

EDWARD L. KOCH
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Experience:

CTO and FOUNDER, AUTOMODALITY (12/14 - present) Founder and Chief Technology Officer. Responsible for managing Automodality's R&D activities as well as leading all technology, intellectual property and architectural decisions. Automodality specializes in developing autonomous mobile systems that can be applied to a variety of industries. As of 08/16/22 Automodality will be acquired by Farm(x).

CTO and FOUNDER, SANCTIPHI TECH (05/20 - present) Founder and Chief Technology Officer. Responsible for advising on SanctiPHI's R&D activities. SanctiPHI specializes in developing systems for the management of data generated by patient's personal healthcare devices.

CEO and FOUNDER, RUBYCOM (12/10 - present) Founder and Chief Executive Officer. Responsible for managing Rubycom's R&D activities to develop a variety of IP in the areas of distributed control, robotics, and autonomous systems.

SENIOR FELLOW, HONEYWELL (5/10 – 12/14) Responsible for strategic and IP activities related to Honeywell's smart grid activities. Managed the integration of Akuacom's technology and product offerings into Honeywell's smart grid operations and offerings.

CTO and FOUNDER, AKUACOM (3/02 – 12/14) Founder and Chief Technology Officer. Responsible for managing and developing Akua's Engineering resources, and R&D activities as well as leading all technology, intellectual property and architectural decisions. Akuacom specialized in developing technologies that support Automated Demand Response programs. Akuacom was acquired by Honeywell in 2010.

SMART GRID STANDARDS ACTIVITIES (1/04 – 1/18) Helped form the OpenADR Alliance and served on its BoD. Currently serve as ambassador to OpenADR Alliance. Served as co-chair of the Utility Communications Architecture International Users Group OpenADR Taskforce. Active participant in NIST PAP 03, 04, 09, and 17. Active participant in NIST Building to Grid Domain Expert Working Group. Active participant in OASIS Energy Interoperation Technical Committee and WS Calendar Technical Committee. Active contributor to NAESB DR Requirements specification. Chairman of the Open Automated Demand Response working group that developed the OpenADR specification at LBNL.

MISCELLANEOUS STANDARDS BODIES (1/94 – present) Served on a number of standards bodies with IEEE, HL7, IHE, CEA and LonMark including both chairing and drafting various standards related to device communications. Currently chair of the Demand Response Automation Server Open Interface Standard. This work is done under an industry consortium that is sponsored and managed by the California Energy Commission and the Demand Response Research Center of the Lawrence Berkeley National Laboratory.

INTELLECTUAL PROPERTY CONSULTANT (3/00 – 5/10) Worked with various IP law firms and companies to advise them on various technology issues related to patents. Have been expert witness in numerous cases. Also render advice to firms on strategies for building their patent portfolios.

CTO and FOUNDER, COACTIVE NETWORKS (1/92 – 3/02) Founder and Chief Technology Officer. Responsible for managing and developing Coactive's Engineering resources, product development and R&D activities as well as leading all technology, intellectual property, and architectural decisions. Coactive specialized in developing technologies that integrated IP networks and applications with a wide

variety of control networks. Coactive was an industry leader in the field of remote telemetry and control applications especially in the market segment of residential energy management.

ADVISORY BOARD MEMBER, HORIZON NAVIGATION (2/02 – 6/07) Served on Horizon's advisory board. A company specializing in developing Vehicle Route Guidance Systems.

ADVISORY BOARD MEMBER, KIVERA (1/99 – 4/04) Served on Kivera's advisory board. A company specializing in providing technologies for location based services.

LEAD CONSULTANT, SEI (3/91 - 12/93) Provided a variety of software consulting services for in-vehicle route guidance and GIS systems. Clients included Zexel, AAA, and Navigation Technologies. Member of IVHS. Served on the committee for Advanced Vehicle Control Systems (AVCS).

MANAGER / PROJECT LEADER, NAVIGATION TECHNOLOGIES (9/88 - 3/91), Managed the group responsible for the design and implementation of a Vehicle Route Guidance system that was subsequently licensed to numerous parties and became the basis for many of the route guidance systems on the market today. Direct responsibility for overall architecture and the vehicle positioning and route planning sub-systems. Also participated in the design and development of the database access libraries used throughout the system.

ELECTRICAL / SOFTWARE ENGINEER, AUSDATA (1/86 - 6/88), Sydney, Australia. Responsible for system and application software as well as hardware design on a wide variety of embedded systems. Specialized in rapid prototyping and implementation of said embedded systems. Did significant amount of work in networking of microcontrollers for distributed control and data collection.

ELECTRICAL ENGINEER, Fort Belvoir R&D Center (1/85 - 6/85) Ft. Belvoir, Va. Participated in development of autonomous land vehicle, helped set up Ft. Belvoir's Robotics laboratory and developed interface and control software for Cincinnati Milacron Robotic arm.

RESEARCH ASSISTANT (8/81 - 12/84), Dr. A. M. Meystel, Dept. Elec, Eng., U.F. Involved in overall development of Intelligent Mobile Autonomous Vehicle, specifically responsible for developing path planning sub-system. Had the project lead on the development of simulation software of the Autonomous Vehicle's hierarchical control system.

ELECTRICAL ENGINEER, Space Astronomy Laboratory (1/83 - 4/83), Gainesville, Fla. Assisted in development of computer controlled telescope.

Education:

M.S. Electrical Engineering (with Honors), University of Florida (U.F.), May, 1985.

B.S. Electrical Engineering (with Honors), U.F., August, 1982

Thesis - "Path Planning for Autonomous Mobile Systems in Binary Traversability Spaces," M.S. Thesis, Dept. of Elec. Eng., Univ. of Fla., Gainesville, FL, 1985.

Patents:

Demand Response

1. US8671191 B2 Installation system for demand response resources
2. US9124535 B2 System for using attributes to deploy demand response resources
3. US8572230 B2 System for using attributes to deploy demand response resources
4. US9183522 B2 Demand response management system
5. US8676953 B2 Use of aggregated groups for managing demand response resources
6. US8671167 B2 System for providing demand response services
7. US8667132 B2 Arrangement for communication about and management of a resource using a mobile device
8. US8782190 B2 Demand response management system
9. US9137050 B2 Demand response system incorporating a graphical processing unit
10. US8565903 B2 Critical resource notification system and interface device
11. US8073558 B2 Critical resource notification system and interface device
12. US20150170171 A1 Demand response system having a participation predictor
13. US20150019037 A1 System having customer defined demand response signals
14. US20150018985 A1 Predicting responses of resources to demand response signals and having comfortable demand responses
15. US20150019275 A1 Optimizing a selection of demand response resources
16. US20150019032 A1 Arrangement for communicating demand response resource incentives

Distributed Control

17. US8001256 B2 System with multiple network protocol support
18. US9037741 B2 System with multiple network protocol support
19. US6671264 B2 Method for detecting invalid packets by assigning super-transaction identifiers
20. US6633574 B2 Dynamic wait acknowledge for network protocol
21. US6421743 B2 Method and system for data transformation in a computer network
22. US6359888 B2 Method for detecting invalid packets by rewriting transaction identifiers

GIS

23. US7904483 B2 System and method for presenting geo-located objects
24. US7617246 B2 System and method for geo-coding user generated content
25. US7917543 B2 System and method for geo-coding user generated content
26. US8200712 B2 System and method for generating a virtual tour on a display device
27. US8447787 B2 System and method for geocoding content
28. US8447792 B2 System and method for presenting user generated geo-located objects

Robotics

29. US 16/694,957 Geocoding Data for an Automated Vehicle
30. 16174278 System and Method for Perceptive Navigation of Automated Vehicles

Healthcare

31. 63/103,519 Digital Human Replicas for Remote Patient Monitoring and Wellness Services

Publications:

1. Koch, Edward. "Asset Inspections using Perceptive Navigation," Presentation at DJI Airworks, November 2017.
2. Koch, Edward. "Winner of DJI Automated Drone Developer Challenge," Presentation at DJI Airworks, December 2016.
3. Guest Lecturer Carnegie Mellon University - "Teleroobotics for Remote Asset Inspection." Apri; 2016. <https://www.cmu.edu/silicon-valley/news-events/dls/2016/ed-koch.html>.
4. Samad, Tariq, Koch, Edward, Stluka, Petr. "Automated Demand Response for Smart Buildings and Microgrids: The State of the Practice and Research Challenges." *Proceedings of the IEEE (Volume: 104, Issue: 4, April 2016)*.
5. Samad, Tariq, and Koch, Edward. "Automated Demand Response for Energy Efficiency and Emissions Reduction." *Proceedings of IEEE Transmission and Distribution Conference and Exposition*. May 2012.
6. Kiliccote, Sila, Piette, Mary Ann, Koch, Edward, Hennage, Dan. "Utilizing Automated Demand Response in Commercial Buildings as Non-spinning Reserve Product for Ancillary Services Markets." *Proceedings of 50th IEEE Conference on Decision and Control European Control Conference*. Dec 2011.
7. Koch, Edward, and Sila Kiliccote. "Role of Standard Demand Response Signals for Advanced Automated Aggregation." *InGrid-Interop 2011*. Phoenix, AZ, 2011.
8. Piette, Mary Ann, G. Ghatikar, S. Kiliccote, E. Koch, D. Hennage, P. Palensky, and C. McParland. 2009. Open Automated Demand Response Communications Specification (Version 1.0). California Energy Commission, PIER Program. CEC-500-2009-063 and LBNL-1779E.
9. Demand Response for Small Commercial Buildings, LBNL-2195E. July 2009.
10. Kiliccote S., M.A. Piette, G. Ghatikar,; E. Koch, D. Hennage, Akuacom; J. Hernandez, A. Chiu, O. Sezgen, and J. Goodin Open Automated Demand Response Communications in Demand Response for Wholesale Ancillary Services,. *Proceedings of the Grid-Interop Forum 2009*, Denver, CO, November 17-19, 2009. LBNL-2945E. November 2009.
11. Koch, E., and M.A. Piette,. Direct versus Facility Centric Load Control for Automated Demand Response, *Proceedings of the Grid-Interop Forum 2009*, Denver, CO, November 17-19, 2009. LBNL-2905E. November 2009
12. Piette, Mary Ann, G. Ghatikar, S. Kiliccote, D. Watson, E. Koch, and D. Hennage. Design and Operation of an Open, Interoperable Automated Demand Response Infrastructure for Commercial Buildings. *Journal of Computing Science and Information Engineering* Vol 9 Number 2, June 2009, Transactions of the ASME.
13. Kiliccote, S., M.A. Piette, J.H. Dudley,; E. Koch, D. Hennage,. Open Automated Koch, E. and M.A. Piette, Scenarios for Consuming Standardized Automated Demand Response Signals, *Proceedings for the Grid Interop Forum*. Atlanta, GA. Nov. 2008. LBNL-1362E.
14. Mary Ann Piette, Girish Ghatikar, Sila Kiliccote, David Watson, Ed Koch, Dan Hennage, "Design and Operation of an Open, Interoperable Automated Demand Response Infrastructure for Commercial Buildings," Paper for Journal of Computing and Information Science in Engineering - May 31, 2008
15. Edward L. Koch, Mary Ann Piette, "Design and Implementation of an Open, Interoperable Automated Demand Response Infrastructure," in Proc. of the Gridwise Interop Forum, Albuquerque, N.M., Nov, 2007.
16. Contributing author to "The Industrial Communication Technology Handbook," editor Richard Zurawski, CRC Press, 1/18/2005.
17. EIA – 852 Standard, "Tunneling of Component Network Data Over IP Channels", Chaired the CEA committee and personally drafted the standard.
18. LonMark Standard, "Tunneling of EIA-709 Over IP Channels", Chaired the LonMark committee and personally drafted standard.

19. R. Bennett, B. Borcherts, C. Collier, E. Koch, "Database Accuracy Effects on Vehicle Positioning as Measured by the Certainty Factor," in Proc. of the 1991 conference on Vehicle Navigation and Information Systems, Detroit, MI, 1991.
20. D. Gaw, E. Koch, "Coactive Aesthetics and Intelligent Control," in Proc. of the 1990 IEEE Symposium on Intelligent Control, Philadelphia, PA, 1990.
21. J. Guzolek, E. Koch, "Real-Time Route Planning in Road Networks," in Proc. of the 1989 conference on Vehicle Navigation and Information Systems, Toronto, Canada, 1989.
22. E. Koch, "Path Planning for Autonomous Mobile Systems in Binary Traversability Spaces," M.S. Thesis, Dept. of Elec. Eng., Univ. of Fla., Gainesville, FL, 1985.
23. E. Koch, C. Yeh, G. Hillel, A. Meystel, C. Isik, "Simulation of Path Planning for a System with Vision and Map Updating," in Proc. of the IEEE Conf. on Robotics, St. Louis, MO, 1985. Presented paper.
24. Meystel, G. Hillel, M. Kao, E. Koch, S. Lee, E. Martinez, C. Yeh, "Computer Simulation of the Intelligent Module for an Unmanned Autonomous Vehicle," unpublished report to the Army, Dept. Elec. Eng., Univ. of Fla., 1984.
25. E. Koch, A. Meystel, "Simulation of Navigation with Varying Time of Computation and Range Vision," unpublished report to the Army, Dept. Elec. Eng., Univ. of Fla., 1984.
26. Meystel, E. Koch, "Computation Simulation of Autonomous Vehicle Navigation," in Proc. of the SPIE, Applications of Artificial Intelligence, Arlington, VA, 1984.
27. D. Keirsey, E. Koch, J. McKisson, A. Meystel, J. Mitchell, "Algorithm of Navigation for a Mobile Robot," in Proc. of the Intl. Conf. on Robotics, Atlanta, GA, 1984. Presented paper.
28. Meystel, J. McKisson, E. Koch, "Intelligent Motion Control: Computer Simulation Part II 'Navigator'," in Proc. of the 4th Intl. Motorcon-83, Orlando, FL, 1983. Presented paper.
29. Meystel, G. Hoffman, E. Koch, "Anthropomorphical Description of an Intelligent Mobile System," in Proc. of the IEEE Southeastcon 1982, Destin, FL, 1982. Presented paper.
30. Meystel, G. Hoffman, E. Koch, T. Looney, J. McKisson, M. Roberts, "Anthropomorphic Control of Intelligent Mobile Systems," in Proc. of the IEEE Southeastcon, 1982, Destin, FL, 1982.
31. Meystel, G. Hoffman, E. Koch, T. Looney, J. McKisson, M. Roberts, "Intelligent Mobile System for Industrial Application," in Proc. of 3rd Intl. Motorcon-82, San Francisco, CA, 1982.