UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOYOTA MOTOR CORPORATION

Petitioner

v.

Patent of American VEHICULAR SCIENCES

Patent Owner

Patent No. 6,772,057

Issue Date: August 3, 2004

Title: VEHICLE MONITORING SYSTEMS USING IMAGE PROCESSING

REVISED DECLARATION OF CRIS KOUTSOUGERAS, PhD IN SUPPORT OF AVS'S RESPONSE UNDER 37 CFR §42.120

Case No. IPR2013-00419

I. INTRODUCTION AND SUMMARY OF OPINIONS

1. My name is Cris Koutsougeras. I am a professor at the department of Computer science and Industrial Technology at Southeastern Louisiana University, Hammond, LA., where I teach courses in Computer Science and in Engineering Technology. My background consists of degrees in Electrical Engineering, Computer Engineering, and Computer Science. Of my past work, pertinent to the present review is my research on neural networks, robotics control and intelligence, and sensors and their interfacing.

2. I have been hired by American Vehicular Sciences ("AVS") in connection with the above-captioned Inter Partes Reexamination Proceeding ("IPR") before the United States Patent and Trademark Office. In the below paragraphs, I provide my opinion that at least claims 1-4, 7-10, 30-34, 37-39, 41, 56, 59-62, and 64 of U.S. Patent No. 6,772,057 ("the '057 patent") at issue in the IPR are not anticipated or obvious in view of the grounds for review.

II. PROFESSIONAL BACKGROUND AND QUALIFICATIONS

3. My background consists of a B.S. degree in Electrical Engineering, a M.S. degree in Computer Engineering, and a Ph.D. degree in Computer Science.

4. I received my B.S. in 1983 from the National Technical University of Athens, my M.S. degree in 1984 from the University of Cincinnati, and my PhD in 1988 from Case Western Reserve University. My Ph.D. research and dissertation

was on the topic of neural networks and more specifically on algorithms for training feed-forward types of neural networks.

5. I also have experience in automotive technology involving external object detection and collision warning systems, and the use of pattern recognition technology in such systems, as I have participated in the DARPA 2005 Grand Challenge competition with a team that built an autonomous vehicle designed to drive completely unassisted in unknown and unrehearsed cross-country environments. The vehicle was a regular production SUV which was modified to be controlled by computers aided by sensors including Ladars and GPS.

6. I am a professor at the department of Computer science and Industrial Technology at Southeastern Louisiana University, Hammond, LA., teaching courses in Computer Science and in Engineering Technology. I have served as department head of that department from 2006 to 2011.

7. Prior to joining Southeastern LA University, I was a faculty of the department of Electrical Engineering and Computer Science from 1988 to 2006.

8. A more detailed account of my work experience, qualifications, and list of publications is included in my Curriculum Vitae, which is attached to this Declaration.

III. COMPENSATION AND MATERIALS CONSIDERED

9. I am being compensated for my time as an expert witness on this matter at $260 per hour. My compensation, however, does not depend in any way on my opinions or conclusions, nor on the result of this proceeding.

10. I am not an employee of AVS or any affiliate, parent, or subsidiary.

11. I have not served as an expert in the last 10 years.

12. In arriving at my opinions, I considered the following documents:

- U.S. Patent No. 6,772,057;
- Prosecution History of U.S. Pat. No. 6,772,057;
- The Patent Trial and Appeals Board's Decision to Institute Inter Partes Review;
- Toyota's Petition for Inter Partes Review;
- The Declaration of Dr. Nikolaos Papanikolopoulos;
- The Transcript of the Deposition of Dr. Papanikolopoulos
- U.S. Pat. No. 6,553,130 to Lemelson;
- U.S. Pat. No. 5,245,422 to Borcherts;
- U.S. Pat. No. 5,214,408 to Asayama;
- Japanese Unexamined Patent Application Publication H07-125567 to Watanabe;

- Pomerleau, "ALVINN: An Autonomous Land Vehicle in a Neural Network," Technical Report AIP-77, March 13, 1990;
- Rombaut, M., "PRO-LAB2: A Driving Assistance System, Proceedings of the 1993 IEEE/Tsukuba International Workshop on Advanced Robotics, Tsukuba, Japan, Nov. 8-9, 1993;
- Suzuki, et al., "Driver Environment Recognition for Active Safety," Toyota Technical Review Vol. 43, No. 1 (Sept. 1993);
- Japanese Unexamined Patent Application Publication H06-124340 to Yamamura; and
- Vincent W. Porto and David B. Fogel, Neural Network Techniques for Navigation of AUVs, Proceedings of the Symposium on Autonomous Underwater Vehicle Technology AUV 90, Washington, 5-6 June 1990.
- The additional patents and references I cite in this declaration in support of my opinions.

IV. OVERVIEW OF THE '057 PATENT

A. Technical Overview of the '057 Patent

13. The '057 patent relates to an arrangement for monitoring an environment exterior of a vehicle. In particular, the '057 patent invention involves

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