UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOYOTA MOTOR CORPORATION
Petitioner

v.

AMERICAN VEHICULAR SCIENCES LLC
Patent Owner

Case IPR2013-00416
Patent No. 8,019,501

PATENT OWNER NOTICE OF APPEAL

Pursuant to 35 U.S.C. § 142 and 37 C.F.R. § 90.2(a), notice is hereby given that Patent Owner American Vehicular Sciences LLC ("AVS") hereby appeals to the United States Court of Appeals for the Federal Circuit from the Final Written Decision entered December 5, 2014 (Paper No. 54) in Case IPR2013-00416 and from all underlying orders, decisions, rulings and opinions, including without limitation the Decision on Institution of *Inter Partes* Review entered January 13, 2014 (Paper 12).

For the limited purpose of providing the Director with the information requested in 37 C.F.R. § 90.2(a)(3)(ii), AVS anticipates that the issues for review on appeal may include, but are not limited to the following:

1. Whether the Board erred in construing at least the following claim term: "a prediction of an impending failure of one of the components or subsystems."

2. Whether the Board erred in finding that claims 1, 6-8, 17 and 18 have been shown to be unpatenable as anticipated under 35 U.S.C. § 102(b) by United States Patent No. 4,849,894 to Probst ("Probst"), including but not limited to the Board's interpretation of Probst.

3. Whether the Board erred in finding that claims 1, 4-10, 17 and 18 have been shown to be unpatentable as obvious under 35 U.S.C. § 103(a) over (a)

United States Patent No. 5,400,018 to Scholl ("Scholl") and (b) Probst, including but not limited to the Board's interpretation of Scholl, the Board's interpretation of Probst, and the Board's determination to combine Probst with Scholl.

4. Any finding or determination supporting or related to those issues, as well as other issues decided adversely to AVS in any orders, decisions, rulings and/or opinions.

Simultaneous with this submission: (1) a copy of this Notice of Appeal is being filed with the Patent Trial and Appeal Board; (2) three copies of this Notice of Appeal, along with the required fees, are being filed with the Clerk's Office for the United States Court of Appeals for the Federal Circuit; and (3) a copy of this Notice of Appeal is being served on Petitioner Toyota Motor Corporation.

No fees are believed to be due to the United States Patent and Trademark Office in connection with this filing, but authorization is hereby given for any required fees to be charged to Deposit Account No. 13-0017.

Respectfully submitted,

DATE: February 5, 2015

Thomas J. Wimbiscus
Registration No. 36,059

MCANDREWS HELD & MALLOY
500 West Madison, 34th Floor
Chicago, IL 60661
Telephone: (312) 775-8000
Facsimile: (312) 775-8100
E-mail: twimbiscus@mcandrews-ip.com

Attorney for Patent Owner
American Vehicular Sciences LLC

CUSTOMER NUMBER: 23446

CERTIFICATE OF FILING AND SERVICE

I hereby certify that the original of the foregoing, PATENT OWNER NOTICE OF APPEAL, was caused to be filed by hand on this 5th day of February, 2015, with the Director of the United States Patent and Trademark Office, at the following address:

Office of the General Counsel
United States Patent and Trademark Office
10B20, Madison Building East
600 Dulany Street
Alexandria, VA 22314

I also hereby certify that on this 5th day of February, 2015, three true and correct copies of the foregoing, PATENT OWNER NOTICE OF APPEAL and the required filing fee, were caused to be filed by hand with the Clerk's Office of the United States Court of Appeals for the Federal Circuit at the following address:

United States Court of Appeals for the Federal Circuit
717 Madison Place, N.W., Suite 401
Washington, DC 20439

I also hereby certify that on this 5th day of February, 2015, a true and correct copy of the foregoing, PATENT OWNER NOTICE OF APPEAL, was caused to be filed electronically with the Board through the Board's Patent Review Processing System.

I also hereby certify that on this 5th day of February, 2015, a true and correct copy of the foregoing, PATENT OWNER NOTICE OF APPEAL, was caused to be served, by electronic mail on the following parties:

Matt Berkowitz
mberkowitz@kenyon.com
A.Antony Pfeffer
apfeffer@kenyon.com
Thomas R. Makin
tmakin@kenyon.com
ptab@kenyon.com
Kenyon & Kenyon LLP
One Broadway
New York, NY 10004
Tel: 212-425-7200

Respectfully submitted,

DATE: February 5, 2015

Thomas J. Wimbiscus
Registration No. 36,059

MCANDREWS HELD & MALLOY
500 West Madison, 34th Floor
Chicago, IL 60661
Telephone: (312) 775-8000
Facsimile: (312) 775-8100
E-mail: twimbiscus@mcandrews-ip.com

Attorney for Patent Owner
American Vehicular Sciences LLC

CUSTOMER NUMBER: 23446

Trials@uspto.gov
571.272.7822

Paper 54
Entered: December 5, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOYOTA MOTOR CORPORATION,
Petitioner,

v.

AMERICAN VEHICULAR SCIENCES LLC,
Patent Owner.

Case IPR2013-00416
Patent 8,019,501 B2

Before JAMESON LEE, BARBARA A. PARVIS, and GREGG I. ANDERSON, *Administrative Patent Judges.*

PARVIS, *Administrative Patent Judge.*

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. BACKGROUND

A. Introduction

On July 8, 2013, Toyota Motor Corporation ("Toyota") filed a Petition ("Pet.") requesting an *inter partes* review of claims 1, 4–10, 17, and 18 of U.S. Patent No. 8,019,501 B2 (Ex. 1001, "the '501 patent"). Paper 1. On January 13, 2014, we instituted trial for all challenged claims 1, 4–10,

17, and 18 of the ’501 patent on certain grounds of unpatentability alleged in the Petition. Paper 12 (“Decision” or “Dec.”).

After institution of trial, American Vehicular Sciences LLC (“AVS”) filed a Patent Owner Response (“PO Resp.”). Paper 23. AVS also filed a Motion to Amend Claims (Paper 24), which was withdrawn on August 7, 2014 (Paper 46). Toyota filed a Reply. Paper 31 (“Reply”).

A consolidated oral hearing for IPR2013-00414, IPR2013-00415, IPR2013-00416, and IPR2013-00417, each involving the same Petitioner and the same Patent Owner, was held on August 14, 2014. The transcript of the consolidated hearing has been entered into the record. Paper 53 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c). This final written decision is issued pursuant to 35 U.S.C. § 318(a).

Toyota has shown by a preponderance of the evidence that claims 1, 4–10, 17, and 18 of the ’501 patent are unpatentable.

B. Related Proceedings

Toyota indicates that the ’501 patent has been asserted in the following district court cases: (1) *American Vehicular Sciences LLC v. Toyota Motor Corp.*, No. 6:12-CV-00405 (E.D. Tex., filed June 25, 2012); (2) *American Vehicular Sciences LLC v. BMW Grp.*, No. 6:12-CV-412 (E.D. Tex., filed June 25, 2012); (3) *American Vehicular Sciences LLC v. Hyundai Motor Co.*, No. 6:12-CV-00776 (E.D. Tex., filed Oct. 15, 2012); and (4) *American Vehicular Sciences LLC v. Kia Motors Corp.*, No. 6:13-CV-00148 (E.D. Tex., filed Feb. 13, 2013). Pet. 1.

C. The ’501 Patent

The ’501 patent relates to arrangements and techniques for generating vehicle diagnostic and prognostic information. Ex. 1001, 2:66–3:2.

Figure 20C of the ’501 patent is reproduced below.

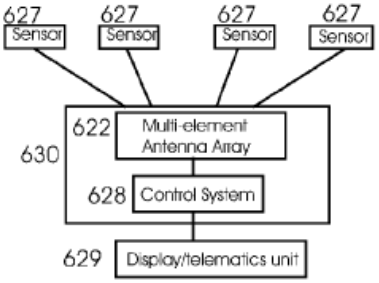

FIG. 20C

Figure 20C of the ’501 patent illustrates an embodiment of a system for obtaining data about a vehicle. Ex. 1001, 56:59–60. Sensors 627 shown in Figure 20C are arranged throughout the vehicle to collect data. *Id*. at 56:60–65. Sensors 627 represent surface acoustic wave (SAW) sensors, radio frequency identification code (RFID) sensors, or other wireless sensors. *Id.* at 56:65–57:1. Antenna array 622 is mounted on the vehicle to receive wireless signals from sensors 627. *Id.* at 57:6–9. Antenna array 622 is within housing 630 along with control system 628, which controls antenna array 622. *Id.* at 57:25–26. Control system 628 directs the processed vehicle information to display/telematics unit 629 via an electrical circuit for display and/or transmission to a remote location. *Id.* at 57:27–32.

Figure 3 of the ’501 patent illustrates an embodiment of the configuration of the sensors of the onboard vehicle diagnostic system and is reproduced below.

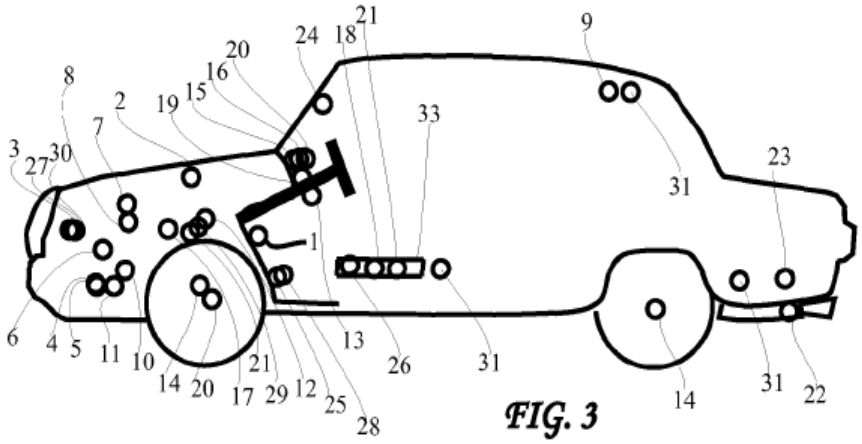

FIG. 3

Figure 3 is a schematic of a vehicle illustrating about thirty sensors shown in their approximate locations on the vehicle. Ex. 1001, 23:7–11. Most of the sensors are mounted on components within the engine of the vehicle, including the following: microphone 2, coolant thermometer 3, oil pressure sensor 4, oil level sensor 5, air flow meter 6, voltmeter 7, ammeter 8, engine knock sensor 10, oil turbidity sensor 11, throttle position sensor 12, oxygen sensor 17, transmission fluid level sensor 25, coolant level sensor 27, transmission fluid turbidity sensor 28, brake pressure sensor 29, and coolant pressure sensor 30. *Id.* at 23:36–54. The following sensors are mounted within the passenger compartment: crash sensor 1, humidity sensor 9, steering torque sensor 13, tachometer 15, speedometer 16, pitch and roll sensor 18, clock 19, odometer 20, power steering pressure sensor 21, cabin thermometer 24, and yaw sensor 26. *Id.* Pollution sensor 22 and fuel gage 23 are mounted near the tailpipe, and wheel speed sensor 14 is mounted on the wheel. *Id.*

D. Illustrative Claim

Claim 1, the only independent claim challenged, is reproduced below:

> 1. A method for predicting impending failures in one or more of a plurality of components or subsystems on a vehicle to prevent a breakdown of the vehicle that could result in an inability to operate the vehicle, comprising:
>
> mounting sensors on the vehicle, the sensors providing data which is affected by the operation of the components or subsystems, the sensors being selected and arranged such that the data provided by the sensors is different for different operating states of each of the plurality of components and subsystems;
>
> obtaining data from the sensors during operation of the components or subsystems;
>
> detecting patterns in the obtained data on the vehicle;
>
> analyzing, using a processor on the vehicle, the detected patterns to *create a prediction of an impending failure of one of the components or subsystems* before the predicted failure occurs; and
>
> informing the user, owner, dealer or manufacturer of the vehicle about the predicted failure before the predicted failure occurs to enable corrective action to be taken before the predicted failure occurs,
>
> whereby a breakdown of the vehicle that might occur if the predicted failure of the component were to occur is thereby avoided.

(Emphasis added).

E. The Prior Art References Supporting Alleged Unpatentability

Reference	Patent No.	Issued Date	Exhibit No.
Scholl	Patent 5,400,018	Mar. 21, 1995	Ex. 1002
Probst	Patent 4,849,894	July 18, 1989	Ex. 1003

F. The Pending Grounds of Unpatentability

Reference[s]	Basis	Claims Challenged
Probst	§ 102(b)	1, 6–8, 17, and 18
Scholl and Probst	§ 103(a)	1, 4–10, 17, and 18

II. ANALYSIS

A. Claim Construction

1. Principles of Law

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). The terms also are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). For an inventor to act 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). Also, when an inventor chooses to be his own lexicographer so as to give a term an uncommon meaning, he must set out his uncommon definition in a manner within the patent disclosure, sufficient to give one of ordinary skill in the art notice of the change. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

An extraneous limitation should not be read into the claims from the specification. *E.g., E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir. 1988). By extraneous we mean a limitation that is unnecessary for the purpose of making sense of the claim.

See, e.g., *In re Paulsen*, 30 F.3d at 1480; *Renishaw PLC*, 158 F.3d at 1249. The construction that stays true to the claim language and most naturally aligns with the inventor's description is likely the correct interpretation. *See Renishaw PLC*, 158 F.3d at 1250.

"Comprising" is a term of art used in claim language, which means that the named elements are essential, but other elements also may be included to constitute additional components within the scope of the claim. *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997).

2. "detecting patterns in the obtained data on the vehicle" and "analyzing . . . the detected patterns"

Independent claim 1 recites "detecting patterns in the obtained data on the vehicle" and "analyzing . . . the detected patterns." Although we stated in the Decision that no express construction was necessary based on the record at that time, we further determined that "detecting patterns in the obtained data on the vehicle" encompasses identifying trends in the obtained data on the vehicle and that "analyzing . . . the detected patterns" encompasses analyzing the identified trends. Dec. 13.

AVS states for the purposes of this *inter partes* review that it does not contest our determinations regarding claim construction. PO Resp. 11. AVS does, however, "dispute at least the application of certain terms to the prior art." *Id.* In particular, AVS states "Scholl discloses implementing, on a vehicle, diagnostic and prognostic fault codes without pattern detection." *Id*. at 37 (emphasis omitted).

AVS's arguments are based in part on an improper limiting of the term "patterns" to exclude trends. We construe the term "pattern" to aid in the evaluation of the arguments presented by AVS regarding Scholl.

The specification of the ’501 patent uses the term “pattern” in its description of pattern-recognition technology. In particular, according to the ’501 patent specification, detection of patterns is performed on time series data emitted by the sensors. Ex. 1001, 16:18–24. The ’501 patent specification describes various patterns that pattern recognition technology detects. For example, the ’501 patent specification states “[i]n some cases, the *frequencies* present in a set of data are a better predictor of component failures than the data itself.” Ex. 1001, 16:54–55 (emphasis added). Additionally, according to the ’501 patent specification, “[i]t is worth emphasizing that in many cases, it is the *rate* that a parameter is changing that can be as or more important that the actual value in predicting when a component is likely to fail.” *Id*. at 14:34–37 (emphasis added). Furthermore, the ’501 specification states: “[t]he pattern recognition algorithm thereby detects *trends or patterns* in the time series received from the sensors.” Ex. 1001, 18:29–30 (emphasis added). As used in the ’501 patent specification, therefore, “pattern” is a frequency of occurrences of certain data present in a set of data, a rate of change of data, or a trend of data.

For the reasons discussed above, we construe “pattern” as a frequency of occurrences of certain data present in a set of data, a rate of change of data, or a trend of data.

3. “a prediction of an impending failure of one of the components or subsystems”

Claim 1 recites the term “a prediction of an impending failure of one of the components or subsystems.” In the Decision, we determined that no express construction of the phrase “a prediction of an impending failure of

one of the components or subsystems" was necessary based on the record at that time. Dec. 14. We also agreed with AVS that "a prediction of an impending failure of one of the components or subsystems" encompasses a prediction of a likely failure of one of the components or subsystems. *Id*.

AVS now argues that the broadest reasonable construction of "failure of one of the components or subsystem" does not include ineffective operation due to driver error. PO Resp. 12. AVS cites to dictionary definitions for the term "failure" in support of its argument. *Id*. at 13. In particular, AVS submits definitions for failure as follows: "a state of inability to perform a normal function," "an abrupt cessation of normal functioning," and "fracturing or giving way under stress." *Id*. (citing *Merriam-Webster Dictionary* (1995) (Ex. 2006)). AVS contends that these dictionary definitions support its position because ineffective operation due to driver error is an inability of a component to perform outside of its normal functions. *Id*.

AVS's contention is inconsistent with the specification of the '501 patent. In particular, the '501 patent contemplates that prediction of a failure of one of the components or subsystems encompasses failures due to the manner in which the operator is operating the vehicle, or driver error. Ex. 1001, 15:38–40. One example provided in the '501 patent is predicting accelerated failure due to a driver driving at a speed higher than appropriate for a low gear. *Id*. at 15:38–44. As an additional example, the '501 patent specification describes predicting a rollover due to high speed. *Id*. at 26:21–25. The '501 patent describes a further exemplary failure that occurs because of how an operator operates a vehicle, by stating "a failure mode can be designed into the mechanism [to enable a restorable system] . . . when

the tire goes flat as, for example, when a nail [] punctures the tire." *Id*. at 76:19–23. A nail puncturing a tire is often due to a driver driving over a nail.

AVS's contention also is inconsistent with other language recited in claim 1. In particular, claim 1 recites, "whereby a breakdown of the vehicle that *might* occur if the predicted failure of the component *were* to occur is thereby avoided" (emphasis added). According to claim 1, breakdown of a vehicle is a possibility, but not a certainty when a component fails.

AVS does not describe persuasively how one of ordinary skill in the art would understand what types of functions are "normal" in the context of the claim and the '501 patent specification. The exemplary failures described in the '501 patent specification, such as a vehicle rollover or a flat tire, are simply states of inability of a component, a wheel or a tire, respectively, to perform a function that the component was designed to do.

As additional evidence of the meaning of "failure," AVS cites its expert, Mr. Steven Loudon, who states that in the automotive industry the term "component failure" is reserved for describing components that require either repair or replacement. PO Resp. 18 (citing Ex. 2001 ¶ 42). Mr. Loudon provides an example, "[i]f a car is sliding on a slippery road, one would not say that the brakes 'failed'—it is not the failure of the brakes to stop the skid, rather the brakes alone were unable to stop the car." Ex. 2001 ¶ 42. Mr. Loudon simply asserts his opinion of the use of the term "component failure" in the automotive industry without providing persuasive evidence supporting this usage by those in the automotive industry. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose

the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

Mr. Loudon relies on the definitions in *Merriam-Webster Dictionary*, which are discussed above. Ex. 2001 ¶ 42 (citing Ex. 2006). *Merriam-Webster Dictionary* is not a technical dictionary and Mr. Loudon has not shown persuasively that it is otherwise specialized for the automotive industry. Additionally, the example provided by Mr. Loudon of brakes failing during a skid satisfies some of the definitions in the dictionary, such as omission of performance and falling short.

Furthermore, Mr. Loudon’s assertion that “component failure” is reserved for describing components that require either repair or replacement is contrary to the ’501 patent specification. In particular, the ’501 patent describes a case in which “the situation causing the failure might be corrected.” Ex. 1001, 26:15–20. A particular example given in the ’501 patent is rollover of a vehicle. *Id*. at 26:15–25 (“[a] rollover of a vehicle may be preventable through the proper application of steering torque and wheel braking force”).

Mr. Loudon also relies on deposition testimony of Toyota’s expert, Mr. Scott Andrews. Ex. 2001 ¶ 42 (citing Ex. 2002, 42:20–43:7). Mr. Andrews testified that failure of a component “[g]enerally [] means that the component is not performing within its set performance boundaries.” Ex. 2002, 43:5–7. Mr. Andrews uses the word “generally,” which indicates that other possibilities exist. AVS did not ask Mr. Andrews if he agrees with Mr. Loudon’s statements regarding claim construction. Additionally, Mr. Andrews provided a declaration consistent with Toyota’s contentions. Ex. 1007.

We, therefore, decline to read into the claims either (1) a requirement that failure not be attributed to driver error or (2) a requirement that a failure involve a component or subsystem that must be repaired or replaced.

For the reasons given, we construe "failure of one of the components or subsystems" as a state of inability of one of the components or subsystems to perform a function that the component or subsystem is designed to perform. We determine that the broadest reasonable interpretation of failure in light of the specification of the '501 patent includes failures attributable to the manner in which an operator operates a vehicle and failures that are correctable without repair or replacement.

4. "informing . . . about the predicted failure"

AVS contends that Probst does not disclose "informing the user, owner, dealer, or manufacturer of the vehicle about the predicted failure," as recited in claim 1. PO Resp. 25 (emphasis omitted). AVS additionally argues that informing those at remote locations about the predicted failure requires transmission of larger file sizes that would be needed to transmit fault codes. PO Resp. 44. To evaluate AVS's contentions, we construe "informing . . . about the predicted failure."

A dictionary definition of "inform" is "[t]o impart information to; make aware of something." *Inform Definition, The American Heritage Dictionary of the English Language* (2011) *available at* http://search.credoreference.com/content/entry/hmdictenglang/inform/0 (last visited Oct. 9, 2014) (Ex. 3001). The specification of the '501 patent describes informing of the predicted failure consistent with this dictionary definition. For example, the '501 patent specification describes that informing may be in the form of a "message" (Ex. 1001, 19:29–33) or a

"fault code" (*id*. at 124:36). Additionally, the exemplary communication devices described in the '501 patent specification used for informing include well-known technologies that would make the recipient aware of the predicted failure, such as "a cellular telephone system" (Ex. 1001, 4:3) and "an Internet-enabled device possessed by an owner of the vehicle, e.g., a PDA or the like" (*id*. at 4:8–13).

For the reasons given, we construe "informing the user, owner, dealer, or manufacturer of the vehicle about the predicted failure" as making the user, owner, dealer, or manufacturer of the vehicle aware of the predicted failure. We determine that the broadest reasonable interpretation of "informing . . . about the predicted failure" in light of the specification of the '501 patent encompasses sending a message or a fault code that is used to bring about the awareness. Additionally, we note that "informing . . . about the predicted failure" does not require transmitting either the predicted failure or a pattern used to predict the failure.

5. Other Terms

In the Decision, we construed "component" as a part or an assembly of parts, less than the whole. Dec. 9. For the purposes of this *inter partes* review, AVS does not contest our construction of "component." PO Resp. 11.

In the Decision, we said the term "sensor" possesses its ordinary and customary meaning, as would be understood by one with ordinary skill, and does not require an express construction. Dec. 11. We also explained that the term "sensor" includes each of the sensors particularly identified in the specification of the '501 patent. *Id*. For the purposes of this *inter partes*

review, AVS does not contest our construction of "component." PO Resp. 11.

In the Decision, we said that the term "signal" does not require an express construction, but that, in light of the specification, "signal" covers examples in the '501 patent such as time-varying outputs from components including electrical, acoustic, thermal, electromagnetic radiation or mechanical vibration. Dec. 11. For the purposes of this *inter partes* review, AVS does not contest our construction of "component." PO Resp. 11.

For each of these claim terms, we discern no reason, based on the complete record now before us, to change our constructions thereof.

B. Alleged Anticipation of Claims 1, 6–8, 17, and 18 by Probst

Toyota contends that claims 1, 6–8, 17, and 18 are unpatentable as anticipated, under 35 U.S.C. § 102(b), by Probst. Pet. 24–34. We have reviewed Toyota's anticipation argument and supporting evidence, including Probst's disclosure, the declaration of Mr. Scott Andrews (Ex. 1007), and the detailed claim charts appearing on pages 27–34 of the Petition.

The claim charts persuasively read all elements of each of claims 1, 6–8, 17, and 18 onto the disclosure of Probst. Despite the counter-arguments in AVS's Patent Owner Response, and the evidence cited therein, which we also have considered, Toyota has shown, by a preponderance of the evidence, that each of claims 1, 6–8, 17, and 18 is unpatentable as anticipated by Probst.

1. Probst

Probst discloses determining operating conditions of a motor vehicle from output signals of a sensor. Ex. 1003, 1:9–12. Figure 1 is reproduced below:

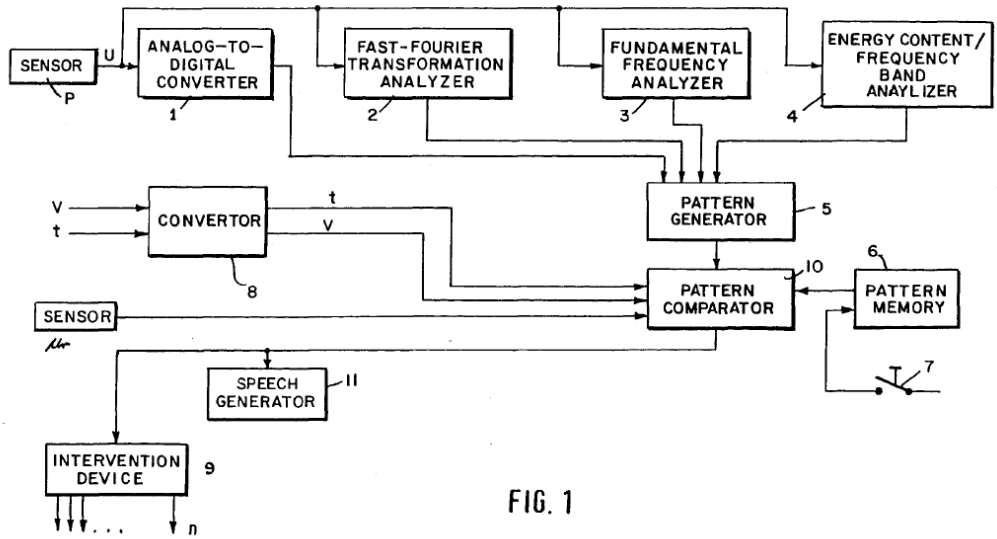

FIG. 1

Figure 1 illustrates a diagram of supplying sensor data directly and in parallel to analyzers for evaluation. *Id.* at 1:12–14.

As shown in Figure 1, Probst discloses that pressure sensor P sends its output in the form of variable alternating voltage U via circuit connections to each of analog-to-digital converter 1, Fast-Fourier transformation analyzer 2, fundamental frequency analyzer 3, and energy content/frequency band analyzer 4, so that each of the analyses carried out by the analyzers is performed in parallel with the operation of analog-to-digital converter 1. Ex. 1003, 3:9–27. Each of analog-to-digital converter 1, Fast-Fourier transformation analyzer 2, fundamental frequency analyzer 3, and energy content/frequency band analyzer 4 sends its output to pattern generator 5. *Id.* at 3:27–29.

Pattern generator 5 generates a current pattern using the analyzed and converted sensor data. Ex. 1003, 3:26–29. Pattern generator 5 furnishes the current pattern via a circuit connection to pattern comparator 10. *Id.* at 5:22–29. In accordance with one embodiment, pattern comparator 10

compares the current pattern received from pattern generator 5 to the preset comparative patterns received from pattern memory 6 using image-comparing techniques. *Id*. at 5:25–28. Pattern comparator 10 determines whether the current pattern is in conformity with a preset pattern corresponding to an operating condition of a motor vehicle. *Id*. at 5:54–59. Pattern comparator 10 determines whether the operating condition of the vehicle is an imminent critical operating condition. *Id.* If so, pattern comparator 10 initiates warning and remedial measures via circuit connections to intervention device 9, as well as speech generator 11. *Id.* at 5:66–6:5.

2. Whether Probst Meets the Limitations of Claims 1, 6–8, 17, and 18

Toyota's claim charts persuasively read all elements of each of claims 1, 6–8, 17, and 18 onto the disclosure of Probst. Pet. 27–34 (citing Ex. 1003, Abstract, 1:10–29, 1:45–54, 1:67–2:29, 2:42–48, 3:9–15, 4:25–68, 5:30–37, 6:6–15, Fig. 1). For instance, claim 1 recites a method for predicting impending failures. As Toyota correctly asserts, Probst is directed to a process for determining the operating condition of a vehicle, including "imminent critical operating conditions." Pet. 25-26 (citing Ex. 1003, Abstract). Additionally, claim 1 requires analyzing detected patterns in obtained sensor data to create a prediction of an impending failure of one of the components or subsystems. Toyota correctly notes that Probst's diagnostic process entails generating a pattern based on sensor signals and comparing this pattern with preset patterns to determine when the limit pattern for a critical operating condition is approached. *Id*. at 26 (citing Ex. 1003, Abstract; col. 1, ll. 36-54; col. 2, ll. 24-30; col. 4, ll. 62-68; col. 5, ll. 22-59; col. 6, ll. 19-29). Exemplary sensor data that is monitored includes a

pressure sensor that determines loading of a chassis spring of the motor vehicle. *Id*. at 28 (citing Ex. 1003, 1:67–2:7). Regarding recitation in claim 1 of informing the user about the predicted failure, Toyota also correctly notes that Probst describes warning a user of the vehicle. Pet. 26, 31-32 (citing Ex. 1003, col. 1, ll. 24-29; col. 2, ll. 42-46; col. 4, ll. 62-68).

We address AVS's counter-arguments in turn. AVS acknowledges that Probst discloses detecting dangerous conditions and determining that a critical operating condition is approaching. PO Resp. 15. AVS, however, contends that Probst discloses predicting critical operating conditions of only the vehicle as a whole, rather than on the component or subsystem level. PO Resp. 16.

AVS's contention is not commensurate with the scope of claim 1. Claim 1 recites, "to create a prediction of an impending failure of one of the components or subsystems." Requiring a prediction of an impending failure of one of the components or subsystems does not exclude the possibility of impending failure of other components or subsystems. Note that independent claim 1 recites the term "comprising," which is a term of art meaning that the named elements are essential, but other elements also may be included to constitute additional components within the scope of the claim. *See Genentech, Inc*., 112 F.3d at 501. Indeed, the preamble of claim 1 recites, "[a] method for predicting impending *failures in one or more of a plurality of components or subsystems*" (emphasis added). Nothing in claim 1 can be read reasonably as prohibiting failure of all components and subsystems of a vehicle. Furthermore, claim 1 does not recite "component or subsystem *level*," as AVS contends. PO Resp. 16 (emphasis added).

In support of its contention that Probst discloses predicting critical operating conditions of only the vehicle as a whole, AVS cites to examples of vehicle instability, including "a tipping or out-of control vehicle." *Id*. Even in the example described by AVS, the tipping vehicle has a wheel not making adequate contact with the road surface, i.e., omission of performance. The wheel is a component of the vehicle.

AVS additionally argues that Probst discloses corrective actions to be taken, which do not indicate necessarily that any component or subsystem "failed." PO Resp. 16. Nevertheless, claim 1 recites creating "a prediction of an *impending* failure" (emphasis added), and does not require that a component or subsystem has already failed. Indeed, claim 1 further recites "informing . . . to enable corrective action to be taken before the predicted failure occurs."

AVS additionally contends that Probst does not disclose a prediction of a failure of a component or subsystem because the term "failure" does not encompass ineffective operation due to driver error, and in the automotive industry the term "component failure" is reserved for describing components that require repair or replacement. PO Resp. 17–19. For the reasons discussed above regarding claim construction, we are not persuaded by these contentions.

AVS contends that Probst also does not disclose "informing the user, owner, dealer, or manufacturer of the vehicle about the predicted failure," as recited in claim 1. PO Resp. 25 (emphasis omitted). AVS acknowledges that Probst informs the driver via an acoustical warning and display. *Id*. at 25–26. AVS, however, contends that these warnings are "non-specific" and

do not constitute informing the driver of "the 'predicted failure.'" *Id*. (emphasis omitted).

As discussed above, we construe "informing the user, owner, dealer, or manufacturer of the vehicle about the predicted failure" as making the user, owner, dealer, or manufacturer of the vehicle aware of the predicted failure. As Toyota correctly points out, Probst describes "it becomes possible to trigger in time, warning and display measures for a critical operating condition." Pet. 31 (citing Ex. 1001, 2:24–29); *see also* Pet. 32 (citing Ex. 1001, 4:62–68) ("The countermeasures to be initiated may now, in a conventional way, consist of an intervention into the engine or brake control or may . . . include an indication to the user of the vehicle as to when the operating condition of the motor vehicle approaches a critical condition."). We, therefore, are persuaded that Toyota has shown by a preponderance of the evidence that Probst discloses "informing the user, owner, dealer, or manufacturer of the vehicle about the predicted failure," as recited in claim 1.

Each of claims 6–8, 17, and 18 depend from claim 1. Toyota's claim charts persuasively read all elements of each of dependent claims 6–8, 17, and 18 onto the disclosure of Probst. Pet. 32–34 (citing Ex. 1003, Abstract, 2:24–29, 2:42–46, 4:62–68, 5:30–37). Accordingly, even after considering the counter-arguments in AVS's Patent Owner Response, and the evidence cited therein, we find Toyota has shown, by a preponderance of the evidence, that each of claims 1, 6–8, 17, and 18 is unpatentable as anticipated by Probst.

C. Alleged Obviousness of Claims 1, 4–10, 17, and 18 over Scholl and Probst

Toyota contends that claims 1, 4–10, 17, and 18 are unpatentable, under 35 U.S.C. § 103(a), as obvious over Scholl and Probst. Pet. 20–23, 34–37, 40–43. We have reviewed Toyota's obviousness argument and supporting evidence, including the disclosures of Scholl and Probst, the declaration of Mr. Scott Andrews (Ex. 1007), and the claim charts on pages 20–23 and the detailed analysis appearing on pages 34–37 and 40–43 of the Petition.

As discussed in the previous section, Probst anticipates independent claim 1, as well as dependent claims 6–8, 17, and 18. Regarding AVS's contentions relating to the alleged deficiencies of Probst with respect to independent claim 1, as Toyota correctly notes, Scholl discloses explicitly detecting faults that are not attributable to the manner in which an operator operates a vehicle and require repair or replacement of a component. Pet. 16–17 (citing Ex. 1002, 1:14–18, 1:30–31, 3:18–20, 4:17–25, 6:5–10, 6:15–23, Fig. 8).

Regarding the dependent claims not discussed in the previous section, the claim charts and detailed analysis read all additional elements of each of claims 4, 5, 9, and 10 onto the disclosure of Probst and Scholl, taken together. Pet. 20–23 (citing Ex. 1002, 1:14–18, 1:30–31, 2:40–47, 2:58–3:6, 3:13–17, 6:15–23). Additionally, as discussed below, we determine that in its Petition (Pet. 42 (citing Ex. 1007 ¶¶ 121–124)), Toyota has articulated sufficient reasoning with a rational underpinning as to why one of ordinary skill in the art would combine the technique of directing predicted failure information through a satellite transceiver, as described in Scholl, into the failure prediction system of Probst. *See KSR Int'l Co. v. Teleflex Inc.*, 550

U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

AVS states that we determined in the Decision that "Scholl does not disclose 'prediction' using an analysis of 'detected patterns.'" PO Resp. 26. That is incorrect. In that connection, the Decision relates to Scholl's statement that conditions recognized using detected patterns "*may* lead to future problems" (Ex. 1002, 4:17–18 (emphasis added)) and to the fact that claim 1 recites "analyzing, using a processor on the vehicle, the detected patterns to create a prediction of an *impending* failure of one of the components or subsystems" (emphasis added). Dec. 26. The shortcoming of Scholl we noted regarding anticipation of independent claim 1 of the '501 patent does not impact our decision with respect to dependent claims 4, 5, 9, and 10. Claims 4, 5, 9, and 10 of the '501 patent recite generic and well-known limitations relating to transmitting information, including communicating or informing someone remote, a communications unit, or a telecommunications system, all of which are taught in Scholl.

Despite the counter-arguments in AVS's Patent Owner Response, and the evidence cited therein, which we also have considered, Toyota has shown, by a preponderance of the evidence, that each of claims 1, 4–10, 17, and 18 is unpatentable, under 35 U.S.C. § 103(a), as obvious over the combination of Scholl and Probst.

1. Scholl

Scholl discloses generating, by a vehicle, a set of data relating to the vehicle's operation. *See* Ex. 1002, 2:58–59. An embodiment is illustrated in Figure 3, reproduced below:

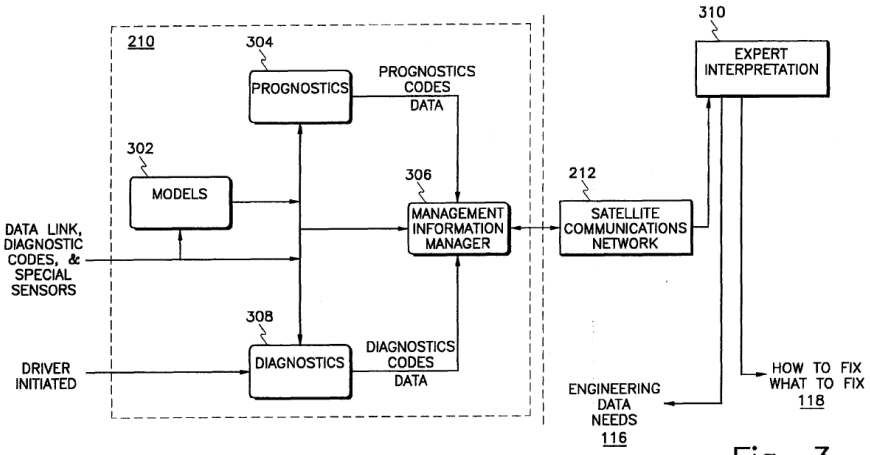

Fig. 3

As shown in Figure 3, diagnostics 308, prognostics 304, and models 302 are implemented on monitor 210 on the vehicle. Ex. 1002, 3:47–53. Data is generated on the vehicle by sources including sensors and electronic control modules (ECM). *Id.* at 3:20–22. That data is received by models 302, prognostics 304, and diagnostics 308. *Id.* at 3:18–21, Fig. 3. Management Information Manager 306 is connected to the data sources, as well as prognostics 304 and diagnostics 308, to receive the prognostics code data, diagnostics codes data, and model data and to prepare them for transmission via satellite communication network 212 for expert interpretation 310. *Id.* at 3:58–60, Fig. 3.

2. Whether Toyota Has Satisfied the Requirements for Combining Scholl and Probst

As indicated above, we determine that Toyota has articulated sufficient reasoning with a rational underpinning as to why one of ordinary skill in the art would combine the technique of directing predicted failure information through a satellite transceiver, as described in Scholl, into the failure prediction system of Probst. *See KSR*, 550 U.S. at 398. Additionally,

in light of the contentions and evidence presented by Toyota, we find that modifying Probst's disclosure of indicating to the user of the vehicle when the vehicle approaches a critical condition with Scholl's disclosure of transmitting indications of faults to a remote location is no more than a predictable use of familiar prior-art elements according to their established functions, therefore rendering the recited invention obvious. *See KSR*, 550 U.S. at 417.

In particular, Toyota relies on the declaration of its expert, Mr. Andrews, who states that one of ordinary skill in the art at the time of the invention would have been motivated to use Scholl's satellite transceiver with Probst's failure prediction system. Pet. 42 (citing Ex. 1007 ¶¶ 121–24). Mr. Andrews states that Scholl explains that transmissions to dealers, manufacturers, and owners allow for maintenance, generation of repair instructions, or the development of future diagnostics and prognostics by a vehicle manufacturer. Ex. 1007 ¶ 122 (citing Ex. 1002, 1:12–18, 2:58–68, 6:55–60). Mr. Andrews also states that one of ordinary skill in the art would have understood in June 1995 that Probst's warning measures could extend to transmission of information relating to predicted failures to remote entities. *Id*. ¶ 124.

We find that the testimony of Toyota's expert is consistent with the disclosure of Scholl and Probst. For example, Mr. Andrew's testimony regarding Scholl's explanation of benefits for transmitting to dealers, manufacturers, and owners is consistent with the disclosure of Scholl. *See, e.g.*, Ex. 1002, 6:56–60 ("[T]he present invention provides a method for relaying information between a vehicle and a remote location . . . [that] is used to perform diagnostics and prognostics, to generate repair instructions,

and in the development of future diagnostics and prognostics.”). Additionally, we credit Mr. Andrews’s testimony (Ex. 1007 ¶ 124) because modifying Probst’s disclosure of warning measures (Ex. 1003, 4:62–68) with Scholl’s disclosure of transmitting indications of faults to a remote location (Ex. 1002, 4:8–26) is no more than a predictable use of familiar prior art elements according to their established functions, therefore rendering the recited invention obvious. *See KSR*, 550 U.S. at 417.

The ’501 patent does not purport to relate to advancements in transmission mediums between vehicles and remote locations. Claims 4, 5, 9, and 10 of the ’501 patent recite generic and well-known limitations relating to transmission, including communicating or informing someone remote, a communications unit, or a telecommunications system. The ’501 patent specification describes well-known technologies for implementing these transmission including “a cellular telephone system” (Ex. 1001, 4:2–3) and “an Internet-enabled device possessed by an owner of the vehicle, e.g., a PDA or the like” (*id*. at 4:8–13; *see also id*. at 111:54–60 (describing communications unit 404 communicating to a wireless ISP as “known to those skilled in the art.”)).

AVS contends that three legal principles of obviousness preclude invalidity based on the combination of Scholl and Probst: (a) that the combination would change improperly the principle of operation of Scholl, (b) that there would have been no reasonable expectation of success, and (c) that Scholl teaches away from the combination. PO Resp. 28. Additionally, AVS states that significant evidence of secondary considerations shows that the challenged claims of the ’501 patent would not have been obvious. PO Resp. 48. We address each of these below.

a. Whether the Combination of Scholl and Probst Would Change Improperly the Principle of Operation of Scholl

AVS contends that modifying Scholl to include pattern recognition and on-board failure prediction, as required by claim 1 would change fundamentally the principle of operation of Scholl. PO Resp. 28–30. AVS relies on its expert, Mr. Loudon, who states, "Scholl *intentionally* utilizes what Toyota characterizes as less 'robust' processing on the vehicle, and *intentionally* off-loads performing any prediction off of the vehicle by an expert." PO Resp. 32 (citing Ex. 2001 ¶ 51). Mr. Loudon cites to the Decision, which refers to statements by Toyota's expert, Mr. Andrews. Ex. 2001 ¶ 51 (citing Dec. 24).

AVS's expert incorrectly characterizes Mr. Andrews's statements. Mr. Andrews states that one of ordinary in the art as of June 1995 would have been motivated to add the specific pattern detecting and pattern analysis of Probst to Scholl's failure prediction system because it provides "a similar, but more robust, system of impending failure detection" as compared to the system taught in Scholl. Ex. 1007 ¶ 107. Furthermore, as AVS's expert, Mr. Loudon, acknowledges (Ex. 2001 ¶ 51), Mr. Andrews states that one of ordinary skill in the art would have considered the specific pattern detection/analysis of Probst to be interchangeable with other failure prediction methods, including the method employed by Scholl (Ex. 1007 ¶ 108).

Mr. Loudon, additionally, cites to two excerpts of Scholl. Ex. 2001 ¶ 51 (citing 1002, 1:65–68, 1:55–60). In the first excerpt, Scholl describes reducing information sent by the vehicle by stating, "[i]n one aspect of the present invention a method for reducing the amount of information relating to the status of a vehicle being relayed to a remote location over a

communication data link is provided." Ex. 1002, 1:65–68 (emphasis omitted). In the second excerpt, Scholl similarly describes reducing transmitted information by stating that "communication services are expensive" so "it is desirable to reduce the amount of information that is required to be transferred while providing relevant information when needed." *Id*. at 1:55–60. Reducing information is not the same as off-loading performing any prediction. Indeed, Scholl also states, "[s]ome of this information may be used on board the vehicle to perform low level diagnostics." *Id*. at 1:24–25.

Additionally, as Toyota correctly points out (Pet. 10–24), Scholl describes an embodiment in which diagnostics and prognostics on the vehicle (Ex. 1002, 3:48–53, Fig. 3) analyze data about the operation of the vehicle (*id*. at 2:58–59) and generate fault indications (*id*. at 4:8–26). In particular, Scholl describes an application involving vehicles having a system with monitor 210, which is "microprocessor based." *Id*. at 3:18–20. Scholl also describes "one embodiment" in which "diagnostics, prognostics and/or models are implemented on [] monitor 210." *Id*. at 3:48–53; *see also id*. at Fig. 3 (illustrating prognostics 304 and diagnostics 308 implemented on monitor 210). Scholl explains that "diagnostics produce a fault code," which is "an indication of a particular fault" (*id*. at 4:11–16), and "prognostics 304 analyze data in order to detect conditions that may lead to future problems" (*id*. at 4:17–18). According to Scholl, these systems reduce downtime of vehicles by preventing certain breakdowns. *Id*. at 1:14–17.

We, therefore, are not persuaded that the combination of Scholl and Probst would change improperly the principle of operation of Scholl.

b. Whether One of Ordinary Skill in the Art Would Have Had a Reasonable Expectation of Success in Making the Modification

AVS contends that Toyota fails to provide any argument or evidence that there would have been any reasonable expectation of success in adding the pattern recognition concepts of Probst to Scholl. PO Resp. 30, 41–43. As discussed above, we are persuaded that Toyota has provided sufficient rationale for making the combination.

AVS additionally contends that one of ordinary skill in the art would not have had a reasonable expectation of success of adding pattern detection capabilities to Scholl because Probst and Scholl "relate to such different things." PO Resp. 31 (citing Ex. 2001 ¶¶ 52–53). Toyota's expert, Mr. Andrews, on the other hand, states that Scholl and Probst are in the same field of monitoring and diagnostic systems and methods intended to detect and predict the failure of vehicle components. Ex. 1007 ¶ 123.

Upon consideration of the parties' arguments and supporting evidence, we credit the testimony of Toyota's expert over that of AVS's expert. *See, e.g.*, *Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010) (holding that Board has discretion to give weight to one item of evidence over another "unless no reasonable trier of fact could have done so"). For instance, we find that the testimony of Toyota's expert that Scholl and Probst are in the same field is consistent with the disclosures of Scholl and Probst. *Compare* Ex. 1002, 2:58–59 ("[each of] vehicles 104, 106 generate a set of data relating to its operation"); *id*. at 3:18–22 ("[e]ach truck 202, 204, 206 includes a monitor 210 . . . [which] is microprocessor based [and] receives data from . . . sensors and electronic control modules"), and *id*. at 3:48–53 ("each vehicle 104, 106 may include . . . diagnostics 308, and/or prognostics 304 . . . [which] are implemented on [] monitor 210"), *with*

Ex. 1003, 1:9–12 ("The present invention relates to a process for determining operating conditions of a motor vehicle from output signals of a sensor for a relevant operating variable."); *see also* Ex. 1003, Abstract ("[A]n n-dimensional [] pattern is generated[,] is compared with preset patterns[,] and permits a simple and fast analysis of the current operating conditions and a fast recognition of an imminent critical operating condition.").

AVS further contends that this case is like *Liberty Mutual Ins. Co. v. Progressive Casualty Ins. Co*., CBM2013-00003, slip op. at 20–21 (PTAB Mar. 15, 2013) (Paper 11) ("the *Liberty Mutual* Decision"). PO Resp. 32–33. In particular, AVS argues that Toyota has not shown how pattern detection from Probst could be incorporated into Scholl. *Id*.

In this case, we are persuaded that Toyota provides sufficient evidence and explanation to support a showing of how pattern detection from Probst could be incorporated into Scholl. For example, Toyota's expert identifies using Scholl's satellite transceiver in Probst's failure prediction system. Ex. 1007 ¶ 121. As Toyota's expert notes, Scholl describes that the satellite transceiver directs codes relating to predicted vehicle component failures to a dealer, manufacturer, or vehicle owner. *Id*.

AVS, in reliance on its expert, Mr. Loudon, further contends that it would not have been obvious to add a transmitter to Probst because persons in the industry did not believe the transmission technology to be advanced enough. PO Resp. 44–46 (citing Ex. 2001 ¶ 59). AVS bases its contention on an argument that large file sizes would need to be transmitted. AVS does not explain persuasively why large file sizes or more than a fault code would need to be transmitted. Nonetheless, as discussed above, we are persuaded

that Toyota has provided a sufficient showing that adding a transmitter to Probst would have been obvious.

We, therefore, are not persuaded that one of ordinary skill in the art would not have had a reasonable expectation of success in making the proposed modification.

c. Whether Scholl Teaches Away from Adding Pattern Detection and On-board Processing for Failure Prediction

AVS contends that Scholl teaches away from performing pattern detection and on-board failure prediction on a vehicle. PO Resp. 35–36 (citing Ex. 2001 ¶ 54). AVS additionally contends that Scholl teaches away from transmitting anything more than fault codes. PO Resp. 40–41 (citing Ex. 2001 ¶ 58).

To constitute properly a teaching away, the teaching must be evaluated from a technological perspective, not merely a comparative perspective. *See, e.g.*, *Syntex (U.S.A) LLC v. Apotex, Inc.*, 407 F.3d 1371, 1380 (Fed. Cir. 2005) ("Under the proper legal standard, a reference will teach away when it suggests that the developments flowing from its disclosures are unlikely to produce the objective of the applicant's invention." (citing *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994))).

In contrast to AVS's contention that Scholl teaches away from performing pattern detection and on-board failure prediction on a vehicle, Scholl describes an embodiment in which pattern detection is processed onboard a vehicle to be used in predicting failures. In particular, Scholl describes having microprocessor-based monitor 210 (Ex. 1002, 3:18–20) and implementing diagnostics 308 and prognostics 304 on monitor 210 (*id*. at 3:48–53; *see also id*. at Fig. 3 (illustrating prognostics 304 and diagnostics

308 implemented on monitor 210)). Scholl further describes that "prognostics 304 may be adapted to look at the rate change of specific parameters." *Id*. at 4:22–25. As discussed above, we construe "pattern" as a frequency of occurrences of certain data present in a set of data, a rate of change of data, or a trend of data. We, therefore, are not persuaded that Scholl teaches away from performing pattern detection and on-board failure prediction on a vehicle.

Scholl's description of also sending data to "a location where it can be used more fully" (*id*. at 1:33–35), such as sending it to an expert to generate repair instructions (*id*. at 4:66–68), simply provides additional uses for the data. Alternate embodiments also are not a teaching away. *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) ("Thus, a finding that the prior art as a whole suggests the desirability of a particular combination need not be supported by a finding that the prior art suggests that the combination claimed by the patent applicant is the preferred, or most desirable, combination.").

Similarly, Scholl's indication that communications services are expensive is not sufficient to show a teaching away. Scholl acknowledges the desirability of "providing relevant information when needed." Ex. 1002, 1:60. Furthermore, as discussed with respect to claim construction, we determine that the broadest reasonable interpretation of "informing . . . about the predicted failure" in light of the specification of the '501 patent encompasses sending a message or a fault code that is used to bring about awareness of the predicted failure. Scholl's disclosure of transmitting a fault code, therefore, is within the scope of informing about the predicted failure and is not a teaching away.

We, therefore, are not persuaded by AVS's contentions that Scholl teaches away from the combination.

d. Secondary Considerations

AVS, in reliance on its expert, contends that evidence of secondary considerations shows that the challenged claims of the '501 patent would not have been obvious. PO Resp. 48 (citing Ex. 2001 ¶¶ 62–67).

First, AVS's expert, Mr. Loudon, states that evidence of failure of others and unexpected results support his opinions of non-obviousness. Ex. 2001 ¶¶ 62–64 (citing Ex. 1002, 1:24–32). Mr. Loudon cites to Scholl as an example, which states that "[d]ue to <u>on-board computing power limitations</u> and the lack of operator expertise in using this information to diagnose the vehicle and its systems, the information is more useful off-board the vehicle." Ex. 2001 ¶ 64 (citing Ex. 1002, 1:24–32). As discussed above, Scholl describes having microprocessor-based monitor 210 (Ex. 1002, 3:18–20) and implementing diagnostics 308 and prognostics 304 on monitor 210 (*id*. at 3:48–53; *see also id*. at Fig. 3 (illustrating prognostics 304 and diagnostics 308 implemented on monitor 210)). Alternate embodiments and additional uses for data are not persuasive evidence of failed attempts or unexpected results.

Second, Mr. Loudon states that other commentators noted limitations in the ability of 1990s vehicle computers to conduct on-board diagnosis and taught away from performing on-board complex computing calculations. Ex. 2001 ¶ 65 (citing Ex. 2004). Although Mr. Loudon refers to "[o]ther commentators," Mr. Loudon does not provide evidence of a widespread effort, but instead cites to a single reference written by Mr. Ken Scott. *Id*. The reference relates to diagnosis "to the level of detail needed for the

service technician to repair [the vehicle]" (Ex. 2004, 29), not to complex computing calculations, as Mr. Loudon suggests. Ex. 2001 ¶ 65 (citing Ex. 2004). Additionally, Mr. Loudon has not identified any claim that recites "complex computing calculations" (Ex. 2001 ¶ 65) or "to the level of detail needed for the service technician to repair [the vehicle]" (Ex. 2004, 29). Furthermore, the reference on which Mr. Loudon relies describes a commercial consideration of cost, rather than technical limitations as Mr. Loudon suggests. *See* Ex. 2001 ¶¶ 65–66 (citing Ex. 2004). Moreover, Mr. Loudon has not provided persuasive evidence of comparable cost effectiveness of the technology of the '501 patent.

Third, Mr. Loudon states "[s]imilarly, Derek Wright wrote in 1990 that computer processing power was not yet sufficient for combining on-board processing and communications technology." Ex. 2001 ¶ 66 (citing Ex. 2005, 249). This reference, cited by Mr. Loudon, describes the availability of commercial products (Ex. 2005, 249), rather than technical limitations as Mr. Loudon suggests. Additionally, Mr. Loudon's assertion involves an incorrect characterization of the reference. In particular, Mr. Loudon states that the reference explains that computer processor power was insufficient to combine on-board and communications technology. Ex. 2001 ¶ 66 (citing Ex. 2005, 249). However, that reference describes that on-board computing was sufficient for combining types of applications similar to those referred to by Mr. Loudon (Ex. 2005, 244–248), such as exemplary integrated systems that communicate on-board processed data (*id*. at 247–248). Mr. Loudon's statements pertain to a description of an application integrating vehicle generated data with "data from the road" (Ex. 2005, 249),

which refers to intelligent highway systems including vehicle location and navigation systems (*id*. at 240, 246).

For the reasons given in this section and above, we are not persuaded by Mr. Loudon's statements regarding secondary considerations. Additionally, the evidence presented by AVS and Mr. Loudon is not directed to failure of others or unexpected results. Neither AVS nor Mr. Loudon has shown persuasive evidence that others have attempted, tried, and endeavored to make the recited technology of the claims, but despite their efforts have failed. Instead, Mr. Loudon discusses what was not present or not made, which is different than what was tried but unable to be made. Also, neither AVS nor Mr. Loudon has identified what was unexpected about the developments of AVS, with respect to the technology of the challenged claims.

Neither AVS nor Mr. Loudon has attempted to present evidence of secondary considerations with respect to any particular claim. We will not attempt to ascertain which secondary considerations evidence corresponds to which claims. Furthermore, neither AVS nor Mr. Loudon has shown persuasively a nexus between the claimed invention and the secondary considerations. *See, e.g., Ormco Corp. v. Align Tech., Inc*., 463 F.3d 1299, 1311–12 (Fed. Cir. 2006).

e. Conclusions Regarding Obviousness

As discussed above, we determine that Toyota has satisfied *KSR*'s requirements for combining the technique of directing predicted failure information through a satellite transceiver, as described in Scholl, into the failure prediction system of Probst. *See KSR*, 550 U.S. at 418. We have considered the totality of the evidence, both for and against obviousness, to

arrive at our determination. Despite the counter-arguments in AVS's Patent Owner Response, and the evidence cited therein, which we also have considered, Toyota has shown, by a preponderance of the evidence, that each of claims 1, 4–10, 17, and 18 is unpatentable, under 35 U.S.C. § 103(a), as obvious over the combination of Scholl and Probst.

III. CONCLUSION

We conclude that Toyota has demonstrated by a preponderance of the evidence that (1) claims 1, 6–8, 17, and 18 are unpatentable, under 35 U.S.C. § 102(b), as anticipated by Probst, and (2) claims 1, 4–10, 17, and 18 are unpatentable, under 35 U.S.C. § 103, as obvious over the combination of Scholl and Probst.

This is a final written decision of the Board under 35 U.S.C. § 318(a). Parties to the proceeding seeking judicial review of this decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IV. ORDER

For the reasons given, it is

ORDERED that claims 1, 4–10, 17, and 18 of U.S. Patent No. 8,019,501 are determined by a preponderance of the evidence 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.

For PETITIONER:

A. Antony Pfeffer
Thomas R. Makin
KENYON & KENYON LLP
apfeffer@kenyon.com
tmakin@kenyon.com
ptab@kenyon.com

For PATENT OWNER:

Thomas J. Wimbiscus
Scott P. McBride
MCANDREWS HELD & MALLOY, LTD.
twimbiscus@mcandrews-ip.com
smcbride@mcandrews-ip.com