Kitch Wilson, Ph.D.
Applied Theoretic Systems

mathematics – electronics – software - system science - signal processing - control systems
wind/solar energy – aerospace – automotive – biomedical – commercial – expert witness

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SUMMARY

A technical consultant in system science, applied mathematics, electronics and computer systems, I provide research, development, design, and evaluation skills to solar, wind, aerospace, automotive, commercial and medical clients. With a broad theoretical and practical foundation, I pull together several disciplines required to perform a complete system design: problem conceptualization and definition, design, and development of modeling & signal processing & control system mathematics, computer simulation, design of analog-digital-microprocessor-DSP-FPGA electronics, software, and intellectual property (15+ patents). Currently also an Expert Witness in intellectual property issues. I have worked in these fields since 1969, have been an independent technical consultant since 1977, have lived and worked from Santa Barbara since 1981, and am a native Spanish speaker.

Wind Energy projects (**Clipper Wind Power**, **Sany Electric** – China, **Envision Energy** – China): applying classical and state space control theory for the control of wind powered electricity generating turbines. These efforts have resulted in five patents.

Energy Park proprietary project: applying signal and image processing technologies to improve energy park control. One patent.

Solar Energy project (**The Boeing Company, Expert Witness**): concept/design/prototype/refinement of a sun tracking system for a concentrated photovoltaic module (one patent), and Expert Witness in defense of US2020/040356 "Cleaning Method for Solar Panels".

Electrical Machine projects (**Potencia Industrial** -- Mexico). This substantial generator and motor manufacturing and repair company is the generator supplier for Clipper WindPower and other industries. Their main concern is cooling permanent magnet machines. I met with them and distilled their ideas into a series of international patents, where one is issued and three are applications.

Aerospace projects (**TRW Systems, Hughes Aircraft, Rockwell International, Delco Electronics, Logicon, L3, General Research Corporation)** range from classical and optimal control and stochastic estimation and waveform analysis to spread spectrum optical-RF links and electronic and software design.

Automotive projects (**Vetronics – Bosch, TRW Automotive, Takata** – Japan) include signal processing applied to automating vehicle diagnostics and prognostics, feedback control; image processing and state space data fusion for pedestrian avoidance, multi-vehicle tracking. These efforts have resulted in three patents.

Medical projects (**Harbor-UCLA Medical School, Nichols Institute, Spacelabs, Cardiac Care Units, Dophin Imaging, Baxter Pharmaseal, Culture Care Systems, Inamed, Circon**) include analysis of *in vivo* hormone metabolic distribution, Food and Drug

Administration (FDA) computer software verification, cardiac signal analysis, electronics, robot design, buffering/monitoring metabolites *in vivo*, and design of metabolic chambers. Feedback control applied to slaving two independent video cameras in order to produce 3-D dental images. These efforts have resulted in five patents.

Commercial projects (**Del Mar Avionics, UC Wireless, Santa Barbara Instrument Group, Veeco Metrology**) include a specialized office intercom system, a mass marketed musical instrument, development of system for reading utility meters via spread spectrum radio, optical data storage technology, design of digital video cameras, development of a laser control system for photo sensitive drug therapy, design of analog/digital/microprocessor/FPGA systems for control of an atomic force microscope. These efforts have resulted in five patents.

EDUCATION

B.S. Cornell University, Electrical Engineering, 1968. Under scholarship.

M.E.E. Cornell University, Electrical Engineering, 1969. Supported by NASA grant to build an autonomous Martian roving vehicle.

Ph.D. UCLA, Engineering Systems and Biomedical Engineering, 1975. Engineering System included optimal control, state estimation, stochastic systems, etc. Biomedical Engineering was supported by NIH grant to investigate system science applications to understanding thyroid hormone metabolism and included UCLA Medical School courses in physiology, biochemistry and endocrinology.

ISSUED PATENTS

1. D.P. Gregg, S.K. Shu, K.C. Wilson, Optical Recording System Utilizing Proportional Real-Time Feedback Control of Recording Beam Intensity. US patent 4,908,815. A means to store digital data onto an optical disk.
2. C.S. Gastouniotis, N. Bandeira, K.C. Wilson, Automated remote water meter readout system. US patent 4,940,976. A means to remotely acquire water consumption data from water meters.
3. R. Warren, L. Maher, K.C. Wilson, Cell feeder/harvester assembly. US patent 5,432,085. A robotic assembly to clean, feed and harvest cell cultures.
4. D.P. Gregg, K.C. Wilson, S.K. Shu, Null Inflection Detection and Pulse Expand Latch in an Optical Recording System. US patent 5,504,732. A means to store digital data onto an optical disk.
5. F. Evantoff, B. Mohracher, K.C. Wilson, K. Goldsholl, Note Assisted Musical Instrument System and Method of Operation. US patent 5,773,742. An electronic music synthesizer system.
6. K.C. Wilson, Apparatus and Method for Energy Generation within a Tire. US patent 7,285,868. A means to generate electrical power within a tire. Private studies.
7. K C. Wilson, Apparatus and Method for Noninvasive Monitoring of Analytes in Body Fluids. US patent 7,214,190. A means of real time non-invasively monitoring blood analytes *in vivo*. Private studies.
8. K.C. Wilson, Wind Flow Estimation and Tracking Using Tower Dynamics. US patent 7,317,260 and international versions. A means of estimating wind speed for wind turbine control applications.
9. K.C. Wilson, A Dynamic Metabolism Monitoring Device. US patent 8,109,884 and international versions. A means to decrease the response time of metabolism measuring chambers. Private studies.
10. K.C. Wilson, Object Detection and Recognition System. US patent 8,131,018. An image processing method of detecting objects in a scene.
11. K.C. Wilson, K. Oittenen, R.J. Rau, A Solar Tracker. US patent 8,587,775. A means of tracking the sun without using sun position sensors for concentrated photovoltaic solar energy collection arrays.
12. M. Assad, A.H. Hardy, K.C. Wilson, Stereoscopic Three Dimensional Visualization System and Method of Use. US patent 8,619,127. A means to use independent video cameras to generate 3-D images for imaging.

13. K.C. Wilson, Spatial Information Correlation for Control of an Energy Park. US patent 8,644,994. A means of using information created by each energy generator to feed forward for overall control of and energy park. Private studies.
14. K.C. Wilson, Adaptive Stochastic Queueing. US patent 9,100,485. A means to shape queue position, of a petitioner requesting access to a resource, according to his and the ensemble historical resource use. Private studies.
15. K.C. Wilson, Feng Zhang, Lin Chen, Yuping Sun, Method for Operating a Wind Turbine Based on Degradation of Wind Turbine Blade. US patent 10,184,450 and international versions. A means to estimate and track wind turbine aerodynamic degradation due to blade aging or environmental factors and including an adaptive pitch and torque control system to compensate for this degradation.

PENDING PATENTS

16. K.C. Wilson, System and Sanitizable Hardware for Detecting Pathogens on Hands. US202134653. A device to detect hand pathogens that is sanitized between users. Private studies.

PATENT APPLICATIONS

17. K.C. Wilson, W. Erdman, T. McCoy, Wind Turbine With Blade Pitch Control To Compensate For Wind Shear And Wind Misalignment. US20100014969. A wind turbine control means to compensate for wind effects using independent blade pitch adjustment.
18. K.C. Wilson, Wind Turbine Damping of Tower Resonant Motion and Symmetric Blade Motion Using Estimation Methods. US20100111693. A wind turbine control means to damp tower and symmetric blade motions.
19. K.C. Wilson, A Means and Method of Wind Turbine Control for Maximum Power Acquisition, US20080132689. Optimizing control for a wind turbine.
20. K.C. Wilson, Vehicle and Vehicle Tire Monitoring System, Apparatus and Method. Patent publication US20030058118. Means of monitoring the load on each tire while vehicle is in motion. Private studies.
21. K.C. Wilson, A Multi-beam Ultrasound Device. US2015141874. A different means to provide intense ultrasound energy for surgical applications. Private studies.

CLIENT PATENT SUPPORT

22. A Device and Method to Clamp and Lock Permanent Magnets and Improve Cooling within a Rotating Electrical Machine Using Pitched Focused Flux Magnets. International Patent Pending; US 8,203,252; Power Group International, Mexico.
23. A Device and Method to Clamp and Lock Permanent Magnets and Improve Cooling within a Rotating Electrical Machine. International Patent Pending US2009256435; Power Group International, Mexico.
24. Machine Cooling Scheme. International Patent Pending US20100176670; Power Group International, Mexico
25. Electrical Machine Cooling System and Method. International Patent Pending; Power Group International, Mexico.

PUBLICATIONS

K.C. Wilson. An optimal control approach to designing constant gain filters. *I.E.E.E. Trans. Aerospace and Electronic Systems*. Vol. 8(6), pp. 836-842, 1972.

K.C. Wilson. Thyroid Hormone Metabolism in Sheep: a Biocybernetic Approach to Experimentation and Analysis. Ph.D. dissertation, University of California at Los Angeles, 1975.

J.J. DiStefano III, K.C. Wilson, M. Jang, P. H. Mak. Identification of the dynamics of thyroid hormone metabolism. *Automatica*. Vol. 11, pp. 149-159, 1975.

K.C. Wilson, J.J. DiStefano III, D.A. Fisher, J. Sack. Quantification of T3 and T4 Metabolism in Sheep, 58th Annual Endocrine Society Meeting, San Francisco, 1976.

K.C. Wilson, J. J. DiStefano III, D. A. Fisher, J. Sack. System analysis and estimation of key parameters of thyroid hormone metabolism in sheep. *An. Biomed. Eng.* Vol. 5, pp. 70-84, 1977.

K.C. Wilson, R. E. Weitzman, D. A. Fisher. Arginine vasopressin metabolism in dogs. II. Modeling and system analysis. *Am. J. Physiol.* Vol. 235(6), E598-E605, 1978.
T.D. Milster, D.P. Gregg, K.C. Wilson. Crescent geometry for an optical ribbon recorder. SPIE Joint International Symposium on Optical Memory and Optical Data Storage 1999. 11-15 July 1999.
K.C. Wilson. Fundamental Concept of Wind Turbine Control Systems. Online course on the Verdeyu website. 2022.

ACTIVITIES IN DETAIL

WIND AND SOLAR ENERGY

DEHLSEN ASSOCIATES (Santa Barbara, 1998-1999, 2010-2011). Technical Consultant. Concept, control, design, and dynamic simulation of a novel alternative energy system.

CLIPPER WINDPOWER (Carpinteria, 2004-2009). Technical Consultant. Mathematical modeling and application of classical and state space multiple-input multiple-output optimal controllers for a novel wind power generator. Invention of a novel wind speed estimator. Invention of a means to estimate wind speed using tower motion. Invention of a means to compensate for wind shear and other imbalance moments. Invention of a means to damp tower motion. Invention of a means to compensate for wind shear. Invention of a power maximizing control system. Four patents or applications (8, 17, 18, 19).

THE BOEING COMPANY (Los Angeles, 2009-2011). Technical Consultant. Design/development of hardware/software/signal processing of a sun tracking system for an industrial concentrated photovoltaic solar energy application. One patent (11).

SANY ELECTRIC (Beijing, China, 2012-2012). Technical Consultant. Evaluation of existing wind turbine control systems and re-design of same.

ENVISION ENERGY (Shanghai, China, 2014-2016). Technical Consultant. Evaluation of existing wind turbine control systems and re-design of same. One patent (15).

EXPERT WITNESS in defense of US2020/040356 “Cleaning Method for Solar Panels”.

KITCH WILSON PRIVATE STUDIES. One patent (13).

> “Dr. Wilson’s grasp of both the fundamentals and esoteric aspects of closed loop feedback control are greatly responsible to our success as a company. Due to his outstanding performance in our control system development we highly recommend him for these kind of activities in any industry.”
>
> Kevin Cousineau
> Director, Electrical Engineering Clipper Windpower, Inc.
> 6305 Carpinteria Ave., Suite 300 Carpinteria, CA 93013

> “I am very happy to write about Kitch. Kitch is one of the most experience control engineer I have ever worked with. I gain lot of knowledge and understand of turbine control by him. He owns really great strategy to mitigate the load on MW turbines. He is equipped with his own developed tools which makes work really fast. I recommend his consultancy for new player in wind industries or any OEM looking to upgrade the MW. I would like to work with him again as I did at Sany. Wish him good luck!”
>
> Vikram Rajput
> Load and Gearbox Engineer
> DEWI-OCC Offshore and Certification Centre GmbH

"I worked with Kitch when he was hired as consultant to help improve the control and safety system of SANY Wind Turbines. With his vast experience and in-depth knowledge about the control systems and wind turbine behavior, Kitch quickly identified the issues in the controller and other electrical systems in the wind turbine. He also came up with a detailed plan for various enhancements (like developing a wind estimator, individual pitch control etc..) to the basic control system. It has been a great learning curve for me to work alongside Kitch. With his knowledge of control systems, mathematical modeling and functioning of electrical systems , he would be an asset to any organization."

Satish Narayan
Wind Turbine Loads and Controls Engineer DEWI-OCC Offshore and Certification Centre GmbH

"The first task was to perform an architecture trade study to determine an optimum configuration that minimized cost. Kitch was an integral part of the trade study and contributed greatly. His other tasks included creating a control communication protocol, microcontroller programming, documentation, electrical design, test procedures, troubleshooting, and proving the design in the field. For this effort he developed a mathematical model of the solar array motion, a nonlinear means to calibrate the model for each array, and a motor control algorithm using the calibrated model.

Kitch's efforts produced two patent filings, and he used his familiarity with patents and their language to write the applications and claims. The project was completed on time, met the precision requirements, and the development progress of the tracker controller exceeded the program manager's expectations. The below link describes the deployment of the solar arrays.

Boeing continued Kitch's contract after the solar tracker was developed on the SAI program to perform a system trade study to further optimize performance and cost of the tracker controller electronics and associated power requirements.

His diverse experience and knowledge of mathematics, electronics, software, and controls made Kitch a valuable asset to the project on many different levels. His work ethic is impeccable and performs with little instruction. He is efficient and has excellent documentation skills.

I highly recommend Kitch Wilson for any technical position involving development of controls, electronics and software. His unique ability to grasp high level system concepts and low level component operation made him a valuable asset to our program."

Scott Rau
Integrated Product Team Lead The Boeing Company

AEROSPACE

TRW SYSTEMS (Los Angeles, 1969-1971, 1975-1977). Member of Technical Staff. Simulation of missile guidance and control systems, and development of Kalman filters for vehicle state estimation.

HUGHES AIRCRAFT (Los Angeles, 1977-1978). Member of Technical Staff. Design of radar- computer interface electronics.

ROCKWELL INTERNATIONAL (Los Angeles, 1979-1980). Technical Consultant. Evaluation of digital and Kalman filters used on the Space Shuttle.

COMMAND, CONTROL, AND COMMUNICATION CORPORATION (Los Angeles, 1980). Technical Consultant. Development of radar tracking systems and target simulators.

SANTA BARBARA RESEARCH CENTER/RAYTHEON (Santa Barbara, 1981-2001). Technical Consultant. Development of Walsh and Fourier transform algorithms and design of hardware- software for a high-speed bit-slice microprocessor based laser warning system. Simulation and digital filtering applied to study magnetic signature signals for a missile-based magnetic sensor. Design, development, coding, and testing of a nonlinear constrained maximum likelihood trajectory reconstruction algorithm for a laser fan beam detector array; developed the constrained optimal estimation algorithm and wrote the signal processing code. Design of laser warning and IFF systems. Technical proposal support for a wide variety of defense related subjects. Development of spread spectrum optical-RF link for 'friend' determination. Support of development of new RAM missile target sensor electronics and DSP coding. Design and development of DSP hardware software for OWL laser warning system. Supported development of novel hyper-spectral scanner, especially the signal processing hardware-software solution. Systems engineer for analysis & hardware & software for proposal efforts involving solar X-ray imaging telescope used in GOES weather satellite fleet, on infra-red sounder and imager used in NPOESS weather satellite fleet.

DELCO ELECTRONICS (Santa Barbara, 1983). Technical Consultant. Modeling and Kalman filters applied to development of fighter aircraft avionics system.

LOGICON (Vandenberg Air Force Base, 1984). Technical Consultant. Evaluation and improvement of Kalman filter based missile tracking and trajectory reconstruction software for the Vandenberg Air Force Base radar range.

MARIPRO DIVISION OF L3 COMMUNICATIONS (Santa Barbara, 1984-1993, 2010-present). Technical Consultant. Design and development of software digital filters and hardware for a microprocessor based acoustic signal processing system to replace an existing analog system. Developed, built and tested high speed special purpose digital signal processing electronics and computer DMA circuitry for an underwater acoustic range tracking system. Evaluate and redesign a Kalman filter used to track targets monitored by an underwater acoustic range. Mathematical modeling of 4-conductor transmission line cable including experimental verification and parameter estimation of electromagnetic characteristics. Design of network time synchronization hardware/software. Selection IEEE-1588 time synchronization equipment for 1000 km underwater seismic monitoring network and evaluate accuracy.

GENERAL RESEARCH CORPORATION (Santa Barbara, 1986-1987). Technical Consultant. Evaluation of guidance, control, and Kalman filter tracking technology in support of the Strategic Defense Initiative. Defined the nonlinear track problem, developed the mathematics, wrote the code, and evaluated several radar tracking filters for various threat configurations.

TECOLOTE RESEARCH (Santa Barbara, 1989-1993). Technical Consultant. Established technical baseline of a Space Based Radar satellite system, for a national air traffic control system, and for the Defense Weather Satellite System to support cost evaluation efforts.

SANTA BARBARA LASER SYSTEMS (Santa Barbara, 2007-2009). Technical Consultant. Development of updated TOW missile munitions detonator.

Magnetic/optical signal analysis and circuit evaluation. Hardware/Software for Digital Signal Processor core.

AUTOMOTIVE

VETRONIX (Santa Barbara, 1997-2004). Technical Consultant. Investigation of an automated diagnostic system for internal combustion engines. Develop the signal processing and procedures for balancing in-vehicle drive shafts using accelerometers and Fourier Transform theory. Development of sampled data feedback control system of engine rpm. Development of remote vehicle diagnostic and prognostic systems for next generation internet ready vehicles.

TRW AUTOMOTIVE (Livonia MI, 2002). Technical Consultant. Investigation of vehicle tire loading application.

TAKATA (Santa Barbara and Japan, 2005-2008). Technical Consultant. Conversion of floating point image processing software to embedded fixed point application; image processing for object detection; development of state space vehicle model with GPS, radar, vision, and vehicle data fusion for pedestrian avoidance. Theoretical development and C-coding of Kalman filter based multi- vehicle tracker. Application of modern systems theory to general data fusion development. Object detection in an image of a scene. One patent (10).

KITCH WILSON PRIVATE STUDIES. Two patents or applications(6, 19).

"Dr. Wilson saved the day on our sensor development project at Takata writing various Software Control and Application algorithms very quickly. This enabled our team to meet our customer deadlines when previous deliverables from other engineers proved incompatible for our sensor system. In the course of this Dr. Wilson created a series of multi-object , image processing algorithms, and various other analytic tools for our project using 3D vision. He then coded these in C for an embedded processor, and they became the basis of a prototype system that underwent successful testing in the US, Japan and Germany. He is the inventor of a patent covering some of this work. I strongly recommend Dr. Wilson for any task needing analytic tools that work in the field."

Marcus Chevitarese
Systems Engineer
Takata R&D Division
5720 Thornwood Dr., Goleta, CA. 93117

MEDICAL

HARBOR-UCLA MEDICAL CENTER (Los Angeles, 1977-1982). Technical Consultant and Member of the Faculty of the Department of Pediatrics. Modeling distribution dynamics of endocrine systems (thyroxine, triiodothyronine, vasopressin), developed mathematical models, designed verification experiments, performed the computer data analysis. Hardware/software design of microprocessor based real-time patient monitoring system; designed, built and tested the system. Hardware and software design of tissue oxygen uptake analysis system with Kalman filter based signal differentiator. Development of laboratory microcomputer software for analysis of radioimmunoassay and Michaelis-Menten binding site kinetic data.

NICHOLS INSTITUTE (San Juan Capistrano, 1979-1985). Technical Consultant. Development of a microprocessor based telecommunication system; designed and

coded the system. Development of a real-time laboratory radioimmunoassay data acquisition and analysis system including mathematics and coding.

SPACELABS (Los Angeles, 1982-1983). Technical Consultant. Development and application of digital filters for cardiac signal analysis; technical support of the software development of the Arrhythmia II bedside arrhythmia monitor.

CARDIAC CARE UNITS (Los Angeles and Haifa, Israel, 1984-1993). Technical Consultant. Evaluation and improvement of the hardware-software for a microprocessor based real-time cardiac arrhythmia analysis system; went to Israel to evaluate the technology of a newly purchased company, redesigned their analog and digital hardware, and evaluated the signal processing algorithms and software development group. Later a complete redesign of the device using modern surface mount electronics and adding a co-processor to handle 3M byte memory module and share various demanding tasks.

DOLPHIN IMAGING SYSTEMS (Valencia, 1988-1996). Technical Consultant. Development of electronics and system concepts for an orthodontic work station with 3-D patient mapping capabilities. Evaluation of commercial 3-D sonic positioning system and supported OEM negotiations. Design and manufacture of new acoustic position determination system and of a computer controlled test station for it. Signal processing mathematics applied to improve accuracy of the 3-D mapping function.

BAXTER PHARMASEAL (Valencia, 1989-1993). Technical Consultant. Provided critical evaluation of and support for software verification and validation for FDA 510(k) approval of various computer controlled medical devices including comprehensive review of overall system, hardware, and software. Addition of digital active lead compensation feedback control and flow sensing software to patient warming devices.

VAN R (Oxnard, 1989-1990). Consultant. Developed prototype hardware, feedback control system theory, software, user interface logic, and packaging for an inherently unstable microprocessor based water temperature controller for use in dental offices.

CULTURE CARE SYSTEMS (Miami, 1992-1994). Technical Consultant. Mechanical design, software, digital and analog electronics implementation of robotic device for automated care of human cell cultures. Co-inventor. One patent (3).

INAMED (Santa Barbara, 1995-1996). Consultant. Modernization of device used in gastrostenometer surgery. Overall and detailed design, software, microcontrollers, digital and analog electronics.

CIRCON CORPORATION (Santa Barbara, 1999-2000). Technical Consultant. Developed hardware and software for two digital video cameras used for endoscopy.

KITCH WILSON PRIVATE STUDIES. Four patents or applications(7, 9, 15,16).

COMMERCIAL

DEL MAR AVIONICS (Irvine, 1987-1988). Technical Consultant. Co-inventor of a patented optical disk data storage system. Two patents (1, 4).

UC WIRELESS (Santa Barbara, 1987-2001). Co-Founder. Co-inventor of patented low cost spread spectrum radio frequency systems for automated utility meter reading

of residential water, gas and electric meters. Product introduction in 1993 with pilot evaluation projects ongoing since 1991 in both the United Kingdom and in the USA. Company is rapidly becoming a premier spread spectrum technology source branching into telephony, traffic control, and general data transmission and wireless internet access. Company was acquired by Wi-Lan of Canada. One patent (2).

DESIGN EVENT (Santa Barbara, 1993-1995). Technical Consultant. Co-inventor and leader of a 5- member technical team to develop a commercial musical instrument manufactured in Hong Kong. Microprocessor, music synthesis, digital and analog design. One patent (5).

SANTA BARBARA INSTRUMENT GROUP (Santa Barbara, 1998-1999). Technical Consultant. Developed DSP code for embedded controller of an astronomical CCD imaging camera.

SANTA BARBARA LASER SYSTEMS (Santa Barbara, 1998-2010). Technical Consultant. Concept, design, prototyping and manufacture of a microcontroller based high power laser control system for photo-sensitive drug therapy. Development, manufacture and marketing of a photo-tachometer used in vehicle diagnostics. Analysis of the TOW missile sensor analog electronics and its replacement by a fully digital DSP algorithm.

GREENERIDGE SCIENCES (Santa Barbara, 1999-2002). Technical Consultant. Supporting their efforts to build a digital data acquisition pod for attachment to whales in the wild.

DIGITAL INSTRUMENTS DIVISION OF VEECO METROLOGY GROUP (Santa Barbara, 2001- 2003). Technical Consultant. Hardware/software/FPGA/DSP support of atomic force microscope product line. Design of sampled-data feedback and signal processing algorithms and implementations in fixed point mathematics. Digital low-pass, high-pass, band-pass, all-pass, differentiator, classical feedback compensators, lock-in amplifier, CORDIC magnitude/phase calculator. Modern optimal controller design using stochastic estimation techniques.

ASSAD MORA (Santa Barbara, 2007). Technical Consultant. Development of feedback control and stabilization loops to slave three video cameras together to produce a 3-D zoomable dental imaging system. One patent (12).

KITCH WILSON PRIVATE STUDIES. One patent (14 – queueing algorithm).

PATENT SUPPORT

POTENCIA INDUSTRIAL (Mexico, 2005-2007). Patent Consultant. Distilled the technology and wrote the patents, including claims, for a number of international patents related to electrical machines. Four patents (22, 23, 24, 25).

EXPERT WITNESS in defense of US2020/040356 “Cleaning Method for Solar Panels”.