MARK ALAN STURZA

President

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Mark Sturza is President of 3C Systems Company, which he founded 33 years ago to provide consulting expertise in the design, development, analysis, and regulation of communications systems.

Mark has been a key contributor to over a dozen venture startups. He was a member of the Teledesic founding team (Gates–McCaw “internet in the sky”), and advised the management and technical teams for the 12 year life of the company. Mark was technical lead for the Eagle River (Craig McCaw) due diligence leading to ICO’s emergence from bankruptcy. He has provided due diligence services to numerous venture funds.

Mark has served as a technical advisor to Microsoft, Google, SpaceX, Facebook, and Viasat in communications systems and spectrum regulatory matters. He was a member of the founding technical teams of SiRF Technology (GPS chipsets, 2004 IPO NASDAQ:SIRF), WirelessHome (broadband wireless access systems, acquired by Western Multiplex), and TrueSpan (digital video broadcast receiver chipsets, acquired by SiRF Technology).

Mark’s industry experience includes senior engineering management and technical positions at LinQuest, Teledyne, Magnavox, and Litton, where he developed advanced navigation and guidance systems for both commercial and government customers. Mark has served on the Boards of Directors of several startups. He holds thirty US patents in communications system design, with several additional patents pending, and has presented over 30 technical papers.

Mark has a BS in Applied Mathematics from Caltech, a MSEE from USC, and a MBA from Pepperdine University. He is a Senior Member of the IEEE, a Senior Member of the American Institute of Aeronautics and Astronautics, and is a member of the Institute of Navigation, the Pacific Telecommunications Council, and the Society of Satellite Professionals International. Mark holds a General Radiotelephone Operator License from the FCC.

EXPERIENCE

VIASAT, CARLSBAD, CA (2016 - 2023)
Support international and domestic spectrum regulatory activities for NGSO and GSO satellite systems. Provide systems expertise on NGSO satellite systems.

META, MENLO PARK, CA (2015 – 2023)
Support Meta's international and domestic spectrum regulatory and standards activities. Rapporteur for development of ETSI TC-BRAN EN 303 722 standard. Support various connectivity projects. Develop link budget analysis and simulation tools.

ONPOINT SYSTEMS, CARMEL, IN (2022 – 2023)
Expert witness in the areas of computational geometry and GNSS systems.

GEOSCOPE TECHNOLOGIES, SINGAPORE (2022 – 2023)
Expert witness in the areas of positioning and location.

ONEWEB, MCLEAN, VA, (2019 - 2021)
Provide expertise on PNT.

CORUS REALTY HOLDINGS, MCLEAN, VA, (2018 – 2020)
Expert witness in the area of position location apps.

XINOVA, SEATTLE, WA (2019)
Reviewed major telecom company's patent portfolio and identified potential business opportunities.

VISIBLE SENSORS, SUNNYVALE, CA (2017 – 2019)
Chief Engineer of venture startup developing next generation vehicular radar sensors.

LIGATO, RESTON, VA (2015 – 2019)
Provided GPS expertise and supported spectrum regulatory activities.

METEORCOMM, RENTON, WA (2018)
Supported development of next generation VHF/UHF radios for railroad networks.

X ONE, SARATOGA, CA, (2017 – 2018)
Expert witness in the area of navigation and positioning apps. Prepared reports. Deposed.

PARKERVISION, JACKSONVILLE, FL (2016 – 2017)
Expert witness in the area of RF signal processing. Prepared rebuttal invalidity report, deposed, and prepared witness statement. Conducted circuit simulations.

LINQUEST CORPORATION, LOS ANGELES, CA (2011 – 2017)
Vice President And General Manager, Commercial Solutions Division. Recruited by CEO to develop commercial client services group. Managed relationships with all commercial clients, including Panasonic Avionics, MTN, Thuraya, DIRECTV, and SES. Developed web service tool product line for link budget analysis, capacity planning, and performance monitoring. Developed installation planning tool for DIRECTV. Supported on-board processor development for Iridium-NEXT. Developed Extranet tools for sun outage mapping. Led team conducting Independent Technical Evaluation of eXConnect service. Managed team providing communication systems engineering support to DIRECTV in support of DVB-S2X standard.

WAVESTREAM CORPORATION, SAN DIMAS, CA (2016)
Provided marketing support.

ELBIT SYSTEMS, HAIFA, ISRAEL (2015 – 2016)
Expert witness in the area of satellite communications. Prepared claims charts and infringement contentions. Conducted code review.

CALTECH, PASADENA, CA (2014 – 2015)
Expert witness in the area of satellite communications. Prepared expert report supporting damage claims. Deposed.

SPACEX, HAWTHORNE, CA (2014)
Supported SpaceX's spectrum regulatory activities.

GOOGLE, MOUNTAIN VIEW, CA (2013 - 2014)
Supported Google's international and domestic spectrum regulatory activities.

VIASAT, CARLSBAD, CA (2013 - 2014)
Expert witness services in the area of satellite communications. Prepared infringement reports and rebuttal invalidity repots. Prepared various declarations. Conducted code review. Deposed and testified.

SFARA, NEW YORK, NY (2012 – 2013)
Member of the founding team of this mobile app telematics startup.

LIGHTSQUARED, RESTON, VA (2010 – 2013)
Member of the LightSquared/GPS Industry technical working group (TWG). Provided regulatory support.

PASCAL'S POCKET, WEST COVINA, CA (2010 – 2012)
Member of team developing remote control app for smart phones. Developed a C#.Net class implementing an ultra-secure VPN for gaming machine applications.

AMBATO, DURHAM, NC (2009 – 2012)
Expert witness in the area of GPS. Prepared infringement and rebuttal invalidity reports. Prepared supplemental expert reports and declarations. Conducted code review. Deposed and testified.

SOCIAL FABRIC CORPORATION, WEST COVINA, CA (2005 – 2012)
Cofounder of this venture startup developing technology to put the science into online dating.

HURST INTERNATIONAL, CHATSWORTH, CA (2010 – 2011)
Improved motor control code for fruit labeling system.

ORBITAL NETWORK ENGINEERING, CUPERTINO, CA (2009 – 2011)
DSP and RF architect for new digital TT&C modem product line. Designed RF for 70 MHz through S-band. Designed multimode DSP carrier and subcarrier modulators and demodulators for PM, FM, AM, BPSK, DPSK, QPSK, OQPSK, DQPSK, and CPFSK/AM waveforms, including diversity combining and FFT acquisition. Validated DSP block and system designs with MATLAB simulations.

FASTERZAP, LA JOLLA, CA (2008 – 2011)
Member of the founding team of this startup developing an UAS architecture for localization of selected mobile devices.

SKYTERRA LP, RESTON, VA (2009 – 2010)
Provided regulatory support. Managed test campaign at independent laboratory to assess impact of out-of-band emissions on GPS receivers.

SPACE SYSTEMS/LORAL (2007 – 2010)
Conducted simulation study investigating methods for exploiting dual antenna handsets to improve performance of TerreStar GMR-3G satellite links. Developed concept for ground based TerreStar real-world link simulator, and implemented simulation controller. Conducted functional audit of TerreStar beam pointing simulation. Member of Iridium NEXT proposal team.

INTELLECTUAL VENTURES, BELLEVUE, WA (2009)
Performed analysis of patent portfolios.

WI-TRIBE, MANAMA, KINGDOM OF BAHRAIN (2008 – 2009)
Provided expert witness services in area of WiMAX. Prepared witness statement and testified.

SIRF, SAN JOSE, CA (2006 – 2009)
Member of the SiRFstar IV GPS chip architecture team. Developed high performance signal acquisition algorithms and moding. Investigated standards based (Cell ID, time difference, and satellite) and non-standards based (fingerprinting) techniques for GSM and UMTS mobile devices. Prepared report on hybrid positioning techniques for mobile devices.

SAIC, TORRANCE, CA, (2008)
Supported SATCOM architecture analysis study for Air Force Space and Missiles Center (AFSMC).

MENACHE LLC, CULVER CITY, CA (2003 – 2008)
Assumed the VP Engineering role for this venture startup developing a RF Tag motion capture system for the entertainment industry. Developed system architecture. Provided technical management of vendor implementing system. When vendor was unable to deliver, managed inhouse development of demo system.

MICROSOFT CORPORATION, REDMOND, WA (2006 – 2007)
Prepared “White Spaces” technical report addressing the question of unlicensed devices operating in TV bands.

WI-FI ALLANCE, AUSTIN TX (2004 – 2007)
Performed simulations of adaptive spectrum sharing rules.

TRUESPAN, LONG BEACH, CA (2004 – 2006)
Member of the founding team. Contributed to the business plan and system architecture. Performed simulations and conducted design trades for DVB-T/H receiver. The company was sold to SiRF Technology.

GIGABEAM CORPORATION, HERNDON, VA (2004 – 2006)
Prepared analysis of atmospheric gas dispersion and rain attenuation in millimeter wave bands. Worked with founder to identify and protect key IP.

IOSTAR CORPORATION, NORTH SALT LAKE, UT (2005 - 2006)
Prepared capacity analysis for W-band satellite system. Prepared overview of ITU coordination process for satellite systems.

OPLUS TECHNOLOGIES, ISRAEL (2004)
Prepared and presented a three day workshop covering all aspects of analog TV audio.

GLOBALSTAR, MILPITAS, CA (2004)
Supported design of amplifier module for multi-channel active antenna subscriber units.

MICROSOFT CORPORATION, REDMOND, WA (2002 – 2004)
Advisor on broadband wireless access, and on power line communications.

FALCON FUND, WEST COVINA, CA (2003)
Provided due diligence services.

SPACEX, EL SEGUNDO, CA (2003)
Designed a Ka-band/5-GHz transverter.

INSILICA, SANTA CLARA, CA (2003)
Provided due diligence services.

GKM VENTURES, LOS ANGELES, CA (2003)
Provided due diligence services.

TECHNOVATIVE APPLICATIONS, BREA, CA (2002 – 2003)
Performed review of Trajectory Correctable Munitions transceiver. Prepared data link and transceiver specifications. Developed coherent and non-coherent demod architectures and detailed designs, including design trades and performance simulations.

KITCOMM, BERMUDA (1998 – 1999, 2002 – 2003)
Prepared several coordination strategy, regulatory assessment, and interference analysis memos in support of Kitcomm's L-band NGSO satellite system's business plan.

WAVESTREAM CORPORATION, WEST COVINA, CA (2001 – 2003)
Senior advisor to this millimeter/microwave high-power amplifier venture startup.

SKYVAULT SECURE DIGITAL DISTRIBUTION, CARMEL, CA (2001 – 2003)
CTO for this digital rights management and secure content distribution startup. Developed a demo system showcasing SkyVault's UltraSecure™ digital content protection.

MENACHE INC., BEVERLY HILLS, CA (2001 – 2003)
Performed trade studies and developed system design of a RF Tag motion capture system for the entertainment industry. Worked with potential vendors to obtain proposals.

VIASAT, CARLSBAD, CA (2002)
Expert witness in Government contract dispute.

TERRABEAM LABS, REDMOND WA (2001 – 2002)
Provided atmospheric attenuation and rain attenuation modeling.

TELEDESIC, BELLEVUE, WA (1990 – 2002)

Chief Consultant System Architecture. Member of the original Teledesic (Calling Communications) technical team. Developed the communications systems architecture for this low-Earth orbit (LEO) Ka-band satellite communications system including radio frequency plan, multiple access techniques, and link budgets. Prepared the technical sections of the Teledesic FCC application and amendments. Provided technical inputs for various domestic and international regulatory filings.

Member of the Teledesic management team. Contributed to the design of the Teledesic organization. Helped formulate Teledesic regulatory strategy. As Director, Communications Systems was responsible for all Teledesic communications systems design and analysis, and regulatory support engineering activities. Managed support contractors and consultants to refine the communications systems design and to prepare technical analysis of regulatory issues. Surveyed potential Teledesic suppliers. Recruited several key members of the Teledesic team.

ICO GLOBAL COMMUNICATIONS., UXBRIDGE, UK (1999 – 2002)

Technical lead for the Eagle River due diligence leading to ICO's emergence from bankruptcy. Worked closely with the ICO and Boeing Space Systems teams to identify and mitigate technical risks. Continued to provide technical and regulatory support following the restructuring. Managed the preparation of an independent assessment of the interference environment. Developed detailed payload simulations to access the impact of terrestrial interference on satellite performance. Prepared analysis in support of Ancillary Terrestrial Component (ATC) regulatory filings.

MISSION RESEARCH CORPORATION, TORRANCE, CA (2002)

Supported development of broadband transmitter and receiver.

MALIBU NETWORKS, CALABASAS, CA (1999 – 2001)

Coached founders during initial fund raising. Served as a member of Malibu's advisory board.

ENDWAVE, SUNNYVALE, CA (1991 – 2001)

Prepared a white paper on free space optical (FSO) propagation and the impact of fog. Prepared a tutorial on radiation exposure hazard and regulations. Conducted a sensitivity analysis of rain availability versus link margin in the 28 GHz and 38 GHz bands. Prepared various analysis in support of regulatory filings.

LEO ONE USA, ST. LOUIS, MO (1993 – 2001)

Developed the communications system architecture for this "Little-LEO" VHF/UHF store-and-forward satellite system including radio frequency plan, multiple access techniques, and link budgets. Designed satellite constellation orbits. Developed network protocols. Identified satellite and user terminal requirements.

Prepared technical sections of FCC application and amendments. Provided technical inputs for various domestic and international regulatory filings. Managed support contractors and consultants to develop constellation analysis software program, to analyze constellation performance, and to refine the communications systems design. Evaluated potential satellite vendors.

SIRIUS SATELLITE RADIO, NEW YORK, NY (2000)
Member of tiger team formed to review contract performance of vendor developing receiver chipset.

TACHYON, SAN DIEGO, CA (2000)
Expert witness in area of satellite communications. Deposed.

HOULIHAN, LOKEY, HOWARD, AND ZUKIN, LOS ANGELES, CA (1999)
Technical advisor to Iridium bond holders during bankruptcy proceeding.

SiRF TECHNOLOGY, LOS ANGELES, CA (1995 – 1999)
Retained by Founder as Chief Technical Advisor to this venture startup. Provided technical and marketing support in GPS and spread spectrum communications. Supported the development of GPS and wireless chipsets.

WIRELESSHOME, LONG BEACH, CA (1998 – 1999)
Co-founder and CFO for this Communications Systems Intellectual Property (CSIP) venture startup. Served as a Member of the Board. Developed the business plan expanding on the Silicon IP model by including RF and software for a complete communications system solution. Worked with VC's and potential foundry partners to obtain funding. The company was subsequently refocused on the broadband wireless access opportunity, and acquired by Western Multiplex.

SAFE ZONE SYSTEMS, NM (1999)
Prepared competitive assessment of object and personal detection devices including UWB technology and manufacturers of UWB equipment, and companies applying other traditional and innovative technologies in the weapons and object detection marketplace.

GARMIN, OLATHE, KS (1999)
Expert witness in area of GPS. Provided opinion.

SOCIAL FABRIC CORPORATION, WEST COVINA, CA (1996 – 1999)
Co-founder and chief engineer. Developed the communications system architecture for this 60-GHz broadband wireless local loop company. Devised regulatory strategy.

ANGEL TECHNOLOGY, ST. LOUIS, MO (1995 – 1996)
Member of the founding technical team for this high-altitude platform system (HAPS) tall-tower startup. Developed communications systems architectures for broadband (LMDS) and narrowband (cellular & PCS) applications. Prepared technical sections of regulatory filings.

dbX, ST. LOUIS, MO (1993 – 1995)
Performed a feasibility study of wireless cable systems (LMDS, MVDS, and MMDS) using digital modulation techniques. Conducted due diligence investigations of several high technology companies.

LITTON AERO PRODUCTS, MOORPARK, CA (1993 – 1994)
Conducted prior art searches in support of patent valuations.

TECELMEX, MEXICO CITY, MEXICO (1993 – 1994)
Provided regulatory and technical support for the Leo One store-and-forward LEO satellite system.

NAVSYS, COLORADO SPRINGS, CO (1989 – 1993)
Served as a member of the Board. Developed algorithms for skewed axis inertial navigation system (INS) fault detection and isolation (FDI). Performed a study of the long duration performance of aircraft inertial navigation systems.

Developed an ultra-low production cost GPS receiver module. Developed a post-test GPS software receiver program. Performed trade studies for a L-Band digitizing GPS receiver. Developed a miniaturized L-Band to S-Band GPS Translator and associated S-Band to L-Band receiver. Designed receiver-tracking loops for a very high dynamic (50 g, 50 g/sec) application. Performed a study analyzing direct sequence spread spectrum receiver implementation loss sources. Developed several miniaturized low-power S-Band, L-Band, and VHF frequency synthesizers. Developed a differential GPS navigation filter with autonomous fault detection. Conducted a study of the receiver autonomous integrity monitoring (RAIM) performance of an integrated GPS/GLONASS receiver.

KNIGHT PROTECTIVE, VAN NUYS, CA (1992)
Performed a trade study comparing narrow band and spread spectrum wireless security systems.

JCA, THOUSAND OAKS, CA (1990 – 1991)
Prepared requirements flowdown for a K-band low noise amplifier/downconverter, a L/C-band switchable upconverter, and a SHF/70 MHz down converter.

LITTON GUIDANCE AND CONTROL SYSTEMS, WOODLAND HILLS, CA (1990 – 1991)
Supported integrated GPS/Inertial Navigation System design reviews.

PRINCIPLE INVESTIGATOR FOR 4 DOD SBIR PHASE I CONTRACTS (1990 – 1991)
Awarded four DOD SBIR Phase I contracts. Performed trade studies and prepared final reports for the following topics:

- QPSK and MPSK Transmission and Receiving Equipment, Naval Weapons Center, China Lake, CA
- RPV Range Surveillance and Radio Relay Via Satellite, Pacific Missile Test Center, Oxnard, CA
- Miniature GPS Digital Translator Development, Air Force Space Command (Western Space and Missile Center), Vandenberg AFB, CA
- ECM Resistant GPS Receiver, Harry Diamond Laboratory, Adelphi, MD.

ALLEN OSBORNE ASSOCIATES, WESTLAKE VILLAGE, CA (1989 – 1991)
Redesigned the RF front end of a high performance GPS receiver to reduce cost, size, weight, and power consumption.

LITTON GUIDANCE AND CONTROL SYSTEMS, WOODLAND HILLS, CA (1987 – 1989)
Member Technical Staff, Advanced Systems Engineering. Transferred to Guidance & Control Systems Division to pursue my interest in fiber optic sensors. Engineering proposal manager for successful All Optical Towed Array (AOTA) proposal. Principal investigator for Fiber Optic Acoustic Detection System (FOADS) program. Developed real-time 10 Hz to 20 KHz FFT spectrum analyzer with one-third-octave outputs based on TMS 320C30 and 386 PC. Designed digital signal processing techniques for fiber optic

hydrophone demodulation. Engineering proposal manager for various fiber optic gyro (FOG) proposals. Investigated signal processing techniques for FOGs.

Principal investigator for Integrated GPS/Inertial System R&D program. Engineering manager for GPS Guidance Package (GGP) study. Provided consulting expertise to all Guidance & Control Systems GPS/Inertial programs.

LITTON AERO PRODUCTS, MOORPARK, CA (1985 – 1987)

Director, Systems Engineering. Promoted when new Engineering VP was appointed. Responsible for all systems engineering activities across all product lines (INS, IRS, AHRS, Omega, GPS, and advanced systems). Reorganized directorate into four departments (analysis, design, integration, and test) each managed by an Engineering Manager. Increased directorate from 35 engineers to 55 engineers to support workload. Reduced back to 35 engineers eighteen months later when company management decided to sharply curtail engineering activity. Established a summer intern program for engineering students.

Managed system design of fault-tolerant fiber optic gyro IRS system, development of improved strapdown system calibration, investigation of RLG instrument block vibration, development of PC based system test equipment, and conceptual design of new products. Implemented policies and procedures which improved systems engineering effectiveness and efficiency.

LITTON AERO PRODUCTS, MOORPARK, CA (1981 – 1985)

Director, GPS Development. Recruited by Litton to lead their GPS development effort. Starting from scratch with a team of 3 engineers developed working brassboard during the 1st year. Conducted successful flight tests by the end of 2nd year. Completed production prototypes within 3 and 1/2 years. Interfaced with Manufacturing for limited production run of 25 LTN-700 GPS Navigation Sets. Developed system architectures for 2nd and 3rd generation products (LTN-710 and μNAV). Developed codeless L2 signal-processing technique incorporated in Western Atlas Aero Service's GPS survey set (MINI-MAC). Developed single channel GPS signal generator for receiver testing. Developed a digital Omega receiver.

Managed a project budget of $1 to $2 million per year. Directly responsible for the GPS systems engineering and RF design groups (increased staff from 2 to 7 engineers). Managed CMOS gate array and custom GaAs ASIC developments. Established a state-of-the-art RF development lab for work from 10 MHz to 2 GHz.

MAGNAVOX ADVANCED PRODUCTS AND SYSTEMS COMPANY, TORRANCE, CA (1979 – 1981)

Senior Engineer, Communication Systems Engineering. Recruited by Magnavox to join their Phase II GPS development team. Designed the set moding for the five, two, and one channel GPS Phase II User Equipment (UE) sets. Performed various system engineering tasks for the GPS Phase II UE sets.

TELEDYNE SYSTEMS COMPANY NORTHRIDGE, CA (1979)

Research Scientist, Engineering. Returned to Teledyne after receiving my MSEE from USC. Designed a simplified test procedure for the DRIRU-II gyro that significantly reduced test time. Conducted a processor requirements study for Missile Accuracy Evaluator (MAE) GPS receiver.

TELEDYNE SYSTEMS COMPANY NORTHRIDGE, CA (1978 – 1979)
Worked my way through the USC MSEE program by consulting for Teledyne. Conducted performance trade-off studies for GPS Phase IIA program. Performed hardware/software integration of Tactical GPS Guidance (TGPSG) receiver. Designed and implemented a GPS satellite simulator using off-the-shelf subsystems.

TELEDYNE SYSTEMS COMPANY NORTHRIDGE, CA (1977 – 1979)
Member Technical Staff, Advanced Systems Engineering. Joined Teledyne after completing my BS at Caltech. Designed and implemented an improved graphics capability for St. Mary's Loran-C navigation system. Developed and analyzed algorithms for Tactical GPS Guidance (TGPSG) receiver.

TELEDYNE SYSTEMS COMPANY NORTHRIDGE, CA (SUMMERS 1974, 1975, 1976)
Simulated the CH-46 Doppler-Omega navigation system. Developed a GPS receiver simulation. Analyzed the effect of sequencing on tracking loop stability. Analyzed various navigation system configurations.

EDUCATION

BS, California Institute of Technology, 1977

MSEE, University of Southern California, 1979

MBA, Pepperdine University, 1985

PERSONAL

Born January 17, 1957

Married

Valid Passport

PROFESSIONAL AFFILIATIONS

Senior Member of Institute of Electrical and Electronic Engineers (IEEE)

Senior Member of American Institute of Aeronautics and Astronautics (AIAA)

Member of Institute of Navigation (ION)

Member of Pacific Telecommunications Council (PTC)

Member of Society of Satellite Professionals International (SSPI)

Member of International Association for the Advancement of Space Safety (IAASS)

LICENSES

General Radiotelephone Operator License (PG00007722)

PUBLICATIONS

"LEO Capacity Modeling for Sustainable Design", 2022 Advanced Maui Optical and Space Surveillance Technologies Conference (AMOS), September 2022, with M. Dankberg and W. Blount.

"Consequences of LEO Satellite Collisions – The Fragments", 11th International Association for the Advancement of Space Safety (IAASS) Conference, October 2021, with G. Saura Carretero.

"Design Trades for Environmentally Friendly Broadband LEO Satellite Systems", 2021 Advanced Maui Optical and Space Surveillance Technologies Conference (AMOS), September 2021, with G. Saura Carretero.

"Mega-Constellations – A Holistic Approach To Debris Aspects", Proc. 8th European Conference on Space Debris (virtual), Darmstadt, Germany, 20–23 April 2021, with G. Saura Carretero.

"Averting Environmental Risks in the New Space Age", Day One Project, March 2021, with A. Mehlman and J. Janka.

"High Throughput Ku-band Satellites for Aeronautical Applications", MILCOM 2012, October 2012, with C. McLain, S. Panthi, and J. Hetrick.

"White Spaces Engineering Study: Can Cognitive Radio Technology Operating In The TV White Spaces Completely Protect Licensed TV Broadcasting?", New America Foundation, Wireless Future Program, Working Paper #16, January 2007, with F. Ghazvinian.

"The Teledesic Network", 17th AIAA International Communications Satellite Systems Conference Colloquium, February 1998, with D. Kohn.

"LEOs – The Communications Satellites of the 21st Century", Northcon/96 IEEE Technical Applications Conference, November 1996.

"LEOs – The Communications Satellites of the 21st Century", Wescon/96 IC EXPO Applications Conference on Communication & Computer Technologies, October 1996.

"Wireless Multimedia and Internet Via Satellite", 2nd Ka-Band Utilization Conference, September 1996, with F. Ghazvinian and D. Payne.

"The Teledesic Satellite System", 4th Budapest International Conference on Up-to-Date Satellite Communications, September 1996, with F. Ghazvinian.

"The Teledesic Broadband Global Satellite System", Twentieth International Symposium on Space Technology and Science, May 1996, with D. Patterson.

“Digital Direct-Sequence Spread-Spectrum Receiver Design Considerations”, Fourth Annual WIRELESS Symposium, February 1996.

“Satellite System Links Communications Networks – A LEO Satellite System Connects Rural and Remote Areas to International Communications Networks”, Lead Feature, Wireless System Design Magazine, November 1995.

“Teledesic Satellite System Overview”, Ka Band Utilization Conference, October 1995, with F. Ghazvinian.

“Co-Directional Ka-Band Frequency Sharing Between Non-GSO Satellite Networks and GSO Satellite Networks”, Ka Band Utilization Conference, October 1995, with F. Ghazvinian.

“Architecture of the Teledesic Satellite System”, International Mobile Satellite Conference, June 1995.

“The Teledesic Satellite System: Overview and Design Trades”, Third Annual WIRELESS Symposium, February 1995.

“The Teledesic Satellite System”, National Telesystems Conference, May 1994.

“Digital Translator Design Trades”, ION Satellite Division 5th International Technical Meeting, September 1992, with A. Brown.

“Comparison of Fixed and Variable Threshold RAIM Algorithms”, ION Satellite Division 3rd International Technical Meeting, September 1990, with A. Brown.

“Fault Tolerant GPS/Strapdown Inertial System Design”, ION Satellite Division 3rd International Technical Meeting, September 1990, with F. DeAngelis, D. Lukaszewski, and A. Brown.

“Advantages of Digital Translators for GPS TSPI Applications”, ION Satellite Division 3rd International Technical Meeting, September 1990, with A. Brown.

“Fault Detection and Isolation (FDI) Techniques for Guidance & Control”, NATO AGARDgraph GCP/AG.314 Analysis, Design and Synthesis Methods for Guidance & Control; June 1990.

“The Effect of Geometry on Integrity Monitoring Performance”, Institute of Navigation Annual Meeting, June 1990, with A. Brown.

“Integrated GPS/GLONASS for Reliable Receiver Autonomous Integrity Monitoring (RAIM)”, Institute of Navigation Annual Meeting, June 1990, with A. Brown.

“Navigation System Integrity Monitoring Using Redundant Measurements”, NAVIGATION: Journal of The Institute of Navigation, Volume 35, No. 4, 1988-89.

“Embedded GPS Solves the Installation Nightmare”, PLANS '88, November 1988, with C. Richards.

“Skewed Axis Inertial Sensor Geometry for Optimal Performance”, AIAA/IEEE Digital Avionics Systems Conference, October 1988.

“GPS Ground Proximity Warning System”, ION National Technical Meeting, January 1987.

“Design of Differential GPS Receivers for Marine Navigation”, RTCM Annual Assembly Meeting, May 1986, with A. Brown.

“MINI-MAC – A New Generation of Dual-Band Surveyor”, Journal of Geodesy, Volume 60, Number 3, September 1985, with A. Brown, J. Ladd, and R. Welshe.

“Commercial Aviation GPS Navigation Set Flight Test Results”, Institute of Navigation National Technical Meeting, June 1985, with A. Brown.

“Static Point Positioning with an L1, C/A Code GPS Receiver”, First International Symposium on Precise Positioning with the Global Positioning System, April 1985, with A. Brown.

“Static Point Positioning using the Global Positioning System”, 35th Congress of the IAF, Switzerland, October 1984, with A. Brown.

“GPS/AHRS: A Synergistic Mix”, NAECON, May 1984, with A. Brown and J. Kemp.

“Commercial Aviation GPS Navigation Set Architecture”, ION National Technical Meeting, January 1984.

“Digital Signal Processing Techniques for GPS Receivers”, National Telesystems Conference, November 1983.

“A GPS Navigation Set for Commercial Aviation Applications”, SAE 1983, Aerospace Congress & Exposition, October 1983.

“GPS Navigation Using Three Satellites and a Precise Clock” Navigation: Journal of the Institute of Navigation, Volume 30, No. 2, 1983.

“St. Marys River Loran-C Precision Guidance Systems Improvements”, NTIS AD-A062160, September 1978, with E. Dietrich and J. Holdsworth.

TEACHING

UCLA SHORT COURSE INSTRUCTOR

Integrated Communications, Precision Positioning Determination and Navigation, and Identification Systems; Principles, Technology, & Operational Aspects – March 1985, March 1986.

NAVSTAR Global Positioning System (GPS): Operation, Implementation, and Applications – June 1985, June 1986, December 1986, June 1987, December 1987, June 1988, December 1988.

INSTRUCTOR, CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

EE 351, Linear Systems II – Discrete Linear Systems, Fall 1988.

UCCE SHORT COURSE INSTRUCTOR

NAVSTAR/GPS: Operation, Implementation, and Applications – October 1990, November 1990, May 1991, November 1991.

US PATENTS

9,037,625	Multi-Standard Multi-Rate Filter
8,462,831	System and Method for Use of Sieving in GPS Signal Acquisition
8,188,917	System and Method for Operating a GPS Device in a Micro Power Mode
8,176,107	Multi-Standard Multi-Rate Filter
8,111,791	Differential Evolution Design Of Polyphase IIR Decimation Filters
7,592,910	Matching System
7,466,778	Memory Efficient OFDM Channel Estimation and Frequency Domain Diversity Processing
7,432,810	Radio Frequency Tags For Use in a Motion Tracking System
7,423,602	Multiple-Point to Multiple-Point Communication System
7,009,561	Radio Frequency Motion Tracking System and Method
6,850,732	Scalable Satellite Data Communication System That Provides Incremental Global Broadband Service Using Earth-Fixed Cells
6,665,296	Network Access Communication System
6,157,642	Coding System and Method For Low-Earth Orbit Satellite Data Communication
6,157,621	Satellite Communication System

6,127,967	Low-Earth Orbit Satellite Acquisition and Synchronization System Using a Beacon Signal
6,011,951	Technique for Sharing Radio Frequency Spectrum in Multiple Satellite Communication Systems
5,995,841	Technique for Sharing Radio Frequency Spectrum in Multiple Satellite Communication Systems
5,936,570	Low-Earth Orbit Satellite Acquisition and Synchronization System Using a Beacon Signal
5,822,680	Frequency Sharing for Satellite Communication System
5,736,959	Earth-Fixed Cell Beam Management for Satellite Communication System Using Dielectric Lens-Focused Scanning Beam Antennas
5,678,175	Satellite System Using Equatorial and Polar Orbit Relays
5,548,294	Dielectric Lens Focused Scanning Beam Antenna for Satellite Communication System
5,408,237	Earth-Fixed Cell Beam Management for Satellite Communication System
5,379,224	GPS Tracking System
5,225,842	Vehicle Tracking System Employing Global Positioning System (GPS) Satellites
4,862,178	Digital System for Codeless Phase Measurement
4,849,961	Fast Sequencing Demodulation Method and Apparatus
4,706,286	Method and Circuit for Extraction of Doppler Information from a Pseudo-Noise Modulated Carrier
4,642,647	Signal Generator for Radio Navigation System
4,584,652	Apparatus and Method for Determining In-phase and Quardrature-phase Components

PUBLISHED US PATENT APPLICATIONS

20150186773	Searching Methods Using Genetic Responsivity Measurements
20150186468	Searching methods using genetic responsivity measurements
20140245014	Remote control app for smart phones

20140222832	Searching methods using genetic responsivity measurements
20120254272	Multi-Standard Multi-Rate Filter
20120207690	Searching Methods Using Genetic Responsivity Measurements
20110205115	Always on GPS Device
20110066857	Method For Secure Delivery Of Digital Content
20110021171	System And Method For Use Of Sieving In GPS Signal Acquisition
20100039316	System and Method for Operating a GPS Device in a Micro Power Mode
20080055049	Searching Methods
20070243537	Human Sample Matching System
20070206687	Memory Efficient OFDM Channel Estimation And Frequency Domain Diversity Processing
20070156800	Multi-Standard Multi-Rate Filter
20070153946	Differential Evolution Design Of Polyphase Iir Decimation Filters
20070069901	Matching System
20070057858	Multiple-Point To Multiple-Point Communication System
20060141929	Cellular Communication System
20060125691	Radio Frequency Tags For Use In A Motion Tracking System
20050136386	Distance Learning System
20040259496	Construction Project Data Distribution & Update System
20040178955	Radio Frequency Motion Tracking System and Method.
20040163135	Method For Securely Distributing & Updating Software
20030060156	Method For Securely Distributing & Updating Information
20030050008	Scalable Satellite Data Communication System That Provides Incremental Global Broadband Service Using Earth-Fixed Cells
20020085588	Method For Securely Distributing & Updating Digital Content
20020042919	Method For Utilizing Excess Communications Capacity