating what it may include,” but Petitioner does not state concisely what definition it ascribes to the term. Pet. 25–26 (quoting Ex. 1001, 5:43–64).

Patent Owner does not address Petitioner’s contentions or otherwise address claim construction. *See generally* Prelim. Resp.

For purposes of this Decision, and based on the record before us, we determine that no construction of any term is necessary.

#### D. Overview of the Asserted Prior Art

##### *1. Hacı*

Hacı discloses “a method of and an apparatus for directional drilling with a steerable drilling motor.” Ex. 1006, 1:24–26. Typically, changing the direction of the well bore is accomplished through slide drilling, in which the drill string is not rotated and the direction of drilling is determined by the tool face angle of the drilling motor. *Id.* at 1:66–2:3. Several difficulties arise in this method of directional drilling, including friction between the drill string and the well bore and controlling the orientation of the drilling motor during slide drilling. *Id.* at 2:18–3:35. Hacı purports to provide a more efficient method and an apparatus for directional drilling with a steerable drilling motor. *Id.* at 3:50–51. Hacı discloses an iterative method of drilling a bore hole that “comprises rotary drilling at a first rotation rate until a first target value is substantially met, changing the first rotation rate to a second rotation rate when a trigger is substantially met, and then drilling at the second rotation rate until a second target value is substantially met.” *Id.* at 3:58–67. The second rotation rate is less than the first rotation rate, causing drilling to be concentrated in a particular direction. *Id.* at 7:51–64. Additionally, the second rotation rate can be zero such that the method alternates between rotary drilling and slide drilling. *Id.* at 8:9–14. Targets for determining when to start checking for a trigger include weight on bit, differential pressure, downhole reactive torque, and a set time period. *Id.* at 7:38–47. Triggers for determining when to change the rotation rate include tool face angle and torque. *Id.* at 7:65–67, 9:37–60.

The drilling control system includes a number of sensors for measuring various drilling parameters, including directional sensor 51

located on the bottom hole assembly, drill string torque sensor 53 located at the surface, and drill string torque sensor 63 located at the surface.

Ex. 1006, 4:60–5:3, 5:58–67, Fig. 1. The system includes driller's screen 71 that displays pertinent drilling information to the driller (drilling rig operator) and provides a graphical user interface to the system. *Id.* at 6:16–20. Figure 3 illustrates the driller's screen and is reproduced below.

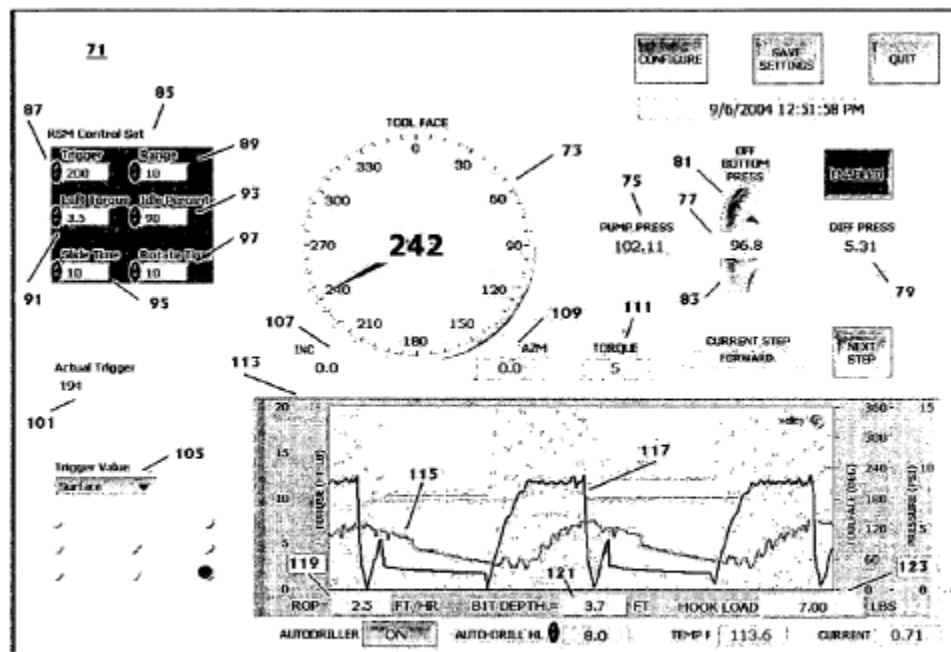


**FIG. 3**

Figure 3 is a pictorial view of driller's screen 71. *Id.* at 4:10–11, 6:16–19. The screen includes a number of indicators, including tool face indicator 73 that “displays the tool face angle derived from the output of the steering tool,” pump pressure indicator 75, differential pressure indicator 79, and actual trigger indicator 101. *Id.* at 6:25–7:2. The screen also includes graphical display 113 that “shows plots of differential pressure vs. time 115 and torque vs. time 117 for the driller.” *Id.* at 7:5–7.

## 2. Jones

Jones discloses “a method and apparatus for oscillatory control of a drill string used for subterranean drilling.” Ex. 1007, 1:17–18. “During straight path drilling, the drill string is continuously rotated in a single direction about its longitudinal axis to reduce the effect of friction and increase the penetration rate.” *Id.* at 1:51–54. During directional drilling, “the continuous rotation of the drill string is terminated.” *Id.* at 1:57–58. To reduce friction between the bore hole and the drill string during directional drilling, “the drill string can alternate between rotation in forward (e.g., clockwise) and reverse (e.g., counterclockwise) directions.” *Id.* at 2:13–16. These iterative clockwise and counterclockwise rotations are controlled such that the drill bit is not rotated due to the length and torsional spring properties of the drill string. *Id.* at 2:16–23. In this manner, friction is reduced during directional drilling. *Id.* at 2:23–27. However, “it can be difficult to achieve the desired back and forth rotation without affecting the orientation of the toolface during directional drilling.” *Id.* at 2:27–29.

Jones purports to improve upon conventional directional drilling by providing for adjustment of the times during which clockwise and counterclockwise rotation take place. Ex. 1007, code (57). The absolute angle of the drill string at the rig, which may be several revolutions from the default position, is estimated using a rotation sensor on the top drive. *Id.* at 6:23–34. An offset angle is determined by averaging the maximum and minimum absolute rotation angles over several oscillation cycles and calculating the difference between this average absolute angle value and the target drill string rotation angle. *Id.* at 6:41–48. If the toolface was correctly oriented prior to initiating oscillation, the offset angle is zero. *Id.*

at 6:48–50. If the offset angle is not zero, the times of clockwise rotation and counterclockwise rotation can be adjusted to correct the toolface orientation. *Id.* at 6:56–7:7.

### 3. *Maidla*

Maidla provides “program facts” regarding a system for directional drilling that employs robotics and software to automate rocking during slide drilling. Ex. 1008, 1. Maidla purports that its system “controls torque from the surface with a combination of hardware and software that integrates surface and [measurement while drilling] data to automate rocking during sliding.” *Id.* The system includes a user interface that presents various data to the operator, including plots of torque data and pressure data. *Id.*

### 4. *Leder*

Leder discloses a directional drilling system that avoids collisions while drilling on multi-well locations. Ex. 1009, 7. Leder describes a software application that performs calculations based on measurement while drilling data and provides a polar graph to the operator displaying relative positions of the existing wells. *Id.* The system projects the drilling trajectory beyond the current location and triggers an alarm if any of the offset wells come within a specified proximity. *Id.*

### 5. *Cobern*

Cobern discloses a method “for use in borehole drilling, for correcting errors in azimuth determination resulting from variations in the earth’s magnetic field to which a measuring instrument is exposed.” Ex. 1010, code (57). Cobern uses a microprocessor that “calculates various values,

such as drillers' angles (azimuth, inclination, gravity tool face reference (GTF) or magnetic tool face reference (MTF))" as depicted in Figure 3. *Id.* at 4:65–5:1. GTF values are typically used in the calculations, but MTF values are used if the drill string is substantially aligned with the vertical axis. *Id.* at 5:32–40. The outputs from the microprocessor are then delivered to a valve driver to operate a valve to create mud pulse signals for eventual display. *Id.* at 5:2–5.

#### E. Asserted Obviousness Based on Hacı, Cobern, and Jones

Petitioner argues that claims 1, 4–7, 9, 10, and 12 would have been obvious over the combination of Hacı, Cobern, and Jones. Pet. 26–71. In support of its showing, Petitioner relies upon the Schaaf Declaration. *Id.* (citing Ex. 1005). We have reviewed Petitioner's assertions and supporting evidence. For the reasons discussed below, and based on the record before us, we determine that Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 1, 4–7, 9, 10, and 12 would have been obvious over the combination of Hacı, Cobern, and Jones.

Independent claim 1 recites, in relevant part,

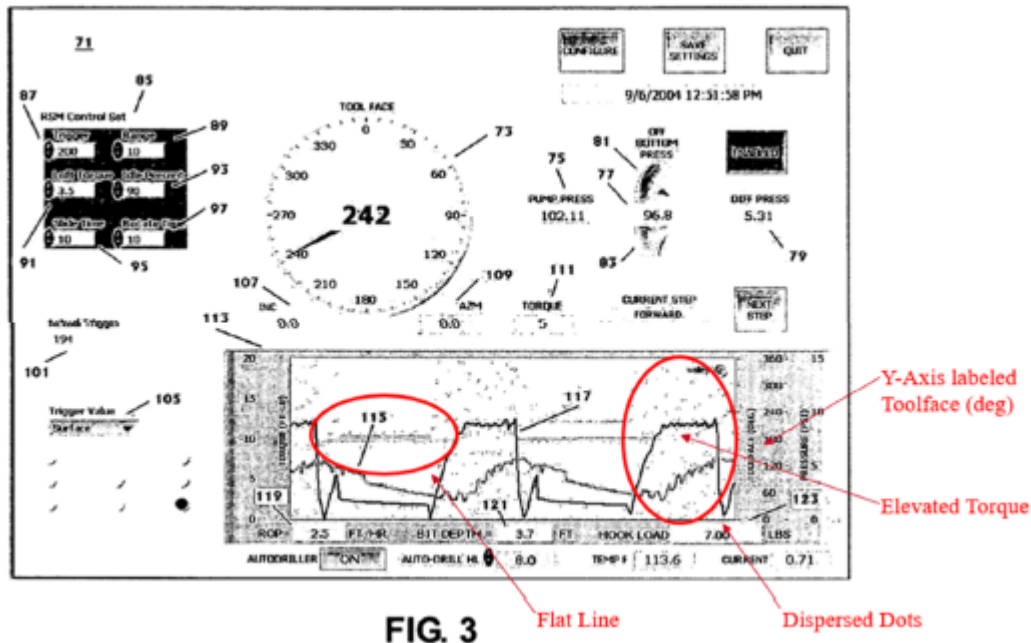
receiving electronic data on a recurring basis, wherein the electronic data includes quill position data and at least one of gravity-based toolface orientation data and magnetic-based toolface orientation data; and

displaying the electronic data on a user-viewable display in a historical format depicting data resulting from a most recent measurement and a plurality of immediately prior measurements.

Ex. 1001, 10:39–46.

Petitioner argues that Hacı discloses displaying toolface orientation data in a historical format. Pet. 43–46. Petitioner presents an annotated

version of Hacı Figure 3, which is reproduced below, in support of its arguments.



Hacı Figure 3 is a pictorial view of driller's screen 71, and Petitioner's annotations identify a "toolface (deg)" label on a Y-axis and asserted toolface vs. time data having regions Petitioner describes as "flat line" and "dispersed dots." *Id.* at 44. According to Petitioner, Hacı's graphical display 113 includes "an unlabeled plot composed of small dots" that an ordinarily skilled artisan "would have recognized . . . as a plot of toolface vs. time" for two reasons. *Id.* at 44–45 (citing Ex. 1005 ¶ 129). First, Petitioner argues that "the unlabeled plot on Hacı's Figure 3 is consistent with the expected behavior for a toolface vs. time plot" because it is "relatively flat" during slide drilling and "randomly dispersed between 0 and 360 degrees" during rotary drilling. *Id.* at 45 (citing Ex. 1005 ¶ 130). Second, Petitioner argues that "the Y-Axis label of 'toolface (deg)' indicates that toolface is plotted. . . . The other labeled axes have corresponding data, so a POSITA

would have recognized the unlabeled plot was toolface vs. time.” *Id.* at 45–46 (citing Ex. 1005 ¶ 131).

Patent Owner argues that Petitioner relies only on its declarant’s “conclusory testimony” to support its contention that “the plot of toolface vs. time in [Haci] Figure 3 corresponds to ‘an unlabeled plot composed of small dots’ within a portion of a graphical display (113) in *Haci*’s driller’s screen.” Prelim. Resp. 10–12 (citing Pet. 43–46; Ex. 1005 ¶¶ 129–132). Patent Owner argues that Mr. Schaaf’s testimony is conclusory and “is therefore entitled to little or no weight.” *Id.* at 12 (citing 37 C.F.R. § 42.65(a)). Continuing, Patent Owner asserts that “neither Petitioner[] nor Mr. Schaaf point[s] to any disclosure in *Haci* to corroborate their allegation that ‘*Haci*’s graphical display [is] a plot of toolface vs. time’” and, thus, Petitioner’s contentions are “purely speculative, based entirely on hindsight bias.” *Id.* at 12–13 (third alteration in original).

We agree with Patent Owner. *Haci* does not discuss the “small dots” identified by Petitioner at all, let alone as a plot of toolface orientation versus time. Rather, *Haci* discloses that toolface orientation data is displayed elsewhere on the driller’s screen: “Screen 71 includes a tool face indicator 73, which displays the tool face angle . . . .” Ex. 1006, 6:25–26. *Haci* also discloses what is shown in its display: “[G]raphical display 113 shows plots of differential pressure vs. time 115 and torque vs. time 117 for the driller.” *Id.* at 7:5–7. To support its contentions, Petitioner does little more than cite to its annotated version of *Haci* Figure 3 and the Schaaf Declaration, which in large measure presents the same conclusory assertions advanced in the Petition. *See* Pet. 43–46; Ex. 1005 ¶¶ 126–133. Such speculation is inadequate to support Petitioner’s contentions. Neither

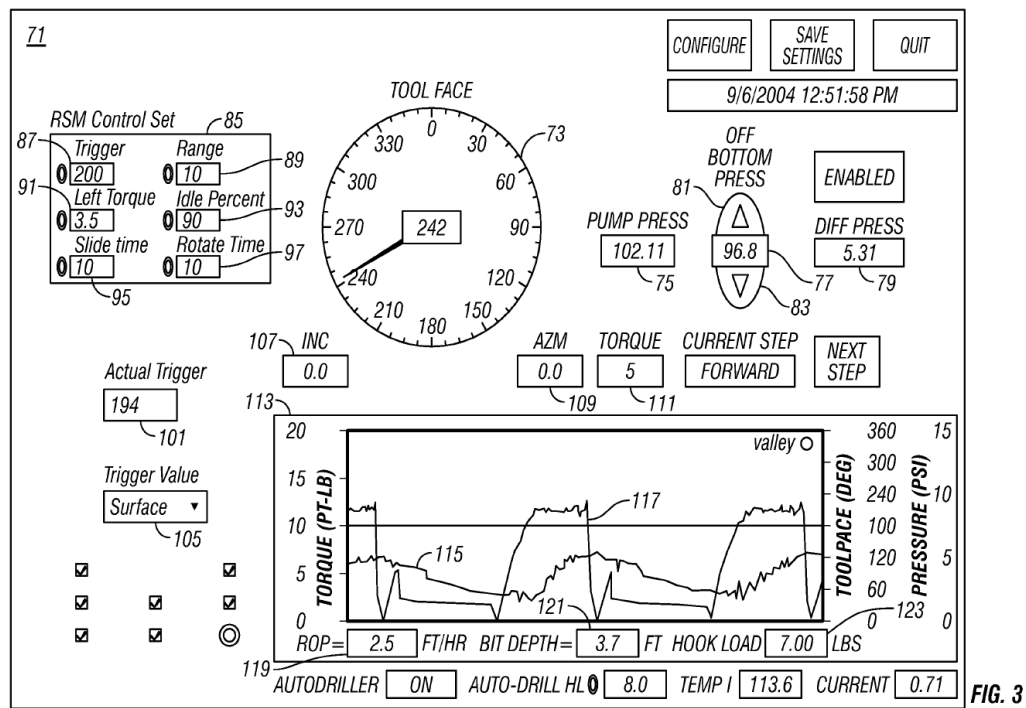
Petitioner nor Mr. Schaaf support adequately the contention that an ordinarily skilled artisan would interpret the “small dots” identified by Petitioner in Hacı Figure 3 as “a plot of toolface vs. time.” Pet. 44–46; Ex. 1005 ¶¶ 128–133. For example, neither Petitioner nor Mr. Schaaf explains why Hacı’s disclosure describes toolface orientation data being displayed to the user via tool face indicator 73 (Ex. 1006, 6:25–26), but fails to discuss the alleged toolface orientation data in graphical display 113. Similarly, neither Petitioner nor Mr. Schaaf explains why Hacı’s disclosure describes graphical display 113 as presenting differential pressure data and torque data (*id.* at 7:5–7), but fails to discuss the alleged toolface orientation data.

Additionally, neither Petitioner nor Mr. Schaaf explain why the asserted toolface orientation data is presented as “randomly dispersed” dots rather than as a line graph in the manner that the differential pressure and torque data is presented in Hacı Figure 3. Nor does Petitioner or Mr. Schaaf explain how the “randomly dispersed” dots would be useful to the operator. It is difficult to imagine how any useful information could be conveyed by the “randomly dispersed” dots identified by Petitioner in its annotated version of Hacı Figure 3. To this end, tool face indicator 73 shows that the tool face is oriented at 242°, which is not readily determinable via the “small dots” identified by Petitioner.

Furthermore, both Petitioner and Mr. Schaaf fail to reconcile the asserted plot of toolface orientation data with Hacı’s disclosure. Hacı discloses exemplary values of approximately 10 seconds for each iteration of rotary drilling and slide drilling (even when the target values are based on differential pressure). Ex. 1006, 9:24–28, 10:30–35. At 40 rpm drill string

rotation during rotary drilling (*id.* at 7:51–55), the toolface would rotate approximately 6.6 revolutions during each iteration of rotary drilling. Petitioner fails to address this disclosure of Hacı or explain how the “randomly dispersed” dots convey this number of revolutions. Moreover, the unlabeled dots relied upon by Petitioner would seem to indicate a much faster rate of rotation than contemplated by Hacı.

Finally, Petitioner’s arguments are inconsistent with the family prosecution history of Hacı. On September 11, 2007, the Hacı applicant submitted a PCT Request claiming priority to the application resulting in the asserted Hacı reference. Ex. 3002, 1–4. The U.S. Receiving Office responded with an Invitation to Correct Defects, indicating that a new drawing for Figure 3 was required. *Id.* at 5–8. In response, the applicant submitted a substitute Figure 3. *Id.* at 9–10. This figure is reproduced below.



Substitute Figure 3 is a formal version of Hacı Figure 3. Notably, the substitute figure does not contain the “unlabeled plot composed of small dots” that Petitioner asserts to be a plot of toolface orientation data. If the dots identified by Petitioner were, in fact, a plot of toolface orientation versus time, it seems likely that the dots would not have been deleted in the formal version of Figure 3.

For at least these reasons, the arguments and evidence presented in the Petition fail to provide sufficient support for Petitioner’s contentions that Hacı discloses toolface orientation data as recited in claim 1 and incorporated into its dependent claims 4–7, 9, 10, and 12. Petitioner relies on Cobern to teach receiving toolface data that is gravity-based or magnetic-based depending on drill string orientation and on Jones to teach displaying quill data in a historical format, but does not assert that these secondary references disclose displaying toolface orientation data in a historical format. *See* Pet. 26–49, 65–71. Therefore, Petitioner does not demonstrate a reasonable likelihood of prevailing in showing that claims 1, 4–7, 9, 10, and 12 would have been obvious over the combination of Hacı, Cobern, and Jones.

#### F. Asserted Obviousness Based on Hacı, Cobern, Jones, and Leder

Petitioner argues that claim 2 and 3 would have been obvious over the combination of Hacı, Cobern, Jones, and Leder. Pet. 71–76. Petitioner relies on Hacı, Cobern, and Jones as set forth in § II.E above and relies on Leder to teach displaying azimuth data and inclination data in a historical format. *Id.*

Claims 2 and 3 depend from claim 1. As Petitioner has failed to establish that Hacı, Cobern, and Jones satisfy the recitations of claim 1 as discussed above, Petitioner has likewise failed to establish how these recitations are satisfied with respect to these dependent claims. Thus, the Petition has not demonstrated a reasonable likelihood of prevailing in showing that claims 2 and 3 would have been obvious over the combination of Hacı, Cobern, Jones, and Leder.

#### G. Asserted Obviousness Based on Hacı, Cobern, Jones, and Maidla

Petitioner argues that claims 8 and 11 would have been obvious over the combination of Hacı, Cobern, Jones, and Maidla. Pet. 76–84. Petitioner relies on Hacı, Cobern, and Jones as set forth in § II.E above and relies on Maidla to teach graphically displaying older data as a target-shaped representation. *Id.*

Claims 8 and 11 depend from claim 1. As Petitioner has failed to establish that Hacı, Cobern, and Jones satisfy the recitations of claim 1 as discussed above, Petitioner has likewise failed to establish how these recitations are satisfied with respect to these dependent claims. Thus, the Petition has not demonstrated a reasonable likelihood of prevailing in showing that claims 8 and 11 would have been obvious over the combination of Hacı, Cobern, Jones, and Maidla.

#### H. Discretionary Denial

Patent Owner argues that we should exercise our discretion under 35 U.S.C. § 314(a) to deny institution of *inter partes* review in view of the Texas litigation. Prelim. Resp. 30–51; Prelim. Sur-reply 1–5. Because we

have considered the merits of Petitioner's challenges and decline to institute *inter partes* review on that basis, we need not determine whether it would be appropriate to exercise our discretion to deny institution of *inter partes* review under § 314(a).

### III. CONCLUSION

For the foregoing reasons, we are not persuaded that the Petition establishes a reasonable likelihood that Petitioner would prevail in any of its challenges to claims 1–12 of the '634 patent.

### IV. ORDER

In consideration of the foregoing, it is hereby ordered that the Petition is *denied*, and no trial is instituted.

IPR2021-01018  
Patent 7,802,634 B2

For PETITIONER:

Chad C. Walters  
Douglas M. Kubehl  
Clarke W. Stavinoha  
BAKER BOTTS L.L.P.  
chad.walters@bakerbotts.com  
doug.kubehl@bakerbotts.com  
clarke.stavinoha@bakerbotts.com

For PATENT OWNER:

David M. O'Dell  
Jonathan R. Bowser  
Jeffrey A. Wolfson  
Vera L. Suarez  
HAYNES AND BOONE, LLP  
david.odell.ipr@haynesboone.com  
jon.bowser.ipr@haynesboone.com  
jeff.wolfson.ipr@haynesboone.com  
vera.suarez.ipr@haynesboone.com