

Ralph V. Wilhelm, Jr.
Ph.D.
Curriculum Vitae

Professional Summary

Dr. Wilhelm has over forty-three years of industry experience in the automotive industry beginning his career at General Motors Research Laboratory, eventually holding positions of increasing responsibility with Delphi Delco Electronics Corporation, and currently running an automotive electronics consultancy. Dr. Wilhelm is familiar with automotive electronic component technology and the supply-line management required not only producing suitable automotive components, but supervising the R&D, advanced engineering, forward technology development, sales, and product line management process from automotive suppliers to OEM vehicle manufacturer. He has worked in various technical and leadership roles to develop new products and complex systems from invention to production using both internal invention/development and external partnerships to achieve world-class automotive electronic systems worldwide. In 2001, Dr. Wilhelm founded and established an automotive electronics consultancy focused both on automotive electronics suppliers doing business in North America and also support for intellectual property litigation as an expert witness.

His firm, Wilhelm Associates (www.wilhelmassoc.com) has supported suppliers whose “home” countries have included Japan, Taiwan, China, Korea, Canada, United States, Germany, and France as they do business in North America.

Expert Witness Summary:

Recent Expert Witness work has included:

- **Litigation areas such as:**
 - Expert witness reports for invalidity, non-infringement, and obviousness
 - Claim Construction and Markman hearings
 - Reviewing and searching for appropriate prior art
 - IPR documentation (Petitions & Declarations)
 - Depositions

- **Technical Automotive Areas such as:**
 - Instrument Clusters
 - Automotive primary and secondary displays
 - Center Stack Displays and subassemblies
 - Human Factor Design and guidelines
 - Automotive User Interfaces
 - Automotive sensors & transducers
 - Vehicle Telematics
 - Infotainment systems
 - GPS Systems
 - On-board & Off-Board diagnostics and prognostics
 - Complex safety systems
 - Automotive Cameras & multi-camera vision systems

Expertise

Advanced Mobile Multi Media Automotive Systems	Human Machine Interface issues (HMI) for Automotive Electronics, displays, and Touch, Appearance, Lighting (TAL) devices
Automotive Electrical & Electronic Systems	Display Technology for Automotive Applications
Automotive ADAS & Safety Systems	Integrated Circuits for Automotive Applications
Design, Manufacturing & Distribution of Automotive Components	Navigation & Real Time Traffic Automotive applications
Electric Vehicle components and systems	Telematics and TSPs (call centers)
Expert Witness in Automotive Electronics	Component and Sub-system development

Education

<u>Year</u>	<u>College or University</u>	<u>Degree</u>
1985	University of Illinois	Executive Management Program
1987	University of Michigan	MBA, Operations & Strategy
1972	Rutgers University	Ph.D., Material Science/Ceramic Engineering
1967	Cornell University	B.S. (Electrical Engineering)

Professional Experience

From: 2001
To: Present
Organization: Wilhelm Associates, LLC
Title: President/Founder
Summary: Consulting firm concentrating in automotive electronics, telematics, infotainment, safety systems, systems engineering, and data communications between systems and devices, product/market & international business strategies

- Developing and using methodologies for market assessment, requirements definition, product design, strategy, and implementation
- Firm includes five part-time highly experienced Senior Associates plus other individuals as needed to support customers as needed
- Diverse client base: Japanese, Taiwanese, Chinese, Korean, French, German, Canadian, & US based
- Expert Witness in Automotive Electronics

From: 1997
To: 2001
Organization: Delphi Delco Electronics Corporation
Title: Product Line Mgr., Mobile Multi Media NA
Summary: Responsible for all deliverables for product line: strategy, tactics, technology planning, design, manufacturing, sales and delivery of product to OEM customers

- Responsible for revenue, cost management, profit margin and on-time delivery of products within budget and at required quality
- Won \$2.2 Billion revenue new business over 18 months, across three major product lines and five Vehicle OEMs
- Customers headquartered in Japan, Europe and North America, including GM, Ford, Toyota (Lexus), and Honda (Acura)
- Typical programs done on commercial development cycle of 6 to 15 months from specification to start of production

From: 1994
To: 1997
Organization: Delco Electronics Corp (living in Singapore)
Title: VP Engineering, Delco Electronics Asia/Pacific
Summary: Responsible for all application & design center engineering in seven Asian countries to support worldwide customers.

- Responsible for deliverables for all Asia/Pacific customers worldwide
- Charged with growing employee skill sets available near A/P customer locations to meet their worldwide requirements
- Revenue grew at 30 to 40% CAGR with revenue at \$250 Million in 1996 across 6 product lines, 8 customers, and OEMs in six countries

R.V. Wilhelm Curriculum Vitae

- From: 1989
To: 1994
Organization: Delco Electronics Corporation
Title: Director, Advanced Development & Systems Integration (AD/SI)
- Summary: Responsible for creating & leading AD/SI staff, aimed at all R&D and product development for \$5 Billion automotive electronics business worldwide.
- AD/SI grew to 7 departments covering integrated circuit development & fabrication through automotive safety, infotainment, and communication products/systems
 - Budget in 1994 of \$50 Million with over 450 technical personnel worldwide
 - New products/systems in that period included: forward looking radar, obstacle detection, solid state YAW sensors, advanced airbag electronics & sensors, head up displays, RDS audio for North America, infrared based night vision, and telematics systems.
- From: 1984
To: 1989
Organization: Delco Electronics Corporation
Title: Dept. Head, Advanced Instrumentation & Display
- Summary: Responsible for leading an Advanced Engineering Department focused on developing new & creative uses of instrument cluster displays and center stack display assemblies.
- Significant developments included numerous head up displays (HUDs) that included the world's first commercial factory installed HUD for a production vehicle (1989).
 - Other technology and advanced product areas included three dimensional instrument clusters, full instrument clusters made totally of plastic LCDs, and the first production CRT installed in a North American factory installed vehicle.
- From: 1978
To: 1984
Organization: AC Spark Plug Division of General Motors
Title: Supervisor & Department Head, Materials Development
- Summary: Responsible for staffing and leading a technical department that created and produced world class coatings and processes for catalytic converters, exhaust oxygen sensors (EOS), and various metallic substrates for catalysis.
- Coating development done with physical vapor deposition (PVD) resulted in three unique patents for precious metal coatings, driving unique and market-leading EOS performance in the automotive market for closed loop emission control in NA
 - Lead team to scale-up production for thin film sputtering process for EOS sensor coatings

R.V. Wilhelm Curriculum Vitae

From: 1971

To: 1978

Organization: General Motors Research Labs (GMR)

Title: Senior Research Scientist

Summary: Participated in research and development targeted at a variety of electronic sensors, transducers, coatings, and smart sensors that included integrated silicon devices for signal processing.

- Effort in the laboratory focused on bulk, thick film, and thin film devices to sense various operating parameters that were of importance in the monitoring & control of internal combustion engines, e.g. temperature, humidity, fuel flow, oxygen partial pressure, etc.
- Basic modeling and process development done at GMR on sputtered platinum/palladium thin film electrodes resulted in materials and process being transferred to GM operating division for successful product launch across all GM vehicles.

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