**IN THE UNITED STATES DISTRICT COURT**
**FOR THE EASTERN DISTRICT OF TEXAS**
**TYLER DIVISION**

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| **CANRIG DRILLING TECHNOLOGY LTD** | § | |
| | § | |
| **Plaintiff,** | § | |
| | § | **CASE NO. 6:09-CV-414** |
| **vs.** | § | **PATENT CASE** |
| | § | |
| **OMRON OILFIELD AND MARINE INC., et al.** | § | |
| | § | |
| **Defendants.** | § | |

## MEMORANDUM OPINION

This opinion construes the disputed terms in United States Patent No. 6,050,348.

## BACKGROUND

Canrig asserts claims 1–5 of the '348 patent against Omron Oilfield and Marine, Inc. and Helmerich & Payne, Inc. Each claim is an independent claim. The '348 patent describes a method and apparatus for controlling the rotation of a directional drill string. In directional drilling, the drill string moves vertically down into the ground and then horizontally to reach the desired area. "The present invention provides apparatus and methods for eliminating some of the guess work involved in orienting a steerable downhole tool by precisely controlling the angle of rotation of the drill string drive motor." '348 patent at 1:66–2:2.

## APPLICABLE LAW

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312

(Fed. Cir. 2005) (en banc) (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). In claim construction, courts examine the patent's intrinsic evidence to define the patented invention's scope. *See id.*; *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). This intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1314; *C.R. Bard, Inc.*, 388 F.3d at 861. Courts give claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the entire patent. *Phillips*, 415 F.3d at 1312–13; *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

The claims themselves provide substantial guidance in determining the meaning of particular claim terms. *Phillips*, 415 F.3d at 1314. First, a term's context in the asserted claim can be very instructive. *Id*. Other asserted or unasserted claims can also aid in determining the claim's meaning because claim terms are typically used consistently throughout the patent. *Id*. Differences among the claim terms can also assist in understanding a term's meaning. *Id*. For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id*. at 1314–15.

"[C]laims 'must be read in view of the specification, of which they are a part.'" *Id*. (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc)). "[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Id*. (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). This is true because a patentee may define his own terms, give

a claim term a different meaning than the term would otherwise possess, or disclaim or disavow the claim scope. *Phillips*, 415 F.3d at 1316. In these situations, the inventor's lexicography governs. *Id*. Also, the specification may resolve ambiguous claim terms "where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone." *Teleflex, Inc.*, 299 F.3d at 1325. But, "'[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims.'" *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); *see also Phillips*, 415 F.3d at 1323. The prosecution history is another tool to supply the proper context for claim construction because a patent applicant may also define a term in prosecuting the patent. *Home Diagnostics, Inc., v. Lifescan, Inc.*, 381 F.3d 1352, 1356 (Fed. Cir. 2004) ("As in the case of the specification, a patent applicant may define a term in prosecuting a patent.").

Although extrinsic evidence can be useful, it is "'less significant than the intrinsic record in determining the legally operative meaning of claim language.'" *Phillips*, 415 F.3d at 1317 (quoting *C.R. Bard, Inc.*, 388 F.3d at 862). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *Id*. at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert's conclusory, unsupported assertions as to a term's definition is entirely unhelpful to a court. *Id*. Generally, extrinsic evidence is "less reliable than the patent and

its prosecution history in determining how to read claim terms." *Id*.

## DISPUTED TERMS

**"rotational information" and "rotational data"**

Canrig contends these terms should be construed as "information relating to the rotation of the drill string." Defendants propose "information from a sensor about the amount of rotational movement of the drill string." The parties dispute whether the terms are limited to information about the amount of rotation (Defendants' position) or encompass any information related to the drill string's rotation (Canrig's position).

Canrig argues its construction is consistent with the plain and ordinary meaning and the specification. The Abstract describes "monitor[ing] the rotation of the drill string and transmit[ting] the rotational information to a computer." Additionally, a sensor may detect rotational information in several ways, and the specification describes the sensor in a manner that encompasses all types of information relating to the drill string rotation. *See* '348 patent at 4:14–25 ("The invention is sufficiently broad to capture any device that detects the rotation of the drill string."). Canrig contends that numerous variables, including time, speed, torque, and acceleration, can comprise rotational information. Canrig argues that Defendants' proposed construction improperly limits the terms to only one aspect of rotational information: positional rotational information or angular displacement.

Defendants contend that every claim using these terms involves rotating to or oscillating between two positions and accordingly the terms should be limited to positional information. Defendants also argue the specification only describes the sensors as sending positional information. *See* '348 patent at 4:50–52, 5:1–11, 5:20–24. Defendants further argue that Canrig seeks to

improperly expand the terms' meaning. Defendants also contend that the specification distinguishes between rotational data and the data relevant to torque and thus torque cannot be considered rotational data. *See* '348 patent at 4:29–34, 32–34. Moreover, Defendants contend that, contrary to Canrig's claims that speed can be rotational data, the specification does not mention measuring or controlling the speed of the drill string.

The Court construes these terms as "information relating to the rotation of the drill string." Defendants' proposed construction is unduly narrow. Had the patentees intended to limit "rotational data" or "rotational information" to positional information regarding the amount of rotational movement, they could have confined the claims to "positional information" or an equivalent. They did not, and the Court does not presume the claims to be so limited. The '348 patent specification is plainly drafted and while it does not describe in detail every potential claim embodiment, it does clearly contemplate other embodiments: "The invention is not limited to the specific embodiments disclosed. It will be readily recognized by those of ordinary skill in the art that the inventive concepts disclosed may be expressed in numerous ways." '348 patent at 5:61–64. More specifically, the specification states that "[t]he invention is not limited to an inductive sensor used with a brake disk as previously described. Any device that detects the rotation of the drill string 14 may be used. . . . The invention is sufficiently broad to capture any device that detects the rotation of the drill string." '348 patent at 4:14–25. Notably, the specification does not emphasize or even describe limiting the rotational information to the *amount* of rotation. The inventors clearly contemplated whatever measurement means that someone might choose and certainly did not distinguish or disclaim the use of any sensor information disclosed in the specification. The inventors did not limit their invention as Defendants propose. Accordingly, the Court construes "rotational data" and

"rotational information" as "information relating to the rotation of the drill string."

**"predetermined angle[s]"**

This term is used in all of the claims except claim 3. Canrig contends the term should be construed as "an angle determined before arriving at that angle." Defendants contend it means "a precise angle entered by an operator to advance the drill string from a known position to that precise entered angle."

Canrig argues its proposed construction is correct because it is consistent with the plain meaning of the term and the patent does not give the term any idiosyncratic technical meaning. Defendants seek to include three limitations in their proposed construction: (1) the predetermined angle is "a precise angle," (2) the angle is "entered by an operator," and (3) the drill string advances "from a known position to that precise entered angle."

Defendants contend the predetermined angle is "a precise angle" and not a group of angles or a range. Defendants argue the patent only discloses a single angle and the premise of the invention is the precise control of the drill string's rotational movement to a predetermined angle. *See* '348 patent at Abstract, 1:59–60, 1:66–2:2, 2:3, 2:14–18, 5:10–11, 5:34–35. Canrig argues Defendants' proposal of a "a precise entered angle" is improper. The specification only sporadically uses the words "precise," "exact," and "specific," and those words do not appear in the claims. Canrig also argues that the Abstract and three embodiments discuss predetermined angles but do so without any reference to precision. Canrig contends that Defendants are seeking to change the invention from one that uses precise rotational data to move a predetermined angle to one that requires a precise angle entered by an operator.

In describing the predetermined angle, the claims do not use terms such as "precise," "exact,"

or any of their synonyms. The Summary of the Invention describes seven embodiments. '348 patent at 2:14–54. In only the first embodiment is the computer programmed to advance the drill string a precise angle. *Id*. Taken as a whole, the specification does not teach that the invention is limited to a precise (i.e. error free) movement of the drill string to the predetermined angle. The precision with which the drill string must be moved to a predetermined angle, i.e., the margin for error or inaccuracy, is a question of infringement for the jury to decide. Accordingly, the Court rejects this proposed limitation.

Defendants contend that the predetermined angle must be determined before the process begins and thus must be "entered by an operator." *See* '348 patent at Abstract, 2:2–4, 2:16–18, 2:40–42, 2:45–47, 2:51–53, 4:60–61, 5:12–13, 5:20–21, 5:34–38. Defendants further contend there is no disclosure in the patent where the computer calculated a "predetermined angle" and Canrig's arguments to the contrary confuse the computer controlling the motor's rotation with determining the angle to which the drill string will be rotated. Canrig argues that two embodiments describe a computer automatically orienting the toolface and oscillating the drill string, contrary to Defendants' proposed limitation. *See* '348 patent at 5:43–47, 48–60. Canrig further contends that the second of these embodiments makes clear that the predetermination occurs before arriving at the angle not before the rotation or oscillation begins.

Defendants' proposed limitation that the angle is entered by an operator is unfounded. The claims do not address the origin of the predetermined angle and are thus sufficiently broad enough to encompass both angles entered by an operator and generated by a computer. Defendants are correct, however, that the angle must be determined before the drill string begins to move through that angle. Canrig's arguments to contrary and its proposed construction read out "predetermined"

from the claim language. Every claim using this term indicates the concept of advancing, rotating or oscillating the drill string by or to a predetermined angle. The claim words of "advancing," "rotating," or "oscillating" are only claimed in the context of the predetermined angle.[1] Thus, any "advancing," "rotating" or "oscillating" that occurs prior to the determination of an angle is literally not covered by these claim limitations. Had the patentees intended to claim this, they could have merely claimed "an" angle. The embodiments that Canrig cites do not support a different result. *See* '348 patent at 5:43–47, 48–60. Canrig argues that the "automatic" embodiments in column 5 disclose a computer automatically orienting the toolface and oscillating the drill string and thus the claims should cover those embodiments. While these embodiments do suggest that during oscillation the computer may determine a new angle and conform the drill string movement at any time, these embodiments do not suggest that advancing to a unknown angle is the same as advancing to a predetermined angle. For example, if the drill string is oscillating at 180 degrees and the computer determines a new on-the-fly angle of 160 degrees, it is conceivable (although not discussed in the specification) that a single oscillation may begin with the intent of going 180 degrees but end at 160 degrees due to an on-the-fly computer adjustment. In that situation, the 160 degree value is not predetermined with respect to that single 160 degree oscillation. However, the 160 degree value is predetermined with respect to the next oscillation cycle (assuming no other immediate change from the computer). Accordingly, while the angle does not need to be entered by an operator, it must be determined before the drill string begins its movement through that angle.

[1] Claim 1 calls for "advanc[ing] said drill string to a predetermined angle." Claim 2 calls for "advancing said drill string a predetermined angle." Claim 4 calls for "rotating said drill string to a predetermined angle." Claim 5 calls for "oscillating said drill string between predetermined angles." Claim 6 calls for "rotating said drill string with said computer controlled motor to a predetermined angle."

Defendants additionally contend the "predetermined angle" is a position, and therefore they include the limitation that the drill string is advanced "from a known position to that precise entered angle." Defendants contend the claims are clear that the string rotates to a position and the specification demonstrates the predetermined angle represents a movement from a neutral position to a second position. *See* '348 patent at 6:9 (claim 1), 6:19–20 (claim 2), 6:48 (claim 5), 5:30–31, 4:50–52, 5:35–37, 5:41–42. Finally, Defendants contend the prosecution history supports their construction. Canrig argues that the language of claims 1, 2, 4, and 5 refer to a resulting predetermined angle and not a known initial angle. Canrig contends Defendants' construction is improper because it implies that the claims require some knowledge of the absolute compass angle of the drill string's starting point. Canrig argues that advancing to a predetermined angle can be accomplished through an absolute compass angle, or by arbitrarily assigning a starting position zero degrees, or by inputting a time and speed in revolutions per minute, which results in equal angular displacement.

The patent does not indicate that the operator knows the drill string's starting position. Rather, the patent refers to the starting position either abstractly or from a neutral position. '348 patent at 5:30–31, 4:50–52, 5:35–37; 5:41–42. It is not an otherwise known position. The "predetermined angle" is predetermined relative to the drill string's prior position rather than a known initial position. Thus, the Court does not adopt Defendants' proposal.

While Defendants attempt to import unnecessary limitations into the claims, Canrig seeks to omit the necessary limitation that the angle is "predetermined." Accordingly, the Court adopts neither party's proposed construction but construes "predetermined angle" to mean "an angle having a size that is determined prior to any movement of the drill string through that angle."

**"control signals"**

Canrig contends "control signals" should be construed as "signals from the computer or controller," while Defendants contend it means "control signals transmitted from a computer directly to a motor to cause the rotation of the motor."

Canrig argues its proposed construction is consistent with the specification, which teaches that the computer transmits signals to oscillate the motor, rotate the drill string, control the drill string drive motor, maintain torque, and perform other tasks associated with controlling the system. *See* '348 patent at Abstract, 2:21–25, 2:28–31, 4:56–59. Canrig contends the specification also supports its inclusion of a "controller." *See* '348 patent at 4:32–34 ("Data . . . are transmitted to a programmable logic controller (PLC) or computer 54."). Canrig objects that Defendants' construction requires the signal be sent "directly" to the motor. Canrig contends that several embodiments describe the control of intermediate devices with the language at issue. *See* '348 patent at Fig. 5, 4:39–46, 5:3–11, 5:54–59. Canrig also objects that Defendants' proposed construction implies the computer is supplying the power to the motor.

Defendants contend that "control signals" is used only in the claims and the claims describe a direct connection between the computer and motor. Defendants also dispute that the patent discloses intermediate devices between the computer and motor, arguing that the motor actuator valves are part of the motor. *See* '348 patent at Fig. 5. Defendants deny that their construction implies supplying power to the motor. Defendants contend Canrig's proposed construction reads out "control," construes only "signals," and improperly expands "computer" to "computer or controller."

At the hearing, the parties agreed that the only issue is whether the control signals must be

sent directly to the motor. The specification describes the motor and computer generally. *See* '348 patent at 5:39–40, 45–46. The specification gives dozens of examples of computer function in columns 4 and 5, however none of these limit the control signals to a direct path between the computer and the motor. The specification and claims are simply not concerned with the nature of the path between the computer and the motor, as this is not material to the invention. Moreover, the specification does describe the computer controlling parts of the brake or motor system, such as the hydraulic fluid valves. '348 patent at 4:38–47, 4:60–5:1. Accordingly, the claims are not limited to control signals that are directly transmitted from the computer to the motor. As the Court has resolved the parties' only dispute and this term has an otherwise plain meaning, this term does not require construction.

**"a computer adapted to receive information"**

Canrig argues this term means "a programmable machine capable of accepting or acquiring data or information." Defendants contend it should be construed as "the same computer receives rotational information from the first sensor at the surface and tool face orientation from the second sensor." This term only appears in claim 3.

Canrig contends its proposed construction is consistent with the plain and ordinary meaning and claim 3, which implies no limitations on the term. Further, neither the specification nor the prosecution history limit the term. Canrig argues that Defendants' construction improperly limits "a computer," which under normal rules of construction means "one or more computers," to a single computer and improperly requires the same computer to receive information from both the first and second sensor. Canrig contends that limiting the computer to one computer and failing to define "computer" introduces confusion because there may be a number of computing components in

separate locations operating both independently and in harmony.

Defendants argue that claim 3 is unique from the other claims because it does not involve rotating or oscillating a drill string, but merely describes a computer that receives rotational information from the rotational sensor at the surface and tool face orientation information from the second sensor, the MWD sensor, downhole. Defendants contend their construction is consistent with the specification and in order for the downhole information and rotational information to be combined they must be received by the same computer. *See* '348 patent at Abstract, Fig. 5, 2:29–31, 4:33–34, 5:43–45. Defendants contend the sole issue in this construction is whether the same computer must receive the information from the first and second sensors, which Canrig's construction fails to address.

Contrary to Canrig's arguments, claim 3 requires at least a single computer that is adapted to receive information from the first and second sensors. '348 patent at 6:32–33. While "a" is commonly construed to mean "one or more," Canrig's argument misapplies this maxim. With respect to the claims at issue, that "a" means "one or more" simply indicates that one or more computers are each adapted to receive information from both sensors. The "a" maxim (otherwise known as the "comprising" rule) would not mean that this claim element is satisfied if one computer receives information from only one sensor while a second computer receives information from a second sensor. Thus, although the claims do not require that the computer receive the information directly from the sensor, the claims do not cover a situation where the first and second sensor transmit their information to different computers.

In arguing against the single computer construction, Canrig argues that any limitation of the claim to a single computer would simply open the door to defining "a computer." The Court

disagrees. The claim requires that the computer is "adapted to receive" both signals. This claimed "adaptation" requires that the computer is poised to process the two signals together without further adaptation. If the two signals could not be processed by the computer, then the computer would certainly lack any "adaptation" that draws meaning from the intrinsic record. Accordingly, the Court construes "a computer adapted to receive information" as "a computer that receives information from both the first sensor and the second sensor (directly or indirectly) and does not require further adapting to process information from both sensors."

**"computer programmed to control" and "controlling a motor"**

Although the parties originally proposed constructions for these terms, Defendants withdrew their proposed construction and agreed not to argue their proposed construction to the jury. Both sides then agreed that the terms did not require construction. Since these terms are no longer disputed, the Court does not construe them.

## CONCLUSION

For the foregoing reasons, the Court interprets the claim language in this case in the manner set forth above. For ease of reference, the disputed claims are set forth in Appendix A and the Court's claim interpretations are set forth in Appendix B.

**So ORDERED and SIGNED this 11th day of February, 2011.**

**LEONARD DAVIS**
**UNITED STATES DISTRICT JUDGE**

## APPENDIX A

1. A drill string drive comprising:
a motor adapted to rotate a drill string;
a sensor adapted to detect the rotation of said drill string at the surface; and
a computer receiving rotational information from said sensor, said computer transmitting control signals to said motor, said computer programmed to control said motor to advance said drill string to a predetermined angle.

2. A drill string drive comprising:
a motor adapted to rotate a drill string;
a sensor adapted to detect the rotation of said drill string; and
a computer receiving rotational data from said sensor and transmitting control signals to said motor, said computer programmed to control the rotation of said motor, said computer advancing said drill string a predetermined angle in a first direction and then reversing said rotation and advancing said drill string a predetermined angle in a second direction.

3. A drilling system comprising:
a motor;
a drill string connected to said motor;
a first sensor adapted to detect the rotation of said motor at the surface;
a bit at the distal end of said drill string;
a second sensor adapted to detect the orientation of said bit; and
a computer adapted to receive information from said first sensor and said second sensor.

4. A drilling method comprising:
monitoring the rotation of a drill string with a sensor at the surface;
transmitting said rotational information to a computer;
controlling a motor that rotates said drill string with said computer; and
rotating said drill string to a predetermined angle.

5. A drilling method comprising:
monitoring the rotation of a drill string with a sensor;
transmitting said rotational information to a computer;
controlling a motor that rotates said drill string with said computer; and
oscillating said drill string between predetermined angles.

**APPENDIX B**

| Claim Term | Court's Construction |
|---|---|
| **rotational information/ rotational data** (Claims 1, 2, 4, 5 ) | information relating to the rotation of the drill string |
| **computer programmed to control** (Claims 1, 2) | No construction |
| **controlling a motor** (Claims 4, 5) | No construction |
| **predetermined angle** (Claims 1, 2, 4, 5) | an angle having a size that is determined prior to any movement of the drill string through that angle |
| **control signals** (Claims 1, 2) | No construction |
| **a computer adapted to receive information** (Claim 3) | a computer that receives information from both the first sensor and the second sensor (directly or indirectly) and does not require further adapting to process information from both sensors |