

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LIBERTY MUTUAL INSURANCE CO.
Petitioner

v.

PROGRESSIVE CASUALTY INSURANCE CO.
Patent Owner

Case CBM2012-00002 (JL)
Patent 6,064,970

Supplemental Declaration of Dr. Mark Ehsani

Progressive Exhibit 2021
Liberty Mutual v. Progressive
CBM2012-00002

Supplemental Declaration of Dr. Mark Ehsani

I, Dr. Mark Ehsani, hereby declare under penalty of perjury:

- 1) I am a Professor of electrical engineering and the founding Director of Advanced Vehicle Systems Research Program and the Power Electronics and Motor Drives Laboratory at Texas A&M University. I have extensive knowledge and qualifications within the relevant field of the 6,064,970 patent.
- 2) Vehicle telematics includes the acquisition of automotive onboard vehicle data and its processing. My qualifications in this area are provided below.
- 3) My current research work is in power electronics, motor drives, vehicle electronics, and hybrid vehicles and their control systems.
- 4) I was selected for the IEEE Vehicular Society 2001 Avant Garde Award for “Contributions to the theory and design of hybrid electric vehicles.” In 2004, I was elected to the Robert M. Kennedy endowed Chair in Electrical Engineering at Texas A&M University.
- 5) In 2005, I was elected as a Fellow of the Society of Automotive Engineers (SAE).
- 6) I am a Fellow of IEEE, an IEEE Industrial Electronics Society and Vehicular Technology Society Distinguished Speaker, and an IEEE Industry Applications Society and Power Engineering Society Distinguished Lecturer. I am also a registered professional engineer in the State of Texas.
- 7) In my vehicle-related work, I have extensively performed real-time vehicle data acquisition, logging, and analysis for driver-specific drive cycle analysis. Some of my work in this area is reflected in my books and research publications, including, for example, the following:

- Contributor of a chapter on “ More Electric Vehicles” to CRC Handbook of Power Electronics, 2002.
- Contributor to SAE book “Hybrid Electric Vehicles,” SAE SP-1633, published in 2001.
- Vehicular Electric Power Systems, my Co-Authors: A. Emadi & JM Miller, Marcel Dekker, Inc. 2004.
- “Modern Electric, Hybrid Electric, and Fuel Cell Vehicles – Fundamentals, Theory, and Design”, M. Ehsani, Y. Gao, S. E. Gay, A. Emadi, CRC Press, Second Edition, 2010.
- M. Ehsani and M.A. Masrur, “Vehicle Electrical Power System Modeling,” 1st Annual US Army Ground-Automotive Power & Energy Symposium, July 22, 2005, Troy, Michigan.
- Liang Chu, Jiayun Gu, Minghui Liu, Jun Li, Yimin Gao and M. Ehsani, "Study on CAN communication of EBS and Braking Performance Test for Commercial vehicles,” IEEE Vehicle Power and Propulsion Conference, VPPC07, Arlington, Texas, September 10-12, 2007.
- J. S. Won, R. Langari, and M. Ehsani, “An Energy Management and Charge Sustaining Strategy for a Parallel Hybrid Vehicle with CVT,” IEEE Trans. on Control Systems Technology, Vol. 13, No. 2, March 2005.
- M.Ehsani, M.Falahi, S.Lotfifard, “Vehicle to Grid Services: Potentials and Applications,” accepted for publication in the special issue of Energies Journal for vehicle to grid technologies, 2012.
- Lin Lai and Mehrdad Ehsani, “Dynamic Programming Optimized Constrained Engine On and Off Control Strategy for Parallel HEV,”

IEEE-ENERGYCON 2012 - Sustainable Transportation Systems,
Florence, Italy, September 9-12.

- “ Vehicle Power systems”, Short Course, January 2006, US Army Tank Automotive
- Chapters contributor, “The 42-Volt Electrical System,” Book, Society of Automotive Engineers, Inc. PT-99, ISBN 0-7680-1297-X, 2003.
- “Modern Electric, Hybrid Electric, and Fuel Cell Vehicles – Fundamentals, Theory, and Design”, M. Ehsani, Y. Gao, S. E. Gay, A. Emadi, CRC Press, 2005.
- Contributor of chapter on “Hybrid Drive Trains” to “Handbook of Automotive Power Electronics and Motor Drives” CRC Press, 2005.
- K. Butler, K. Stevens, and M. Ehsani, “A Versatile Computer Simulation Tool for Design and Analysis of Electric and Hybrid Drive Trains,” SAE Proceedings Electric and Hybrid Vehicle Design Studies, Book # SP 1243, Paper # 970199, February 1997, pp. 19-25, Detroit, MI.
- Z. Rahman, K. Butler, and M. Ehsani, “A Study of Design Issues on Electrically Peaking Hybrid Electric Vehicles for Diverse Urban Driving Patterns,” Advances in Electric Vehicle Technologies, SP-1417, Paper #: 1999-01-1151, Society of Automotive Engineers, March 1999, pp. 1-9.
- K. Butler, M. Ehsani, and P. Kamath, “A Matlab-Based Modeling and Simulation Package for Electric and Hybrid Electric Vehicle Design,” Invited Paper for the Special Issue of IEEE Trans. on Vehicular Technology, Vol. 48, No. 6, Nov. 1999, pp. 1770-1778.

- M. Ehsani and M.A. Masrur, “Vehicle Electrical Power System Modeling,” 1st Annual US Army Ground-Automotive Power & Energy Symposium, July 22, 2005, Troy, Michigan.
 - Liang Chu, Lanli Hou, Minghui Liu, Jun Li, Yimin Gao and M. Ehsani, "Study on the Dynamic Characteristics of Pneumatic ABS Solenoid valve for Commercial Vehicles,” IEEE Vehicle Power and Propulsion Conference, VPPC07, Arlington, Texas, September 10-12, 2007.
 - Liang Chu, Lanli Hou, Minghui Liu, Jun Li, Yimin Gao and M. Ehsani, "Development of Air-ABS-HIL-Simulation Test Bench,” IEEE Vehicle Power and Propulsion Conference, VPPC07, Arlington, Texas, September 10-12, 2007.
 - Yimin Gao and M. Ehsani, “Design and Control Methodology of Plug-in Hybrid Electric vehicles” , IEEE Vehicle Power and Propulsion Conference, VPPC08, Harbin, China, September 3-5, 2008.
- 8) At this time, I have nearly 40 years of continuous professional experience in the fields of electronics, motor drives, power electronics, control systems, vehicle electronics, and hybrid electric vehicles, among others.

Date: May 21, 2013



Signature: _____