

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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TOYOTA MOTOR CORPORATION,  
Petitioner,

v.

AMERICAN VEHICULAR SCIENCES LLC,  
Patent Owner.

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Case IPR2013-00419  
Patent 6,772,057 B2

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Before JAMESON LEE, TREVOR M. JEFFERSON, and  
LYNNE E. PETTIGREW, *Administrative Patent Judges*.

PETTIGREW, *Administrative Patent Judge*.

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

I. BACKGROUND

Petitioner, Toyota Motor Corporation (“Toyota”), filed a Petition for *inter partes* review of claims 1–4, 7–10, 30–34, 37–41, 43, 46, 48, 49, 56, 59–62, and 64 of U.S. Patent No. 6,772,057 B2 (Ex. 1001, “the ’057 patent”). Paper 3 (“Pet.”). Patent Owner, American Vehicular Sciences LLC (“AVS”), filed a Preliminary Response. Paper 17 (“Prelim. Resp.”).

On January 13, 2014, pursuant to 35 U.S.C. § 314, we instituted an *inter partes* review for all challenged claims on certain grounds of unpatentability asserted in the Petition. Paper 19 (“Dec. on Inst.”).

Subsequent to institution, AVS filed a Patent Owner Response (Paper 33), and later filed a Revised Patent Owner Response (Paper 45, “PO Resp.”).<sup>1</sup> Toyota filed a Reply to Patent Owner’s Response (Paper 40, “Pet. Reply”).

A consolidated oral hearing for this proceeding and *Toyota Motor Corp. v. American Vehicular Sciences, LLC*, IPR2013-00424, involving the same parties and similar issues, was held on August 18, 2014. A transcript of the consolidated hearing is included in the record. Paper 58 (“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) and 37 C.F.R. § 42.73.

As explained below, Toyota has shown by a preponderance of the evidence that claims 30, 32–34, 37–40, 43, 46, 48, and 49 of the ’057 patent are unpatentable, but Toyota has not shown by a preponderance of the evidence that claims 1–4, 7–10, 31, 41, 56, 59–62, and 64 of the ’057 patent are unpatentable.

#### *A. Related Proceedings*

Toyota and AVS indicate that the ’057 patent has been asserted by AVS in the following district court cases: *American Vehicular Sciences LLC v. Toyota Motor Corp.*, No. 6:12-cv-00410 (E.D. Tex.) (filed June 25, 2012); *American Vehicular Sciences LLC v. BMW Group*, No. 6:12-cv-

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<sup>1</sup> We authorized AVS to file a Revised Patent Owner Response to make certain non-substantive corrections to the Patent Owner Response. See Papers 39, 44 (Orders on Conduct of the Proceedings).

00415 (E.D. Tex.) (filed June 25, 2012); *American Vehicular Sciences LLC v. Subaru of Am. Inc.*, No. 6:12-cv-00230 (E.D. Tex.) (filed Mar. 8, 2013); and *American Vehicular Sciences LLC v. Mercedes-Benz U.S. Int'l, Inc.*, No. 6:13-cv-00309 (E.D. Tex.) (filed Apr. 3, 2013). Pet. 1; Paper 27, 2–3.

### *B. The '057 Patent*

The '057 patent, titled “Vehicular Monitoring Systems Using Image Processing,” generally relates to a vehicle monitoring arrangement for monitoring an environment exterior of a vehicle. Ex. 1001, Abstract. One embodiment of such an arrangement described in the '057 patent includes a transmitter that transmits electromagnetic waves into the environment exterior of a vehicle and one or more receivers that receive reflections of the transmitted waves from exterior objects, such as approaching vehicles. *Id.* at 14:8–12, 14:32–37, 38:7–13, Fig. 7. In a preferred implementation, the transmitter is an infrared transmitter, and the receivers are CCD (charge coupled device) transducers that receive the reflected infrared waves. *Id.* at 38:10–12, 39:25–28. One or more receivers may be arranged on a rear view mirror of the vehicle. *Id.* at 14:58–60, 38:22–25. The system also may include radar or pulsed laser radar (lidar) for measuring distance between the vehicle and exterior objects. *Id.* at 14:38–40, 39:1–6.

The waves received by the receivers contain information about exterior objects in the environment, and the receivers generate signals characteristic of the received waves. *Id.* at 14:12–14, 39:44–49. A trained pattern recognition means, such as a neural computer or neural network, processes the signals to provide a classification, identification, or location of an exterior object. *Id.* at 14:17–25, 39:49–54. Training of a neural network to provide classification, identification, or location of objects is

accomplished by conducting a large number of experiments in which the system is taught to differentiate among received signals corresponding to different objects. *Id.* at 36:22–39 (describing a neural network training session in connection with an embodiment that monitors an interior of a vehicle, particularly the passenger seat). The classification, identification, or location of an exterior object may be used to affect operation of other systems in the vehicle, e.g., to show an image or icon on a display viewable by a driver or to deploy an airbag. *Id.* at 14:21–31, 39:54–62.

### *C. Illustrative Claims*

Of the challenged claims, claims 1, 30, 40, and 56 are independent.

Claims 1, 30, and 40 are illustrative:

1. A monitoring arrangement for monitoring an environment exterior of a vehicle, comprising:

at least one receiver arranged to receive waves from the environment exterior of the vehicle which contain information on any objects in the environment and generate a signal characteristic of the received waves; and

a processor coupled to said at least one receiver and comprising trained pattern recognition means for processing the signal to provide a classification, identification or location of the exterior object, said trained pattern recognition means being structured and arranged to apply *a trained pattern recognition algorithm generated from data of possible exterior objects and patterns of received waves from the possible exterior objects* to provide the classification, identification or location of the exterior object;

whereby a system in the vehicle is coupled to said processor such that the operation of the system is affected in response to the classification, identification or location of the exterior object.

30. A vehicle including a monitoring arrangement for monitoring an environment exterior of the vehicle, the monitoring arrangement comprising:

*at least one receiver arranged on a rear view mirror* of the vehicle to receive waves from the environment exterior of the vehicle which contain information on any objects in the environment and generate a signal characteristic of the received waves; and

a processor coupled to said at least one receiver and arranged to classify or identify the exterior object based on the signal and thereby provide the classification or identification of the exterior object;

whereby a system in the vehicle is coupled to said processor such that the operation of the system is affected in response to the classification or identification of the exterior object.

40. A monitoring arrangement for monitoring an environment exterior of a vehicle, comprising:

a plurality of receivers arranged apart from one another and to receive waves from different parts of the environment exterior of the vehicle which contain information on any objects in the environment and generate a signal characteristic of the received waves; and

a processor coupled to said receivers and arranged to classify, identify or locate the exterior object based on the signals generated by said receivers and thereby provide the classification[, ] identification or location of the exterior object,

whereby a system in the vehicle is coupled to said processor such that the operation of the system is affected in response to the classification, identification or location of the exterior object.

Ex. 1001, 54:13–32, 55:58–56:6, 56:37–52 (emphases added).

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