UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VALEO NORTH AMERICA, INC., VALEO S.A., VALEO GMBH,
VALEO SCHALTER UND SENSOREN GMBH,
and CONNAUGHT ELECTRONICS LTD.
Petitioners
v.

MAGNA ELECTRONICS INC.
Patent Owner

Case IPR2015-01410[1]
Patent 8,643,724

DECLARATION OF DR. RALPH ETIENNE-CUMMINGS
IN SUPPORT OF PATENT OWNER RESPONSE

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P.O. Box 1450
Alexandria, VA 22313-1450

[1] Case IPR2015-01414 has been consolidated with this proceeding.

Magna 2004
Valeo v. Magna
IPR2015-01410

TABLE OF CONTENTS

I. Introduction

I, Dr. Ralph Etienne-Cummings, hereby declare as follows:

1. I understand that in response to Petitions submitted by Valeo North America, Inc., Valeo S.A., Valeo GmbH, Valeo Schalter und Sensoren GmbH, and Connaught Electronics Ltd. (collectively "Valeo"), the Patent Trial and Appeal Board ("Board") instituted an *inter partes* review as to claims 1, 3–12, 14, 15, 17, 19–52, 54–67, 69–79, and 81–86 ("instituted claims") of U.S. Patent No. 8,643,724 ("the '724 patent"). I understand that the '724 patent is titled "Multi-Camera Vision System for a Vehicle" by Kenneth Schofield, Mark L. Larson, and Keith J. Vadas and that the '724 patent is currently assigned to Magna Electronics Inc. ("Magna").

2. I have been retained on behalf of Magna to provide expert opinions in connection with this *inter partes* review proceeding. Specifically, I have been asked to provide my expert opinion relating to the patentability of claims 1, 3–12, 14, 15, 17, 19–52, 54–67, 69–79, and 81–86 of the '724 patent) relative to the instituted grounds.

II. Qualifications

3. I am an expert in the field of computer vision, having designed and implemented image sensors and vision algorithms hardware and software.

4. Currently, I am Chairman and Professor of Electrical and Computer Engineering at the Johns Hopkins University in Baltimore, MD.

5. I am also the Director of the Computational Sensory Motor Systems Lab at the Johns Hopkins University.

6. I am a founding member of the Laboratory for Computational Sensing and Robotics at the Johns Hopkins University.

7. I received my B.S. degree in Physics in 1988, from Lincoln University, Pennsylvania. I completed my M.S.E.E. and Ph.D. degrees in Electrical Engineering at the University of Pennsylvania in 1991 and 1994, respectively.

8. From August 1998 to July 2002, I was an Assistant Professor of Electrical and Computer Engineering at the Johns Hopkins University. From July 2002 to July 2008, I was an Associate Professor. During my first four years, I was Director of Computer Engineering at Johns Hopkins University and the Institute of Neuromorphic Engineering. I was promoted to Professor in July 2008.

9. I am a recipient of the National Science Foundation's Career and Office of Naval Research Young Investigator Program, Kavli Frontiers Fellowship and Fulbright Fellowship Awards.

10. I have won numerous best paper awards from the Institute of Electrical and Electronic Engineering (IEEE) for articles in IEEE journals and conferences for my work on computer vision systems, robotics and neuroprosthetics.

11. I am an IEEE Fellow, an honor bestowed on the top 0.1% of IEEE members, for contributions to "neuromorphic sensory-motor systems."

12. I am a former Topic Editor of the IEEE Sensors Journal and the former Deputy Editor in Chief of the IEEE Transactions on Biomedical Circuits and Systems. I am an Associate Editor of IEEE Transactions on Biomedical Circuits and Systems, Frontiers in Neuromorphic Engineering and Journal of Low Power Electronics and Applications.

13. I have expertise in mixed signal VLSI systems, CMOS image sensors, computational sensors, computer vision, neuromorphic engineering, smart structures, mobile robotics, legged locomotion, and neuroprosthetics based on education, research, and industrial experience.

14. The vision systems that I have developed can be used in the automotive context. I have tested my vision systems in vehicles operating in real-world conditions.

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